Appendix 2BB GEOTECHNICAL BORING LOGS

APPENDIX 2BB-1 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-01	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	ENT : Dietrich D-5	50 S/N 232, mud rotary, o	cathead, NWJ rods, 6 tri-	-cone bit		ORIENTATION : Vertical
<u>WATE</u> R	LEVELS	: 2 ft bgs	on 03/15	/07	START: 3/14/2007	END: 3/21/2007	LOGGE	R : R.	Bitely
				STANDARD		OIL DESCRIPTION			COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME II	SCS GROUP SYMBOL,	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ACE		RECOVE	RY (ft)		MOISTURE CO	NTENT, RELATIVE DEN	NSITY OR	l S	DRILLING FLUID LOSS, TESTS, AND
무유 도			#TYPE	6"-6"-6"	CONSISTENCY,	SOIL STRUCTURE, MIN	NERALOGY	₹	INSTRUMENTATION
41.6				(N)				107	"Water level is based on Ground Water
-								┨	Monitoring at LNP site (FSAR Table -
-								┨	2.4.12.08)" Water at 6' below ground surface
-								┨	
-								┨	-
-								┨	-
-								┨	-
-	3.5				Poorly Graded Sa	nd With Silt (SP-SM)		177	-
-		1.0	SS-1	5-4-3	3.5-4.5' - very pale	orange to moderate y		甘草	1 →
5	E 0	1.0	00-1	(7)	\ \ \ \ \ \ \ \ \	to 10YR 5/4), wet, loos 15% fines, nonplastic,	<10% root	1:1:	1
36.6	5.0				matter and organic	material, trace concre a sand and silt in an iro	etions up to $+$	1	Few dense lenses from 5.0-8.5', thin,
-					1/4 , very line since	a sanu anu siil iii ali iil	JII IIIAUIX	1	relatively consistent drilling rate (moderately rapid)
-								1	Tapiu)
-								1	-
-								1	-
-								1	-
-	8.5							1]
-	0.0	0.5	00.0	9-50/5	_ Limestone Fragme	ents		+	1
-	9.4	0.5	SS-2	(59/11")	8.5-8.75' - very pal	e orange, (10YR 8/2), zed, subrounded to and	strong HCl gular, up to	╁	Very hard from 9.0-12.5', possible limestone
10					\1"x1-1/2"		January 11 11	1	lenses, light chatter, extremely slow advancement rate
31.6					Silt (ML) 8.75-9.0' - gravish	orange, (10YR 7/4), m	oist to wet.		_
					hard, nonplastic, ra	apid dilatancy, mild to r	moderate]	
					sand, all carbonate	5% very fine to mediun e derived	n grained		
-]	
_]	
_								1	Relatively consistent from 12.5-28.5', moderately rapid drilling rate
-	13.5				0:14.14.14			 	-
_				27-17-4		ne Fragments (ML) ale orange, (10YR 8/2)	, wet, verv	4111	_
-		0.8	SS-3	(21)	¬ stiff, nonplastic, mi	ld to moderate HCl rea	action,	╫	-
15 <u> </u>	15.0				lenses (<1/2") at 13	o fine grained sand, 3 l 3.5', 13.7' and 14.0', al	l carbonate	-	-
20.0					derived`			-	-
-								-	-
-								-	-
-								-	-
-								-	-
-								1	-
-	18.5							╁╥	SS-4 actual sample depth is 18.5-20.0'
-		1.3	SS-4	40-54-50				$\ \ $	-
	20.0	1.0	JJ-4	(104)				$\ \ $	-
20	20.0							╫	
								1	



1	PROJECT NUMBER:	BORING NUMBER:					
ı	338884.FI	A-01	SHEET	2	OF	a	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

ORIENTATION · Vertical

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit WATER LEVELS: 2 ft bgs on 03/15/07 START: 3/14/2007 END: 3/21/2007 LOGGER: R. Bitely											
WATER	LEVELS	: 2 ft bgs	on 03/15	5/07 S	TART : 3/14/2007 END : 3/21/2007 LOGGER : R. Bitely						
				STANDARD	SOIL DESCRIPTION COMMENTS						
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
필유인		RECOVE	RY (ft)	TEGT NEGGETO	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR O DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND						
PTA NYA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY						
SU ELE				(N)							
21.6					Sandy Silt (ML)						
_					hard, nonplastic, rapid dilatancy, mild to moderate						
_					HCI reaction, 35-40% very fine to fine grained sand, all carbonate derived						
					all carbonate delived						
_											
	23.5										
					Sandy Silt With Limestone Fragments (ML)						
_		1.5	SS-5	17-24-31 (55)	23.5-25.0' - grayish orange, (10YR 7/4), wet, hard, -						
25	25.0			(55)	reaction, 20% fine to coarse gravel, limestone						
16.6	-				─ fragments are extremely weak rock (R0); similar to ───────────────────────────────────						
-					1						
-					11						
-					11						
-					11						
_					11						
_	28.5				11						
-	20.0	0.8	SS-6	34-50/3.5	Silty Sand With Limestone Fragments (SM) Slow advancement rate from 28.5-33.5' with						
-	29.3	0.8	55-0	(84/9.5")	28.5-29.25' - Same as 23.5-25.0' except 72% fine to medium grained sand, interbedded with limestone several dense lenses <0.5' thick, associated with light chatter						
30					lenses (<1/2") at 28.5-28.8' and intermittent						
11.6					throughout						
-					11						
-					11						
-					11						
-					1						
-					11						
-	33 5				† 						
-	33.5 33.7	0.2	SS-7	50/2.5	_ Limestone Fragments						
-				(50/2.5")	33.5-33.7' - grayish orange to dusky yellowish brown, (10YR 7/4 to 10YR 2/2), mild to moderate HCl						
25					reaction, gravel-sized limestone fragments up 1-1/2"						
35 6.6					diameter, sample includes 1/2" thick iron cemented						
-					lenses that have no HCl reaction						
-											
-					- 						
-					- 						
-					- 1						
-											
-	38.5										
-		1.1	SS-8	28-35-50/1 (85/7")	- Extremely dense from 39.0-46.0', slow						
	39.6			(0011)	drilling with light to heavy rig chatter						
40											
1											

APPENDIX 2BB-3 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-01	SHEET	2	OF	9	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

						ary, cameau, rivio rous, o m-				ONLINIATION: Veitical
WATER	LEVELS	: 2 ft bgs	on 03/15	5/07	START : 3/14/2007	END: 3/21/2007	LOGG	ER	: R.	
				STANDARD		SOIL DESCRIPTION			_O	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS					ΓÕ	
BEL ON			, ,	IEST RESULTS		E, USCS GROUP SYMBOL,			LIC.	DEPTH OF CASING, DRILLING RATE,
AT AT							DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
E.E.E.			#TYPE	6"-6"-6" (N)	CONSISTEN	CT, SOIL STRUCTURE, MIN	IERALUG1		ΣΫ́	INSTRUMENTATION
21.6				(11)	│ Sandy Silt (ML	1		7	0)	
					18.5-19.75' - ve	ery pale orange. (10YR 8/2	2), moist,	/-		=
I _					hard, nonplasti	 c. rapid dilatancy, mild to r 	noderate	11		<u>_</u>
						5-40% very fine to fine gra	ined sand,			
1 -					all carbonate d	enved		7		_
-								1		
-								⊢		-
_								4		=
I _	23.5									_
					Sandy Silt Wit	h Limestone Fragments (ML)			
1 -		1.5	SS-5	17-24-31	23.5-25.0 - gra	ayish orange, (10ŸR 7/4), v id dilatancy, moderate to s	vet, nard, trong HCI	1		_
25	25.0			(55)	reaction, 20% f	fine to coarse gravel, limes	stone	Ⅎ		
25 16.6	25.0				fragments are	extremely weak rock (R0);		7	Щ	-
					\18.5-19.75'			/ 4		
								_		
1 7					l			٦		1
-								-1		=
-								4		-
-					l			4		_
_	28.5									_
		0.8	SS-6	34-50/3.5		h Limestone Fragments (Slow advancement rate from 28.5-33.5' with
	29.3	0.0	000	(84/9.5")		ame as 23.5-25.0 except and sand, interbedded with li		/1		several dense lenses <0.5' thick, associated with light chatter
						at 28.5-28.8' and intermitte		/1		with light officer
30 <u> </u>					\throughout			\vdash		-
-								4		-
_								4		<u>_</u>
_								1		-
-								\exists		-
-					l			4		-
-	33. <u>5</u> 33.7		00.7	50/0.5	1:			_		_
		0.2	SS-7	50/2.5 (50/2.5")	Limestone Fra	igments ayish orange to dusky yello	wish hrown	力	Н	
]				(30/2.3)	(10YR 7/4 to 10	0YR 2/2), mild to moderate	e HCl			
35					reaction, grave	I-sized limestone fragment	ts up 1-1/2"	/1		1
6.6						ple includes 1/2" thick iron	cemented	\vdash		-
-					lenses that hav	e no HCl reaction		/ -		-
_					l			4		_
					l					
					l			1		1
-					l			+		-
-								4		-
-	38.5								,,,,	_
		1 4 4	000	28-35-50/1				J		
1 7	20.6	1.1	SS-8	(85/7")	l			7		Extremely dense from 39.0-46.0', slow
40	39.6				h			Ħ	ш	drilling with light to heavy rig chatter
40_					1			-		
			1		1					

APPENDIX 2BB-4 Rev. 4



WATER LEVELS: 2 ft bgs on 03/15/07

PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	A-01	SHEET	3	OF	9	

SOIL BORING LOG

LOGGER: R. Bitely

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

START: 3/14/2007

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

END: 3/21/2007

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

COMMENTS SOIL DESCRIPTION STANDARD Pog DEPTH BELOW SURFACE AND ELEVATION (#) PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SYMBOLIC SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND CONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION #TYPE 6"-6"-6" (N) 1.6 Sandy Silt With Limestone Fragments (ML) 38.5-39.58' - olive gray to light olive gray, (5Y 3/2 to 5Y 5/2), wet, hard, low to medium plasticity, slow to rapid dilatancy, moderate to strong HCl reaction, 35% fine to coarse grain sand, trace organic content, limestone interbeds at 38.5-38.7' and intermittently throughout 43.5 0.3 SS-9 50/3 Limestone Fragments 43.5-43.75' - light olive gray, (5Y 6/1), mild HCl (50/3")reaction, very fine to fine gravel, up to 3/4"x1/2" 45 $-3\bar{4}$ 48.5 Silty Sand (SM) Split spoon sample SS-10 actually advanced 28-50/2 48.5-48.8' - yellowish gray, (5Y 8/1), wet, very dense, 30% fines, nonplastic, mild to moderate HCl reaction, 0.3 SS-10 48.5-49.2 (78/8")fine to medium grained sand, 10% gravel-sized limestone fragments 50 Begin Rock Coring at 49.0 ft bgs -8.4 See the next sheet for the rock core log 55 -13.4 60

APPENDIX 2BB-5 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-01	SHEET	4	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing

ORIENTATION: Vertical

RECOVERY (%) S:			DISCONTINUITIES		7 LOGGER : R. Bitely LITHOLOGY	COMMENTS
OVERY (%)		S.		၅	LITHOLOGY	COMMENTS
OVERY (%	_	SII.	DECODIDION	4 × F		
	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		0		H	Limestone	Switch to NQ rock coring
R1-NQ 2.5 ft 88%	42	>10	49.55-49.65, 50.2-50.3' - Fracture zone (2), rough, undulating, with 1" openings — 50.45' - Mechanical break or fracture, 40 deg, rough, undulating, open <3/4" 50.75, 50.9' - Bedding plane or mechanical		49.0-51.2' - dark yellowish brown, (10YR 4/2), fine grained, extremely weak to very weak (R0 to R1), voids (<3/16") over 70% of surface except from 49.65-50.2' where voids (<1/16") cover <20% of surface,	tooling at 49.0', drive HW casing to 49', seat casing in <6" rock, flush casing with 3-7/8" tricone bit R1: 5 minutes
R2-NQ 5 ft 98%	82	0 2 0	break (2), <10 deg, rough, undulating, open <1/2" 53.0' - Mechanical break or fracture, <10 deg, rough, stepped to undulating, tight 53.8' - Mechanical break or fracture, <10 deg, rough, undulating, tight at fracture with		fossiliferous, cavities <1/2"x1/4" over <15% of surface, trace organics No Recovery 51.2-51.5' Limestone 51.5-56.4' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCI reaction, very weak to weak (R1 to R2), voids (<3/16") over 60-80% of surface, few cavities <1-1/2"x1" concentrated at	
	-	2 3	54.4' - Mechanical break — 55.0, 55.1' - Fractures, 35 deg, rough, undulating, tight — 56.0, 56.2' - Mechanical break or fractures,		53.8', fossiliferous	R2: 10 minutes
R3-NQ 5 ft	48	>10	56.5-56.8' - Fracture zone, rough, undulating, gravel-sized (<1-1/2"x1"), open 57.0, 57.3, 57.5' - Fractures (3), 50-90 deg, smooth, undulating, intersecting fractures, tight 58.7, 58.85, 59.5' - Bedding plane or		Limestone 56.5-60.4' - pale yellowish brown, (10YR 6/2), fine grained, very weak to medium strong (R1 to R3), voids (<3/16") over 85% of surface, fossiliferous, trace organics, extremely weak rock (R0) zones at	Water level at 1' below ground surface at 17:30, end drilling on 03/14/07 Water level at 2' below ground surface on 03/15/07 07:30
78%	-	>10 NR	tight 58.95' - Mechanical break 59.75-60.0' - Fracture zone, rough, undulating, gravel-sized fragments <1"diameter, open		50.5-50.8', 58.7', 58.85', 59.5', 59.75-60.0' No Recovery 60.4-61.5'	R3: 16 minutes
R4-NQ 5 ft 99%	98	0 1 0 0	61.3' - Bedding plane or mechanical break, rough, undulating, broken along weak bedding planes, tight 63.15' - Bedding plane, horizontal, rough, undulating, tight 63.5, 63.7, 63.95, 64.0, 64.05, 64.4, 64.45, 65.2' - Mechanical break (8)		Limestone 61.5-66.45' - pale yellowish brown, (10YR 6/2), very fine to fine grained, weak to medium strong (R2 to R3), voids (<3/16") over 60-80% of surface at 61.5-61.9', 62.5-62.8', 63.5-65.1' and 65.4-66.3', organic material as <1/4" thick laminations at 63.0-65.2' over 20% of surface; very weak rock (R1) at 62.7-63.1', 65.0-65.5' and 66.3', bioturbated with	_
R5-NQ		1 NR/ 3	66.7, 67.5, 68.2, 68.5, 70.2, 70.3, 70.55' - Mechanical break or bedding plane (7), <10 deg, rough, undulating, <1/4" openings 67.3' - Fracture, 70 deg and vertical, rough, stepped to undulating, tight		some secondary infilling at 65.5-66.3' No Recovery 66.45-66.5'	R4: 8 minutes Driller's Remark: Slight fluid loss in zone
28 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	2-NQ 5 ft 98% 3-NQ 5 ft 78%	2-NQ 5 ft 82 82 83-NQ 5 ft 82 98% 48-NQ 5 ft 98 99% 98	2.5 ft 38%	1.5 ft 42 2 2 50.45' - Mechanical break or fracture, 40 deg, rough, undulating, open <3/4" 50.75, 50.9' - Bedding plane or mechanical break (2), <10 deg, rough, undulating, open <1/2" 53.0' - Mechanical break or fracture, <10 deg, rough, stepped to undulating, tight 53.8' - Mechanical break or fracture with associated cavity 54.4' - Mechanical break or fracture with associated cavity 54.4' - Mechanical break or fracture, <10 deg, rough, undulating, tight at fracture with associated cavity 56.0, 56.1' - Fractures, 35 deg, rough, undulating, tight 56.0, 56.2' - Mechanical break or fractures, <10 deg, rough, undulating, open <1/2" 56.5-56.8' - Fracture zone, rough, undulating, gravel-sized (<1-1/2"x1"), open 57.0, 57.3, 57.5' - Fractures (3), 50-90 deg, smooth, undulating, intersecting fractures, tight 58.95' - Mechanical break (3), smooth, undulating, tight 58.95' - Mechanical break (3), smooth, undulating, tight 58.95' - Mechanical break obedding plane or mechanical break, rough, undulating, gravel-sized fragments <1"diameter, open 61.3' - Bedding plane or mechanical break, rough, undulating, tight 63.15' - Bedding plane, horizontal, rough, undulating, tight 63.5, 63.7, 63.95, 64.0, 64.05, 64.4, 64.45, 65.2' - Mechanical break (8) 66.7, 67.5, 68.2, 68.5, 70.2, 70.3, 70.55' - Mechanical break or bedding plane (7), <10 deg, rough, undulating, <1/4" openings 67.3' - Fracture, 70 deg and vertical, rough, stepped to undulating, tight	2-NQ 2-NQ 2-NQ 38% 42 2 50.45' - Mechanical break or fracture, 40 deg, rough, undulating, open <3/4" 50.75, 50.9' - Bedding plane or mechanical break (2), <10 deg, rough, undulating, tight 53.8' - Mechanical break or fracture, <10 deg, rough, undulating, tight associated cavity 54.4' - Mechanical break or fracture with associated cavity 54.4' - Mechanical break or fracture, <10 deg, rough, undulating, tight at fracture with associated cavity 54.4' - Mechanical break or fractures, <10 deg, rough, undulating, tight at fracture with associated cavity 56.5-56.8' - Fractures, 35 deg, rough, undulating, tight sociated (<1-1/2"\sqrt{2"}\sqrt{3"}\), open 57.0, 57.3, 57.5' - Fractures (3), 50-90 deg, smooth, undulating, intersecting fractures, tight solved by the solved	Soft 42 2 2 2 2 2 2 2 2

APPENDIX 2BB-6 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-01	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing

ORIENTATION : Vertical

				DENT : Dietrich D-30 3/N 232, mid fotaly, NQ tools, NV					ORIENTATION . Vertical
WATER	LEVELS : 2 f	t bgs (on 03/		/21/20	07	LOGGER : R. Bitely	_	
≥D €	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	ő	ᆫ	LITHOLOGY	[COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)			FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,		OUTE AND DEDTIL OF GARING
出병은		(%	35		- 1 ≥		MINERALOGY, TEXTURE,	- 1	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΞĔŚ	#FP.00	(%) О	PE	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	<u>B</u>		WEATHERING, HARDNESS,		SMOOTHNESS, CAVING ROD
989		Ø	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Į≥		AND ROCK MASS CHARACTERISTICS	- 1	DROPS, TEST RESULTS, ETC.
Δош		<u>~</u>		THOMASO, COM NOT ON MAINTO, MAD THOMASO	S	L		_	
	5 ft 92%	62	0		ш		Limestone	- 1	
70 -	92/0			69.45' - Fracture, 60 deg, smooth, undulating,	┰		66.5-71.1' - pale yellowish brown,	- 1	7
70 <u> </u>			3	tight	-		(10YR 6/2), very fine to fine grained, very weak to weak (R1 to R2), voids	- 1	
-20.4					\perp		up to 3/16" over 80% of surface,	- 1	
			1		\vdash		fossiliferous, trace laminated	- 1	R5: 7 minutes
-					╁		organics, very weak rock to weak	- 1	=
_	71.5		NR				rock at 66.5-67.0' and 70.0-71.1',	- 1	=
			4			1	medium strong rock (R3) at	- 1	
_			1		╨		69.0-70.0'	- 1	_
-				72.35' - Bedding plane, <10 deg, rough,	+ $-$		No Recovery 71.1-71.5'	- 1	-
_			5	undulating, 1/4" soil seam infill, open 1/2"			Limestone	- 1	_
				72.6, 72.85, 72.95' - Bedding plane or	\perp		71.5-76.3' - pale yellowish brown,	j	
-	R6-NQ			mechanical break (3), <10 deg, rough,	1		(10YR 6/2), very fine to fine grained, weak (R2) to medium strong (R3) at	j	7
-	5 ft	50	2	undulating, tight 73.7' - Mechanical break or bedding plane,	-		71.5-72.3', 72.7-73.7', and 74.2-74.7'	j	╡
Ι -	96%			15 deg, rough, undulating, open 1/4"	\Box		with voids (<3/16") over 80% of	j	
75			.	74.1' - Mechanical break or bedding plane,	\vdash		surface; extremely weak (R0) to very	j	
-33.4			3	horizontal, smooth, undulating, 1/4" infill,	1	t	weak (R1) at 72.3-72.7' and	j	
_				open 1/4"			73.7-74.2' with voids (<3/16") over	- 1	D0: 7
			5	74.8-75.2 and 75.5-76.0' - Clay seams (2),	_		30% of surface; extremely weak (R0)	- 1	R6: 7 minutes
	76.5			smooth, undulating, extremely weak rock	₽		to very weak (R1) interbeds from	- 1	
-	70.5		NR_	(R0) zones	+		74.7-76.0'; all fossiliferous No Recovery 76.3-76.5 '	- 1	-
_			2				Limestone	- 1	4
				77.0, 77.3' - Fractures (2), 60 deg and 50-90			76.5-79.5' - moderate yellowish		
				deg, rough, stepped to undulating, tight	┰	ſ	brown to very light gray, (10YR 5/4 to		_
-			3	77.95, 78.15, 78.3' - Fractures (3), <10 deg,		╊	N8), very fine to fine grained, weak to	- 1	03/20/2007 set NW casing
_				rough, stepped to undulating, tight	\perp		medium strong (R2 to R3), except		to 80' to free NQ tooling
	R7-NQ			78.65-79.0' - Fracture zone, rough, stepped	\vdash		extremely weak (R0) to very weak		to co to noo rea tooming
_	5 ft 77%	28	>10	to undulating, dissolution zone, angular to	1		(R1) rock at 78.1-78.3' and	- 1	03/21/2007 continue rock
-	1170			subangular gravel-sized fragments <1"			79.5-79.85'; 76.5-78.3' and 79.85-80.35' - 80% voids <3/16",	Н	coring from 81.5' below -
80			10	diameter	<u> </u>		fossiliferous (molds, casts);	Н	ground surface, 100%
-38.4				79.2' - Fracture, vertical, smooth, undulating,			78.3-79.0' - >90% voids <3/16",		circulation with NW casing
_				tight 79.35, 79.5' - Fractures (2), rough,	口		30-40% cavities up to 1/2"x1/4",		at 80' below ground -
-			NR	undulating, silt and/or clay sized infilling, tight	+-	Ł∖	highly fractured zone;		surface R7: 10 minutes
1 -	81.5			79.5-79.65' - Clay seam, 4-1/2" silt and/or	┲		79.0-79.5' - <20% voids <3/16",		TV. 10 Illinutes
			امدا	clay sized infilling, Elastic Silt (MH) to Lean			medium strong rock (R3)		
1 -			>10	Clay (CL), moderate plasticity, low dilatancy,	1—		Lean Clay - Elastic Silt (CL-ML)	j	7
-			\vdash	strong HCl reaction	╂╫		79.5-79.85' - medium plasticity, slow	Į	⊣
1 -			0	79.85' - Bedding plane, smooth, undulating,	\perp		dilatancy, strong HCl reaction	Į	_
				tight 81.5-81.7' - Fracture zone, rough, undulating,	—		No Recovery 80.35-81.5' Limestone	j	
1 -	R8-NQ			gravel sized fragments <1/2" diameter,	╁		81.5-86.0' - pale yellowish brown to	j	7
-	5 ft	76	1	angular to subangular	七		moderate yellowish brown, (10YR 6/2	j	-
I _	90%			82.25' - Fracture, 0-40 deg, rough,	\bot		to 10YR 5/4), very fine to fine	j	
85				undulating, open <1"	\vdash	ł	grained, mild to moderate HCl	j	
-43.4			>10	83.6' - Bedding plane, <10 deg, rough,	+		reaction, weak to medium strong (R2	j	SC-1 collected at 84.95-
-			<u> </u>	undulating, tight	亡		to R3), voids (<3/16") over 60-80% of		86.0'
I _			0	84.0' - Mechanical break	┵		surface at 81.5-83.0' and 84.5-86.0',	j	R8: 9 minutes
I -	86.5		NR	84.65-84.8' - Fracture zone, horizontal and	\vdash		fossiliferous (molds <1/2"x1/4"), dissolution cavities up to 2"x1/2" at	j	
1 -	00.0			20 deg, rough, undulating, fragmented rock, angular gravel sized fragments <1"diameter,	世		82.3', 84.65-84.8', 84.9-85.15' and	j	=
-			>10	open <2"	\perp		85.6-86.65'	j	=
				84.95' - Mechanical break, rough, undulating,	\vdash	1	55.5 55.55	j	
1 -				open <1/2"	┰ᆣ	ſ		j	7
-			0	86.75-86.95' - Fracture zone, rough,	仜	ŀ		j	Ⅎ
-			L	undulating, angular gravel sized fragments	4	ļ.		Į	_
	R9-NQ			<1-1/2" diameter, 2-1/2" open	\vdash	1		j	
					1				
1						1		j	
			i			1			

APPENDIX 2BB-7 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-01	SHEET	6	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2 ft	bgs o	on 03/	15/07 START : 3/14/2007 END : 3/2	21/200	D7 LOGGER : R. Bitely	
\$ □ \$	(%)			DISCONTINUITIES] ي	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
90_ -48.4	5 ft 98%	80	0	89.0' - Bedding plane, <10 deg, rough, undulating, open 1/4" -		Limestone - 83.0-84.5' - mild to moderate HCI reaction, mottled with zones of bioturbation having a secondary infill of a very fine, medium strong rock	 R9: 11 minutes
- -	91.5		2 NR) 1	90.95' - Bedding plane, horizontal, smooth, undulating, open <1/4" 91.25' - Mechanical break or bedding plane, 15 deg, rough, undulating, tight		(R3) matrix, voids (<3/16") over 30% of surface, secondary infilling of bioturbated zone consisting of 20-30% of surface, trace fossil molds No Recovery 86.0-86.5'	
-	R10-NQ		0	91.6' - Bedding plane, horizontal, smooth, undulating, tight 92.9' - Mechanical break		 Limestone 86.5-87.05' - moderate yellowish brown to very light gray, (10YR 4/2 to N8), very fine to fine grained, extremely weak to very weak (R0 to 	- - -
95 -53.4	5 ft 98%	82	1	93.85-93.95' - Fracture zone, rough, undulating, 3 fractures, open <1-1/2" 95.3' - Fracture, 75 deg, smooth, undulating,		R1), grayish blue mottling (5PB 5/2), voids (3/16") over 60-80% of surface from 84.5-86.0' and fossiliferous with trace organics 87.05-89.15' - Same as 86.5-87.05'	- - -
-	96.5		4 (NR) 1	ight 95.85-95.9' - Clay seam, horizontal, smooth, undulating, 3/4" clay infilling, Fat Clay (CH), medium gray (N5), moist, soft, high plasticity 96.05, 96.35' - Mechanical break or bedding		except very light gray (N8) and grayish blue (5PB 5/2) mottling, voids (3/16") over 50-60% of surface, fossiliferous (microfossils) 89.15-90.7' - fine grained, very weak	R10: 16 minutes -
- -	R11-NQ		2 ro	plane (2), <10 deg, rough, undulating, tight 96.85, 97.55' - Bedding plane, <10 deg, rough, undulating, tight 97.05, 99.0, 99.75, 101.05, 101.4' -		(R1), voids (<3/16") over 30-50% of surface, moderately fossiliferous 90.7-91.4' - Same as 86.5-87.05' except no mottling No Recovery 91.4-91.5'	SC-2 collected at 98.05- 99.0'
100 -58.4	5 ft 100%	98	0	Mechanical break (5) 98.0' - smooth, undulating, <1/2" silt and/or clay sized infilling —		 Limestone 91.5-96.4' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 7/2), very fine to fine grained, extremely weak to weak (R0 to R2) 	- - -
-	101.5		0	- 101.55, 102.65, 103.75' - Bedding plane or fractures (3), horizontal, smooth, undulating,		91.55-91.85' - fine grained, very - weak (R1), voids (<3/16") over 30-50% of surface, fossiliferous 91.85-94.6' - moderate HCI reaction, - voids (<3/16") over 60-80% of	R11: 8 minutes
-	R12-NQ		1	tight		surface, moderately fossiliferous (molds up to 1/2" x 1/4"), few cavities - <1/2" diameter, trace organics 94.6-96.4' - strong HCI reaction, gradual transition to >30% voids up	- - -
105 -63.4	5 ft 96%	86	0	104.0, 104.85' - Mechanical break		to 1/16", 1/4" diameter cavity with medium light gray (N6) clay infill No Recovery 96.4-96.5' — Limestone 96.5-101.5' - yellowish gray, (5Y 7/2),	- - -
-	106.5		>10 NR 0	105.5-105.6' - Fracture zone, rough, undulating, gravel sized fragments, <1" - diameter		very fine to fine grained, strong HCI reaction, extremely weak to very weak (R0 to R1), voids (<3/16") over 70-80% of surface, moderately fossiliferous (molds <1/2"x1/4"), trace	R12: 3 minutes -
-	R13-NQ		1	- - -		organics; 1/2" silt seam at 98.0, slow to fast dilatancy, low plasticity, carbonate material	- - -
	1110-110						

APPENDIX 2BB-8 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-01	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2 ff	bgs o	on 03/	15/07 START : 3/14/2007 END : 3/	21/200	D7 LOGGER : R. Bitely	
> 00	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	J.H.	(%) O	T.00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,) SOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ENGE	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Y.ME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ΔОШ	0 ⊒ <u>rc</u> 5 ft	≃ 70	⊥ <u> </u>	108.65' - Fracture, 75 deg, smooth,	S	Limestone	
_	100%	. •		undulating, tight	H	- 101.5-106.3' - yellowish gray, (5Y	-
110 <u> </u>			4	109.1, 109.15, 109.25' - Fractures (3), 90, 30, _ 50 deg, smooth to rough, undulating,	Ш	7/2), very fine to fine grained, strong HCl reaction, extremely weak to very	
-00.4				intersecting fractures from 108.7-109.5'	ш	 weak (R0 to R1), voids (<1/16") over 	P42: 40 minutes =
_			3	109.65' - Fractures, 65 deg and 70 deg, rough, undulating, tight	Ш	50% of surface, few cavities up to 1/2"x1/4", poorly to moderately	R13: 10 minutes
_	111.5			110' - Fracture, 75-85 deg, rough, undulating,	ш	- fossiliferous; 105.6-106.05' weak	_
_			0	tight, intersecting 110.5-110.65' - Fracture zone, 50 deg and 70	+	rock (R2) zone, voids (<3/16") over 70% of surface, moderately	_
_				deg, rough, undulating, open <1-1/2"	Н	- fossiliferous, moderate HCl reaction	_
_			0		H	at 105.6-106.05' No Recovery 106.3-106.5'	_
_				113.35, 114.0, 114.2, 115.2, 116.25, 116.5' -	Ш	Limestone	_
_	R14-NQ 5 ft	100	0	Mechanical break (6)	₽₩	106.5-111.5' - moderate yellowish brown to yellowish gray, (10YR 5/4 to	
-	100%				Щ	 5Y 7/2), very fine to fine grained, 	SC-3 collected at 114.2- 115.2' -
115_			0		Ш	strong HCl reaction, very weak (R1), voids (<3/16") over 60-80% of	_
-73.4					Н	 surface, moderately to highly 	
_			0	_	Ħ	fossiliferous (molds <1/4" diameter) concentrated at 106.5-107.7' and	R14: 7 minutes
	116.5			_	Н	_ 110.0-110.3', surface iron staining at	_
_			1	116.6' - Bedding plane, horizontal, smooth,		106.8', 107.8' and 109.5' 111.5-116.5' - yellowish gray, (5Y	_
_			·	undulating, tight	Н	_ 7/2), very fine to fine grained, strong	_
_			0		Ш	HCl reaction, very weak (R1), 40% voids to <1/16", poorly to moderately	_
_					ш	fossiliferous (molds <1/16"), iron	_
_	R15-NQ 5 ft	92	0	118.85, 119.85' - Mechanical break (2)	Ш	staining at 113.8', 114.6' and 115.7' - 116.5-119.0' - yellowish gray, (5Y	_
_	97%				Н	_ 7/2), very fine to fine grained, strong	_
120_			0	_	Ħ	HCl reaction, very weak to weak (R1 — to R2), voids (<3/16") over 60% of	_
-78. 4				100 5 100 01 5 1	Ħ	surface, poorly to moderately	D45 0
_			2	120.5-120.6' - Fracture zone, 25 deg and horizontal, rough, undulating, intersecting,	Ш	fossiliferous (molds <1/2"x1/4") - 119.0-121.35' - Same as	R15: 9 minutes
_	121.5		NR.	open <1"	₽₩	116.5-119.0' except 80% voids up to	_
-			1	121.9' - Bedding plane, horizontal, smooth,	H	3/16", few cavities up to 1/2" diameter, highly fossiliferous (molds	_
-				undulating, tight	Щ	<1/2") No Recovery 121.35-121.5'	-
-			0		Ш	- Limestone	_
-	D.(2.):2				\vdash	121.5-122.65' - Same as 119.0-121.35'	_
-	R16-NQ 5 ft	84	0		Ħ	 122.65-124.0' - pale yellowish brown, 	_
-	100%				H	(10YR 6/2), very fine to fine grained, very weak (R1), voids (<1/16") over	-
125_ -83.4			0	_	世	>50% of surface, poorly fossiliferous	_
-83.4					円	(molds up to 1/4" diameter), few cavities up to 1/2"x1/4"	D40: 0
-			>10	125.75-126.5' - Fracture zone, rough,	Щ	_ 124.0-126.5' - Same as	R16: 6 minutes
	126.5			undulating, gravel sized fragments <3"x1-1/2"	Ш	122.65-124.0' except voids up to 3/16" over 60-80% of surface.	_
_			2		Н	extremely weak rock (R0), highly	_
_				127.25, 127.45, 127.7, 131.3' - Bedding	用	fossiliferous below 125.75', friable	_
			1	plane, horizontal, smooth, undulating, tight	Ħ	_	_
				<u>.</u>	Ш	_	_
	R17-NQ			128.7, 129.0' - Mechanical break (2)	Н		

APPENDIX 2BB-9 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-01	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS : 2 ft	bgs o	on 03/	15/07 START : 3/14/2007 END : 3/	21/200	7 LOGGER : R. Bitely	_
≥0≎	_ (i)			DISCONTINUITIES	၂ ွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
130 -88.4	5 ft 100%	87	0	- - -		Limestone 126.5-131.5' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 60% of surface, poorly to moderately	- R17: 5 minutes
-	131.5		0			fossiliferous, few cavities <1/2" diameter, trace secondary infill of cavities, laminated bedding at 127.2', 127.85' and 128.95'	- - -
-	R18-NQ 5 ft 100%		0	133.05, 134.0, 135.2' - Mechanical break (3)		 131.5-136.5' - yellowish gray, (5Y 7/2), very fine to fine grained, very weak to medium strong (R1 to R3), 131.5-132.95' - voids <3/16" over 	SC-4 collected at 133.05- 134.0' -
- 135		100	0			40% of surface, poorly fossiliferous (molds <1/2" diameter); 132.95-136.5' - voids up to 3/16" over 70% of surface, highly fossiliferous	- -
-93.4 -			0	 - -		(molds <1/2"), molds over 30-50% surface	R18: 10 minutes
-	R19-NQ 5 ft 94%		1			136.5-141.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to fine grained, strong HCI	- - -
-			2	137.5' - Bedding plane, horizontal, smooth, undulating, tight 138.05, 138.45, 138.6' - Bedding plane, <10 deg, rough, undulating, tight		reaction, very weak to medium strong (R1 to R3), laminated bedding, 30-60% voids up to 3/16", poorly to moderately fossiliferous	-
- 140_ -98.4		86	0			 (molds <1/2"x1/4"), surface iron staining at 136.7', 137.7', 138.2', 139.1' and 140.5', laminated throughout 	- - -
-	141.5		>10 NR	140.9-141.2' - Fracture zone, rough, undulating, gravel sized fragments <2"		- - No Recovery 141.2-141.5'	R19: 8 minutes
-			>10	diameter 141.6-142.0' - Bedding plane (>10), <10 deg, smooth to rough, undulating, open <1/4" 142.0-142.65' - Fracture zone, rough,		Limestone 141.5-145.0' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 7/2), very fine to fine grained,	-
-	R20-NQ		>10	undulating, angular gravel-sized fragments <1-1/2" diameter 142.9, 143.3, 143.65, 144.15, 144.25, 144.5,		- 141.5-142.0' - moderate yellowish brown, very weak to weak rock (R1-R2), voids (<3/16") over 70% of	-
145_	5 ft 70%	23	4 >10	144.7' - Fractures (8), <10 deg, rough, undulating, <1/2" openings 144.7-145.0' - Fracture zone, rough,		 surface, moderately fossiliferous, trace organics, trace laminated bedding; 142.0-145.0' - voids up to 3/16" over 	Core barrel malfunction
-103 <u>.4</u> -	146.5		NR	undulating		50% of surface, medium strong rock (R3), highly fossiliferous (molds - <1"x1/2"), cavities <1.5"x1", several cavities with secondary mineral infill,	from 144.7-145.0' due to rock fragments wedged in – bit – R20: 10 minutes
-	170.0		2	146.6' - Bedding plane, <10 deg, rough, undulating, open <1/4" 146.8, 147.8' - Bedding plane (2), horizontal, smooth, undulating, tight		heavily bioturbated No Recovery 145.0-146.5'	- - -
-	R21-NQ		1			- -	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-01	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing ORIENTATION : Vertical

CORING	NIE I NOD AI	ND E	JUILIA	/IENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW	/ ПVV	cas	ing	ORIENTATION : Vertical
WATER	LEVELS : 2 f	t bas	on 03/	15/07 START : 3/14/2007 END : 3	/21/20	007	LOGGER : R. Bitely	
			50/	DISCONTINUITIES		Ť	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			<u> </u>	- 69	\vdash		33E1110
NA N	ΣΑΣ	_	FRACTURES PER FOOT	DESCRIPTION	ا ا		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	B.F.Ř	(%) Q	<u> </u> 58	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
투유X	# 50 00	αD	R _F	PLANARITY, INFILLING MATERIAL AND	Ψ̈́		AND ROCK MASS	SMOOTHNESS, CAVING ROD
SU	Sää	R	F.F.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY		CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	5 ft	80	1	148.95' - Bedding plane, horizontal, rough,	+	٠	Limestone	
_	86%			undulating, open <1/4"		1	146.5-150.8' - moderate yellowish	-
150			0	_	ш	Ł	brown to yellowish gray, (10YR 5/4 to	
-108.4			"		\vdash	T	5Y 7/2), very fine to fine grained, mild	
-	1		0		亡	1	to moderate HCl reaction, laminated	R21: 13 minutes
-	-		NR		+	╁	bedding, 146.5-148.9' - weak to medium strong rock (R2-R3), voids	-
I _	151.5		INIX		\bot	1	(<3/16") over 30% of surface, voids	_
							increase to 80% from 148.3-148.9'	00 5 11 1- 1 454 05
_	1		1	151.85' - Bedding plane, horizontal, rough,	╨	╁	148.9-150.8' - very weak rock (R1),	SC-5 collected 151.85- 152.8'
-	-			undulating, tight	+	╁	voids (up to 3/16") over 60% of	132.0
_			1			1	surface, moderately fossiliferous	_
1					\vdash	L	(casts) concentrated at 148.9-150.0 No Recovery 150.8-151.5'	_
1 -	R22-NQ			153.45-153.55' - Clay seam or bedding		T	Limestone	1
1 -	5 ft	92	0	plane, horizontal, smooth, undulating, 5/8" silt	1	┲║	151.5-153.45' - Same as	-
1 -	100%			and/or clay sized infilling, tight	+	╁╵	148.9-150.8' except very weak (R1)	-
155_			0	_	ഥ		Silty Sand (SM)	
-113.4			"		\vdash	Г	153.45-153.55' - wet, loose, silt has	
-	1			455 05 450 051 Padding plans (0) 440 day	++	t	rapid dilatancy, 50% fine to medium	R22: 14 minutes
-	-		2	155.65, 156.35' - Bedding plane (2), <10 deg, smooth, undulating, tight	-	₽	grained sand, calcareous, 1/4" thick lense	-
<u> </u>	156.5			Smooth, undulating, tight	\perp	L	Limestone	_
				156.7, 156.8, 156.9' - Bedding plane (3), <10	\vdash	1	153.55-156.5' - pale yellowish brown	
-	1		3	deg, smooth, undulating, tight		t	to yellowish gray, (10YR 6/2 to 5Y	-
-	-			2-3, 22, 22	+	₽	7/2), very fine to fine grained,	_
_			0		┵	╁	moderate to strong HCl reaction,	_
			ਁ	4-0-0-4-0-4-0-1-4-1-4-1-4-0		1	medium strong (R3), 50-70% voids	
_	R23-NQ			158.35, 158.6, 159.7' - Mechanical break (3)	1	1	up to 3/16", poorly to moderately fossiliferous, laminated bedding	-
-	5 ft	92	0		+	╁	concentrated at 155.0-156.5', few	-
I -	100%				\perp	1	cavities <1/2"x1/4", 1 large	_
160						1	(3/4"x1/2") cavity at 156.4'	
-118.4	1		0	_	┰	Г	156.5-161.5' - pale yellowish brown,	
-	-				\pm	Ŧ	(10YR 6/2), very fine to fine grained,	R23: 7 minutes
_			1	160.65' - Bedding plane, <10 deg, smooth,	+	+	moderate to strong HCl reaction, weak to very weak (R2 to R1), 60%	-
_	161.5			undulating, tight	┵	Ł	voids up to 3/16", moderately	Water level at 5' below
						$I \setminus$	fossiliferous (molds 3/4"x1/2"	ground surface on
_	1				1		diameter), trace organics, trace	\3/21/2007 at 18:30
-	-				-	H١	secondary infill and silt-sized	-
_					1		carbonate material at 158.35-158.5'	_
							and 160.5', medium strong rock (R3) lense at 158.7-159.7', laminated	
1 -]				1	r	bedding at 156.5-156.9' and	_
1 -	-				1	F	160.5-160.9'	-
-					4	F	Bottom of Boring at 161.5 ft bgs on	-
1						L	3/21/2007	
1					1			_
1 -	1				1	F		-
1 -					-	F		-
1 _					1	L		_
1						1		
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	1	OF	13	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ and NWJ rods, 6 tri-cone bit ORIENTATION: Vertical WATER LEVELS: 1.5 ft bgs on 03/22/07 START: 3/22/2007 END: 4/5/2007 LOGGER: R. Bitely SOIL DESCRIPTION COMMENTS STANDARD DEPTH BELOW SURFACE AND ELEVATION (#) PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SYMBOLIC SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND CONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION #TYPE 6"-6"-6" (N) 41.6 Poorly Graded Sand With Organics (SP) "Water level is based on Ground Water 0.0 0.0-0.2' - grayish black, (N2), moist, loose, very fine to Monitoring at LNP site (FSAR Table 2-2-4 SS-1 1.1 fine grained, no HCl reaction, sand is silica, trace (6) nonplastic fines, 20% fine organics Water level at 1.5' below ground surface 1.5 SS-1 collected with hammer only, hammer Poorly Graded Sand (SP) stem is AWJ rod, NWJ used below SS-1 0.2-1.1' - medium light gray, (N6), moist, loose, very 6" tri-cone roller bit used with mud rotary to fine to fine grained, sand is silica, trace nonplastic fines, 10% organics and roots open bore hole, rapid drilling from 0-10' below ground surface 5.0 36.6 Silty Sand (SM) 5.0-5.9' - light olive gray, (5Y 6/1), wet to moist, 3-4-7 0.9 SS-2 medium dense, slow dilatancy, no HCl reaction, fine (11)sand, 22% low plasticity fines 6.5 10 10.0 10.3 31.6 0.3 SS-3 50/3 Silt With Sand (ML) Extremely slow drilling rate 10.0-14.5' 10.0-10.25' - dusky yellow, (5Y 6/4), wet, hard, low to medium plasticity, rapid dilatancy, mild to moderate (50/3")HCl reaction, 25% sand sized grains, trace iron-rich concretions at 10.25', carbonate material with some silica grains (possibly slough) Rapid drilling 14.5-20' 15 15.0 $26.\bar{6}$ 15.0-16.3' - moderate yellow, (5Y 7/6), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 14% fine to medium sand sized grains, carbonate 21-30-25 SS-4 1.3 (55) 16.5 derived 20



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-02	CHEET	2 OF 13

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ and NWJ rods, 6 tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 1.5 ft bo	gs on 03/2	22/07	START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely
>00				STANDARD	SOIL DESCRIPTION COMMENTS
AND S	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SOILMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE ACE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
21.6	20.0	0.1	SS-5	50/2.5	Limestone Fragments
				(50/2.5")	\ \ \ 20.0-20.1' - grayish yellow, (5Y 8/4), mild HCl reaction, rock fragments to 1/2" with 60% coverage of \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
					voids to 1/16" Rapid drilling with intermittent dense zones 21-35'
_					
_					
-					-
-					
-					- 1
25	25.0				1
16.6	25.4	0.4	SS-6	50/5 (50/5")	Silt With Interbedded Limestone Lenses (ML) \[\sum_ 25.0-25.4' - dark yellowish orange, (10YR 6/6), wet, \[\sum_ \frac{1}{2} \]
_				(30/3)	\ hard, nonplastic, rapid dilatancy, mild to moderate
_					HCI reaction, limestone lenses <1/2" thick, voids -
_					- 1
-					
-					†
-					1
]
30	30.0				
11.6		1.0	SS-7	15-30-50/3	Silty Sand (SM) 30.0-31.0' - dark yellowish orange, (10YR 6/6), wet,
-	31.3	1.0	33-7	(80/9")	very dense, fine to coarse grained, moderate HCl ☐ reaction, 49% nonplastic fines, 1" thick limestone
-					lense at 30.4', few limestone lenses <1/4" thick interbedded throughout, carbonate derived
-					liner bedded till odgriodt, carbonate derived
-					1
] [
-					.
-					
35 6.6	35.0			45 50/0 5	Silty Sand (SM) Moderate to heavy chatter increasing with
-	36.0	0.8	SS-8	15-50/2.5 (65/11.5")	35.0-35.8 - Same as 30.0-31.0' except a few siltier depth, moderate to slow drilling 35-40' lenses <1/2" thick, no limestone lenses
-	55.0				(STOSS THE WHISH, HE HITTERS TO THE STORY OF
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+0_					



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-02 SHEET 3 OF 13

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ and NWJ rods, 6 tri-cone bit ORIENTATION: Vertical

	RILLING WE I HOD AND EQUIPMENT. Dietrich D-50 S/N 252, Hidd Totally, Cathead, AWJ and NWJ 1008, 6 th-core bit ORIENTATION. Vehical								
WATER	LEVELS	: 1.5 ft b	gs on 03/2	22/07 S	START : 3/22/2007	END : 4/5/2007	LOGGE	R : R.	
>				STANDARD		SOIL DESCRIPTION		Ď	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
ᆱᆼ		RECOVE	ERY (ft)			IE, USCS GROUP SYMBOL E CONTENT, RELATIVE DE		Ę	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MII		MB	INSTRUMENTATION
SU				(N)				λ	
1.6	40.0	0.1	_SS-9_/	50/1	Limestone Fra		(5)(7/0	Т	Drilling stops at 17:30 on 03/22/2007
				(50/1")	to 5Y 5/2) mod	llowish gray to light olive g derate to mild HCl reactior	ray, (51 7/2	1	Water/mud level 0.5' below ground surface
-					<1-1/2" x 1/2" i		i, iiugiiiciiio	1	at 07:30, 3/23/07
-								1	Continue drilling from 40' with mud rotary NWJ rod and 6" tri-cone bit at 08:00 on
-								1	03/23/2007 -
-								4	Extremely slow drilling, light to moderate chatter 40-44'
_								1	Challer 40-44
_								1	_
								1	44.0-45.0' Drill rate increases slightly 40-44'
45	45.0							1	1
-3.4	10.0				Sandy Silt (ML	L)		1111	Rapid drill rate 45-55'
-		1.3	SS-10	37-50-48	45.0-46.3' - ligh	ht olive gray, (5Y 5/2), wet bid dilatancy, mild to mode	, hard,	$\parallel \parallel$	-
-		1.0	00 10	(98)		fine to coarse grained san		$H \cap H$	-
-	46.5							\top	-
_								4	-
-								4	-
_								1	_
								1	1
50	50.0							1	1
-8.4	00.0				Sandy Silt Wit		_	1111	1
-		1.3	SS-11	12-24-30		oderate olive brown, (5Y 4, bid dilatancy, moderate to s		1111	<u> </u>
-				(54)	reaction, 30%	sand sized grains, 20% gr	avel sized	$H \cap H$	-
-	51.5				∖ grains, few ext	tremely weak (R0) rock lim		\mathbf{T}	-
-					\lenses <1/2" th	nick, carbonate derived		4	-
_								4	-
_								1	_
l _								1	_
]								1]
55	55.0			l				1	1
-13.4	23.0	0.8	SS-12	50-50/3	Sandy Silt Wit	th Gravel And Limestone	(ML)	1111	HW casing set to 55', clean out casing with
-	55.8	0.0	33-12	(100/9")	55.0-55.5' - Sa	ame as 50.0-51.3' except n n, (10YR 5/4), limestone fi	noderate	Ш	3-7/8" tri-cone to 56'
-					<1-1/2" x 1/2" t			1	Rock coring begins at 56.5', no sampling
-					Silt (ML)			1	from 56.0-56.5'
-						oderate yellowish brown, (1	-
-					strong HCl rea	iction, 10-15% very fine to		-	-
-						arbonate derived		4	-
-					Begin Rock Co	oring at 56.5 ft bgs sheet for the rock core log		4	_
					OCC LIC HOALSI	and a for the rook done log		1	
_									
60								L	

APPENDIX 2BB-14 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-02	SHEET	4	OF	13

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bgs	s on 03	3/22/07 START : 3/22/2007 END : 4/9	5/2007	7 LOGGER : R. Bitely	
≥∩≎	. (9			DISCONTINUITIES	ဥ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	D (%)	TUS -	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Lic	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ОΩШ		ď	ΞΔ	THIORNESS, SON ACE STAINING, AND HOTTINESS	S		
_	56.5		1	<u>-</u>	Ш	Limestone 56.5-60.8' - pale yellowish brown to	_
_				57.1' - Fracture, 30 deg, smooth, undulating, <1/4" open	Н	moderate yellowish brown, (10YR 6/2	_
_			1	< 1/4 Open	Щ	to 10YR 5/4), very fine to fine grained, mild to moderate HCl	<u> </u>
			Ċ	58.35, 58.5, 58.75' - Fractures (3), <10 deg,		reaction, very weak to medium	_
	R1-NQ 5 ft	74	2	rough, undulating, <1/4" open	\vdash	strong (R1 to R3), voids (<3/16") over 70% of rock surface from	
	86%	74	_	58.95' - Mechanical break		56.5-58.2', voids (<3/16") variable	
60			2	50 051 Fracture (2) 60 dec and 20 dec		from trace to 50% of rock surface from 58.2-60.8', trace organics,	
-18.4				59.85' - Fracture (2), 60 deg and 30 deg, — smooth, undulating, intersecting fractures	Ш	moderately fossiliferous, few	
			0	<u> </u>		molds/casts <1/4", many molds/casts = <3/16"	R1: 13 minutes
	61.5		NR			- <3/16 56.5-58.2; 58.9-60.5' - weak to	1
_	01.0			61.7' - Fracture, <10 deg, rough, undulating,	\vdash	medium strong (R2 to R3)	1
-			2	<1/2" open		58.2-58.9; 60.5-60.8' - very weak (R1)	1
-				62.1' - Fracture, 15 deg, rough, undulating,	ш	No Recovery 60.8-61.5'	1 1
-			>10	<1" open 62.6' - Fracture, 70 deg, smooth, undulating,	\vdash	Limestone 61.5-66.0' - moderate HCl reaction,	1 1
_	R2-NQ			tight -	ш	extremely weak to medium strong	1
-	5 ft	76	1	62.9' - Fracture, <10 deg, rough, undulating, _ <1-1/2" open	+	 (R0 to R3), trace organics throughout, organic lense at 62.9' 	1
	90%			63.7' - Fracture, <10 deg, rough, undulating,	+	<1-1/2" thick (laminated), voids	-
65 -23.4			2	<1" open 64.0, 64.5' - Mechanical break (2)		(<3/16") over 70% of surface from 61.7-63.7', voids (<1/16") over 20%	_
				64.7' - Fracture, <10 deg, rough, undulating,	+	of surface from 63.7-66.0',	R2: 11 minutes
-			0	tight 65.35' - Fracture, <10 deg, smooth,	\vdash	_ moderately fossiliferous with molds <3/16", few cavities (1" x 1/2")	TZ. 11 minutes
_	66.5		NR	undulating, tight	\Box	= 61.5-61.7; 62.9-63.7' - extremely	1 -
_			0	-	\Box	weak to very weak (R0 to R1)	1 -
_				-	\vdash	61.7-62.9; 64.2-66.0' - weak to medium strong (R2 to R3)	1 -
_			0	67.8, 68.9, 70.8, 71.25' - Mechanical break		No Recovery 66.0-66.5	1
_				(4)	Ш	Limestone - 66.5-71.4' - moderate yellowish	_
_	R3-NQ 5 ft	98	0	_	Н	brown, (10YR 5/4), very fine to fine	
_	98%			_	Ш	grained, moderate HCl reaction, very weak to medium strong (R1 to R3),	
70			0			trace laminated bedding, trace	
-28.4					\mathbb{H}	organics, voids (<3/16") variable for 0-50% of rock surface, poorly	
			0		口	fossiliferous	R3: 12 minutes
	71.5				\Box	66.5-68.4, 70.0-71.5' - very weak (R1)	1
			NR)		Н	68.4-70.0' - weak to medium strong	1
1 7			0	-		R2 to R3) No Recovery 71.4-71.5'	1 1
					ТЩ	Limestone	1 1
			0	72.85' - Fracture, 65 deg, rough, undulating, tight	Ш	71.5-72.3' - pale yellowish brown to moderate yellowish brown, (10YR 6/2	SC-1 collected at 72.9-
	R4-NQ				\mathbb{H}	to 10YR 5/4), very fine to fine	17.0
-	5 ft 95%	84	1	74.0' - Mechanical break	囯	grained, moderate HCl reaction,	1
75	0070			74.35' - Fracture, 15 deg, smooth, undulating, tight	Ш	weak to medium strong (R2 to R3), voids (<3/16") over 40-50% of rock	1
-33.4			0		+	surface, fossiliferous with molds	
-				-	Ħ	_ <1/4", trace secondary infilling	R4: 15 minutes
-	76 5		0	-	H	-	-
	76.5				╂╫		-
					•		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	5	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bgs	s on 0	3/22/07 START : 3/22/2007 END : 4/9	5/200	7 LOGGER : R. Bitely	
≥∩ ∷	6)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
 	R5-NQ 5 ft 100% 81.5	60	NR) 0 >10 1 2 3	77.65' - Fracture zone (>5), rough, undulating, <1" open 77.85' - Fracture, 60 deg, rough, undulating, <1/2" open 78.5' - Fracture, 25 deg, smooth, undulating, tight 78.85' - Bedding plane, <10 deg, smooth, undulating, tight 79.0' - Mechanical break 79.6' - Fracture, horizontal, rough, undulating, tight 80.45' - Fracture, 40 deg, rough, undulating, tight 80.7' - Fracture, horizontal, rough, undulating, tight		Silt (ML) 72.3-72.8' - moist, nonplastic, rapid dilatancy Limestone 72.8-76.25' - Same as 71.5-72.3' except voids (<3/16") over up to 80% of surface No Recovery 76.25-76.5' Limestone 76.5-77.0' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 50% of rock surface, trace black organics Silt (ML)	R5: 11 minutes
85_ -43.4	R6-NQ 5 ft 88% 86.5	74	0 2 2 0 NR	tight 80.85' - Fractures (2), horizontal and 30 deg, intersecting, tight 81.75' - Fracture, 15 deg, rough, stepped, tight 83.5, 83.8' - Fractures (2), 15 deg, rough, undulating, to stepped, tight 84.0' - Mechanical break 84.65' - Fracture, 50 deg, rough, undulating, tight 85.15' - Fracture, horizontal, rough, undulating, <1" open		77.0-77.3' - moderate olive brown, (5Y 4/4), moist, nonplastic, firm to hard, trace lignite Limestone 77.3-78.15' - Same as 76.5-77.0' Silt (ML) 78.15-78.25' - Same as 77.0-77.3' Limestone 78.25-81.5' - Same as 76.5-77.0' except 1/4" clay lense at 78.8', medium dark gray (N4), plastic, with organics, calcareous, extremely	
	R7-NQ 5 ft 75%	56	>10 0 >10 2 NR	86.65-86.75' - Fracture zone, rough, undulating, <1-1/2" open 87.05' - Mechanical break 88.85-89.05' - Fracture zone, rough, undulating, <3" open 99.85' - Fracture, 80 deg, rough, undulating, tight 90.05' - Fracture, 55 deg, rough, undulating, <1/2" open		weak to very weak (R0 to R1) from 78.25-79.95' with trace voids and laminated bedding at 78.8' 79.5-81.5' - weak to medium strong (R2 to R3), voids (<3/16') over 50-80% of surface, few cavities (1-1/2" x 1/2"), some cavities with secondary infilling 81.5-85.9' - very pale orange to moderate yellowish brown, (10YR 8/2 to 10YR 5/4), very fine to fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), voids (<3/16') covering 20-70% of surface at 81.5-83.5' and 83.8-84.9' increasing with depth, with secondary	SC-2 collected at 87.05-87.8'
 95 -53.4	R8-NQ 5 ft 98% 96.5	95	1 0 1 0	92.3' - Bedding plane, horizontal, rough, undulating, silt and/or clay sized infilling, <1/4" open 93.15' - Mechanical break		infilling, bioturbation accounts for 30% of surface area 83.5-83.8' - extremely weak to very weak (R0 to R1), with elastic silt laminations and organics No Recovery 85.9-86.5'	R8: 11 minutes Stop coring on 03/23/2007

APPENDIX 2BB-16 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	6	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bas	s on 0	3/22/07 START : 3/22/2007 END : 4	/5/200	7 LOGGER : R. Bitely	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A BE	TH. /	(%) _Q	TUR 100	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPTI URF,	ORE ECO	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND	ΥMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
교교교	ō H R	α.		THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	, , , , , , ,
_			(NR) 0	96.8, 98.75, 99.0, 99.2' - Mechanical break	上	Limestone - 86.5-90.25' - moderate yellowish	
_			Ţ	(4)	\bot	brown to pale yellowish brown,	Resume coring at 08:00 on 03/24/2007 -
_			0		\perp	(10YR 5/4 to 10YR 6/2), very fine to fine grained, moderate to strong HCl]
l _			U			reaction, weak to medium strong (R2	Water level at 1' below ground surface
l _	R9-NQ 5 ft	100	0		\bot	to R3), voids (<3/16') over 50-80% of rock surface, highly fossiliferous with	ground surface
	100%	100	U			molds (1/4" diameter), trace	
100)			organics, trace laminated bedding, — few cavities (<1-1/2" x 1"), extremely	
-58.4			0	_	\mathbb{H}	weak (R0) to very weak (R1) from	
1 -					\perp	86.5-86.56'	R9: 6 minutes
	101.5		0		世	No Recovery 90.25-91.5' Limestone	1
-					1	91.5-96.4' - yellowish gray to	1 1
-			0		二	moderate yellowish brown, (5Y 8/1 to 10YR 5/4), very fine to fine grained,	1 1
-					\perp	moderate to strong HCl reaction,	1
-			0		+	very weak to weak (R1 to R2), voids (<3/16") over 70% from 91.5-92.3'	1
-	R10-NQ				1	and 94.7-96.4', voids (<3/16") over	1
_	5 ft 98%	98	0	104.0, 106.35' - Mechanical break (2)		10-30% of surface from 92.3-94.7'; cavities <1-1/2" x 1/2" partially infilled	1
405	90%			,	+	with silt; clay lense from 94.0-94.05'	1
105_ -63.4			0	-	+	(elastic silt to fat clay, CH-MH, grayish olive (10YR 4/2),	_
-					\pm	calcareous); fossiliferous especially	R10: 11 minutes
-			0		+	at 94.7-96.4' No Recovery 96.4-96.5'	-
_	106.5		NR,	100 01 5 1 (0) 11 1 1 1 1	\perp	Limestone	-
-			1	106.6' - Fracture (2), vertical and horizontal, rough, undulating, <1/2" open	$-\Box$	96.5-101.5' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to	-
-					+	 strong HCl reaction, very weak to 	-
-			4	107.7, 108.0, 108.25' - Fractures (4),	\Box	weak (R1 to R2), voids (<3/16") over 50% of rock surface, trace laminated	-
-	D44 NO			horizontal and 80-90 deg, rough, undulating, four intersecting fractures, tight	片	- bedding, moderately to highly	Drillorle Demorts: 20, 400/
_	R11-NQ 5 ft	42	5	108.65, 108.8, 108.9, 109.05, 109.15' -	世	fossiliferous with molds <1/2", few cavities 1" x 1/2"	Driller's Remark: 30-40% loss of circulation at 108.5'
-	99%			Fractures (>5), horizontal and 80-90 deg, rough, undulating, intersecting fractures, tight	\perp	- 101.5-106.4' - Same as 96.5-101.5'	
110_			4	109.6, 109.7, 109.8, 109.95, 110.1, 110.3,	\perp	except strong HCl reaction, trace]
-68.4				110.6, 110.7' - Fractures (>8), horizontal and 80-90 deg, rough, undulating, intersecting	上	organic lenses <1-1/2" x 1/4", few - cavities <3/4" x 1/2"]
-			5	fractures, tight	\perp	No Recovery 106.4-106.5'	R11: 5 minutes
_	111.5			111.1, 111.2-111.9' - Fracture zone (2),	片	Limestone - 106.5-111.45' - yellowish gray, (5Y]
_			(NR) 1	horizontal and 75-90 deg, rough, undulating, tight	片	7/2), very fine to fine grained, strong]
_				-	\vdash	HCl reaction, extremely weak to very weak (R0 to R1), voids (<3/16") over]
			>10	112.45, 112.65, 112.7, 113.0' 113.1, 113.25' 113.6, 113.7, 113.8'5, 115.3' 115.65' -	Т	50-70% of rock surface, trace	
				Bedding plane (17), <10 deg, rough,	上	laminated bedding, moderately fossiliferous with molds <1/4" in	1
	R12-NQ		7	undulating, tight to 1/4" open 112.6, 112.7, 113.2, 113.3' - Fractures (4),	\bot	diameter	1
	5 ft 100%	68	7	60-70 deg, rough, undulating, intersecting	\perp	No Recovery 111.45-111.5' Limestone	1
115				fractures, tight	世	111.5-116.5' - Same as	SC-3 collected at 114.4-
-73.4			1	_	╨	106.5-111.45' except poorly to moderately fossiliferous, fossil	110.0
					\blacksquare	casts/molds <1/2" x 1/4", laminated	R12: 5 minutes
_	116.5		1		世	bedding over <30% of rock surface	1 1

APPENDIX 2BB-17 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	7	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bgs	on 0	3/22/07 START : 3/22/2007 END : 4/9	5/200	7 LOGGER : R. Bitely	
≥∩≘	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
 120 -78.4	R13-NQ 5 ft 94%	82	1 1 0 2 >10	116.6' - Fracture, 60 deg, rough, undulating, tight 118.05' - Bedding plane, horizontal, rough, undulating, <1/4" open 120.0' - Fracture, 75 deg, rough, undulating, <1/4" open		Limestone - 116.5-121.2' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 30-70% of rock surface increasing with depth, moderate to highly fossiliferous increasing with depth, fossil molds/casts <1/2" in diameter, several cavities (<1-1/2" x 1/2"), trace secondary infilling and organics	
- - - - 125 -83.4	121.5 R14-NQ 5 ft 96%	82	1 10 0 0	121.0-121.3' - Fracture zone, rough, undulating, <1-1/2" angular gravel sized rock fragments 121.8' - Fracture, horizontal, rough, undulating, <1/2" open 122.55, 122.65, 122.8, 122.9, 123.05' - Bedding plane (5), <10 deg, smooth, undulating, tight to 1/4" open 122.65, 122.95' - Fractures (2), 80 deg and vertical, rough, undulating, tight 123.85, 124.5, 124.7' - Mechanical break (3)		No Recovery 121.2-121.5' Limestone 121.5-123.0' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), very fine to fine grained, strong HCI reaction, very weak to weak (R1 to R2), voids (<3/16") over 30-50% of rock surface, laminated bedding over 20% of surface from 123.0-125.0' with trace secondary infilling and poorly fossiliferous 123.0-125.0' - Same as 121.5-123.0' except granular texture up to medium grained, very fossiliferous, fossil	Possible loss of circulation, 100% loss of circulation as R14 proceeded
	126.5 R15-NQ 5 ft 100%	100	1 NR 1 0 0 1 1 0	125.65' - Bedding plane, horizontal, smooth, undulating, tight 127.0' - Fracture, 60 deg, rough, undulating, tight 127.7' - Bedding plane, 15 deg, smooth, undulating, tight, possible mechanical break		casts/molds <1' x 1/2" 125.0-126.3' - Same as 121.5-123.0' No Recovery 126.3-126.5' Limestone 126.5-131.5' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), laminated bedding from 127.35-127.7', voids (<3/16") over 10-40% of rock surface especially from 126.5-127.35' and 130.35-131.5', poorly to moderately fossiliferous, few fossil molds/casts <1/2" x 1/4", trace secondary infilling, trace cavities <3/4" x 1/2"	SC-4 collected at 130.4- 131.5'
- - - - 135 -93.4	131.5 R16-NQ 5 ft 1 100%	94	1 0 0 1	131.6' - Bedding plane, rough, undulating, <1/2" open, possible mechanical break 133.6, 134.0, 136.45' - Mechanical break (3) 135.15' - Fracture, 45 deg, rough, undulating, tight		131.5-136.5' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), limestone with voids (<3/16') over 50% of rock surface interbedded with limestone having laminated bedding with trace voids (<3/16"), moderate to highly fossiliferous zones, fossil molds <1/2" x 1/4", trace secondary infilling of cavities	R15: 8 minutes
	22.2						



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	Δ-02	SHEET	8	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				MENT . Diethon D-30 3/N 232, mud rotary, NQ tools, HW			ORIENTATION: Vertical
WATER	LEVELS : 1.5	ft bgs	s on 0		5/200		,
>00	(9			DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱ끯힏	Z, X ₽, X A, X	(%	FRACTURES PER FOOT		1 2	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H Ă K	GTI GTI OV	(%) Q	PE	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
92,9	REN S	a Q	ER.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БОШ	014	ш	шш		0)		<u> </u>
			0	135.95, 136.15' - Fracture (2), horizontal, smooth, undulating, to rough, tight	Н	Limestone - 136.5-141.5' - yellowish gray to	_
			"	Smooth, undulating, to rough, tight		moderate yellowish brown, (5Y 7/2 to	1
-				137.55, 137.6, 137.9, 137.95, 138.0, 138.05' -	┧	10YR 5/4), very fine to fine grained,	1
_			6	Bedding plane (6), <10 deg, smooth to rough,	₽₩	 strong HCl reaction, very weak to 	-
				undulating, tight to 1/4" open	Ш	weak (R1 to R2), laminated bedding	
	R17-NQ					from 137.5-138.05' and	
-	5 ft	90	0	139.0, 140.55, 141.45' - Mechanical break (3)	Н	 140.2-140.65', voids (<3/16") over 0-30% of rock surface from 	1
-	100%				ш	136.5-137.5', 138.05-140.2', and	-
140			0		₩	— 140.65-141.5'	
-98.4			ਁ		Н		
-						_	R17: 9 minutes
-			0		₩	=	1
_	141.5				₽Н		1
			3	141.65' - Fracture, 40 deg, rough, undulating,		141.5-142.0' - yellowish gray to dark - yellowish brown, (5Y 7/2 to 10YR	
			ا	tight	Н	4/2), very fine to fine grained, mild to	Water level at 1' below
-				141.8' - Fracture, 50 deg, rough, undulating,	₩	moderate HCl reaction, medium	ground surface at 14:30
_			1	tight 142.0' - Fracture, <10 deg, rough, undulating,	ш	 strong (R3), minor infilling with 	-
_				<1/2" open	┰	medium grained and weak to	
	R18-NQ			142.6' - Mechanical break	\vdash	medium strong (R2 to R3) limestone,	
	5 ft 86%	54	3	143.3' - Fracture, <10 deg, rough, undulating,		 trace voids (<3/16") 142.0-145.2' - Same as 141.5-142.0' 	1
-	0070			<1/4" open	╁	except voids (<3/16") over 10-30% of	1
145			10	143.6' - Fracture, 40 deg, rough, undulating,	+	— rock surface, many cavities (<2" x 1")	
-103.4				tight ====================================		up to 40% secondary infilling with	
			0	tight	Н	medium grained limestone, highly	R18: 19 minutes
-	440.5		NR	144.2-144.25, 144.85-144.9' - Fracture zone		 fossiliferous with molds and casts <1/2", possibly bioturbated 	1
-	146.5			(2), <10 deg, rough, undulating, <1" open,	ш	145.2-145.8' - Same as 141.5-142.0'	1
_			0	subangular to angular rock fragments <1" in diameter	₽Н	 except laminated bedding, trace 	_
				145.2' - Fracture, 15 deg, rough, undulating,		voids, poorly fossiliferous	
				tight	Ш	No Recovery 145.8-146.5'	1
-			1	145.4' - Bedding plane, horizontal, smooth,	TT	 Limestone 146.5-151.5' - pale yellowish brown 	1
-	D40 NO			undulating, tight		to moderate yellowish brown, (10YR	1
	R19-NQ 5 ft	92	0	147.85, 149.0' - Mechanical break (2) 148.05' - Bedding plane, horizontal, smooth,	ш	_ 6/2 to 10YR 5/4), very fine to fine	
	100%	32	"	undulating, <1/4" open		grained, moderate to strong HCl	
150				andalating, -1/- open	口	reaction, weak to medium strong (R2	1
-108.4			0	_	╁┼	to R3), trace laminated bedding, trace organics, voids (<3/16") over	⊢
_			<u> </u>		ш	10% of rock surface, moderately	D40: 0
			1		H	fossiliferous with molds/casts <1" x	R19: 6 minutes
1 7	151.5		'	151.15' - Fracture, 60 deg, rough, undulating,	H	1/2", cavities <1/2" diameter from	1
1 -	.51.0			possible mechanical break, 1/4" open	ш	- 146.5-146.6'	1
-			1	151.9' - Bedding plane, horizontal, smooth,	$\vdash\vdash$	_ 151.5-151.9' - pale yellowish brown to dark yellowish brown, (10YR 6/2 to	-
				undulating, <1/4" open	H	- 10YR 4/2), fine to medium grained,	SC-5 collected at 152.4-
				152.0, 152.2, 152.4, 155.95' - Mechanical	Ш	mild HCl reaction, weak (R2), trace	153.25'
1 7			0	break (4)	\mathbb{H}	secondary infilling	
-	R20-NQ				Ш	- 151.9-154.1' - Same as 151.5-151.9'	1 +
-	5 ft	83	1	154 Of Frontiero 70 dos sough undulation	Ш	except very fine to fine grained,	1 -
	97%			154.0' - Fracture, 70 deg, rough, undulating, tight	\mathbb{H}	medium strong (R3), voids (<3/16") over 20% of rock surface,]
155			_	154.65, 154.7, 154.8, 154.95, 155.05, 155.3' -	Ħ	moderately to poorly fossiliferous,	1
-113.4			6	Bedding plane (6), <10 deg, smooth to rough,	Ш		
-			\vdash	undulating, tight to <1/4" open	H	-	R20: 10 minutes
-			0		\Box	<u> </u>	T.Z.O. TO Milliotes
	156.5		<u> </u>		Ш		
					_		

APPENDIX 2BB-19 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-02	SHEET	9	OF	13

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

DEPTH, TYPE, ORIENTATION, ROUGHNESS, WEATHERING, HARDESS, SMOOTH	COMMENTS AND DEPTH OF CASING, LOSS, CORING RATE AND OTHNESS, CAVING ROD 'S, TEST RESULTS, ETC.
NR	LOSS, CORING RATE AND OTHNESS, CAVING ROD
NR	OTHNESS, CAVING ROD
1 156.85, 158.0, 160.8, 161.1' - Bedding plane (4), horizontal, rough, undulating, <1/4" open 1 154.1-154.8' - Same as 151.5-151.9' except laminated bedding, voids (<3/16") over 30-50% of rock surface, poorly to moderately fossiliferous Limestone 1 154.8-155.3' - Same as 151.5-151.9'	-
R21-NQ	
- 5 ft 94 0 158.7, 158.55, 158.95, 159.15, 159.7' 154.8-155.3' - Same as 151.5-151.9'	
checht weak to very weak (NZ to NT),	_
160 -118.4 0 laminated bedding, -155.3-156.35' - Same as 	_
- Limestone Water	B minutes level is <1.5' below
161.6, 162.4, 163.35, 164.7, 164.85, 165.05, 165.7, 165.8, 165.85, 165.9, 166.0, 166.05, 165.8, 165.85, 165.9, 166.0, 166.05,	d surface at 17:45 - al boring A-2
(16), <10 deg, smooth, undulating, to rough and planar, tight to <1/4" open (3/16) over 40-00% of rock surface, trace organics, moderately to highly fossiliferous, laminated replace	eted to 161.5' and oned on 03/24/2007; ement boring offset
- St 75 0 164.0, 164.15' - Mechanical break (2) Topic Cavities over <10% of rock surface, open cavities (<1/2") over 10% or tri-cone	from original and - to 161.5' with 3-7/8" e roller bit on NWJ
165 - 161.5-166.5' - yellowish gray, (5Y replace repla	samples not collected – asing installed in ement boring to
to R2), voids (<3/16") over 20% of coring 04/03/2	on 03/29/2007, – begins at 161.5' on 2007 at 11:30
166.5-166.7' - Bedding plane (5), horizontal, smooth, undulating to planar, tight 161.5-162.4' where voids cover 20-50% of rock surface, poorly to moderately fossiliferous with fossil	level is <1.5' below -d surface at 09:00 on 2007 -5 minutes -
167.65, 167.75, 167.8, 167.9, 168.0, laminated bedding 168.1, 168.15, 168.2, 168.25' - Bedding plane 166.5-170.4' - yellowish-gray to light	- Initiaties -
R23-NQ 5 ft 78% (10), horizontal, smooth, undulating, to planar, tight 168.25-168.35' - Fracture zone or bedding plane, smooth, undulating, to rough and olive gray, (5Y 7/2 to 5Y 5/2), very fine to fine grained, very weak to medium strong (R1 to R3), strength increases with depth, trace laminated	
170 1 1 1 1 1 1 1 1 1	_
169.0, 169.45' - Mechanical break (2) 169.55' - Fracture, <10 deg, rough, undulating, silt and/or clay sized infilling, NR R23: 12	2 minutes
4 (1/4" open, trace organic stain 171.55, 172.1, 172.2, 172.4, 173.2, 173.65, 173.85, 174.35' - Bedding plane (8), <10 deg, - 7/2), very fine to fine grained,	}
smooth, undulating, to rough and planar, tight to <1/4" open 172.85, 175.35' - Mechanical break (2) moderate HCl reaction, very weak to medium strong (R1 to R3), medium strong (R3) rock at 171.5-172.1',	-
R24-NQ 5 ft 64 4 174.1' - Fracture, 70 deg, rough, undulating, 172.2-174.5', and 174.95-176.4'; voids (<3/16") over 30-40% of rock surface, poorly fossiliferous with	-
175 -133.4 10 10 174.55-174.65' - Fracture zone, rough, undulating, gravel sized fragments molds <1/2" x 1/4", trace laminated bedding	
0 smooth, undulating to planar (1/4" 176.4'	collected at 175.35 7 minutes

APPENDIX 2BB-20 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	10	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				NENT . Diethor D-30 3/N 232, mud rotary, NQ tools, HVV			ORIENTATION: Vertical
WATER	LEVELS : 1.5	ft bg	s on 0		5/200		1
≥∩≘	_ (9			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	0175 AND DEDTH OF 0401110
出出은	₩,H	(%	I R C		- 일 [MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
Ĭ,Ÿ,≷	SGTE	(%) Q	PF	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S. O	F.RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	×	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
□ 07 Ш	014	ш	NR/	' '	0)		
<u> </u>			3	176.6, 179.2' - Mechanical break (2)	\perp	No Recovery 176.4-176.5' Limestone	_
				176.8, 177.2, 177.5, 177.7, 178.1, 178.15,		176.5-180.8' - yellowish gray to	
-				178.3, 178.75, 179.05, 179.35, 179.55, 179.6, 179.65, 179.7, 179.85, 180.15, 180.2, 180.4,	Н	moderate yellowish brown, (5Y 7/2 to	1
-			5	180.45, 180.5, 180.6' - Bedding plane (21),	+	 10YR 5/4), very fine to fine grained, 	-
l _				<10 deg, smooth to rough, undulating to		strong HCl reaction, very weak to	l _
	R25-NQ		_	planar, tight to <1/4" open	\vdash	medium strong (R1 to R3), voids	
-	5 ft 86%	16	3	178.45-178.44, 180.4-180.45, 180.5-180.6' -	\top	 (<3/16") over 5-30% of rock surface, poorly to moderately fossiliferous 	1
-	0070			Fracture zone (3), smooth to rough,	\blacksquare	with fossil molds <1/2" diameter,	l -
180			>10	undulating, tight to 1/2" open _	╁┼┤	— trace laminations, few cavities <3/4"	
-138.4						x 1/4"; zones of very light gray (N8),	
I -			10		Ш	very fine grained, non-fossiliferous	R25: 19 minutes
-			NR		+	 strong rock (R4) at 178.15-178.3' and 178.75-179.35' 	-
-	181.5			191 5 191 65' Fracture zone rough		No Recovery 180.8-181.5'	-
-			>10	181.5-181.65' - Fracture zone, rough, undulating, gravel sized fragments <1"	Ш	Limestone]
			10	diameter	H	181.5-184.8' - yellowish gray to pale	
I -				181.7' - Fracture zone, 20 deg, rough,		yellowish brown, (5Y 7/2 to 10YR	1
-			4	undulating, <1/4" open	ш	_ 6/2), very fine to fine grained,	1
l -				182.7, 182.9, 183.1, 183.4, 183.55, 183.7,	+	moderate HCl reaction, weak to medium strong (R2 to R3), voids	1
	R26-NQ		_10	183.75, 183.8, 183.95, 184.1, 184.35' - Bedding plane (11), <10 deg, smooth,		_ (<3/16") over 30-50% of rock	
	5 ft 90%	48	>10	undulating, tight to <1/4" open		surface, poorly fossiliferous with few	
	0070			184.15' - Fractures, horizontal and vertical,	$\pm \pi$	fossil molds <1/2" x 1/4"	-
185 <u>-</u> -143.4			1	rough, undulating, multiple intersecting –	-	— 184.8-186.0' - Same as 181.5-184.8'	_
-145.4				fractures	ш	except trace organics at 184.8', voids	
			0	185.6' - Fracture, <10 deg, rough, undulating,	\Box	(<3/16") over 50% of rock surface,	R26: 15 minutes
I -	186.5		NR	<1/2" open		 highly fossiliferous with molds 3/4" x 1/4", large cavity at 187.75' (2-1/2" x 	1
-	160.5			400 01 5 1	ш	1-1/2")	
l -			2	186.6' - Fracture or mechanical break, rough, undulating, <1/2" open	$\pm \Pi$	No Recovery 186.0-186.5'	
_						Limestone	
				187.4, 187.65, 187.95, 188.1, 188.3' -	Ш	186.5-189.5' - pale yellowish brown	
-			4	Bedding plane (5), <10 deg, smooth, undulating to planar, tight to 1/4" open		 to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine 	1
-	D07 N0			anddiating to plantal, light to 1/4 open	+	grained, moderate to strong HCl	-
l _	R27-NQ 5 ft	56	0		ш	reaction, medium strong (R3),	
	96%	00	ਁ			interbedded and laminated fine and	
190				189.65, 189.85, 190.5, 190.9, 191.05' -	\square	very fine grained limestone,	1
-148.4			4	Fractures or mechanical break (5), rough,	╅┪	undulating bedding planes, voids (<1/16") over <20% or rock surface,	-
-			—	undulating, <1/2" open	Ш	poorly fossiliferous with fossil molds	D27: 40 minutes
I -			>10	190.5, 190.6, 191.05, 191.3' - Fracture zone	\mathbb{H}	_ <1/2" in diameter, several cavities	R27: 10 minutes
	191.5		NR	(4), rough, undulating, rock fragments up to		1-1/2" x 1/2"	
1 -			/NK	1" diameter and sand sized grains	Ш	189.5-191.3' - Same as 186.5-189.5'	1
-			2	191.65' - Fracture or mechanical break, <10 deg, rough, undulating, <1/4" open	+	except extremely weak to weak (R0 to R2), voids (<3/16") over 50% of	-
I -					世	rock surface, poorly to moderately]
			_10	192.45' - Fracture or mechanical break, 20 deg, rough, undulating, <1/2" open	Ш	fossiliferous, several cavities <1/2"	
I -			>10	192.65' - Fracture or mechanical break, <10	\mathbb{H}	No Recovery 191.3-191.5'	Stop coring at 18:00 on
-	R28-NQ			deg, rough, undulating, tight	Ш		04/03/2007 -
I -	5 ft	56	3	192.9-193.1' - Fracture zone, rough,	Ш	_	-
I _	96%			undulating, gravel sized fragments <2"	Н		
195				diameter]
-153.4			2	193.35, 193.45, 193.65, 193.8, 194.2, 194.6' Bedding plane or mechanical break (6), <10	Ш		Water level at 1.0' below
-			\vdash	deg, rough, undulating, tight to <1/4" open	+	_	ground surface at 18:00,
I _			>10	195.05' - Fracture or mechanical break,	Ш	_	04/03/2007
	196.5		<u> </u>	horizontal, rough, undulating, tight	Ш		R28: 5 minutes
					1		1

APPENDIX 2BB-21 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-02	SHEET	11	OF	13

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bg	s on 0	3/22/07 START : 3/22/2007 END : 4/5	5/200	LOGGER : R. Bitely	
₹ □₽	(%)			DISCONTINUITIES	90	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 200 -158.4	R29-NQ 5 ft 68%	20	>10 2 >10 2 NR	195.65' - Fracture or mechanical break, 50 deg, rough, undulating, tight 196.0-196.3' - Fracture zone, rough, undulating, gravel sized fragments <1-1/2" diameter 196.5-196.65, 196.9-197.35, 198.85-199.0' - Fracture zone (3), rough, undulating, angular gravel sized fragments <1-1/2" diameter 197.9' - Fracture or mechanical break, 30 deg, rough, undulating, <1/4" open 198.4' - Fracture or mechanical break, <10 deg, rough, undulating, <1/2" open 198.6, 198.8' - Mechanical break (2) 199.25, 199.4, 199.55' - Bedding plane (3),		Limestone 191.5-194.5' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 8/1), very fine to fine grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), interbedded with weak to medium strong (R2 to R3) rock from 192.0-193.6', voids (<3/16") over 20-30% of rock surface, cavities <2" x 3/4", poorly fossiliferous, trace secondary infilling with fine grained texture 194.5-196.3' - Same as 191.5-194.5' except medium strong (R3), voids	Core barrel sand-locked at 196.5' on 04/03/2007, core barrel freed from sandlock by over-drilling NW casing from 161.5' to 195.0' on 04/04/2007 Continue coring from 196.5 at 13:30 on 04/04/2007 R29: 7 minutes
	201.5 R30-NQ 5 ft 74%	10	>10 >10 >10 >10 >10	<10 deg, smooth, planar, tight 199.7' - Bedding plane, horizontal, smooth, undulating, silt and/or clay sized infilling, organic stained, poorly indurated organic silt lens, <1/4" open 201.8' - Fracture or mechanical break, 60 deg, rough, stepped to undulating, tight to <1/4" open 201.9' - Bedding plane, <10 deg, rough, undulating, <1" open 202.05' - Fracture, vertical, rough, undulating 202.2-202.4, 202.55-202.8' - Fracture zone (2), rough, undulating, gravel sized fragments <1-1/2" diameter 202.9, 203.0, 203.15, 203.35, 203.5, 203.7' - Bedding plane (6), <10 deg, smooth,		(<3/16") over 30% of rock surface, fossiliferous with molds <1/2" in diameter, strong color contact at 194.5' No Recovery 196.3-196.5' Limestone 196.5-199.0' - pale yellowish brown, (10YR 6/2), very fine to fine grained, moderate HCI reaction, extremely weak to very weak (R0 to R1), laminar interbeds of very fine to fine grained material, trace organics, poorly to moderately fossiliferous, voids (<3/16") over <20% or rock surface, dissolution cavities <1/2"	R30: 14 minutes
-168.4	206.5 R31-NQ 5 ft 64%	40	>10 >10 1 1 NR	undulating, tight to <1/4" open 203.7-203.9, 204.35-204.7' - Fracture zone (2), rough, undulating, gravel sized fragments <2" diameter 205.0' - Fracture, 40 deg, rough, undulating, <1" open 206.8' - Fracture or mechanical break, 20 deg, rough, undulating, <1/2" open 206.95' - Fracture or mechanical break, <10 deg, rough, undulating, <1/2" open 207.35-207.55' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter 207.95, 208.85' - Mechanical break (2) 208.3, 208.4' - Bedding plane (2), <10 deg, rough, undulating, <1/4" open		diameter over 20-30% of rock surface 199.0-199.9' - Same as 196.5-199.0' except very fine grained, extremely weak to medium strong (R0 to R3), trace organics as laminations, voids and fossils absent No Recovery 199.9-201.5' Limestone 201.5-204.0' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), very fine to fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), interbedded with extremely weak to very weak (R0 to R1) limestone, 20%	R31: 7 minutes
- - - 215 -173.4	R32-NQ 5 ft 34%		>10 >10 NR	209.1' - Fracture or mechanical break, rough.		laminated, trace organic laminations especially at 204', friable, voids (<3/16") over 10% of rock surface, few consolidated seams up to 1/2" thick with 50% voids, poorly fossiliferous with molds <1/2" diameter 204.0-205.2' - Same as 201.5-204.0' except voids (<3/16") over 10% of rock surface, moderately fossiliferous with molds <1/4" in diameter, few cavities with secondary infilling 1" x 1/2" No Recovery 205.2-206.5'	- - - - - - R32: 11 minutes
	<u> </u>						

APPENDIX 2BB-22 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	12	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

		10 20	XOII IV	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casing		ORIENTATION : Vertical
WATER	LEVELS: 1.5	ft bgs	s on 0	3/22/07 START : 3/22/2007 END : 4/	5/2007	LOGGER : R. Bitely	
>00	<u></u>			DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - 220	R33-NQ 5 ft 38%	0	>10	smooth, undulating, to rough, tight to <1/4" open		Limestone - 206.5-207.0' - yellowish gray, (5Y 8/1), very fine to fine grained, moderate to strong HCI reaction, very weak to weak (R1 to R2), with lenses of extremely weak (R0) rock, voids (<3/16") over 10-30% of rock surface, poorly to moderately fossiliferous with molds/casts <1/2" in diameter, friable	Formation collapsing on core barrel at 216.5', - advance NW casing to 209'
-178.4 - - -	221.5		NR >10,	– 221.5-221.7' - Fracture zone or mechanical		207.0-208.3' - moderate to strong HCl reaction, poorly consolidated silts to very weak (R1) rock, laminated bedding, trace voids in few bedding planes, fossils absent 208.3-209.7' - Same as 206.5-207.0'	R33: 14 minutes Stop coring at 221.5 at
- - - - 225 -183.4	R34-NQ 5 ft i 4%	0	NR	break, rough, undulating, angular gravel sized fragments <1-1/2" diameter		No Recovery 209.7-211.5' Limestone 211.5-213.2' - yellowish gray, (5Y 8/1), very fine to fine grained, moderate to strong HCl reaction, extremely weak to weak (R0 to R2), voids (<3/16") over <20% of rock surface, few cavities <1/2" diameter No Recovery 213.2-216.5' Limestone 216.5-218.4' - yellowish gray, (5Y 8/1), very fine to fine grained,	18:30 on 04/04/2007; water level at ground level Resume coring at 07:00 on 04/05/2007 - Recovery loss for R34 due to core barrel blockage at 221.7' - R34: 19 minutes
- - - -	226.5 R35-NQ	0	>10	226.6, 226.75, 226.9, 226.95, 227.05, 227.2, 227.5' - Fractures or mechanical break (7), <10 deg, rough, undulating, <1" open, gravel sized fragments <1/2" diameter 227.5-228.1' - Fracture zone, rough, undulating, angular gravel sized fragments <1" diameter		moderate HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 20-40% of rock surface, moderately fossiliferous with molds/casts <1/2" diameter, trace organic laminations No Recovery 218.4-221.5' Limestone 221.5-221.7' - yellowish gray, (5Y 8/1), very fine grained, mild to moderate HCl reaction, weak to	
230 -188.4 -	5 ft 36% 231.5	U	NR	_		medium strong (R2 to R3), voids - (<3/16") over 20-30% of rock surface, moderately fossiliferous, with molds/casts <1/2" diameter, few - cavities <1/2" diameter No Recovery 221.7-226.5' Limestone	R35: 12 minutes
- - - -			0 >10	232.6' - Fracture, 60 deg, rough, undulating,		 226.5-228.3' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), voids (<3/16") over 10-30% of rock surface, poorly to moderately fossiliferous, few cavities <1/4" 	SC-7 collected at 231.5- 232.5' -
- 235 -193.4 -	R36-NQ 5 ft 40%	20	NR	tight 232.8-233.5' - Fracture zone, rough, undulating, gravel sized fragments <2" diameter —		diameter, trace organics, medium strong (R3) rock from 227.4-227.5' No Recovery 228.3-231.5'	R36: 18 minutes
	236.5						

APPENDIX 2BB-23 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	13	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bg	s on 0	3/22/07 START : 3/22/2007 END : 4/	5/200	7 LOGGER : R. Bitely	
₹ □₽	(%)			DISCONTINUITIES	ရွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R37-NQ 5 ft 58%	30	>10 2 10	236.6' - Fracture or mechanical break, <10 deg, rough, undulating, <1/4" open 236.9-237.15' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter 237.25, 237.45, 238.0, 238.15, 238.85' - Fracture or mechanical break (5), <10 deg, rough, undulating, tight to <1/4" open 239.2-239.25' - Fracture zone or bedding plane, rough, undulating, <1/2" open, bedding plane fractures with vertical fractures		Limestone 231.5-233.5' - yellowish gray, (5Y 8/1), very fine to fine grained, mild to moderate HCl reaction, very weak (R1), voids (<3/16") over 10-20% of rock surface, poorly to moderately fossiliferous with fossil molds/casts <1/4", medium strong (R3) rock from 233.15-233.25' No Recovery 233.5-236.5' Limestone	- - - - -
-	241.5		NR			236.5-239.4' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCI reaction, extremely weak to very weak (R0 to R1), voids (<3/16") over 20-50% of rock	R37: 13 minutes -
-			>10	241.65' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/4" open 241.65-241.8' - Fracture zone, rough, undulating, gravel sized fragments <1"		 surface, trace laminated bedding, poorly to moderately fossiliferous with fossil molds/casts <3/4", few 	-
245 -203.4	R38-NQ 5 ft 36%	0	0 NR	diameter 241.85' - Mechanical break 241.11, 242.35' - Bedding plane or mechanical break (2), <10 deg, rough, undulating, <1/4" open 242.4, 242.55' - Mechanical break (2)	- - - - - - -	cavities <1/2" in diameter, secondary infilling of cavities at 238.5-239.2' No Recovery 239.4-241.5' Limestone 241.5-242.55' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, extremely weak to weak (R0 to R2), strength decreases with depth, voids (<3/16") over 20-40% of rock surface,	
-	246.5		>10	246.65-246.95' - Fracture zone, rough, undulating, gravel sized fragments <3/4" diameter		moderately fossiliferous with molds/casts <3/4" in diameter, trace laminations Sandy Silt (ML) 242.55-243.3' - very fine to medium	- - -
250 -208.4	R39-NQ 5 ft 17% 251.5	0	NR	247.25' - Bedding plane or mechanical break, smooth, undulating, <1/4" open		grained, moderate HCl reaction, carbonate derived silts and sands No Recovery 243.3-246.5' Limestone 246.5-247.35' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), laminated with organics, trace voids (<3/16"), few cavities <1/4" in diameter, poorly fossiliferous No Recovery 247.35-251.5'	R39: 17 minutes Boring completed to 251.5' at 15:30 on 04/05/2007
- - - - - -					-	Bottom of Boring at 251.5 ft bgs on 4/5/2007	

APPENDIX 2BB-24 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	1	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 6 tri-cone bit

						END : 0/10/0007) . D	ONIENTATION . Vertical
WATER	LEVELS	: 1.3 ft bo	ıs on 3/1°		START : 3/10/2007	END: 3/12/2007 SOIL DESCRIPTION	LUGGEF	1 : K.	Bitely, C. Wallestad, N. Jarzyniecki COMMENTS
30₽	041:5: =	IN ITEM :		STANDARD PENETRATION		SUIL DESCRIPTION)G	CONNINIEN 12
NAN (‡)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,				DEPTH OF CASING, DRILLING RATE,
H BI ACE ATIC		RECOVE	RY (ft)		MOISTURE	CONTENT, RELATIVE DI	ENSITY OR	DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, M	IINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
 42.1				(N)				S	
							-		C. Wallastad and N. Jarzuniaski also lagged
-							_		C. Wallestad and N. Jarzyniecki also logged portions of boring A-03 -
_							_		_
_							_		_
							_		
	3.5						-	1	1
-					Poorly Graded	Sand With Silt (SP-SM)	H	-
-		1.2	SS-1	3-4-6	3.5-4.7' - very p	oale orange and dark yel 10YR 6/6), wet, loose, v	lowish orange, -	間	1
5	5.0			(10)	grained, silica s	sand, 6% nonplastic fine	s, trace root	棉	1
37.1	3.0				matter, trace ind diameter	on cemented sand nodul	es <1/4"	14 1	Moderate to light chatter, slow advancement —
-					diameter			1	at 5.0-8.5'
-							-	1	-
-							-	1	-
-							-		-
_							-		-
_							-		-
_	8.5				O:It (MIL)			Ь	_
_				3-8-4	Silt (ML) 8.5-9.4' - pale v	yellowish orange, (10YR	8/6), wet, stiff, -	$\ \ $	4
_		0.9	SS-2	(12)	$_{ ightharpoonup}$ nonplastic to lo	w plasticity, rapid dilatan	cy, mild to	Ш	_
10	10.0			` ′	moderate HCI i	reaction, 5-10% fine to m	nedium grained		_
32.1					barra, an barbor	nato			
							_		
							_	1	Very slow drilling at 11.5-13.5'
							-		_
							-	1	1
-	12.5						-	1	1
-	13:5	0.0	SS-3	50/1	No Recovery 1	13.5-13.6'		H	1
-				(50/1")					- Rapid advancement
							-		·
15 27.1							_		-
-							-		-
-							-		
-							-		-
-							_		
-							-		
_							_		_
_	18.5								
_	18.8	0.3	SS-4	50/4 (50/4")	Silt With Sand	l (ML) le yellowish orange, (10Y	'R 8/6) wet	Ш	Very dense layer at 18.75', very slow
				(30/4)	\ hard, nonplasti	c, rapid dilatancy, mild H	CI reaction,		advancement
20					15-20% fine to	medium grained sand, a	Il carbonate		1



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-03	SHEET	2	OF 1	12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 6 tri-cone bit

					TART - 0/10/0007		DGGER : R. Bitely, C. Wallestad, N. Jarzyniecki						
WATER	LEVELS	. 1.3 11 00	gs on 3/1		TART: 3/10/2007 END: 3/12/3		1 : K.	Bitely, C. Wallestad, N. Jarzyniecki COMMENTS					
30⊋				STANDARD PENETRATION	SOIL DESCRIPT	ION	Ja Da	COIVIIVIEN 15					
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	. ,	TEST RESULTS	SOIL NAME, USCS GROUP S	YMBOL COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,					
ACE ATIC		RECOVE	ERY (ft)		MOISTURE CONTENT, RELAT	IVE DENSITY OR	S S	DRILLING FLUID LOSS, TESTS, AND					
PT.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTU	JRE, MINERALOGY	¥₩.	INSTRUMENTATION					
<u> </u>				(N)			S						
22.1								_					
I _							1	_					
								_					
-						•		Moderate to rapid advancement at 22.5'					
_	23.5												
-	20.0				Silty Sand (SM)		Ш	Sample SS-5 may be weak limestone					
-		1.5	SS-5	23-36-46	23.5-25.0' - grayish orange, (10Y) dense, fine to coarse grained, mil	R 7/4), wet, very	1111	-					
-		1.0		(82)	reaction, 46% nonplastic fines, ap	oproximately 5	111	-					
25 17.1	25.0				 interbedded extremely weak (R0) 	limestone lenses 7							
-					<1/2" thick		┨	-					
-							-	_					
_							4	_					
_							1	_					
								_					
	28.5												
-					Silty Sand (SM)			_					
-		1.5	SS-6	8-9-27	28.5-30.0' - Same as 23.5-25.0' e orange, (10YR 6/6), dense, 1/2" le	except dark yellowish ense of medium	1111	_					
30	30.0			(36)	plastic silt at 28.6', approximately	5 interbedded	1	<u> </u>					
12.1	30.0				limestone lenses up to 1/2" thick		111	Moderate drilling rate with variable thin,					
-							1	dense zones.					
-								-					
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-	33.5				Oilt-OI Will III		1.17	_					
		0.5	SS-7	4-10-50/1.5	Silty Sand With Limestone (SM)	except 50% of	Ш	_					
	34.6	0.0	00-7	(60/7.5")	sample is limestone lenses to 1/2	" thick	1						
35							1						
7.1]						
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1 7						•	1	1					
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-	00.5						1	-					
-	38.5			00.50/5			111	-					
-	20.4	0.9	SS-8	22-50/5 (72/11")		-	111	-					
-	39.4			(,, /	٦	[·	111	-					
40							1	_					
							1						
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	3	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 6 tri-cone bit

						Ty, cameau, AVVJ 10us, 6 m-			ONIENTATION : Vertical
WATER	LEVELS	: 1.3 ft bo	us on 3/1		START : 3/10/2007	END: 3/12/2007 SOIL DESCRIPTION	LOGGER	1 : K.	Bitely, C. Wallestad, N. Jarzyniecki COMMENTS
≥o⊋ l			1 (0)	STANDARD PENETRATION		JUIL DEJURIT HUN		Jg.	OOIVIIVIEN 13
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOII NAME	E, USCS GROUP SYMBOL,	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
A ACE		RECOVE	ERY (ft)		MOISTURE	CONTENT, RELATIVE DEN	ISITY OR	30LI	DRILLING FLUID LOSS, TESTS, AND
EV,			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, MIN	IERALOGY	YME	INSTRUMENTATION
				(N)	V Cilta Carral With	. I : (OM)		S	
2.1					38 5-39 4' - olive	Limestone (SM) e gray, (5Y 4/1), wet, very	dense, fine	1	Slow drilling with intermittent light chatter at 40.0-43.5'
					to coarse graine	ed, moderate HCl reaction, with interbedded limesto	, 30%		_
					nonplastic fines 1" thick, all carb	, with interbedded limesto	ne lenses to		
					T trick, air carb	onate		1	
							-	1	_
-							-	1	-
-	43.5						-	1	-
-	43.6	0.1	SS-9	50/1	☐ Limestone Fraç	gments	Г	Ħ	
-				(50/1")	\ 43.5-43.6' - olive	e gray, (5Y 4/1), mild to me sand to fine gravel-sized	oderate HCI	1	-
-						er), trace fossils and void		1	-
45 -2.9					Begin Rock Cor	ing at 43.5 ft bgs		1	
-2.9					See the next sh	eet for the rock core log	-	1	-
_							-	1	_
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60								lacksquare	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	4	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION · Vertical

Milling RALD は と	CORING	METHOD A	ND E	QUIPM	IENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
DESCRIPTION	WATER	LEVELS : 1.3	ft ba	s on 3/	/11/07 START : 3/10/2007 END : 3/	12/200	7 LOGGER : R. Bitely, C. Wallesta	d, N. Jarzyniecki
43.5 - 4.5 -						TT		
43.5 Section	§8€	2€		(n		- 		
43.5 Section	H H H O	Z Z Z		照는	DESCRIPTION	딕		SIZE AND DEPTH OF CASING,
43.5 Company Associated	FEE	H # E S	%	L S		BOL	WEATHERING, HARDNESS,	
43.5 Section	P.S.E.	RNA	ō	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS SURFACE STAINING AND TIGHTNESS.	Σ		DROPS, TEST RESULTS, ETC.
R1-NO 2.5 ft 88 0 44.65 - Mechanical break 45.4 - Bedding plane or fracture, <10 deg. voids (-167) over 60.70% of rock 45.4 - Dedding plane or fracture, <10 deg. voids (-167) over 60.70% of rock destination of the control of the co	Δош		œ	μΔ	THISTATEOU, SOTA NOE STANIANO, THE HOTTINESS	S		
R1-NO 2-9 3	l _	43.5		0		Н		
46.0 46.0 47.4 48.6 - Mechanical break 45.4 - Bedding plane or fracture, <10 deg, rough, undulating, <14" open 48.15, 46.25, 46.2 - 8.46.1 Bedding plane or mechanical break 47.4-47.65' - Clay seam 48.54' - Redding plane or mechanical break 47.4-47.65' - Clay seam 49.25-49.45' - Clay seam 50.25' - Bedding plane or mechanical break <10 deg, smooth, undulating, <114" open 51.0 88''s 84 85		B1 NO				Ш		
46.0 VR 45.4 - Bedding plane or fracture, <10 deg, rough, undulating, <14" open 46.15.4 62.9, 46.4 - Bedding plane or mechanical break, 0-410 deg, smooth, undulating, <14" open 46.15.4 62.9, 46.4 - Bedding plane or mechanical break, 0-410 deg, smooth, undulating, <14" open 48.55.4"	45		88	0	44 65' - Mechanical break	Н	weak to extremely weak (R2 to R0),	
46.0 NR 46.0 NR 46.0 NR 46.0 NR 46.0 NR 46.0 A6.4 Bedding plane or fracture, <10 deg. rough, undulating, <14*0 pen 46.15, 46.25, 46.4* Bedding plane or mechanical break 47.44*7.68* - Clay seam 47.44*7.68* - Clay seam 49.25*49.45* - Clay seam 50.25* Bedding plane or mechanical break <10 deg, smooth, undulating, sight 50 deg, rough, undulating, sight 50 deg, rough, undulating, sight 50 deg, rough, undulating, sight 51.0 NR 52.3.52* - Bedding plane or mechanical break, one degrated weak for the fire grained, moderate yellowish brown, (10YR S/4), were fire to fire grained, moderate yellowish brown, (10YR S/4), very fine to fine grained, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate yellowish brown, (10YR S/4), very fine to fine grained, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate yellowish brown, (10YR S/4), very fine to fine grained, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate yellowish brown, (10YR S/4), very fine to fine grained, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate HCl reaction, very weak for weak (R*1 to R2), voids surface, moderate HCl reaction, weak to mediate HCl reaction, weak to mediate HCl reaction, weak to mediate HCl reaction, weak to					44.00 Westianisal break	甘甘		R1: 5 minutes —
As As As As As As As As	-	- 1		1	45.4' - Bedding plane or fracture, <10 deg,	╁┼┼		
mechanical break, 0~10 deg. smooth, undulating, 144" open 46.55, 47.2, 47.85". Mechanical break 47.44".76.5°. Clay seam 48.55, 47.2, 47.85". Mechanical break 47.44".76.5°. Clay seam 48.5°. Mechanical break 47.44".76.5°. Clay seam 48.5°. Mechanical break 49.25-49.45°. Clay seam 47.7-49.2°. 1	_	46.0		NR		山		
R2-NO 5ft 77 0 48.5 - Mechanical break 47.447.65 - Clay seam 49.52-49.45 - Clay seam 49.25-49.45 - Clay seam 49.25-49.45 - Clay seam 47.447.65 - Clay seam 47.49.2 - Clay seam 47.447.65 - Clay seam 47.449.2	I -]		3		╆┼		
1 46.55, 47.2, 47.85°. Mechanical break 47.4.47.65°. Clay seam 47.4.47.65°. Clay seam 47.4.47.65°. Clay seam 47.4.47.65°. Clay seam 48.5°. Mechanical break 48.5°. Mechanical break 49.25-49.45°. Clay seam 49.25-49.45°. Clay seam 49.25-49.45°. Clay seam 49.25-49.45°. Clay seam 47.7-49.2° No Recovery 50.3-51.0° Limestone 51.0-55.5°. Bedding plane or mechanical break, 10 deg, rough, undulating, 19th 55.0°. Bedding plane or mechanical break, 10 deg, rough, undulating, 19th 55.0°. Bedding plane or mechanical break, 20 deg, rough, undulating, 19th 55.4°. Fracture or mechanical break, 50 deg, rough, undulating, 19th 55.4°. Fracture or mechanical break, 50 deg, rough, undulating, 19th 55.4°. Fracture or mechanical break, 50.45°. Fracture or mechanical b				ਁ				
1						Ш		
Sit 86% 77 0 48.5' - Mechanical break 48.5' - Mechanical break 49.25-49.45' - Clay seam 47.7-49.2' - No Recovery 50.3-51.0' - Silliferous, moderately to highly fossilliferous, moderately to highly	_			1		ш	brown, (10YR 5/4), fine grained, very	-
5 ft 86% 77 0 48.5' - Mechanical break 48.5' - Mechanical break 49.25-49.45' - Clay seam 47.7-49.2' 1 49.25-49.45' - Clay seam 47.7-49.2' 1 50.25' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 52.3, 52.5' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 53.0' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 53.0' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 53.0' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 53.0' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 53.3' - Fracture or mechanical break, -10 deg, rough, undulating, tight 53.4' - Fracture or mechanical break, -10 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 57.25, 57.35, 58.0, 58.4' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 57.25, 57.35, 58.0, 58.4' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight 57.25, 57.35, 57.5, 58.0, 58.4' - Bedding plane or mechanical break, -10 deg, rough, undulating, stand plane or mechanical break, -10 deg, rough, undulating, stand plane or mechanical break, -10 deg, rough, undulating, stand plane or mechanical break, -10 deg, rough, undulating, stand plane or mechanical break, -10 deg, rough, undulating, stand plane or mechanical break, -10 deg, rough, undulating, stand plane or mechanical break, -10 deg, rough, undulating, stand plane or mechanical break, -10 deg, rough, undulating, stand plane or mechanical break, -10 deg, rough, undulating, stand plane or mechanical break, -10 deg, rough, undulating, stand plane or mechanical break, -10 deg, rough, undulating, s	-	R2-NO		\vdash		╂┼┼		1
1 49 25-49.45' - Clay seam 49 25-49.45' - Clay seam 49 25-49.45' - Clay seam 50.25' - Bedding plane or mechanical break, <10 deg, smooth, undulating, -tight 51.0	-	5 ft	77	0	48 5' - Mechanical break	世		
47.7-49.2' 47.7-49.2' No Recovery 50.3-51.0' Limestone 51.0 Sec. 9' moderate yellowish brown, (10 Nr 5/4), very fine to fine grained, moderated HCI reaction, very weak to weak (R1 to R2), voids (<1/16") over 80-90% of rock surface, moderated HCI reaction, very weak to weak (R1 to R2), voids (<1/16") over 80-90% of rock surface, moderated HCI reaction, very weak to weak (R1 to R2), voids (<1/16") over 80-90% of rock surface, moderated HCI reaction, very weak to weak (R1 to R2), voids (<1/16") over 80-90% of rock surface, moderated by to highly fossiliferous with molds up to 12"x1/4", extremely weak at 52.0-52.5' No Recovery 50.3-51.0' Limestone 51.0-55.9' -moderated yellowish brown, (10 Nr 5/4), very fine to fine grained, moderated with molds up to 12"x1/4", extremely weak at 52.0-52.5' No Recovery 50.3-51.0' Limestone 52.0-52.5' No Recovery 50.9-56.0' Limestone 52.0-52.5' No Recovery 50.3-51.0' Limestone 52.0-52.5' No Recovery 50.3-51.0' Limestone 52.0-52.5' No Recovery 50.9-56.0' Limestone 52.0-52.5' Limestone 52.0-52.5' Limestone 52.0-52.5' Limestone 52.0-60.5' -moderate yellowish brown, (10 Nr 5/4), very fine to fine grained, moderated to strong HCI reaction, weak to medium strong (R2 to R3), voids (<2/16") over 80-90% of rock surface, moderated to strong HCI reaction, weak to medium strong (R2 to R3), voids (<2/16") over 80-90% of rock surface, moderated to strong HCI reaction, weak to medium strong (R2 to R3), voids (<2/16") over 80-90% of rock surface, moderated to strong HCI reaction, weak to medium strong (R2 to R3), voids (<2/16") over 80-90% of rock surface, moderated to strong HCI reaction, weak to medium strong (R2 to R3), voids (<2/16") over 80-90% of rock surface, and the surface and the surfa	1 -	86%		\vdash	TO.O - MECHANICAL DIEAK	Ш	fossiliferous, moderately to highly	
50.25' - Bedding plane or mechanical break, <10 deg, smooth, undulating, tight R3-NQ	1 -]		1	49.25-49.45' - Clay seam	Ш		1
51.0 NR 50.25' - Bedding plane or mechanical break, <10 deg, smooth, undulating, tight Finding plane or mechanical break, <10 deg, rough, undulating, sight S5.2 - Fracture or mechanical break, so deg, rough, undulating, tight S3.0' - Bedding plane or mechanical break, so deg, rough, undulating, tight S3.2' - Fracture or mechanical break, 50 deg, rough, undulating, tight S3.2' - Fracture or mechanical break, 50 deg, rough, undulating, tight S3.2' - Fracture or mechanical break, 50 deg, rough, undulating, tight S3.2' - Fracture or mechanical break, 50 deg, rough, undulating, tight S3.4' - Fracture or mechanical break, 50 deg, rough, undulating, tight S5.4' - Fracture or mechanical break, 50 deg, rough, undulating, tight S5.4' - Fracture or mechanical break, 60 deg, rough, undulating, tight S5.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, tight S5.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, tight S5.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, tight S5.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, 410' open S5.2's - Fracture or mechanical break, 410 deg, rough, undulating, 410' open S5.5' - Fracture or mechanical break, 410 deg, rough, undulating, 410' open S5.5' - Fracture or mechanical break, 410 deg, rough, undulating, 410' open S5.5' - Bedding plane or mechanical break, 410 deg, rough, undulating, 410' open S5.5' - Bedding plane or mechanical break, 410 deg, rough, undulating, 410' open S5.5' - Bedding plane or mechanical break, 410 deg, rough, undulating, 410' open S5.5' - Bedding plane or mechanical break, 410 deg, rough, undulating, 410' open S5.5' - Bedding plane or mechanical break, 410 deg, rough, undulating, 410' open S5.5' - Bedding plane or mechanical break, 410 deg, rough, undulating, 410' open S5.5' - Bedding plane or mechanical break, 410 deg, rough, undulating, 410' open S5.5' - Bedding plane or mechanical break, 410 deg, rough, undulating, 410' open S5.5' - Fracture or mechanical break, 410 deg, rough, u	50			'	,	\mathbf{H}	47.7-49.2	
51.0 NR NR A 51.0 deg, smooth, undulating, tight 52.3 , 52.5' - Bedding plane or mechanical break, 50 deg, rough, undulating, sight 55.1 deg, rough, undulating, tight sight sig	-7.9	1		_1_	EO OEL Dodding plane or machanical break	H		R2: 4 minutes
Limestone 51.0-55.9 - moderate yellowish brown, (10'RR 5/4), very fine to fine grained, moderate HCI reaction, very weak to weak (R1 to R2), voids (<17/16') over 80-90% of rock surface, moderately to highly fossiliferous with moids up to 122 53.3' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.2' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.4' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.4' - Fracture or mechanical break, 60 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, tight 57.2' - 57.35, 57.5, 57.55, 58.0, 58.4' - Bedding plane or mechanical break, 410 deg, rough, undulating, 18' infilling, sand infilling, open 56.5' - Fracture or mechanical break, 410 deg, rough, undulating, 18' infilling, sand infilling, open 56.5' - Fracture or mechanical break, 410 deg, rough, undulating, 18' infilling, sand infilling, open 56.5' - Fracture or mechanical break, 410 deg, rough, undulating, 41'd' open 59.25' - Bedding plane or mechanical break, 410 deg, rough, undulating, 41'd' open 59.25' - Bedding plane or mechanical break, 410 deg, smooth, undulating, 41'd' open 59.95' - Bedding plane or mechanical break, 410 deg, smooth, undulating, 41'd' open 61.0' - The plane of the plane	-	54.0		NR		田	- No Recovery 50.3-51.0'	
R3-NO Str. 12.9 Section 14 Section 2.5 Sec	-	51.0			To dog, officeri, and diamig, agric	$+ \Box +$	- Limestone	-
R3-NQ 84 2 52.3, 52.5' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/8" open 5.8" 84 2 2 5.85' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.0' - Fracture or mechanical break, 20 deg, rough, undulating, tight 53.2' - Fracture or mechanical break, 20 deg, rough, undulating, tight 53.3' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.4' - Fracture or mechanical break, 60 deg, rough, undulating, tight 54.2' - Fracture or mechanical break, 60 deg, rough, undulating, tight 55.4' - Fracture or mechanical break, 60 deg, rough, undulating, tight 55.5' - Fracture or mechanical break, 60 deg, rough, undulating, tight 55.5' - Fracture or mechanical break, 410 deg, rough, undulating, 18" infilling, sand infilling, open 56.55' - Fracture or mechanical break, 30 deg, rough, undulating, 414' open 61.0 deg, smodh, undulating, 414' open 62.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, 414' open 60.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, 414' open 61.8' - Fracture or mechanical break, horizontal, rough, undulating, 414' open 61.8' - Fracture or mechanical break, horizontal, rough, undulating, 414' open 61.8' - Fracture or mechanical break, horizontal, rough, undulating, 414' open 61.8' - Fracture or mechanical break, horizontal, rough, undulating, 414' open 61.8' - Fracture or mechanical break, open 61.0' - Fracture or mechanical break, open 61.0	-			0		+	- 51.0-55.9' - moderate yellowish	
R3-NQ 51 84 2 2 52.3, 52.5 - Bedding plane or mechanical break, 50 deg, rough, undulating, 41/8" open 52.85' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.0' - Bedding plane or mechanical break, 20 deg, rough, undulating, tight 53.2' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.3' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.3' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.4', 53.6' - Mechanical break, 50 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, 19ht 55.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, 19ht 55.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, 19ht 56.5's' - Fracture or mechanical break, 410 deg, rough, undulating, 19ht 56.5's' - Fracture or mechanical break, 410 deg, rough, undulating, 19ht 56.5's' - Fracture or mechanical break, 410 deg, rough, undulating, 19ht 56.5's' - Fracture or mechanical break, 410 deg, rough, undulating, 19ht 57.2's, 57.3, 57.5, 57.5, 58.0, 58.4' - Bedding plane or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 410 deg, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break	_					╀╫		
break, <10 deg, rough, undulating, <1/8" open 5 th 98% 84	l _			1	52 3 52 5' - Redding plane or mechanical	Щ		l .
5 ft 98% 84 2 2 52.85' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.0' - Bedding plane or mechanical break, 20 deg, rough, undulating, tight 53.3' - Fracture or mechanical break, 20 deg, rough, undulating, tight 53.3' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.45, 53.6' - Mechanical break, 50 deg, rough, undulating, tight 55.45, 57' - Bedding plane or mechanical break, 60 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, 40 deg, rough, undulating, 1/8' infilling, sand infilling, open 56.5' - Fracture or mechanical break, 30 deg, rough, undulating, 4/4' open 61.0 NR				-		Н		
deg, rough, undulating, tight 53.0' - Bedding plane or mechanical break, 35 deg, rough, undulating, tight 53.2' - Fracture or mechanical break, 20 deg, rough, undulating, tight 53.4' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.4' - Fracture or mechanical break, 60 deg, rough, undulating, tight 55.4' - Fracture or mechanical break, 60 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, 1/8" infilling, sand infilling, open 60	-					П		
53.0' Bedding plane or mechanical break, 35 deg, rough, undulating, tight 53.2' Fracture or mechanical break, 20 deg, rough, undulating, tight 53.4's Fracture or mechanical break, 50 deg, rough, undulating, tight 53.4's 53.6' - Mechanical break, 60 deg, rough, undulating, tight 55.4' - Fracture or mechanical break, 60 deg, rough, undulating, tight 55.7' Bedding plane or mechanical break, 410 deg, rough, undulating, 1/8' infilling, sand infilling, open 56.55' - Fracture or mechanical break, 30 deg, rough, undulating, 1/8' open 61.0 1	-		84	2		╁┼╁		
35 deg, rough, undulating, tight 53.2' - Fracture or mechanical break, 20 deg, rough, undulating, tight 53.3' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.45, 53.6' - Mechanical break, 60 deg, rough, undulating, tight 53.45, 53.6' - Fracture or mechanical break, 60 deg, rough, undulating, tight 55.4' - Fracture or mechanical break, 60 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, 410 deg, rough, undulating, 1/8" infilling, sand infilling, open 56.0-60.5' - moderate yellowish brown, (10/R 5/4), very fine to fine grained, moderate to strong HCI reaction, weak to medium strong (R2 to R3), voids (<3/16") over 80-90% of rock surface, moderately to highly fossiliferous, with fossil molds 1/2"x1/4", extremely weak to very weak at 57.25-57.55's and 59.95-60.5' R4: 10 minutes No Recovery 55.9-56.0' Limestone 56.0-60.5' - moderate yellowish brown, (10/R 5/4), very fine to fine grained, moderate to strong HCI reaction, weak to medium strong (R2 to R3), voids (<3/16") over 80-90% of rock surface, moderately to highly fossiliferous, with fossil molds 1/2"x1/4", extremely weak to very weak at 57.25-57.55's and 59.95-60.5' R4: 10 minutes No Recovery 60.5-61.0'	-	90%				田		
rough, undulating, tight 53.3' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.4's, 53.6' - Mechanical break, 60 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, 30 deg, rough, undulating, tight 55.7's Bedding plane or mechanical break, 30 deg, rough, undulating, tight 56.0-60.5' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids (<3/16") over 80-90% of rock surface, moderately to highly fossiliferous, with fossil molds 1/2"x1/4", extremely weak to very weak at 57.25-57.55' and 59.95-60.5' Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented	-			2		╂╥╂	-	
53.3' - Fracture or mechanical break, 50 deg, rough, undulating, tight 53.45, 53.6' - Mechanical break, 60 deg, rough, undulating, tight 53.45, 53.6' - Fracture or mechanical break, 60 deg, rough, undulating, tight 55.4' - Fracture or mechanical break, <10 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, <10 deg, rough, undulating, 1/8" infilling, sand infilling, open 56.55' - Fracture or mechanical break, 30 deg, rough, undulating, tight 57.25, 57.35, 57.55, 58.0, 58.4' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.25' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented						\Box	_	
rough, undulating, tight 53.45, 53.65, - Mechanical break 54.25' - Fracture or mechanical break, 60 deg, rough, undulating, tight 55.4' - Fracture or mechanical break, <10 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, <10 deg, rough, undulating, 1/8" infilling, sand infilling, open 56.55' - Fracture or mechanical break, 30 deg, rough, undulating, 1/8" infilling, sand infilling, open 56.55' - Fracture or mechanical break, 30 deg, rough, undulating, tight 57.25, 57.35, 57.5, 55.5, 58.0, 58.4' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.25' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 60.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 60.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented	-12.9]		2		Н	_	R3: 8 minutes
NR 53.45, 53.6' - Mechanical break, 60 deg, rough, undulating, tight 55.4' - Fracture or mechanical break, <10 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, <10 deg, rough, undulating, 1/8" infilling, open 56.5' - Fracture or mechanical break, <10 deg, rough, undulating, tight 57.25, 57.35, 57.5, 57.55, 58.0, 58.4' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.25' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, <10 deg, smooth, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/2" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <10.2" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough, undulating, <10.2" open 60.2 open 60.2 open 60.2 open 60.2 open 60.2 open 60.2 op		56.0			rough, undulating, tight	Ш		1
deg, rough, undulating, tight 55.4' - Fracture or mechanical break, <10 deg, rough, undulating, tight 55.4' - Fracture or mechanical break, <10 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, <10 deg, rough, undulating, 1/8" infilling, sand infilling, open 56.55' - Fracture or mechanical break, <30 deg, rough, undulating, 1/8" infilling, sand infilling, open 56.55' - Fracture or mechanical break, 30 deg, rough, undulating, tight 56.0-60.5' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate to strong HCI reaction, weak to medium strong (R2 to R3), voids (<3/16") over 80-90% of rock surface, moderately to highly fossiliferous, with fossil molds 1/2"X1/4", extremely weak to very weak at 57.25-57.55' and 59.95-60.5' Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.25' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 60.2, 60.45' - Fracture or mechanical break, horizontal, rough, undulating, <1/4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented				-		╁		1
55.4' - Fracture or mechanical break, <10 deg, rough, undulating, tight 55.7' - Bedding plane or mechanical break, <10 deg, rough, undulating, 1/8" infilling, sand infilling, open 56.55' - Fracture or mechanical break, 30 deg, rough, undulating, tight 2 Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.25' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, <10 deg, smooth, undulating, <1/2" open 60.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented 55.4' - Fracture or mechanical break, <10 deg, rough, undulating, sandy or fragmented 55.5' - Fracture or mechanical break, <10 deg, rough undulating, sandy or fragmented 55.7' - Fracture or mechanical break, <10 deg, rough, undulating, sandy or fragmented 57.25, 35, 57.55, 57.55, 58.0, 58.4' - Bedding plane or mechanical break, <10 deg, rough undulating, <1/4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented	1 -			1		口		
FR4-NO 5 ft 90% 67 1 2 2 55.7' - Bedding plane or mechanical break, 30 deg, rough, undulating, 1/8" infilling, sand infilling, open 56.55' - Fracture or mechanical break, 30 deg, rough, undulating, tight 57.25, 57.35, 57.55, 58.0, 58.4' - Bedding plane or mechanical break, 410 deg, rough, undulating, 41/4" open 59.25' - Bedding plane or mechanical break, 410 deg, rough, undulating, 41/4" open 59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, 41/4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented 55.7' - Bedding plane or mechanical break, and the same strong (R2 to R3), voids (<3/16") over 80-90% of rock surface, moderately to highly fossiliferous, with fossil molds 1/2"x1/4", extremely weak to very weak at 57.25-57.55' and 59.95-60.5' R4: 10 minutes	-					╀┼╂	brown, (10YR 5/4), very fine to fine	
 R4-NQ 5 ft 90% 67 1 1 2 60 -17.9 61.0 R4-NQ 5 ft 90% 67 1 1 2 60 -17.9 61.0 84 NR 7	-			5		口		
sand infilling, open 56.55' - Fracture or mechanical break, 30 deg, rough, undulating, tight 2	- ا			igsquare		╀		
56.55' - Fracture or mechanical break, 30 deg, rough, undulating, tight 57.25, 57.35, 57.55, 58.0, 58.4' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.25' - Bedding plane or mechanical break, <10 deg, smooth, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 60.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented	I _		67	,	sand infilling, open	口	rock surface, moderately to highly	
2 57.25, 57.35, 57.55, 58.0, 58.4' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.25' - Bedding plane or mechanical break, <10 deg, smooth, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 60.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented Weak at 57.25-57.55' and 59.95-60.5' Weak at 57.25-57.55' and 59.95-60.5' No Recovery 60.5-61.0'			O1		56.55' - Fracture or mechanical break, 30	H		
Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open 59.25' - Bedding plane or mechanical break, <10 deg, smooth, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 60.2, 60.45' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented	_	1 1				Ш		1
rough, undulating, <1/4" open 59.25' - Bedding plane or mechanical break, <10 deg, smooth, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough to smooth, undulating, 1/4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented				2		╁┼	_ wound at 07.20-07.30 and 08.80-00.9	
59.25' - Bedding plane or mechanical break, <10 deg, smooth, undulating, <1/4" open 59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough to smooth, undulating, 1//4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented					rough, undulating, <1/4" open	口	_	R4: 10 minutes —
59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough to smooth, undulating, 1/4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented	-			_		₽₽	No Possyon, 60 5 64 0	
horizontal, rough, undulating, <1/2" open 60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough to smooth, undulating, 1/4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented	1 -	61.0		NR		Ш	NO Recovery 60.5-61.0	
60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough to smooth, undulating, 1/4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented	[_]			horizontal, rough, undulating, <1/2" open	H	_	1
1 1/4" open 61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented						Ħ		
61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented	1 -				3,	14	-	
rough, undulating, sandy or fragmented	-			1	61.8' - Fracture or mechanical break, 30 deg.	世	-	1
infilling, 1/2" to 1/4" open	-	DE NO			rough, undulating, sandy or fragmented	\square	-	
	<u> </u>	INO-INQ		\vdash	ıntılling, 1/2" to 1/4" open	H		
								1

APPENDIX 2BB-28 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	5	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMING	METHODA	ND LC	ZUIFIV	MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casin		ORIENTATION : Vertical
WATER	LEVELS: 1.3	ft bgs	on 3	/11/07 START : 3/10/2007 END : 3/	12/200	7 LOGGER : R. Bitely, C. Wallestac	l, N. Jarzyniecki
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
BEL ON	N A Y	(9)	FRACTURES PER FOOT	BECOME HOW	亨	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H H		Q D (%)	FOU	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	S S	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	ENS	g	ZAC ER	PLANARITY, INFILLING MATERIAL AND	Σ	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
口饭皿		ď	표교	THICKNESS, SURFACE STAINING, AND TIGHTNESS	တ	CHARACTERISTICS	, ,
	5 ft	74	1	62.5' - Bedding plane or mechanical break,	Ш	Limestone	
_	84%			horizontal, rough, undulating, 1/2" to 1/4"	Н	- 61.0-65.2' - moderate yellowish	-
-			1	open		brown, (10YR 5/4), very fine to fine grained, moderate HCl reaction,	-
65				63.45' - Mechanical break 63.7-64.0' - Fracture or mechanical break, —	Ш	— extremely weak to very weak (R0 to	
-22.9			_1_	<10 deg, rough, undulating, rock fragment	\Box	R1), voids to 1/16" over <15% of	R5: 12 minutes
-	000		NR	infilling, 3-1/2" open		rock surface from 61.0-61.6', voids to	7
-	66.0			64.65' - Bedding plane or mechanical break,	ш	- 3/16" over 10% of rock surface in	-
_			2	horizontal, smooth, undulating, 1/8" open	\vdash	mottled patterns from 61.6-63.4',	_
			_	65.05' - Bedding plane or mechanical break,		mottling decreasing with depth, voids	
_				<10 deg, rough, undulating, 1/8" open 66.3' - Fracture or mechanical break, 60 deg,	ш	 to 1/16" covering <5% of rock surface from 64.0-65.2', poorly to 	-
_			0	rough, undulating, tight	+	moderately fossiliferous with molds	-
_				66.8' - Bedding plane or mechanical break,	\perp	to 1/2"x1/8", solution	_
	R6-NQ	00		horizontal, rough, undulating, tight		cavities/bioturbation at 63.45', weak	
_	5 ft 100%	98	1	68.45' - Bedding plane, horizontal, smooth,	11	to medium strong at 62.5-64.3'	7
-	100%			undulating, tight	╂╫	No Recovery 65.2-66.0'	-
-			0		\Box	Limestone	_
70					Н	66.0-71.0' - pale yellowish brown, (10YR 6/2), mild to moderate HCl	
-27.9				70.0' - Bedding plane or mechanical break,	Н	reaction, very weak to medium	R6: 9 minutes
-			1	horizontal, smooth, undulating, tight	ш	strong (R1 to R3), voids (1/6") over	-
_	71.0			70.2, 71.0' - Mechanical break		_ 30-70% of rock surface, poorly	_
			,		\vdash	fossiliferous, trace molds, trace	
-			1	71.55' - Fracture, 25 deg, rough, stepped,	П	cavities to 3/4"x1/4" some cavities	_
-				1/4" open	-	with secondary infilling, laminated bedding with organics from 67.3-67.7	-
_			3	72.4' - Fracture, 60 deg, smooth, undulating,	ш	71.0-72.9' - yellowish gray to light	_
				tight	П	_ olive gray, (5Y 7/2 to 5Y 5/2), very	
-	R7-NQ			72.65' - Fracture or mechanical break, 20		fine to fine grained, moderate HCl	Driller's Remark: Silt seam
-	5 ft	53	NR	deg, rough, undulating, tight	₩	reaction, extremely weak to medium	from 72.9-73.9' based on
-	74%		0 /	72.8' - Bedding plane or mechanical break,	₽П	strong (R0 to R3), voids (3/16") over	drilling speed and circulation -
			-	horizontal, smooth, undulating, tight		20-80% of rock surface, moderately	Driller's Remark: 30% loss
75			1	72.9-73.9' - Clay seam, driller reports soil	Ш	 fossiliferous with fossil molds, trace secondary infilling of cavities, mottled 	of circulation fluids at
-32.9				horizon	+	No Recovery 72.9-73.9'	approximately 74'
			4	tight		- Limestone	R7: 9 minutes
	76.0		NR	75.15, 75.25' - Bedding plane, horizontal,	Ш	73.9-75.7' - Same as 71.0-72.9'	
				smooth, undulating, tight	$\vdash \vdash$	No Recovery 75.7-76.0'	1
1 -			1	75.5, 75.55' - Bedding plane or mechanical	口	- Limestone	-
-				break, horizontal, smooth to rough,	Ш	76.0-76.9' - light olive gray, (5Y 5/2),	_
			0	undulating, tight		very fine to fine grained, moderate HCl reaction, weak to medium strong	
I -			U	76.9' - Bedding plane or mechanical break, <10 deg, rough, undulating, open 1"	Ш	(R2 to R3), voids (1/16") over	1
1 -	R8-NQ		0	77.1' - Fracture, 70 deg, rough, undulating,	╁┼	10-90% of rock surface, cavities to	-
-	5 ft	27	0	1/2" open		- 2"x1/8"	-
	49%			77.3-77.5' - Clay seam	Ш	76.9-77.3' - yellowish gray, (5Y 7/2),	
				77.75, 77.85, 77.9, 78.05' - Bedding plane,	\vdash	very fine to fine grained, extremely	7
-			NR	horizontal, smooth, undulating, tight	11	weak (R0), voids (1/6") covering 75% of rock surface	-
-37.9			INIX	_	\Box	Fat Clay To Highly Plastic Silt (CH)	
-37.9					\vdash	- 77.3-77.5' - moderate HCl reaction	R8: 9 minutes
1	81.0				$\vdash\vdash$	Limestone	
1 -	01.0			•	\Box	77.5-78.1' - Same as 76.9-77.3'	-
-			2	81.35, 81.4' - Fracture or mechanical break,	+	78.1-78.45' - Same as 76.0-76.9'	SC-1 collected at 81.4-
1				<10 deg, smooth to rough, undulating,	Н	No Recovery 78.45-81.0'	82.4' _
I -				organic staining over 50-80% of surface,		-	1
1 -			1	<1/2" open		-	-
-				82.7, 83.25, 83.4' - Mechanical break	$\vdash\vdash\vdash$	_	-
	R9-NQ				Ш		
1							
					_		

APPENDIX 2BB-29 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-03	SHEET	6	OF	12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical
C. Wallestad, N. Jarzyniecki

WATER	LEVELS: 1.3	ft bgs	s on 3/	11/07 START : 3/10/2007 END : 3/	12/20	07 LOGGER: R. Bitely, C. Wallesta	d, N. Jarzyniecki
≥ D ≥	(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	5 ft 98%	84	2	83.6, 83.7' - Bedding plane, rough, undulating		Limestone - 81.0-85.35' - yellowish gray to very light gray, (5Y 7/2 to N8), very fine to fine grained, weak to medium strong	-
85 -42.9 -	86.0		>10 NR/	85.55-85.9' - Fracture zone, rough, undulating to stepped		— (R2 to R3), extremely weak at 83.6-83.7', laminated from 81.0-81.4', voids (<1/16") over 30% of rock surface, organics rare from	R9: 12 minutes
- - -			>10	86.0-86.3 - Fracture zone, rough, undulating to stepped, intersecting fractures 86.8-87.0 - Bedding plane, <10 deg, 1/2" clay infilling, 1/2" open		81.35-81.4', secondary infilling of very fine grained matrix from 81.4-83.6', fossiliferous with molds up to 1/2"x1/4" with some secondary infilling, cavities up to 3" with	- - -
- - -	R10-NQ 5 ft 86%	64	0	87.6' - Bedding plane, <10 deg, smooth, undulating, 1/4" open 88.5' - Mechanical break		 secondary infilling, voids (3/16") over 80-90%, organics, fossiliferous, and cavities up to 1-1/2", possible bioturbation at 81.4-83.6' 85.35-85.9' - Same as 81.0-85.35' 	- - -
90 -47.9	91.0		>10 >10 NR	89.7-90.3' - Fracture zone, rough, undulating,intersecting fractures		except extremely weak to very weak (R0 to R1), molds up to 1"x1/4" with some secondary infilling, cavities up to 1-1/2"x1/2", trace organics No Recovery 85.9-86.0'	R10: 7 minutes
- - -			0	92.0, 94.3' - Mechanical break		Limestone 86.0-87.0' - Same as 85.35-85.9' except fat clay (CH) to elastic silt (MH) seams at 86.8' and 87.5', secondary infilling of cavities at	End drilling for the day 3/10/07 at 91.0' Resume drilling on 3/11/07 at 91.0', water level is 1.3' below ground surface
-	R11-NQ 5 ft 100%	76	0	92.8' - Bedding plane or mechanical break, <10 deg, smooth, undulating 93.5' - Mechanical break 94.05, 94.5' - Bedding plane or mechanical		86.65-86.8', cavities up to 1-1/2"x1/2" 87.0-87.65' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely weak (R0), fossil molds up to 1/2"x1/4", cavities few, some secondary infilling	- - -
95_ -52.9 -	96.0		>10	break, <10 deg, rough, undulating 94.65' - Fracture, smooth, undulating, 1/4" open 94.75' - Fracture, 50 deg, infilling, up to 1/2" open		87.65-90.3' - light olive gray to dark yellowish brown, (5Y 5/2 to 10YR - 4/2), very fine to fine grained, very weak to medium strong (R1 to R3),	R11: 24 minutes
- - -			0	95.1-96.0' - Fracture zone, intersecting fractures 97.05, 99.5, 96.0-96.2' - Mechanical break		voids (<3/16") over 60% of rock - surface, cavities few (up to 1/2"), trace organics, possible bioturbation, very fossiliferous, molds and casts - up to 1/4"x1/2"	SC-2 collected at 96.0- 97.0' -
- - - -	R12-NQ 5 ft 100%	87	1	98.7' - Mechanical break, 50 deg, rough, stepped		No Recovery 90.3-91.0' Limestone 91.0-93.0' - dusky yellow, (5Y 6/4), very fine to fine grained, very weak to medium strong (R1 to R3), fossiliferous with casts up to	- - -
100 -57.9 -	101.0		5	99.9' - Bedding plane, <10 deg, smooth, undulating, up to 1/4" open 100.35, 100.4' - Fracture, <10 deg, rough, undulating, up to 1/4" open 100.55-101.0' - Fracture zone, 80-85 deg,		3/4"x1/2", voids (3/16") over 30% of rock surface, cavities up to 1/2"x1/4" over 15% of rock surface, yellowish gray (5Y 7/2) secondary infilling up to 2"x2" with trace voids (1/16"), trace organics	R12: 10 minutes -
- - -	R13-NQ		1	rough, undulating, fracture interval separated by bedding plane fractures 100.7-100.9' - Fracture zone or bedding plane, rough, undulating 101.2, 103.3, 103.5, 103.6, 104.4' - Mechanical break		-	

APPENDIX 2BB-30 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	7	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW			ORIENTATION : Vertical
WATER	LEVELS : 1.3	ft bg	s on 3		12/20		
≳ D ≨	<u> </u>			DISCONTINUITIES	F00	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE	S.E.A.	Q D (%)	150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
TA Z	SNE	Oρ	RAC ER F	PLANARITY, INFILLING MATERIAL AND	Į₩.	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ESE		œ		THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
	5 ft 100%	98	0	101.3' - Fracture, 50 deg, rough, undulating 102.5' - Mechanical break, <5 deg, rough,	Н	93.0-96.0' - yellowish gray, (5Y 7/2), - weak to medium strong (R2 to R3),	
			,	undulating	Ш	voids over <10% of rock surface	
105			1	3	Н	increasing to 30% from 93.65-94.35',	· ·
-62.9				104.95' - Bedding plane, rough, undulating		 fossiliferous with molds/casts up to 1/2"x1/4", possibly bioturbated from 	R13: 8 minutes
-	400.0		0			93.65-94.35'	-
-	106.0				\vdash	- Limestone	-
_			0	106 F 109 2 100 2! Machanical brook	+	96.0-101.0' - yellowish gray, (5Y 7/2), very fine to fine grained, very weak to	-
_				106.5, 108.3, 109.2' - Mechanical break	\perp	- medium strong (R1 to R3), voids	_
			1	107.35' - Bedding plane, <15 deg, rough,		(3/16") over 35% of rock surface	_
			'	undulating, 1/4" open	\vdash	decreasing to 15-20% at 99.8', fossiliferous with casts/molds up to	
1 7	R14-NQ			108.1, 108.6, 108.8' - Bedding plane, 10 deg,	Ш	1/2"x1/4", organics visible in solution	· -
	5 ft 100%	87	3	smooth to rough, undulating, tight to up to	╁	cavities at 98.4-98.6', secondary	_
-	10070			1/8" open at 108.8'	Ħ	 infilling with voids over <10% of surface and with trace fossils 	-
			1		₩	101.0-106.0' - yellowish gray, (5Y	-
110_ -67.9				109.75' - Mechanical break, 10-15 deg,	╨	7/2), very fine to fine grained, weak	SC-3 collected at 109.75-
-			3	rough, undulating	╁┰	to very weak (R2 to R1), voids over 20-30% of rock surface, fossiliferous	110.65' R14: 5 minutes
_	111.0			110.65, 110.85, 110.95' - Bedding plane, <10		with casts up to 1"x1/2", fossils and	-
			3	deg, rough, undulating, up to 1/4" open 111.05' - Fracture zone, rough, undulating,	\vdash	voids increase from zone at	_
				intersecting fractures		102-103.5', clay infilling over 5% of voids, secondary infilling of yellowish	
				111.7, 112.1, 115.15-115.2, 115.85' -		gray (5Y 8/1) limestone with <10%	_
1 -			0	Mechanical break	┰	voids and fossils; sparsely fossiliferous from 101-102.5' with	-
_	R15-NQ			113.1, 113.35, 113.45, 113.55, 113.7, 113.8,		15-25% voids on rock surface	-
-	5 ft	89	6	114.1, 144.3, 144.35, 114.75, 114.85' -	╨	106.0-106.9' - light olive gray to	-
-	100%			Fracture zone or bedding plane, <10 deg,	┰	yellowish gray, (5Y 5/2 to 5Y 7/2), very fine to fine grained, very weak	-
-			5	smooth to rough, undulating, up to 1/8" open, healed fracture at 119.6'	╁╌	(R1), voids (1/16") over 20% of rock	-
115 <u> </u>				_		surface, fossiliferous with	
-12.9			1		片	molds/casts up to 1"x1/2", laminar bedding planes	R15: 9 minutes
	116.0			115.5' - Bedding plane, <10 deg, smooth to rough, undulating, up to 1/8" open	$oldsymbol{oldsymbol{oldsymbol{\mu}}}$	106.9-111.0' - yellowish gray, (5Y	_
			2	116.1, 116.45, 116.55' - Bedding plane, <10		5/2), very fine to fine grained, very	
1 7			3	deg, smooth to rough, undulating, up to 1/4"	\vdash	 weak to weak (R1 to R2), voids (3/16") over 25-30% of rock surface, 	-
				open		fossiliferous with fossils up to	·
-			0		╨	 1/4"x1/4", possible dissolution cavities up to 1/2"x1/2" 	-
-	R16-NQ			440 5 440 45 440 75 440 0 400 0	匚	111.0-119.0' - yellowish gray, (5Y	-
-	5 ft		0	118.5, 118.45, 116.75, 119.8, 120.9' - Mechanical break	+	 7/2), very fine to fine grained, very 	-
-	100%			soriariisai sisait	F	weak (R1), voids (<1/16") over 10-30% of rock surface, voids with	-
			1	119.3' - Bedding plane, rough, undulating,	Ľ	 secondary infilling over additional 	_
120				ground rock infilling, up to 1/2" open	$oldsymbol{\square}$	25% of rock surface, secondary	
-77.9			2		Ш	infilling is yellowish gray (5Y 8/1) 119.0-121.0' - yellowish gray, (5Y	R16: 6 minutes
1 7	121.0			120.6' - Bedding plane, rough, undulating	\vdash	7/2), very fine to fine grained, weak	·
				120.95' - Fracture or mechanical break,		(R2), voids (3/16") over 30% of rock	_
-			1	rough, undulating, high angle fracture 121.35' - Bedding plane, 15 deg, rough,	╨	 surface, highly fossiliferous, with fossils up to 1/2"x1/4", dissolution 	-
-				undulating, 1/2" open	仜	cavities up to 1/4" in diameter over	-
-			2	122.0' - Bedding plane, rough, undulating to	+	_ 15% of rock surface	-
-	R17-NQ			stepped, tight	F	_	-
	KII-NQ				H		
					1		

APPENDIX 2BB-31 Rev. 4



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-03 SHEET 8 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

00	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	10	<u> </u>	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casing		ORIENTATION : Vertical
WATER	LEVELS: 1.3	ft bgs	s on 3/	/11/07 START : 3/10/2007 END : 3/	12/200	D7 LOGGER : R. Bitely, C. Wallestad	l, N. Jarzyniecki
> 0 0				DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE ANI SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- 125 -82.9	5 ft 100%	88	0	122.9' - Fracture, 55 deg, smooth to rough, undulating, up to 1/4" open 123.4' - Bedding plane, smooth to rough, undulating, up to 1/2" open 123.5, 123.7, 124.15, 125.7' - Mechanical break		Limestone 121.0-126.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 6/1), very fine to fine grained, voids (3/16") over 30% of rock surface, secondary infilling with yellowish gray (5Y 8/1) to	R17: 11 minutes
-	126.0		1 	125.75' - Fracture, 55 deg, rough, undulating		medium gray (N5) limestone, voids increase to 40-50% at 123.8-124.0 and 125.2-126.0', fossiliferous with	
-			1	126.9-126.95' - Fracture zone, intersecting fractures, up to 1/4" open 127.4' - Bedding plane, rough, undulating, up		highly fossiliferous zones at 121.0-122.2', 123.8-124.2' and 125.2-126.0' (casts/molds), dissolution cavities at 121.8' and	
-	R18-NQ 5 ft 100%	98	2	to 1/4" open 127.5, 130.15, 130.9' - Mechanical break 128.4, 128.7' - Bedding plane, tight to 1/4"		 122.1' up to 1"x1/2", smaller dissolution cavities throughout, laminar bedding at 122.9' 	
130_	.5576		0	open		 126.0-127.1' - Same as 121.0-126.0' except very weak to weak (R1 to R2), voids decreasing with depth 127.1-131.0' - yellowish gray, (5Y 	_
-87.9 - -	131.0		0			7/2; 5Y 8/1), very fine to fine grained, very weak (R1), voids (1/16") over 10% of rock surface becoming	R18: 7 minutes SC-4 collected at 130.15- 131.1'
-			0	131.95, 133.3, 134.35, 135.5' - Mechanical		infilled with depth, laminar bedding, fossiliferous with some fossils up to 1/4" in diameter, trace cavities 131.0-134.8' - yellowish gray to	
-	R19-NQ		2	break 132.4, 132.9' - Fracture, 40 deg, smooth to rough, undulating	Ħ	 dusky yellow, (5Y 7/8 to 5Y 6/4), very fine to fine grained, very weak to weak (R1 to R2), voids (1/8") over 	
_ _ _	5 ft 100%	94	0	133.45' - Bedding plane, <5 deg, smooth, undulating 133.55' - Fracture, 80 deg, rough to smooth,		10-30% of rock surface increasing with depth, fossiliferous as casts/molds, fossils more abundant at 132.7-133.2', laminar bedding	
135_ -92.9 -	426.0		0	undulating, tight — 135.5, 133.6' - Fracture, 75 deg and 80 deg,		planes 134.8-136.0' - yellowish gray, (5Y - 7/6), very fine to fine grained, weak (R2), voids (3/16"), fossiliferous	R19: 8 minutes
-	136.0		4	rough to smooth, undulating, fractures intersect at 133.55' 136.05' - Bedding plane, 40 deg, rough to smooth, undulating		(casts), dissolution cavities at - 134.9-135.2' (1"x1/2") 136.0-141.5' - yellowish gray and	
- -	B00 NO		>10	136.35, 136.7, 136.85' - Bedding plane, 40 deg, rough to smooth, undulating, up to 1/4" open		light olive gray, (5Y 7/2 and 5Y 5/2), very fine to fine grained, very weak to weak (R1 to R2), voids (1/16") over 10% of rock surface increasing to	
-	R20-NQ 5 ft 100%		2	136.45, 137.1, 137.75, 139.0' - Mechanical break 137.3-137.75' - Fracture zone or bedding plane, multiple high angle intersecting		 1/8" at 138.7' covering 25:% of rock surface, dissolution cavities up to 1/4" with some secondary calcite 	
140 -97.9			1	fractures 138.2, 138.5, 139.2' - Bedding plane, 40 deg, — rough to smooth, undulating, up to 1/4" open		mineralization, poorly fossiliferous, laminar bedding	R20: 8 minutes
_ _ _	141.0		3	140.0, 140.3' - Fracture (2), 60 deg and 65 deg, rough, undulating, up to 1/4" open 140.7' - Bedding plane, <10 deg, smooth,		- - -	Driller's Remark: 100% loss of circulation fluids at 140'
-			0	undulating, up to 1/2" open 141.3, 141.95, 145.9' - Mechanical break 141.45' - Bedding plane, <10 deg, smooth, undulating		- -	SC-5 collected at 141.85- 142.9'
-	R21-NQ					-	

APPENDIX 2BB-32 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-03	SHEET	9	OF	12

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

				EINT . Dietrich D-50 5/N 252, Hidd Totally, NQ 10015, HW			
WATER	LEVELS : 1.3	tt bgs	s on 3		12/200		
ŞQ₽	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	ე	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ANE ₹	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A B B A T I C A T I	TH,	(%) _Q	TUF:	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F 두 및	ORE SNG SCO	Oρ	SAC ER F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SE		R		THICKNESS, SURFACE STAINING, AND TIGHTNESS	ŝ	CHARACTERISTICS	21.01 0, 1201 N200210, 210.
	5 ft 91%	53	>10	143.0' - Bedding plane, <10 deg, smooth to	\Box	Limestone	
_	9170			rough, undulating, up to 1" open 143.3' - Bedding plane, <10 deg, some	\top	 141.5-143.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very 	-
			>10	recrystallization on 20% of surface		fine to fine grained, very weak to	1
145_ -102.9				143.5-144.6; 145.05-145.55' - Fracture zone, —	╫	— weak (R1 to R2), voids over 20% of	R21: 22 minutes
102.0			>10	intersecting fractures		rock surface, cavities over 10% of	NZ1. ZZ IIIIIutes
l .	146.0		NR		\bot	rock surface up to 1-1/3"x3/4", most voids and cavities infilled with	
				146.1-146.15' - Fracture zone, open		medium gray (N6) material,	
_			4	146.3' - Bedding plane, <10 deg, smooth to	Н	fossiliferous (as casts)	1
-				rough, undulating to planar, organic staining on fracture face, up to 1/2" open	ш	 143.1-145.55' - yellowish gray to very light gray, with light olive grey 	1
-			3	146.9, 147.4' - Fracture, 50 deg	+	mottling, (5Y 7/2 to N8, with 5Y 5/2),	1
-	500.110			147.55' - Bedding plane, <10 deg, 1/4" open		 very fine to fine grained, weak to 	_
I -	R22-NQ 5 ft	71	2	147.9' - Bedding plane, 10-15 deg, up to 1" open	H	medium strong (R2 to R3), voids]
	80%	, ,	_	148.4, 149.0' - Bedding plane, <10 deg, up to		over 15% of rock surface, dissolution cavities up to 1/2" in diameter,	
				1/2" open	\vdash	fossiliferous (as casts)	1
150			1			No Recovery 145.55-146.0'	1
-107.9				_	ш	Limestone 146.0-147.2' - Same as	R22: 25 minutes
-			NR		$+ \Box$	140.0-147.2 - Same as 143.1-145.55' except laminar beds	-
_	151.0					up to 4" thick, trace to 20% voids	_
_			4	151.05' - Fracture, 20 deg, up to 1/2" open	╟	over rock surface, trace organics	
			7	151.65, 151.8, 151.9' - Bedding plane, <20		 147.2-150.0' - dusky yellow to very pale orange, (5Y 6/4 to 10YR 8/2), 	
-				deg, up to 1/2" open	Н	very fine to fine grained, very weak	1
-			1	152.0' - Bedding plane, <5 deg, tight		(R1), voids (<3/16") over 30% of rock	1
-	R23-NQ				₽	surface, dissolution cavities up to 1/4" in diameter, fossiliferous (fossils	-
-	5 ft	71	1		ш	- 1/16"-1" in length), some voids and	-
l _	89%			153.8' - Mechanical break, 50 deg	\vdash	_ cavities with dusky yellow (5Y 6/4) to	
			_	•		light olive gray (5Y 6/1) secondary	
155			6	154.35-154.6' - Fracture zone or bedding plane, <10 deg, 1/2" open at 156.5	Ш	 infilling No Recovery 150.0-151.0' 	1
-112.9			>10		ш	Limestone	R23: 12 minutes
-			NR	155.4-155.55' - Fracture zone, intersecting	╁┼	- 151.0-152.75' - dusky yellow to light	-
-	156.0		INIX	fractures		gray, (5Y 6/4 to N7), very weak to weak (R1 to R2), voids (up to 1/16")	1 4
-			>10	156.0-156.1' - Fracture zone, open 156.35, 156.45' - Bedding plane, <10 deg,	Щ	- over 40% of rock surface, dissolution]
I _				rough, undulating, up to 1/8" open	Ш	cavities up to 1"x1/2", organic layer]
I -				156.4' - Fracture, 85 deg, 1/8" open		at 152.0' with very fine grained	1
			1	157.6' - Bedding plane, <10 deg, rough,		 limestone layer with no voids (<1/4" thick) 	1
-	R24-NQ			undulating, 1/4" open	Ш	152.75-155.45' - yellowish gray, (5Y	1 1
-	5 ft		2	158.5-158.8' - Fracture zone, 50 deg, rough,		 7/2), very fine to fine grained, weak 	-
-	92%			undulating, organic staining over 10-20%		(R2), very weak at 154.45-155.4', voids (up to 3/16") over 20% of rock	1 4
I -			6	159.0-159.45' - Fracture zone, rough,	H	- surface, poorly fossiliferous, laminar]
160				undulating, intersecting fractures, up to 1/4"	Ш	beds	
-117.9			0	open — 159.55, 159.75' - Bedding plane, 10 deg,	\vdash	No Recovery 155.45-156.0'	R24: 8 minutes
I -	161.0		NR	rough, undulating, 1/8" open	口	 Limestone 156.0-156.45' - Same as 	End drilling for the day
-	161.0		1417	160.5' - Fracture, 50 deg, rough, undulating,	╁┼┤	152.75-155.45' except very weak	03/11/2007, 18:30 at 161.0' -
-			1	1/8" open	口	(R1), laminar organics (<3/4") thick,	Resume drilling on 03/12/2007, water level is
-				161.55' - Bedding plane, <5 deg, rough to smooth, undulating, up to 1/4" open	+	moderately fossiliferous with casts up to 1/4"x1"	1.0' below ground surface
I _			2	162.05' - Bedding plane, <5 deg, rough to	口	- WT XI	
			4	smooth, undulating, up to 1/8" open	H		1
-	R25-NQ			162.75, 163.75, 164.55' - Mechanical break,	ш	=	1
-				rough, undulating	$+ \exists$	-	1
					1		

APPENDIX 2BB-33 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					Т
338884.FL	A-03	SHEET	10	OF	12	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 1.3	8 ft bgs	s on 3/	11/07 START: 3/10/2007 END: 3/	12/20	07 LOGGER: R. Bitely, C. Wallesta	d, N. Jarzyniecki
⊋Q≲	(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B FACE	E RU 3TH, OVE	R Q D (%)	FOC	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP' SURI ELE\	COR LEN(REC	RQI	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	5 ft	85	1			Limestone	
_	86%			-	╁	 156.45-160.6' - very fine to fine grained, very weak to weak (R1 to 	-
- 165			2	-	F	R2), alternating laminar beds up to 8"	-
-122.9			0	164.95' - Bedding plane, smooth to rough,	Ħ	— thick defined by changes in voids, voids ranging from <10% up to 30%	R25: 19 minutes
-	166.0		NR	undulating, up to 1/2" open -		(up to 1/16"), dissolution cavities at	-
_	166.0			-	⊬	 157.6', 158.45', 158.9', and 159.5' up to 1/2"x1/4" over 15% of rock 	-
-			3	- 166.6, 166.75, 166.8, 167.1, 167.2, 167.4,	ш	surface, poorly to moderately	-
-				167.55, 167.65, 167.7, 167.8, 167.95, 168.10,	世	 fossiliferous No Recovery 160.6-161.0' 	-
-			8	168.15, 168.2, 168.35, 168.45, 168.50, 169.9, - 170.0' - Bedding plane or mechanical break,	╁╌	Limestone	-
_	R26-NQ			<5 deg, smooth, undulating to planar, open	F	 161.0-165.3' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), 	-
-	5 ft 85%	38	6	up to 1/4"	Ħ	very fine to fine grained, voids (up to	SC-6 collected at 168.6-
-	65%			-	L	 3/16") over <10% of rock surface, fossil casts over <10% of rock 	169.6'
470			1	-	⊬	 surface, laminar bedding 	-
170_ -127.9			1	_	匚	characterized by color change and % voids, trace organics, highly	R26: 15 minutes
-			NR	-	団	fossiliferous from 162.05-163' with	-
_	171.0			-	Н	increase in voids (up to 1/4") over 35% of rock surface, some	-
_			3	- 171.55' - Bedding plane or mechanical break,	H	secondary infilling of voids with	-
-				horizontal, rough, undulating, tight	Ė	_ yellowish gray (5Y 7/2) to gray (N7) limestone	-
_			9	171.8' - Bedding plane, 20 deg, smooth, undulating, <1/8" open	H	No Recovery 165.3-166.0'	-
_	R27-NQ			171.95-172.25' - Fracture zone, <5 deg,	₽	Limestone 166.0-168.7' - yellowish gray to	-
-	5 ft	34	3	rough to smooth, undulating, up to 1/4" open 172.4' - Fracture, 80 deg, rough to smooth,	⇇	 moderate olive brown, (5Y 7/2 to 5Y 	-
-	97%			undulating, recrystallization on fracture	仜	4/4), very fine to fine grained, weak to medium strong (R2 to R3),	_
_			4	surface 172.6' - Bedding plane, smooth to rough,	\vdash	 extremely weak (R0) to very weak 	-
175_ -132.9				undulating, silt-sized infilling, organic —	\vdash	rock (R1) at discontinuities, voids (<3/16") over 60-80% of rock	R27: 6 minutes
102.0			5	staining, up to 1/4" open 172.9, 172.95, 173.1, 173.5, 174.0, 174.35,	Ħ	 surface, several cavities (>5) from 	1\27. 0 minutes
_	176.0		NR.	174.65' - Bedding plane or mechanical break, -	世	1/4"-1/8" on bedding laminations, poorly fossiliferous	-
_			1	<5 deg, smooth, undulating 174.5' - Bedding plane or mechanical break,	\vdash	- 168.7-170.25' - Same as	-
_				35 deg, smooth, undulating -	П	166.0-168.7' except mild to moderate HCl reaction, moderately to highly	-
-			5	175.0, 175.25-175.35, 175.55, 175.65, 175.75' - Bedding plane or mechanical break,	口	 fossiliferous (casts/molds), trace 	-
-	Dao vio			rough, undulating, <1/2" open, friable from -	士	bedding plane laminations, trace secondary infilling of fossil molds at	-
-	R28-NQ 5 ft	32	7	175.25-175.35' 176.95' - Bedding plane or mechanical break,	\vdash	– 169.8-169.9'	-
_	91%			20 deg, smooth to rough, undulating -	F	No Recovery 170.25-171.0' Limestone	-
_			>10	177.25, 177.3' - Bedding plane or mechanical break, 10 deg, smooth, undulating	片	 171.0-175.85' - light olive gray to 	-
180 <u>-</u> 137.9				178.7, 178.8' - Bedding plane, <10 deg,		pale yellowish brown, (5Y 5/2 to 10YR 6/2), very fine to fine grained,	D29: 10 minutes
- 131.8			3	rough, undulating, up to 1/4" open 178.75' - Fracture, 60 deg and 65 deg	\vdash	 extremely weak to weak (R0 to R2), 	R28: 19 minutes
-	181.0		NR	178.95' - Bedding plane, <10 deg, rough,	口	weakest along bedding plane fractures, voids (<3/16") over	_
-			2	undulating, up to 1" open 179.2-179.25' - Fracture zone, rough,	団	_ 50-80% of rock surface, laminated	_
_				undulating, 1/2" open	\vdash	bedding at 171.8', 172.9' and 174.8-175.05', several cavities	_
_			3	179.3' - Bedding plane, <5 deg, smooth to rough, planar	F	_ (<1/2") over 20% of rock surface,	_
_	Baa 1:-			179.45' - Bedding plane or mechanical break,	片	poorly fossiliferous No Recovery 175.85-176.0'	_
_	R29-NQ			smooth to rough, 1/2" to 1/4" open	H	-	
	i .						•

APPENDIX 2BB-34 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	11	OF	12	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 1.3 ft bgs on 3/11/07 START: 3/10/2007 END: 3/12/2007 LOGGER: R. Bitely, C. Wallestad, N. Jarzyniecki DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 179.5, 179.65, 179.8, 179.85, 179.95, 180.0, 180.1, 180.15' - Bedding plane, <10 deg, 5 ft Limestone 88% 176.0-178.5' - pale yellowish brown to very light gray, (10YR 6/2 to N8), smooth to rough, undulating, up to 1/2" open 4 very fine to fine grained, weak to 179.6-179.8' - Fracture zone, rough. 185 medium strong (R2 to R3), voids (<3/16") over 60-80% of rock undulating -142.9 0 R29: 15 minutes 181.3, 181.35' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/4" surface, dissolution cavity at 179.3' NR 186.0 (1-1/2"x1"), few fossil molds open SC-7 collected at 186.0-181.45-181.6' - Fracture zone, 0-55 deg, 178.5-178.7' - Same as 176.0-178.5' 1 186.75 except medium strong (R3), voids rough, undulating, intersecting fractures 182.75, 182.9, 183.0, 183.05, 183.35, 183.4, 183.45, 184.2, 184.3' - Bedding plane or (<1/16") over 0-30% of rock surface, trace mottling 5 mechanical break, smooth to rough, 178.7-179.0' - Same as 176.0-178.5' undulating, friable zones at 183.0-183.5' 186.75, 187.05' - Bedding plane or 179.0-179.5' - Same as 178.5-178.7' R30-NQ 179.5-180.55' - Same as 5 5 ft 56 mechanical break, <10 deg, rough, 176.0-178.5' 100% undulating, <1/4" open No Recovery 180.55-181.0' 187.2, 187.35, 187.75, 187.9, 188.1, 188.45, Limestone 3 188.65, 188.75' - Bedding plane, <10 deg, rough to smooth, undulating, with some <1/4" 181.0-185.4' - pale yellowish brown, 190 (10YR 6/2), very fine to fine grained, very weak to medium strong (R1 to -147 9 R30: 18 minutes open 4 189.25' - Fracture, 50 deg, smooth, R3), with extremely weak (R0) and friable silty lens, voids (<3/16") over 191.0 undulating 189.65, 189.75, 190.4, 190.55, 190.75' -60% of rock surface, few cavities 3 Bedding plane, <10 deg, rough to smooth, undulating, <1/8" open 191.1, 191.35, 191.7' - Fracture, <10 deg, (3/4"x1/4") poorly fossiliferous with few casts/molds, bioturbated, friable lens at 184.55-184.6' 2 No Recovery 185.4-186.0' rough, undulating 192.15' - Mechanical break Limestone 186.0-191.0' - pale yellowish brown R31-NQ 192.85, 193.0-193.1' - Fracture zone, rough, to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine 3 5 ft 62 undulating, <1/2" open 99% 193.45, 193.6' - Mechanical break 193.75, 193.95, 194.1' - Bedding plane or grained, weak to medium strong (R2 mechanical break, <10 deg, rough, 3 to R3), voids (<3/16") over 70-80% of undulating to stepped 194.55' - Mechanical break, 40 deg 195 rock surface, moderately to highly fossiliferous especially at 186.0-186.75' (molds/casts), -152<u>.9</u> R31: 10 minutes 194.75-194.9' - Fracture zone, rough, 1 undulating 195.6-195.8' - Fracture, rough, undulating, 2" laminated bedding over 50% of rock 196.0 NR surface 191.0-193.0' - moderate yellowish 3 fragment missing over 180 degrees of core brown to yellowish gray, (10YR 5/4 to 196.45' - Bedding plane, horizontal, rough, 5Y 7/2), fine grained, very weak to undulating, silt and/or clay sized infilling, 1/2" >10 weak (R1 to R2), voids (<3/16") over 80% of rock surface, dissolution open 196.9-197.45' - Fracture zone, rough, cavities (<1-1/2" diameter), R32-NQ undulating 198.55' - Bedding plane, horizontal, rough, laminated over 30% of rock surface, 3 5 ft 40 highly fossiliferous 84% undulating, 1/4" silt infilling 198.8, 198.85, 199.15' - Bedding plane, <10 193.0-194.0' - Same as 191.0-193.0' except very weak (R1), voids (<1/16") over 40% of rock surface, >10 deg, rough, undulating, <1/4" open 200 199.4-199.65; 199.95-200.1' - Fracture zone, rough, undulating to stepped few dissolution cavities (<1/2"x1/8") 157.9 >10 R32: 11 minutes 194.0-195.95' - Same as NR 199.65-199.95' - Fracture zone, smooth to Total depth of boring is 191.0-193.0' except voids (<3/16") 201.0 201.0' over 30-80% of rock surface, fossils rough, undulating, high angle fracture planes intersecting bedding plane at 199.8', tight decreasing with depth, highly fossiliferous with casts/molds and 2" diameter dissolution cavities at 195.6-195.8' No Recovery 195.95-196.0'

> APPENDIX 2BB-35 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	12	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

				MENT . Dietrich D-50 5/N 252, Midd rotary, NQ tools, HW		
WATER	LEVELS : 1.3	ft bgs	s on 3/		2/20	
>				DISCONTINUITIES	U	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,
표공인	Z - Z	(%	紫		일	MINERALOGY, TEXTURE,
ΤΥΫ́Α	SE F GTI SOV	(%) Q	SET	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽ Bo	MEATHERING, HARDINESS, SMOOTHNESS, CAVING ROD
	SEN	S S	F.R.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	CHARACTERISTICS DROPS, TEST RESULTS, ETC.
20,2					٠,	Limestone
				_	ļ	- 196.0-197.45' - pale yellowish brown
						to very pale orange, (10YR 6/2 to
					1	10YR 8/2), very fine to fine grained,
1 -					ł	extremely weak to weak (R0 to R2),
1 -				-	ł	voids (<3/16") over 50% of rock surface, mottled, bioturbated over
				_		- 30% of rock surface, elastic silt (MH)
						from 196.0-196.5'
1 1				_	1	197.45-199.4' - Same as
1 -				-	i	- 196.0-197.45' except very weak to
-				-	ł	medium strong (R1 to R3), voids (<3/16") over 70-80% of rock
1 4				_		(\(\cap{3}\) 0 \(\cap{4}\) \(\cap{5}\) \(\cap{7}\) \(\cap{5}\) \(\cap{7}\) \(\cap{5}\) \(\cap{7}\) \(\cap{5}\) \(\cap{5}\)
1						fossiliferous, trace laminated bedding
1 7				_	1	199.4-200.2' - Same as
1 -				-	1	196.0-197.45' except voids (<1/16") over 30-50% of rock surface, poorly
1 -				-	l	fossiliferous, organics from
1 4					1	199.5-200.1 [']
				_		No Recovery 200.2-201.0'
				_	1	Bottom of Boring at 201.0 ft bgs on
1 -				-	ı	- 3/12/2007 -
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-04	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

ORIENTATION : Vertical

,					50 3/14 232, ITIUU TOLALY	v, cathead, NWJ rods, 6 tri-	cone bit		ORIENTATION: Vertical
WATER	LEVELS	: 0.1 ft bo	gs on 03/2	26/07	START : 3/25/2007	END: 3/27/2007	LOGGE	R : R.	Bitely, C. Wallestad
>00				STANDARD		SOIL DESCRIPTION		ā	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 1111	LICOC ODOLID OVARDO	001.00	SYMBOLIC LOG	DEDTIL OF CACING SPILLING DATE
H H H		RECOVE	RY (ft)			USCS GROUP SYMBOL, CONTENT, RELATIVE DEN		O LK	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
THE YEAR			#TYPE	6"-6"-6"		, SOIL STRUCTURE, MIN		₩	INSTRUMENTATION
333				(N)	D 1 0 1 10	1 (00)		Ś	
41.3	0.0			1-1-2	Poorly Graded S 0.0-1.0' - pale vel	i and (SP) Ilowish brown, (10YR 6/2	?). moist.		"Water level is based on Ground Water Monitoring at LNP site (FSAR Table -
l _		1.0	SS-1	(3)	very loose, very f	ine to fine grained, subro	ounded silica		2.4.12.08)"
l _	1.5			, ,	sand, trace nonpl	lastic fines, 1" loamy org n black (5YR 2/1), with 20	anic layer at		
					mass/organics	1 51dok (5 111 2/1), with 2	70 1001		
-								1]
_							-	1	Water table between 1.5' and 5' below
_							•	1	ground surface, based on split spoon sample -
-							-	1	Rapid drilling rate
5	5.0						•	1	-
36.3	5.0				Silty Sand (SM)			111	
-		1.3	SS-2	1-2-3	5.0-5.7' - dusky y	rellow, (5Y 6/4), wet, loos	se, very fine	Ш	
-		1.0	00-2	(5)	grained, subround fines	ded silica sand, 20-25%	iow plasticity /		
-	6.5				Clav With Sand	(CH)		1	-
-					5.7-6.3' - modera	ite olive brown, (5Y 4/4), dilatancy, 20-25% very	moist, firm,	-	-
-					silica sand	dilataricy, 20-25% very	ille grained	-	_
-							, .	4	_
_							-	1	_
-								1	_
l _									_
10	10.0							<u> </u>	_
31.3				10.40	Fat Clay (CH)	olive gray, (5Y 5/2), wet,	soft [K	1
		1.3	SS-3	16-4-8 (12)		plasticity, slow to no dilata	ancy, no HCl /[ш	
	11.5			(/		ery fine grained silica san	nd /	Ш	Light chatter at 11 feet
_					Silt (ML) 10.2-10.7' - gravis	sh yellow, (5Y 8/4), mois	t to wet. stiff.	1]
-					rapid to no dilatar	ncy, moderate HCI reacti	ion, fine to	1]
_					medium sand-siz	red lenses <1/2" thick at	10.2'	1	1
-					Silt (ML)	ilate		1	1
-					10.7-11.3' - Same	e as 10.2-10.7' except we	et ·	1	1
-					(saturated)			1	Moderate to slow drilling rate 11-20'
	45.0							1]
15 <u></u> 26.3	15.0				Sandy Silt (ML)			Ιш	⊣
-		1.0	SS-4	11-6-10	15.0-16.0' - grayis	sh yellow, (5Y 8/4), mois	t, very stiff,	1	-
-		1.0	JJ-4	(16)		dilatancy, moderate HCl <1/4" thick of fine to coa		╨	-
-	16.5				Countries in initials	i mon or mic to toda		1	-
-								1	-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-04	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

ORIENTATION: Vertical

DRILLIN	GIVIETH	OD AND	EQUIPIVII	ENT : Dietrich D-	50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 0.1 ft bo	gs on 03/2	26/07	START: 3/25/2007 END: 3/27/2007 LOGGER: R. Bitely, C. Wallestad
≥∩∵				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
ANI (#	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR ☐ ☐ DRILLING FLUID LOSS, TESTS, AND
EN.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
21.3	20.0			(N)	Silt And Limestone Lenses (ML)
-	20.0	10	SS-5	18-11-11	20.0-21.0' - grayish yellow to grayish orange, (5Y 8/4 -
-		1.0	33-3	(22)	to 10YR 7/4), moist to wet, very stiff, nonplastic, rapid dilatancy, moderate to strong HCl reaction, all
-	21.5				√ \carbonate, 50% silt and 50% limestone lenses <2" / - □
-					\thick, voids and fossil structures intact
-					-
-					-
-					-
-					- I
-					
25 <u> </u>	25.0				Silt And Limestone Lenses (ML) Moderate to heavy chatter 25-37', moderate
		1.5	00.0	8-10-16	25.0-26.5' - Same as 20.0-21.0' except yellowish gray, - to slow drilling rate
-		1.5	SS-6	(26)	(5Y 7/2), 2" elastic silt or lean clay (CL) seam at 25.5'-25.65'; moderate plasticity with slow dilatancy
-	26.5				25.5 25.55 ; moderate plasticity with slow dilutationy
-					-
-					-
-					
-					-
-					- I
-					- .
30 <u> </u>	30.0 30.3	0.2	SS-7	50/3	Limestone Fragments And Silt And Sand
11.3	00.0	0.2	35-7	(50/3") /	√ \ 30.0-30.25' - Same as 25.0-26.5' except moderate
-					\HCl reaction, all carbonate, limestone fragments <1/2" \ -
-					- Linck
-					
-					- .
-]
-]
l -]
-					- .
35	35.0				Cile Mish Cond (MI)
6.3		0.9	SS-8	20-50/5 (70/11")	Silt With Sand (ML) 35.0-35.9' - moderate yellowish brown to dusky
_	35.9			(10/11)	Ļ yellowish brown, (10YŘ 5/4 to 10YR 2/2), wet, hard,
_					\langle low to medium plasticity, slow to rapid dilatancy, mild \langle HCl reaction, 15% fine to coarse sand-sized \langle -
-					carbonate particles
-					Moderate to heavy chatter from 37-39', extremely slow drilling (15 minutes / 2 feet)
-					
-]
-					<u> </u>
-					Heavy chatter from 39-40', slow drilling rate
40					
Щ					<u> </u>



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-04	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

ORIENTATION : Vertical

DNILLIN	GIVIETH	OD AND	EQUIPIVIE	ENT : Dietrich D-	50 5/N 232, mud rotary	y, cathead, NWJ rods, 6 tri-co	one bit		ORIENTATION: Vertical
WATER	LEVELS	: 0.1 ft bo	gs on 03/2	26/07	START : 3/25/2007	END: 3/27/2007	LOGGER	: R.	Bitely, C. Wallestad
				STANDARD	<u> </u>	SOIL DESCRIPTION		(n	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION				SYMBOLIC LOG	
O A A		RECOVE	. ,	TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL, C	OLOR,	CIC	DEPTH OF CASING, DRILLING RATE,
A HE E		L VECOAR			MOISTURE C	CONTENT, RELATIVE DENS	SITY OR	BO	DRILLING FLUID LOSS, TESTS, AND
FE E			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MINE	RALOGY	N.S	INSTRUMENTATION
1.3	40.0	0.1	\ SS-9 /	50/2	│ ├┐ Limestone Fragr	monto		-	Moderate to heavy chatter from 40-55',
'.5	40.0		(00-5)	(50/2")	\ 40.0-40.1' - pale	vellowish brown. (10YR 6/	2), verv		moderate to rieavy chatter from 40-33,
I _					\dense, mild to mo	oderate HCI reaction, very	fine to fine / _		_
					\grained, <10% vo	oids <1/16" diameter			
-									7
-							-		-
-							-		-
-							-		-
_							_		_
45	45.0						_		-
45 -3.7	73.0				Silty Sand (SM)			111	-
-		1.4	SS-10	27-42-50/4.5	45.0-46.4' - mode	erate yellowish brown, (10	YR 5/4), -		-
-		'.4	33-10	(92/10.5")	moist to wet, very	y dense, very fine to coars HCl reaction, 30% nonpl	e grained,		-
_	46.4				milio to moderate	norreaction, 30% nonpi	astic lines	1111	_
_							_		-
-							-		-
-							-		-
I -							-		=
I _							_		_
50_	50.0 50.2								
-8.7	50.2	0.2	SS-11	50/2	Limestone Fragr	ments	(D.F.()	-	
-				(50/2")	bild HCl reaction	erate yellowish brown, (10` n, wafer-shaped fragments	YR 5/4),		-
-					VIIIIa 11011caciioii	i, water shaped fragments			-
_							-		-
-							-		-
_							_		_
-							_		-
-							-		-
	55.0						-		-
55	55.3	0.1	SS-12	50/3	Limestone Fragr		7	Щ	End SPT at 55' below ground surface; switch
-13.7				(50/3")	\55.0-55.1' - Same Begin Rock Corir		/ _		to rock coring Set HW casing to 55' below ground surface
					See the next she	et for the rock core log			at 17:00
					COO the next one	ot for the rook core log	_		Break for day at 17:00
-							_		Water level at 0' (ground surface)
-							-		-
-							-		-
-							-		-
_							_		
1 7							_]
60							_		7
00_									
		L							



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-04	SHEET	4	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

CORING	METHODA	ND L	QUIT IV	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casing		ORIENTATION : Vertical
WATER	LEVELS: 0.1	ft bg	s on 0	3/26/07 START: 3/25/2007 END: 3/2	27/200	7 LOGGER: R. Bitely, C. Wallesta	<u> </u>
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ø	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	ER'A	(%	복당		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T ¥ ₹ ×	A S S S S S S S S S S S S S S S S S S S	(%) Q	PE	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	RES	a Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-13.7	55.0				Н	Limestone	Continue drilling at A-04 at
-	R1-NQ		0	-		55.0-55.9' - moderate yellowish	07:30 on 03/26/07 -
l -	1.5 ft 60%	60		55.7' - Mechanical break	H	brown, (10YR 5/4), very fine to fine	Begin rock coring at 55'
I _	56.5		NR	_	Ш	grained, moderate HCl reaction, - extremely weak to weak (R0 to R2),	Water level at 1 inch below ground surface at 07:30
			,		Н	strength decreasing with depth, voids	ground canado at or loc
			4	56.9, 57.0, 57.4, 57.95, 58.05, 58.9, 59.55, 60.0' - Fractures (8), <10 deg, rough,	Н	<3/16" over 60% of surface, trace	R1: 2 minutes
-				undulating, along bedding planes, open <1/2"	H	 organic laminations No Recovery 55.9-56.5' 	
-			3	57.4' - Fracture, 60 deg, rough, undulating,	口	Limestone	-
_	D2 NO			open <1/2"	\vdash	- 56.5-60.1' - moderate yellowish	-
-	R2-NQ 5 ft	48	>10	58.5' - Fracture, 40 deg, rough, undulating, open <1/2"	口	brown, (10YR 5/4), very fine to fine grained, extremely weak (R0), to	
_	72%			59.15-59.55' - Fracture zone, rough,	H	- compacted non-indurated carbonate	
60			2	undulating, gravel-sized fragments <2" diameter —	Ш	silts, <10% organics, voids <3/16"	
-18.7				ulametei —	Ш	over 30% of surface, weakest material at 56.5-57.2' and 58.5-60.0'	
1 -			NR	-	口	No Recovery 60.1-61.5'	R2: 8 minutes
I -	04.5		````	-	╁┼	- · · · · · · · · · · · · · · · · · · ·	
-	61.5			-	┅	Limestone	-
-			0	-	H	- 61.5-66.25' - moderate yellowish	-
_				_	П	brown, (10YR 5/4), very fine to fine	_
_			1		Н	grained, mild to moderate HCl reaction, extremely weak to weak	
			' '	63.1' - Fracture or mechanical break, 35 deg,		(R0 to R2), <10% laminated	
_	R3-NQ			rough, undulating, tight	Н	organics, voids <3/16" over 40-50%	1
-	5 ft 95%	82	0	63.3, 61.75, 64.1 - Mechanical break (3)	囯	of surface, strongest rock zones 62.0-63.0' and 63.7-65.8', few	-
	3370			64.55, 64.65' - Fractures or mechanical break	Н	cavities <1"x1/2"	-
65_ -23.7			3	(2), <10 deg, rough, undulating, open <1/2"	₽		_
				65.2' - Fracture or mechanical break, 35 deg,	団	-	D2: 40 minutes
_			2	rough, undulating, open <1/2" 65.85, 66.05' - Fractures or mechanical break	\vdash	-	R3: 18 minutes
_	66.5		NR	(2), <10 deg, rough, undulating, along		No Recovery 66.25-66.5'	_
1				bedding planes, open <1/2"	Ш	Limestone	
_			1	66.9, 67.9' - Fractures or mechanical break (2), <10 deg, rough, undulating, open <1/2"	団	66.5-71.25' - pale yellowish brown to]
-				(2), > 10 deg, rough, undulating, open < 1/2	⊣	moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine	<u> </u>
-			1	-	世	grained, moderate HCl reaction,	
-	R4-NQ			-	╀┼	extremely weak to medium strong	-
-	5 ft	78	4	68.75, 69.1' - Fractures (2), 70 to 90 deg,	ш	(R0 to R3), voids < 3/16" over 30-50% of surface, few fossil casts	-
_	95%			rough, undulating, tight 69.3' - Fracture or mechanical break, <10	$\vdash\vdash$	and molds <1/4" diameter, trace	_
70			0	deg, rough, undulating, tight	口	secondary infill of cavities 1/4"	
-28.7			"	69.4, 70.05, 71.0' - Mechanical break (3)	Ш	— diameter	
			0	_	ш	-	R4: 8 minutes
_	71 5			-	\vdash	-	<u> </u>
-	71.5		NR	-	口	No Recovery 71.25-71.5' Limestone	
-			0	-	₽₽	71.5-74.6' - pale yellowish brown to	Driller's Remark: Slight
-				-	Ш	moderate yellowish brown, (10YR 6/2	water loss <10%
_			3	_	H	to 10YR 5/4), very fine to fine grained, moderate HCl reaction, very	Driller's Remark: Strength
			Ľ	73.05, 73.15' - Fractures (2), horizontal,	口	weak to medium strong (R1 to R3),	decreasing abruptly from 74.8' to 75.4'
I -	R5-NQ			rough, undulating, open <1/2" 73.1' - Fracture, vertical, rough, undulating,	Н	voids <3/16" over <30% of surface,	74.0 10 75.4
-	5 ft 62%	53	4	intersects with 73.05' and 73.15', open 1/2"	口	moderately fossiliferous, fossil molds	
	02/0			74.25, 74.35' - Fractures (2), horizontal and	H	and casts <1-1/2" x 1/2", few cavities <1"x1/2"	
75				50 deg, rough, undulating, open <1/4"	干		_
					ш		

APPENDIX 2BB-40 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-04	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				IENT : Dietrich D-30 3/N 232, mud rotary, NQ tools, HV			ORIENTATION : Vertical
WATER	LEVELS : 0.1	ft bg	s on 0		27/20 1		
⊋∩⊋	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ŽAŽ ŽAŽ		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	SER	(%) _Q	150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ĕ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF.F.	NG NG	OΩ	AC-	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
밀양급	8필문	A O	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λ	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
-33.7				74.5' - Fracture, horizontal, rough, undulating,	ш	No Recovery 74.6-76.5'	
_			NR	along bedding plane, open <1/4"	╁┌	-	R5: 10 minutes
-				-	E	-	-
_	76.5			-	₽	Limestone	_
_			2	76.7, 76.75' - Fractures (2), 40 deg and		- 76.5-77.3' - very pale orange to dark	
			-	horizontal, smooth, planar, tight		yellowish orange, (10YR 8/2 to 10YR	SC-1 collected at 76.75- 77.6' -
				77.65, 78.1, 78.2' - Fractures or mechanical		6/6), very fine to fine grained, strong	77.0
_			3	break (3), <10 deg, smooth, undulating, along	ш	 HCl reaction, extremely weak to medium strong (R0 to R3), strength 	
-	R6-NQ			bedding planes, open <1/4" to tight	\pm	increasing abruptly 77.3' to 77.4',	-
-	5 ft	76	2	78.7, 78.85' - Fractures (2), 80 deg and 50	╁	 non-indurated silt to extremely weak 	-
-	91%			deg, rough, undulating, open 1/4" to 1/2"	世	rock (R0) 76.5-77.3', trace voids] -
80			0		Ш	<3/16", no fossils, trace laminated bedding	
-38.7					Ш	77.3-80.1' - Same as 76.0-77.3'	
	1		1	80.5' - Fracture or mechanical break, <10	F	except medium strong (R3), voids	R6: 18 minutes
-	04.5		NR	deg, rough, undulating, tight	╁	 <3/16" over 30-50% of surface, trace fossil casts, trace secondary infill 	-
-	81.5		INIX	-	┰	80.1-81.05' - Same as 77.3-80.1'	-
_			2	-	╁┰	 except secondary infill with voids 	-
_				82.15, 82.45' - Mechanical break or fractures		<3/16" over 30-50% of surface, poorly fossiliferous, heavily	_
			>10	(2), <10 deg, rough, undulating, open <1/2"	┢	bioturbated with 50% of bioturbation	
			10			with secondary infilling, cavities up to	
_	R7-NQ			83.5-83.9' - Fracture zone, rough, undulating,	\vdash	1/2"x5"	1
-	5 ft 100%	86	0	gravel-sized fragments <1-1/2" diameter	E	No Recovery 81.05-81.5' Limestone	1
	100%			-	╁	81.5-82.0' - moderate yellowish	-
85 -43.7			0	_	仜	brown to yellowish gray, (10YR 5/4 to	
-				-	╁┰	5Y 8/1), very fine to fine grained, strong HCl reaction, extremely weak	
_			0	_		to medium strong (R0 to R3), voids	R7: 9 minutes
	86.5					<3/16" over 30-60% of surface,	
_				-	$oxed{\bot}$	 heavily fossiliferous, fossil molds/casts <1"x1/4", cavities 	1
-			1	-	╁	<1/2"x1/4", few cavities with	-
-				87.35' - Fracture or mechanical break, 60-90	广	 secondary infill 	-
-			4	deg, rough, undulating, tight to open 1/8" 87.65' - Fracture or mechanical break, 20	╀	82.0-82.25' - Same as 81.5-82.0' except very weak (R1),	-
1 -				deg, rough, undulating, tight to open 1/8"		- laminated/variegated bedding 30% of]
1 -	R8-NQ 5 ft	84	0	88.25, 88.4, 88.45' - Mechanical break or	\vdash	zone	
	98%	5 4	Ľ	fractures (3), rough, undulating, open <1/2" at	F	82.25-84.8' - Same as 81.5-82.0' - 84.8-85.25' - Same as 81.5-82.0'	
90				88.25', others are tight	╁	except non-indurated silts as]
-48.7			0		Œ	secondary infill, very very weak	
1 -				-	tr	- (<r0) 85.25-85.4' - Same as 81.5-82.0'</r0) 	R8: 11 minutes
1 -			0	-	F	85.4-86.0' - Same as 81.5-82.0'	-
1 -	91.5		NR.	-	Ľ	 except extremely weak (R0), trace 	SC-2 collected at 95.65-
1 -			2	91.65' - Fracture, horizontal, smooth, planar,	$oldsymbol{oldsymbol{oldsymbol{\square}}}$	voids 86.0-86.5' - Same as 81.5-82.0'	96.45' -
1 -				along bedding plane, tight 92.2' - Fracture, 70 deg, rough, undulating,	\Box	- 00.0-00.0 - Same as 01.0-02.0	_
			10	tight	H		
-			10	92.85-92.9' - Fracture zone, rough, planar	77	Ē F	1
1 -	R9-NQ			93.6, 93.7, 93.8, 93.9, 94.05' - Fractures, 80	Ľ	<u> </u>	1
1 -	5 ft	50	10	deg, rough, undulating, tight	oxdot	<u> </u>	-
1 -	99%			-	仜	F	-
95					1	<u> </u>	
1					1		
					1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-04	SHEET	6	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NETHOD A	ND E	JUIT IV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin		ORIENTATION : Vertical
WATER	LEVELS: 0.1	ft ba	s on 0	3/26/07 START : 3/25/2007 END : 3/	<u>27/</u> 20(D7 LOGGER : R. Bitely, C. Wallesta	d
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)				SYMBOLIC LOG	232001	33E1113
N S S	ŽAN ŽAN O		LS⊒⊢	DESCRIPTION	5	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	S 두 파	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	<u> </u>	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
 	#20		25.	PLANARITY, INFILLING MATERIAL AND	₽	AND ROCK MASS	SMOOTHNESS, CAVING ROD
	Sel	a	5.5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	3	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-53.7	024		10	04 451 Fronting 410 day rough undulating	, °,	Limentone	
-55.7			10	94.45' - Fracture, <10 deg, rough, undulating, tight	Н	Limestone 86.5-91.4' - moderate yellowish	_
				94.8-95.2' - Fractures, 80 deg, rough,		brown to yellowish gray, (10YR 5/4 to	R9: 14 minutes
-			1	undulating, tight		5Y 8/1), very fine to fine grained,	-
l -	96.5		NR/	95.45' - Fracture, 65 deg, rough, undulating,	Н	strong HCl reaction, extremely weak	_
			-	tight	Н	to weak (R0 to R2), voids <3/16"	
_			2	95.65' - Bedding plane, horizontal, smooth,		over 30%, moderately to highly	_
-				undulating, along bedding plane, tight	ш	 fossiliferous, fossil casts and molds 	_
_			1	96.65' - Fracture or mechanical break, 20	Н	less than 1"x1/2"; cavity zones from	<u> </u>
			' '	deg, rough, undulating, tight to open 1/8"	Н	87.1-88.45' and 90.0-91.4'; trace	
-	R10-NQ			97.15' - Fracture, 80-90 deg, rough,	ш	- unfilled cavities 1-1/2"x1"; heavily	-
_	5 ft	50	2	undulating, tight	1	bioturbated or dissolution cavities	_
	100%			97.9' - Fracture, 70 deg, rough, undulating, tight	Н	over 25% of core, 20% filled with secondary infill of poorly indurated	
100				99.0, 99.2' - Mechanical break or bedding	Н	silts to extremely weak rock (R0)	
-58.7			1	plane (2), <10 deg, rough, undulating, tight to		No Recovery 91.4-91.5'	_
_ 50.7				open 1/8"	Ш	Limestone	1
			_	99.4' - Fracture, 85 deg, rough, undulating,	H	91.5-93.05' - yellowish gray, (5Y 8/1),	R10: 6 minutes
I -	404.5		2	tight	Н	very fine to fine grained, strong HCI	-
-	101.5			100.4, 100.6' - Fracture (2), 50 deg and 80	ш	reaction, extremely weak to medium	_
			10	deg, smooth, undulating to stepped, tight	Щ	strong (R0 to R3), weak zones at	_
			10	100.85' - Mechanical break or bedding plane,	Н	92.35-93.05', voids <3/16" over	
-				<10 deg, smooth, undulating, tight	т	_ 0-15% surface, poorly fossiliferous,	-
-			0	101.55, 101.6, 101.85, 101.95, 102.0' - Fractures or bedding plane (5), 70-90 deg	口	trace organics	-
				and horizontal, rough, undulating, tight to	ш	Fat Clay To Elastic Silt (CH)	
_	R11-NQ	!		open <1/4"	1	93.05-93.25' - olive gray, (5Y 3/2), strong HCl reaction, high plasticity	-
-	5 ft	86	0	102.45' - Fracture, 60 deg, rough, undulating,	Ш	from 93.05-93.15', moderate to low	-
I -	98%			tight	П	plasticity from 93.15-93.25',	_
105				103.7, 104.0' - Mechanical break (2)	H	non-indurated silt	
-63.7			0	_	Н	Limestone	
-			<u> </u>		Н	- 93.25-96.45' - Same as 91.5-93.05'	D44. 5 minutes
			0			except weak zones at 93.25-93.4'	R11: 5 minutes
	106.5				ш	and 95.5-96.45'; at 94.3-95.5' voids	
-	100.0		NR.		H	- <3/16" over 60% of surface and	-
I -			1			highly fossiliferous with fossil casts	-
			'	107.2' - Fracture, 70 deg, rough, undulating,	Ш	and molds up to 1/4" diameter	
I -				tight	1	No Recovery 96.45-96.5' Limestone	-
-			10	-3 -	H	96.5-101.5' - very pale orange to	-
				108.3' - Fractures (3), 70-90 deg, rough,	П	grayish orange, (10YR 8/2 to 10YR	
I -	R12-NQ			undulating, intersecting fractures, tight to		7/4), very fine to fine grained, strong	
-	5 ft	86	2	open <1/4"	ш	HCI reaction, extremely weak (R0),	-
I -	100%			109.1, 109.25' - Fractures (2), 70 deg and	Н	medium strong (R3) zone from	_
110				horizontal, rough, undulating, intersecting		99.3-100.2'; voids <3/16" cover	
-68.7			0	fractures, tight to open <1/4"	Ш	10-25% of surface, except voids	_
-			<u> </u>		\vdash	_ <3/16" cover 40-60% of surface at	R12: 7 minutes
I _			0		\vdash	99.3-100.2'; moderately fossiliferous	1X12. / Himules
I	111.5		"			with fossil casts and molds to 1"x3/4", trace secondary infill in	
I -	111.0					casts, trace organics, trace laminae.	-
l –			0		ш	- 101.5-106.4' - Same as 96.5-101.5'	-
					Н	except extremely weak to weak (R0	
I -					1"	to R2), voids <3/16" cover 10-25%	-
-			0		ш	No Recovery 106.4-106.5'	-
					Щ	_	
I -	R13-NQ			113.45, 114.05, 116.3' - Mechanical break (3)	Н		
I -	5 ft	100	0		\Box	_	-
-	100%				口	_	-
115					Ш		
Ь			L				I

APPENDIX 2BB-42 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-04	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				MENT . Diethor D-30 3/N 232, mud totaly, NQ tools, HVV			
WATER	LEVELS: 0.1	ft bgs	s on 0		27/20		
300	<u></u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표한한	N 4 8	9	FRACTURES PER FOOT		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ΞĂĔ	RES	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	<u>S</u>	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	RNA	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	034	œ		THICKNESS, SORFACE STAINING, AND HOTTINESS	Ś	CHARACTERISTICS	
-73.7			0		Ш	Limestone	SC-3 collected at 115.45-
_				115.45' - Mechanical break	╁	- 106.5-111.5' - yellowish gray, (5Y	116.3'
_			0		+	7/2), very fine to fine grained, very weak to weak (R1 to R2), voids	R13: 12 minutes
l	116.5				ш	<3/16" over 20-50% of surface,	
	·				\vdash	moderately fossiliferous, fossil casts	
-			0		++	and molds <1/2" diameter, trace iron	1
-					-	- staining	-
					<u> </u>	Limestone	
_			0		╙	111.5-116.5' - yellowish gray, (5Y	1
-	R14-NQ				+	 8/1), very fine to fine grained, strong 	-
_	5 ft	96	0			HCl reaction, weak (R2), voids	_
	100%	- •		119.05' - Mechanical break	\vdash	<3/16" over <20% of surface, tracelaminations, poorly fossiliferous, few	
120					┰	fossil molds 1/2"x1/4"	1
-78.7			0	_		116.5-120.7' - yellowish gray, (5Y	⊢
'5.' -					ш	8/1), very fine to fine grained, strong	l
				120.7, 120.9' - Mechanical break or bedding	\vdash	HCl reaction, very weak to weak (R1	R14: 17 minutes
1 -	121 5		2	plane (2), horizontal, smooth, undulating,	Ľ	to R2), trace laminations, voids	1
-	121.5			tight to open 1/2"	╨	_ <3/16" over 10-50% of surface	1
_			1	404.05.400.01.5	╆╾	(highly variable across length), moderately to heavily fossiliferous	_
			•	121.95, 122.0' - Fractures (2), 50 deg and 30	 	with fossil casts and molds up to 1/4"	
_				deg, rough, undulating, intersecting fractures, open 1"		diameter, especially 117.5-118.0' and	1
-	-		0	орен 1	╁	118.5-119.5', laminated bedding from	1
_					╁	_ 116.85-117.0'	
	R15-NQ					120.7-121.5' - Same as 116.5-120.7'	
_	5 ft 100%	94	3	123.95, 124.0, 124.25' - Bedding plane (3),	1_	except extremely weak (R0) rock to	1
-	100%			horizontal, smooth, planar to stepped, tight	╫	non-indurated silt, laminated from	-
125			0	_	┸	120.7-120.9' — 121.5-123.6' - yellowish gray to	
-83.7			0			grayish orange, (5Y 8/1 to 10YR 7/4),	
_					╨	very fine to fine grained, strong HCl	R15: 12 minutes
-			0		+	reaction, weak (R2), voids to 3/16"	-
l _	126.5					over 50% of surface, decreasing with	
					ш	depth, fossil casts and molds to	
_			1		╁	- 1/2"x1/4" over 30% of surface.	1
-				127.2, 130.45, 131.0, 131.05, 131.35' -	亡	123.6-126.55' - Same as 121.5-123.6' except voids to 3/16"	-
1 -			0	Fractures (5), <10 deg, smooth, planar to undulating, along bedding planes, tight to	$oldsymbol{\perp}$	over 20-40% of surface, trace fossil]
1			ľ	open 1/4"	\vdash	molds and casts to 1/4" diameter,	
1 -	R16-NQ				Ľ	possibly bioturbated 123.6-126.55'	1
-	5 ft	89	0		ш	 126.55-131.45' - very pale orange to 	-
1 -	99%				\vdash	pale yellowish brown, (10YR 8/2 to]
130					H	10YR 6/2), very fine to fine grained,	
-88.7			0	– 130.1' - Mechanical break	ш	— strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16" over	
-				100.1 - MCCHarlical DIEAN	+	10-20% of surface except	R16: 11 minutes
I _			4		╁	- 130.15-130.85' voids to 3/16" over	1310. 11 minutes
1	131.5					60% of surface, poorly to moderately	
I -			NR/	131.55, 133.9' - Fractures (2), horizontal,	┰	fossiliferous except 130.15-130.85'	SC-4 collected at 133.9-
-			1	smooth, planar, along bedding planes, tight	╁	highly fossiliferous, with casts and	134.7'
1 -					\perp	molds to 1/2"x1/4", trace infill material]
1					\vdash	material _ No Recovery 131.45-131.5'	
1 -	1		0		╨	L No Recovery 101.40-101.0	1
1 -	D17 NO				╆╌	-	-
1 -	R17-NQ 5 ft	98	1		厂	<u>-</u>]
1	99%	50	'		\vdash		
125					т	-	1
135				_			-
					1		

APPENDIX 2BB-43 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-04	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	INETHOD A	ND E	ארוטג	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
<u>WATER</u>	LEVELS: 0.1	ft bg	s on 0	3/26/07 START: 3/25/2007 END: 3/	<u> 27/20</u> 0	7 LOGGER: R. Bitely, C. Wallesta	d
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		·c	<u> </u>	SYMBOLIC LOG		222
N A E	₹ _{AN} ,		'ES	DESCRIPTION	- C	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
무성분	J. H.	Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E F X	R 66	Ω <	AC.	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SU ELE	SEES	R	FR.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S≺	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-93.7			2	134.7, 135.1' - Bedding plane or mechanical	1	Limestone	
				break (2), 10-20 deg, smooth, undulating,		- 131.5-136.45' - pale yellowish brown	1
			0	trace organics, tight		to vellowish gray, (10YR 6/2 to 5Y	R17: 8 minutes
_			0		╁┼	8/1), very fine to fine grained, strong	1
_	136.5		NR/		╀┼	- HCl reaction, extremely weak to	
			1	136.65, 140.2, 140.65' - Fractures or		weak (R0 to R2), voids to 1/16"	
			' '	mechanical break (3), rough, undulating,		covering 10-30% of surface,	
_				along bedding planes, open <1/2"	₩	decreasing with depth, except voids	1 1
_			0		\Box	to 3/16" over 60-70% of surface from	1 -
						131.6-133.05', trace fossils, except	
	R18-NQ				Ш	 highly fossiliferous 131.6-133.05', with casts and molds to 3/4"x1/2", 	1
-	5 ft	86	0		╁┼┼	trace infill in fossil casts	R18: 10 minutes
I _	98%				H	No Recovery 136.45-136.5'	10. To fillinates
140			,			Limestone	DR: 100% circulation loss
-98.7			1	_	╀	136.5-141.4' - yellowish gray, (5Y	at 141.5' below ground
-					╂┷╂	8/1), very fine to fine grained, strong	surface -
			>10	140.65, 140.95' - Fracture zone, rough,	Щ	HCl reaction, weak to medium strong	
1 7	141.5		' '	undulating, fragments <1-1/2" diameter		(R2 to R3), voids to 3/16" over	Stop drilling at 17:30 on
-	141.5		NR/		₩	5-30% of surface, decreasing with	03/26/07 at 141.5' below -
-			1		╀┼	depth, poorly to moderately fossiliferous, fossil casts and molds	ground surface
			·			to 3/4"x1/4", secondary infill	Water level at 1.8' below
				142.45, 142.55' - Fracture zone, rough,		extremely weak rock (R0) and void	ground surface at 17:30 -
-			10	undulating, fragments <1/2" diameter,	╀┼┼	<3/16" over 30-40% in infill, several	Continue rock coring
				angular, open <1"	Н	bioturbation or dissolution cavities	03/27/07 at 08:00
	R19-NQ			142.9, 143.1, 143.25, 143.35, 143.55' -		with secondary infilling up to 2" x 1"	Water level at 1.3' below
_	5 ft	75	2	Fractures (5), <10 deg, rough, undulating, tight to open <1" at 143.25-143.35', with	ш	No Recovery 141.4-141.5'	ground surface
_	97%			angular rock fragments <1" diameter	₽₽	Limestone	No circulation -
145			1	143.8' - Fracture, horizontal, smooth,	Ш	141.5-143.6' - light olive gray to	
-103.7			' '	undulating, along bedding plane, tight		moderate yellowish brown, (5Y 5/2 to 10YR 5/4), very fine to fine grained,	
-				144.0, 144.5' - Mechanical break (2)	ш	weak to medium strong (R2 to R3),	R19: 12 minutes
_			1	144.9' - Fracture, <10 deg, smooth,	\vdash	voids <3/16" over 20-30% of surface	
	146.5		ND	undulating, tight		moderately fossiliferous, fossil molds	
]			NR.	145.95' - Fracture, <10 deg, smooth,	Ш	<1/2" diameter, many cavities	1
-			1	undulating, along bedding plane, tight to open	╂┼┼	- <1-1/2"x1/2" comprising 20% of	-
_				<1/4" 146.6' - Fracture, horizontal, rough,	H	surface, several (<50% of cavities)]
				undulating, along bedding plane, open <1/4"		with secondary infill, trace organic	
-			0	andalating, along boading plane, open 1/4		- laminations	1
-	B00 1:0				╀┼┼	143.6-146.35' - Same as 141.5-143.6' except moderate HCl	-
	R20-NQ	98	0		H	- reaction, voids <3/16" over <5%-30%	
]	5 ft 100%	90	'			variable, trace laminated bedding	1
	100 /0			149.55' - Fracture, horizontal, smooth,	Ш	especially 143.8-144.0' and	1
150_			1	undulating, along bedding plane, open <1/4" —	╀┼	- 145.9-146.0', poorly fossiliferous	-
-108.7				andalating, along boading plane, open 1/4	$\vdash \vdash \vdash$	No Recovery 146.35-146.5'	
1 7					Ш	Limestone	R20: 8 minutes
-			0		\Box	146.5-149.6' - grayish orange to	-
_	151.5				₽₽	moderate yellowish brown, (10YR 7/4]
					$\vdash \vdash \vdash$	to 10YR 5/4), very fine to fine grained, weak to medium strong (R2	I
-			1	152.1, 153.0, 153.15, 153.25, 153.35, 153.7' -		to R3), strength increasing with	SC-5 collected at 152.1-
-				Fractures or mechanical break (6), along	╀┼┼	depth, except very weak rock (R1) at	152.9'
			3	bedding planes, smooth to rough, undulating,	Н	149.35-149.6', voids <3/16" over	102.8
]			3	tight	++i	<20% of surface, poorly fossiliferous,	1
-	R21-NQ			152.9' - Mechanical break	╓	trace cavities with secondary infill	
_	5 ft	90	1	153.9, 154.15, 154.4' - Mechanical break (3)	\Box	_ <1"x1/2"] _
	100%			153.9, 154.15, 154.4 - Mechanical break (3)	H		
155				101.0 Woonamou broak		=	1
155					仠	-	+
					1 1		j l

APPENDIX 2BB-44 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-04	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 0.1	ft bgs	s on 0	3/26/07 START : 3/25/2007 END : 3/2	27/20	2007 LOGGER : R. Bitely, C. Wallestad
≥ ∩ ⊙	(9)			DISCONTINUITIES	ō	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-113.7	0.7%	Ľ.	0	154.95, 156.3' - Mechanical break		Limestone - 149.6-151.5' - Same as 146.5-149.6' - P21: 22 minutes -
	156.5 R22-NQ 5 ft 98%			154.95, 156.3' - Mechanical break 156.55' - Fracture or mechanical break, horizontal, rough, undulating, open <1/4" 158.65, 160.9' - Mechanical break (2) 158.85, 158.95, 159.10, 160.1' - Mechanical break (4)		Limestone
-				-		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 2-3/8 tri-cone bit

ORIENTATION : Vertical

DNILLIN	GIVILITI	JD AND	LQUIFIVII	ENT DIETHONDS	50 3/11 232, Illuu Tolai	y, cathead, AWJ rods, 2-3	o/o tii-cone bit		ORIENTATION: Vertical
WATER	LEVELS	: 3.5 ft bo	gs on 3/06	6/07	START : 2/26/2007	END: 3/1/2007	LOGGER	: T.	Valentine, R. Bitely, J. Schaeffer
	_	_	_	STANDARD		SOIL DESCRIPTION		(L	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION				SYMBOLIC LOG	
ON A PE		RECOVE	BV (ft)	TEST RESULTS	SOIL NAME,	, USCS GROUP SYMBOL	., COLOR,	CIC	DEPTH OF CASING, DRILLING RATE,
F EE ¥		INLOOVE	<u> </u>		MOISTURE C	CONTENT, RELATIVE DE Y, SOIL STRUCTURE, M	ENSITY OR	lBO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	6"-6"-6" (N)	OCNOISTENO	I, SOIL STITIOUTOTIL, W	INLINEOGI	SYI	INSTITUMENTATION
42.0				(* -)					Water level is based on Ground Water
-							-		Monitoring at LNP site (FSAR Table
-							_		2.4.12.08) 2-3/8" tricone roller bit
l -							_		2-5/6 tricorie foliei bit
l -							_		
I _							_		
-	3.5						-		
-	0.0				Poorly Graded S	Sand With Silt (SP-SM)		TT	
-		0.7	SS-1	5-5-4	3.5-4.2' - modera	ate yellow to moderate of	olive brown, -		
		0.7	00 1	(9)	fines. 30% very f	1), wet, loose, 10-15% n fine silica sand, trace iro	onplastic on cemented	ijij	
5 37.0	5.0				sand concretions	s to 1/8"		4540	_
-									
-							_		
l _							_		
l _							_		
-							_		
_	8.5						_		
-	0.5				Silt (ML)			Ш	
-		1.2	SS-2	9-18-50/4	8.5-9.7' - dark ye	ellowish orange, (10YR	6/6), moist to -		
-	9.8			(68/10")	wet, nard, nonpla	astic, rapid dilatancy, m e to medium sand-sized	oderate HCI all carbonate =		
10 32.0					roadion, 6 /6 ime	o to modium dana dizoa			_
J2.0 _							-		
-							=		
l _							_		
-							_		
-	13.5						_		
-	10.0				Silt With Sand (ML)		Ш	
-		1.3	SS-3	25-28-31	13.5-14.8' - Sam	ne as 8.5-9.7' except 20'	% very fine to -		
		1.5	00-0	(59)	medium sand		-		
15 27.0	15.0						_		_
							_		
-							_		
_							_		
1 -	17.5						_		
-	18.1	0.3	SS-4	33-50/1	Silt With Sand (ML)		Ш	
-				(83/7")	\ 17.5-17.8' - Sam	ne as 13.5-14.8' except led material from 18.6-18	lens of fine to /-		
-					Coarse Sariu-Size	50 matemai 110111 10.0-10			
-							_		
-							_		
20									



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 2-3/8 tri-cone bit

ORIENTATION: Vertical

						ry, cathead, AWJ rods, 2-3			ORIENTATION : Vertical
WATER	LEVELS	: 3.5 ft bo	gs on 3/06		START : 2/26/2007	END: 3/1/2007 SOIL DESCRIPTION	LUGGE	<u>₹∶⊺.</u> 	Valentine, R. Bitely, J. Schaeffer COMMENTS
≩Q≆	CAMPIE	INTERVA	1 (#)	STANDARD PENETRATION	-	SOIL DESCRIPTION		00	JOIVIIVILIVIO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAIVIPLE		, ,	TEST RESULTS	SOIL NAME	, USCS GROUP SYMBO	_, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ATI ACI		RECOVE			MOISTURE (CONTENT, RELATIVE DE	ENSITY OR	B B	DRILLING FLUID LOSS, TESTS, AND
P.E.E.			#TYPE	6"-6"-6" (N)	CONSISTENC	Y, SOIL STRUCTURE, M	INERALOGY	SYM	INSTRUMENTATION
22.0				(,				+	
-	-							1	-
-	-							┨	-
-	-							┨	-
-	-							┨	-
-	-							1	-
-								-	-
-	23.5			25-50/2	Silty Sand (SM)			1111	-
-	24.2	0.6	SS-5	(75/8")	_ 23.5-24.1' - dark	yellowish orange, (10Y	'R 6/6), wet,		-
-						I to moderate HCI react % nonplastic fines, all o		-	-
25 <u> </u>					Coarse saria, 33	70 HOHPIASHO IIIIES, All C		4	-
''.0 -	-				1			-	-
-								-	-
l -								4	-
-	1							4	_
_	1							1	_
l -									_
l _	28.5							ļ.,,	_
l _			00.0	8-8-50/2	Silty Sand (SM) 28 5-29 4' - Sam	ne as 23.5-24.1' except	fragmented		_
l _	29.7	0.9	SS-6	(58/8")	limestone lenses	s 1/4"-1/2" thick at 28.7	5' and 29.4'		_
30	29.7						_		_
12.0									_
l _									_
]								_
]				1			1]
	33.5							1	
-					Silty Sand With	Gravel (SM)	(D. 0/0)		
-	1	1.2	SS-7	13-16-7 (23)	33.5-34.7' - dark medium dense.	yellowish orange, (10) mild to moderate HCl re	ਜ 6/6), wet, eaction, fine to	1	
35	35.0			(23)	coarse sand, 25	% fine to coarse gravel.		1 111	1
7.0	23.0				nonplastic fines,	all carbonate		1	_
-	1							1	_
-	-							1	·
-	-							1	·
-	1							1	Driller's Remark: Intermittent heavy chatter
-	1							1	on drilling 37.0-38.5' - Driller's Remark: Very dense material,
-	39.5							1	difficult drilling 37.0-40.0'
-	38:5	0.0	SS-8 /	50/1.5	No Recovery 38	3.5-38.6'		┢	·
-	-			(50/1.5")	1			1	<u>-</u>
	-							1	-
40								+	-
								_	1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 2-3/8 tri-cone bit

ORIENTATION : Vertical

					·	END : 0/1/0007		· . T	Valentina B. Bitaha I. Calantina
WATER	LEVELS	: 3.5 11 00	gs on 3/06		START : 2/26/2007	END : 3/1/2007	LOGGER	(: I.	Valentine, R. Bitely, J. Schaeffer
30=1				STANDARD		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAM	ME LIGOS CROLIR SYMBOL	COLOR	SYMBOLIC LOG	DERTH OF CASING DRILLING DATE
		RECOVE	ERY (ft)		MOISTURE	ME, USCS GROUP SYMBOL E CONTENT, RELATIVE DE	NSITY OR	O L	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FFF			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MI		MB	INSTRUMENTATION
DE SU EL				(N)				S	
2.0									
1 1							=	1	1
1 1							-	1	1
1 -							-	1	-
1 -							-	•	-
-							-		-
1 -							-		
1 4	43.5 43.8							,,,,	_
	43.8	0.1	SS-9	50/3 (50/3")	Lean Clay With	t h Sand (CL) oderate olive brown, (5Y 4	(4) wat hard		
				(30/3)	medium plastic	city, mild to moderate HCl	reaction.		
45					20% sand and	l limestone fragments		1	1
-3.0								i	-1
1 -							-	1	-
-							-		-
1 4							_		
							_		_
							_		1
1 1	48.5						=	1	1
1 +		0.5	SS-10	50/4	☐ Fat Clay (CH)			77	-
1 +	49.0	0.0	00 10	(50/4")	\\48.5-48.6' - pa	le olive, high plasticity	/[-		-
1 -					Silt With Sand	d And Gravel (ML) oderate olive brown, (5Y 4	(4) wat law -		-
50 -8.0					\plasticity, rapid	d dilatancv. mild to modera	ate HCl 🗁		-
-0.0					reaction, 25%	fine to coarse sand, 20%	gravel		_
									_
							_		1
1 1							=	1	1
1 -							-	1	1
1 -							-		-
	53.5			47 FO/9	Silty Sand Wit	th Gravel (SM)	_	717	Driller's Remark: Heavy chatter from rig
	54.3	0.5	SS-11	47-50/3 (97/9")	¬ 53.5-53.95' - m	noderate olive brown, (5Y	4/4), wet, verv /=	111.	Diller's Hemain. Heavy Glatter Holling
	J-7.U			(3.7.0)	\ dense, mild to	moderate HCI reaction, fin	ne to coarse]
55					sand, 25% non limestone, all d	nplastic fines, 30% fine gra	avel		
-13.0					limestone, and	Carbonale			
1							-	1	1
							-	1	1
							-	1	-
							-		-
							-		-
	58.0		00.15	50/2	<u></u>				
	58.0	0.0	SS-12	50/0 (50/0")	Begin Hock Co	oring at 58.0 ft bgs sheet for the rock core log	_		
				(55/67)	OCC THE HEAT SI	most for the rook core log			
1							_		1
60							-	1	1
00									-
								_	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NE I NOD AI	ND E	JUIPIN	/IEN1: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION: Vertical
WATER	LEVELS: 3.5	ft bg	s on 3	/06/07 START : 2/26/2007 END : 3/	1/200	LOGGER: T. Valentine, R. Bitely	, J. Schaeffer
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
E H	1 3 4 K	(9)	FRACTURES PER FOOT	DECORUM FIGURE	익	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H H		(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
		Ø	XX.	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΣΨ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		ď	H I	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	, , , , , , , , , , , , , , , , , , ,
	58.0			58.05' - Mechanical break, vertical, rough,	\Box	Limestone	
_	R1-NQ		3	stepped	Н	- 58.0-59.7' - light olive gray, (5Y 5/2),	Driller's Remark: hard,
-	2 ft	54		58.1' - Mechanical break, 10 deg, rough,		very fine to fine grained, strong HCl reaction, weak to medium strong (R2	switch to 3 7/8" rock core
I _	80%		2	stepped	ш	- to R3), voids up to 3/16" on 50% of	bit to depth
60	60.0		NR	58.3' - Mechanical break, 60 deg, rough, undulating	Н	surface, cavities up to 1/2",	R1: 2 minutes
-18.0	00.0			59.05' - Bedding plane or mechanical break,	1	microfossils with few macrofossils, 1"	Even, continuous boring —
-	R2-NQ		>10	rough, undulating	ш	 low to moderate plasticity silt at 	B2: 2 minutos
_	1.5 ft	31		59.45' - Fracture, 70 deg, smooth, undulating	Н	59.5-59.6'	R2: 2 minutes Short run to adjust tooling -
	60% 61.5		NR	60.0-60.4' - Fracture zone or mechanical	Н	No Recovery 59.7-60.0'	for 5' continuous run length
-	01.0			break, multiple intersecting fractures, various	ш	 Limestone 60.0-60.8' - Same as 58.0-59.7 	1
-	{		1	angles, bedding plane fractures at 60.2', 60.25', and 60.4, rough to smooth, undulating	╂┼┤	except medium strong to very strong	SC 1 collected at 62.0
I _]			to stepped, tight	Н	- (R3 to R5), trace organic	SC-1 collected at 62.0- 62.8'
1				61.7' - Mechanical break	Ш	laminations, seams up to 1/16" thick,	
1 -	1		1	62' - Bedding plane, horizontal, smooth,	1	voids <3/16" over 60% of surface,	1
-	R3-NQ		\vdash	undulating	Н	few cavities up to 1x1/4"	1
_	5 ft	55	3	62.8' - Bedding plane, 40 deg, rough, stepped		No Recovery 60.8-61.5 Limestone	
	75%	00	ਁ	63.1' - Mechanical break	Н	_ 61.5-65.25' - Same as 60.0-61.5'	
65	1			63.35' - Mechanical break, 40 deg, rough, stepped	Н	except moderate yellowish brown to	1
-23.0	1		6	63.7' - Mechanical break, 60 to 90 deg,	Ш	pale yellowish brown, (10YR 5/4 to	I —
				smooth, undulating	+	10YR 6/2), extremely weak (R0),	1
			NR	63.8' - Mechanical break, 50 deg, smooth,	\vdash	voids up to 1/12" on 30% of surface,	R3: 9 minutes
_	66.5			undulating, intersecting 67.7' mechanical		large cavities up to 3" with silt infill	
-	00.5			break	Н	No Recovery 65.25-66.5' Limestone	1
-	.		4	64.05' - Mechanical break, horizontal, rough, undulating	₽	66.5-67.3' - Same as 61.5- 66.5'	-
l _				64.65-64.75' - Mechanical break (4), rough,		except very weak to medium strong	
				undulating, multiple intersections and angles,	Н	(R1 to R3), voids <1/16" over 10% of	
-	1		3	ground rock	╁┷	surface, trace cavity infill	1
-	. DANO			64.75' - Fracture, 60 deg, smooth, undulating	ш	_ 67.3-68.1' - Same as 66.5-67.3'	SC-2 collected at 68.45-
_	R4-NQ 5 ft	77	0	65.05' - Bedding plane, 40 deg, smooth, undulating	+	except weak to medium strong (R2 to - R3), voids up to 3/16" over 50% of	69.45'
	98%	''		67.05, 67.15, 67.30, 67.65' - Mechanical	\vdash	surface, cavities up to 1/2"	
70	1			break (4), <10 deg, rough, stepped to	ш	68.1-68.45' - Same as 67.3-68.1'	1
70 <u> </u>			1	undulating —	╂┼	except very weak (R1), friable	⊢
				68.15, 68.45' - Bedding plane, horizontal,	₽₩	surface, no voids or cavities	15, 45
]		1	smooth, undulating	Ш	68.45-71.4' - Same as 68.1-68.45'	R4: 13 minutes
1 -	71.5			68.3' - Mechanical break 69.7, 70.1' - Mechanical break	Н	 except dense, strong HCl reaction, medium strong (R3), voids up to 	1
1 -	11.0		NR.	70.4' - Fracture, 60 deg, smooth, undulating	╁┤	1/16" over 20% of surface, trace	-
-			1	71.05' - Fracture or mechanical break, 10 to	Ш	organics, microfossils	-
Ι -]			50 deg, rough, stepped to undulating	\mathbb{H}	No Recovery 71.4-71.5'	l J
				71.2' - Fracture, vertical, rough, stepped to	Н	Limestone]
1 -	1		2	undulating	Ш	- 71.5-72.4' - Same as 68.45-71.4' except pale yellowish brown to	1
-	R5-NQ		\vdash	72.15' - Bedding plane, horizontal, smooth, undulating	++	yellowish gray, (10YR 6/2 to 5Y 7/2),	-
_	5 ft	55	3	72.4' - Mechanical break or bedding plane,	H	very weak to weak (R1 to R2), voids]
	88%			horizontal, smooth, undulating, <1/2" open	Ш	<3/16" over 60% of surface	
75	1			72.65' - Bedding plane, horizontal, smooth,	\mathbb{H}	72.4-72.65' - Same as 71.5-72.4'	1
-33.0			1	undulating —	Ш	except extremely weak to weak (R0	⊢
-			<u> </u>	72.8' - Fracture, 70 deg, rough, undulating 73.8' - Fracture, horizontal, rough, undulating	\Box	to R2), few cavities 1/4 x 1/8" 72.65-75.1' - Same as 72.4-72.65'] DE: 44 minutes -
1]		>10	73.8' - Fracture, nonzontal, rough, undulating 74.5, 74.75, 74.85' - Mechanical break		except medium strong (R3), voids up	R5: 11 minutes
1 -	76.5		NR	75.1' - Fracture, 20 deg, smooth, undulating		to 3/16" over 50%, cavities up to	1
-	10.0			75.15, 75.25' - Mechanical break, horizontal,		1/2x1/4" over 40%, sharp contact at	1 - 1
-			>10	rough, undulating, 1/2" open	<u> </u>	75.1'	1 -
]			75.55' - Fracture, 50 deg, rough, undulating	Д	_	
					Н		1
					П	_ 11	
			l				

APPENDIX 2BB-49 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				/IENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiri		ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bgs	s on 3	/06/07 START : 2/26/2007 END : 3/	1/200	LOGGER : T. Valentine, R. Bitely	
>00	<u>.</u>			DISCONTINUITIES	ტ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SI	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUTE AND DEDTIL OF GARING
ᆱ끯은	Z H HR HR	(%) O	FRACTURES PER FOOT	DEDTIL TYPE OPIENTATION POLICINESS	1 5 1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YF A F	SOV	0	ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	SHR	S Q	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			4	75.6, 75.65' - Mechanical break or fracture	Н	Limestone	
-	DC NO			zone, multiple intersecting fractures and	П	- 75.1-75.6' - Same as 72.65-75.1'	1 -
-	R6-NQ 5 ft	57	3	angles, ground rock	Н	_ except extremely weak to very weak	
	94%	٥.		75.8' - Bedding plane, horizontal, smooth, undulating	ш	(R0 to R1), weakens with depth, voids up to 3/16" over 30%	
80				76.85-77.4' - Fracture zone, rough,	Н	Calcareous Silty Fat Clay (CH)	
-38.0			2	undulating, various angles		75.6-75.9' - moist, hard, high	1
-				77.4' - Fracture, 50 deg, rough, undulating	ш	plasticity, strong HCl reaction	R6: 18 minutes
_			0	77.65, 77.95, 78.0, 78.05' - Bedding plane, <10 deg, smooth, undulating	Н	No Recovery 75.9-76.5'	-
	81.5		NR	78.55, 78.95, 79.35' - Bedding plane,		Calcareous Silty Fat Clay (CH)	_
			_	horizontal, smooth, undulating	Н	76.5-76.85' - Same as 75.6-75.9' except pale yellowish brown, (10YR	
1 7			1	79.5' - Mechanical break	Ш	6/2), moist	1
-				80.3, 80.5' - Bedding plane, <10 deg, rough, undulating	H	Limestone	SC-3 collected at 82.45-
-			0	80.55-80.7' - Mechanical break	Ш	- 76.85-78.65' - pale yellowish brown,	83.25'
_	5-11			81.9, 84.3' - Mechanical break	ш	(10YR 6/2), strong HCl reaction, extremely weak to weak (R0 to R2),	-
	R7-NQ 5 ft	83	5	82.25' - Mechanical break, 40 deg, smooth,	Ы	trace laminations with organics, voids]
	100%	00	5	undulating 83.6-83.65' - Fracture zone, rough, stepped,	\vdash	up to 3/16" over 20%, cavities up to	
85				various angles, ground rock	Н	1/4x1/8" over 5% of surface	1 1
-43.0			2	84.55, 85.2, 85.6, 85.95' - Mechanical break, —	ш	78.65-79.85' - Same as 76.85-78.65' except weak to medium strong (R2 to	-
-				rough, undulating to stepped, <1/2" open	Н	R3), voids up to 3/16" over 30-50%	R7: 13 minutes
_			3	-		_ of surface	K7. 13 Illillutes
	86.5		,		ш	79.85-80.50' - Same as 78.65-79.85'	
				86.45' - Bedding plane, horizontal, smooth,	ш	except dark yellowish brown, (10YR 4/2), voids up to 3/16" over 70% of	1
1 7			1	undulating 86.75' - Fracture or mechanical break, 70	Н	surface, cavities up to 1/2"	1 1
-				deg, rough, stepped	Н	80.50-81.20' - Same as 79.85-80.5'	1 -
-			>10	87.9-88.3' - Fracture zone or mechanical	ш	_ except yellowish gray, (5Y 8/1), very	1 -
_				break, rough, undulating, various angles .	Н	fine grained, medium strong (R3), voids up to 3/16" over 15% of	_
	R8-NQ 5 ft	67	2	88.5' - Bedding plane, horizontal, smooth,		surface, fossil molds	
	90%	07		undulating 88.9' - Fracture or mechanical break, rough,	Н	No Recovery 81.2-81.5'	
90				stepped, 1/2" open	ш	 Limestone 81.5-83.1' - Same as 80.50-81.20' 	1 1
-48.0			1	89.1, 89.75, 90.65' - Bedding plane or —	╁┼	except possible bioturbation	-
-				fractures, smooth, undulating	ш	- 82.25-83.6' - few voids	DO: 42 minutes
-			1	89.4' - Mechanical break	ш	83.1-85.6' - strong HCl reaction,	R8: 12 minutes
	91.5		NR		Ш	weak to medium strong (R2 to R3), voids <1/16" over 70-80% of surface,]
			_	91.5-91.6' - Fractures or mechanical break	\square	cavities up to 3/4x1/2" over 30% of	1
			5	(3), rough, various angles, stepped to undulating	1	surface, few fossil molds, potential	. 1
-				91.95' - Fracture, horizontal, rough, stepped,	144	bioturbation	
-			3	<1/2" open	Ш	85.95-86.5' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to	-
				92.25, 92.5-92.6' - Fractures, horizontal,	Ш	 weak (R1 to R2), voids up to 1/16" 	
	R9-NQ 5 ft	48	>10	rough, stepped 92.9' - Fracture, horizontal, rough, stepped	H	over 30%, cavities up to 1/4x1/8 "	
	86%	+0	- 10	93.7-94.25' - Fractures (>10)	ဓ	over 15% of surface	1
95				, ,	14	86.5-87.9' - yellowish gray to dark yellowish brown, (5Y 8/1 to 10YR	1
-53.0			0	_	口	4/2), very weak to medium strong	⊢
-			3		++	(R1 to R3), voids <1/4" over 70 % of	R9: 14 minutes
				95.65' - 70 deg, rough, undulating	口	surface, cavities <1/2x1/4" over 30-40% of surface, possible	No. 14 Illillutes
	96.5		NR		Щ	bioturbation	
]					Ш	87.9-91.0' - Same as 86.7-87.9'	1
1 7			>10	90.95 - Fracture of Thechanical break, 0 to	Н	except voids <1/4" over 40-70 % of	1
-				45 deg, rough, stepped	ᡛᠲ	_ surface, cavities <1/4x1/4" over 10-20% of surface	-
					柙	10 20 /0 01 3011000	

APPENDIX 2BB-50 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW			ORIENTATION : Vertical
WATER	LEVELS : 3.5	ft bg	s on 3		/1/200		
≥0€	(%			DISCONTINUITIES	_ ღ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
AAGH	S F Ř	Q D (%)	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF 등	N N N N N N N N N N N N N N N N N N N	OΩ	SAC FIRE	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SE	225	œ		THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	2.13. 3, 123. 1.232.3, 2.3.
			>10	97.15' - Fracture or mechanical break,	\vdash	Limestone	
	R10-NQ			horizontal, rough, stepped 97.15-98.3' - Fracture zone, rough, stepped,		- 88.8-88.9' - Same as 87.9-91.0' except strong HCl reaction, mottled	
-	5 ft 40%	8		gravel up to 2" diameter, intersecting angles	1—	infilling with cavities, possible	1
-	7070				世	- bioturbation, fossils prevalent	-
100 <u> </u>			NR	-	₩	No Recovery 91.0-91.5'	
-					\pm	 91.5-92.25' - very light gray and 	R10: 5 minutes
_					\perp	yellowish gray, (N8 and 5Y 8/1),	R 10. 5 minutes
	101.5					strong HCl reaction, extremely weak to medium strong (R0 to R3), voids	
			1		\mathbf{H}	up to 1/4" over 30% of surface,	SC-4 collected at 101.5-
					Ш	cavities up to 1/2", infill and bioturbation	102.4'
				102.45' - Fracture, 30 deg, rough, undulating		Calcareous Fat Clay (CH)	1
			1	102.8' - Fracture, 30 deg, rough, undulating	1	92.25-92.60' - yellowish gray, (5Y	1
	R11-NQ			103.3' - Mechanical break	#	- 8/1), moist, stiff to hard, high	-
-	5 ft	69	2		+	plasticity, strong HCl reaction, carbonate derived	-
-	100%			104 F 104 2F 104 7 10F 11 Padding plans	上	- Limestone	_
105			4	104.5, 104.35, 104.7, 105.1' - Bedding plane, <10 deg, rough, undulating –	╁╌	92.6-95.8' - Same as 91.5-92.25'	
-63.0				105.2, 105.35' - Bedding plane, <10 deg,		No Recovery 95.8-96.5' - 95.8-96.5"	
			0	rough, undulating	Н	Limestone	R11: 7 minutes
	106.5		0	105.7' - Mechanical break	\blacksquare	96.5-98.5" - yellowish gray, (5Y 7/2),	
1				106.65-107.25' - Fracture zone, rough,	1	 very fine to fine grained, strong HCl reaction, extremely weak (R0), 	_
			>10	undulating, intersecting fractures at various	\Box	friable, voids up to 1/4" over 30% of	_
-				angles, gravel up to 1-1/2" diameter	+	- surface, few cavities with infill up to	-
-			0	107.5' - Bedding plane, horizontal, rough, undulating	+	_ 1/4"x1/8", fossiliferous, trace organics	_
_	D40 NO			108.1' - Mechanical break	-	- No Recovery 98.5-101.5'	_
	R12-NQ 5 ft	53	1	100 OFL Freeture or hadding plans	\perp	Limestone	_
	80%			108.95' - Fracture or bedding plane, horizontal, rough, undulating		101.5-104.8' - yellowish gray, (5Y – 7/2), very fine to fine grained, strong	
110			5		$oldsymbol{\perp}$	HCl reaction, extremely weak to very	
-68.0				109.85, 110.25, 110.35, 110.4' - Bedding plane, horizontal, rough, undulating, tight to	Т	weak (R0 to R1), voids up to 3/16"	
				<1/2" open	1	 over 50-70% of surface, cavities up to 1/2" over 30% of surface, 	R12: 6 minutes
	111 5		NR		口	fossiliferous with infilled cavities and	
+	111.5			111.6' horizontal amonth undulating 4/6"	+	fossil molds, trace organics 104.8-105.05' - Same as	
-			2	111.6' - horizontal, smooth, undulating, 1/6" open, loose	+	104.6-105.05 - Same as 101.5-104.8' except laminated	-
				111.9' - horizontal, smooth, undulating, 1/12"	\pm	_ bedding	-
			6	open, loose 112.55' - Bedding plane, horizontal, smooth,	+	Limestone 105.05-106.5' - Same as 101.5-104.8	_
				undulating	上	_ 106.5-110.5' - Same as	
	R13-NQ	30		112.9' - Mechanical break	\coprod	104.8-105.05' except voids <1/4"	
	5 ft 100%	30	2	113.1' - Fracture, 40 deg, smooth, undulating 113.3, 113.4, 113.5' - Fractures, 20 to 65		over <20% of surface, many fossil casts and cavities up to 1/2" diameter	
115				deg, smooth, undulating	1	No Recovery 110.5-111.5'	
-73.0			3	113.85' - Fracture, 40 deg, smooth,	廿	Limestone	
-				undulating 114.05' - Bedding plane, horizontal, smooth,	+	_ 111.5-116.5' - Same as 106.5-111.5' except few cavities 3/4"x1/4"	R13: 8 minutes
-			7	undulating	一	-	-
	116.5			115.2' - Fractures, 0 to 80 deg, smooth,	+	Limostono	-
			>10	undulating 115.4, 115.5' - Fractures, 35 deg and vertical,	\Box	Limestone - 116.5-118.7' - Same as 111.5-116.5'	_
				smooth, undulating		except secondary infill in a few fossil	
					Ш	molds	

APPENDIX 2BB-51 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMINC	INIC I I IOD AI	ND L	QUIFIV	/IENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiii	<u>y</u>	ORIENTATION: Vertical
WATER	LEVELS: 3.5	ft bg	s on 3	/06/07 START : 2/26/2007 END : 3/	1/200	7 LOGGER : T. Valentine, R. Bitely	
> 0 =	(9			DISCONTINUITIES	Ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	907	ROCK TYPE, COLOR,	
불병은	RUI H. / ÆR	(%) О	120	DEDTIL TYPE OPIENTATION POLICINESS	SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	RE VGT	<u>۵</u>	A F	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	CO	R Q	F.F.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			>10	115.95-116.3' - Fractures (6+), rough,			
-	R14-NQ		1	undulating, intersecting at various angles	╁	-	-
-	5 ft	12		116.6' - Bedding plane, horizontal, smooth, undulating	亡	No Recovery 118.7-121.5'	-
l -	44%			116.6-117.7' - Fracture zone, rough,	₽	=	_
120				undulating, multiple intersecting fractures,			
-78.0			NR	gravel < 1-1/2" diameter			
-				118.35, 118.55' - Fractures, 55 deg, smooth, undulating	\vdash	-	R14: 4 minutes
-	404.5			undulum g	ш	-	-
-	121.5				+	Limestone	SC-5 collected at 121.5-
_			0		1	- 121.5-123.65' - Same as	122.6'
_					╨	116.5-121.5' except grading into	_
			3	122.6, 124.3' - Mechanical break		weak rock with depth (R2)	_
1			"	122.95' - Bedding plane, horizontal, smooth, undulating	ь		
	R15-NQ			123.3' - Fracture, 35 deg, smooth, undulating	\vdash	123.65-125.0' - Same as	_
-	5 ft 100%	76	0	123.65' - Fracture, 20 deg, smooth,	Ľ	121.5-123.65' except weak to	-
l	100 /6			undulating	╨	- medium strong (R2 to R3), highly	-
125_ -83.0			3		t	fossiliferous, voids <1/4" over 50-70% of surface, cavities	
				undulating	+	<3/4"x1/2" over 40% of surface	-
_			6	125.4, 125.45, 125.6, 125.7, 125.75, 125.9,		125.0-125.45' - Same as	R15: 5 minutes
	126.5			126.15, 126.25' - Bedding plane, horizontal, smooth, undulating		123.65-125.0' 125.45-126.5' - Same as	
						123.65-125.0'	
-			2	126.85, 126.95' - Bedding plane, horizontal, smooth, undulating	┰	Limestone	-
-				127.2, 129.3, 129.45, 129.6, 130.25' -		 126.5-131.4' - very fine to fine grained, strong HCl reaction, very 	-
-			0	Mechanical break	₩	weak to weak (R1 to R2), voids (<	-
-	R16-NQ				仜	_ 3/16") variable 0-30% of surface,	-
_	5 ft	82	0		╁╌	(especially at 127.05-128.5' and 129.6-131.4'), cavities (<1/4") over	-
_	98%					20% of surface from 129.6-131.4',	_
130			0	_	$oldsymbol{oldsymbol{eta}}$	fossiliferous (molds/casts),	
-88.0			"		ш	secondary infill in molds 127.05-128.5' - Same as	
			_		╁	125.45-126.5' except many fossil	R16: 7 minutes
-	101 5		0		二	molds and casts with few secondary	-
-	131.5		NR	404.05L Franking 440.L	 	│ infill of molds │ 128.5-129.6' - Same as 121.5-123.65	-
-			5	131.65' - Fracture, <10 deg, rough, undulating	+	129.6-131.4' - Same as 128.5-129.6	-
_			<u> </u>	132.05, 132.35' - Bedding plane, horizontal,	₽	except many fossil molds and casts	-
_			>10	smooth, undulating	\Box	with few secondary infill of molds No Recovery 131.4-131.5'	_
I _				132.35-132.5' - Fractures, smooth, undulating, perpendicular fractures 0 and 90	\vdash	Fat Calcareous Clay (CH)	_
	R17-NQ			degrees		131.5-131.55' - yellowish gray, (5Y	
	5 ft 100%	54	1	132.65' - Bedding plane, horizontal, smooth,	╁	7/2), moist to wet, soft, high plasticity	_
135	.55,0			undulating, <1/4" open 132.85, 133.05, 133.1, 133.25, 133.3, 133.45'	仜	 Limestone 131.55-132.6' - yellowish gray, (5Y 	-
-93.0			1	- Bedding plane, horizontal, smooth,	+	7/2), strong HCl reaction, very weak	
_			<u> </u>	undulating	F	to weak (R1 to R2), voids <1/4" over	R17: 6 minutes
-			5	133.45-133.55' - Fracture zone, horizontal, rough, undulating, gravel <1/2", angular	Ľ	20-70% of surface, variable, cavities <a> <1/4" diameter over 20% of surface,	-
-	136.5			133.6' - Bedding plane, horizontal, smooth,	$oldsymbol{\perp}$	 variable, fossil molds throughout with 	_
I -			7	undulating	Ь	some infilling	_
			Ľ	135.05' - Fracture, 40 deg, smooth, undulating, <1/4" open	\bot		
					Τ		
<u></u>					L		

APPENDIX 2BB-52 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NIE I HOD AI	ND E	אורוע	/IENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casin		ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bg	s on 3	/06/07 START : 2/26/2007 END : 3/	1/200	LOGGER : T. Valentine, R. Bitely	, J. Schaeffer
> 0 0	(9)			DISCONTINUITIES	ڻ ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
出병은	RUN H, A ŒR'	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	RE FISION	(%) Q	25	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	ABC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SOF	S. O	쥬	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY _N	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		_	2	135.4' - Fracture, 30 to 50 deg, smooth,	+	132.6-133.0' - Same as	
_				undulating		- 131.55-132.6' except light olive	_
	R18-NQ	58	0	135.55,135.6, 135.80, 136.3, 136.5' -	ш	brown, (5Y 5/2), very fine to fine	
	5 ft 100%	56	"	Fractures, <10 deg, smooth, undulating	Н	grained, weak to medium strong (R2	
	.00,0			136.65, 136.75, 137.05, 137.1, 137.2, 137.25,	仜	- to R3), few fossils, voids <1/4" over	-
140 <u> </u>			5	137.4, 137.6' - Bedding plane, 0 to 10 deg, smooth, undulating	+	5% of surface, fossil molds <1/8" 133.0-136.5' - Same as	
-30.0				138.4' - Fracture, 15 deg, rough, undulating		- 131.55-132.6'	
			_ ا	139.65, 139.75, 140.0, 140.3, 140.35, 140.9,		Limestone	R18: 7 minutes
	141.5		5	141.1, 141.15, 141.3, 141.45, 141.5' -	ш	136.5-137.1' - yellowish gray, (5Y	1
-	141.5			Bedding plane, horizontal and <10 deg,	$\pm \Box$	- 7/2), very fine to fine grained, strong	-
_			1	undulating, rough to smooth 141.65' - Bedding plane, <10 deg, smooth,	\Box	HCl reaction, very weak to weak (R1 to R2), variable 0-30% 15-20% of	-
				undulating	\mathbb{H}	- surface, cavities (<1/2"), variable]
				142.6' - Mechanical break		15-20% of surface, fossiliferous, trace	1
-			1		\Box	molds and laminated bedding, rare	1
-	R19-NQ		<u> </u>	143.35' - Fracture or mechanical break, 20	╂╫	secondary infill of cavities	-
_	5 ft	42	4	deg, rough, stepped	Щ	137.1-137.25' - Same as 136.5-137.1' except pale yellowish	_
	86%			143.65' - Fracture, horizontal, rough,	Н	brown to moderate yellowish brown	
145				undulating 144.05' - Fracture, horizontal, rough,	\top	to moderate yellowish brown, (10YR	
-103.0			>10	undulating	ш	6/2 to 10YR 5/4), medium strong	
-			5	144.3-145.05' - Fracture zone, rough,	+	_ (R3)	R19: 24 minutes
_			\sim	intersecting fractures at various angles, <1"		137.25-139.75' - Same as - 136.5-137.1'	R 19. 24 minutes
	146.5		NR	gravel, angular, stepped to undulating, partial		139.75-140.0' - Same as	
				recovery 145.25' - Bedding plane, horizontal, rough,	\top	137.1-137.25'	SC-6 collected at 146.5-
-			1	undulating	亡	140.0-141.5' - Same as 136.5-137.1'	147.4'
_				145.45' - Fracture, vertical, smooth,	+	_ Limestone	-
I _			0	undulating	┸	141.5-145.5' - dark yellowish brown to pale yellowish brown, (10YR 4/2 to	_
				145.55, 145.65, 146.15' - Bedding plane, horizontal, smooth, undulating		10YR 6/2), very fine to fine grained,	
	R20-NQ			145.8, 146.05, 146.35' - Fractures (3),	₽₩	strong HCl reaction, weak to medium	1
-	5 ft	90	2	vertical, smooth, undulating	ш	strong (R2 to R3), with extremely	-
_	98%			147.45' - Bedding plane, horizontal, smooth,	+	weak (R0) zone at 141.6-141.65',	-
150_			2	undulating	┸	voids (<3/16") over 10-50% of — surface, cavities and fossil molds (up	
-108.0			-	148.35' - Mechanical break 149.15, 149.25, 149.75, 150.0, 150.75, 151.4'		to 1" diameter) over 40% of surface,	
_				- Bedding plane, horizontal and <10 deg,	\mathbb{H}	about 50% of cavities have	R20: 10 minutes
-			1	smooth, undulating	世	 secondary infill, very fossiliferous 	-
-	151.5		NR,		\coprod	(molds) 145.5.145.8' pale vellowish brown	-
_			0		\Box	145.5-145.8' - pale yellowish brown, (10YR 6/2), very fine grained, strong]
			ľ			HCl reaction, medium strong (R3),]
-				1	₩	laminated bedding, voids (<3/16")	1
-			0	152.75, 153.2, 153.35' - Mechanical break	Н	over 0-20% of surface	-
-					П	No Recovery 145.8-146.5' Limestone	1 -
	R21-NQ 5 ft	80	6	153 95 153 0 154 05 154 15 154 3 154 35	\mathbb{H}	_ 146.5-151.4' - pale yellowish brown,	
]	5π 94%	00	١ ٥	153.85, 153.9, 154.05, 154.15, 154.3, 154.35, 154.9, 155.0' - Bedding plane, 0 to 10 deg,	Ш	(10YR 6/2), very fine to fine grained,	1
1,55	.,,,			smooth, undulating	\Box	strong HCl reaction, weak to medium	1
155 <u> </u>			2		╫	strong (R2 to R3), voids (<3/16")	-
13.5					Ш	over 0-20% of surface (voids <1/4" over 80% of surface from	Box 44
			0	155.55, 155.65' - Mechanical break	\vdash	_ 150.7-151.05'), few cavities	R21: 11 minutes
	156.5				\mathbb{L}^{+}	<3/4"x1/2", few cavities with infill,	1
-	100.0		NR_	156.6' Redding plane, horizontal smooth	Ш	fossiliferous	SC-7 collected at 156.55-
-			1	156.6' - Bedding plane, horizontal, smooth, undulating	+	_ 150.7-151.4' - Same as 146.5-150.7'	157.55'
_				aaaiaang		except voids <1/4" over 80% of surface	
				157.6' - Mechanical break		No Recovery 151.4-151.5'	
						THE MODELLY IN THE TOTAL	
				1	•		•

APPENDIX 2BB-53 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				MENT . Dietrich D-30 3/N 232, Mud rotary, NQ tools, HW		_	ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bg	s on 3		1/200	i '	
> ^ ~	(9)			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDETICATIONS
岩병흔	AUN H,A	(%	N N		1 2	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A Y	SOV	(%) Q	P.F.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCE	COF	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S.√I	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
F			8	157.75, 157.8, 157.9, 158.0' - Bedding plane,	H	Limestone	
_				horizontal, smooth, undulating		- 151.5-154.95' - Same as	-
l _	R22-NQ 5 ft	71	6	158.1' - Fracture, vertical, smooth, undulating	₽	_ 150.7-151.05' except yellowish gray	_
	96%	, ,	ਁ	158.15, 158.25, 158.3' - Bedding plane or		to dark yellowish brown, (5Y 7/2 to	
160				mechanical break, 0 to 90 deg, smooth,	—	10YR 4/2), weak to medium strong (R2 to R3)	_
-118.0			0	158.6, 158.65, 158.75, 158.9, 159.15' -	1	151.60-151.65' - Same as	
-				Bedding plane, horizontal, smooth,	$oxed{\sqcup}$	 151.5-154.95' except voids <1/4" 	R22: 12 minutes
-			0	undulating 160.1, 160.65, 161.05' - Mechanical break	+	over 60% of surface 151.65-153.2' - Same as	- 12 minutes
	161.5		NR	100.1, 100.05, 101.05 - Mechanical break		151.65-153.2 - Same as	
						cavities <1/4" diameter	
_				-	1	153.2-154.2' - Same as	_
1 -				-	1	- 151.65-153.2' except voids <1/8" over 30-60% of surface	-
1 -				-	1	154.2-154.92' - Same as	-
1 -				-	1	_ 153.2-154.2' except highly laminated	-
1 -					1	with organics, voids <1/4" over	_
						<pre>< 10-20% of surface L Limestone</pre>	l
					1	154.95-156.2' - Same as	_
-					1	154.2-154.92' except very weak to	
-				-	1	weak (R1 to R2), voids <1/8" over	-
_				-	1	<pre><10-20% of surface No Recovery 156.2-156.5'</pre>	_
_						Limestone	_
						156.5-157.95' - Same as	
					1	154.95-156.5' except pale yellowish brown to very light gray, very fine	_
-				-	1	grained, voids < 1/4" over 20-40% of	-
-				-	1	surface	-
l -				-	1	157.95-158.6' - Same as	_
_				_	1	156.5-157.95' except pale yellowish brown to very light gray, (10YR 6/2 to	_
						N8), very fine grained, medium	
_				-	1	strong (R3), <10% voids over	_
-				-	1	surface, few cavities <1/4"x1-1/2"	_
-				-	1	with infill 158.6-161.3' - Same as	-
_					1	- 157.95-158.6' except yellowish gray,	_
l _						(5Y 7/2), very fine to fine grained,	_
						weak (R2), voids <1/4" over 40-70%	
-				-	1	of surface, cavities up to 1"x1/2" over 30% of surface	<u> </u>
1 -				-	1	No Recovery 161.3-161.5'	-
1 -				-	1	Bottom of Boring at 161.5 ft bgs on	-
1 -				-	1	3/1/2007	-
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APPENDIX 2BB-54 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-06	SHEET	1	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

ORIENTATION : Vertical

					·	FND : 0/0/0007		-D . F	Oniciniation vertical
WATER	LEVELS	: 1.0 ft bo	gs on 03/0		START : 3/6/2007	END: 3/9/2007 SOIL DESCRIPTION	LOGG	<u> </u>	R. Bitely, L. Prochaska COMMENTS
30₽1	04142: -	INITES	1 (4)	STANDARD PENETRATION		JOIL DESCRIFTION		- 5	S CONTINUENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAN	ME, USCS GROUP SYMB	OL COLOR	- SOMBOLICI OB	DEPTH OF CASING, DRILLING RATE,
H B ATIC		RECOVE	RY (ft)		MOISTUR	E CONTENT, RELATIVE	DENSITY OR	Ş	DRILLING FLUID LOSS, TESTS, AND
EPT			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE,	MINERALOGY	\ \{\bar{2}{\chi}}	INSTRUMENTATION
42.5				(14)				╫	·
-								+	-
-								+	-
-								+	-
-								-	-
-								4	-
-								4	-
-	3.5					10 114711 0111 (00 01		-	
_				4-4-4	Poorly Grade 3.5-4.1' - dark	d Sand With Silt (SP-Silt yellowish orange, (10Y	M) R 6/6). wet.		14
		1.3	SS-1	(8)	\ loose, very fin	e to fine grained, 10-15°	% nonplastic		
5	5.0			` '		ganics, trace coarse sar nd concretions, sand is s		4	_
37.5					Clavey Sand	(SC)			
					4.1-4.8' - pale	yellowish brown, (10YR	6/2), moist,	']	
						e to fine grained, 40% ne race organics, sand is s		1	
					"	,		1	
								1	
								1	1
-	8.5							1	1
-	0.0				Silt (ML)			Ш	
-		1.0	SS-2	5-5-6	8.5-9.5' - dark	yellowish orange, (10Y) yid dilatancy, moderate	R 6/6), wet, stiff,	111	
10	10.0			(11)	10% very fine	grained sand, 5% medi	um to coarse	/#"	-
32.5	10.0				grained sand,	all carbonate	/	1	_
-								1	-
-								1	-
-								1	-
-								+	-
-								+	-
-								+	-
-	13.5				Silt With Sand	d (ML)		+	
-		0.8	SS-3	38-50/5.5 (88/5.5")	13.5-14.25' - c	gravish orange, (10YR 7	/4), moist to wet,	$ \mathbf{H} $	-
-	14.5			(00/0.0)	hard, nonplast	tic, rapid dilatancy, mod 5% very fine sand-sized	erate HCI	/‡¨	7
15 <u> </u>					sand-sized, tra	ace fine gravel-sized, all	carbonate	\Box	-
27.5						·	,	4	-
								1	-
								1	
								1	
	18.5 18.7							\perp	Driller's Remark: Hard layer 18.0-21.0'
]	18.7	0.2	SS-4	50/2 (50/2")	Limestone Fr	ragments	1) mild HCI	尸	-
				(50/2)	reaction, fragr	ayish orange, (10YR 7/4 ments to 3/8"	+), IIIIIQ FICI /	1]
20								1]
								\top	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-06	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

ORIENTATION · Vertical

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical											
WATER	LEVELS	: 1.0 ft bg	gs on 03/0	09/07	TART : 3/6/2007 END : 3/9/2007 LOGGE	R : R.	Bitely, L. Prochaska				
				STANDARD	SOIL DESCRIPTION	ď	COMMENTS				
NO (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG					
		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	7	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MBC	INSTRUMENTATION				
DEPTH BELOW SURFACE AND ELEVATION (ft)			,,,,,,	(N)		SΥ					
22.5						1	_				
l _						1	_				
l _											
						1					
						1]				
	23.5					1					
_					Silty Sand (SM)						
		1.1	SS-5	10-13-24 (37)	23.5-24.6' - grayish orange, (10YR 7/4), wet, dense, rapid dilatancy, moderate HCl reaction, fine to coarse						
25	25.0			(07)	sand, 47% nonplastic fines, 3/4" thick limestone lense at 24.4-24.5', all carbonate	1	1				
17.5					ai 27.7-27.J, aii cai dulliale]]				
						1	Driller's Remark: Very hard layer 25.5-27.0'				
						1					
	28.5										
				31-50-50/5	Silt With Sand (ML) 28.5-29.9' - dark yellowish orange, (10YR 6/6), moist	Ш					
l _		1.4	SS-6	(100/11")	to wet, hard, nonplastic, rapid dilatancy, moderate HCl]					
30	29.9				reaction, 30% fine to medium sand-sized (amount varies in lenses), all carbonate	Ш	_				
12.5						1	Driller's Remark: Very hard layer 30.0-35.0'				
_						1	_				
_							_				
-						1	_				
-						1	_				
-						-	-				
-	33.5 33.8	0.3	SS-7	50/3.5	_ Limestone Fragments	╀	-				
-	00.0		00-1	(50/3.5")	\ 33.5-33.8' - gravish orange. (10YR 7/4), mild HCl	╀	1				
-					reaction, gravel-sized fragments (1/16"-1"), 75% coverage of <1/16" voids on fragment surfaces	-	-				
35 7.5						-	-				
'						-	-				
-						-	-				
-						-	-				
-						+	-				
-						+	-				
-						+	Driller's Remark: Hard layers 38.0-38.5' and				
-	38.5 38.8	0.3	SS-8	50/3		+	38.5-42.0' -				
-				(50/3")	7	Ė]				
						1	-				
40						+					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-06	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

ORIENTATION · Vertical

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical										
WATER	LEVELS	: 1.0 ft bo	gs on 03/0	09/07	START: 3/6/2007 END: 3/9/2007 LOGGER: R. Bitely, L. Prochaska					
> 1				STANDARD	SOIL DESCRIPTION g COMMENTS					
AND AND	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS						
4 BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND					
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY BOTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION					
2.5				(14)	Limestone Fragments Dense drilling 40.0-43.0', light chatter					
_					38.5-38.8' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, fine to coarse gravel-sized					
_					fragments up to 2" diameter, 70-80% coverage of					
					<1/16" voids on fragment surfaces					
Ī					1					
	43.5									
	43.8	0.3	SS-9	50/3.5 (50/3.5") /	Limestone Fragments 43.5-43.8' - pale yellowish brown, (10YR 6/2), mild					
				(30/3.3)	│ \ HCl reaction, coarse sand-sized to fine gravel-sized │ │ │					
45					fragments (1/16"-1"), 2" silt lense (ML) at bottom of sample					
-2.5										
_]]					
_										
_					-					
_										
_					-					
_	48.5				Limestone Fragments					
-		1.3	SS-10	49-15-20	48.5-49.0' - Same as 43.4-43.8' except fragments					
50 50	50.0	'.0	00 10	(35)	___\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					
-7.5	30.0				49.0-49.8' - dark yellowish brown, (10YR 4/2), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl					
-					\reaction, 35-40% fine to coarse sand-sized,					
-					\gravel-sized limestone lense at 49.6-49.8', all carbonate					
					1					
]					
	53.5				<u> </u>					
_	53.9	0.4	SS-11	50/5 (50/5")	Limestone Fragments 53.5-53.9' - light olive gray, (5Y 5/2), moderate HCl					
_				(1111)	\reaction, sand and gravel-sized / _					
55 <u> </u>										
-12.5										
-					Dense drilling 56.0-57.0', light chattering					
-					Dense unining 56.0-57.0 , light chattering					
-										
-										
-	58.5				Stop drilling at 18:30 on 3/6/07, set HW					
-	58.6	0.1	SS-12	50/1	Limestone Fragments / casing to 40'					
-				(50/1")	\58.5-58.6' - light olive gray, (5Y 5/2), mild to moderate / _ HCI reaction, only a single 2" fragment					
60					Begin Rock Coring at 58.5 ft bgs					
					See the next sheet for the rock core log					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-06	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

CORING	NETHOD A	ND E	ורוטג	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin	9	ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bg	s on 0	3/09/07 START: 3/6/2007 END: 3/	9/200	7 LOGGER : R. Bitely, L. Prochask	a
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		<i>(</i> 0	DESCRIPTION	SYMBOLIC LOG		
D'III	₹ _A ₹	_	FRACTURES PER FOOT	DESCRIPTION	_ □	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A TIC	贤듀씨	(%) Q	⊉8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FRE	NS SS S	αD	AC R	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	SHR	ď	E E	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROLO, TEOL REGGETO, ETO.
	58.5			50.7.50.41.84		Limestone	3/7/07 advanced HW
-			2	58.7, 59.4' - Mechanical break (2) 58.85, 59.1, 59.5' - Bedding plane (3), 40	Н	58.5-61.4' - pale yellowish brown,	casing to 58.5'
_				deg, smooth, undulating	\vdash	(10YR 6/2), very fine to fine grained,	_
60	R1-NQ		١,	aog, omoon, anadang		strong HCl reaction, medium strong — (R3) at 58.5-59.0' grading to very	
-17.5	3 ft 97%	68	4		Н	weak (R1) at 59.0-61.4', 80%	
_	0,70			60.25' - Bedding plane or fracture, horizontal, smooth, undulating, intersecting high angle		coverage of <1/16" voids on surface	R1: 3 minutes
-			3	fracture	Ш	 from 58.5-59.0', trace voids and few 	-
	61.5		NID	60.3' - Fracture, 75 deg, smooth, undulating	Ы	cavities <1/4" diameter from	_
			NR.	60.8, 61.0' - Bedding plane (2), horizontal,		59.0-61.4'	
_			0	smooth, undulating	ш	 No Recovery 61.4-61.5' Limestone 	-
-				60.9' - Fracture, 80 deg, smooth, undulating,	+	61.5-66.1' - pale yellowish brown,	-
_			>10	tight 62.55, 62.65' - Bedding plane (2), horizontal,	H	- (10YR 6/2), very fine to fine grained,	-
				smooth, undulating	Ш	moderate to strong HCl reaction,	
	R2-NQ			62.65-62.8' - Fracture zone, rough,	\mathbb{H}	very weak to medium strong (R1 to	1
-	5 ft	62	2	undulating, >10 fractures at various angles	ᡛ╣	R3), 60% coverage of <1/16" voids	-
-	92%			63.1, 63.2, 63.6' - Fractures or mechanical	Ш	on surface from 64.75-65.25', trace voids and few cavities up to	-
65			2	break (3), smooth to rough, undulating, low	Н	3/4"x1/12" 61.5-64.75' and	
-22.5			-	angle — 64.1, 65.0' - Bedding plane or mechanical	T	65.25-66.5', trace organics in	
-			10	break (2), smooth to rough	ш	laminations	R2: 10 minutes
-			10	64.45-65.95' - Fracture zone, rough,	+		-
_	66.5		NR	undulating, 5+ fractures at intersecting		No Recovery 66.1-66.5'	_
				angles		Limestone	Many cavities or lost
_			>10	65.75' - Bedding plane, smooth, undulating 65.75' - Fracture, 40 deg, smooth, undulating	Н	 66.5-70.3' - moderate yellowish brown to dark yellowish brown, 	material from coring at - 66.5-68.15'
-				66.5-67.8' - Fracture zone, rough, undulating		(10YR 5/4 to 10YR 4/2), fine grained,	00.5-06.15
_			>10		ш	- moderate to strong HCl reaction,	_
				angles	Н	very weak to medium strong (R1 to	
	R3-NQ			68.05, 68.15' - Bedding plane or mechanical		R3), hardness increasing with depth,	
-	5 ft	40	2	break (2), <10 deg, rough to smooth,	ш	- 60% coverage of <1/16" voids on	_
-	76%			undulating 69.25, 69.4' - Bedding plane, <10 deg,	$+ \Box$	surface, no cavities 68.15-70.3', 67.7-67.8' silt lense, carbonate, low	_
70			0	smooth, undulating —		— plasticity	
-27.5				69.75, 71.85, 72.5, 74.9' - Mechanical break	ш	·	
_			l	(4)	111	- No Recovery 70.3-71.5'	R3: 8 minutes
-			NR			-	-
-	71.5				₽₩	-	_
			4		Н	Limestone	
]			1	72.1, 72.6' - Bedding plane (2), <10 deg,		 71.5-75.3' - pale yellowish brown to very light gray, (10YR 6/2 to N8). 	1
-				smooth, undulating	Ш	very fine to fine grained, moderate	
-			1			- HCl reaction, medium strong (R3) at	-
_					口	71.5-75.15', very weak to extremely	_
	R4-NQ		\		\mathbb{H}	weak (R1 to R0) at 75.15-75.3',	
-	5 ft 76%	68	1	74.05' - Fracture, 20 deg, smooth, undulating	ш	 25-75% coverage of <1/16" voids on surface, many cavities <1/4" 	1
	10/0			74.5, 74.65' - Bedding plane (2), <10 deg,	\Box	diameter with few cavities <1/4	-
75			3	smooth, undulating —	₽	— (fossil molds), fossiliferous	
-32.5			-	75.15' - Fracture, 20 deg, rough, undulating	Ш	- No Recovery 75.3-76.5'	
]			NID		Н	- No Necovery 70.0-70.0	R4: 16 minutes
-			NR		╁┼	-	-
-	76.5			76.5.76.6! Eracture zone rough undulation	口	Limestone	-
_			>10	76.5-76.6' - Fracture zone, rough, undulating to stepped, trace silt infill		Limestone	4
			' '	76.7' - Mechanical break or bedding plane.		(10YR 6/2), very fine to fine grained,	
I -				<10 deg, rough, undulating		strong HCl reaction, very weak (R1),	1
-			NA	76.9, 78.25' - Clay seam (2), clay contact		- \20% coverage of <1/16" voids on	-
					Ш	¬ surface ┌	
					\perp		

APPENDIX 2BB-58 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-06	SHEET	5	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	METHOD A	ND E	QUIPN	IENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin	g	ORIENTATION : Vertical
WATER	LEVELS : 1.0	ft bg	s on 0	3/09/07 START: 3/6/2007 END: 3	9/200	7 LOGGER : R. Bitely, L. Prochask	a
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- 80	R5-NQ 5 ft 86%	20	0	78.4' - Mechanical break or bedding plane, <10 deg, smooth, undulating 78.55' - Mechanical break or fracture, 50-70 deg, smooth, undulating		Fat Clay (CH) 76.9-78.25' - very pale orange, (10YR 8/2), moist, medium stiff to stiff, low dilatancy, moderate to high	Laminated organics varve- like deposition at 79.4-79.5'
-37.5 - -	81.5		4 0 NR	78.75, 79.2, 79.3' - Bedding plane (3), <10 – deg, smooth, undulating		plasticity, 30% silt Limestone 78.25-80.8' - very light gray to dark yellowish brown, (N8 to 10YR 4/2), very fine to fine grained, weak to	R5: 10 minutes
- - -			>10	81.6' - Fracture or mechanical break, <10 deg, rough, undulating 81.8-82.0' - Fracture zone, rough, undulating, multiple intersecting factures at various angles		medium strong (R2 to R3), 40% coverage of <1/1/16" voids on surface varying/decreasing with depth, laminated organics 79.4-79.5' No Recovery 80.8-81.5'	81.5-82.75' possible bioturbation, 82.75-83.2' wormholes/bioturbation SC-1 collected at 82.25- 83.2'
- - 85_ -42.5	R6-NQ 5 ft 86%	54	0 s2. frac	82.25, 83.2, 83.4, 84.6' - Mechanical break or fractures (4), rough, stepped to undulating, variable angularities		Limestone 81.5-82.75' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, weak to medium strong (R2 to R3), 70% coverage of <1/16" voids	_
-	86.5		4 NR	85.3' - Mechanical break or fracture, 0-50 deg, rough, stepped 85.55-85.8' - Fracture zone, rough, undulating, multiple (<4) fractures, various angles		on surface, 20% coverage of <1/2" cavities on surface, several cavities <1/2" with secondary infill, all acid reactive 82.75-83.2' - Same as 81.5-82.75'	R6: 16 minutes
 90 -47.5	R7-NQ 5 ft 76%	58	>10 >10 0 10 NR	87.2' - Fracture, 35 deg, rough, undulating 87.35-87.8' - Fracture zone, rough, undulating to stepped, multiple fractures at various angles 87.95, 88.9, 89.3' - Mechanical break (3) 89.0' - Mechanical break or bedding plane, 40 deg, rough, undulating 89.2-89.3' - Fracture zone, rough, undulating to stepped, intersecting fractures at various angles		except 30% coverage of <3/16" voids on surface, 15-20% coverage of <1/4" cavities on surface 83.2-85.8' - Same as 81.5-82.75' except 80% coverage of <1/12" cavities on surface, 50% coverage of <1/2" cavities on surface, fossiliferous No Recovery 85.8-86.5' Limestone 86.5-90.3' - pale yellowish brown to dark yellowish brown, (10YR 6/2 to 10YR 4/2), very fine to fine grained, mild to moderate HCI reaction, very	R7: 23 minutes
- - - -	91.5 R8-NQ		>10	91.6' - Fracture, vertical, rough, undulating 91.65' - Mechanical break or fracture, 15 deg, rough, stepped to undulating 91.85' - Fracture, vertical, rough, undulating 92.05-92.2' - Fracture zone, rough, undulating to stepped, multiple fractures at various angles		weak to medium strong (R1 to R3), 60% coverage of <1/16" voids on surface, many cavities <1"x1/4" over 20-30% of surface, fossiliferous, mottled coloration, weak to moderate HCL reaction, trace organics No Recovery 90.3-91.5' Limestone 91.5-92.2' - dark yellowish brown to	
- 95_ -52.5 -	5 ft 90%	58	1 2 1 NR	92.95' - Mechanical break or fracture, 25-70 deg, rough, undulating, variable fracture angle 93.3' - Bedding plane, horizontal, smooth, undulating 94.1' - Bedding plane, smooth, planar 94.25-94.35' - Clay seam, soil horizon 94.7' - Fracture, 35 deg, rough, stepped		pale yellowish brown, (10YR 4/2 to 10YR 6/1), very fine to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids <3/16" over 80% of core surface, few cavities (<1/4") over 20% of surface 92.2-93.0' - Same as 91.5-92.2'	SC-2 collected at 95.05- 95.85' R8: 29 minutes
- - -			1 >10	94.7 - Fracture, 35 deg, rough, stepped 95.0' - Mechanical break, 70 deg, rough, undulating 95.05' - Clay seam, soil horizon, clay contact <1/4", potential fracture infill, open 1/4" 95.85' - Mechanical break or fracture, 15 deg, rough, stepped		except weak to medium strong (R2 to R3), fossiliferous, voids <3/16" over 60% of core surface, decreasing with depth, cavities up to 2-1/2"x1" with extremely weak (R0) limestone or silt infill	96.5-96.85' hammer test for calibration (50/4") Top 4" of core lost to hammer test for calibration, measurements of core depths start from 96.85'
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-06	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

WATER	LEVELS: 1.0	ft bgs	s on 0	3/09/07 START: 3/6/2007 END: 3/	/9/2007	LOGGER : R. Bitely, L. Prochaska	a
				DISCONTINUITIES	ტ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B	E.R.L. STH, OVEI	Q D (%)	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	COR	3 O E	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3YM!	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
2002	R9-NQ			97.5, 99.6' - Mechanical break (2)	1	Limestone	
-	5 ft	60	0	97.95' - Fracture, 60 deg, rough, undulating	\Box	- 93.0-94.1' - Same as 91.5-92.2'	=
400	82%			98.0-98.6' - Fracture zone, rough, stepped, multiple (>20) intersecting fractures at	目	except weak to medium strong (R2 to R3), trace voids <3/16" and cavities	=
100_ -57.5			1	various angles, gravel sized fragments <3" -	廿	— 94.1-95.1' - Same as 91.5-92.2'	_
-				100.2' - Mechanical break	+	except very weak to weak (R1 to R2), trace voids <3/16" and cavities	R9: 7 minutes
-	404.5		NR		╫	 95.1-96.0' - Same as 91.5-92.2' except very weak to medium strong 	=
-	101.5				田	(R1 to R3), voids <3/16" over	=
-			0	101.95, 103.3, 103.6, 105.0' - Mechanical	世	 60-80% of core surface, few cavities (<1/2"x1/4"), horizon of greenish 	-
-				break (4)	Ш	black (5GY 2/1) fat clay (moist, soft	-
-			1	103.15' - Mechanical break or fracture, 40	+	 to medium stiff, highly plastic, mild HCl reaction) at 94.25-94.35' 	-
-	R10-NQ			deg, rough, stepped	日	No Recovery 96.0-96.85'	=
_	5 ft 99%	97	0		Ħ	Limestone 96.85-100.6' - pale yellowish brown,	=
105					Ħ	(10YR 6/2), very fine to fine grained,	_
-62.5			0	_	Ш	strong HCl reaction, extremely weak to very weak (R0 to R1), 60%	
					\mathbb{H}	coverage of <3/16" voids on surface, 20% coverage of <3/4"x1/2" cavities	R10: 13 minutes
	106.5		0		田	on surface, fossiliferous	=
			NR/	100.051.5	囯	No Recovery 100.6-101.5'	=
			2	106.85' - Fracture, 30 deg, rough, stepped	団	101.5-106.45' - pale yellowish brown,	=
			1	107.4' - Fracture or mechanical break, 70 deg, smooth, stepped, open	Ш	(10YR 6/2), very fine to fine grained, extremely weak to very weak (R0 to	_
			ļ		Н	R1), 60% coverage of <3/16" voids	
	R11-NQ 5 ft	60	2	108.5' - Bedding plane, horizontal, smooth, undulating, 1/2" open	用	on surface, few cavities <1/2" diameter, fossiliferous with fossil	
	94%	00		108.7' - Fracture or mechanical break, 60	耳	molds, trace organics No Recovery 106.45-106.5'	_
110_			3	deg, smooth, stepped 109.0' - Bedding plane, horizontal, smooth, —	凵	Limestone	
-67. 5				undulating	Ш	106.5-111.2' - pale yellowish brown, (10YR 6/2), very fine to fine grained,	
_			0	110.15, 110.25' - Bedding plane (2), <10 deg, rough, stepped	₽	extremely weak to weak (R0 to R2),	R11: 16 minutes
-	111.5		NR	110.4' - Bedding plane, <10 deg, smooth, undulating	押	30-70% coverage of <3/16" voids on surface variable and decreasing with	=
-			1	110.85' - Mechanical break	口	_ depth, cavities up to 1/2" to 1/4",	=
-				112.35, 112.6' - Bedding plane (2), <10 deg,	丗	fossiliferous, fossil molds and casts No Recovery 111.2-111.5'	_
-			1	rough, undulating		_ Limestone	-
-	R12-NQ				+	111.5-116.4' - pale yellowish brown, (10YR 6/2), very fine to fine grained,	-
-	5 ft	92	2	114.0' - Fracture, 40 deg, smooth, undulating	\Box	extremely weak to weak (R0 to R2), 40-70% coverage of <1/16" voids on	_
	98%			114.35, 115.45' - Bedding plane (2), smooth,	+==	 surface variable, fossiliferous with 	-
115_ -72.5			1	planar	╂╬┨	fossil molds and casts <1/4" diameter	
-					\blacksquare	-	SC-3 collected at 115.45-
-			0		+	-	116.2' – R12: 14 minutes
-	116.5		NR)	116.2' - Mechanical break	田	No Recovery 116.4-116.5'	1X12. 14 Hilliules
-			1		団	-	=
-				117.3' - Fracture, 70 deg, smooth, planar 117.55' - Fracture or mechanical break, 30		-	-
-			1	deg, rough, stepped	╁┼	_	-
					+	-	

APPENDIX 2BB-60 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-06	SHEET	7	OF	9	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) ${\color{blue} DRILLING\ CONTRACTOR: Universal\ Engineering\ Sciences,\ Jacksonville,\ FL;\ Driller:\ B.\ Truitt;\ Cathead\ Operator:\ B.\ Crews}}$

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical WATER LEVELS: 1.0 ft bgs on 03/09/07 START: 3/6/2007 END: 3/9/2007 LOGGER: R. Bitely, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS R13-NQ Limestone 5 ft 92 1 116.5-117.5' - yellowish gray, (5Y 7/2), very fine to fine grained, very weak to weak (R1 to R2), 30-50% 98% 119.45, 119.7' - Fracture or mechanical 120 break (2), 50 deg and 80 deg, rough, coverage of <1/16" voids on surface, 2 -77.5 1 cavity 1/2" diameter, fossiliferous undulating (molds), trace organics 117.5-121.4' - Same as 116.5-117.5' 119.6' - Fracture or mechanical break, 60 R13: 9 minutes deg, rough, planar 120.95' - Fracture or mechanical break, <10 1 except 50-70% coverage of <3/16" 121.5 NR deg, rough, stepped 121.6, 121.65' - Bedding plane (2), <10 deg, voids on surface, 20% coverage of 4 1/4" to 1" cavities on surface, highly smooth, stepped fossiliferous (molds) 122.0' - Mechanical break or fracture, <10 No Recovery 121.4-121.5' deg, rough, stepped Limestone 1 122.5' - Bedding plane, horizontal, smooth, 121.5-125.4' - very pale orange, undulating (10YR 8/2), very fine to fine grained, R14-NQ 122.65' - Mechanical break or fracture, 50 strong HCl reaction, weak to very 70 1 5 ft weak (R2 to R1), 50-70% coverage deg, rough, undulating 90% of <3/16" voids on surface, 10% 123.65, 123.9' - Fracture or mechanical 125 break (2), 45 deg and 80 deg, rough, coverage of 3/16" to 1/2" cavities on 0 -82 5 undulatina surface, highly fossiliferous (molds) 125.4-126.0' - Same as 121.5-125.4' except thinly (1/16") laminated with R14: 8 minutes 2 125.7' - Bedding plane, horizontal, smooth, NR planar pale yellowish brown, (10YR 6/2), 126.5 125.9' - Bedding plane, horizontal, smooth, very fine to fine grained, weak to Sample can be crushed undulating medium strong (R2 to R3), organics, >10 between fingers to silt size 126.5-126.83' - Fracture zone, smooth, mild HCI reaction except for material (calcerous) undulating, multiple intersecting fractures, laminations fragments up to 2" diameter No Recovery 126.0-126.5' 3 126.85' - Bedding plane, horizontal, smooth, Limestone undulating 127.15' - Bedding plane or mechanical break, 126.5-131.5' - yellowish gray, (5Y R15-NQ 7/2), very fine to fine grained, strong >10 5 ft 42 rough, undulating HCl reaction, extremely weak to 100% 127.7, 127.8, 128.0' - Bedding plane (3), <10 weak (R0 to R2), friable, 20% deg, smooth, undulating coverage of <1/16" voids on surface, 130 >10 128.15' - Bedding plane or mechanical break, -87.5 highly fossiliferous (casts and molds) horizontal, rough, undulating R15: 5 minutes 128.5, 128.75, 128.9, 129.0' - Bedding plane >10 (4), horizontal, rough, undulating 129.15-129.35' - Fracture zone, rough, 131.5 131.5-134.7' - very pale orange, (10YR 8/2), very fine to fine grained, stepped 5 129.55-129.65' - Fracture zone, rough, extremely weak to very weak (R0 to stepped R1), trace organics, fossiliferous 130.2, 130.8' - Bedding plane (2), rough, 3 (casts and molds), 60-90% coverage undulating 131.0-131.5' - Fracture zone, rough, stepped of <3/16" voids on surface, interbedded laminated bedding up to R16-NO to undulating 1" thick with trace voids and fossils 5 ft 84 0 131.6' - Bedding plane or mechanical break, SC-4 collected at 134.0-100% rough, undulating, 1/2" open 134.85' 132.2' - Bedding plane or mechanical break, 135 134.7-136.5' - Same as 131.5-134.7' 2 smooth, planar -92.5 except strong HCI reaction, 20-40% 132.4' - Fracture or mechanical break, <10 coverage of <1/16" voids on surface, R16: 7 minutes deg, rough, stepped trace fossil molds or casts, 2 132.5, 132.55' - Bedding plane (2), interbedded with highly fossiliferous horizontal, smooth, undulating 136.5 lenses up to 1" thick 133.2, 133.55' - Bedding plane (2), <10 deg, 0 rough, undulating 134.85, 135.1' - Bedding plane (2), <10 deg, smooth, undulating 0

> APPENDIX 2BB-61 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-06	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NETHOD A	ND EC	אורוע	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casin		ORIENTATION : Vertical
WATER	LEVELS: 1.0) ft bgs	s on 0	3/09/07 START: 3/6/2007 END: 3/	9/2007	7 LOGGER : R. Bitely, L. Prochask	a
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		<i>(</i> 0	<u> </u>	SYMBOLIC LOG		
D'III	₹ _A ₹	_	삤	DESCRIPTION	_ C	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A TIC	SE E	R Q D (%)	⊉8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FRE	S S S S S S S S S S S S S S S S S S S	ص د	A P	PLANARITÝ, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SCE	SHR	R	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
	R17-NQ			135.9, 135.95' - Fracture or mechanical		Limestone	
_	5 ft	100	0	break (2), 60 deg, rough, undulating,	4	 136.5-141.5' - very pale orange, 	-
l _	100%			intersecting	Н	(10YR 8/2), very fine to fine grained,	_
140				139.65' - Bedding plane or mechanical break,	П	extremely weak to weak (R0 to R2),	
-97.5			1	smooth, undulating		— <1/16" voids, highly fossiliferous	
-					ш	(molds), interbedded with horizontal laminations up to 1 1/2" thick which	D47: 44 minutes
			1		Ы	- are yellowish gray (5Y 7/6) and	R17: 11 minutes
	141.5		1	141.1' - Mechanical break, rough, undulating	\vdash	exhibit no fossils and few voids	
-	141.5				ш	<1/16", large fossil cast 1" in	-
_			1		+	- diameter at 141.1'	_
				142.2' - Fracture or mechanical break, 20	\vdash	141.5-144.95' - yellowish gray to very	
]				deg, rough, stepped, 1/2" open	Ш	pale orange, (5Y 7/2 to 10YR 8/2),	SC-5 collected at 142.5-
-			0		╫	- very fine grained, medium strong	143.75' –
-	B 40 1:0				╀┤	(R3), 40-50% coverage of voids on surface, solution cavities up to 1 1/2"	-
	R18-NQ	68	2	143.8' - Mechanical break		with secondary infill of fine grained	
]	5 ft 88%	00	~	144.1. 144.3' - Mechanical break or fracture	\vdash	limestone with voids over 80-90% of	1
 	0070			(2), <10 deg, rough, undulating to stepped,	₩	surface, all fossiliferous with multiple	
145 <u> </u>			>10	1/4" open —	Ш	casts in matrix and secondary infill,	_
-102.5				144.6, 144.7, 144.9' - Mechanical break or		organic staining occuring on fresh	
			0	fracture (3), horizontal, rough, undulating,	Ш	surface at 144.1-144.95'	R18: 38 minutes
-			NR	organic staining	$+ \Box$	 144.95-145.9' - yellowish gray to very pale orange, (5Y 7/2 to 10YR 5/2), 	-
_	146.5		IVIX	144.9-144.95' - Fracture zone, smooth to rough, undulating to stepped, organic staining		very fine to fine grained, medium	4/48 1 : 58 4 454 01
			3	145.6' - Mechanical break	\vdash	strong (R3), 20-40% coverage of	1/4" clay infill at 151.2'
			٥	146.9' - Mechanical break or bedding plane,	Ш	<1/16" voids on surface, trace	
-				<10 deg, smooth, undulating, 1/4" open		fossils, no cavities	-
-			>10	147.0' - Mechanical break	ш	No Recovery 145.9-146.5'	_
				147.2, 147.45, 147.65, 147.7, 147.8, 147.9,	\Box	Limestone	
	R19-NQ			148.15, 148.2, 148.3, 148.35, 148.5' -		 146.5-151.4' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 3/2), fine 	1
-	5 ft	60	1	Mechanical break or bedding plane (11), <10 deg, smooth to rough, undulating	ш	grained, very weak to medium strong	-
_	98%			149.05' - Fracture, 40 deg, rough, undulating	+	(R1 to R3), 50-80% coverage of	-
150			0	_		<1/16" voids on surface, moderately	
-107.5			0		ш	fossiliferous, trace laminations, trace	
-					╁┼	- mottling/potential secondary infilling	R19: 8 minutes
-			1			on cavities <1 1/2"	Stop drilling at 18:00 on
	151.5		NID	151.2' - Clay seam, horizontal, 1/4" open,	Щ	- No Decement 454 4 454 51	3/8/07
			NR.	1/4" clay infill	\vdash	No Recovery 151.4-151.5' Limestone	Resume drilling at 08:15 on
_			0		╁┤	timestone 151.5-153.8' - pale yellowish brown,	3/9/07 -
-				152.45' - Mechanical break	Ш	(10YR 6/2), very fine to fine grained,	Driller's Remark: Depth to water before drilling at 1'
_			1	102TO - WCGHailleal DIGAN	H	_ moderate HCl reaction, weak to	below ground surface –
			'	450.01	\vdash	medium strong (R2 to R3), 30-60%	25.511 ground surface
-	R20-NQ			153.3' - Fracture or mechanical break,	Ш	coverage of <3/16" voids on surface	1
-	5 ft	73	5	horizontal, smooth, undulating, 1/4" open 153.8' - Fracture or mechanical break.	╂┼┦	variable, fossiliferous, fossil molds	-
_	95%			horizontal, smooth, undulating	╁┼┤	and casts up to 1/2" to 1/4" 153.8-155.4' - pale yellowish brown	_
155				153 95-154 65' - Mechanical break		to dark yellowish brown, (10YR 6/2 to	
-112.5			>10	154.1, 154.15, 154.2, 154.3, 154.35' -	1 - 1	10YR 4/2), very fine to fine grained,	_
-				Bedding plane (5), <10 deg, smooth,	++	extremely weak to weak (R0 to R2),	-
I _			0	undulating, <1/4" open	Ш	poorly laminated bedding, highly	
	156.5		NR	154.65' - Fracture or mechanical break, <10		fossiliferous, fossil molds and casts	
_	. 50.0		INIX	deg, rough, undulating 155.3-155.4' - Fracture zone, <10 deg, rough,	111	- <1/4", organics on laminar partings,	R20: 27 minutes
-			2	stepped to undulating	┦┤	60% coverage of <3/16" voids on	_
				156.1' - Mechanical break	口	surface, 20% coverage of <3/4" - cavities on surface, 1" carbonate	
				156.65' - Bedding plane or mechanical break,	Ш	derived silt lens at 155.3-155.4'	1
-			4	horizontal, smooth, undulating, 1/4" open	H		<u> </u>
					H		

APPENDIX 2BB-62 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-06	SHEET	9	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.0	ft bgs	s on 03	3/09/07 START : 3/6/2007	END : 3/9	/200	7 LOGGER : R. Bitely, L. Prochask	а
₹0₽	(%			DISCONTINUITIES		ာ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B FACI	E RU STH, OVE	(%) _Q	FOC	DEPTH, TYPE, ORIENTATION, ROUGH	GHNESS,	BOL	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP' SURI ELE\	COR	RQI	FRA(PER	PLANARITY, INFILLING MATERIA THICKNESS, SURFACE STAINING, AND		SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	R21-NQ			157.05' - Fracture or mechanical br		İ	155.4-156.25' - Same as	
-	5 ft 99%	76	5	deg, rough, stepped, 1/2" open, silt 158.0' - Bedding plane or mechanic	size infill -		- 151.5-153.8' No Recovery 156.25-156.5'	-
160	3070			horizontal, rough, undulating, 1/4" o	pen		Limestone	-
-117.5			1	158.25, 158.35, 158.45' - Fractures mechanical break (3), horizontal, sr			156.5-157.8' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR	_
-				rough, undulating, 1/4" open 158.6' - Bedding plane, rough, undu	_		6/2), very fine to fine grained,	SC-6 collected at 160.45- 161.45'
	161.5		0	1/4" open	0 ,		 moderate HCl reaction, weak to medium strong (R2 to R3), 40-70% 	R21: 27 minutes
				158.8, 158.83, 158.85, 158.9' - Bed or mechanical break (4), smooth to	ding plane		coverage of <3/16" voids on surface, fossiliferous with molds and casts	
				undulating, 1/4" open			157.8-159.0' - yellowish gray, (5Y	
				\ 159.45' - Fracture, 60 deg, rough, u \ 1/4" open	indulating, _		7/2), very fine grained, mild HCI reaction, medium strong (R3),	
-				160.45' - Mechanical break			interbedded, 10-30% coverage of <1/16" voids on surface, few fossils] _
-					-		_ \159.0-161.4' - Same as 156.5-157.8'	-
-					=		No Recovery 161.4-161.5' Bottom of Boring at 161.5 ft bgs on] -
-					_		— 3/9/2007	-
_					-		_	-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-07	SHEET	1	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez SOIL DESCRIPTION COMMENTS STANDARD DEPTH BELOW SURFACE AND ELEVATION (ft) PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SYMBOLIC SOIL NAME, USCS GROUP SYMBOL, COLOR DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND CONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION 6"-6"-6"-6" #TYPF (N) 42.3 0.0 Topsoil 0.0-0.1' - wood debris 1-2-2-1 Poorly Graded Sand (SP) SS-1 1.0 (4) 0.1-1.0' - pale yellowish brown, (10YR 6/2), moist, very loose, no HCl reaction, very fine to fine grained 20 silica sand to <1/16", trace nonplastic fines, trace NR=No Recovery 2.0-2.4' - Same as 0.1-1.0' except color darkens with 3-3-4-5 depth SS-2 1.4 (7) Poorly Graded Sand With Silt (SP-SM) 2.4-3.4' - dark yellowish orange, (10YR 6/6), moist, 4.0 loose, very fine to fine grained, nonplastic, no HCI reaction, 5-10% nonplastic fines, trace fine organics 2-2-50/5 and roots, mottled, sand is silica 1.0 SS-3 (52/11")Silty Sand (SM) 37.3 4.0-4.4' - moderate yellowish brown, (10YR 5/4), 5.4 moist, loose, very fine to fine grained, low plasticity, 6.0 no HCI reaction, 30% low plastic fines, trace organics, 50/5 0.4 SS-4 sand is silica 6.4 (50/5")Clayey Sand (SC) 4.4-4.7' - pale green, (10G 6/2), moist, loose, no HCl reaction, 20-25% medium to high plastic fines, trace organics at contact with next material 8.0 Silt With Sand (ML) 4.7-5.0' - yellowish gray, (5Y 8/1), moist, hard, nonplastic, very rapid dilatancy, moderate HCI Ш 45-3-2-1 0.8 SS-5 reaction, 15-20% sand-sized, very fine to fine and (5)scattered coarse-sized, all carbonate
Silt (ML) 10 10.0 6.0-6.4' - yellowish gray, (5Y 8/1), wet, hard, 32.3 nonplastic, very rapid dilatancy, moderate HCl reaction, some yellowish staining, 5-10% very fine to 2-1-2-4 fine sand-sized, trace coarse sand-sized, all 1.9 SS-6 (3) carbonate Sandy Silt And Limestone Fragments (ML) 12.0 8.0-8.5' - Same as 6.0-6.4' except some yellowish staining, 30-35% coarse sand to fine limestone 4-5-50/6 fragments sized carbonate material, has the 15 SS-7 (55/12")appearance of beds, may be extremely weak imestone 13.5 Silt (ML) 8.5-8.8' - Same as 6.0-6.4' 10.0-10.6' - Same as 6.0-6.4' except soft, 5-10% very 14.9 0.0 SS-8 50/2 (50/2")fine sand sized, all carbonate 15 Silt With Sand (ML) $27.\bar{3}$ 10.6-11.9' - Same as 10.0-10.6' except 10-15% fine to medium sand sized, trace fine gravel sized carbonate 16.0 material, trace limestone lenses <1/2" thick Driller's Remark: 16.0-18.0' is hard, cuttings 12.0-13.5' - yellowish gray, (5Y 8/1), wet, soft, are brown limestone fragments nonplastic, very rapid dilatancy, sand-sized content 14-14-3-2 varies, trace scattered fine gravel-sized, 1/6" thick 1.1 SS-9 (17)lenses of limestone from 13.4-13.6', moderate HCl reaction in fines, mild to moderate HCI reaction in 18.0 larger particles, all carbonate Driller's Remark: Softer at 18.0' No Recovery 14.0-14.2' 2-3-6-3 1.7 SS-10 (9)20



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-07	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez									
	LLVLLO	. <u>2.</u> IL D <u>(</u>	10 011 00/0		SOIL DESCRIPTION COMMENTS				
<u>\$</u> 9€1	SAMPI F	INTERVA	L (ft)	STANDARD PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
SELC SE AI	O) WIII EE	RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, $\left[\begin{array}{c} \vec{Q} \\ \vec{Q} \end{array}\right]$ DEPTH OF CASING, DRILLING RATE,				
TH E		RECOVE		011 011 011 011	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION				
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SONOISTENOT, SOIL STRUCTURE, MINICIPALEGOT				
22.3	20.0				Silt (ML)				
_				1-2-27-50	16.0-17.1' - yellowish gray, (5Y 8/1), wet, very stiff, nonplastic, very rapid dilatancy, moderate HCl				
-		1.6	SS-11	(29)	reaction, 5-10% fine to coarse grained sand, all				
-	22.0				carbonate - 111.				
-	22.0 22.2	0.2	SS-12	50/2	10.0-19.7' - Same as 16.0-17.1' except 40% sand Driller's Remark: 22.0-23.6' hard, becomes				
-				(50/2")	sized trace gravel sized to 1", voids 1/16" and fossil -				
-					Silty Sand (SM)				
-					20.0-21.6' - grayish orange, (10YR 7/4), wet, medium dense, fine to coarse grained, moderate HCl reaction,				
-	24.0				↑ 30% nonplastic fines, 20% fine gravel-sized in lenses				
		1.1	SS-13	9-26-50/2	\ <1/4" thick, all carbonate / -				
25 17.3	25.2			(76/8")	22.0-22.2' - Same as 20.0-21.6' except silt and fine to				
-					Silty Sand With Limestone Fragments (SM)				
-	<u>26</u> .9	0.1	\SS-14 <i>)</i>	50/1	24.0-25.1' - grayish orange, (10YR 7/4), wet, very dense, fine to coarse grained, moderate to strong HCl				
-		(_0.1_/	(00-14)	(50/1")	\ \reaction, 35\% nonplastic fines, 15\% fine gravel-sized \ \right - \ casing; heavy chatter at 15.0-20.0'				
-					to 1", trace white limestone fragments - Finish drilling at 16:00 on 4/25/07 Resume drilling 2/26/07 at 8:00				
-					26.0-26.1' - white to yellowish gray, (N9 to 5Y 8/1), silt /				
_	28.0				and a 1" iron nodule, silt may be slough				
-		0.6	SS-15	6-50/5 (56/11")	Sandy Silt With Limestone Fragments (ML) 28.0-28.6' - pale yellowish brown, (10YR 6/2), wet,				
_	28.9			(30/11)	\ very dense, fine to coarse grained, moderate to strong /				
_					HCl reaction, 16% nonplastic fines, limestone / -				
30	30.0								
12.3					Limestone Fragments 30.0-30.1' - pale yellowish brown, (10YR 6/2), mild to				
		1.3	SS-16	3-7-13-6	moderate HCl reaction, coarse gravel-sized pieces, /				
		1.0	00-10	(20)	\surface covered in 1/16" voids, some fossil molds, \rightarrow\ri				
	32.0				Silty Sand (SM)				
					\\\\ 30.1-31.3' - dark yellowish orange, (10YR 6/6), wet, \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				
		2.0	00 17	2-3-3-4	√medium dense, fine to coarse grained, moderate HCl / - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
		2.0	SS-17	(6)	Silty Sand With Limestone (SM)				
	34.0				32.0-32.8' - Same as 30.1-31.3' except mild HCI reaction, intact limestone fragments to 1" in silt and				
	34.6	0.4	SS-18	45-50/1	sand sized matrix				
35	34.0			(95/7")	Sandy Silt (ML) 32.8-33.5' - dark yellowish orange, (10YR 6/6), wet,				
7.3					very soft, moderate HCl reaction, 30-35% sand-sized				
	36.0				fragments, very friable, trace medium sand-sized white particles, trace black streaks				
-	55.0	0.0	SS-19	50/0	Silty Sand With Limestone (SM)				
-				(50/0")	33.5-33.7' - Same as 32.0-32.8' Shut down at 10:11 2/26/07 due to hydraulic				
-					33.7-34.0' - yellowish gray, (5Y 8/1), wet, medium dense, mild HCl reaction, intact limestone fragments				
-	20.0				to 1" in silt and sand-sized matrix, fragments have				
-	38:9	0.1 /	\SS-20/	50/1	many fossil molds/casts, all carbonate Resume drilling 2/27/07 12:00 Driller's Remark: 38.0-40.0' hard, but no				
-				(50/1")	34.0-34.2' - Same as 32.8-33.5' except medium stiff				
-					Silty Sand (SM)				
					34.2-34.4' - Same as 32.0-32.8' No Recovery 36.0'				
40									

APPENDIX 2BB-65 Rev. 4



PROJECT NUMBER:	BORING NUMBER:
338884.FL	A-07

SHEET 3 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 550X	S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 2.5 ft bo	gs on 03/0	07/07	TART : 2/25/2007
				STANDARD	SOIL DESCRIPTION 0 COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEI GE.		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
PTH EVA			#TYPE	6"-6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
				(N)	S X
2.3	40.0				\\Limestone Fragments \\38.0-38.1' - dark yellowish brown, (10YR 4/2),
		1.9	SS-21	6-8-33-50/5	∖moderate HCl reaction, fragments <1/8" thick and
		1.5	33-21	(41)	wafer shaped, abundant fossil casts/molds
-	42:8				Silty Sand (SM) 40.0-41.9' - moderate yellowish brown to dark
-	72.0				yellowish brown, (10YR 5/4 to 10YR 4/2), wet, dense,
-		1.3	SS-22	21-38-50/5	\fine to coarse grained, moderate to strong HCl
-	43.4			(88/11")	thin bedded appearance at 41.6-41.9', sand-sized Driller's Remark: Chatter starting at 43.0'
-					│ │ │very friable and can crush with fingers, all carbonate
-	44.0				Sandy Silt (ML) 42.0-43.0' - moderate yellowish brown to dark
-					
45 -2.7		1.4	SS-23	14-15-17-24	plasticity, no dilatancy, strong HCl reaction, trace black streaks, 30% fine sand-sized
-2.1				(32)	Silty Sand With Limestone Fragments (SM)
	46.0		00.5		43.0-43.3' - moderate yellowish brown to dark
_	46.3	0.3	SS-24	50/4 (50/4") /	yellowish brown, (10YR 5/4 to 10YR 4/2), dense, moderate to strong HCl reaction, trace black streaks,
				(30/4)	predominately sand-sized material with 30% silt-sized,
					limestone fragments in last 0.3' with bedded
-	48.9				appearance, carbonate materials - Sandy Silt (ML)
-	48:4	0.1	SS-25	50/1	44.0-45.4' - moderate yellowish brown to dark
-				(50/1")	yellowish brown, (10YR 5/4 to 10YR 4/2), moist to wet, hard, nonplastic, low to rapid dilatancy, strong
-					HCl reaction, 40% fine sand, 1/2" limestone lens at
					44.2' Silty Sand (SM)
50 -7.7	50.0				46.0-46.3' - moderate yellowish brown to dark
'					\∥yellowish brown, (10YR 5/4 to 10YR 4/2), wet, very
-		1.5	SS-26	46-31-49-41	dense, fine to coarse grained, strong HCl reaction, 40% medium plastic silt, last 0.1' has gravel-sized
_				(80)	│ ∥imestone fragment
_	52.0				Limestone Fragments 48.0-48.1' - strong HCl reaction, 80% coverage of
				4-14-50/4	voids 1/16" or less on surface of fragments
		0.9	SS-27	(64/10")	Sandy Silt (ML)
	53.3				50.0-51.5' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moist to
1 7	54.9				wet, hard, fine to coarse grained, moderate HCl
1 7	J ≒ . I	0.0	SS-28	50/1	reaction, 55% nonplastic fines, 3/4" to 1/2" limestone
55				(50/1")	Silty Sand (SM)
-12.7					52.0-52.9' - Same as 50.0-51.5' except 40-50% low plastic fines, 1/2" poorly indurated limestone lens at
-	EG 0				52.3'
-	56.9	0.1	SS-29	50/1	No Recovery 54.0-54.1' Driller's Remark: Very hard 56.0-57.0', softer
-				(50/1")	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
-					\moderate HCl reaction, fragments to 1", 60% -
-					coverage of 1/16" voids on surface, black streaks
-	58.0				☐ Limestone Fragments
_		0.8	SS-30	25-50/6 (75/12")	\ 58.0-58.1' - moderate yellowish brown, (10YR 5/4),
-	59.0			(75/12")	¬∖ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction, 60% coverage of 1/16" voids / ¬ ¬ moderate HCl reaction is the first of 1/16" voids / ¬ ¬ moderate HCl reaction is the 1/16
					on surface, fossil molds/casts, black streaks, very Driller's Remark: Very hard 59.0-60.0'
60					
			1		I I



PROJECT NUMBER: BORING NUMBER: 338884.FL A-07

SOIL BORING LOG

SHEET 4 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

					SIN 340233, Illiud totally, auto transmer, Avv3 tous, 3-7/o tir-corie bit. ORIENTATION : Vertical
WATER	LEVELS	. 2.5 ft bo	us on U3/0		START : 2/25/2007 END : 3/8/2007 LOGGER : J. Schaeffer, R. Gomez SOIL DESCRIPTION COMMENTS
≥□⊋				STANDARD PENETRATION	SOIL DESCRIPTION O CONVINIENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft) PENETR TEST RE				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
ACE		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
THE YEAR			#TYPE	6"-6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
				(N)	
-17.7	60.0	0.9	SS-31	5-50/6	Silty Sand (SM) 58.1-58.8' - moderate yellowish brown, (10YR 5/4), -
	61.0	0.9	33-31	(55/12")	wet, very dense, fine to coarse grained, moderate HCI
1 7					│
-	60.0				carbonate -
-	<u>62</u> .9	0.0	SS-32	50/1	60.0-60.9' - moderate yellowish brown, (10YR 5/4),
-			(3.2.2.)	(50/1")	wet, low to medium plasticity, rapid dilatancy, strong
_					HCl reaction, hard, 15-20% fine sand-sized carbonate particles, trace black streaks, trace coarse sand-sized
_					limestone fragments
	64.0				No Recovery 62.0-62.1'
		0.8	SS-33	44-50/3	Silty Sand (SM)
65	64.8		00 00	(94/9")	64.0-64.8' - Same as 58.1-58.5' except 50% silt sized carbonate material, 2 limestone lenses 1" thick, last
-22.7					│ \ 0.2' is coarse sand size limestone fragments, no black / │ │ │ │ │ │
-	66.0				\streaks \
-	66.0	0.0	SS-34	50/0	Limestone Fragments
-		0.0		(50/0")	│ 66.0' - moderate yellowish brown, (10YR 5/4), hard, │
_					very fine grained, mild to moderate HCl reaction,
					voids (1/16") over <5% of surface, few fragments recovered, fragments are 1/4" size
	68.0				recovered, ridginerite die 174 - 0126
		0.7	SS-35	17-50/2	Silty Sand (SM)
	68.7		0000	(67/8")	↑ 68.0-68.4' - Same as 64.0-64.8' except 2 limestone ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑
-					\\surface
					Silt With Sand (ML)
70 <u> </u>	70.0 70.3	0.2	SS-36	50/4	68.4-68.7' - grayish orange, (10YR 7/4), moist, hard, Driller's Remark: Some chatter 70.0-71.0',
-21.1	70.0	0.2	33-30	(50/4")	Now plasticity, rapid dilatancy, moderate HCl reaction, Driller's Remark: Some chatter 70.0-71.0', softer at 71.0' faster drilling
_					Silt With Sand (ML)
					70.0-70.2' - Same as 68.4-68.7' except 25% sand-sized
	72.0				Driller's Remark: Hard at 71.5'
					Sandy Silt With Limestone Fragments (ML)
_		0.7	SS-37	14-9-50/5	72.0-72.7' - moderate yellowish brown, (10YR 5/4),
-	73.4			(59/11")	2" lense of limestone, scattered pieces to 3/8", 80%
-					coverage of voids 1/16" on surface
-	74.0				Loan Clay (CL)
					Lean Clay (CL) 74.0-74.9' - pale yellowish brown, (10YR 6/2), moist,
75		1.8	SS-38	2-3-7-50/4	low to medium plasticity, no dilatancy, strong HCl
-32.7				(10)	reaction, stiff, 10-15% fine to medium sand-sized particles, trace black spots to 1/16", carbonate
]	7 5:8				
1		0.0	SS-39	50/0 (50/0")	Sandy Silt (ML)
-				(30/0)	74.9-75.8' - yellowish gray, (5Y 8/1), moist to wet, stiff,
-					low plasticity, slow to rapid dilatancy, strong HCl reaction, 20-30% sand-sized material, carbonate
-					Limestone Fragments
-					75.9-76.0' - dark yellowish brown, (10YR 7/2), moderate HCl reaction, some with voids 1/16", others
-					without voids
					Begin Rock Coring at 76.0 ft bgs
					See the next sheet for the rock core log
80]

APPENDIX 2BB-67 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-07	SHEET	5	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Install HW casing to 76.0 Limestone 76.2-76.3' - Mechanical break, multiple 4 76.0-81.0' - pale yellowish brown to Not able to retrieve inner very pale orange, (10YR 6/2 to 10YR 8/2), strong HCl reaction, no 76.7' - Fracture, smooth, undulating, <3/4" silt core last interval due to infilling or silt seams catcher not grasping inner noticeable fossils, no solution 3 77.2' - Fracture, horizontal, smooth, planar, core barrel cavities from 76.0-79.0'. 16% <1-3/16", thick clayey silt Begin rock coring at 76.0' coverage of solution cavities 3/8" or R1-HQ 77.4' - Fracture, horizontal, smooth, planar, After pulling core barrel, 73 1 <3/16" fines less in diameter at 79 0-81 0' 1-2 5 ft used A rods to flush hole perfect elongate spherical solution 100% 77.9' - Fracture, horizontal, smooth, planar, with water to extract slough cavities, limestone is fine grained at <3/8" silt 76.0-76.9' and 79.2-81.0' (very pale 78.2' - Fracture, 1-2 deg, rough, stepped, orange), limestone becomes silty 80 <3/4" friable fines from 77.2-77.9' 79.2' - Fracture, rough, stepped, <3/16" fines -37 7 R1: 12 minutes 80.3' - Fracture, 30-40 deg, rough, stepped, 1 SC-1 collected at 80.0-<3/16" fines 81.0 81 0' 81.0-81.3' - very pale orange, (10YR 8/2), strong HCl reaction, fine 1 81.6' - Fracture, 1 deg, smooth, undulating, grained limestone, no fossils, no <5% fines, laminated organics solution cavities 82.3' - Fracture, 20-25 deg, rough, stepped, 2 81.3-86.0' - pale yellowish brown, 20-30% mix of fines and sand sized grains (10YR 6/2), moderate to strong HCI 82.9, 83.5' - Fracture (2), horizontal and 5-10 reaction, 20-30% microfossils, R2-HQ 50-70% silty matrix, 60-70% coverage of solution cavities 1/16" or deg, rough, stepped, 20-30% mix of fines and 5 ft 92 1 sand sized grains 100% less, 81.5-81.6' zone laminated SC-2 collected at 83.7dusky brown (5YR 2/2) organics 1 85 84.8' - Fracture, rough, undulating, 20-30% -42.7R2: 8 minutes mix of fines and sand size grains 0 86.0 86.0-88.0' - moderate yellowish brown, (10YR 5/4), 30-50% fossil 1 86.4' - Fracture, 30 deg, sand to gravel size shells, molds and casts, 50-60% limestone grains coverage of 3/8" or less solution cavities, 87.6' infilling of fat clay (CH) 1 87.6' - Fracture, 25 deg, rough, stepped, bluish gray (5B 9/1) to light bluish <3/4" fractured carbonate grains and up to gray (5B 7/1), high plasticity and very R3-HQ 1-3/16" void filled with fat clay (CH) 5 ft 93 1 88.4' - Fracture, horizontal, smooth, 88.0-88.4' - pinkish gray, (5YR 8/1), dry, dense, strong HCl reaction, 100% undulating, <3/8" silty infilling extremely weak to very weak (R0 to 0 SC-3 collected at 89.6-90 88.4-90.6' - pinkish gray, (5YR 8/1), -47 7 dry, dense, strong HCl reaction, very R3: 11 minutes 1 90.6' - Bedding plane, horizontal, smooth, weak (R1) 91.0 90.6-91.0' - pinkish gray, (5YR 8/1), undulating strong HCI reaction, 70-90% silty 0 matrix, no fossils observed SC-4 collected at 91.7-91.0-94.0' - Same as 90.6-91.0' 92.6' except weak to medium strong (R2 to 2 92.5' - Fracture, horizontal, smooth, planar R3), noticeable fossil (shell 92.8' - Fracture, horizontal, rough, undulating, fragments, casts), 10-20% coverage R4-HQ infilled with 3/4" of medium plasticity clay/silt of voids 1/8" or less 70 <7 5 ft 93.3-93.7' - Fracture zone, rough, undulating. 100% multiple fractures, low to high angle 94.0-96.0' - moderate yellowish brown, (10YR 5/4), 30-50% fossil 0 shells, molds and casts, 50-60% 95 R4: 12 minutes -52 7 coverage of solution cavities up to Driller's Remark: 95.0-96.0' 3/8' 1 soft 96.0

APPENDIX 2BB-68 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-07	SHEET	6	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez LITHOLOGY DISCONTINUITIES COMMENTS DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 95.4' - Fracture, planar, <2" thick, clays and Limestone 96.0-97.0' - pinkish gray, (5YR 8/1), >10 silts strong HCI reaction, 70-90% silty 96.0-98.0' - Fracture zone, 0-90 deg, fractured material, most likely mechanical matrix, non fossiliferous Driller's Remark: Sand lense 97.0-100.0'; core loss No Recovery 97.0-100.0' assumed to be from that R5-HQ interval 5 ft 0 NR No recovery in core barrel 40% but residual material appears to be very fine to fine grained sand, poorly 100 graded, white to light brown in color -57.7 Limestone Driller's Remark: Advance 100.0-101.0' - medium yellowish >10 brown, (10YR 5/4), strong HCl HW casing past sand lense 101.0 reaction, very weak (R1), 30-50% to 101.0' R5: 13 minutes 1 fossils shells, molds and casts, 101.6' - Mechanical break, horizontal, rough, Insert and set surface 50-60% solution cavities stepped, 3/4" of relief, open casing to 101.0' 101.0-105.3' - Same as 100.0-101.0' Stop drilling at 17:30 except solution cavities up to 3/4" in 0 length (fossil molds) 2/28/07 Resume drilling at 15:52 R6-HO 0 3/6/07 86 5 ft 86% SC-5 collected at 102.4-103.4' 0 105 0 -62.7 R6: 8 minutes 105.3' - Mechanical break No Recovery 105.3-106.0' NR 106.0 Limestone 106.0-111.0' - very pale orange, (10YR 8/2), strong HCl reaction, 0 weak to medium strong (R2 to R3), 1 20-40% coverage of solution cavities 107.5' - Mechanical break, 2-6 deg, rough, up to 3/16", no apparent bedding, planar SC-6 collected at 107.9silty matrix when reduced with rock R7-HQ 0 hammer, 10-20% fossil evidence 5 ft 100 100% Driller's Remark: Softer 0 drilling 109.0-111.0' 110 -67.7 R7: 14 minutes 0 111.0 111.0-116.0' - Same as 106.0-111.0' Very weak to weak interval identified as 109.0-111.0' 0 except Very weak to weak (R1 to R2) on field log, it is assumed that 114.0-116.0' was at 114.0-116.0 0 intended R8-HO 100 0 5 ft 100% SC-7 collected at 113.7-114 6 0 115 -72.7 R8: 7 minutes 0 116.0



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-07	SHEET	7	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 116.0-121.0' - very pale orange, 0 (10YR 8/2), 60-80% coverage of broken shells, fossil molds and casts, 0 20-30% coverage of 3/4" diameter solution cavities from 116.0-117.5'. 20-40% silty and sandy matrix, black R9-HQ SC-8 collected at 118.2-100 1 118 3 119 5 120 8' - Fractures (3) and translucent crystals very fine to 5 ft 119.2' 100% horizontal, rough, stepped fine grained, not the typical moderate vellowish brown fossiliferous limestone encountered towards upper portion 120 -77.7 R9: 9 minutes 1 121.0 121.0-123.4' - light olive gray, (5GY 121.2, 121.6' - Mechanical break (2) 2 6/1), very fine to fine grained, strong HCl reaction, 30% coverage of 1/6" to 3/16" voids, 5% coverage of 0 cavities 1/4" or less are dissolved fossils, fossiliferous SC-9 collected at 124.8-R10-HO 96 2 125 8 5 ft 123.4-126.0' - yellowish gray, (5Y 123.4' - Fracture, smooth, undulating, 100% 8/1), very fine grained, strong HCl reaction, 15% coverage of voids limestone contact 123.5' - Fracture, 60 deg 1 124.3' - Fracture, 1-2 deg, smooth, 1/16" or less, laminated bedding of 125 undulating light silts as well as undulating 124.6' - Fracture, 75 deg, rough, stepped, -82.7 laminae from 124.0-125.5' R10: 13 minutes 1 tight Stop drilling at 17:58 3/6/07 126 0 125.8' - Fracture, 0-1 deg, rough, undulating 126.0-127.7' - pale yellowish brown, 0 (10YR 6/2), strong HCl reaction, Resume drilling at 08:03 10-20% coverage of fossil shells and 3/7/07 casts, no solution cavities, 10-30% 0 coverage of voids 1/6" or less 50-60% sand-sized matrix with black grains 1/16" or less R11-HQ 0 127.7-129.8' - very pale orange, 88 5 ft 100% (10YR 8/2), strong HCI reaction, very weak to weak (R1 to R2), 30-40% 129.1, 129.5' - Fractures (2), 5 deg, rough, coverage of 3/8" or less solution 3 planar cavities 130 129.8-130.1' - pale yellowish brown, 129.9, 130.1' - Fractures (2), 5 deg, smooth, R11: 7 minutes -87.7 SC-10 collected at 130.0planar (10YR 6/2), fine grained, medium 1 strong (R3), no fossils 130.1-131.0' - Same as 127.7-129.8' 131.0-132.8' - very pale orange to 131.0' 131.0 131.2' - Bedding plane, horizontal, smooth, 2 planar pale yellowish orange, (10YR 8/2 to 131.99' - Fracture, rough, stepped 10YR 8/6), strong HCI reaction, extremely weak to very weak (R0 to 3 132.4, 132.5, 132.7' - Fractures (3), 7-20 deg, R1), medium to coarse quartz grains rough, stepped, irregular, minor silt infilling, SC-11 collected at 132.8and sand-sized carbonate grains, R12-H0 open to 1/4 30-40% fossils, 20-40% coverage of 0 5 ft 80 1/16" or less voids 100% 132.8-134.4' - very pale orange, (10YR 8/2), strong HCl reaction, very weak (R1), 10-20% fossils, voids 134.2' - Mechanical break, rough, stepped 1 135 (<1/16") over 10-20% of surface -92.7 R12: 17 minutes 135.1, 135.3, 135.6' - Bedding plane (3), 0-7 3 deg, smooth, planar 136.0

APPENDIX 2BB-70 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-07	SHEET	8	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 0 134.4-135.5' - pale yellowish brown, (10YR 6/2), very fine grained, strong HCI reaction, laminar bedding, 5-6 2 3/8" in diameter solution cavities 137.5, 137.8' - Fractures (2), horizontal, following silty laminae, <10% smooth, planar, silty infilling <1/16" SC-12 collected at 137.8coverage of voids 1/16" or less on R13-HQ 138.7' 62 0 surface 5 ft 135.5-137.5' - grayish orange pink, 82% (10R 8/2), weak to medium strong (R2 to R3), fine grained with some 0 Driller's Remark: medium to coarse sand-sized 140 Circulation lost at 139.5' particles, sporadic 1/16" pyrite -97.7 0 R13: 13 minutes grains, 10-15% coverage of 1/16" or NR less voids 141.0 **Silt (ML)** 137.5-137.8' - pale brown, laminar 1 bedding 141.8' - Fracture, 12-15 deg, rough, Limestone undulating, open up to 1/4", minor silt sized 137.8-139.5' - pale orange, (10YR 3 particle infilling 142.2, 142.3, 142.7' - Fractures (3), 5-10 deg, 8/2), weak to medium strong (R2 to R3), 10-25% voids coverage of 1/16" Driller's Remark: R14-HO rough, planar, apparent orientation of or less, 10-20% fossils, 3/4" solution >10 Continuous circulation loss 52 5 ft fractures with solution cavities 100% even while adding water to cavity with fat clay infilling at 139.5' 142.8-143.8' - Fracture zone, variable 139.5-140.1' - grayish orange, (10YR mud tub orientation, fragments range from 1/2" to 2 2 7/4), fine grained, weak to medium 145 strong (R2 to R3), 10-20% fossil 143.9' - Bedding plane, horizontal, smooth, -102.7casts R14: 11 minutes No Recovery 140.1-141.0' >10 . 144.2, 144.6' - Bedding plane (2), horizontal, Limestone 146.0 smooth, planar 141.0-144.0' - pale brown, (5YR 5/2), SC-13 collected at 146.0-144.6-146.0' - Fracture zone, fragments very weak to weak (R1 to R2). 0 range from 1/2" to 3"x1" or larger 147 05' 20-30% coverage of 3/4" voids on surface, intact fossil casts and molds, no broken fossil shells. 0 147.6, 155.7' - Mechanical break (2), load becomes more fossiliferous towards base (143.5-144.0') and increases in tests and machine breaks R15-HQ 0 sand-sized grains, dense limestone 98 5 ft 100% but density decreases 143.2-144.0' as granularity increases 144.0-145.5' - pale yellowish brown, 3 149.5, 149.6' - Bedding plane (2), 5-8 deg, (10YR 6/2), very fine to fine grained, 150 rough, planar, <1/16" thick silty infilling on no visible fossils, laminar to thin -1077 R15: 9 minutes bedding plane partings 149.75' - Fracture, 80 deg, smooth, planar, bedded, 5-10% coverage of voids 0 1/16" or less 151.0 tiaht 145.5-146.0' - pale brown, (5YR 5/2), SC-14 collected at 151.0strong HCl reaction, weak (R2), 10-30% sand-sized grain matrix 0 152.1' 10-30% Sano-Sized grain matrix 146.0-146.7' - very pale orange to grayish orange, (10YR 5/2 to 10YR 7/4), medium to coarse grained, 152.1, 152.5' - Fractures (2), horizontal, 2 rough, planar, <3/8" thick unconsolidated silt weak to medium strong (R2 to R3), R16-H0 153.1' - Bedding plane, planar, undulating fossils up to 3/8", sand to 100 1 5 ft gravel-sized grains 100% 146.7-147.0' - fine grained, strong HCI reaction, weak (R2), silty 0 laminae, silty matrix, no fossils, 15% 155 coverage of voids 1/16" or less -112.7 R16: 14 minutes 155.2' - Fracture, rough, stepped, <1/16" silty 1 infill 156.0



PROJECT NUMBER:	BORING NUMBER:					_
338884 FI	Δ-07	CHEET	۵	ΩE	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IEINT : CIVIE 330A 3/IN 340233, ITIUU TOLAIY, FIQ LOOIS, FIV		<u> </u>	ORIENTATION: Vertical
WATER	LEVELS : 2.5	ft bgs	s on 0		8/2007		
30₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
ᆱ끯은	RUI H, / ÆR	(%) _Q	N C	DEDTH TYPE OPICATATION POLICINESS	1 ⋈ 1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA Y	ZE I	0	CT RFC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COF	S S	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
						Limestone	
_			0			- 147.0-149.7' - grayish orange to very	_
					Щ	pale orange, (10YR 7/4 to 10YR 5/2),	
					Н	mottled and variegated, fine to	
1 -			1	157.5, 160.4' - Fractures (2), 0-5 deg,		- medium grained, strong HCI	SC-15 collected at 157.5-
-	R17-HQ			smooth, undulating	₩	reaction, 10-20% 1/16" or less voids, sporadic echinoderms 3/8" to 9/16"	158.4' -
1 -	5 ft	100	0		\Box	- 149.7-151.0' - fine grained, weak to	_
	100%					medium strong (R2 to R3), 5-10%	
1 7					Ш	fossil casts, 5-10% coverage of 1/8"	
1			0	-	ш	- or less voids	-
160 <u>-</u> -117.7				<u> </u>	+	151.0-151.8' - Same as 149.7-151.0' except very fine to fine grained	D47: 0
-11/./			1	_	Н	- 151.8-152.4' - moderate yellowish	R17: 9 minutes
	161.0					brown, (10YR 5/4), strong HCl	
1 1					11	reaction, very weak to weak (R1 to	1
-			0		\Box	R2), 10-20% coverage of voids 1/16"	-
-					Ш	or less, silty matrix 152.4-153.1' - brown, (10YR 5/4),	_
			0		Ы	alternating silt and sand-sized	
			"			carbonate layers at less than 1/8"	SC-16 collected at 162.5-
-	R18-HQ			-	ш	thick, 5-10% coverage of 1/8" or less	163.4'
-	5 ft	86	0		+	_ solution cavities, fossil molds at	-
_	100%					base, undulant to broadly undulant, thin to laminar bedding, unit exhibits	
						slow but moderate HCl reaction,	
165			1	164.7' - Fracture, horizontal, smooth, planar,	ΤП	strong HCl reaction in very fine	
-122.7				minor silt infilling	\Box	grained layers, exhibits differential	_
-			3	165.3' - Fracture, horizontal, stepped, 1/8"	₩	compaction in very fine grained	Driller's remark: Feels -
-	166.0			relief, lithology contact, silt and sandy infill,	ш	layers, dissolved fossils at/near center of bedding features	gritty like sand
				<3/8" thick	\vdash	153.1-155.0' - Same as 149.7-151.0'	
1 7			6	165.6, 165.8' - Fractures (2), horizontal, rough, planar, very fine to fine sandy infill,	╁┼	except very fine to medium grained	
-				<3/8" thick	ш	155.0-156.6' - moderate orange pink	
-			0	166.1-166.4' - Bedding plane, 0-5 deg, rough,	+	to pale yellowish brown, (5YR 8/4 to	_
				planar	\perp	10YR 6/2), very weak to weak (R1 to - R2), voids 3/8" or less, 10-20%	
	R19-HQ					fossils (30% at 155.3')	
	5 ft 100%	90	1	-	\vdash	156.6-161.0' - very pale orange,	A variety of rock, mainly
-	100 /0			168.9' - Bedding plane, horizontal, smooth,	世	- (10YR 8/2), strong HCl reaction, very	limestone and shell
-			0	stepped, consolidated silt/clay laminae,	Ш	weak to weak (R1 to R2), 30-50% coverage of voids 1/8" or less, 1-3%	fragments up to 1/4" x 1.3"
170				<3/16" thick	\Box	— coverage of 3/8" or less solution	in random distribution but sub parallel in deposition,
-127.7				170.15' - Bedding plane, horizontal, rough,		cavities at base (161.0'), 15-20% silty	the long axes are aligned
1 1	171.0		1	stepped, <3/16" thick	14	matrix	with apparent flow, the high
-	17 1.0			-	団	- 161.0-165.3' - Same as 156.6-161.0'	energy (relatively)
-			2	171.2, 171.9' - Mechanical break or bedding	H	except very thin laminar bedding planes from 163.6-164.9', brown	deposition is from 167.2- 168.25', where the bedding
				plane (2), 0-3 deg, planar, rough to smooth	H	laminae increase in frequency from	becomes laminar to thin
				172.1' - Fracture, horizontal, smooth,		164.4-164.9'	with very fine to fine
			4	undulating, silty infill <1/8" thick	\mathbb{H}	165.3-165.6' - fine to medium	grained laminae
-	R20-HQ			172.2' - Fracture, horizontal, smooth, planar	世	 grained, moderate HCl reaction, very fine to fine grained laminae 	R19: 12 minutes –
-	5 ft	68	0	172.5, 172.8' - Fractures (2), 10-15 deg, rough, planar	\Box	105.6-166.0' - medium gray, (N5),	SC-17 collected at 170.15- 171.0'
	100%			Tough, plana	H	_ medium to coarse grained, strong	SC-18 collected at 172.7-
			[174.1' - Fracture, 5 deg, rough, stepped		HCl reaction, weak to medium strong	174.0'
175			2	174.6' - Fracture, 12 deg, rough, planar	Ш	(R2 to R3), no visible fossils, no	1
175 <u> </u>					\Box	solution cavities	R20: 8 minutes —
.52/			6	175.1' - Fracture, 1-2 deg, rough, planar, <1/8" thick silty infill	口	<u></u>	- 1.25. 6 minutes
	176.0			- 170 thiok only initial	\vdash		

APPENDIX 2BB-72 Rev. 4



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-07

SHEET 10 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bgs	on 0	3/07/07 START : 2/25/2007 END : 3/9	3/200	DOT LOGGER: J. Schaeffer, R. Gome	ez
≥∩≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 180 -137.7	R21-HQ 5 ft 100%	53	5 2 2 1	175.4-175.5' - Bedding plane, 0-3 deg, smooth, planar, 1/4" to 1/2" wafers 176.1-176.3' - Bedding plane, 0-3 deg, rough, planar, recrystallized carbonate on plane 176.8' - Fracture, horizontal, rough, stepped, enlarged solution cavity fractures at depositional contact 177.45' - Fracture, horizontal, smooth, planar 177.6' - Fracture, horizontal, rough, planar, very fine grain infilling 177.95, 178.3, 178.5' - Fractures (3), horizontal, rough, planar, lithology contact, <1/16" thick very fine sandy infill 180.1, 180.4, 180.6' - Fractures (3), horizontal, rough, planar, <1/8" thick		Limestone - 166.0-167.5' - moderate yellowish brown, (10YR 5/4), strong HCI reaction, sandy and silty sized matrix, fossil casts at base, 10-20% voids 3/16" or less, iron oxide stains and grains of pyrite - 167.5-168.5' - grayish orange, (10YR 7/4), strong HCI reaction, 20-40% fossils, 20-40% coverage of solution cavities 3/8" or less, 20-30% coverage of voids 1/16" or less 168.5-169.8' - alternating very pale orange and pale yellowish brown, (10YR 8/2 to 10YR 6/2), thinly	SC-19 collected at 178.95- 180.0' R21: 10 minutes
 - - - - 185 -142.7	R22-HQ 5 ft 1 100%	45	4 0 2 4 5	carbonate recrystallization infilling 181.1' - Fracture, horizontal, smooth, planar 181.5, 181.7, 181.7' - Fractures (3), horizontal, planar, smooth to rough, trace infilling 183.2' - Fracture, horizontal, rough, planar, trace silty infilling 183.5, 185.3, 185.4, 185.7, 185.8, 185.9' - Bedding plane (6), 5 deg 184.2, 184.5' - Fractures (2), horizontal, rough, undulating		laminated bedding 169.8-171.0' - strong HCl reaction, very weak to weak (R1 to R2), no laminae, no visible fossils, 40-50% coverage of voids 1/16" or less 171.0-172.2' - grayish orange, (10YR 7/4), moderate HCl reaction, 1 solution cavity up to 3/8" wide and 1 3/16" long across surface, increase in silts below 172.0', becoming dark yellowish orange, voids 5/16" or less 172.2-172.5' - grayish orange, (10YR 7/4), very fine to fine grained, carbonate derived silt-sized particles 172.5-175.0' - Same as 171.0-172.2'	SC-20 collected at 181.8- 182.95'
- - - 190 -147.7	R23-HQ 5 ft 100%	66	5 1 2 1	186.1-186.3' - Fracture zone, horizontal, smooth, planar 186.6' - Fracture, horizontal, rough, planar, lithology contact 186.9' - Fracture, 10 deg, rough, undulating 187.8' - Fracture, 8 deg, rough, undulating, silty infilling from formation matrix 188.3, 188.7, 189.9' - Fractures (3), horizontal, rough, planar, trace silty infilling 190.5, 190.7, 190.9' - Fractures (3), 5-40 deg, trace silty infilling		- 175.0-175.5' - Same as 171.0-172.2' - except fine grained, mild HCl reaction, laminated - 175.5-176.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction, weak to medium strong (R2 to R3), - <2% coverage of voids 1/16" or less, no visible fossils - 176.0-176.9' - fine grained, strong - HCl reaction, weak to medium strong (R2 to R3), silty matrix with very fine sand (<10%), very fine to medium sand-sized lense, void filling with mica mineral, 10-15% coverage of tubular solution cavities on surface - 176.9-177.6' - pale yellowish brown,	SC-21 collected at 188.6- 189.8'
- - - - 195 -152.7	R24-HQ 5 ft 100%	>10 191.0-192.4' - Bedding plane, 0-10 deg, smooth, planar to undulating, numerous partings, irregular 192.4-195.05' - Fracture zone, 0-90 deg, rough, multiple fracture zones, irregular, may exhibit recrystallization on the surface 191.0-192.4' - Bedding plane, 0-10 deg, smooth, planar to undulating, numerous partings, irregular 191.0-192.4' - Bedding plane, 0-10 deg, smooth, planar to undulating, numerous partings, irregular 192.4-195.05' - Fracture zone, 0-90 deg, rough, multiple fracture zones, irregular, may exhibit recrystallization on the surface		(10YR 6/2), fine grained, strong HCI reaction, weak to medium strong (R2 to R3), <10% noticeable fossils, <10% coverage of voids 1/16" or less 177.6-181.0' - moderate yellowish brown, (10YR 5/4), mild to moderate HCI reaction, very weak to weak (R1 to R2), silty matrix, 5-10% coverage of 3/8" or less solution cavities 181.0-183.5' - Same as 177.6-181.0' except dark brown silty organic laminae (1-3/16" thick)	Numerous rock fragments indicate possible cavity filling debris from at least 195.5-196.0' but probably 193.4-196.0' R24: 6 minutes		

APPENDIX 2BB-73 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-07	SHEET	11	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

CORING	WETTIOD AI	ND LC	ZOIFIV	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v Casii	<u>ıg</u>	ORIENTATION : Vertical
WATER	LEVELS: 2.5	ft bgs	on 00	3/07/07 START : 2/25/2007 END : 3/	8/2007	LOGGER : J. Schaeffer, R. Gome	ez
>00	<u>.</u>			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱ띯뎓	₹, A,E	(%) O	N L	DEDTU TYPE OBJECTATION BOUGHNESS		MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YE	Set) O i	ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	SHR	RQ	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				195.6, 195.8' - Fractures (2), horizontal and		Limestone	
_			5	15 deg, rough, undulating	\vdash	- 183.5-185.0' - very pale orange,	
_				196.0-196.3' - Fracture zone, random	₽	(10YR 8/2), strong HCl reaction, very	1 4
			4	orientations, fragments 1/4" to 3/4" 196.6' - Fracture, 30-50 deg, rough, planar	Ш	weak to weak (R1 to R2), 40-50% fossil shells, casts and molds up to	
			7	197.3, 197.4' - Fractures (2), horizontal,	\vdash	1"x 9/16", 20-40% coverage of voids	
-	R25-HQ			rough, planar, solution cavity fractures		1/16" or less	1
-	5 ft	10	5	198.05, 198.1, 198.4, 198.5' - Fractures (4),	ш	- 185.0-186.0' - very fine to medium	1
-	70%		. 40	0-7 deg, smooth, planar 198.6' - Fracture, horizontal, smooth, planar,		grained, very strong HCl reaction, 15-20% coverage of voids 1/16" or	
-			>10	lithology contact	\vdash	- less	1 4
200				199.0-199.5' - Fracture zone, orientations are		186.0-191.0' - pale yellowish brown,	
-157.7			NR	random, rock fragments range from 1/8"x1/2" to 2"x1"x1 1/2"		(10YR 6/2), mild to moderate HCl reaction, very weak to weak (R1 to	R25: 9 minutes
	201.0			10 2 X1 X1 1/2	Т	R2), 10-30% fossil casts and molds,	1
-	<u>-01.0</u>			201.0-201.5' - Fracture zone, random	П	5-10% coverage of solution cavities	Widely disseminated
-			>10	orientation	ᡛᅦ	3/8" or less, 30-50% coverage of	oxidized pyrite grains -
-				201.5-202.1' - Fracture zone, 25-90 deg,	Ш	voids 1/16" or less, 189.0-190.0 alternating dark brown and pale	-
I _			5	rough, non separated fracture, indistinctly extends into underlaying unit	Н	_ yellow brown laminae	The unit appears as
			Ŭ	201.5' - Fracture, 10 deg, rough, planar		191.0-192.4' - pale yellowish brown,	random clast orientations in variably hard matrix, it is
	R26-HQ			202.1' - Fracture, horizontal, rough, stepped,	Н	(10YR 6/2), very fine to medium grained, moderate to strong HCl	either fluvial or infill of an
-	5 ft 80%	36	5	lithology contact 202.7-203.0' - Fracture zone, multiple		reaction, laminar to thin bedded,	undetermined void, it
-	00 /6			fracture orientation	Н	10-20% coverage of solution cavities	exhibits very low density _ and apparent strength
_			>10	203.1-203.3' - Fracture zone, multiple		_ 3/8" or less	and apparent strength
205_				fractures broken along fragment edges	ш	192.4-193.4' - very pale orange, (10YR 8/2), strong HCl reaction, very	
-162.7			NR	203.7' - Fracture, 2 deg, rough, planar		_ weak to weak (R1 to R2), 20-30%	R26: 7 minutes
	206.0		INIX		\vdash	coverage of voids 1/16" or less,	
-				206.2. 206.2. 204.7. 206.0! Eracturas (4)		 20-40% fossil casts and molds 193.4-196.0' - pale yellowish brown, 	1
-			4	206.2, 206.3, 201.7, 206.9' - Fractures (4), 0-10 deg, smooth, planar	ш	(10YR 6/2), very fine to coarse	1
-				207.0-208.5' - Fracture zone, 75-80 deg,	+	 grained, strong HCl reaction, slightly 	1 -
_			>10	multiple fractures 207.5-208.0, fragments up		mottled, light to moderately dense	-
				to 2 1/2"x1 to 1/4"x1/2"	Н	rock, 10-15% coverage of voids 1/16" or less, abundant fossils,	<u> </u>
	R27-HQ		>10			indistinct bedding, multiple lithologic	
	5 ft 50%	10			Н	fragments	1
-	00,0				口	 196.0-198.0' - grayish orange, (10YR 7/4), medium to coarse grained,] - 1
-			ND		╀┼┤		-
210_ -167.7			NR	_	\Box	— (R1), 30-40% fossils, 10-20%	P27: 11 minutos
-107.7					H	coverage of solution cavities 3/8" or	R27: 11 minutes
	211.0					less - 198.0-198.5' - alternating grayish	Stop drilling 17:28 3/7/07
				211.0-213.0' - Fracture zone, no	$\vdash\vdash$	orange and light brown, (10YR 7/4 to	Water level 2.5' below
-			>10	distinguishable orientation	Ш	5YR 5/6), fine grained, strong HCl	ground surface -
-					+	 reaction, weak to medium strong (R2 to R3), medium to coarse grained at 	Resume drilling 08:50
-			>10		世	alternating laminae	3/8/07
_					₽₽	_ 198.5-199.5' - strong HCl reaction,	-
	R28-HQ 5 ft	0			Ш	extremely weak (R0), large amount]
	40%	5			\square	of non carbonate silt to clay-sized particles, 10% coverage of voids	
					1	1/16" or less, pyrite grains on and	1
			NR		囯	define laminar silt beds	1
21 <u>5</u> -172.7				_	+	No Recovery 199.5-201.0'	R28: 23 minutes
					口	_	- 1.25. 20 minutes
	216.0				\vdash		
					1		

APPENDIX 2BB-74 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-07	SHEET	12	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 216.0-216.4' - Fracture zone, multiple >10 Limestone fractures, fragments range from 1/4" to 201.0-202.1' - grayish orange, (10YR 7/4), strong HCl reaction, weak to medium strong (R2 to R3), carbonate Driller's Remark: Soft and rapid drilling at 216.5derived silt-sized grains 202.1-205.0' - pale yellowish brown, (10YR 6/2), mild to moderate HCl 220 0' NR R29-HQ Assume loss of recovery is reaction, extremely weak to very 0 216.4-219.7' based on 5 ft weak (R0 to R1), 10-20% sand-sized driller's report of soft and 34% matrix, 5-15% fossils, 30-40% rapid drilling at 216.5coverage of voids 3/16" of less 220.0' No Recovery 205.0-206.0 220 >10 Limestone 177 7 R29: 8 minutes 206.0-207.0' - grayish orange, (10YR 5 7/4), strong HCl reaction, very weak 221.0 (R1), thin to laminar bedding, very 221.0-222.5' - Fracture zone, 2-3 of the Driller's Remark: Drilling low density, no visible fossils, 5-15% >10 fractures are smooth and planar bedding action intermittently coverage of voids 1/16" or less, no plane partings becomes hard and soft solution cavities The final 0.5' recovered is >10 207.0-208.5' - dark yellowish orange to grayish orange, (10YR 6/6 to 10YR 7/4), moderate to strong HCl an agglomeration, appears to have 60-80 deg planar features that may indicate R30-H0 reaction, 10-20% coverage of voids subsidence infill 0 5 ft 30% 1/8" or less, slightly friable, worm burrows in very fine grained NR limestone 207.2-208.0' No Recovery 208.5-211.0' 225 Limestone 182.7 R30: 4 minutes 211.0-213.0' - very pale orange to pale yellowish brown, (10YR 8/2 to 226.0 10YR 6/2), very fine to fine grained, 226.0-227.5' - Fracture zone, multiple very weak to weak (R1 to R2), >10 fractures no visible orientations 30-40% fossil shell fragments, casts, and molds, 20-40% coverage of >10 voids 1/6" or less, 5-10% coverage of solution cavities 3/8" or less, low to moderate density R31-HQ No Recovery 213.0-216.0' 0 5 ft Limestone 30% 216.0-216.4' - pale yellowish brown NR and grayish orange, (10YR 6/2, 10YR 7/4), fine grained, strong HCI 230 reaction, pale yellowish brown -187 7 R31: 5 minutes material is weak to medium strong (R2 to R3), non fossiliferous, grayish 231.0 orange material is very weak to weak (R1 to R2) with 30-40% fossils Discuss drilling to 265.0', 231.0-231.6' - Fracture zone, random >10 conclusion continue drilling orientations, fragments range from 1/4" to No Recovery 216.4-219.7 to 265.0' even though very Limestone low recovery and 0% RQD 219.7-221.0' - grayish orange, (10YR 7/4), strong HCl reaction, very weak to weak (R1 to R2), 40-50% fossils, for the last 5 runs (25') in hopes that borehole stays open R32-HQ 20% coverage of voids 3/8" or less, 0 5 ft trace organics, abundant fossil casts NR 12% and molds, low to moderately dense, 15% coverage of 1/16" or less voids 235 192.7R32: 8 minutes 236.0

APPENDIX 2BB-75 Rev. 4



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-07

SHEET 13 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bgs	s on 0	3/07/07 START : 2/25/2007 END : 3/	/8/200	17 LOGGER : J. Schaeffer, R. Gom	ez
≥∩≎	. (%			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SL	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE	ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	¥₩	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	075	ď	шФ	236.0-236.1' - Fracture zone, 3/4" fragments	S	Limestone	
_			>10	236.4' - Fracture, horizontal, rough, planar	丰	- 221.0-222.5' - grayish orange, (10YR	-
_				236.5' - Fracture, 60 deg, rough, planar	╨	7/4), strong HCl reaction, very weak	1
_			5	237.2, 237.3, 237.5, 237.6, 237.85' - Bedding	丌	(R1), 10-20% fossils, 10-20% coverage of voids 1/16" or less on	1
_				plane (5), 0-5 deg, rough	上	surface, thin to laminar bedded,	_
_	R33-HQ 5 ft	22			上	silt-sized particles No Recovery 222.5-226.0'	_
_	40%				ᅪ	Limestone	1
_			NR		片	226.0-227.5' - very pale orange, (10YR 8/2), very fine to fine grained,	1
240				_	片	strong HCl reaction, weak to medium	
-197.7					╨	strong (R2 to R3), no visible fossils, voids, or solution cavities	R33: 4 minutes
	241.0				oxdappi	No Recovery 227.5-231.0']
			>10	241.0-242.1' - Fracture zone, fragments range from 3/8" to plates 1/4"x3/8" thick and	口	Limestone 231.0-231.6' - pale yellowish brown,]
			- 10	1 1/2"x1 1/2"	上	(10YR 6/2), 20-40% fossils, 30-40%]
					ᅪ	coverage of voids 1/16" or less No Recovery 231.6-236.0'	_
					Ė	Limestone	_
	R34-HQ 5 ft	0			片	236.0-238.0' - very pale orange to grayish orange, (10YR 8/2 to 10YR	_
	22%	Ĭ	ND		┸	7/4), very fine to medium grained, moderate to strong HCl reaction,	
			NR			wery weak to weak (R1 to R2), low to	
245				_	」	moderate density, 15% of rock is	
-202.7						medium grained, thin to laminar bedding with organics along bedding	R34: 5 minutes
	246.0				ᅪ	partings, bedding ranges from horizontal to 10 degrees, 5-15%	
			>10	246.0-247.0' - Fracture zone	F	coverage of voids 1/16" or less	
			- 10		岸	No Recovery 238.0-241.0' Limestone	_
			4	247.05, 247.2, 247.35, 247.4' - Bedding plane	片	241.0-242.1' - grayish orange to pale	_
				(4), 0-7 deg	╨	yellowish brown, (10YR 7/4 to 10YR – 6/2), strong HCl reaction, very weak	_
	R35-HQ 5 ft	0			厂	to weak (R1 to R2), 10-20%	
	30%	١			工	coverage of voids 1/8" or less, very fine to medium grained (medium	
			NR		上	grains constitute 30% of the unit), the]
250_				_	\vdash	unit exhibits no bedding until 241.7' — then thin (up to 1/4") to laminar beds	
-207.7					广	that are thumbnail soft	R35: 8 minutes
	251.0				片	No Recovery 242.1-246.0']
			>10	251.25, 251.6' - Bedding plane (2)	Ľ	246.0-247.5' - very pale orange to]
			- 10	251.6-252.3' - Fracture zone, fragments from	F	pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine to fine grained,	
			>10	1/4" to 1"x1" to 1/4"x3/8" (bedding planes), fragments are generally small	工	strong HCl reaction, weak to medium	1
			-10	252.45, 252.6, 252.8, 252.95, 253.2, 253.4' -	上	strong (R2 to R3), fossiliferous, 5-10% coverage of voids 1/16" or	1
	R36-HQ	13	2	Fractures (6), 0-7 deg, smooth, planar, fractures or partings along bedding planes	\vdash	less	1
	5 ft 48%	13		2	厈	No Recovery 247.5-251.0'	1
1 7					岸	1	1
255_			NR	_	片	<u>L</u>]
-212.7				_	廾	L	R36: 7 minutes
	256.0				Ш		
							<u> </u>

APPENDIX 2BB-76 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-07	SHEET	14	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS DEPTH BELOW SURFACE AND ELEVATION (#) 90 CORE RUN, LENGTH, AND RECOVERY (%) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 256.1, 256.3, 256.4, 256.6, 256.7, 256.8, 7 251.0-253.4' - pale yellowish brown, 256.9' - Fractures (7), horizontal, rough, (10YR 6/2), very fine to medium planar, fractures along laminae grained, moderate to strong HCI 257.15, 157.35, 157.7, 157.9' - Fractures (4), reaction, very weak to weak (R1 to R2), moderately dense, some coarse grained material, 25-40% fossil casts 4 rough, planar, fractures along bedding plane R37-HQ . 258.1, 258.2, 258.4, 258.75' - Bedding plane and molds. 30% coverage of voids 25 4 (4), 0-10 deg, smooth, undulating 1/16" of less, 5-10% solution cavities, 90% moderately friable at both ends of 259.1, 259.25, 259.4, 259.5, 260.0' ->10 Fractures (5), horizontal, rough, planar, along No Recovery 253.4-256.0' 260 laminae Limestone -217.7 R37: 4 minutes >10 260.0-260.5' - Fracture zone, random 256.0-260.5' - very pale orange to orientation, fragments 1"-2" NR grayish orange, (10YR 8/2 to 10YR 7/4), very fine to medium grained, 261.0 261.0-263.0' - Fracture zone moderate to strong HCI reaction, >10 extremely weak (R0), light to 261.6, 261.99' - Fractures (2), rough, planar moderately dense, laminar to thin (up 262.1, 262.3, 262.6, 262.9' - Fractures (4), to 1" thick) beds that locally contain >10 rough, planar, hard to distinguish minor amounts of organic material that grade from very fine moderately R38-HO dense limestone to very thin very 8 5 ft weak laminae with undulating beds, 40% 20-30% fossils, 20-30% coverage of voids 3/16" or less, 5-10% solution NR cavities, friable, 30-50% silty and 265 sand-sized grain matrix, coarse R38: 7 minutes -222.7grained limestone Removed inner core barrel, No Recovery 260.5-261.0' driller pulled 10' of outer 266.0 casing and tagged depth to 266.0', hole stayed open Limestone 261.0-263.0' - very pale orange, (10YR 8/2), very fine grained, overnight, outer core barrel medium strong (R3), 15-20% coverage of voids 1/16", interbedded with light fossil rich friable intervals, stayed at 256.0' fossil casts and molds abundant in friable interbeds, rock has moderate HCl reaction in medium strong intervals and strongly HCl reaction in friable intervals No Recovery 263.0-266.0' Bottom of Boring at 266.0 ft bgs on



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-08	SHEET	1	OF	15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

					S/N 340233, High rolarly, auto rightness, AWJ 1005, 3-7/6 til-corie bit Onientation . Vertical
WATER	LEVELS	: 3.4 ft bg	gs on 03/2		START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska SOIL DESCRIPTION COMMENTS
≥Q⊋	CAMPIE	INITEDY	1 (4)	STANDARD PENETRATION	SOIL DESCRIFTION O CONVINCENTS
ELO ON (SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
H B		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
42.1	0.0		l 	(14)	Poorly Graded Sand With Organics (SP)
-					│ \ 0.0-0.3' - dusky brown, (5YR 2/2), moist, very loose, │ │ ├ │ ├ │ │ │ │ │ │ │ │ │ │ │ │ │ │
-		1.0	SS-1	2-2-2-3 (4)	\very fine to fine grained, 15% fine grained organics, \very fine to fine grained, 15% fine grained organics, \very fine to fine grained, 15% fine grained organics, \very fine to fine grained, 15% fine grained organics, \very fine to fine grained, 15% fine grained organics, \very fine to fine grained, 15% fine grained organics, \very fine to fine grained, 15% fine grained organics, \very fine to fine grained, 15% fine grained organics, \very fine to fine grained organics, \very fine grained o
-				(.,	Poorly Graded Sand With Silt (SP-SM)
-	2.0				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					│ \nonplastic fines, sand is silica
-		1.4	SS-2	3-3-2-1 (5)	Poorly Graded Sand With Silt (SP-SM) 2.0-3.4' - moderate brown, (5YR 4/4), wet, loose, very
-				(3)	↑ fine to fine grained, no HCl reaction, 10-15%
_	4.0				\nonplastic fines, sand is silica
-					Clayey Sand (SC) 4.0-4.9' - medium light gray, (N6), moist, soft, very
5 37.1		0.9	SS-3	0-1-2-2	fine to fine grained, no HCl reaction, 35% medium to high plastic fines, trace organics, sand is silica
37.1				(3)	Ingriphastic lines, trace organics, sand is sinca
_	6.0				
_					Silt (ML) 6.0-7.2' - grayish orange, (10YR 7/4), wet, very stiff,
_		1.2	SS-4	3-10-12-13	nonplastic, very rapid dilatancy, mild to moderate HCl
_			00 .	(22)	reaction, 5-10% very fine sand-sized, carbonate
	8.0				
					Silt (ML) 8.0-8.8' - Same as 6.0-7.2' except very soft -
_		0.8	SS-5	16-24-5-3	o.o o.o oano ao o.o 7.2 oxoopi very son
_		0.0	00-5	(29)]
10	10.0				
32.1					Silt (ML) 10.0-10.7' - Same as 6.0-7.2' except soft, 10-15%
		0.7	SS-6	0-2-1-12	very fine to fine sand-sized
		0.7	33-6	(3)]]
	12.0]
		0.5	SS-7	5-50/5	Silt With Sand (ML)
	12.9	0.5	33-7	(55/11")	12.0-12.5' - Same as 10.0-10.7' except 10-15% very fine to fine sand-sized. 5% coarse sand-sized
1 7					<u> </u>
1 7	14.0				11
1 7	14.5	0.5	SS-8	50/6	Sandy Silt (ML)
15				(50/6")	14.0-14.5' - grayish orange, (10YR 7/4), wet, hard, - honplastic, very rapid dilatancy, mild to moderate HCI
27.1					reaction, 35% very fine to medium sand-sized, all
	16.0				\[\text{carbonate} \] -
	16.3	0.1	SS-9	50/3	Limestone Fragments
				(50/3")	\ 16.0-16.05' - grayish orange to dark yellowish orange, / (10YR 7/4 to 10YR 6/6), mild HCl reaction, several
-					limestone fragments of 1/4"-1/2" size
-	18.0				
-	10.0				Silty Sand (SM)
-				17 20 20 20	18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to
-		1.9	SS-10	17-28-39-22 (67)	coarse grained, moderate HCl reaction, 25-30%
-				` ′	nonplastic fines, 10-15% fine gravel-size, all
20					carbonate
				_	

APPENDIX 2BB-78 Rev. 4



PROJECT NUMBER:	BORING NUMBER:

338884.FL A-08

SOIL BORING LOG

SHEET 2 OF 15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 3.4 ft bo	gs on 03/2	22/07	START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska
				STANDARD	SOIL DESCRIPTION COMMENTS
NON (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	Й
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	RY (ft)	120111200LIO	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
PTH RFA(#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
DE SU ELE			,,,,,	(N)	
22.1	20.0				Silty Sand (SM) 20.0-21.5' - Same as 18.0-19.9' except dense
		1 5	SS-11	10-15-17-16	20.0-21.5 - Same as 10.0-13.5 except dense
		1.5	33-11	(32)	
	22.0				
-					Silty Sand (SM)
-		1.6	SS-12	17-19-49-50/1	22.0-23.6' - Same as 18.0-19.9' except very dense
-				(68)	-
-	23.6 24.0				
-	24.4	0.4	SS-13	50/5	Silty Gravel With Sand (GM)
75				(50/5")	24.0-24.4' - Same as 22.0-23.1' except mild HCl reaction, 60% of sample is several wafer shaped
25 <u> </u>					limestone fragments to 1/4" thick
-	00.0				
-	26.0				Silty Sand (SM) Sample SS-14 is similar to SS-12 and
-					26.0-27.6' - dark yellowish orange, (10YR 6/6), wet, - │ │ │ │ above, but darker in color -
-		1.6	SS-14	10-11-7-11 (18)	medium dense, fine to medium grained, mild to moderate HCI reaction, 35% nonplastic fines, trace of
-				(10)	_ coarse sand to fine gravel-size, trace white
_	28.0				\sand-sized particles, all carbonate Silty Sand And Limestone (SM)
_					28.0-28.7' - Same as 26.0-27.6' except a few 1/4"
_		0.7	SS-15	8-11-10-50/5 (21)	wafer shaped limestone fragments
_				(21)	Chatter at 29.0'
30	39:8				
12.1	30.3	0.0	SS-16	50/4 \ (50/4") /	Limestone Fragments \[\] 30.0' - a few coarse sand-size limestone fragments \[/ - \] -
_				(00, 1)	recovered
_					_ _ _
	32.0				
					Silty Sand With Gravel (SM) 32.0-33.5' - dark yellowish orange, (10YR 6/6), wet,
		1.5	SS-17	23-36-27-28	very dense, fine to coarse grained, mild to moderate
]		1.5	JOS-1/	(63)	HCÍ reaction, 15-20% fine gravel-size, 20-25% $\Vert \cdot \Vert_1$
1 7	34.0				nonplastic fines, all carbonate - 111
]		0.6	QQ 10	28-50/5	Silty Sand With Gravel (SM)
35	34.9	0.6	SS-18	(78/11")	34.0-34.6' - Same as 32.0-33.5' except several coarse
7.1					
-	36.P				1
-	38:Ψ	0.0	SS-19	50/1	No Recovery 36.0' Heavy chatter at 36-37'
-				(50/1")	
-					-
-	00.0				
-	38:P	0.0	\SS-20 /	50/0.5	Limestone Fragments
-				(50/0.5")	│ \ 38.0-38.04' - light olive gray, (5Y 5/2), mild HCl
-					reaction, fragments to 1/2" size, fragments are stronger than previously
-					-
40					
	l				I I

APPENDIX 2BB-79 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					_
338884 FI	A_08	CHEET	2	ΩE	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLIN	G METH	DD AND	EQUIPME	ENT : CME 550X	S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 3.4 ft bo	s on 03/2	22/07	START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
JOE TO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH RFA			#TYPE	6"-6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SU				(N)	
2.1	40.0			24-24-50/3	Silty Sand (SM) 40.0-41.3' - light olive brown to moderate olive brown, -
		1.3	SS-21	(74/9")	(5Y 5/2 to 5Y 4/4), wet, very dense, fine to coarse
1 7	41.3				grained, mild HCl reaction, 30% nonplastic fines,
-	42.0				5-10% fine gravel-size, all carbonate
-	42.5	0.5	SS-22	50/6	Silty Sand (SM)
-	42.5			(50/6")	42.0-42.5' - Same as 40.0-41.3' except 30% size
_					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
-					
_	44.0 44.3	0.1	SS-23	50/3	\(\silty \text{ Sand (SM)} \)
_		0.1	00 20	(50/3")	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
45 <u> </u>					
-2.9					<u> </u>
	46.0 46.2				
	46.2	0.1	SS-24	50/2	Limestone Fragments
				(50/2")	\dagger 46.05' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, 2 wafer shaped limestone pieces,
_					\\\ 1/8"-1/4" thick, voids up to 1/16" over 30% of surface \ -
-	40.0				
_	48.0 48.4	0.3	SS-25	50/5	Silty Sand (SM)
_	70.7	0.0	00 20	(50/5")	\ 48.0-48.3' - Same as 42.0-42.5' except more /-
-					\limestone fragments
-					
50	50:P		00.00	50//	
-7.9		0.0/	\SS-26	50/1 (50/1")	Limestone Fragments 50.0' - recovered one 1/4" limestone fragment
				(30/1)	00.0 Tecovered one 174 innectoric magnitude
	52.0				11
_					Silty Sand (SM) Sample SS-27 and similar samples may be
-				14.05.04.10	52.0-53.7' - Same as 48.0-48.3' - extremely weak limestone -
-		1.7	SS-27	14-25-24-16 (49)	-
-				(- /	
-	54.0 54.3	0.2	SS-28	50/4	Silty Sand (SM)
-	∪ -1 .∪	U. <u>C</u>	00-20	(50/4")	\(\sqrt{54.0-54.2'} - \sqrt{Sand (SW)}\\ - \sqrt{-1}
55					
-12.9					_
	56.9				
1	∪∪. I	0.0	SS-29	50/1	Limestone Fragments Stopped drilling for the day 3/12/07 at 17:50,
-				(50/1")	\sigma_56.0' - a few limestone fragments to 3/8" \square - \left at 56' \quare Surface collapse 3/13/07 at 07:45. driller
-					rebuilding surface with dirt; will insert HW
-	F0.0				- casing -
-	58.0	0.4	00.00	24-50/1	HW casing set to 14' at 09:40 Silty Sand With Gravel (SM) HW casing set to 14' at 09:40 Resume drilling at 10:15 on 3/13/07
-	58.6	0.4	SS-30	(74/7")	↑ 58.0-58.4' - Same as 52.0-53.7' except moderate
-					\ \ yellowish brown, (10YR 5/4), wet, hard, nonplastic, \ \ \ \ very rapid dilatancy, mild HCl reaction, 20-25% fine to \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
					very rapid dilatancy, mild HCI reaction, 20-25% tine to /
60					(

APPENDIX 2BB-80 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-08	SHEET	4	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

					5/N 540255, mud rotary, auto naminer, AWS rods, 5-			ONIENTATION : Vertical
WATER	LEVELS	: 3.4 ft bo	gs on 03/2	22/07	START : 3/12/2007 END : 3/21/2007	LOGGE	₹ : C.	Wallestad, R. Gomez, R. McComb, L. Prochaska
>				STANDARD	SOIL DESCRIPTION		U	COMMENTS
0 N (£)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG	
HHH		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COI MOISTURE CONTENT, RELATIVE DENSIT	LOR,		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
YFA.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERA		₩ W	INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			#111	(N)	,		SY	
-17.9	60.0 60.6	0.5	SS-31	27-50/1	Silty Sand With Gravel (SM)		Ш	
-	60.6			(77/7")	60.0-60.5' - Same as 58.0-58.4' except 20% to coarse sand-size, 30-35% gravel-size limesto	fine to	1.5	1
-					\fragments in wafer shapes	one /	┨	-
-					(3		1	-
-	62.0 62.3	0.2	SS-32	F0/0	- Limestone Fragments		╀-	-
_	02.3	0.2	35-32	50/3 (50/3")	62.0-62.2' - dark yellowish brown, (10YR 4/2)	mild /	1] _
				(00,0)	\HCl reaction, 1/4" thick wafer shaped limesto	ne		_
					\fragments		1	
	64.0						1]
	64.4	0.2	SS-33	50/5	_ Limestone Fragments		Ħ	64-64.7' heavy chatter
GE -				(50/5")	\64.0-64.2' - Same as 62.0-62.2'	/	1	-
65 <u> </u>						_	1	-
	66.0			56:-			.	_
-	66.3	0.3	SS-34	50/5 (50/5")	Silty Sand (SM) \[66.0-66.3' - moderate yellowish brown to dark	, ,		65.7-66' no chatter, softer
_				(30/3)	yellowish brown, (10YR 5/4 to 10YR 4/2), wet	t, fine to	1	_
					coarse grained, mild HCI reaction, 30-35% no	onplastic		_
					fines, 20% fine size, all carbonate Begin Rock Coring at 66.0 ft bgs		1	
					See the next sheet for the rock core log		1	
_					Ç		1	1
-							1	-
-							1	-
-							1	-
70 <u> </u>						_	-	_
-27.9							1	_
_							1	_
							1	1
-							1	1
-							1	-
-							1	-
-							1	
							1]
75						_	1	
-32.9								
]
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80]

APPENDIX 2BB-81 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-08	SHEET	5	OF	15

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724017.2 N, 457734.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Geophysical testing 66.0 66.0-66.2' - Fracture zone Limestone <10 66.3' - Fracture, horizontal, smooth, planar, 66.0-70.6' - moderate yellowish performed prior to rock brown, (10YR 5/4), very fine to fine coring, depth tagged at open 66.8-67.0' - Fracture, 50-55 deg, rough, grained, mild HCI reaction, very weak to weak (R1 to R2), <1/16" voids on 3 planar, tight 67.2' - Mechanical break 15-20% of surface 67.3-67.9' - Fracture, 10-50 deg, rough, R1-HQ 65 1 planar, tight 5 ft 68.2' - Fracture, 10 deg, rough, planar, open 92% 68.4-68.55' - Mechanical break, 30 deg, SC-1 collected at 69.4-3 smooth, planar, open <1/16" 68.95-69.0' - Fracture, 30 deg, smooth, 70 planar, silt and/or clay sized infilling, <3/16" -27 9 R1: 8 minutes 0 thick, open NR 69.4, 69.5' - Fractures (2), horizontal No Recovery 70.6-71.0' 71.0 smooth, planar, silt infilling, open Limestone 70.5' - Fracture, horizontal, smooth, 0 71.0-75.2' - Same as 66.0-70.6' undulating, open except 5-10% solution cavities up to 71.4' - Fracture, 20 deg, rough, undulating, 3/8" at 72.6-75.2', weak to medium SC-2 collected at 71.4trace red laminated staining, open 2 strong (R2 to R3) at 74.0-75.0' 72.85' 72.35' - Fracture, horizontal, rough, planar 72.75, 72.9' - Fractures (2), 30 deg, rough, R2-HQ planar, tight 73 3 5 ft 96% 73.0' - Fracture, horizontal, rough, stepped, trace silt and/or clay infilling 73.3-73.6' - Fracture, 80 deg, rough, 0 undulating, tight 75 73.6' - Fracture, horizontal, rough, undulating, $-32.\overline{9}$ R2: 7 minutes 75.2-75.8' - moderate yellowish 2 tight 73.6-74.25' - Fracture, 60 deg, rough, brown, (10YR 5/4), fine grained, mild 76.0 NR undulating, tight HCl reaction, extremely weak to very 75.3, 75.5' - Fractures (2), horizontal, rough, weak (R0 to R1), trace voids to 1/8", >10 stepped, <3/16" silt infilling, open 1/8" trace casts/ cavities up to 3/8"x9/16" 75.5-75.8' - Fracture, 75 deg, rough, No Recovery 75.8-76.0' SC-3 collected at 76.9undulating, tight 76.0-76.05' - Clay seam, dark organic rich Limestone 3 76.0-78.9' - light gray to very pale orange, (N7 to 10YR 7/2), very fine to clav R3-HQ 76.05-76.6' - Fracture zone fine grained, moderate HCI reaction, 5 ft 23 7 76.8-76.9' - Mechanical break or fracture, 15 weak (R2), trace voids to 1/16", trace 64% deg, rough, undulating, open casts/cavities to 3/4"x3/8" Clay (CL) 78.9-79.2' - grayish brown, (5YR 3/2), 77.7' - Fractures, multiple vertical fractures 77.8-78.2' - Fracture, 75 deg, smooth, 80 undulating, tight 77.8-78.2' - Fracture, rough, planar, mild HCI reaction, organic, laminated NR -37.9 R3: 8 minutes No Recovery 79.2-81.0' orthogonal to above, tight 81.0 78.2-78.9' - Fracture, vertical, rough, Limestone undulating, trace black powdery staining, tight 81.0-83.3' - moderate yellowish 1 78.9-79.2' - Bedding plane, horizontal, smooth, undulating, 1/4"-1/2" thick, open 1/8" 81.7' - Fracture, 15 deg, rough, planar, brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2). SC-4 collected at 82.4-15% voids <1/16", 5-10% solution cavities up to 3/8", 10-15% fine sand 1 <1/16" thick silt or/and clay sized infilling, 1/4" open with limestone, weak (R2), same R4-HQ 82.4' - Fracture, 15 deg, rough, undulating, 88 3 color 20-25% voids 5 ft open 100% 83.3-83.6' - transition zone as rock 83.3, 83.6, 84.3' - Fractures (3), horizontal, from 81.0-83.3' grades into material rough, planar, silt and/or clay sized infilling, at 83.6-86.4' 1 open 85 83.6-83.7' - Fracture zone -42.9 R4: 7 minutes 84.8' - Mechanical break 0 86.0

APPENDIX 2BB-82 Rev. 4



PROJECT NUMBER: BORING NUMBER: A-08

ROCK CORE LOG

SHEET 6 OF 15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

				MENT: CME 550X S/N 340253, mud rotary, HQ tools, HV			ORIENTATION : Vertical
WATER	LEVELS : 3.4	ft bgs	s on 0		21/200	· · · · · · · · · · · · · · · · · · ·	
30₽	<u> </u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE	S.F.A.	Q D (%)	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	P.	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FRE	NG NG	Oρ	SAC FIRE	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	8.50	ď	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	21.61.6, 1201.112021.6, 21.6.
			0	86.2' - Fracture, 10 deg, rough, undulating,	Ш	Limestone	
			0	open	Ш	 83.6-86.4' - pale yellowish brown, (10YR 6/2), fine grained, moderate 	1
_				-	Н	HCI reaction, weak (R2), 20-25%	SC-5 collected at 88.6-
-			4	87.35' - Fracture, horizontal, smooth,	П	 coverage of voids up to 1/16", 25% casts/ cavities up to 3-1/8"x1-9/16" at 	89.5'
-	R5-HQ			undulating, 1/4" hard infill, tight 87.6' - Fracture, horizontal, smooth,	Н	83.6-84.8', trace casts/cavities (up to	1
_	5 ft	71	2	undulating, silt and/or clay sized infilling, 1"	ш	- 3/4"x3/8") throughout, single large	-
_	100%			thick infilling, tight	₽₽	(2-3/4"x3/4") cavity at 86.0' 86.4-91.0' - moderate yellowish	
			1	87.75' - Fracture, horizontal, smooth, undulating, 1/2" silt infill, tight to 1/2" open		brown, (10YR 5/4), fine grained,	<u> </u>
90_			·	88.0' - Fracture, horizontal, smooth,	Н	strong HCl reaction, very weak to	_
-47.9				undulating, silt and/or clay sized infilling,	ш	weak (R1 to R2), fossil casts and molds, 3/16" voids on 15% of	R5: 7 minutes
	91.0		1	tight, 1/2" silt infill, 1/4" open 88.35' - Fracture, horizontal, smooth,	Ш	surface, 10% solution cavities up to	1
-	- 1.0			stepped, tight	\square	- 3-1/8"x3/4"] 1
-			0	88.6' - Fracture, horizontal, smooth, undulating, 1/8"-1/2" open		 91.0-92.9' - moderate yellowish brown mottled very pale orange, 	1
_				89.8' - Mechanical break	₩	(10YR 5/4 mottled 10YR 6/2), fine	SC-6 collected at 94.0-
_			1	90.5' - Fracture, 2-4 deg, smooth, undulating,	ш	grained, moderate HCl reaction, very	94.9'
_	50.110			tight 92.6' - Fracture, 5-7 deg, rough, planar, <3/8"	Н	weak to weak (R1 to R2), 10-20% voids <1/8", 5-10% solution cavities	
_	R6-HQ 5 ft	93	3	thick infilling, carbonate silt, open	H	up to 1-3/16"- 1-9/16", partially to	
	100%	00	L	93.0' - Fracture or mechanical break,	Н	completely infilled with white to	
				horizontal, rough, undulating, white infilling 1/16" thick, tight		yellowish gray (5Y 5/1) carbonate, extremely weak (R0) material	
95			2	93.2, 93.6' - Mechanical break (2)	Н	92.9-96.0' - yellowish gray to very	1
-52.9				94.0, 94.9' - Fractures (2), horizontal, rough,	П	pale orange, (5Y 8/1 to 10YR 8/2),	R6: 15 minutes
-			2	undulating, open 95.2' - Fracture, horizontal, smooth, planar,		fine grained, strong HCl reaction, weak to medium strong (R2 to R3),	1 1
-	96.0			dark brown clay infilling 3/4" thick	ш	5% voids, 2-5% solution cavities	1 -
_			2	95.9-96.0' - Fracture or mechanical break, 30	ш	96.0-101.0' - very pale orange to	-
_				deg, rough, planar, tight 96.25-96.35' - Fracture, 45 deg, rough,	₽₽	yellowish gray, (10YR 8/2 to 5Y 7/2), fine grained, strong HCl reaction,	-
			3	planar, open		very weak (R1), 10-15% voids up to	SC-7 collected at 98.15- 98.9'
			Ľ	96.95' - Fracture, horizontal, smooth, planar,	Н	1/16", trace casts/cavities up to 3/8" - diameter, 10% irregular black	
	R7-HQ			fractured along contact 97.05' - Fracture, horizontal, rough, planar,	ш	laminae/inclusions at 96.5-97.5'	
	5 ft 100%	58	1	tight	Н	_	1
_				97.4, 97.6, 98.9' - Fractures (3), 0-5 deg, rough, undulating, up to 1/8" open		=	1
100			2	99.3' - Mechanical break	H	-	-
100_ -57.9				99.6' - Fracture, 0-30 deg, rough, undulating, —	H	_	R7: 6 minutes
-			2	tight 100.0' - Mechanical break	ш	_	-
-	101.0		N/A	100.5-101.05' - Fracture, 70 deg, rough,	\vdash	Doorly Creded Soud (CD)	1 -
-			NA	undulating, open 1/8"-1/4"	H	Poorly Graded Sand (SP)	1
			1	101.4' - Fracture, 30 deg, rough, undulating, sand/rock contact	H	7/4), very fine to fine grained, strong	l J
			_	102.25' - Fracture, horizontal, rough, planar,	Н	HCl reaction, 80% carbonate, 20%	SC-8 collected at 103.05-
]			3	tight	Ш	- \silicate _ Limestone	103.95'
-	R8-HQ			102.8' - Fracture, 10 deg, rough, undulating,	\vdash	101.4-106.0' - very pale orange to	1
-	5 ft 100%	46	2	open 102.85-103.05' - Fracture, 60 deg, rough,	Ħ	grayish orange, (10YR 8/2 to 10YR	1
-	100%			undulating	\vdash	7/4), fine grained, strong HCl reaction, extremely weak to very	-
-			>10	103.95' - Fracture, 20-25 deg, rough, planar,	Ш	weak (R0 to R1), trace voids up to	-
105 <u> </u>			<u> </u>	open 103.95-104.2' - Fractures (3), rough, —	Ш	1/16", no visible casts/cavities	D8: 10 minutes
-02.9			>10	undulating, open	F	_	R8: 10 minutes
	106.0			104.5' - Mechanical break	Ш		

APPENDIX 2BB-83 Rev. 4



PROJECT NUMBER:	BORING NUMBER:			
338884.FI	A-08	SHEET	7 OF	15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS DEPTH BELOW SURFACE AND ELEVATION (#) 90 CORE RUN, LENGTH, AND RECOVERY (%) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 104.65-105.0' - Fracture zone Limestone 3 105.3-105.45' - Fracture, 45 deg, rough, 106.0-111.0' - very pale orange to yellowish gray, (10YR 8/2 to 5Y 7/2), fine grained, strong HCl reaction, undulating, open 105.45-106.0' - Fracture zone SC-9 collected at 110.0-106.0-106.1' - Fracture, vertical, rough, 3 very weak to weak (R1 to R2), 20% 111 0' undulating, 1/4" open 106.1, 106.3' - Fractures (2), vertical, voids up to 1/16" on surface, casts/cavities up to 1-9/16" on 10% R9-HQ 66 2 smooth, planar, open of surface 5 ft 107.3, 107.5' - Fractures (2), horizontal, 100% smooth, planar, <3/16" open 107.9, 108.25-108.3' - Fractures (3), 30 deg, 3 smooth, undulating, tight 110 109.0' - Fracture, horizontal, rough, -67.9 R9: 6 minutes undulating, open 0 109.45' - Fracture, horizontal, smooth, 111.0 undulating, 1/8" open 111.0-116.0' - very pale orange to yellowish gray, (10YR 8/2 to 5Y 7/2), 109.6' - Fracture, 10 deg, rough, stepped, 2 1/8" open fine grained, strong HCI reaction, 109.7' - Fracture, 10 deg, rough, undulating, very weak (R1), trace voids to 1/16", SC-10 collected at 113.65open 0 trace cavities to 3/8" diameter at 114.55' 110.0' - Fracture, horizontal, rough, undulating R10-H0 111.3' - Mechanical break, horizontal 90 3 5 ft 111.65-111.85' - Fracture, 45 deg, rough, 100% planar, tight Driller's Remark: Lost 113.2' - Fracture, horizontal, rough, stepped, 1 circulation at 115' 1/8" open 115 113.4' - Mechanical break -72.9 R10: 8 minutes 113.65, 114.55' - Fractures (2), horizontal, 1 rough, undulating 116.0 115.5' - Fracture, horizontal, smooth, 116.0-121.0' - very pale orange to undulating, open pale yellowish brown, (10YR 8/2 to 4 116.1, 116.25' - Mechanical break (2) 10YR 6/2), fine to medium grained, 116.25-116.8' - Fractures (2), 75 deg, rough, strong HCl reaction, very weak (R1), voids (1/16") on 10% of surface, SC-11 collected at 120.2undulating, 10% black stain, open 7 121.0' 116.8' - Fracture, 30 deg, rough, undulating, 15-20% casts/cavities, single cavity open (2"x1-3/16") at 114.5', poorly R11-HQ 117.1-117.2' - Fracture, 52 deg, rough, fossiliferous 33 3 5 ft planar, 1/8" open 117.35' - Fracture, horizontal, rough, planar 100% 117.65-117.9' - Fracture, rough, planar, 1/8" 4 120 117.9-118.2' - Fracture zone -77.9 R11: No runtime recorded 118.8, 119.5, 119.3' - Fractures (3), 10 deg, 1 smooth, undulating, tight 121.0 118.9' - Fracture, 20 deg, rough, undulating, 121.0-122.65' - Same as tiaht 5 116.0-121.0' except trace cavities up 197.3. 197.5' - Fractures (2), <5 deg. rough. to 9/16"x3/16" stepped, open 119.7-119.8' - Fracture, 30 deg, rough, SC-12 collected at 123.7-3 undulating, open 119.9-120.0' - Mechanical break 124 5 122.65-126.0' - very pale orange, (10YR 8/2), fine grained, strong HCI R12-H0 120.2' - Mechanical break 2 reaction, very weak (R1), trace voids 5 ft 34 121.15, 121.2' - Fractures (2), horizontal, smooth, planar, open 1/4" to tight 121.15-121.4' - Fracture, 60 deg, rough, to 1/16", 25-30% casts up to 3/8"x3/4" at 122.65-123.7', highly 100% fossiliferous 2 undulating, 30% black staining 125 121.7' - Bedding plane, horizontal, smooth, -82.9 R12: 5 minutes planar, <1/8" open >10 121.95' - Fracture or bedding plane, 126.0 horizontal, smooth, planar, <1/8" open

APPENDIX 2BB-84 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL A-08 SHEET 8 OF 15

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724017.2 N, 457734.1 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams ELEVATION: 42.1 ft (NAVD88)

ORIENTATION: Vertical WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 122.25-122.6' - Fracture, 60 deg, rough, Limestone >10 stepped, tight 126.0-129.5' - fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" on 3-5% of 122.6-122.7' - Fracture, 25 deg, rough, undulating 123.3-123.6' - Fracture, 75 deg, rough, 10 surface, trace fossils (molds/casts), undulating, tight 124.5' - Fracture, 35 deg, smooth, planar rare intraclasts R13-HQ 124.8-126.0' - Fracture zone 5 ft 70% 0 10 126.0-127.0' - Fracture zone, 0-60 deg, rough, undulating to stepped, open 10 127.0, 127.25' - Fractures (2), <5 deg, rough, No Recovery 129.5-131.0' stepped, open 130 127.45' - Fracture, 60 deg, smooth, -87.9 R13: 6 minutes NR undulating, open 127.7-128.0' - Fracture, 60-90 deg, smooth, 131.0 stepped, tight, vertical from 128.0 to 128.3 Limestone 128.3' - Fracture, horizontal, rough, stepped, 10 131.0-131.5' - pale yellowish brown, open (10YR 6/2), medium to coarse 128.75' - Fracture, 60 deg, rough, stepped, grained, strong HCI reaction, very 5 open weak (R1), 50-60% voids up to 3/8", 129.0-129.25' - Fracture zone, horizontal, fossils (molds/casts) common smooth, undulating to stepped, tight to open 131.2' - Fracture, <5 deg, rough, undulating 131.45' - Fracture, <5-30 deg, rough, 131.5-133.8' - gravish orange, (10YR R14-HO 7/4), fine to very fine grained, strong HCl reaction, weak to medium strong >10 15 5 ft 56% stepped, open (R2 to R3), chalk like 131.45-131.65' - Fracture zone, various No Recovery 133.8-136.0' orientations, rounded gravely limestone 135 NR 131.65-132.0' - Fracture, <5-90 deg, rough, -92.9 R14: 4 minutes undulating, open 132.0-132.3' - Fracture zone, 60 deg, rough, 136.0 stepped, intersected by 40 deg inclined Limestone fracture, tight 136.0-137.3' - pale yellowish brown alternating with very pale orange >10 132.5' - Mechanical break 132.75-133.0' - Fracture, 70 deg, rough, laminae, (10YR 6/2 alternating with undulating, tight 133.0-133.2' - Fractures (2), vertical, rough, 10YR 8/2), fine grained, weak to medium strong (R2 to R3), 15-20% >10 undulating, vertical and horizontal silty matrix, voids <1/16" on 10-15% R15-HQ intersecting fractures >10 of core surface, trace fossils 0 5 ft 133.25, 133.35, 133.4' - Bedding plane (3), 76% (echinoderms) horizontal, smooth, open 137.3-139.8' - Same as 136.0-137.3' 133.4-133.6' - Fracture zone, various >10 except densely fractured, laminated orientations, gravel sized limestone rock to massive bedding, fossils rare to 140 fragments, angular absent, incipient fractures common, -97.9 R15: 5 minutes 136.0-139.8' - Fracture zone, multiple NR "chalky" appearance fractures ranging from horizontal to vertical, No Recovery 139.8-141.0' 141.0 stepped to undulating, rough, tight to open Limestone 141.0-141.1' - Fracture zone, various 141.0-143.8' - light gray, (N7), fine to very fine grained, mild HCl reaction, 5 orientations, producing limestone rock fragments medium strong to strong (R3 to R4), SC-13 collected at 141.4-141.5, 142.8, 143.4' - Fractures (3), 5-10% voids <1/16", 15-20% solution cavities up to 1-3/6" heavily 1 horizontal, rough, undulating bioturbated especially in upper R16-H0 48 5 section, fossil casts/molds common 5 ft 100% 143.7-143.9' - Fracture zone, 0-90 deg. 143.8-145.0' - fine to medium rough, undulating to stepped grained, mild HCI reaction, very weak >10 144.0' - Fracture, <5 deg, rough, open 144.3' - Fracture, <5 deg, rough, stepped, to weak (R1 to R2), brecciated 145 appearance, fossils rare to absent. -102.9 R16: 16 minutes open 1-2% voids to <1/16", occasional thin 10 black organic laminae 146.0

> APPENDIX 2BB-85 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-08

SHEET 9 OF 15

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 144.3-145.2' - Fracture zone, rough to Limestone 2 smooth, various orientations, open to tight, 145.0-146.0' - dark yellowish brown, limestone rock fragments (10YR 4/2), fine grained, moderate to strong HCl reaction, weak to medium 145.2' - Bedding plane, horizontal, smooth, SC-14 collected at 146.8-0 strong (R2 to R3), laminated bedding 147 9 open alternating between pale yellowish 145.4' - Fracture, <5 deg, smooth, undulating, tight, black crystalline-like grains brown (10YR 6/2) and dark yellowish brown (10YR 6/6), incipient hairline R17-HQ over 10-15% of surface 90 1 5 ft 146.1' - Fracture, <5 deg, rough, stepped to fractures throughout length of interval 100% 146.0-151.0' - mottled yellowish gray undulating, open 146.35' - Fracture, 10 deg and vertical, to grayish orange, (5Y 7/2 to 10YR 0 rough, planar, tight 7/4), fine to very fine grained, 150 148.3' - Fracture or mechanical break, moderate HCI reaction, weak to -107.9 R17: 5 minutes horizontal, rough, undulating medium strong (R2 to R3), thinly 1 150.6' - Fracture, horizontal, rough, planar, laminated to massive bedded, rare 151.0 solution cavities, 5-10% voids up to 151.0-152.3' - Fracture, vertical, rough, 1/16", rare macro fossils 1 undulating, tight, tiny black crystalline-like 151.0-153.3' - yellowish gray, (5Y grains 7/2), fine grained, strong HCI SC-15 collected at 155.05reaction, very weak to medium strong (R1 to R3), voids (1/16") over 3-5% of surface, trace cavities, trace 2 156.0' 152.74' - Fracture, <10 deg, rough, stepped, R18-H0 black tiny crystals over 2% of surface, open fossil casts becoming thinly >10 80 5 ft 153.3, 153.6' - Fractures (2), <10-40 deg, laminated with depth, some mottling 100% rough, planar to stepped, open 153.7-154.1' - Fracture zone, stepped to 153.3-153.8' - Same as 151.0-153.5' except with cavities and voids on >10 planar, horizontal to slightly inclined, bedding 20-25% of surface, few thin laminae 155 laminae, open 153.8-156.0' - mottled yellowish gray -112<u>.9</u> 154.25' - Fracture, 20 deg, smooth, R18: 8 minutes to yellowish gray, (5Y 7/2 to 5Y 8/1), 1 undulating, tight 154.64' - Fracture, horizontal, rough, fine grained, strong HCI reaction, 156.0 very weak to weak (R1 to R2), thinly stepped, tight laminated, numerous bedding plane 0 155.05' - Fracture, horizontal, rough, planar, separations in upper 1/3 of interval, open, silty infilling becoming chalk-like with depth, SC-16 collected at 158.4fossils rare to absent 1 150.3' 156.0-161.0' - very pale orange to grayish orange, (10YR 7/4 to 10YR 157.8' - Fracture, 5 deg, smooth, planar, tight R19-HQ 8/2), very fine grained, strong HCI 2 100 5 ft 158.4, 158.8' - Fractures (2), 2 deg, rough, reaction, very weak to weak (R1 to 100% stepped, tight R2), 10-15% fossil shells/casts decreasing with depth, voids (1/16") 0 over 1-3% of surface, rare cavities, 160 occasionally thinly laminated, -117 9 R19: 7 minutes chalk-like texture at 158.4-158.8' 0 161.0 161.0-165.7' - Same as 156.0-161.0' 5 except voids up to 30-40% on upper 1' of interval, voids becoming less 161.7-162.0' - Fracture zone, horizontal and dense with depth, massive bedding SC-17 collected at 163.85vertical, smooth, planar to undulating, open 3 with thin laminae near base 162.0-162.5' - Fracture, 80 deg and vertical, rough, planar to undulating, open 162.55-163.0' - Fracture, 70 deg, rough, R20-H0 0 5 ft 68 undulating, open 94% 1 165 164.9' - Fracture, horizontal, smooth, planar, 122.9 R20: 8 minutes 3 3/16" thick silt and/or clay sized infilling, open NR 166.0 No Recovery 165.7-166.0'

APPENDIX 2BB-86 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-08

SHEET 10 OF 15

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 3.4	ft bg	s on 00	3/22/07 START: 3/12/2007 END: 3/3	21/200	D7 LOGGER : C. Wallestad, R. Gon	nez, R. McComb, L. Prochaska
≳D⊋	(%)			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(6	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
THE FAC	RE RI IGTH SOVE	R Q D (%)	CTU R FOC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BOL	WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
ana Snk Jao	COF LEN REC	RQ	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
_			3	165.4, 165.72, 165.78' - Bedding plane (3), horizontal, smooth to undulating, rough to	Ħ	Limestone - 166.0-166.8' - very pale orange,	_
_				loose 166.2, 166.8, 166.9' - Fractures (3),	Н	(10YR 8/2), very fine grained, strong HCl reaction, very weak to weak (R1	SC-18 collected at 168.3-
-			>10	horizontal, smooth, planar, fractured along	Н	 to R2), up to 3/8" solution cavities on 	169.65' -
-	R21-HQ			laminated bedding, open 167.0-168.0' - Fracture zone, horizontal,		_ 3-4% of surface, up to 1/16" voids on 15-20% of surface	-
-	5 ft 100%	52	2	smooth, planar, fractured along laminated - bedding, open	Н	 166.8-169.2' - moderate yellowish brown, (10YR 5/4), fine grained, mild 	-
_	10070		_	168.1, 168.4, 169.95' - Fractures (3), 1-2 deg,	\Box	to moderate HCl reaction, very weak	-
170_			1	smooth to rough, trace of silt	\vdash	(R1), 15-20% voids, 1-2% solution cavities up to 3/8", gradational	_
-127 <u>.</u> 9			2	_	Н	contact with interval below 169.2-171.0' - Same as 166.0-166.8'	R21: 7 minutes
_	171.0			170.65' - Fracture, 5-10 deg, rough, undulating, trace silt, open	oxdot	_ 171.0-173.6' - moderate yellowish	End of shift; stop drilling 3/15/07 at 10:00 -
-			1	170.8' - Fracture, 1-2 deg, rough, stepped,	Ш	brown, (10YR 5/4), mild to moderate	Bottom of hole tagged at
-				open 171.25, 171.4, 171.8' - Fracture zone (3), 70	oxdot	HCl reaction, strong (R4), voids over 15-20% of surface, up to 3/4"x3/8"	Resume drilling 3/20/07 at - 12:22
-			4	deg, rough, planar, cobble size fragments 172.75' - Fracture, 20 deg, rough, undulating,	Ш	- cavities	R. McComb begins logging
	R22-HQ 5 ft	66	3	open	Ш	_	hole -
	100%	00	3	173.05, 173.7' - Fractures (2), horizontal, rough, planar to stepped, open	Ш	173.6-173.9' - Same as 171.0-173.6	SC-19 collected at 171.45- 172.75' -
_			1	173.55' - Fracture, <5 deg, smooth, undulating, brown silty clay over 60% of	Ш	except no voids, no cavities, finely laminated	-
175 <u> </u>				surface	Ш	173.9-177.75' - Same as 171.0-173.6'	R22: 10 minutes
-	470.0		3	undulating, tight	Ш	-	
-	176.0			174.3' - Fracture, horizontal, smooth, planar, open	Ш	-	-
_			5	174.6' - Fracture, 70 deg, rough, planar, tight 174.73' - Fracture, horizontal, smooth, planar,	Ш	_	
			3	tight 175.85' - Fracture, <5 deg, smooth,	Н		SC-20 collected at 178.65- 179.45'
_	D00 110			undulating, clay infilling, silty clay infilling	H	_ 177.75-178.1' - moderate olive	-
_	R23-HQ 5 ft	52	1	176.3' - Fracture, <5 deg, rough, undulating 176.6-176.85' - Fracture zone, horizontal,	H	brown, (5Y 4/4), fine grained, no to mild HCl reaction, extremely weak	-
-	100%			smooth, planar, open 177.03' - Fracture, horizontal, smooth, planar,	H	(R0), 1/16" voids over 10-15% of surface, 3/8"- 1-3/16" cavities, friable	-
- 180			3	open 177.45, 177.6' - Fractures (2), horizontal,	Ш	178.1-179.45' - yellowish gray, (5Y	-
-137.9			_	smooth, planar, open 178.4' - Fracture, <5 deg, rough, stepped,	H	7/2), fine grained, mild to moderate HCl reaction, weak (R2), up to 1/16"	R23: 4 minutes
	181.0		5	3/8"-3/4" open	$\parallel \parallel$	voids over 10-15% of surface, 10-15% 3/8" to 1-3/16" cavities]
_			3	179.0' - Fracture, <5 deg, smooth, stepped, brown silty clay infilling, 3/4"-1-3/16" open	H	179.45-180.4' - pale yellowish brown, (10YR 6/2), fine grained, moderate to	-
_				179.25-179.43' - Fracture zone, <10 deg, smooth, stepped, zone of soft friable rock	H	strong HCl reaction, weak to medium strong (R2 to R3), voids over 1-2% of	SC-21 collected at 184.8-
_			5	fragments, inclined to horizontal, clay over 10-15%	H	- surface	185.7' -
-	R24-HQ			179.85' - Fracture, <5 deg, smooth, stepped	H	180.4-184.80' - dusky yellow, (5Y 6/4), fine to very fine grained, mild to	-
-	5 ft 100%	66	3	180.0-180.3, 180.55-181.6' - Fractures (2),	H	 moderate HCl reaction, very weak to weak (R1 to R2), voids over 10-15% 	-
			2	181.5' - Fracture, 70 deg, smooth, planar, tight	╠	of surface and increasing to 30-40% of surface below 183.5', thinly	_
185_				181.8, 181.95' - Fractures (2), horizontal, smooth, planar, open	H	laminated at 182.2-182.4', trace	
-142.9 -			1	182.1' - Fracture, <5 deg, smooth, stepped,	H	voids from 184.65-184.8' -	R24: 5 minutes
-	186.0			open	H		

APPENDIX 2BB-87 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-08

SHEET 11 OF 15

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 3.4	ft bgs	s on 00	3/22/07 START : 3/12/2007 END : 3/	21/20	D7 LOGGER: C. Wallestad, R. Gom	nez, R. McComb, L. Prochaska
≳ D ⊋	(%)			DISCONTINUITIES	[g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ATIC	TH, VEF	(%) _Q	Į,	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE ECC	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
교호텔	035	ď	표료		Ś	CHARACTERISTICS	
_			7	182.5' - Fracture, horizontal, rough, planar, open	Ш	Limestone - 184.8-186.5' - pale yellowish brown,	
_			,	182.7-183.02' - Fracture zone, horizontal,	Щ	(10YR 6/2), very fine to fine grained,	
			4	smooth, planar, open		mild to moderate HCl reaction, weak to medium strong (R2 to R3), fossil	SC-22 collected at 187.0-
			4	183.3' - Fracture, horizontal, smooth, planar, open to tight	Н	cavities up to 1-1/2"x1" over 60% of	188.5' -
_	R25-HQ			184.55' - Fracture, <5 deg, rough, undulating,		surface, voids up to3/16" over 40%	1
_	5 ft 100%	56	1	rock fragments with dark brown clay filling 184.7' - Fracture, horizontal, rough, planar,	Ш	 of surface 186.5-187.7' - dusky yellow, (5Y 6/4), 	1
_	10070			open	Ш	fine grained, moderate HCl reaction,	1
400 -			4	185.5-185.7' - Fracture zone, <5 deg, rough, undulating, 1-3/16"-2" open		 very weak to weak (R1 to R2), 5-10% voids over surface, trace cavities, 	-
190 <u>-</u> -147.9				186.2, 186.35, 186.45' - Fractures (3), 0-<5	+	trace fossil molds, up to 40-50%	R25: 9 minutes
-			1	deg, rough, open to tight	口	voids at 186.7-186.8' and	-
-	191.0			186.64' - Fracture, horizontal, smooth, planar, open		186.9-187.05' 「 187.7-187.73' - Same as	
_			1	186.78, 186.93, 187.0, 187.35, 187.6, 187.65,	$+\Pi$	 186.5-187.7' except 20-30% voids, 	-
_				187.7' - Fractures (7), 0 - <5 deg, rough, planar, open, vertical fracture at	Щ	10-15% cavities T 187.73-187.93' - light olive gray, (5Y	
_			3	187.35-187.6', tight	\Box	6/1), fine grained, thinly laminated	SC-23 collected at 191.0- 191.9' -
_				187.8' - Fracture, 70 deg, smooth, planar,		187.93-190.2' - yellowish gray, (5Y	_
	R26-HQ		3	tight 189.05' - Fracture, <5 deg, rough, planar,		5/2), fine grained, mild to moderate HCl reaction, weak (R2), voids over	
	5 ft 100%	36	3	light brown sandy clay infilling, open	Ш	60-70% of surface with discontinuous	1
_				189.6, 189.7' - Fractures (2), horizontal, smooth, planar, open		laminae with less voids 190.2-190.6' - yellowish gray to	1
195			6	189.9' - Fracture, <5 deg, rough, stepped to	\Box	dusky yellow, (5Y 7/2 to 5Y 6/4), fine	1
-152.9				undulating —	Ħ	grained, mild to moderate HCl	R26: 6 minutes
-	100.0		>10	190.6' - Fracture, horizontal, rough, stepped to undulating, black organics over 90% of		reaction, very weak to weak (R1 to R2), dark wispy laminae, voids over	-
-	196.0			surface	╁┷	- 40-60% of surface	-
-			1	191.0' - Fracture, horizontal, smooth, planar, black coating over 100% of surface	\Box	_ 190.6-193.5' - yellowish gray to dark yellow, (5Y 7/2 to 5Y 6/4), fine	-
_				191.6-191.9' - Fracture, 80 deg, rough,	$+$ \Box	 grained, mild to moderate HCl 	SC-24 collected at 197.5-
_			2	planar, open	+	reaction, very weak to weak (R1 to R2), voids over 50-60% of surface,	198.5' –
_	D07.110			191.9' - Fracture, <5 deg, rough, open, with stains	口	- cavities up to 3/4"x3/8" and up to	-
_	R27-HQ 5 ft	50	2	192.3, 192.4, 192.7' - Fractures (3), <5 deg,	╁┼┤	1-3/16" deep, voids becoming less]
_	100%			rough, undulating to stepped, open 193.25' - Fracture, <10 deg, smooth, planar	Д	common with depth - 193.5-196.0' - grayish yellow, (5Y	
_			10	to stepped, open		8/4), fine to very fine grained, mild to	
200			10	193.25-195.6' - Fracture zone, with low to high angle fractures, rock fragments —		moderate HCl reaction, very weak — (R1), voids over 20-30% of surface,]
-157.9			10	196.1' - Fracture, <5 deg, rough, stepped,		3-5% cavities, trace fossils, trace	R27: 10 minutes
l -	201.0		10	open	Ш	black organics	1
_	, · · · ·			198.5' - Fracture, horizontal, rough, stepped, open	Ш	 196.0-199.3' - yellowish gray, (5Y 7/2), fine grained, mild to moderate 	1
_			2	198.9' - Fracture, <5 deg, rough, stepped,	ш	HCl reaction, very weak (R1), thinly	
-				open 199.3-201.0' - Fracture zone, horizontal,	╂┼┦	 laminated, trace voids filled with dark organic material, voids over 20-30% 	SC-25 collected at 202.5-
-			3	smooth, open, becoming stepped and rough	Ħ	of surface, rare cavities, trace voids	203.5'
-	R28-HQ			with depth	ᡛ╣	_ fossils	-
-	5 ft	54	1	201.35' - Fracture, horizontal, rough, stepped, open	Ш	199.3-201.0' - yellowish gray, (5Y 7/2), fine to very fine grained, very	-
_	100%			201.95' - Fracture, horizontal, smooth, planar,	世	weak (R1), voids on 3-5% of surface,	-
_			4	open 202.25' - Fracture, horizontal, rough, planar,	\Box	trace black organic material as thin discontinuous laminae	
205_				open			
-162.9			2	202.35-202.5' - Fractures (2), horizontal,	Н	_	R28: 8 minutes
	206.0			rough to smooth, stepped, open	Ш]
I			1 1		1		1

APPENDIX 2BB-88 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-08

SHEET 12 OF 15

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724017.2 N, 457734.1 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska LITHOLOGY DISCONTINUITIES COMMENTS DEPTH BELOW SURFACE AND ELEVATION (#) CORE RUN, LENGTH, AND RECOVERY (%) 9 DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 201.0-203.0' - Same as 199.3-201.0' 203.9' - Fracture, horizontal, rough, >10 undulating, open except with void/ cavity zone from 204.1, 204.25, 204.4, 204.5' - Fractures (4), 201.3-201.6' covering 20-30% of surface, very thin dark laminae at horizontal, rough, stepped, open 205.5' - Fracture, horizontal, rough, planar, 201.8' 3 Limestone open 203.0-207.65' - dusky yellow to moderate yellow, (5Y 6/4 to 5Y 7/6), 205.8' - Fracture, <5 deg, rough, stepped, R29-HQ 5 ft 76% 25 2 open 206.0-207.0' - Fracture zone, horizontal and fine to medium grained, mild to moderate HCl reaction, very weak to vertical, rough, abundant horizontal to vertical >10 extremely weak (R1 to R0), voids fractures, open 210 207.3, 207.75, 207.65' - Fractures (3), over 100% of surface except rare horizontal, rough, planar cavities from 205.1' to 205.5', some -167.9 R29: No runtime recorded NR 208.25, 208.7' - Fractures (2), horizontal, cavities are 3/8" to 3/4" deep smooth, planar, open 207.65-208.8' - yellowish gray, (5Y 211.0 208.7-209.8' - Fracture zone 211.0-212.3' - Fracture zone 7/2), very fine grained, mild HCl reaction, very weak (R1), >10 voids/cavities rare to absent 208.8-209.2' - fine grained, mild HCl >10 reaction, extremely weak (R0) 209.2-209.8' - light gray, (N7), fine grained, mild to moderate HCl R30-HQ reaction, very weak to weak (R1 to 0 5 ft 26% R2), only small gravel sized fragments, voids/cavities over NR 15-20% of surface up to 3/4" -1-3/16" length, 3/16" deep 215 No Recovery 209.8-211.0' -172.9 R30: 6 minutes Limestone 211.0-212.3' - yellowish gray, (5Y 216.0 7/2), mild to moderate HCl reaction, 216.0-218.45' - Fracture zone very weak (R1), voids/cavities over >10 30-40% of surface No Recovery 212.3-216.0' Limestone 216.0-218.45' - yellowish gray, (5Y >10 7/2), fine to medium grained, mild to R31-HQ moderate HCI reaction, extremely 13 5 ft 218.45' - Fracture, horizontal, rough, planar, weak (R0), voids/cavities over 49% open 20-30% of surface, trace fossils casts interbedded with soft friable NR limestone at 217.0-218.0' 220 No Recovery 218.45-221.0' -177 9 R31: 7 minutes 221.0 221.0-223.5' - Fracture zone Limestone 221.0-222.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, >10 221.7' - Fracture, horizontal, rough, stepped, very weak (R1), friable along thin 222.1' - Fracture, fractured gravel sized laminae, voids/cavities over 10-30% >10 of surface, trace fossils (casts/molds) limestone 222.7-223.5' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, R32-H0 8 5 ft 50% extremely weak to very weak (R0 to R1), voids on 1-3% of surface or NR No Recovery 223.5-226.0' 225 182.9 R32: 4 minutes 226.0

> APPENDIX 2BB-89 Rev. 4



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-08	SHEET	13 OF 15

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska LITHOLOGY DISCONTINUITIES COMMENTS DEPTH BELOW SURFACE AND ELEVATION (#) CORE RUN, LENGTH, AND RECOVERY (%) 9 DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Stop drilling for the day 226.0-228.0' - Fracture zone, with some Limestone >10 discernible fracture planes 226.0-228.0' - pale greenish yellow, 3/20/07 (10Y 8/2), fine to very fine grained, mild to moderate HCl reaction, very Resume drilling at 08:40 on 226.3' - Fracture, <5 deg, rough, stepped, 3/21/07 open 226.75, 226.95' - Fractures (2), horizontal, >10 weak to weak (R1 to R2), voids over smooth, undulating, open 10-15% of surface, voids absent 226.95' - Fracture, zone of rock fragments from 227 35-227 50 R33-HQ 9 227.35' - Fracture, horizontal, smooth, planar, No Recovery 228.0-231.0' 5 ft 40% open 227.5, 227.60' - Fractures (2), horizontal, rough, planar, open 227.52' - Fracture, zone of rock fragments NR 230 227.9' - Fracture, horizontal, smooth, planar, -187.9 R33: 5 minutes 231.0 Limestone 231.2' - Fracture, <5 deg, rough, undulating, 3 231.0-233.0' - yellowish gray to pale open greenish yellow, (5Y 7/2 to 10Y 8/2), 231.9' - Fracture, horizontal, rough, stepped, fine grained, mild HCl reaction, very open 3 weak to extremely weak (R1 to R0), 232.0' - Fracture, 40 deg, rough, undulating, voids over 90% of rock open No Recovery 233.0-236.0' R34-H0 232.4' - Fracture, <5 deg, rough, undulating, 20 5 ft tight 40% 232.65' - Fracture, 25 deg, rough, undulating, tight NR 232.8' - Fracture, <5 deg, rough, undulating, 235 open 1-3/16"-1-9/16" 192.9 R34: 5 minutes 236.0 236.0-237.6' - Fracture zone. no Limestone >10 bedding/fracture plane apparent, gravel sized 236.0-237.6' - Same as 231.0-233.0' limestone fragments up to 1-2" length >10 No Recovery 237.6-241.0' R35-HQ 0 5 ft 32% NR 240 -197 9 R35: 6 minutes 241.0 241.0-242.6' - Fracture zone, gravel sized Limestone 241.0-242.6' - yellowish gray, (5Y rock fragments, fracture plane uncertain 7/2), fine to very fine grained, mild >10 HCl reaction, extremely weak to very weak (R0 to R1), voids over 40% of rock, trace clay, trace fossil casts No Recovery 242.6-246.0' R36-HQ 0 5 ft 32% NR 245 -202.9 R36: 8 minutes 246.0



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-08

SHEET 14 OF 15

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724017.2 N, 457734.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS DEPTH BELOW SURFACE AND ELEVATION (#) CORE RUN, LENGTH, AND RECOVERY (%) 9 DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 246.0-246.8' - Fracture zone, rock fragments Limestone >10 246.0-247.6' - yellowish gray, (5Y 7/2), fine grained, mild to moderate 246.8' - Fracture, horizontal, rough, stepped, HCl reaction, very weak (R1), friable, 10 thin laminae present in upper 0.5' of 247.1' - Fracture, horizontal, rough, stepped, interval, voids over 10-15% of tight surface, cavities up to 3/8" rare R37-HQ 247.45' - Fracture, horizontal, rough, No Recovery 247.6-251.0' 7 5 ft stepped, open 32% 247.55' - Fracture, horizontal, smooth, planar NR 250 -207.9 251.0-251.7' - Fracture zone, rock fragments R37: 7 minutes 251.0 251.7' - Fracture, 60 deg, smooth, planar, Limestone open >10 251.0-252.4' - yellowish gray, (5Y 252.2, 252.45' - Fractures (2), horizontal, rough, planar, open 7/2), fine to medium grained, mild to moderate HCl reaction, very weak 252.7, 252.75' - Fractures (2), <5 deg, rough, 4 stepped to planar, open 252.95' - Fracture, <5 deg, rough, undulating, (R1), friable 252.4-253.5' - yellowish gray, (5Y tight 253.2' - Fracture, horizontal, smooth, 7/2), very weak to weak (R1 to R2), R38-H0 very thinly laminated with lenses up 4 45 5 ft to 1/2", voids over 100% of surface. 100% stepped, open slightly fossiliferous from 253.6' - Fracture, horizontal, smooth, planar, 252.4-252.7, cavities up to 3/8" over 3 open 10-20% 255 253.75' - Fracture, <5 deg, stepped to planar, 253.5-256.4' - yellowish gray, (5Y -212.9 open R38: 8 minutes 254.05' - Fracture, <5 deg, smooth, 7/2), fine grained, very weak (R1), 3 voids over 50-75% of surface, undulating, tight 256.0 254.5' - Fracture, horizontal, rough, planar, cavities over 30% >10 open 256.4-257.8' - Same as 253.5-256.4' 254.55' - Fracture, horizontal, smooth, planar, except laminated, cavities over open 50-60% of surface, fossiliferous 10 254.95' - Fracture, rough, planar to undulating, tight No Recovery 257.8-261.0' 255.5' - Fracture, 70 deg, rough, planar, open R39-HQ 255.7' - Fracture, rough, planar, open 0 5 ft 256.0-257.8' - Fracture zone, rough, planar, 36% fracture/joints horizontal to subhorizontal NR 261.0-261.4' - Fracture zone, rock fragments 261.4, 261.5' - Fractures (2), horizontal, 260 smooth, undulating, open -217.9 R39: 6 minutes 261.6' - Fracture, horizontal, rough, undulating, open 261.0 261.8' - Fracture, <5 deg, stepped, sand Limestone sized limestone infilling, open 3/4"-13/16" 262.0' - Fracture, <5 deg, rough, undulating, 261.0-263.8' - yellowish gray, (5Y >10 7/2), fine grained, mild to moderate rouah HCl reaction, very weak (R1), voids 262.3' - Fracture, horizontal, rough, planar, over 50% of surface, very thinly laminated at 263.3' (black organics), 10 open 262.3-262.6' - Fracture zone, rock fragments some thin laminae at 261.4- 261.5' R40-HQ 262.65' - Fracture, <5 deg, rough, stepped, 2 8 5 ft open 56% No Recovery 263.8-266.0' 263.0' - Fracture, <5 deg, smooth, planar, open 263.5' - Fracture, <5 deg, rough, stepped, 265 NR 222.9 R40: 6 minutes 266.0 Bottom of Boring at 266.0 ft bgs on

APPENDIX 2BB-91 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-08	SHEET	15	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 3.4	l ft bgs	s on 03	3/22/07 START : 3/12/2007 END : 3/	21/20	07	LOGGER : C. Wallestad, R. Gom	ez, R. McComb, L. Prochaska
>00	6)			DISCONTINUITIES	G		LITHOLOGY	COMMENTS
ANE N (#	N, AND ≪ (%		ES T	DESCRIPTION	3.50		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	1	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE ENG ECC	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΒ		WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	074	Ω.	╙╙	THIORNESS, SORI ACE STAINING, AND HOTTINESS	S	L	CHARACTERISTICS	End drilling on 2/21/07
_				-	-	L		End drilling on 3/21/07, total depth 266'
_				-	1	F		
_					-	L		Borehole collapsed to 38' overnight; unable to re-
_					-	ŀ		open hole
_				-	-	L		Water level at 3.4' below ground surface -
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-09	SHEET	1	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

DITILLIN	GIVIETH	JU AND	EQUIPIVII	ENT : CIVIE 550 5	N 186073, mud rotary, cathead	1, AVVJ rods, 3-7/8 tri-co	orie bit		ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft bo	s on 3/13	3/07		D: 3/22/2007	LOGGER	: T.	
>				STANDARD	SOIL DE	SCRIPTION		٥	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
H H H		RECOVE	RY (ft)			ROUP SYMBOL, COLO T, RELATIVE DENSITY)TC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
H P H			#TYPE	6"-6"-6"	CONSISTENCY, SOIL S			MB	INSTRUMENTATION
				(N)				S	
41.9									
							_		
-							_	1	Cathead Operator - Matthew Griffin
-							_	i	14:17 Water level at about 2' below ground
-							-		surface
-							-		-
-							-		SS-1 (5.0-6.5') totally saturated (wet)
-							-		-
_							_		_
_							_		_
5	5.0							<u> </u>	
36.9				10.6.15	Sand With Clay And Gra	vel (SP-SC)	n —		
]		0.5	SS-1	12-8-12 (20)	\ dense, fine to medium gra	ained, no HCl reactior	n, silica /		
]	6.5			(20)	sand, 9% medium plastic	fines, 20% fine to coa	arse / -]
-	0.0				gravel			i	Driller's Remarks: Drill time: 4 minutes (6.5-
-							-		10.0')
-							-		-
-							-		-
_							_		_
_							_		_
l _							_		
10	10.0								
31.9					Silt (ML) 10.0-10.7' - grayish orang	us (10VD 7/4) west m	adium		Driller's Remarks: Hard drilling at 13', continued circulation loss
		0.7	SS-2	4-3-5 (8)	stiff, nonplastic, rapid dila	tancy, moderate HCl		ш	Continued circulation loss
-	11.5			(0)	reaction, 5-10% very fine	sand, trace fine sand	l-sized	1	
_					white particles, trace very sand-sized particles	fine brilliant green (5	G 6/6) -	l	_
-					cana cizoa particio				-
-							-		-
-							-		-
-							-		-
-							-		Driller's Remarks: Drill time: 4 minutes (10.0-
_							_		15.0')
15	15.0			50/F				<u>L</u>	14:37 Driller's Remarks: Will insert 15' of 3"
26.9	15.4	0.1	SS-3	50/5 (50/5")	Limestone Fragments 15.0-15.1' - grayish orang	ne (10YR 7/4) mild to	, [_		NW casing to seal off hole Driller's Remarks: Now using a 4.5" tricone
				(55/5)	moderate HCl reaction, fr	iable with hand, 1/4-1	/2"		roller drill bit with NW rod to open up the hole
]					sized discs; remainder ar	e yellowish gray (5Y 5	5/1)		for 10' of 6" diameter casing
]					angular fragments to 1/2" reaction	, milia to moderate HC	- ار		15:45 Driller's Remarks: Hole is crooked with - 19' NWJ in ground; Adding 10' of 6" surface
-					. 34000.				casing to straighten hole
-							-		17:17 End of drilling for the day on 3/13/07 – with 20' of 6" in place
-							-		with 20 010 in place
-	18.5								-
-			06.	47-36-46			_		-
-		1.5	SS-4	(82)			_		-
20	20.0							Щ	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-09	SHEET	2	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

RILLIN	G METH	OD AND	EQUIPM	ENT : CME 550 S	/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit		ORIENTATION : Vertical
VATER	LEVELS	: 2.0 ft bo	gs on 3/1:	3/07 S	TART : 3/13/2007 END : 3/22/2007 LOGGE	R : T.	Stewart
				STANDARD	SOIL DESCRIPTION	σ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft) PE			PENETRATION TEST RESULTS		92	DEDTIL OF GACING DRIVENIC DATE
H H H		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EWE			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
				(N)	Sandy Silt With Gravel (ML)	S	3/14/07; bottom of hole at 18.5'
- - -					18.5-20.0' - very pale orange, (10YR 8/2), wet, hard, nonplastic, moderate HCl reaction, 30% fine to coarse sand, 15% limestone in disc-shaped gravel size pieces, all carbonate, trace fine to medium sand-sized white particles, trace brilliant green (5G 6/6) particles	-	Will start sampling interval at 18.5' to 20.0' to avoid complicated footage counts No adapter available to reset drill rig run stroke 08:00 3/14/07 Water level is 1.8' below ground surface 09:22 03/14/07 start SPT at 18.5-20.0'
-	23.5					1	Driller's Remarks: Drill time: 20 minutes
- - 25 16.9	25.0	1.2	SS-5	40-35-37 (72)	Silty Sand (SM) 23.5-24.7' - dusky yellow, (5Y 6/4), wet, very dense, very fine to medium grained, moderate to strong HCI reaction, 30-35% nonplastic fines, trace white particles as laminae and fine to medium particles,		(20.0-23.5') 09:57- Clean out mud tub from accumulated sandy cuttings, current borehole construction has 20' of 6" diameter casing, driller using N-rod (NWJ) to advance 4-1/2" tricone roller drill bit
- - -					trace fine to medium grained sized brilliant green particles (5G 6/6); 23.75-24.0' limestone fragment, all carbonates		
-	28.5				City Cond With Cyanal (CM)		Driller's Remarks: Drill time: 19 minutes (25.0-28.5')
-	29.4	0.8	SS-6	36-50/4.5 (86/10.5")	Silty Sand With Gravel (SM) 28.5-29.3' - dusky yellow, (5Y 6/4), wet, very dense,	-	
- 30 11.9 - - -	25.7				very fine to medium grained, moderate to strong HCI reaction, 20-30% nonplastic fines, 10-15% gravel-sized, poorly fossiliferous (casts) limestone fragments; trace fine black particles	-	
-	33.5 33.9	0.4	SS-7	50/5	Silty Sand With Gravel (SM)		Driller's Remarks: Drill time: 6 minutes (30.0-33.5')
- 35 6.9				(50/5") /	33.5-33.9' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), wet, very fine to coarse grained, moderate to strong HCI reaction, 20% nonplastic fines, 25% fine gravel, moderately fossiliferous (molds, casts, fragments), trace black inclusions, all carbonate		12:48 Start run from 35.0-38.5' - heavy
- -					magments), trace biack inclusions, all carbonate	-	chatter, 5-6 minutes to drill 1/2' 13:16 Driller's Remarks: Maintaining circulation 14:04 End run from 35.0-38.5' (76 minutes)
_	38.5					1	
-	38.7	0.2	SS-8	50/2 (50/2")	Limestone Fragments 38.5-38.7' - light olive gray, (5Y 5/2), moderate HCI reaction, coarse sand to fine gravel-sized fragments, poorly fossiliferous (casts), 15-20% fine black organic particles Begin Rock Coring at 38.5 ft bgs		14:24 Driller's Remarks: Switch to rock coring, end of soil sampling at SS-8; approximately 38.5' below ground surface
40					See the next sheet for the rock core log	1	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-09	SHEET	3	OF	11	

ORIENTATION : Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

				1211 . ONE 330 3/11 1000/3, mad rotary, 110 tools, 1111/		g	ONENTATION . Vertical
WATER	LEVELS : 2.0	ft bg	s on 3	/13/07 START : 3/13/2007 END : 3/	22/20	D7 LOGGER : T. Stewart	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	F00	BOCK TYPE COLOR	
HH	, A Y	(9)	FRACTURES PER FOOT	BEOOK!! HOW	SYMBOLIC	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAR	A E E	(%) Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	RNN	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ОΩШ		ď	╙┺	THICKNESS, SORI ACE STAINING, AND HOTTINESS	Ś	CHARACTERISTICS	
	38.5				ш	Limestone	Start R1 at 15:50; 3 foot
_	1		1	-	П	 38.5-41.1' - light olive gray, (5Y 5/2), fine grained, strong HCl reaction, 	run to set stroke
l	R1-NQ			39.5' - Bedding plane, horizontal, rough,	П	very weak (R1), no fossils, moderate	Driller's Remarks: 20' of 6" – HW casing and 40' of 3"
40 1.9	3 ft	54	>10		Н	— olive gray bedding (organics) across	NW casing and 40 of 3
1.9	87%			39.6' - Bedding plane or mechanical break,		entire run up to 1/4-1/8" in thickness,	, and the second
			1	horizontal, rough, undulating, tight	Н	trace of 1/16" voids	R1: 8 minutes
-	144.5		NR	40.2-40.45' - Fracture zone, rock fragments up to 2-1/4"	Н	No Recovery 41.1-41.5'	-
-	41.5		INIX	40.75' - Fracture, horizontal, rough,	ш	Limestone	-
-			2	undulating, tight	\vdash	- 41.5-46.2' - light olive gray, (5Y 5/2),	Start R2 at 16:11
				41.5' - Bedding plane, horizontal, rough,	Н	strong HCl reaction, weak to medium	
I -				planar, fine infill 1/8", tight	ш	strong (R2 to R3), extremely weak	1
-			1	42.05, 42.25' - Mechanical break (2)	Н	- (R0) 44.0'-45.0', voids (1/8"x1/8")	1
-	R2-NQ			42.65' - Fracture, 45 deg, rough, planar, tight		over 25-40% of surface, poorly fossiliferous (casts), 25% of fine	-
-	5 ft	62	0		Ш	grained black inclusions (organics)	
	94%			44.0' - Fracture, horizontal, smooth, planar,	Н	(-19)	Driller's Remarks: Very
45				tight - 44.2' - Bedding plane, horizontal, rough,			easy drilling over last 1/2' - New NQ core barrel:
-3.1	1		>10	undulating, top of extremely weak rock	ш		product shipping
-	-		_	44.95' - Bedding plane, horizontal, rough,	Н	_	#370005154 new NQ drill -
I _			1	undulating	口	_	bit is a hard rock formation
	46.5		NR	45.75' - Bedding plane or mechanical break,	$\vdash \vdash$	No Recovery 46.2-49.0'	drill bit serial #/product #:
I -			<u> </u>	5 deg, rough, undulating, tight 46.5' - Bedding plane, horizontal, smooth,	Ш	1.0001019 1014 1010	C36501 – R2: 7 minutes
-	1			planar, fines on surface, open	П	-	Start R3 at 16:27
-			l	-	$\vdash \vdash$	_	-
I -			NR		ш	_	
					Н		
-	R3-NQ			-	┰	<u> </u>	1
-	5 ft	27	>10	-	ш	Limestone	
-	50%		>10	-	$\vdash \vdash \vdash$	- 49.0-51.5' - Same as 41.5-46.2'	-
50			0			except 49.0-49.1', 49.35-49.7'	
-8.1			"		Щ	extremely weak rock (R0), the rest of	
-				-	Н	- the interval is medium strong (R3)	R3: 7 minutes
-			2	-	口	rock, fossil casts up to 3/8-1/4"	17:40 Driller's Remarks:
_	51.5			51.2' - Bedding plane or mechanical break,	ш		Bottom of hole is 51.5'
			0	horizontal, rough, undulating, tight	Н	51.5-56.5' - light olive gray, (5Y 5/2),	Driller's Remarks: Core
1			"	51.4' - Bedding plane or mechanical break, horizontal, rough, undulating, open with 1/4"		 strong HCl reaction, extremely weak to medium strong (R0 to R3), voids 	loss probably from top
1 -				infill of fines	₽₩	up to 3/16"x3/16" over 30-40% of	(sandy interval) –
-			1	52.7' - Bedding plane, horizontal, smooth,	ш	 surface, poorly fossiliferous (casts 	Start R4 at 16:45 Last core run for 3/14/07
_				undulating, tight	H	molds), organic laminae predominant	Mottling in slightly darker –
	R4-NQ		امدا		Н	from 52.7-53.1', 20%-30% fined grain	hue over last 2',
	5 ft 100%	83	>10		Ш	 black organic particles 	bioturbated zones,
I	10070			-	$\vdash \vdash$	-	horizontally aligned over –
55_ -13.1			0	_	ᡛ╣	<u> </u>	last 2.0-2.5' of run R4-NQ
-13.1					ш	_	
			[$\vdash \vdash$		R4: 10 minutes
-	E6 E		1	-	ш	Ť	Driller's Remarks: Bottom
-	56.5			56.4' - Bedding plane, horizontal, rough,	ш	-	at 56.3' below ground -
-			3	undulating, fines on surface	H	-	surface
			Ĺ	56.8' - Bedding plane, horizontal, smooth,			20' of 6" casing 40' of 3" NW casing -
				undulating 57.0' - Bedding plane, <10 deg, smooth,	Щ		TO UIS INVI CASING
-			3	undulating	Н	-	1
					H		-

APPENDIX 2BB-95 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-09

SHEET 4 OF 11

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

DESCRIPTION ROCK TYPE, COLOR, MINERALOGY, TEXTURE. WAITHERING, HARRISS, MADDROKEMSS, AND ROCK MASS, AND ROCK MASS, AND ROCK MASS SAND ROCK MASS SA	OF CASING, NG RATE ANI AVING ROD SULTS, ETC. 5' below Culation
RS-NQ 5 ft 82%	NG RATE ANI AVING ROD SULTS, ETC. 5' below Q culation
RS-NQ 5 ft 82% 82% 60	5' below culation Probably
Jandulating, base of weakly indurated material 57.65 - Fracture, 40 deg, rough, undulating, open 1/4 - 3/4" 57.85 - Fracture, horizontal, rough, undulating, open 1/4 - 1/2" 57.95 - Fracture, 45 deg, smooth, undulating, open 1/4 - 1/2" 58.95 - Fracture, 45 deg, smooth, undulating, open 1/4 - 1/2" 58.95 - Fracture, 45 deg, smooth, undulating, 19th 1 section motified, trace black fine to medium grained, moderate to strong HCI reaction, extremely weak to weak (R0 to R2), tiny voids up 1 surface, poorly fossiliferous (cast, open 1/4 - 1/2" 57.95 - Fracture, 45 deg, smooth, undulating, 19th 1 section motified, trace date with thumb, 19th 1 section motified, trace activities with secondary mineral infill up to 3/4" 1 section motified, trace black fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), crumbles up 1 soft of the section motified, trace activities with section motified, trace black fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), crumbles up 1 soft of the section motified, trace activities with section motified, trace black fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), crumbles up 1 soft of the section motified, trace activities with section motified, trace black fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), crumbles up 1 soft of the section motified, trace activities with section motified, trace black fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), trumbles up 1 soft of the section motified full circles and the section motified, trace black fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), trumbles up 1 soft of the section motified full circles and the section motified full circles and the section strong HCI reaction, extremely weak to very weak (R0 to R1), trumbles up 1 soft of the section strong HCI reaction, extremely	culation Probably
open 1/4 - 3/4" 57.85' - Fracture, horizontal, rough, undulating, open 1/4-1/2" NR 61.5 NR 62.75' - Fracture, 45 deg, smooth, undulating, blanc or mechanical break, horizontal, rough, planar, tight 65.4'- Bedding plane or mechanical break, horizontal, rough, planar, tight 65.9'- Fracture, 15 deg, rough, undulating, open 1/4-1/2' 01.6'- Mechanical break 05.9'- Fracture, 15 deg, rough, undulating, open 1/4-10'- Mechanical break 06.9'- Fracture, 15 deg, rough, undulating, open 1/4-10'- Mechanical break 06.9'- Fracture, 15 deg, rough, undulating, open 1/4-10'- Mechanical break 06.9'- Fracture, 15 deg, rough, undulating, open 1/4-10'- Mechanical break 06.9'- Fracture, 15 deg, rough, undulating, open 1/4-10'- Mecha	culation Probably
undulating, open 1/4-1/2' 57.95 - Bedding plane, horizontal, smooth, planar, open 1/4-1/2' 58.65, 590. 59.2 - Mechanical break (3) 59.65 - Fracture, 45 deg, smooth, undulating, tight 62.75 - Fracture, horizontal, smooth, undulating, base of weakly indurated section, tight 62.75 - Bedding plane or mechanical break, horizontal, rough, planar 63.4 - Bedding plane or mechanical break, horizontal, rough, undulating, light 65.1 - Mechanical break, horizontal, rough, planar (63.6 - Mechanical break, horizontal, rough, planar, tight 65.1 - Mechanical break, horizontal, rough, planar, tight 65.6 - Mechanical break, horizontal, rough, planar, tight 65.6 - Mechanical break, horizontal, rough, planar, tight 65.9 - Fracture, 25 deg, rough, undulating, tight 67.7, 67.95 - Fractures or mechanical break (2), horizontal, rough, planar, tight 67.7 67.95 - Fracture, complex to the medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 20° of "diameter and to the medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish statisting on surface 71.5	culation Probably
58.65, 59.0, 59.2' - Mechanical break (3) 59.65' - Fracture, 45 deg, smooth, undulating, tight 62.75' - Fracture, horizontal, smooth, undulating, base of weakly indurated section, tight 62.85' - Bedding plane or mechanical break, horizontal, rough, planar 63.8' - Bedding plane or mechanical break, horizontal, rough, undulating, black staining, tight 64.5' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 65.1' - Mechanical break, horizontal, rough, planar (66.5) 87.NO 87.NO 87.NO 87.NO 9.5 ft 72 1 1 2 80% 87.NO 9.5 ft 72 1 1 66.5' - Fracture, 15 deg, rough, undulating, tight 65.9' - Fracture, 25 deg, rough, undulating, tight 66.9' - Fracture, 25 deg, rough, undulating, tight 67.7, 67.95' - Fracture, 25 deg, rough, undulating, tight 6	
R6-NQ 5ft 78% 65 -23.1 R7-NQ 5ft 70 -28.1 R7-NQ -5 ft 80% 70 -28.1 R7-NQ -5 ft 80% 70 -28.1 R7-NQ -28.1	
R6-NQ 5 ft 78% 52 4 6.2.75' - Fracture, horizontal, smooth, undulating, base of weakly indurated section, tight of 2.85' - Bedding plane or mechanical break, horizontal, rough, planar 63.4' - Bedding plane or mechanical break, horizontal, rough, undulating, black staining, tight to open 1/4' 64.0' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/4-1/2'' 64.4' - Bedding plane or mechanical break, horizontal, rough, undulating, gight 65.1' - Mechanical break horizontal, rough, planar, tight 65.95' - Fracture, 25 deg, rough, undulating, tight 66.6' - Mechanical break 66.6' - Mechanical break 66.95' - Fracture, 25 deg, rough, undulating, tight 69.0' - Bedding plane, horizontal, rough, planar, tight 69.0' - Bedding plane, horizontal, rough, planar, 1/4' fine infill 70 -28.1 - 1.5 - 2	-
65 ft 78%	
41 0 deg, rough, planar 63.8' - Bedding plane or mechanical break, horizontal, rough, undulating, black staining, to tight to open 1/4" 66.5	
horizontal, rough, undulating, black staining, tight to open 1/4" of 3.5 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 64.5' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 64.5' - Bedding plane or mechanical break, horizontal, rough, planar, tight 65.1' - Mechanical break 65.4' - Bedding plane, horizontal, rough, planar, tight 65.95' - Fracture, 15 deg, rough, undulating, open 1/4" of 66.6' - Mechanical break 66.9' - Fracture, 25 deg, rough, undulating, tight 67.7, 67.95' - Fractures or mechanical break (2), horizontal, rough, planar, open 1/4-1/2" of 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Mechanical break 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill 66.5 - Me	-
horizontal, rough, undulating, open 1/4-1/2" 64.4' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 64.5' - Bedding plane or mechanical break, horizontal, rough, planar, tight 65.1' - Mechanical break 65.4' - Bedding plane, horizontal, rough, planar, tight 65.5' - Fracture, 15 deg, rough, undulating, open 1/4" 66.6' - Mechanical break 66.6' - Mechanical break 66.95' - Fracture, 25 deg, rough, undulating, tight 67.7, 67.95' - Fractures or mechanical break (2), horizontal, rough, planar, open 1/4-1/2" 64.4' - Bedding plane or mechanical break, horizontal, rough, planar, open 1/4-1/2" 63.5-64.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5' -70.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5' -70.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5' -70.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8	
horizontal, rough, undulating, tight 64.55' - Bedding plane or mechanical break, horizontal, rough, planar, tight 65.1' - Mechanical break 65.1' - Bedding plane, horizontal, rough, planar, tight 65.1' - Bedding plane, horizontal, rough, planar, open 1/4-1/2" 66.5' - Fracture, 15 deg, rough, undulating, to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5' - To.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCl reaction, et al. (80 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5' - To.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCl reaction, et al. (80 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5' - To.5' - light olive gray, (5Y 5/2), moderate to strong HCl reaction, et al. (80 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5' - To.5' - light olive gray, (5Y 5/2), moderate to strong HCl reaction, et al. (80 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium grained, moderate to strong HCl reaction, et al. (80 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5' - To.5' - light olive gray, (5Y 5/2), moderate to strong	ıt 10:26
R7-NQ 5 ft 80% 72 1 1 65.1' - Mechanical break 65.4' - Bedding plane, horizontal, rough, planar, tight 65.9' - Fracture, 15 deg, rough, undulating, open 1/4" 66.6' - Mechanical break 66.95' - Fracture, 25 deg, rough, undulating, tight 67.7, 67.95' - Fractures or mechanical break 67.9, horizontal, rough, planar, open 1/4-1/2" 69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill to very weak (R0 to R1), up to 20% of rock has cavities up to 4" long 64.5-66.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5-70.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), up to 20% of rock has cavities up to 4" long 64.5-66.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5-70.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5-70.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), up to 20% of rock has cavities up to 4" long 64.5-66.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), up to 20% of rock has cavities up to 4" long 64.5-66.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), up to 20% of surface, 15-20% medium grained, moderate to strong HCI reaction, extremely we	
5 ft 80% 72 1 planar, ugnt 65.95' - Fracture, 15 deg, rough, undulating, open 1/4" 56.95' - Fracture, 25 deg, rough, undulating, open 1/4" 56.95' - Fracture, 25 deg, rough, undulating, tight 67.7, 67.95' - Fractures or mechanical break (2), horizontal, rough, planar, open 1/4-1/2" 66.5-70.5' - light Olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5-70.5' - light Olive gray, (5Y 5/2), moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5-70.5' - light Olive gray, (5Y 5/2), moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5-70.5' - light Olive gray, (5Y 5/2), moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish to 1/16"x1/8" over 25% of surface, 15-20% medium grained, moderate to strong HCI reaction, 15-20% medium grained, 15-20% medium grained, 15-20% medium grained, 15-20% med	
70 -28.1	
NR 67.7, 67.95' - Fractures or mechanical break (2), horizontal, rough, planar, open 1/4-1/2" (2), horizontal, rough, planar, open 1/4-1/2" (3), horizontal, smooth, planar, 1/4" fine infill (2), horizontal, smooth, planar, 1/4" fine infill (3), horizontal, smooth, planar, 1/4" fine infill (2), horizontal, smooth, planar, 1/4" fine infill (3), horizontal, smooth, planar, 1/4" fine infill (3), horizontal, smooth, planar, 1/4" fine infill (4), horizontal, smooth, planar, 1/4" fine infill (5), horizontal, smooth, planar, 1/4" fine infill (6), horizontal, smooth, planar, 1/4" fine infill (6), horizontal, smooth, planar, 1/4" fine infill (7), horizontal, smooth, planar, smooth, planar, smooth, planar, smooth, planar, smooth, planar, smooth, p	-
99.0 - Bedding plane, florizofital, shlootif, planar, 1/4" fine infill	
	NW
72.1 - Fracture or mechanical break, 50 deg, poorly fossiliferous (casts), tiny voids smooth, undulating, tight poorly fossiliferous (casts), tiny voids up to 3/16"x3/16" covering 20-30% of up to 3/16" covering 20-30% of	asured
R8-NQ R8-NQ NR 72.75 - Mechanical break or fracture, 70 deg, Surface, trace cavines with surface; but surface	ottom of
rough, undulating, open 1/4-3/4" layer at 67.5', gradual change from or 72.5- layer at 67.5', gradual change from or 72.5- layer at 67.5', gradual change from or 72.5-	
75 -33.1 74.7' - Bedding plane, <10 deg, bottom of core loss zone 74.85' - Bedding plane or mechanical break, No Recovery 70.5-71.5' 74.7' - Bedding plane or mechanical break, No Recovery 70.5-71.5'	
- 1 smooth, planar, tight - 1 smooth, planar, tight - 176.5 76.2' - Fracture 70 deg slickensided 14:10	3-NQ; -
undulating, black staining, tight 3 76.55, 76.7' - Bedding plane or mechanical Driller's Remarks: in 3rd gear, will m	3-NQ; - oss over imately
break, horizontal, slickensided, planar, open 1/4-1/8" >10 76.85' - Fracture, 70 deg, rough, undulating, 14:25 Start run	3-NQ; - oss over imately Running ix a
tight	3-NQ; - oss over imately Running ix a

APPENDIX 2BB-96 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				-	
338884.FL	A-09	SHEET	5	OF	11	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS : 2.0	ft bgs	s on 3	/13/07 START : 3/13/2007 END : 3/	<u>22/20</u> 0	D7 LOGGER : T. Stewart	
				DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	R9-NQ 5 ft 94%	63	1	THICKNESS, SURFACE STAINING, AND TIGHTNESS 78.0' - Bedding plane, horizontal, sharp contact also showing mottling of rock 78.2-75.5' - Fracture zone, irregular shaped cavities infilled with medium coarse grained		CHARACTERISTICS Limestone - 71.5-73.0' - yellowish gray to light olive brown, (5Y 2/2 to 5Y 5/6), strong HCl reaction, very weak to	
80 -38.1 -	81.5		1 >10 NR	infill, infill of medium gray (N5) 79.05' - Bedding plane, horizontal, rough, undulating, open up to 3/4" 80.35' - Bedding plane or mechanical break, rough, undulating, tight, open up to 1/8"			R9: 16 minutes 14:42 End run Drillog's Romarks: Soft
- - -	R10-NQ	67	>10	80.8-81.2' - Fracture zone, 1-1/4"-1/4" limestone fragments 81.5-82.2' - Fracture zone 82.7' - Fracture, 50 deg, rough, undulating, tight, brownish black staining		coarse grained, gray inclusions or infill, poorly fossiliferous (molds) No Recovery 73.0-74.7' 74.7-76.5' - Same as 71.5-73.0' except very weak (R1) rock and yellowish gray (5Y 7/2) from 74.7-74.85', more dense and more fossiliferous from 74.85-76.5'	Driller's Remarks: Soft near bottom of run at 81', will advance 3" NW casing to 80' due to continued circulation loss Assumed core loss from end of run SC 1 collected at 81.6-
-85_ -43.1 -	5 ft 92% 86.5	67	1 1 NR	85.3-85.6' - Fracture zone		Limestone 76.5-81.2' - moderate yellowish brown to dusky yellow, (10YR 5/4 to 5Y 6/4), moderate to strong HCI reaction, medium strong (R3), mottled very pale orange (10YR 8/2) and medium gray (N5) over	82.45' Driller's Remarks: Continued circulation loss during 3" NW casing advancement, soft at 81.5-84' R10: 9 minutes
- - - -	R11-NQ 4.5 ft	0	>10	86.8-87.4' - Fracture zone, yellowish gray carbonate silts and up to 1-1/2" subrounded limestone fragments		78.2-78.7', tiny (1/16"x1/16") voids on 25-35% of surface, irregular shaped cavities 15-20% with secondary mineral infill, poorly fossiliferous (molds), trace organics as 1/2" long horizontally aligned inclusions, 10-15 deg bedding plane at 78.0', wavy carbonate silt and organic laminae at	O9:12 Start R11-NQ Core loss assumed from 88.1 to 90.8' (2.7 ft core loss)
90 -48.1 -	91.0 R12-NQ		NR			80.0', gray staining from 80.4-81.2' No Recovery 81.2-81.5' Limestone 81.5-86.1' - moderate yellowish brown, (10YR 5/4), fine to medium grained, strong HCl reaction, medium strong (R3), voids up to	R11: 14 minutes
- - -	91.5 0.5 ft \\100%/	100	2	91.2' - Fracture, vertical, smooth, undulating, black staining, tight (runs from 90.8-91.5') 92.1' - Fracture, horizontal, smooth, stepped, tight		3/16"x3/16" over 35-45% of surface, elliptical 1/2"x1/2" shaped cavities, moderately fossiliferous (casts), subangular to subrounded inclusions of yellowish gray (5Y 8/1) carbonate	Driller's Remarks: Very hard drilling at 91.0', driller pulled out of hole because he thought the core barrell was not spinning; another core run will be made to
- -	R13-NQ 5 ft 100%	0	3	92.35' - Bedding plane, horizontal, smooth, undulating, 1/2" thick organic infill 92.55' - Fracture, 80 deg, rough, undulating, tight 92.85' - Fracture, 70-80 deg, rough, undulating, tight		silt clasts from 1/8"-2"x2" No Recovery 86.1-86.5' Limestone 86.5-88.3' - medium olive brown, (5Y 4/4), strong HCI reaction, very weak	get the remaining 1/2 foot The 6" core run will be R12-NQ R12: 3 minutes Start R13 at 09:52
95_ -53.1 - - -	96.5		1	93.0' - Fracture, 70-80 deg, rough, undulating, tight 93.2' - Bedding plane or mechanical break, horizontal, rough, undulating 93.4, 93.5, 93.6' - Fractures (3), horizontal, rough, undulating, tight		to medium strong (R1 to R3), voids up to 1/16" over 35-40% of surface; carbonate silts (yellowish gray) at 87.0'; at 87.8' medium olive brown, moderately fossiliferous (casts), black medium grained inclusions	R13: 14 minutes
- - -			1	93.5' - Fracture, 60-75 deg, rough, undulating 93.75' - Bedding plane, horizontal, smooth, planar, <1/8" organic infill 94.5' - Bedding plane or mechanical break, horizontal, rough, undulating, tight		No Recovery 88.3-91.0' Limestone 91.0-91.5' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, medium strong (R3), trace voids, trace black wavy laminations (>1/16")	-

APPENDIX 2BB-97 Rev. 4



FRACTURES PER FOOT

1

1

2

1

1

>10

1

1

0

0

1

0

0

2

0

NR

3

2

53 1

RQD(%)

100 0

WATER LEVELS: 2.0 ft bgs on 3/13/07

CORE RUN, LENGTH, AND RECOVERY (%)

R14-NQ 5 ft

100%

R15-NC

5 ft

100%

R16-NO

5 ft 93

100%

R17-NO

5 ft 97 0

98%

101.5

106.5

111.5

116.5

DEPTH BELOW SURFACE AND ELEVATION (ft)

100

-58.1

105

 $-63\overline{1}$

110

-68.1

115

-73.1

PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-09	SHEET	6	OF	11

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724113.8 N, 457731.4 E (NAD83)

START: 3/13/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

 $DRILLING \underline{\ CONTRACTOR: Universal\ Engineering\ Sciences,\ Gainesville,\ FL;\ Driller:\ M.\ Boatright;\ Cathead\ Operator:\ M.\ Griffinnes and Contractors ELEVATION: 41.9 ft (NAVD88)

9

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

DISCONTINUITIES

95.1' - Fracture, 40-50 deg, rough,

95.5' - Fracture, 40-50 deg, rough,

97.85' - Fracture, 45-55 deg, rough,

98.9' - Fracture, 55-65 deg, rough,

101.7' - Fracture, 40-50 deg, rough,

102.1' - Fracture, 40-50 deg, rough,

104.35' - Fracture, 40-50 deg, rough,

104.8' - Fracture or mechanical break,

106.7' - Bedding plane or mechanical break,

111.4' - Fracture or mechanical break, 40-50

114.75' - Fracture or mechanical break,

50-60 deg, rough, undulating, open 1/8-1/4" 115.0' - Bedding plane or mechanical break,

horizontal, slickensided, undulating, open

116.65' - Fracture or mechanical break.

117.45' - Fracture or mechanical break,

20-30 deg, rough, undulating, open 1/4'

rough, undulating, open 1/8-1/4"

dea, rough, undulating, tight

horizontal, rough, undulating, tight to open

107.75' - Fracture, 70-80 deg, rough,

horizontal, rough, undulating, tight

105.4-106.5' - Fracture zone

100.55' - Fracture or mechanical break,

undulating, tight

rough, undulating, tight

ORIENTATION : Vertical END: 3/22/2007 LOGGER: T. Stewart LITHOLOGY COMMENTS ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 91.5-93.75' - Same as 90.8-91.5' except organic interval 1/2" thick at 92.4' gradational change from 93.45' to 93.75' 93.75-96.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, medium strong (R3), tiny R14: 8 minutes (1/16"x1/16") voids over 35-40% of Continued circulation loss surface, up to 25% organic SC-2 collected at 100.55laminations concentrated from 101.5' 93.8-94.7', highly fossiliferous (shells/casts) up to 1-1/2" fragments, up to 5% medium grained gray (N5) particles 96.5-101.5' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCI reaction, very weak (R1), highly fossiliferous (molds, casts, fragments), trace organics (soft) up to 1-1/2" square fragments, apparent bedding, fossil fragments up to 1/2", few whole spherical fossils, rock has R15: 8 minutes a chalk like appearance 101.5-106.5' - Same as 96.5-101.5' except densely bedded R16-NQ has similar "chalk 106.5-111.5' - yellowish gray, (5Y like" appearance to R15-7/2), fine to medium grained, strong NQ, but no apparent HCl reaction, very weak (R1), tiny bedding spherical voids up to 1/16"x1/16" over up to 15% of surface, poorly fossiliferous (casts), trace cavities up to 1/4"x1/4", medium grained white and gray particles up to 35% in matrix R16: 10 minutes 111.5-116.4' - Same as 106.5-111.5' 13:29 Start run R17 except at 114.6-116.4' elongated cavities rimmed with a secondary mineralization infill of the same color as the matrix, medium to coarse grained medium gray (N5) inclusions over 30-40% of surface, wavy bedding 1/4" thick near base (about 116.2') SC 3 collected at 114.0-114 8' R17: 6 minutes No Recovery 116.4-116.5' 13:55 Start run R18 Driller's Remarks: Soft drilling from 116.5-119.5'; medium drilling at 119.5-121.5

Rev. 4



WATER LEVELS: 2.0 ft bgs on 3/13/07

PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-09	SHEET	7	OF	11

ROCK CORE LOG

LOGGER: T. Stewart

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin ELEVATION: 41.9 ft (NAVD88)

END: 3/22/2007

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing START: 3/13/2007

VV/ \I LIX	LLVLLS . Z.	, it bg	3 011 0	113/01 STANT 3/13/2001 LIND . 3/2		UT LOGGEN . 1. Stewart	
> -	<u> </u>			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	99	ROCK TYPE, COLOR,	
ÄÄ.	N S S		뿐는	22001 11011	SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A S E	문트등	(%) Q	I₽ĕ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Гĕ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무유장	8888	οD	A P	PLANARITY, INFILLING MATERIAL AND	₽	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SSI	임끸뿞	R	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
	R18-NC			118.55' - Fracture, <10 deg, rough,	t	Limestone	SC 4 collected at 117.5-
_	5 ft	82	3	undulating, tight		- 116.5-121.5' - very pale orange	118.6'
	100%	02		119.0' - Mechanical break		(10YR 8/2) from 116.5-119.8' and	110.0
-	100,1			119.2' - Fracture or mechanical break,	1_	yellowish gray (5Y 8/1) from	1
120_			3	horizontal, rough, planar, tight	$oldsymbol{+-}$	— 119.8-121.5', fine to medium grained,	_
-78.1				119.35' - Bedding plane or mechanical break,		strong HCl reaction, weak (R2), very	
-				horizontal, rough, planar, open 1/8-1/4"	1 '	fine well rounded grains, moderately	R18: 5 minutes
-			3	_		to highly fossiliferous (casts, molds),	-
	121.5			121.05, 121.2' - Bedding plane or mechanical	L.	gray staining from 116.5-117.0', trace	
_				break (2), horizontal, rough, undulating, open	\vdash	elliptical cavities (1/2"x1/8") rimmed	1
-			1	1/4-1/8"	+	 with opaque secondary 	-
				121.45' - Fracture, 40-50 deg, black staining,	-	mineralization in center, coarse	
_				tight -		appearance of rock due to micro	1
_	-		1	121.6' - Fracture or mechanical break, rough,		 fossils, rock has a "chalk like" feel 	-
_				planar, tight	ш	121.5-126.3' - yellowish gray, (5Y	
I -	R19-NC			122.2' - Fracture, 30 deg, rough, planar, brownish black staining, open 1/8"	\vdash	8/1), fine grained, strong HCl	1
-	5 ft	43	3	122.5' - Fracture or bedding plane, 20 deg,	⇈	reaction, weak (R2), tiny voids	-
l –	96%			open 1/8-1/4"	ш	(<1/16") up to 20% of surface, trace	
125				122.55, 123.5' - Fracture (2), horizontal,		elliptical cavities rimmed with white	
-83.1	1		1	rough, planar, tight	╙	secondary mineralization, poorly	_
_				123.9' - Fracture, horizontal, rough,	┢┯	fossiliferous (casts, few molds), trace	_
			3	undulating, open 1/8"		organics as very fine discontinuous laminations (<1/16"), 5-15% fine to	R19: 7 minutes
-	1		۱ ۵	124.2' - Bedding plane or mechanical break,		medium grained, medium gray (N5)	1
_	126.5		NR.	horizontal, smooth, planar, open 1/8"		particles	
				124.55, 124.65' - Bedding plane or		No Recovery 126.3-126.5'	100% loss of circulation
_	i		3	mechanical break (2), horizontal, smooth,	1	Limestone	continues -
-				undulating, open 1/8" -	╀	126.5-131.3' - yellowish gray (5Y 7/2)	-
				125.25' - Bedding plane or mechanical break,		from 126.5-129.7' and yellowish gray	
_	1		2	horizontal, smooth, planar, open 1/8"		(5Y 8/1) from 129.7-131.25', strong	1
-	D00 N0	ļ		125.55' - Bedding plane or mechanical break, -	┷	HCl reaction, weak (R2), moderately	I -
_	R20-NG 5 ft	53	2	horizontal, smooth, undulating, open 1/8-1/4"	Ь	to highly fossiliferous (casts, molds,	
	96%	55	-	125.8, 125.95' - Bedding plane or mechanical		microforams), black staining on rock	
-	3070			break (2), horizontal, rough, undulating, open		 surface, 15-20% fine grained 	1
130			>10	1/8-1/4"		medium gray (N5) particles, very	
-88.1			10	126.65' - Mechanical break or bedding plane,		thinly bedded from 128.5-129.5'	
_	1			horizontal, smooth, planar, tight	╁	F	R20: 8 minutes
_			2	127.2' - Bedding plane, <10 deg, rough,	₽—	<u> </u> -	1120. 0 1111114165
	131.5		ND	undulating, tight 127.45' - Bedding plane or mechanical break,	П	1 ,, 5	I
I -	.51.5		NR.	horizontal, rough, undulating, brown staining,	匚	- No Recovery 131.3-131.5'	Start R21 at 14:42
-			5	open 1/2"	ш	Limestone	_
				127.95' - Fracture, <10 deg, rough,	\vdash	131.5-134.1' - fine to medium	SC-5 collected at 135.70-
I -	1			undulating, open 1/4"	1-	 grained, strong HCl reaction, very weak (R1), bedding up to 1/2" thick, 	136.50' -
-			5	128.15' - Mechanical break or fracture,	\vdash	20% fine grained medium gray	-
				horizontal, smooth, planar, tight	ഥ	- inclusions	
I -	R21-NG	į		128.8' - Bedding plane, horizontal, rough,	Ш	- inolusions	1
-	5 ft	63	4	planar, tight -	┰	F	
	100%			129.1, 129.13' - Bedding plane (2),	⊢	134.1-136.5' - fine to medium	
135				horizontal, rough, planar, tight	Н	grained, strong HCl reaction, very	1
-93.1			0	129.65' - Bedding plane, horizontal, rough, —	亡	— weak (R1), moderately fossiliferous	-
				planar, open 1/4"	ш	(molds, casts), disconformity at	
				129.8' - Bedding plane, horizontal, rough,	\vdash	134.25'; 136.3-136.5' beds dipping at	R21: 10 minutes
I -			0	undulating, open 1/2-3/4"	╁	7 deg, trace voids with calcite infill up	-
I -	136.5			130.15' - Bedding plane, horizontal, rough,	厂	to 1/6"x1/16" (white infill color), rock	<u> </u>
				planar, open 1/2-3/4"		color is alternating, laminated to thinly bedded yellowish gray (5Y 7/2)	Continued circulation loss
I -			3	130.15-130.4' - Fracture zone, up to 1/2" core -	ш	to light olive gray (5Y 5/2) from	1
-			<u> </u>	fragments, brownish black staining on	ऻ—	131.5-134.25', then yellowish gray	1
				fracture surface	\vdash	(5Y 7/2) to the end of core run	
I -	1		>10		\vdash	L (0.1 1/2) to the one of one full	1
			\vdash	break, rough, undulating, open 1/4-3/8"	Ë		-
					1		I
1	I	1	1		1	Ī	1

APPENDIX 2BB-99 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL A-09 SHEET 8 OF 11

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing ORIENTATION: Vertical WATER LEVELS: 2.0 ft bgs on 3/13/07 START: 3/13/2007 END: 3/22/2007 LOGGER: T. Stewart LITHOLOGY DISCONTINUITIES COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD SYMBOLIC RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 131.55' - Bedding plane, horizontal, smooth, Limestone R22-NQ 136.5-138.3' - dusky yellow, (5Y 6/4), fine grained, strong HCl reaction, tiny voids up to 1/16" (spheroidal) over 5 ft 57 >10 undulating, tight 131.75, 131.8' - Bedding plane or mechanical 90% break, horizontal, smooth, planar, tight 132.15, 132.25, 132.55, 133.1' - Bedding 140 10% of surface, cavities up to 1/2"x1" elongated and infilled with white 4 -98.1 plane or mechanical break (4), horizontal, rough, smooth, planar, tight 133.3-133.4' - Fracture zone minerals and medium gray R22: 12 minutes 1 secondary minerals, up to 15% NR 133.45, 133.65, 133.75, 134.0, 134.1' medium grained, medium gray 141.5 Bedding plane or mechanical break (5), particles, dipping wavy laminations horizontal, rough to smooth, planar, tight 136.6, 136.7' - Bedding plane or mechanical >10 near 138.0' 138.3-139.6' - yellowish gray, (5Y break, horizontal, rough, planar, tight 7/2), very fine grained, strong HCI 137.2' - Fracture, horizontal, rough, planar, reaction, strong (R4), moderately 0 open 1/4" fossiliferous (casts, molds), trace tiny 137.65' - Fracture, horizontal, rough, voids, reflective very fine grains R23-NQ undulating, open 1/8" inside cavities and on broken 2 82 5 ft surfaces, fossils up to 3/4" 138.3-138.85' - Fracture zone, 1"-1-1/2" 92% subrounded fragments 139.6-141.0' - light olive gray, (5Y 145 5/2), strong HCl reaction, strong (R4), short (about 3/8") 139.4' - Fracture or mechanical break, 0 horizontal, rough, undulating, tight, (R5) 139.6' - Fracture, horizontal, rough, -103 1 discontinuous vertical stress R23: 9 minutes 0 undulating, open 1/2-3/4", orange staining 140.0' - Fracture, horizontal, rough, fractures, orange staining, irregular Circulation loss (100%) shaped cavities up to 1-1/2'
No Recovery 141.0-141.5' NR 146.5 has continues undulating, black staining, open 1/8' About 75-100% water loss Limestone 141.5-144.0' - very light gray, (N8), 140.3' - Fracture or mechanical break, 2 during run, 1/4 bag, quick horizontal, rough, planar, open 1/8" gel in bentonite added to 140.4' - Fracture, 20-30 deg, rough, mild to strong HCl reaction, weak to mud undulating, open 1/4-1/2" medium strong (R2 to R3), thinly 2 Powdery, "chalk like" feel 140.9' - Fracture, horizontal, rough, bedded to laminated, voids up to over upper interval. undulating, open 1/2-1' 1/16" diameter over 10% of surface, translucent secondary R24-NQ 141.5-141.65' - Fracture zone, subangular with very weak (R1) zones that are 0 mineralization in center. 5 ft 68 fractured, trace cavities up to 1/2' fragments up to 3/4" 88% coarse appearance of rock 141.85' - Bedding plane or mechanical break, diameter, organic content in very due to microfossils weak zones of rock 143.96-144.0', 150 horizontal >10 organic odor 144.0-146.1' - yellowish gray, (5Y 8/1), strong HCI reaction, chalk like/powdery feel, horizontally 143.85' - Bedding plane or mechanical break, -108.1 horizontal, rough, planar, open 1/4" 143.95' - Fracture, 60-70 deg, rough, >10 R24: 6 minutes undulating, black staining, open 146.65, 146.8, 148.4, 148.35' - Bedding plane NR 151.5 bedded, white and yellowish gray Start at 16:05 added more or mechanical break (4), horizontal, rough, matrix, texture gradually changes 2 quick gel. planar, tight from medium to fine grained Circulation loss (mud was 149' - Mechanical break downward with depth mixed as above) 150.1' - Fracture, 80 deg, rough, undulating, No Recovery 146.1-146.5' 3 Limestone 146.5-148.6' - yellowish gray, (5Y 1/2), mottled in Hue 5Y colors, thinly 150.25' - Mechanical break or fracture, R25-NO horizontal, open 1/4" 5 ft 73 1 150.45-150.9' - Fracture zone. 1-1/2" bedded 80% 148.6-150.9' - light olive gray, (5Y fragments 151.55, 151.65' - Bedding plane (2), 5/2), very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), powdery/"chalk like" feel over upper interval, dense 155 1 horizontal, rough, undulating, tight, organics -113.1 on fracture surfaces 152.75, 152.85' - Fracture (2), horizontal, R25: 7 minutes NR rough, undulating, open 1/8-1/4" 152.85' - Fracture, horizontal, rough, undulating, open 1/4" limestone mottled with gray stains 156.5 over lower interval, elongated cavity 2" long at 150.0', no infill 1 154.1' - Bedding plane or mechanical break No Recovery 150.9-151.5' 155.05' - Bedding plane, 7 deg, smooth, 1 planar, open 1/4 156.8' - Bedding plane, horizontal



FRACTURES PER FOOT

NR

NR

N/A

>10

>10

0

3

4

0

>10

2

4

5

5

3

NR

>10

0

42

RQD(%)

10

WATER LEVELS: 2.0 ft bgs on 3/13/07

CORE RUN, LENGTH, AND RECOVERY (%)

R26-NQ

5 ft

28%

R27-NQ

4.5 ft 73% 7

R28-NQ

5 ft 50 >10

100%

R29-NQ

5 ft

98%

R30-NQ

161.5

166.0

171.0

176.0

DEPTH BELOW SURFACE AND ELEVATION (ft)

160

-118.1

165

-123 1

170

-128.1

175

-133.1

PROJECT NUMBER:	BORING NUMBER:	
338884.FL	A-09	SHEET

ROCK CORE LOG

9 OF 11

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) $DRILLING \underline{\ CONTRACTOR: Universal\ Engineering\ Sciences,\ Gainesville,\ FL;\ Driller:\ M.\ Boatright;\ Cathead\ Operator:\ M.\ Griffinnes and Contractor

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

ORIENTATION: Vertical START: 3/13/2007 END: 3/22/2007 LOGGER: T. Stewart LITHOLOGY DISCONTINUITIES COMMENTS 90 DESCRIPTION ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>∪</u> MINERALOGY, TEXTURE, WEATHERING, HARDNESS, DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 157.8' - Fracture, 70-80 deg, rough, Last core run of 3/21/07 Limestone 151.5-155.5' - Same as 148.6-150.9' undulating, black staining, tight 80' of 3" NW in hole 20' of 6" casing in hole except thinly bedded to laminated Driller's Remarks: Expects 151.5-152.8' and 154.0-155.0' light to be in void space from olive gray, (5Y 5/2), moderate to strong HCl reaction, organic approximately 158.0' down (possible karst/cavity) laminations, gray staining of rock at Rock has "chalk like" 152.8', 5-10% cavities up to 3/4' texture spherical and infilled with white R26: 2 minutes 08:16 Begin drilling on minerals, trace up to 10% shell 3/22/07- water level 1.5' fragments, black wavy laminae (organic) at base of core, gradually below ground surface changes texture twice from coarse to 08:44 Štart R27-NQ; fine grained with depth bottom of hole at 160.7 No Recovery 155.5-156.5' Driller's Remarks: Still no circulation Limestone 156.5-157.9' - yellowish gray, (5Y Driller's Remarks: Run is 8/1), fine grained, strong HCI 0.5' short, he can feel the reaction, weak (R2), tiny spherical loose material from the voids (micro forams) up to 20-30%, trace of elongated cavities, rimmed above void that is apparently lodged at top of with secondary mineralization, up to 10% fine grained orange and black run and is not allowing for further advancement 166.3, 166.4, 166.65' - Bedding plane (3), particles R27-NQ is a 4.5' run. Sand horizontal, rough, undulating, organic infill No Recovery 157.9-162.7' is observed around the Carbonate Silty Sand With Gravel pulled core; hole tagged 167.1, 167.5, 167.7, 167.93' - Bedding plane bottom at 166.0' (4), horizontal, smooth, planar, tight 162.7-163.4' - medium gray to Driller's Remarks: Mixes a thick batch of mud medium dark gray, (N5 to N4), wet, R27: 13 minutes nonplastic, strong HCl reaction, Driller's Remarks: Steady 30-40% very fine to fine black 168.98-169.33' - Fracture zone drilling through run, particles, gravel-sized fossil fragments up to 1/2" diameter continued circulation loss (100%), mix 1/4 bag Limestone Fragments bentonite to mud tub 170.02' - Bedding plane, horizontal, rough, 163.4-164.0' - angular limestone undulating, organic infill 1/16" R28: 5 minutes fragments 170.07-170.4' - Fracture zone, organic Limestone laminated rock 164.0-166.0' - medium gray to 170.6' - Fracture, vertical, rough, undulating, medium dark gray, (N5 to N4), fine grained, strong HCl reaction, weak (R2), bedded limestone, trace voids 170.78' - Bedding plane, horizontal, rough, undulating, tight up to 1/16"x1/16" 170.93' - Bedding plane or mechanical break, Limestone <10 deg, rough, undulating, tight 166.0-171.0' - light olive gray, (5Y 171.27, 171.9' - Bedding plane or mechanical 5/2), strong HCl reaction, strong break, horizontal, rough, undulating, tight 172.1' - Fracture, 70-80 deg, rough, (R4), voids up to 1/16"x1/16" spherical cover 15-20% of surface, undulating, tight 172.32' - Fracture, 70-80 deg, rough, trace medium gray (N5) inclusions up to 1/2"x1/8" at 166.3', wavy horizontal undulating, tight R29: 10 minutes laminations from 166.0-166.6' 172.4' - Fracture or mechanical break, 171.0-175.9' - Same as 166.0-171.0' horizontal, rough, undulating, tight except without wavy bedding 172.55' - Bedding plane, <10 deg, rough, 100% circulation loss, mix No Recovery 175.9-176.0' planar, open 1/8 1/4 bag bentonite to mud 173.08' - Bedding plane, horizontal, rough, tub undulating, open 1/8" 173.35' - Bedding plane, horizontal, rough, SC-6 collected at 177.0undulating, open 1/8" 178 2



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	A-09	SHEET	10	OF	11	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS : 2.0) ft bgs	s on 3/	13/07 START : 3/13/2007 END : 3/2	22/200	7 LOGGER : T. Stewart	
≳O⊋	(%			DISCONTINUITIES	၅၉	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	E RU STH, OVEF	R Q D (%)	T.00-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	5 ft	<u>⊬</u>	<u>⊩</u>	173.60, 173.65, 173.8' - Bedding plane (3),	S	Limestone	
-	84%		- 10	173.60, 173.65, 173.6 - Bedding plane (3), <10 deg, rough, undulating, organic infill,		- 176.0-180.2' - light olive gray, (5Y	_
-			5	open 1/8"	₽	5/2), moderate to strong HCl	_
180			٦	174.12' - Bedding plane, <10 deg, rough, — planar, open 1/16-1/8"		reaction, weak to medium strong (R2 — to R3), trace cavities up to 3/8"	
-138.1 -			ND	174.22, 174.5, 174.9, 174.97, 175.2' -		elongated, tiny voids up to 1/16" over	R30: 9 minutes
l _	181.0		NR	Bedding plane (5), horizontal, rough, undulating, open 1/2"	Н	10-15% of surface, trace organics as wavy laminations <1/16" thick from	_
_			5	175.75, 175.8' - Bedding plane (2),		179.0-180.2'	
			5	horizontal, rough, planar, open 1/8" 177.0' - Fracture or mechanical break,		No Recovery 180.2-181.0' - Limestone	
_				horizontal, rough, undulating, brownish black	Ш	181.0-185.9' - yellowish gray, (5Y	_
_			4	staining, open 1/4"		7/2), moderate to strong HCl	_
-	R31-NQ			178.2' - Bedding plane or mechanical break, - horizontal, rough, planar, top of fractured	Ш	 reaction, weak to medium strong (R2 to R3), medium to lightly fossiliferous 	
-	5 ft 98%	20	3	zone	\square	(molds, casts), tiny voids up to	_
-	3070			178.7' - Bedding plane or mechanical break, - <10 deg, rough, planar, organic infill 1/16"		 1/8"x1/8" over 25-35% of surface, trace cavities with medium gray (N5) 	-
405			5	179.0, 179.2' - Bedding plane (2), 8-10 deg,	₩	secondary mineral infill, fossils up to	-
185 <u> </u>				rough, planar, organic infill 1/16"	\Box	1/4", wavy laminated bedding 1/16"	R31: 10 minutes
-			4	179.45, 179.55' - Bedding plane (2), 8-10 deg, rough, planar, open 1/16-1/8"	Ш	thick at 187.3', yellowish gray matrix mottling at 183.0'	-
-	186.0		NR.	179.75' - Bedding plane or mechanical break,	\vdash	No Recovery 185.9-186.0'	-
_			>10	5-10 deg, rough, undulating, open 1/4", bedding contact brown, more organic layered		Limestone	_
-				unit underneath	_	186.0-190.3' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), fine	_
_			>10	181.25' - Bedding plane, 5-10 deg, rough, undulating, organic infill 1/16"	Ш	grained, moderate to strong HCl	_
_				181.65, 181.75' - Bedding plane (2),		reaction, weak to medium strong (R2 to R3), voids up to 1/16"x1/8" over	_
l _	R32-NQ 5 ft	13	>10	horizontal, rough, undulating, tight 181.85' - Fracture or mechanical break,	Н	_ 30-50% of surface, poorly	_
l _	86%	10	- 10	80-90 deg, rough, undulating, tight	H	fossiliferous (molds), 10-15%	
_				181.95' - Fracture or mechanical break,		organics as short (3/8") discontinuous to laminated at 189.8',	
190			>10	40-50 deg, rough, undulating, tight 182.2' - Fracture, 75-85 deg, rough,		silt above yellowish gray (5Y 7/2),	
-148.1				undulating, tight	Ш	— fossiliferous (molds, casts)	R32: 8 minutes
_	191.0		NR	182.4' - Fracture or mechanical break, horizontal, rough, undulating, open 1/2-3/4"		- No Recovery 190.3-191.0'	1
-				182.75' - Fracture, horizontal, rough,	\vdash	Limestone	Appearance is "chalk like"
-			>10	undulating, tight to open 1/4" 182.9' - Fracture or mechanical break, 10-20	厈	 191.0-192.3' - yellowish gray, (5Y 7/2), very fine grained, strong HCI 	
-				deg, rough, planar, tight		reaction, weak (R2), voids are micro	
-			>10	183.25' - Fracture or mechanical break, - 10-15 deg, rough, planar, open 1/16"	Н	forams and micro form molds up to 1/8"-1/4" over 20-25% of surface	-
-	R33-NQ			183.8, 183.9' - Fracture or mechanical break	Ш	1/8 - 1/4 Over 20-25% of surface 192.3-192.8' - light olive gray, (5Y	-
-	5 ft	0		(2), 5-10 deg, rough, undulating, 183.8' open	団	- 5/6), fine grained, mild to moderate	-
_	36%			1/8", 183.9' open 1/16", black staining 184.1' - Bedding plane, horizontal, rough,	\vdash	HCl reaction, very weak (R1), sharp change from 192.3-192.4'	-
-			NR	undulating, tight -	口	No Recovery 192.8-196.0'	-
195 <u>-</u> -153.1				184.4' - Bedding plane, 5-10 deg, smooth, undulating, open 1/8"	냅		R33: 4 minutes
-				184.55' - Bedding plane or mechanical break, -	dash	-	1.00. 4 minutes
-	196.0			5-10 deg, rough, undulating, tight 184.8, 184.81' - Bedding plane or mechanical	Ш	Limentone	-
-			>10	break (2), 0-5 deg, smooth, undulating, tight		Limestone - 196.0-198.85' - yellowish gray, (5Y	_
_				184.9' - Bedding plane or mechanical break, 5-10 deg, rough, planar, tight	\vdash	7/2), very fine to fine grained, strong]
_			>10	185.2' - Bedding plane or mechanical break,	H	HCl reaction, medium strong (R3), trace voids, up to 10% very fine to	
_			- 10	20-30 deg, rough, undulating, open 1/4-1/8"	${\mathbb H}$	fine black particles in matrix	
	R34-NQ			185.3' - Bedding plane or mechanical break, 60-70 deg, rough, undulating, tight			
I					1		I

APPENDIX 2BB-102 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-09	SHEET	11	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing ORIENTATION : Vertical

00111110	TWETHOU 7		<u> </u>	TENT . CIVIE 330 3/N 180073, Mud Totally, NQ tools, NVV		ouc	<u>g</u>	ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bgs	s on 3	/13/07 START : 3/13/2007 END : 3/	22/20	007	LOGGER : T. Stewart	
		DISCONTINUITIES				Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			•	SYMBOLIC LOG	\vdash		
I ∐ ₹ Z	Ž,A,Ž		FRACTURES PER FOOT	DESCRIPTION	ا ا	1	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
프핑은	SHE	(%) Q	158	DEDTH TYPE ODIENTATION POLICINESS	7∄		MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₽₹	# <u>P</u>	٥	25.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	Ιĕ		WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S S	5.7	THICKNESS, SURFACE STAINING, AND TIGHTNESS	1 ≲		CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БОЛШ					97	╄		
	5 ft 80%	15	>10	185.5' - Bedding plane or mechanical break,	Ш	-		
_	0070			rough, undulating, open 1/2-3/4"	T	╁	Limestone	1
-			1	185.6' - Bedding plane or mechanical break, rough, undulating, tight to open 1/16"	E	1-	198.85-200.0' - dusky yellow, (5Y	SC-7 collected at 198.85-
200				186.0' - Bedding plane or mechanical break, —	\perp	L	6/4), mild to moderate HCl reaction, – weak (R2), 60-70% tiny voids up to	199.8'
-158.1				<10 deg, black staining or organic bedding	\vdash	-	1/8" (spherical), poorly fossiliferous	R34: 8 minutes
-			NR	planes	╁	╁	(molds), 20% fine to medium grained	Final core run end at 12:19
I -	201.0			_ 190.0' - Fracture zone		1	black particles, brownish black	Ending borehole -
				196.35, 196.45, 196.7' - Bedding plane or		П	staining near bottom	construction 20' of 6"
_				mechanical break (3), rough, planar, tight	1	r	No Recovery 200.0-201.0'	diameter casing, 80' of 3"
-				198.85' - Bedding plane, 5-10 deg, smooth,	-	F	Bottom of Boring at 201.0 ft bgs on	diameter NW casing
				planar, organics on surface			3/22/2007	203.0' NQ coring assembly
I -				199.8' - Fracture or mechanical break,	1	Γ		Measured total depth at
-			1	horizontal, rough, undulating, open 1/2"	1	H		200.0' below ground
1 -				,	1	F		surface
					1	1		3/22/07 15:03 depth
I -]				1	T		measured at 177.0' then – 148.0' after abandonment
-			1		1	F		3/23/07 08:13 Water level
					_	L	_	at 0.75' below ground —
1 -				_	1	Γ		surface
-			1		1	H		Abandonment completion
_						L		on 3/23/07 at 15:50
								47 bags of Portland
-					1	F		cement type I/II, 92 bags of
_					4	F		Type Gel, 2 bags of Sure
								Plug bentonite, one 50lb
_					1	r		bag of 3/8" bentonite chips,
-					-	H		one 50lb bag of Quick Gel
<u> </u>						L		used for borehole
I -					1	Г		abandonment -
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PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-10	CHEET	1 OF 12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8 tri-cone bit

DHILLIN	GIVILITI	JD AND	EQUIFIVII	EINT : CIVIE 550 S	5/N 1860/3, mud rotary, cathead, AWJ rods, 2-//8 tri-cone bit					ORIENTATION: Vertical				
WATER	LEVELS	: 1.0 ft bo	gs on 03/	10/07	START : 2/25/2007	END: 3/11/2007	LOGG	ER:	C. LeE	Blanc, T. Stewart, C. Wallestad				
				STANDARD		SOIL DESCRIPTION			.,	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION				┑	SYMBOLIC LOG					
ON EE		RECOVE	- '	TEST RESULTS	SOIL NAME.	, USCS GROUP SYMBO	L, COLOR,	- [၁	DEPTH OF CASING, DRILLING RATE,				
ATI ATI		MECOVE	<u> </u>		MOISTURE (CONTENT, RELATIVE D	ENSITY OR		g	DRILLING FLUID LOSS, TESTS, AND				
LEVE I			#TYPE	6"-6"-6"	CONSISTENC	Y, SOIL STRUCTURE, I	MINERALOGY		∑	INSTRUMENTATION				
42.2				(N)				+	מ					
42.2								1		_				
1 7								1	C.	. Sump and T. Stewart also logged part of				
1 -								1	bo	oring A-10 -				
-								+		=				
-								4		-				
_								4		_				
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								1						
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	. .							+		-				
5 37.2	5.0				Poorly Graded 9	Sand With Silt (SP-SN	n	-		riller's Remark: Hard 5-13.5'				
				3-36-50/2		vellow. (5Y 6/4), moist	verv dense.	/- [i	14 5	- Tanoi 3 Fiermant. Flaid 5-10.3				
		0.8	SS-1	(86/8")	\ very fine to fine	grained, no HCl reaction	on, 10%	/ ;	Н.	_				
	6.5				nonplastic fines									
					Limestone Frag	iments aht grav. (N8). moist. vi	ery fine							
1 7					grained, mild HC	ht gray, (N8), moist, volt reaction, some orang	ge staining	1		1				
-								1		1				
-								+		-				
-								4		-				
_								4		_				
								1						
10	10.0													
32.2					Silt (ML)			1	П	7				
-		1.4	SS-2	8-18-50/5	10.0-11.4' - gray	rish yellow, (5Y 8/4), w d, nonplastic, very rapid	et, very dense,	1		1				
-	11.4			(68/11")	moderate to stro	ong HCl reaction, 10-15	5% sand	-11		-				
-	11.4					indurated 1" layers the		∕‡"	Н	-				
-								4		-				
								_		_				
]								1						
								1	Di	riller's Remark: Softened at 13.5-15'				
-								+		-				
-								+		4				
15	15.0				Cilt With Canal 4	And Limesters Fra	onto (MI \	4	\mathbb{H}	-				
27.2				18-29-35		And Limestone Fragm rish yellow, (5Y 8/4), w		4		_				
		1.5	SS-3	(64)	coarse grained,	nonplastic, very rapid	dilatancy,							
]	16.5			(51)	moderate HCl re	eaction, 20-25% fine to	coarse	1		1				
					sand-sized, 10%	fine gravel-sized carb	onate material	7		1				
-								1		1				
-								+		-				
-								4		-				
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PROJECT NUMBER:	BORING NUMBER:			
338884 FI	Δ-10	CHEET	2 OF 12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8 tri-cone bit

WATER	LEVELS	: 1.0 ft bo	gs on 03/ ⁻	10/07	TART : 2/25/2007 END : 3/11/2007 LOGGER : C. LeBlar	nc, T. Stewart, C. Wallestad
				STANDARD	SOIL DESCRIPTION	COMMENTS
AND N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		DEDTIL OF GAGING DRILLING DATE
A BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION
22.2	20.0			(14)	¬ Silt With Sand (ML)	
-		0.2	SS-4	18-29-50/5	20.0-20.2' - Same as 15.0-16.5' except except one /-	1
-	21.5			(79/11")	172 graver-sized carbonate fragment.	1
_	21.0				11	1
					11	1
] [
_]]	
-					11	4
-					4 1	-
25 <u> </u>	25.0 25.3	0.1	SS-5	50/3	☐ Silty Sand (SM)	-
		<u> </u>		(50/3")	\ 25.0-25.1' - dusky yellow, (5Y 6/4), wet, very dense, / -	+
-					fine to coarse grained, mild to moderate HCl reaction, / sand-sized carbonate material, 30% fines	-
-					1	1
-					11	1
					11	1
] []
]	
_]	_
30 <u> </u>	30.0 30.3	0.0	00.0	F0/4	Silty Sand (SM)	
12.2	30.3	0.3	SS-6	50/4 (50/4") /	30.0-30.3' - dark vellowish orange. (10YR 6/6), moist.	pple SS-6 has the appearance of emely weak limestone.
_					very dense, fine to coarse grained, moderate HCI reaction, 25% silt-sized grains, carbonate material	-
-					-	-
-					11	-
_					11	1
-					11	1
-					11	1
] [
35	35.0 35.2					
7.2	00.2	0.2	SS-7	50/2 (50/2")	Limestone Fragments 35.0-35.2' - moderate yellowish brown, (10YR 5/4), fine to coarse grained, mild to moderate HCl reaction,	_
_					fine to coarse grained, mild to moderate HCl reaction, / gravel fine to coarse to 1", fossiliferous	-
-					graver line to coarse to 1, rossililerous	-
-						-
-						-
-					1 1	-
-					1	1
					1	1
40					1	



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	Δ-10	CHEET	2	ΩE	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8 tri-cone bit

									ONIENTATION : Vertical
WATER	SAMPLE INTERVAL (ft) RECOVERY (ft) #TYPE 6"-6"-6"(N) 2.2 40.0 1.3 SS-8 31-47-(92) 41.5 45.0				START : 2/25/2007	END: 3/11/2007 SOIL DESCRIPTION	LOGGE	R: C	LeBlanc, T. Stewart, C. Wallestad COMMENTS
≥□€	CALIBI	INITEDIA	1 (4)	STANDARD PENETRATION		JOIL DESCRIPTION		- 50	COIVIIVILIVIO
ELO N (I	SAMPLE			TEST RESULTS	SOIL NAM	E, USCS GROUP SYMBO	OL. COLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE			MOISTURE	CONTENT, RELATIVE D	DENSITY OR	l l	DRILLING FLUID LOSS, TESTS, AND
ENE			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, I	MINERALOGY	λ×	INSTRUMENTATION
2.2	40.0	l		(14)	Sandy Silt (SM	1)		11	
-		1.0	000	31-47-45	40.0-41.3' - mo	derate vellowish brown	, (10YR 5/4),	-	.]
-		1.3	33-6	(92)	moist to wet, had	ard, mild to moderate H gravel, 10-15% fines, c	CI reaction, arbonate	-	-
-	41.5				materials	gravoi, ro rozomioo, o		+	-
_								1	-
_								4	_
_								4	_
_								1	_
_								1	_
									_
45	45.0						_		
-2.8	45.0	0.8	SS-9	40-50/3	Silty Sand (SN	(I) ame as 40.0-41.3' exce	nt traco		
	45.8			(90/9*)	gravel-sized ro		pi irace /	711	
1 7								1	1
								1	_
-								1	1
_								1	1
-								1	-
-								1	-
-								┨	-
								┨	-
50 -7.8	50.0 50.4	0.1	SS-10	50/4.5	│ │ Limestone Fra	gments With Silty San	d	╆	╡ -
	30.4	0.1	00-10	(50/4.5")	\ 50.0-50.1' - pal	le vellowish brown, (10Y	'R 6/2), mild to	+	-
-					moderate HCI	reaction, silty sand (SM) as 45.0-45.75', fossilifer	cuttings, silty	-	-
-					Sand is same a	33 +3.0 +3.73 , 1033iiiieit	Jus	4	-
_								4	_
_								1	_
_								1	_
_								1	_
								1	
]	
55_	55.0								
-12.8	55.3	0.1	SS-11	50/3 (50/3")	Limestone Fra	igments	/	Т	1
				(50/3)	\55.0-55.1 - 5a	me as 50.0-50.1'		1	
								1	1
								1	_
								1	1
								1	
-								1	
-								1	-
-								1	-
-								1	-
60							_	+	
					1				



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	Δ-10	SHEET	4	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8 tri-cone bit

WATER	LEVELS	: 1.0 ft bo	gs on 03/1	10/07	START : 2/25/2007	END: 3/11/2007	LOGGE	R : C	LeBlanc, T. Stewart, C. Wallestad
				STANDARD		SOIL DESCRIPTION			COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
JEEL TON		RECOVE	RY (ft)	12011120210	SOIL NAM	IE, USCS GROUP SYMBOL, (E CONTENT, RELATIVE DEN	COLOR,	밁	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH JRFA			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE, MIN	ERALOGY	₩.	INSTRUMENTATION
333		0.1	\SS-12 <i>)</i>	(N) 50/1	- 1:			Ś	
-17.8 -	60.0	0.1	(33-12)	(50/1")	Limestone Fra 60.0-60.1' - ligi	agments ht olive gray, (5Y 5/2), mild	to moderate /	' -	
_					HCI reaction			4	C1 F C0 01 Llacini shattari drilli tima imarranca
_								4	61.5-62.0' Heavy chatter, drill time increases, cuttings show weak limestone fragments,
_	62.0 62.1	0.0	\SS-13 <i>)</i>	50/1	\[\] Limestone Fra	agments		_	light olive gray, (5Y 5/2), finish soil drilling at 62', switch to rock coring, see rock core log
_	0∠.1	((00 10)	(50/1")	\ 62.0-62.1' - ligl	ht olive gray, (5Y 5/2), mode	erate HCI	4	62, SWITCH to FOCK COTING, See FOCK COTE log
_					reaction, weak	(R2) oring at 62.0 ft bgs		4	1
_					See the next s	heet for the rock core log		4	
-								4	
-								4	
65 <u> </u>							-	4	-
-22.0								-	
-								-	-
-								-	-
_								4	-
_								4	-
_								4	-
_								4	-
-								+	-
-								-	-
70 <u> </u>							-	4	-
-27.0								-	-
-								-	-
-								-	-
-								-	-
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-								+	-
-								+	-
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75 <u> </u>							-	-	-
-								+	1
-								+	1
-								+	1
-								+	-
-								+	-
-								+	-
-								+	-
-								-	-
-								-	-
80								+	-



PROJECT NUMBER: BORING NUMBER: 338884.FL A-10 SHEET 5 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING	METHOD A	ND E	QUIPN	IENT : CME 550 S/N 186073, mud rotary, NQ tools, NW	casin	ing ORIENTATION: Vertical	
WATER	LEVELS : 1.0	ft bg	s on 03	3/10/07 START : 2/25/2007 END : 3/	11/20	2007 LOGGER : C. LeBlanc, T. Stewart, C. Wallestad	
≥0₽	- @			DISCONTINUITIES	၂ ပွ	LITHOLOGY COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING FLUID LOSS, CORING RATE A SMOOTHNESS, CAVING RODROPS, TEST RESULTS, ETC.	ND D
	62.0		NA	62.0-62.5' - Fracture zone or mechanical	Ш	Silt (ML)	
_			>10	break, rough, rock fragments, irregular - fractures	Ш	62.0-62.5' - moderate yellowish brown, (10YR 5/4), moderate to 62.0'	1
-			>10	62.9' - Fracture, rough, undulating 63.4' - Fracture, rough, undulating 63.4-64.0' - Fracture zone, rough, irregular	Ħ	\strong HCl reaction, silt with very fine sand, (20-25%) carbonate material Limestone	
65		36	1	fractures 64.0' - Fracture, horizontal, smooth, planar	H	62.5-63.5' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), voids to	
-22.8			1	65.0' - Fracture, horizontal, rough, undulating 65.1' - Fracture, 70 deg, rough, undulating	Ħ	1/16" over 10-15% of surface Driller's remark: Soft 65.0-63.5-64.0' - Same as 62.5-63.5' 66.0'	
-	67.0		NR	65.4' - Fracture, horizontal, rough, undulating	Ė	except except weaker and friable 64.0-65.4' - Same as 62.5-63.5' except weak (R2), except voids 1/4"-3/8" over 1-2% of surface (fossil	-
-	07.0		3	67.0, 67.1, 67.9, 68.6, 68.8, 68.9' - Fractures (6), horizontal, rough, undulating to planar	Ħ	molds), some infilling No Recovery 65.4-67.0' Limestone	
-				·	Ħ	67.0-68.6' - dusky yellow, (5Y 6/4),	1
-			3	-	Ħ	L- 15-25% voids (1/16"-1/8") over surface, few larger voids (fossil	1
70	R2-NQ 5 ft 94%	62	2	69.0-69.1' - Fracture zone, rock fragments 69.1' - Bedding plane, horizontal, smooth to rough, stepped		molds), trace dark gray crystals trace clear recrystallized calcite, subhedral to euhedral in voids C-1 collected at 69.35- 70.22'	
-27.8 - -			2	69.3' - Bedding plane, horizontal, smooth to rough, undulating to stepped 70.2, 70.6' - Mechanical break (2), 10 deg, rough, undulating to planar	H	68.6-69.3' - grayish yellow, (5Y 8/4), moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), finely laminated R2: 5 minutes	1 1
-	72.0		NR	71.4, 71.7' - Fractures (2), horizontal, rough, stepped	F	- 69.3-71.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), moderate HCl reaction, weak to	-
-			3	72.3' - Fracture, 10 deg, rough, undulating, irregular fractures	H	medium strong (R2 to R3), 10-15% voids (up to 1/16") over surface, few	
_			3	72.4-73.6' - Fracture zone, 70-85 deg, rough, undulating, intersecting high angle fracture	H	rariably spaced larger voids/cavities fossil molds up to 3/8"), fine (1/16")	_
-	DO NO			set, few surface pyrite coatings 73.9' - Fracture or mechanical break,		clear subhedral to euhedral carbonate crystals in few void spaces	_
-	R3-NQ 5 ft	52	3	horizontal, rough, undulating	肼	No Recovery 71.7-72.0'	_
75 <u> </u>	94%		NA	74.4' - Fracture, horizontal, rough, stepped, undulating parting, black finely laminated organic layer	1	72.0-74.4' - dusky yellow, (5Y 6/4), very fine to fine grained, strong HCl	_
_				74.41' - Fracture, rough, clay infilling, fractures with light olive gray (5Y 5/2) silty	1	reaction, weak to medium strong (R2 to R3), voids (1/32"-1/16") variable	_
-			2	clay infilling on surface	Ш	density across surface ranging from	_
-	77.0		NR	74.9' - Fracture, rough, dark brown/black coating on surface, organics- pyrite		15-25% in zones, few larger void/cavities, (fossil molds), very fine,	4
-			NA	76.3-76.7' - Fractures (2), smooth	•:•:	black, wavy laminations	4
-			2	77.0-77.5' - Fracture zone 77.5, 77.55' - Fractures (2), horizontal, rough,	Ħ	☐ Silt (ML) ☐ 74.4-76.3' - very light gray, (N8),	+
-			3	irregular fractures 78.3-78.6' - Fractures (2), 60 deg, rough,	片	strong HCI reaction, very weak (R1), 5% limestone clasts up to 3/8", sub	4
-	R4-NQ			undulating, tight, partially healed fractures,	H	rounded to rounded, light olive gray	-
90	5 ft 94%	15	>10	fine black speckled staining 78.8-79.3' - Fracture zone, 60-90 deg, rough,	世	(5Y5/2), laminated zone with light gray consolidated silt fragments up to	-
-37.8	9470			undulating, multiple high angle fractures, —	F	<u> </u>	-
-			3	open to tight, dark gray-black speckled staining	F	Limestone	+
-			2	79.3-79.4' - Fracture zone, rock fragments 80.4, 80.6, 80.8, 81.1' - Fractures (4), rough,	ᇤ	No Recovery 76.7-77.0'	-
-	82.0		NR	planar, irregular	H	∐	1
_			I		Г		

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-10	SHEET	6	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION: Vertical WATER LEVELS: 1.0 ft bgs on 03/10/07 START: 2/25/2007 END: 3/11/2007 LOGGER: C. LeBlanc, T. Stewart, C. Wallestad DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 81.1-81.3' - Clay seam, poorly to moderately Sand (SW) 2 indurated laminated silt (ML) 77.0-77.5' - strong HCl reaction, well graded fine sand sized carbonate 81.3' - Fracture, horizontal, rough, undulating derived grains, loose, friable, 10-15% 82.2' - Fracture, rough, stepped fine clear crystals, (secondary calcite), possible fine silica grains 82.6' - Fracture, rough, stepped, fine sand 1 sized particles on surface 83.7' - Fracture, horizontal, rough, undulating (<5%) R5-NQ 84.0' - Fracture, 45 deg, rough, undulating to 58 3 Limestone 5 ft planar, tight, dark black/gray fine grained 60% 77.5-81.1' - yellowish gray, (5Y 7/2), 85 -42.8 coating fine grained, moderate to strong HCI SC-2 collected at 85.06-84.6' - Fracture, horizontal, rough, undulating reaction, medium strong (R3), few 86.06 84.7' - Fracture, 45 deg, rough, planar, some larger voids irregular shaped up to NR fine grained pyrite coating 3/4" in size with dark olive gray R5: 4 minutes staining, Silt (ML) 81.1-81.4' - consolidated carbonate 87.0 87.0' - Mechanical break, horizontal, rough, 2 undulating silt 87.7-88.2' - Fracture zone, discontinuity with Limestone weak limestone interbedded 81.4-81.7' - Same as 77.5-81.1' 1 No Recovery 81.7-82.0' Limestone 88.8' - Fracture, 10 deg, rough, undulating, R6-NC 82.0-85.0' - grayish orange, (10YR iron staining 4 60 5 ft 82% 7/4), moderate to strong HCI 89.3, 89.5' - Fractures (2), rough, black to 90 reaction, weak (R2), color changes dark brown staining, irregular fractures -47.8 with depth to yellowish gray (5Y 7/2), associated with larger voids/solution cavities 1 15-25% voids (1/8") over surface, 89.6' - Fracture, horizontal, contact with silty 1-2% larger voids/cavities (fossil material molds) up to 3/8" length, iron R6: run time not recorded 89.8' - Fracture, 30-45 deg, rough, multiple staining, few fossil molds infilled with NR tight healed fractures 920 90.3' - Mechanical break, horizontal very pale orange (10YR 8/2) soft material 91.0' - Fracture, rough, break associated with 4 No Recovery 85.0-87.0' large cavity 92.0' - Mechanical break, horizontal, planar Limestone 2 87.0-87.7' - yellowish gray, (5Y 7/2), 92.2' - Fracture, 45 deg, rough, planar 92.21' - Fracture, horizontal, black coating on moderate to strong HCI reaction, fracture edge, (pyrite-organics) 92.8, 93.2, 93.8' - Fractures (3), horizontal, medium strong (R3), fossiliferous molds and casts 1/16"-3/16" over R7-NQ NA 5-20% of surface, larger cavities up 5 ft 48 rough, stepped, loose, silty sand material on 80% 95 to 3/4" (fossil molds) faces -52.8 87.7-88.2' - white to yellowish gray, 94.5' - Fracture, horizontal, smooth, (N9 to 5Y 8/1), strong HCl reaction, very weak (R1), fossiliferous (molds undulating, parting along fine lamination, dark >10 brown color, friable zone 95.1' - Fracture, 60 deg, planar, loose sand & casts) R7: run time not recorded 88.2-89.6' - pale yellowish brown, (10YR 6/2), moderate to strong HCl NR material, fine grained pyrite on surface 95.1-96.0' - Fracture zone, limestone 97.0 reaction, 15-20% voids (1/16"-1/8"), fragments 2% larger voids/cavities, laminated 2 97.1' - Fracture or mechanical break, 60 deg, rough, undulating 97.6' - Fracture or mechanical break, black organic infilling at 89.4' 89.6-91.1' - pale yellow gray, (5Y 8/1), strong HCl reaction, weak to 2 horizontal, rough, planar medium strong (R2 to R3), silt sized 98.3' - Fracture, 45 deg, rough, undulating, material (inclusions) and thin layers irregular R8-NC 22 3 98.6' - Mechanical break, rough, undulating, 5 ft No Recovery 91.1-92.0' 100 60% near vertical -57.8 99.2' - Fracture, 60 deg, planar 99.4' - Fracture, 15 deg, rough, undulating 99.8' - Fracture, 50-60 deg, rough, planar NR R8: run time not recorded 102.0



PROJECT NUMBER:	BORING NUMBER:				-	
338884.FL	A-10	SHEET	7	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NO tools, NW casing

ORIENTATION · Vertical

CORING	METHOD A	ND EC	QUIPN	IENT : CME 550 S/N 186073, mud rotary, NQ tools, NW	casing		ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bg	s on 0	3/10/07 START : 2/25/2007 END : 3/	11/200	7 LOGGER : C. LeBlanc, T. Stewa	t, C. Wallestad
≥∩ ⊙	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 105 -62.8 -	R9-NQ 5 ft 65% 107.0	38	>10 >10 0 0 NR	102.1, 102.7' - Fractures or mechanical break (2), horizontal, rough, undulating 102.3' - Fracture, 60-70 deg, smooth, thin coating of loose silt sized material on fracture surface 102.7-103.3' - Fracture zone, limestone fragments		Limestone 92.0-93.2' - yellowish gray, (5Y 8/1), strong HCl reaction, weak (R2), black organic/pyrite mottling and castings on fracture/void surfaces, voids (1/16") over 10-15% of surface, fossiliferous (molds/casts) Silt (ML) 93.2-95.2' - moderate HCl reaction, medium strong (R3), carbonate silt material with gravel-sized limestone fragments with 10-15%, voids (1/16-1/8"), large solution cavity (3/4"x3/4") Limestone	R9: 4 minutes
- - -	R10-NQ		1	107.1' - Fracture, 45-60 deg 108.5' - Fracture, 60 deg, rough, undulating, <1% fine black trace secondary pyrite		95.2-96.0' - yellow gray, (5Y 8/1), strong HCl reaction, weak (R2), pyrite on surfaces No Recovery 96.0-97.0' Limestone 97.0-100.0' - yellowish gray, (5Y 8/1), strong HCl reaction, weak (R2),	SC-3 collected at 107.3- 108.35' -
110 -67.8 -	5 ft 100%	54	2 2 6	crystals on surface 109.4' - Fracture or mechanical break, horizontal — 109.5' - Fracture, 45 deg, rough, stepped, trace very fine black pyrite crystals 110.8' - Fracture or mechanical break, horizontal, rough 110.9, 111.0, 111.2, 111.5, 111.6, 111.8,		- 10-15% voids (1/16-1/8") over surface, fossil molds/casts, cavities and molds up to 3/8" over 1-2% of surface. No Recovery 100.0-102.0' Limestone - 102.0-105.25' - yellowish gray, (5Y 8/1), strong HCI reaction, weak (R2),	R10: 4 minutes
- - - - 11 <u>5</u> -72.8	R11-NQ 5 ft 96%	86	1 3 1	112.0' - Fractures (7), horizontal, rough, planar to undulating, open, fine "chalky" material on surface 112.0' - Fracture or mechanical break, horizontal, smooth, planar 113.7' - Fracture, horizontal, iron oxide staining 113.7'-113.8' - Mechanical break or fracture zone, horizontal, (drill pin) 114.4, 115.2, 115.7, 116.1, 116.3, 116.8' - Fractures or mechanical break (6), horizontal, undulating		percent voids vary from 5-15%, large fossil molds/cavities up to 3/8" (mollusks) No Recovery 105.25-107.0' Limestone 107.0-114.6' - yellowish gray, (5Y 8/1), fine grained, strong HCl reaction, weak (R2), small voids (1/16"-1/8") over <5% of surface, very few larger (>3/16") cavities/fossil molds on surface chalky appearance and texture 114.6-116.8' - yellowish gray, (5Y 8/1), strong HCl reaction, weak (R2),	R11: 5 minutes
- - - - - 120	117.0 R12-NQ 5 ft 100%	70	5 3 3	117.0-117.3' - Fracture zone, loose carbonate fine sand 117.3, 117.5, 117.9' - Fractures (3), horizontal, rough, undulating, fine carbonate sand on surface 118.5' - Fracture, 45 deg, rough, undulating to planar 118.8, 118.7, 119.1, 120.1' - Bedding plane (4), horizontal, smooth to rough, planar		highly fossiliferous (molds and casts) up to 30-40%, somewhat friable No Recovery 116.8-117.0' Sand (SP) 117.0-117.3' - strong HCl reaction, well sorted carbonate sand, 5% fine clear subhedral calcite crystals, possible trace silica grains, possibly slough	
-77.8 - - -	122.0		3 >10	120.1, 120.6, 121.1' - Fractures or mechanical break (3), 0-10 deg, rough, undulating 121.1-122.0' - Fracture zone, irregular fracture surfaces, limestone fragments		 - -	R12: run time not recorded



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-10 SHEET 8 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

CORING	METHOD A	ND E	QUIPN	IENT : CME 550 S/N 186073, mud rotary, NQ tools, NW	casing		ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bg	s on 0	3/10/07 START: 2/25/2007 END: 3	11/200	7 LOGGER : C. LeBlanc, T. Stewar	t, C. Wallestad
>				DISCONTINUITIES	ני	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	012		3	122.1, 122.5, 123.25, 123.5, 123.8, 124.1, 124.3, 124.35, 124.55, 124.75, 124.95, 125.1,		Limestone 117.3-117.9' - pale yellowish gray,	NQ rod stuck at 117.0' after completing R-12, hole
-			3	125.25, 125.4, 125.5, 125.6, 125.7, 125.8, 122.8' - Mechanical break (19), horizontal, smooth, planar	目	(5Y 8/1), coarse grained, very weak to weak (R1 to R2), fossiliferous mold and casts up to 3/16", friable into coarse sand particles, 10-15%	abandoned and replacement hole drilled to obtain information below 122'
- - 125	R13-NQ 5 ft 78%	15	6	122.95' - Fracture, 40 deg, smooth, undulating, open, black particles (1/5"-1/3") in matrix on surface		argillaceous sand, iron staining on all sand sized inclusions 117.9-122.0' - very pale yellowish	T. Stewart begins logging at 122' NW casing at 120' below
-82.8 -	127.0		7	_		gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), increasing percentage of large fossil	ground surface, water level 1.0' below ground surface R13: 19 minutes
_			NR		H	molds/casts up to 3/8", few cavities infilled with very fine grained silty material	
- -			>10	127.8' - Fracture, vertical, smooth,	田	122.0-124.65' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, very weak (R1), voids	
- -			5	undulating, tight, black staining 128.1, 128.2, 128.4, 128.75 - Mechanical break (4), horizontal, smooth, planar		<1/16" over 10-15% of surface, with four 3/16"x3/16" trace ellipsoid shaped cavities, 30% fine to medium grained black particles, 15% fine	
130 <u></u>	R14-NC - 5 ft - 64%	0	>10			grained white particles, 15% line grained white particles (fossil fragments), color change to yellowish gray (5Y 8/1) at 128.65'	_
-87.8 - -		NR	124.65-125.9 122.0-124.65		124.65-125.9' - Same as 122.0-124.65' except medium grained, moderately fossiliferous,	R14: 24 minutes	
-	132.0				H	medium gray (N5) lense at 125.5' No Recovery 125.9-127.0 Limestone	Driller's Remark: 50% circulation loss near top of R14-NQ
_			7	132.35' - Fracture, 50 deg, smooth, stepped, tight	Ħ	127.0-128.95' - yellowish gray, (5Y 7/2), medium grained, strong HCl reaction, weak (R2), 15% fine	NITING
-	D45 NO		>10	132.59, 132.69, 132.79, 132.9, 135.1, 133.23, 133.35, 133.55, 133.65, 133.75, 134.55' - Mechanical break (12), horizontal, smooth, planar	grained black particles, moderately fossiliferous (fossil fragments, cast: voids over 45% of surface, trace	grained black particles, moderately fossiliferous (fossil fragments, casts), voids over 45% of surface, trace	
135 <u> </u>	R15-NG 5 ft 88%	23	>10	134.85' - Fracture, 5 deg, rough, undulating,	Ħ	short black laminations <1/16" thick near 128.8' — 128.95-130.2' - yellowish gray, (5Y	-
- -			4	open 2/5" 135.05, 135.15' - Mechanical break (2) 135.53' - Fracture, horizontal, smooth,		7/2), fine grained, strong HCl reaction, weak (R2), trace voids, few fossil casts up to 3/16"x1/8", 1" weak	R15: 13 minutes
-	137.0		NR	undulating, tight to open 1/10" 135.77' - Fracture, 5 deg, rough, undulating, open 3/4", 2/5" thick infilling	Ħ	zone at 129.95' No Recovery 130.2-132.0 Limestone 132.0-135.8' - yellowish gray, (5Y	Driller's Remark: Return of circulation at approximately 135.0' below ground
-			>10	138.05' - Fracture, vertical, tight, healed	Ħ	8/1), fine grained, strong HCl reaction, weak (R2), 10-15% voids up to 1/16", trace to many ellipsoidal	surface
-	R16-NC		>10	138.1-138.3' - Fracture zone 138.7' - Fracture, 70 deg, tight, healed, 1/16" thick infilling		cavities up to 1-1/10", infilled with medium gray color, cavity size increase with depth, up to 40% very	
140 -97.8 -	5 ft 56%	7	7 2 13 rou 13	138.95, 139.15' - Fractures (2), 50 deg, rough, undulating, tight 139.55' - Fracture, vertical, tight, vertical, black staining, 1/16" thick infilling		fine to fine grained fossil fragments in matrix, medium grained from 135.15-135.7', laminated from 132.0-132.35' (moderate olive brown - 5Y 4/4) with medium grained	R16: 22 minutes
_	142.0				Ħ	particles, organic laminations <1/16" at 134.0'	NO. 22 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-10	SHEET	9	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

	METHOD A	`		ENT: CME FEO S/N 196072 mud reteny NO tools NIM		<u> </u>	•
				ENT : CME 550 S/N 186073, mud rotary, NQ tools, NW			ORIENTATION : Vertical
WATER	LEVELS : 1.0) ft bg	s on 03		11/20		
≩Q⊋	<u>(%</u>			DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
				142.0-143.8' - Fracture zone		135.8-136.4' - light olive gray, (5Y	
-			>10		Ħ	6/1), strong HCl reaction, weak to medium strong (R2 to R3), trace voids up to 1/16", many irregularly	- -
-	R17-NQ		1	143.8' - Fracture, horizontal, rough, planar,	Ħ	- shaped cavities up to 2-2/5" long x 2/5" wide, infilled with moderate olive brown (5Y 4/4) medium to coarse	- - - -
145 -102.8	5 ft 80%	37	1	open 144.1, 145.0' - Fractures (2), horizontal, rough, planar, tight —	Ħ	grained material No Recovery 136.4-137.0' Limestone	SC-4 collected at 144.1- 145.05' -
-102.8			0		Ħ	 137.0-139.8' - light olive gray, (5Y 6/1), very fine grained, strong HCl 	_
-	147.0		NR			reaction, medium strong (R3), 75% voids up to 1/8"x3/16", cavities over 15-20% of surface (near top of run),	R17: 17 minutes Last core run on 3/10/07
-			0			infilled with coarse grained material, brownish black laminations <1/16" containing sub rounded clasts up to	Resume drilling 07:55 on 3/11/07
_			5	148.1, 148.2, 148.3, 148.32' - Bedding plane (4), horizontal, rough, planar, tight to open	Ħ	3/16" in size at 138.4-138.6', series of 70-90 degree fractures (healed tight) over 138.6 to 139.8' interval	SC-5 collected at 147.0- 148.1'
-	-	58	2	1/10" 148.93' - Bedding plane, horizontal, rough, planar, silty infilling	Ħ	with black mottled appearance No Recovery 139.8-142.0'	-
150 -107.8			0	149.4, 150.0, 152.05, 152.1' - Mechanical break (4)	苴	Limestone 142.0-143.8' - yellowish gray, (5Y 7/2), medium to coarse grained,	_
-			NR			strong HCl reaction, very weak to weak (R1 to R2), matrix grain colors are white (N9) (33%), yellowish gray (5Y 8/1) (33%), and gray (33%)	R18: 22 minutes
-	152.0		2			- 143.8-144.1' - Same as 142.0-143.8' except brown and white laminations with trace cavities infilled with white	Driller's Remark: Continued loss of circulation
_			5	153.3' - Bedding plane, horizontal, smooth, undulating, open 1/8"-1/4"		- material 144.1-145.05' - Same as 143.8-144.1' except light olive gray	-
155	R19-NQ 5 ft 86%	39	>10	153.43' - Bedding plane, horizontal, smooth, undulating, tight 153.48, 153.55, 153.63' - Bedding plane (3),	Ħ	- (5Y 5/2), 15-20% coarse grained gray particles 145.05-146.0' - Same as	-
-112.8 -	0078		6	horizontal, smooth, planar, tight 153.6' - Fracture, vertical, rough, undulating, tight, black particles in matrix		143.8-144.1' except fine grained, no gray particles No Recovery 146.0-147.0' Limestone	-
-	157.0		NR	153.8' - Bedding plane or mechanical break, horizontal, smooth, planar, tight 154.05' - Bedding plane or mechanical break,	Ė	147.0-148.37' - dark yellowish orange, (10YR 6/6), fine to medium	R19: 14 minutes
_			4	<10 deg, smooth, undulating, open 1/4" 154.05-155.5' - Fracture zone 157.25, 157.4' - Bedding plane or mechanical		 grained, moderate HCl reaction, weak (R2), 3/16"x1/8" voids over 15% of surface, fossiliferous (trace molds), bedding plane at 147.9' at 40 	-
-			4	break (2), <10 deg, smooth, undulating, open 1/4" 157.45' - Bedding plane or mechanical break,		degrees 148.37-148.93' - yellowish gray, (5Y 8/1), medium grained, strong HCl	-
160	R20-NQ 5 ft 92%	42	1	<10 deg, smooth, undulating, open 1/2" 157.8' - Bedding plane or mechanical break, horizontal, smooth, undulating, open 1/8"	#	reaction, extremely weak (R0) 148.93-150.74' - dark yellowish orange, (10YR 6/6), fine to coarse	_
-117.8 - - -			>10 NR	158.05' - Bedding plane or mechanical break, — smooth, undulating, open 1/8"-1/4" 158.47, 158.95' - Bedding plane or mechanical break (2), horizontal, open 1/8"-1/2"		grained, strong HCl reaction, weak (R2), trace voids to 1/16" over <5% surface, some infill of white material, trace fine to medium grained black particles	R20: 19 minutes
	162.0				1	No Recovery 150.74-152.0	



WATER LEVELS: 1.0 ft bgs on 03/10/07

PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-10	SHEET	10	OF	12

ROCK CORE LOG

LOGGER: C. LeBlanc, T. Stewart, C. Wallestad

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

START: 2/25/2007

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

END: 3/11/2007

>00	(DISCONTINUITIES		U	LITHOLOGY	COMMENTS							
AND AND	7. 7. 7. 7. 7. 7.		ES	DESCRIPTION	٦٥	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,						
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.						
_			9	159.1' - Bedding plane or mechanical break, horizontal, smooth, planar, open 1/4"-1/2"	H	Limestone - 152.0-156.3' - very pale orange,	-						
-				159.3, 159.4' - Mechanical break (2) 160.05-161.3' - Fracture zone or mechanical	Ė	(10YR 8/2), strong HCl reaction, weak (R2), voids to 1/8" covering	-						
-	R21-NQ		2	break, horizontal, smooth, planar 162.27, 162.3, 162.4, 162.6, 162.7, 162.75, 162.82, 162.9, 162.98' - Bedding plane or	\vdash	- 25-30% of surface, moderately fossiliferous, (mold and casts) 5-10% white inclusions up to 1-1/4" (]						
165_	5 ft 88%	18	6	mechanical break (9), smooth, planar, tight to open 1/8"	Ħ	 irregular shape), fine brownish black laminations (<1/16") at]						
-122.8 - -			>10	100.00 - Deduing plane of friedranical break,		153.48-153.63', contains vertical fracture across interval, up to 20% fine black particles							
-	167.0		NR	<10 deg, rough, undulating, black staining 164.1, 169.25, 164.4, 164.5, 164.85, 164.95' - Bedding plane or mechanical break (6),	H	No Recovery 156.3-157.0' Limestone 157.0-161.6' - yellowish gray to	R21: 19 minutes						
_	167.0		2	horizontal, smooth, planar to undulating, tight to open 1/8"-1/4"	Ē	dusky yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, strong HCI]						
-				166.0' - Mechanical break 166.1' - Bedding plane or mechanical break, horizontal, smooth, planar, tight to open 1/8"	Ħ	reaction, very weak to weak (R1 to R2), trace voids up to 1/8" elliptical, poorly fossiliferous (few	-						
_	R22-NQ		3	166.25-166.3' - Fracture (2), 80 deg, rough, undulating, tight, reddish brown staining	Ħ	molds,casts), 3/8"x3/16", bedding plane laminations <1/16" from	SC-6 collected at 168.4- 169.3'						
170	5 ft 84%	31	3	167.05' - Mechanical break or bedding plane, horizontal, smooth, planar, tight		_ 160.2-161.6' No Recovery 161.6-162.0'	-						
-127 <u>.8</u> -			4	167.75-167.9' - Fracture zone 168.1' - Bedding plane or mechanical break, horizontal, smooth, planar, open 1/8"-1/4"	H	Limestone 162.0-166.4' - yellowish gray to 2 moderate olive brown, (5Y 7/2 to 5Y]						
_			0 NR	168.2' - Bedding plane or mechanical break, <10 deg, rough, undulating, tight to open	Ħ	5/4), fine grained, strong HCl reaction, weak to medium strong (R2	R22: 23 minutes						
-	172.0			1/4"-3/4" 168.4' - Bedding plane, smooth, undulating, open 1/4"	E	to R3), voids up to 1/16" over 40% of surface, 163.0-163.09 ' interval has voids to 3/16" covering 90% of	-						
_									3	169.3' - Bedding plane, horizontal, smooth, undulating, open 1/8"-1/4"	Ħ	surface, moderately fossiliferous from 163.0-163.9' (some molds),]
_			6	169.55-169.7' - Fracture zone 169.8' - Bedding plane, horizontal, smooth,		2"x1/4" inclusions up to 5%, from 163.0-163.1', irregular shaped	-						
	R23-NQ 5 ft	35	4	undulating, 1/8"-1/4" open 170.1' - Bedding plane or mechanical break, <10 deg, smooth, undulating, 1/8"-1/4" open	H	- inclusions, medium gray in color. No Recovery 166.4-167.0' Limestone	-						
175_ -132.8 -	84%		6	170.3-170.5' - Fracture zone — 170.7-170.8' - Bedding plane (2), <10 deg,	Ħ	— 167.0-171.2' - moderate olive brown, (5Y 4/4), fine grained, strong HCl							
-			1	tight, dark staining 172.05' - Bedding plane, horizontal, smooth, undulating, crystal traces on surface, open	E	reaction, weak to medium strong (R2 to R3), voids up to 1/8" over 15-20% of surface, cavities (1/4"x1") from	R23: 22 minutes						
_	177.0		NR	1/4" 172.15' - Bedding plane, horizontal, smooth,	H	168.05-168.04' poorly fossiliferous (trace molds), horizontal wavy	1						
-			6	planar, open 1/8"-1/4" 172.3-172.55' - Fracture zone 173.2' - Bedding plane, horizontal, smooth,	Ħ	laminations (<1/16") at 170.5 No Recovery 171.2-172.0' Limestone	-						
_			0	undulating, crystals on surface of fracture, open 1/8"		172.0-176.2' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y]						
-	R24-NQ 5 ft	 40	2	173.3' - Bedding plane, <10 deg, smooth, undulating, crystals covering 30% of surface,	Ħ	4/4), strong HCl reaction, weak to medium strong (R2 to R3), voids up							
180 <u>-</u> -137.8	78%			open 1/4"to 1/2" 173.45, 173.75, 173.87, 173.9, 174.0, 174.03,' - Bedding plane (6), horizontal,	Ħ	to 1/8"x3/16" over 10-15% of surface, cavities up to 1"x1/2" over 5% of surface, poorly fossiliferous (few	-						
_			>10	smooth, planar, crystals covering surface, tight to open 1/8"	Ħ	casts), mottling of slightly darker hue up to 20%	R24: 20 minutes						
_	182.0		NR	174.1' - Bedding plane, horizontal, smooth, undulating, crystals, open 1/8"-1/4" 174.2-174.35' - Fracture zone, 3/4" fragments	Ė	No Recovery 176.2-177.0'	1\24. 20 Hillides						



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-10	SHEET	11	OF	12

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

			<u> </u>	12141 . CIVIL 330 3/14 100073, Midd Totally, 140 tools, 1444	000	-	ORIENTATION: Vertical	
WATER	LEVELS: 1.0	ft bg	s on 0	3/10/07 START : 2/25/2007 END : 3/	11/200	D7 LOGGER : C. LeBlanc, T. Stewar	t, C. Wallestad	
>			_	DISCONTINUITIES	υ	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ູເດ	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,		
교실	N.Y.	(9)	뿐		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,	
E ¥ ₹	E R OVE	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BG	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD	
989	RNA	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.	
ОΩШ	OIK	ď	╙┺		S	CHARACTERISTICS		
			١.	175.45, 175.6, 175.8, 175.85, 175.95, 175.98,	Ш	Limestone		
_			4	176.05' - Bedding plane (7), horizontal,	т	 177.0-177.95' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y 	1	
-				smooth, undulating, crystals on surface, tight to open 1/4"		4/4), fine grained, strong HCl	Driller's Remark: 183.0-	
I -			4	177.0-177.05' - Fracture zone	ш	reaction, weak to medium strong (R2	184.5' was hard drilling,	
				177.25, 177.5, 177.55' - Bedding plane (3),	Н	to R3), voids up to 1/8" covering	had to increase pump	
-	R25-NQ			horizontal, smooth, undulating, crystals on		15-20% of surface, wavy dark brown	pressure	
-	5 ft	40	6	surface, tight to 1/8"	ш	laminations at 177.8' to sharp contact	1	
185_	92%			177.65' - Bedding plane, <10 deg, smooth, undulating, open 1/4"-1/2"	+	(bedding plane) at 117.95', 25 degree bedding plane	_	
-142.8			3	177.8' - Bedding plane, horizontal, smooth,		- 177.95-180.9' - yellowish gray, (5Y		
			ا	planar, tight to open 3/4"	Ш	7/2), very fine to medium grained,		
-			1	179.0' - Bedding plane or mechanical break,	T	strong HCl reaction, weak to medium	R25: 28 minutes	
-			1	horizontal, rough, undulating, open 1/2"-1"	口	strong (R2 to R3), voids up to 3/16"		
I -	187.0		NR	179.85' - Fracture or mechanical break,	Ш	covering 30-40% of surface, cavities	l J	
				horizontal, rough, undulating, tight to open 1/2"	H	(fossil molds) up to 1"x2" covering < 5% of surface, moderate		
-			3	180.05-180.15' - Fracture zone, up to 1"		fossiliferous (casts, molds), very fine	1	
-				fragments	₩	grained, very pale orange (10YR 8/2)	SC-7 rejected due to size	
l -			3	180.2-180.3' - Bedding plane (2), horizontal,	Н	wavy beds up to 1"1/2" from	requirements, total of six	
				smooth, planar, tight to open 1/8"		179.65-180.35' and 180.5-180.68'	(6) special cores taken	
I -	R26-NQ			180.25' - Fracture or mechanical break,	Ш	No Recovery 180.9-182.0'	from boring A-10/A-10R	
-	5 ft 96%	31	3	vertical, smooth, undulating, tight 180.45' - Bedding plane, <10 deg, rough,	+	Limestone 182.0-186.6' - yellowish gray to	1	
190_					undulating, open 1/4"-3/4"		moderate olive brown, (5Y 7/2 to 5Y	_
-147.8			2	180.6, 180.8' - Bedding plane (2), <10 deg,	Щ	4/4), strong HCl reaction, weak to		
			-	rough, undulating, open 1/4-1/2"	П	medium strong (R2 to R3), voids up		
-	_			182.15, 182.5, 182.6, 182.85,' - Bedding		to 1/16" on 40-60% of surface,	R26: 11 minutes	
-			4	plane (4), horizontal, smooth, undulating,	\vdash	cavities (irregular shaped) up to	1	
l -	192.0		NR	tight to open 1/8" 183.25-183.35' - Fracture zone, rock		3/8"x3/16" over 10-20% of surface, moderately fossiliferous (molds and	Driller's Remark:	
				fragments up to 1"		casts)	Circulation regained	
I -			>10	183.7, 183.77, 183.9' - Bedding plane (3),	Н	No Recovery 186.6-187.0'	1	
-				horizontal, smooth, planar, open 1/4"-1/2"		Limestone	1	
_			>10	184.10-184.20' - Fracture zone, rock	\perp	187.0-188.15' - Same as		
				fragments up to 1-1/2" fractures 184.4' - Bedding plane, horizontal, smooth,	Н	182.0-186.6' - 188.15-191.8' - yellowish gray, (5Y		
	R27-NQ		0	planar, open 1/8"-1/4"		7/2), fine grained, moderate to strong		
405	5 ft	12		184.45' - Bedding plane, <10 deg, smooth,	Н	HCl reaction, weak to medium strong	1	
195 <u> </u>	44%			undulating, open 1/8" —	╂╫	— (R2 to R3), weaker at bottom of		
-132.6			ND	184.65' - Bedding plane, horizontal, smooth,	П	interval, medium strong (R3) at base,		
			NR	planar, open 1/8"-1/4", dark staining 184.9-185.05' - Fracture zone, rock	H	voids up to 3/16" covering 5-15% of surface, trace cavities 3/4"-1/8" with		
I -				fragments up to 2"	Ш	no infill, poorly fossiliferous, (mostly	R27: 12 minutes	
-				185.2' - Bedding plane or mechanical break,	Ш	casts, molds), trace organics	1	
-	197.0		0	<10 deg, smooth, undulating, open 1/8"-1/4"	H	No Recovery 191.8-192.0'	-	
I -			lacksquare		Ш	Limestone		
				deg, rough, undulating, tight 185.61' - Fracture or mechanical break, 70	Щ	192.0-193.25' - Same as - 182.0-186.6'		
I -				deg, rough, undulating, tight	1 H	193.25-194.2' - yellowish gray, (5Y	1	
-				187.3-187.5' - Fracture zone, rock fragments	口	7/2), fine grained, strong HCl	1 -	
I -				to 1-1/2"x1-1/5"	Ш	reaction, medium strong (R3), trace		
	R28-NQ		l	187.55, 187.8, 187.9, 188.05' - Bedding plane	Н	black color laminations, trace very		
200	5.5 ft		NR	(4), <10 deg, smooth, undulating, 188.05' has		fine to fine black particles	R28: 10 minutes	
-157.8	0%			black stains, open 1/4" 188.8, 188.95' - Fractures or mechanical	Ш	No Recovery 194.2-197.0' Limestone	End of coring at 15:21 on —	
-				break (2), 40 deg, rough, undulating, tight	H	197.0-197.15' - Same as	3/11/07, boring grouted to	
I _				189.25' - Bedding plane or mechanical break,	П	_ 193.25-194.2'	surface with Portland cement type I/II, type GU	
				<10 deg, rough, undulating, tight	H	No Recovery 197.15-202.5'	on 3/13/07	
1 -				189.35' - Bedding plane, <10 deg, smooth,	Ш	†	1	
				planar, tight	仠	_		

APPENDIX 2BB-114 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-10	SHEET	12	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

-	LEVELS : 1.0			3/10/07 START: 2/25/2007 END: 3/	11/20	007 LOGGER : C. LeBlanc, T. Stewar	t, C. Wallestad
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES_	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACINO
H BE ACE ATIO	TRUI VER	Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	J Z	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
EPT SURF SILEV	CORE	RQD	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	∀ME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		ш	шш	189.95' - Bedding plane, horizontal, smooth,	0)	0.2.00.00.00	
-	202.5			⊓ planar, tight		Bottom of Boring at 202.5 ft bgs on	_
-				190.0' - Fracture zone, 60 deg, smooth, undulating, tight	ł	- 3/11/2007	-
-				190.3-190.45, 190.6-190.8' - Fracture zone	ł	-	-
-				(2), up to 2" rock fragments 191.1' - Fracture or mechanical break, 60	ł	-	-
-				deg, rough, undulating, open 7/8"-1" 191.35, 191.45, 191.55' - Bedding plane (3),	1	-	-
-				horizontal, smooth, undulating, open 1/8"-1/4"	1	_	
_				192.0-193.35' - Fracture zone, well graded pieces of limestone fragments 1/4"-2"	1	†	_
-				subangular shapes and several 3/8"-1/2" discs		<u> </u>	-
				193.1-193.4' - Fracture zone, pieces 1/4"-2"		<u> </u>	-
1 -				sub angular shapes and several 3/8"-1/2" discs]		-
1 -				193.95-194.2' - Fracture zone, poorly graded	1	L	_
_				limestone, 1" subangular rock fragments			_
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-11	SHEET	1	OF	15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit

ORIENTATION · Vertical

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 550 S	/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit		ORIENTATION : Vertical					
WATER	WATER LEVELS: 1.0 ft bgs on 4/22/07 START: 4/21/2007 END: 5/9/2007 LOGGER: T. Stewart, R. McComb, A. Bonilla SOIL DESCRIPTION COMMENTS											
 				STANDARD	SOIL DESCRIPTION	U	COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG						
H SE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	F	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND					
PTF/			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ΥMB	INSTRUMENTATION					
30 E				(N)	- -	γ ₁ /γ.						
42.5	0.0			2-2-2	Topsoil √ 0.0-0.3' - grayish black, (N2), moist, roots up to 3/8" √-		_					
_		1.3	SS-1	(4)	\diameter, organics /							
_	1.5				Poorly Graded Sand With Silt (SP-SM) 0.3-0.9' - pale yellowish brown, (10YR 6/2), moist,	1:1:	5' sections of NW rod, 24" split spoon (SS), 50 lb bags of Quik Gel brand bentonite -					
_					very loose, very fine to fine grained, silica sand,	1	10:36 1/4 bag bentonite added to full mud					
_					rounded grains, 5% nonplastic fines, trace of very fine sand-sized black particles	1	vat using 3-7/8" tricone roller bit					
_					0.9-1.25' - moderate yellowish brown, (10YR 5/4),	1	_					
_					moist, very loose, very fine to fine grained, silica sand, 15% nonplastic fines, trace very fine grained particles	1	_					
_					of a dark yellowish orange and very fine grained black	1	_					
_					particles	4	_					
5	5.0				01	1	_					
37.5				6-6-4	Clayey Sand (SC) 5.0-6.0' - pale blue green, (5BG 7/2), wet, loose, 16%		_					
-		1.0	SS-2	(10)	medium plastic fines, silica sand, trace very fine	<i>V///</i>	_					
_	6.5				sand-sized black particles, brownish black staining around roots, trace of coarse sand-sized yellowish	4	_					
_					\gray (5Y 8/1) particles, trace 1/8" rootlets, brownish	-	-					
_					black staining around rootlets	4	<u>-</u>					
_					-	4	<u>-</u>					
_					-	4	D.W. I. D I. 6511 I					
_					-	4	Driller's Remark: 8.5' below ground surface change in drilling -					
_					-	┨ .	_					
10 32.5	10.0 10.3	0.0	00.0	50/0	Larry Olars Mish Oile (OL MIL)		9.5' stiffened up (harder drilling) —					
32.5	10.0	0.3	SS-3	50/3 (50/3")	Lean Clay With Silt (CL-ML) 10.0-10.25' - Same as 5.0-6.0' except hard, no		_					
_					organics	4	-					
_					-	-	-					
_					-	-	-					
_					-	4	Deille de Deurs du 40 51 etente d'Issississe uneten					
_					-	4	Driller's Remark: 12.5' started losing water					
_					-	4	_					
-					-	4	Hord at 14 01 approximately 40 500/					
-					-	-	Hard at 14.0', approximately 40-50% circulation loss, add 1/2 bag bentonite then					
15 <u> </u>	15.0 15.3	0.1	SS-4	50/4	☐ Limestone Fragments	╄	added another 1/8 bag to mud vat					
27.5	10.3	U. I	33-4	(50/4")	15.0-15.3' - gravish to dusky vellow. (5Y 8/4 to 5Y -	-	-					
-					7/4), mild to moderate HCl reaction, 20-30% voids <1/8" in size, spherical to elongated in shape, trace	-	_					
-					brilliant green very fine grained particles, voids are	-	_					
-					possible microfossils	-	-					
-					-	-	_					
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PROJECT	NUMBER:	BORING NUMBER:					
33888	4.FL	A-11	SHEET	2	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit

ORIENTATION · Vertical

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit ORIENTATION : Vertical									
WATER	LEVELS	: 1.0 ft bo	gs on 4/2	2/07	START: 4/21/2007 END: 5/9/2007 LOGGER: T. Stewart, R. McComb, A. Bonilla				
>				STANDARD	SOIL DESCRIPTION COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RA DRILLING FLUID LOSS, TESTS, A INSTRUMENTATION				
H BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RA DRILLING FLUID LOSS, TESTS, A				
THE AND THE			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
<u> 22.5</u>		0.0	00.5	(N) 50/5					
	20.4	0.3	SS-5	(50/5")	20.0-20.25' - grayish to dusky yellow, (5Y 8/4 to 5Y	_			
-					6/4), wet, very dense, fine to coarse grained, moderate HCl reaction, 20% nonplastic fines, 15-20%	_			
_					fine gravel-sized to 3/4", all carbonate	_			
-						-			
-					- Drillada Barradu Hard et 22 El than	-			
_					Driller's Remark: Hard at 22.5' then v	very soπ -			
_					- I	_			
-						-			
_						-			
25 <u> </u>	25.0				CHANGAL Count (NIL)				
17.5				35-34-20	Silt With Sand (ML) 25.0-26.1' - dusky yellow, (5Y 6/4), trace white	_			
_		1.1	SS-6	(54)	mottling, moist to wet, dense, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 15% very	-			
_	26.5				│ \ fine sand-sized, 5-10% fine to medium sand-sized,	-			
_					\trace fine sand-sized brilliant green particles, all \ \text{Carbonate} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	-			
_					\text{\carbonate} \text{Driller's Remark: Hard at 27.0'}	_			
_						_			
_					1 1	_			
-						_			
_					Driller's Remark: Soft again at 29.0'	-			
30 <u> </u>	30.0				OUGANIST Condition				
12.5				40-30-34	Silt With Sand (ML) 30.0-31.15' - Same as 25.00-26.1' except lenses of	_			
_		1.2	SS-7	(64)	very fine grain sized limestone	-			
_	31.5					_			
_						-			
_						_			
_						-			
_					- Drillada Barradu Hard et 22 51	-			
-					Driller's Remark: Hard at 33.5' Driller's Remark: Last foot of run 34.	0.35.0'			
_					is drilling at 2.5 minutes per inch with				
35	35.9	0.4	CC 0	E0/4	pressure applied	·			
7.5		0.1	<u>SS-8</u>	50/1 (50/1")	A 35.0-35.05' - light olive gray to moderate olive brown. A to drill 34.0-35.0'	_			
-					\(\sqrt{5Y}\)5/2 to 5Y 4/4), coarse grained, mild HCl reaction, \(\sqrt{-1}\) \(\text{Driller's Remark: Will switch over to coring assembly}\)	NQ /			
-					Begin Rock Coring at 35.5 ft bgs				
-					See the next sheet for the rock core log	_			
-					1 1	_			
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40									
L			l		1 1				



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-11 SHEET 3 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

DESCRIPTION STAND DEPTH TYPE CRIENTATION, ROUGHNESS PLANKRITY NETLLING MATERIAL AND TIGHTNESS PLAN	CORING	METHOD AI	ND EC	JUIPIV	IENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	casınç		ORIENTATION : Vertical
Section Part	WATER	LEVELS: 1.0	ft bg	s on 4/	22/07 START : 4/21/2007 END : 5/	9/2007	LOGGER: T. Stewart, R. McCom	nb, A. Bonilla
1					DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
1	8 € E	.₽% 		S	DESCRIPTION	1 ŏ	DOCK TYPE COLOR	
1	H H H	LA Y	(9)	滿드	BESSELL HOLE	윽		SIZE AND DEPTH OF CASING,
35.5	FACE	E R 3TF OVE	© 0	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
1	P.S.E.	E C E	ō	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS SURFACE STAINING AND TIGHTNESS.	≥		DROPS, TEST RESULTS, ETC.
State Stat			Ľ.	шп		S		
Cash		35.5		ا م ا		Н		
Start R1 at 15:56 Star						Ш		
R1-NO 5 ft 98 / 98 / 98 / 98 / 98 / 98 / 98 / 98	1 1					Н	gray mottling, (5Y 5/2 to 5Y 4/4 with	Start R1 at 15:56
R1-NC 98% 98	1 -			0	36.75, 38.0' - Mechanical break (2)		- 5Y 7/2), mild to moderate HCl	Added 1/4 bag bentonite to -
String 93	-	D4 NO				╂┴╂		tuli mud vat
96% 2 38.35 - Fracture, 50 deg, rough, undulating, tight 38.39.2* Fracture (2), 50 deg, rough, undulating, tight 38.3 99.2* Fracture (2), 50 deg, rough, undulating, tight 40.5* Fracture, 60 deg, rough, undulating, tight 42.95* Mechanical break, horizontal, rough, undulating, tight 45.5* 48.2* Fracture (2), horizontal, rough, undulating, tight 45.5* 48.2* Fracture zone. PRINCIPLE ASSOCIATION OF A			93	1 1		ш	- medium strong (R3), poorly	
tight 38.8, 39.2 - Fracture (2), 50 deg, rough, undulating, tight 40.2 - Fracture, 60 deg, rough, undulating, tight 40.5 - Fracture, 60 deg, rough, undulating, tight 40.5 - Fracture zone 40.5 - 43.4 - Same as 35.50 - 40.3 except some void infilling with soft gray (N4) fine material gray (N4) f					20.0EL Expetime EO des vouch undulating		fossiliferous (casts), trace black	
2.5 40.5						Н		30.0
1	1 7			2		ш		-
2.5 40.5 NR	-				undulating, tight	╂┼┼		R1: 5 minutes
40.5 No Recovery 40.3-40.5 Limestone 40.5 - 40.75 - Fracture, 60 deg, rough, undulating, tight 40.5 - 40.75 - Fracture zone 41.95 - 42.3 - Fracture zone, tight 41.95 - 42.3 - Fracture, 60-70 deg, rough, undulating, tight 42.95 - Mechanical break, horizontal, rough, undulating, tight 42.95 - Mechanical break, horizontal, rough, undulating, tight 45.5 - 45.5 45.5 45.5 45.5 47.5 - Mechanical break, <1/32" soft silt infill over 25-35% of surface 47.15' - Mechanical break, <1/32" soft silt infill over 25-35% of surface 47.9 - 48.2 "Fracture zone, 2-1/2"-3" crumbled core fragments No Recovery 43.4-45.5'				1			_	
Section of the content of the cont	2.5	40.5		NR		╁┴┨	- No Recovery 40,3-40.5'	-
R2-NO 5 ft 58% 24.95 - Mechanical break, horizontal, rough, undulating, tight 42.95 - Mechanical break, horizontal, rough, undulating, tight 43.0, 43.1 - Fracture (2), horizontal, rough, undulating, tight 43.0, 43.1 - Fracture (2), horizontal, rough, undulating, tight 45.5 - 48.2 - Fracture zone 25	1						Limestone	
R2-NO 5 ft 58%	1 7			^ U	40.5-40.75° - Fracture zone	П	40.5-43.4' - Same as 35.50-40.3'	l -
R2-NO 5 ft 58% 35 3 42.85' - Fracture zone, tight 42.95' - Mechanical break, horizontal, rough, undulating, tight 42.95' - Mechanical break, horizontal, rough, undulating, tight 42.55' - Mechanical break, horizontal, rough, undulating, tight 43.0 4.3 '' - Fracture (2), horizontal, rough, undulating, tight 45.5-48.2' - Fracture zone 45.5-48.5' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, 45.5-48.5' - started losing briller's Remark: Warner 2 or 1/12' - 1/2' -	1 1					+	- except some void intilling with soft	-
R2-NO 5 ft 58% 35 3 42.85' - Fracture, 60-70 deg, rough, undulating, tight 42.95' - Mechanical break, horizontal, rough, undulating, tight 43.0, 43.1' - Fracture (2), horizontal, rough, undulating, tight 43.0, 43.1' - Fracture zone 45.5-48.5' - Limestone 45.5-48.5' - Limestone 47.9-48.2' - Fracture zone 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbled core fragments 1	1 -			>10	41.95-42.3' - Fracture zone, tight	ш	- gray (144) fine material	-
45 - 2.5 45.5		50.110				廾┨	_	-
undulating, tight 42.95 Mechanical break, horizontal, rough, undulating, tight 43.0, 43.1' - Fracture (2), horizontal, rough, undulating, tight 45.48.5' - Limestone 45.5-48.5' - Light olive gray to moderate olive brown, (5) \$72 to 5 Y (42), 10 to 10			35	3	42.85' Fracture 60.70 deg rough		_	_
42.95 - Mechanical break, horizontal, rough, undulating, tight 43.0, 43.1' - Fracture (2), horizontal, rough, undulating, tight 45.2.5 45.5 45.5 45.5' 45.5 45.5 45.5' Limestone 45.5-48.5' - Iight olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, 45.5-45.8' carbonate silts 40.0-46.7' extremely weak rock (R0), crumbles under thumb pressure crumbles under thumb pressure crumbles under thumb pressure 1/16" voids up to 35% of surface, post-of-yolive siles up to 34"), 1/2" elongate trace cavities with no including grained black particles (organics), similar to 35.5-45.5' NR R4-NO 5 ft 81% R4-NO 6 ft 81% R4-NO 6 ft 81% R4-NO 7 ft 181% R5-5-48.5' light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, 45.5-48.5' elong plane (4), horizontal, rough, undulating, tight, except 51.05' is open up to 1-1/2" in size) No Recovery 43.4-45.5' R7-15 ft 185 f			00			Н		
45.5 43.6 43.1 - Fracture (2), horizontal, rough, undulating, tight 45.5 48.2 - Fracture zone 45.5 48.2 - Fracture zone 45.5 48.5 - Iight olive gray to moderate lolive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, 47.15 - Mechanical break, or bedding plane (4), horizontal, rough, undulating, tight, except 51.05 is open up to 1.1/2" R3-NO 51	1 1				42.95' - Mechanical break, horizontal, rough,	Ш	No Recovery 43.4-45.5'	_
undulating, tight 45.5 48.5 48.5 48.5 - light olive gray to moderate lowe brown, (5Y 5/2 to 5Y 4/4), mild to moderate lowe thumb pressure 47.9 48.2 - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9 48.2 fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9 48.2 fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9 48.2 fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9 48.2 fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9 48.2 fracture zone, spherical 11" fill" voids up to 35% of surface, poorly fossiliferous (casts up to 3/4"), 1/2" elongate trace cavities with no infill, trace medium grained black particles (organics), similar to 35.5 45.5 for light olive gray to moderate lowe brown, (5Y 5/2 to 5Y 4/4), mild to moderate lowe brown, (6Y 5/2 to 5Y 4/4), mild to mode	1 -				undulating, tight	╂┼╂	-	-
45.5 48.5 - light olive gray to moderate olive brown, (57 5/2 to 57 4/4), mild to moderate HCl reaction, 45.5 48.5 - light olive gray to moderate olive brown, (57 5/2 to 57 4/4), mild to moderate HCl reaction, 45.5 48.5 - sarbonate silts 46.0 46.7 extremely weak rock (R0), crumbles under thumb pressure 47.9 48.2 - Fracture zone, 2-1/2"-3" crumbled core fragments NR NR NR NR So.5 R4-NQ 50 50 77.5 R4-NQ 51 81% R4-NQ 51 1 R4-NQ 51 1 51.05, 51.7, 51.9, 53.9' - Mechanical break or bedding plane (4), horizontal, rough, undulating, tight, except 51.05' is open up to 1-1/2" 52.5' - Mechanical break, tight NR NR NR NR NR R4-NQ 51 51 51.05, 51.7, 51.9, 53.9' - Mechanical break or bedding plane (4), horizontal, rough, undulating, tight, except 51.05' is open up to 1-1/2" 52.5' - Mechanical break, tight 53.25' - Bedding plane or mechanical break, 0-10 deg, rough, undulating, tight NR NR NR R4: 5 minutes	1 -			NR	43.0, 43.1 - Fracture (2), nonzoniai, rough,	世	-	R2: 3 minutes
45.5 48.2' - Fracture zone 45.5-48.5' - light olive gray to moderate elive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, 45.5-48.6' arrathonate silts 46.0-46.7' extremely weak rock (R0), crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' fractured zone, spherical 1/16" voids up to 35% of surface, poorly fossiliferous (casts up to 3/4"), 1/2" elongate trace cavities with no infill, trace medium grained black particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5' Limestone 45.5-48.5' - light olive gray to moderate HCl reaction, 45.5-45.8' carbonate silts 46.0-46.7' extremely weak rock (R0), crumbles under thumb pressure 47.9-48.2' fractured zone, spherical 1/16" voids up to 35% of surface, poorly fossiliferous (casts up to 3/4"), 1/2" elongate trace cavities with no infill, trace medium grained black particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5' Limestone 45.5-48.6' -light olive gray to moderate HCl reaction, 45.5-45.8' similar to 35% of surface, poorly fossiliferous (casts up to 1/12" light olive gray to moderate block particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5'	45					ш		——————————————————————————————————————
Sand Signature S	-2.5	45.5				Ш		_
R3-NQ 5 ft 60% 23 >10 47.15' - Mechanical break, <1/32" soft silt infill over 25-35% of surface 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbled core fragments 47.9-48.2' fractured zone, spherical 1/16" voids up to 35% of surface, poorly fossiliferous (casts up to 3/4"), 1/2" elongate trace cavifies with no infill, trace medium grained black particles (organics), similar to 35.5-4.5' light olive gray to moderate olive brown, (57 5/2 to 57 4/4), mild to moderate HCl reaction, 45.5-45.8' carbonate silts 46.0-46.7' extremely weak rock (R0), crumbles under thumb pressure 47.9-48.2' fractured zone, spherical 1/16" voids up to 35% of surface, poorly fossiliferous (casts up to 3/4"), 1/2" elongate trace cavifies with no infill, trace medium grained black particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5' Limestone 50.5-54.55' - light olive gray to moderate olive brown, (57 5/2 to 57 4/4), mild to moderate HCl reaction, medium strong (R3), extremely weak rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 54.55-55.5' R4:5 minutes				_10	45.5-48.2' - Fracture zone			
R3-NQ 5 th 60% 23 > 10				/10		Н		
47.15' - Mechanical break, <1/32" soft silt infill over 25-35% of surface 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' - Fracture zone, 2-1/2" elongate trace cavities with no infill, trace medium grained black particles (organics), similar to 35.5-4.5' - Limestone 50.5-54.5' - Limestone 50.5-54.5' - Limestone 5	1 7				•	ш		-
R3-NQ 5 ft 60% 23 >10 Infill over 25-35% of surface 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbles under thumb pressure 47.9-48.2' fractured zone, spherical 1/16" voids up to 35% of surface, poorly fossiliferous (casts up to 3/4"), 1/2" elongate trace cavities with no infill, trace medium grained black particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5' Limestone 50.5-54.55' Limestone 50.5-55.5' Limestone 50.5-54.55' Li	1 -			>10		+		-
5 ft 60% 23 >10 47.9-48.2' - Fracture zone, 2-1/2"-3" crumbled core fragments 47.9-48.2' fractured zone, spherical 1/16" voids up to 35% of surface, poorly fossiliferous (casts up to 3/4"), 1/2" elongate trace cavities with no infill, trace medium grained black particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5' Limestone 50.5-54.55' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCI reaction, medium strong (R3), extremely weak rock (R0) at 53.9, 1/16" voids up to 3/4"), 1/2" elongate trace cavities with no infill, trace medium grained black particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5' Limestone 50.5-54.55' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCI reaction, medium strong (R3), extremely weak rock (R0) at 53.9, 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 54.55-55.5' No Recovery 54.55-55.5'		50.110				口		47 51 04
1/16" voids up to 35% of surface, poorly fossiliferous (casts up to 3/4"), 1/2" elongate trace cavities with no infill, trace medium grained black particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5' Limestone 50.5-54.55' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCI reaction, medium strong (R3), extremely weak rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 54.55-55.5' No Recovery 54.55-55.5' No Recovery 54.55-55.5'			23	>10		Н		Driller's Remark: Will set 5' -
NR NR 1 1 50 -7.5 50.5 1 2 R4-NQ 5 ft 81% 75 1 R4-NQ 5 tt 81% NR R5: 3 minutes Poorly fossiliferous (casts up to 3/4"), 1/2" elongate trace cavities with no infill, trace medium grained black particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5' Limestone 50.5-54.55' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, medium strong (R3), extremely weak rock (R0) at 53.9'; 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 54.55-55.5' R4: 5 minutes						Ш	1/16" voids up to 35% of surface,	more 3" NW casing
NR NR Solution in fill, trace medium grained black particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5' Limestone 50.5-54.55' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, medium strong (R3), extremely weak rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 54.55-55.5' No Recovery 48.5-50.5' Limestone 50.5-54.55' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, medium strong (R3), extremely weak rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 54.55-55.5' No Recovery 54.55-55.5'	1 7				S.ablod bold hagmonto	H	poorly fossiliferous (casts up to 3/4"),	I
7.5 50.5 No Recovery 48.5-50.5' 1 51.05, 51.7, 51.9, 53.9' - Mechanical break or bedding plane (4), horizontal, rough, undulating, tight, except 51.05' is open up to 1-1/2" R4-NQ 5 ft 81% 75 1 81% 75 1 53.25' - Bedding plane or mechanical break, 0-10 deg, rough, undulating, tight NR R3: 3 minutes Particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5' Limestone 50.5-54.55' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCI reaction, medium strong (R3), extremely weak rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 54.55-55.5' No Recovery 48.5-50.5'	1 -					Ш		-
35.5-45.5' No Recovery 48.5-50.5' Limestone 50.5-54.55' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCI reaction, medium strong (R3), extremely weak rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 48.5-50.5'	1			NR		Ш	particles (organics), similar to	R3: 3 minutes
So.5 1 1 51.05, 51.7, 51.9, 53.9' - Mechanical break or bedding plane (4), horizontal, rough, undulating, tight, except 51.05' is open up to 1-1/2" R4-NQ 5 ft 81% 75 1 81% NR NR NR NR NR No Recovery 48.5-30.5 Limestone 50.5-54.55' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCI reaction, medium strong (R3), extremely weak rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 48.5-30.5 Limestone 50.5-54.55' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCI reaction, medium strong (R3), extremely weak rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 54.55-55.5'					_	╆┩	— 35.5-45.5'	
The standard	-7.5	50.5				口		-
S1.05, 51.7, 51.9, 53.9' - Mechanical break or bedding plane (4), horizontal, rough, undulating, tight, except 51.05' is open up to 1-1/2" R4-NQ 5 ft 81% 75	1					Н		
R4-NQ 5 ft 81% 75 1 1 2 555 NR NR NR NR NR No Recovery 54.55-55.5' Spen up to bedding plane (4), horizontal, rough, undulating, tight, except 51.05' is open up to 1-1/2" 4/4), mild to moderate HCl reaction, medium strong (R3), extremely weak rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size)	1 7					Ш		l -
R4-NQ 5 ft 81% 75 1 1 555 NR NR 1-1/2" 52.5' - Mechanical break, tight 1-1/2" 52.5' - Mechanical break, tight 1-1/2" rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 54.55-55.5' R4: 5 minutes	1 -				bedding plane (4), horizontal, rough,	╁┼	4/4), mild to moderate HCl reaction,	-
R4-NQ 5 ft 81% 75 1 52.5' - Mechanical break, tight 52.5' - Mechanical break, tight 52.5' - Bedding plane or mechanical break, 0-10 deg, rough, undulating, tight 555 No Recovery 54.55-55.5' No Recovery 54.55-55.5'	1 -			2		口		-
spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) NR Sheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size) No Recovery 54.55-55.5' R4: 5 minutes	1 -	DANO				₽₽		-
81% 53.25' - Bedding plane or mechanical break, 0-10 deg, rough, undulating, tight moderately fossiliferous (casts up to 1/2" in size) No Recovery 54.55-55.5' R4: 5 minutes	1 4		75	1	oz.o Moonamoa broak, tigrit	Ш		-
0-10 deg, rough, undulating, tight NR NR NR NR NR NR NR NR No Recovery 54.55-55.5' R4: 5 minutes	1		. 0	ĽIJ	53 25' - Bedding plane or mechanical break	Н	moderately fossiliferous (casts up to	
No Recovery 54.55-55.5' R4: 5 minutes	1 7					Ш	1/2" in size)	l -
55 NR NR	1 1			1		Ш	-	l -
55 NR NR	 					Ш	No Recovery 54 55-55 5'	R4: 5 minutes
55.5	-125			NR	_	\Box	— 1.000 vory 0-1.00-00.0	
	12.0	55.5				H		_
	1							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-11	SHEET	4	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

				HENT : CIVIE 330 3/N 100073, HILL TOLATY, NQ 1001S, NVV			ORIENTATION : Vertical
WATER	LEVELS : 1.0) ft bgs	s on 4		9/200	·	
30≎	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
ᆱ끯읃	RU. H. /	(%) Q	R C	DEDTIL TYPE ODIENTATION DOLLOUNESS	1 ⋈	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	Ser.	۵	ZY.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCF	SEN SE	a	FF.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S.	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				55.5' - Bedding plane or mechanical break,	+	Limestone	Approximately 1.0' below
_			2	horizontal, rough, planar, tight	山	- 55.5-60.5' - light olive gray to	ground surface water level, -
					Щ	moderate olive brown, (5Y 5/2 to 5Y	core run ended at 8:07,
				56.35, 57.15, 57.6, 58.3, 59.25' - Bedding plane or mechanical break (5), horizontal,	\Box	4/4), mild to moderate HCl reaction,	first core run on 4/22/07
1 7			1	rough, undulating, tight to 1" open		 very weak (R1), 1/16" spheroidal voids up to 30% of surface. 	T. Stewart/A. Bonilla are
-	R5-NQ			3, 1, 2, 2, 2, 2, 3, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,	╁┼	moderately fossiliferous (cast up to	the loggers.
_	5 ft	87	2		\perp	- 3/8"), trace black particles (possibly	1
	100%	0.	_			organics)	
					Н		1
-			1		ш	_	1
-					╁┼	_	R5: 6 minutes
60			0	_	┵		No. o minutes
-17.5	60.5				Щ		
1					\mathbb{H}	60.5-65.5' - light olive gray to	1
-			1	61.1, 62.0, 63.45' - Mechanical break or		moderate olive brown, (5Y 5/2 to 5Y	SC-1 collected at 61.1-62'
-				bedding plane (3), horizontal, rough,	$+$ \square	4/4), mild to moderate HCl reaction, very weak (R1), voids (<1/16")	3C-1 collected at 01.1-02
			1	undulating, tight	┸	- 20-25% of surface, poorly	1
			'	5 . 5	Щ	fossiliferous (casts up to 1/16"	
	R6-NQ			62.4, 62.7, 63.0, 65.1, 65.4' - Mechanical	Н	elongated), trace black particles,	1
-	5 ft	100	1	break (5), tight	Ш	 10%-15% organics as medium grain particles and laminations under 1/16" 	1
-	100%				+	thick horizontally aligned, medium	1
_			0		┵	strong rock (R3), stress joints over	_
						61.0-62.0' vertically oriented	
65					Н		R6: 9 minutes
-22 5	65.5		0	_	ш	<u> </u>	1
-	00.0				╁┷┤	_ Limestone	T. Stewart is the logger.
_			0		-	- 65.5-70.3' - light olive gray to	I stomart is the legger.
					\perp	moderate olive brown, (5Y 5/2 to 5Y	
				66.7' - Fracture, 40 deg, rough, undulating,	\vdash	4/4), mild HCl reaction, medium	
			2	tight	Ш	 strong (R3), 1/8" voids on 15-20% of surface, some voids filled with hard, 	1
-	R7-NQ			67.35' - Mechanical break or bedding plane,	╁┼┤	medium gray (N5) mineralization,	1 -
-	5 ft	93	1	horizontal, rough, undulating, open up to 1/2"	╀┪	poorly fossiliferous (casts up to 1/8"	-
	96%			68.3' - Fracture, vertical, rough, undulating,	Щ	_ elongated)	
				tight	H		
			1	68.65' - Fracture, 55-60 deg, rough,	\Box		1
				undulating, tight 69.4' - Mechanical break, horizontal, rough.	Ш	_	R7: 10 minutes
70 <u> </u>			1	undulating, tight	$+\Box$		
	70.5		NR,	70.05' - Fracture, 50-60 deg, rough,	\square	- No Recovery 70.3-70.5'	1
			5	undulating, tight	Щ	Limestone	
			ن	70.6, 70.7, 70.8, 70.85, 71.5' - Mechanical	Ш	70.5-74.1' - light olive gray mottled	1
1 7				break or bedding plane, horizontal, rough, undulating, tight 10 1/8" open	\vdash	 with olive gray, (5Y 5/2 with 5Y 3/2), mild to moderate HCl reaction, 	1
-			2	71.2' - Fracture, 50 deg, rough, undulating,	\Box	strong (R4), extremely weak rock at	
_				tight	₩	 top of sample, 1/16" voids on 10-15% 	-
	R8-NQ 5 ft	40	2	71.7' - Fracture, 30-40 deg, rough,	Ы	of surface, poorly fossiliferous, casts]
	72%	40	_	undulating, carbonate silt infill over 100% surface 1/16" thick		up to 1/2"	1
1 7			1	72.1' - Fracture or mechanical break,	+	-	73.5' Got soft, hard again
-				horizontal, up to 3/8" open	Ш	- No December 74.4 77.5"	at 75.0'
1 -				72.8' - Fracture or mechanical break,	+	No Recovery 74.1-75.5'	D9: 12 minutes
75			NR	horizontal, rough, undulating, open 1/4" 73.1' - Bedding plane or mechanical break,	$oldsymbol{\perp}$		R8: 12 minutes
-32.5	75.5			horizontal, rough, undulating, open 1/4"	Ш		
					\Box		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-11	SHEET	5	OF	15	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) $DRILLING \underline{\ CONTRACTOR: Universal\ Engineering\ Sciences,\ Gainesville,\ FL;\ Driller:\ M.\ Boatright;\ Cathead\ Operator:\ G.\ Davis$

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical WATER LEVELS: 1.0 ft bgs on 4/22/07 START: 4/21/2007 END: 5/9/2007 LOGGER: T. Stewart, R. McComb, A. Bonilla LITHOLOGY DISCONTINUITIES COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 73.9' - Fracture, 70-80 deg, rough, T. Stewart/A. Bonilla are Limestone undulating, tight
75.5-75.85' - Fracture zone, rock fragments >10 75.5-79.5' - yellowish gray to light the loggers olive gray, (5Y 7/2 to 5Y 5/2), black mottling, strong HCI reaction, strong 3/4", sub-angular, some granular mineralization on surface (R4), 1/8" spheroidal voids on 1 77.1' - Fracture, 15-20 deg, rough, undulating, tight, black stains on 90% of 10-15% of surface, poorly fossiliferous (casts up to 5/16"), trace R9-NQ cavities up to 1" elongate and 62 3 surface 5 ft 77.6, 77.7, 77.9' - Fracture, horizontal, rough, horizontally aligned, no infill in voids or cavities, black 1/16" horizontal 80% undulating, open up to 1/4" SC-2 collected at 78.5-2 78.4-78.5 - Fracture zone, rough, undulating, laminations, vertical stress joints 1/16"-1/32" thick infill of very soft carbonate near 79', fractures with secondary black mineralization infill near 77.2' R9: 15 minutes 80 No Recovery 79.5-80.5' NR -37.5 Driller's Remark: Will set 80.5 3" NW casing from 45.5-Limestone 75.5' below ground surface 2 80.5-85.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild 80.85' - Bedding plane or fracture, 0-5 deg, Start R-10 at 11:36, rough, undulating, brownish black stains over observed 50-60% core loss 100% surface, open 1/4" HCl reaction, medium strong (R3), 4 81.35, 81.55, 81.65, 81.8' - Bedding plane or weathered, spheroidal 1/8" voids up mechanical break, horizontal, rough, planar, to 30% of surface, poorly open up to 1/8' fossiliferous (casts up to 1/2"), some R10-NO 2 82.0, 82.95' - Bedding plane or mechanical secondary mineral infill (yellowish 82 5 ft gray 5Y 8/1 in color), trace coarse 100% break (2), horizontal, rough, undulating, tight grained sized black particles to 1/4" open 82.8' - Bedding plane or mechanical break, 0 (organics) horizontal, rough, undulating, organic layers <1/16" thick, apparent weathering R10: 8 minutes 85 83.2' - Mechanical break, tight Add 1/4 bag bentonite to 1 $-42.\overline{5}$ 84.4' - Fracture, 80-90 deg, rough, 85.5 mud vat 85.5-90.5' - light olive gray, (5Y 5/2), moderate HCl reaction, medium strong (R3), spheroidal 1/8" voids up undulating, tight 85.45, 85.6' - Fracture (2), 50-60 deg, rough, 0 undulating to 15-20% of surface, moderately 0 fossiliferous (mostly casts of echinoderma up to 5/8", white whole fossils and fragments up to 3/4" in R11-NO 87.6' - Bedding plane, horizontal, rough, 3 size over bottom 89.5-90.5', 3-7% 85 5 ft undulating, brownish black infill 1/16" thick 100% medium to coarse grained black over 85% of surface fragments (organics) also as 3/8" 87.75' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/16"-1/8" long discontinuous laminations less 0 than 3/8" thick, also spiral and 88.0, 88.15' - Fracture (2), horizontal, rough, conical shaped casts up to 3/16" undulating, 1/8"-1" open 88.95, 89.5' - Mechanical break (2), tight R11: 6 minutes 90 0 SC-3 collected at 89.5--47.5 90.5 90.5 90.5-95.5' - yellowish gray with 14:12 Mix 1/8 bag mud to yellowish gray bedding, (5Y 8/1 with 5Y 7/2), silt-sized black particles, 0 vat 1/16" voids on 20-25% of surface. 91.65' - Bedding plane or mechanical break, highly fossiliferous toward bottom 1/3 1 rough, undulating, tight of sample (casts and whole fossils) microforams and fossil fragments R12-NO 92.55' - Mechanical break, 3-5 deg, rough, undulating, tight 93.0' - Bedding plane, horizontal, smooth, 87 1 range from medium to coarse 5 ft 100% sand-sized particles, oval shaped planar, tight, possibly organic layer 93.6' - Fracture, 10-20 deg, rough, fossils approximately 1/8", spiral shaped fossils 3 undulating, 1/8" open 93.85, 94.3' - Fracture, 50-60 deg, rough, R12: 15 minutes >10 undulating, tight -52.5 95.5



PROJECT NUMBER:	BORING NUMBER:
338884.FL	A-11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

SHEET 6 OF 15

	15/5/0 46			000/07	0.000	LOCOED TOWARD MADE	I A Decille
WATER	LEVELS : 1.0	πbgs	s on 4		9/2007		
≷Q₽	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	 8	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ÄAÄ. YAN		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A TIC	J.H.	(%) Q	Ţ.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ω	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무유실	SING	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND	₩.	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	222	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
			•	94.45' - Fracture, 80-90 deg, rough,		Limestone	T. Stewart is the logger.
			3	undulating, tight 94.8-95.2' - Fracture zone	Ш	 95.5-100.5' - yellowish gray (5Y 7/2), strong HCl reaction, very weak rock 	1
-				95.55, 95.7, 96.75' - Bedding plane or	╁┼	(R1), highly fossiliferous (casts,	1
-			>10	mechanical break, horizontal, rough,	╆	molds up to 1/2", microforams), trace	1
-	D42 NO			undulating 97.5-98.2' - Fracture zone, vertical	+	organics as coarse particles and 3/4" long/1/16" wide laminations, trace	l -
1 4	R13-NQ 5 ft	43	>10	97.5-96.2 - Flacture zone, vertical		- cavities rimmed with secondary	_
	100%		. •			mineralization, elongated	
				98.55' - Fracture, 5-10 deg, rough,	Н	3/16"x1/16", 25% medium dark gray	
1 7			2	undulating, tight 98.65, 98.8' - Mechanical break (2), tight	Ш	- (N4) particles in rock matrix 95.5-98.4' friable in places due to	1
100				99.0' - Bedding plane or mechanical break,	$\dagger \Box \dagger$	fossils, majority of fossil content at	R13: 6 minutes
100 <u> </u>			0	horizontal, rough, undulating, 1/8" open —	口	— 98.4-100.5' voids 5-10% up to 1/16",	-
-	100.5				╂╫	interval from 96.5-98.5' extremely weak rock (R0)	-
			0		Д	100.5-105.2' - yellowish gray (5Y	
						7/2), same sequence as R-13; spiral	Driller's Remark: Will set
					П	casts/molded (1/2"-5/8" size) in upper half (100.5-103.0'); less	3" NW casing (25' more)
			2	102.0, 102.35' - Mechanical break or bedding	╁┼	casts/molds in lower half, trace light	Last core run on 4/22/07
-	R14-NQ			plane (2), 3-5 deg, rough, undulating, open	丗	olive gray (5Y 5/2) mottling at 104.0'	1
-	5 ft	82	1	up to 1/8" 102.6' - Bedding plane or mechanical break,	╂┼┼	in lower half (103.0-105.2'), upper	l -
_	94%			horizontal, rough, undulating	口	half of R-14 not friable as is R-13	1
			0	, , ,	Щ	_	_
105			0		Н	-	R14: 8 minutes
-62.5	105.5		NR	-	Ħ		1
-	105.5		INIX	105.5-106.1' - Fracture zone, fragments up to	╁┼┼	No Recovery 105.2-105.5' Limestone	8:05 Start first core run of
-			>10	2"	╆	105.5-110.4' - yellowish gray, (5Y	4/23/07 -
-					ш	7/2), very fine grained, strong HCI	Unable to get water level
				400.051.55.4.00.50.1.	7 I F	. 4/401 1 11 11	
				106 85' - Fracture 60-70 dea rough	Ш	reaction, 1/16" spheroidal voids on	before coring start due to
_			2	106.85' - Fracture, 60-70 deg, rough, undulating, tight	H	20-30% of surface, moderate to	before coring start due to coring barrel being hung – over night
	R15-NQ			undulating, tight 106.95' - Fracture, 20-30 deg, rough,		 20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over 	coring barrel being hung -
-	5 ft	82	1	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight		 20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% 	coring barrel being hung -
-				undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or		 20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts 	coring barrel being hung -
- -	5 ft			undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight		 20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over-first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities-below 107.9'; 15-20% medium 	coring barrel being hung -
-	5 ft		1	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to		20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over-first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles	coring barrel being hung over night
- - - 110	5 ft		1	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to		 20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over-first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 	coring barrel being hung -
- - - 110 -67.5	5 ft		1 2 0	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to		 20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9', 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine 	coring barrel being hung over night
	5 ft 98%		1 2 0 NR	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to		20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular	coring barrel being hung over night
	5 ft 98%		1 2 0	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to		- 20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles	coring barrel being hung over night
	5 ft 98%		1 2 0 NR	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to		 20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 	coring barrel being hung over night
	5 ft 98%		1 2 0 NR	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to undulating, open to 1/16"		- 20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles in rock matrix, microforams up to —1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 110.5-115.5' - Same as 105.5-110.4'	coring barrel being hung over night
	5 ft 98%	82	1 2 0 NR 0	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to undulating, open to 1/16"		20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 110.5-115.5' - Same as 105.5-110.4' except 1/16" spheroidal voids on	coring barrel being hung over night
	5 ft 98% 110.5 R16-NQ	82	1 2 0 NR 0 2	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to undulating, open to 1/16" 112.15, 112.3' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight		20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 110.5-115.5' - Same as 105.5-110.4' except 1/16" spheroidal voids on 5-15% of surface, trace cavities up to 5/8" elongated - rimmed with	coring barrel being hung over night
	5 ft 98%	82	1 2 0 NR 0	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to undulating, open to 1/16" 112.15, 112.3' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight 113.0' - Mechanical break, tight		 20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 110.5-115.5' - Same as 105.5-110.4' except 1/16" spheroidal voids on 5-15% of surface, trace cavities up to 5/8" elongated - rimmed with yellowish gray (5Y 8/1) secondary 	coring barrel being hung over night
	5 ft 98% 110.5 R16-NQ 5 ft	82	1 2 0 NR 0 2 1	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to undulating, open to 1/16" — 112.15, 112.3' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight 113.0' - Mechanical break, tight 113.25' - Mechanical break or bedding plane,		20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 110.5-115.5' - Same as 105.5-110.4' except 1/16" spheroidal voids on 5-15% of surface, trace cavities up to 5/8" elongated - rimmed with yellowish gray (5Y 8/1) secondary mineralization, some cavities	coring barrel being hung over night
	5 ft 98% 110.5 R16-NQ 5 ft	82	1 2 0 NR 0 2	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to undulating, open to 1/16" 112.15, 112.3' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight 113.0' - Mechanical break, tight		20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9', 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 110.5-115.5' - Same as 105.5-110.4' except 1/16" spheroidal voids on 5-15% of surface, trace cavities up to 5/8" elongated - rimmed with yellowish gray (5Y 8/1) secondary mineralization, some cavities horizontally aligned in a 1/2" bed at	coring barrel being hung over night
-67.5 - - - - - -	5 ft 98% 110.5 R16-NQ 5 ft	82	1 2 0 NR 0 2 1	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to undulating, open to 1/16" — 112.15, 112.3' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight 113.0' - Mechanical break, tight 113.25' - Mechanical break or bedding plane,		20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 110.5-115.5' - Same as 105.5-110.4' except 1/16" spheroidal voids on 5-15% of surface, trace cavities up to 5/8" elongated - rimmed with yellowish gray (5Y 8/1) secondary mineralization, some cavities	coring barrel being hung over night
-67.5 - - - - - - - 115	5 ft 98% 110.5 R16-NQ 5 ft 100%	82	1 2 0 NR 0 2 1	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to undulating, open to 1/16" — 112.15, 112.3' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight 113.0' - Mechanical break, tight 113.25' - Mechanical break or bedding plane,		20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9', 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 110.5-115.5' - Same as 105.5-110.4' except 1/16" spheroidal voids on 5-15% of surface, trace cavities up to 5/8" elongated - rimmed with yellowish gray (5Y 8/1) secondary mineralization, some cavities horizontally aligned in a 1/2" bed at	coring barrel being hung over night R15: 10 minutes
-67.5 - - - - - -	5 ft 98% 110.5 R16-NQ 5 ft	82	1 2 0 NR 0 2 1 0	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to undulating, open to 1/16" — 112.15, 112.3' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight 113.0' - Mechanical break, tight 113.25' - Mechanical break or bedding plane,		20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9', 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 110.5-115.5' - Same as 105.5-110.4' except 1/16" spheroidal voids on 5-15% of surface, trace cavities up to 5/8" elongated - rimmed with yellowish gray (5Y 8/1) secondary mineralization, some cavities horizontally aligned in a 1/2" bed at	coring barrel being hung over night R15: 10 minutes
-67.5 - - - - - - - - 115	5 ft 98% 110.5 R16-NQ 5 ft 100%	82	1 2 0 NR 0 2 1 0	undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to undulating, open to 1/16" — 112.15, 112.3' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight 113.0' - Mechanical break, tight 113.25' - Mechanical break or bedding plane,		20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9', 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 110.5-115.5' - Same as 105.5-110.4' except 1/16" spheroidal voids on 5-15% of surface, trace cavities up to 5/8" elongated - rimmed with yellowish gray (5Y 8/1) secondary mineralization, some cavities horizontally aligned in a 1/2" bed at	coring barrel being hung over night R15: 10 minutes



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-11 SHEET 7 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

WATER	LEVELS: 1.0	ft bgs	s on 4	22/07 START : 4/21/2007 END : 5/9	9/2007	7 LOGGER : T. Stewart, R. McCon	nb, A. Bonilla
≥0≥	. 00			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - - 120 -77.5	R17-NQ 5 ft 100%	40	0 >10 >10 7	116.55, 116.7' - Bedding plane or mechanical break, horizontal, rough, undulating, tight to open 1/4" 116.55-117.3' - Fracture zone 118.15-118.45' - Fracture zone 118.5, 118.65, 118.8, 188.95, 119.2' - Bedding plane or mechanical break (5), horizontal, rough, undulating, tight to open 1/4" 119.45' - Fractures (2), horizontal and		Limestone 115.5-120.5' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak to extremely weak (R1 to R0), very fossiliferous (casts, molds, microforams), trace cavities with medium dark gray infill up to 1-1/4", 25-35% medium to coarse grained medium dark gray particles in rock matrix, gray mottling in matrix at 119.0'	SC-4 collected at 115.5- 116.55' - - - - - - R17: 9 minutes
-	120.5 R18-NQ		NR 1 1	vertical, rough, undulating, perpendicular, tight 119.6, 119.8' - Bedding plane or mechanical break (2), 0-5 deg, rough, planar, tight 121.2' - Bedding plane, horizontal, cohesive silt infill on surface, 1/4" thick 121.8, 122.8' - Mechanical break (2), tight		No Recovery 120.5-121.0' Carbonate Silt With Silica Sand (ML) 121.0-121.2' - grayish yellow, (5Y 7/2), wet, strong HCl reaction, 15-25% very fine to fine grained,	9:25 Add 1/4 bag bentonite after emptying mud vat and refilling –
- - 125 -82.5	5 ft 90%	70	6	123.2' - Bedding plane or mechanical break, horizontal, rough, undulating, open 3/8" 123.6, 123.63, 123.65, 123.7, 123.75, 123.8, 124.0, 124.02' - Bedding plane or mechanical break (8), horizontal, rough, planar, tight, dark surfaces, possibly bedding plane of dark — material		clear, subrounded, silica sands, 3-7% very fine to fine grained dark yellowish orange (10YR 6/6) and light brown (5YR 5/6) particles Limestone 121.2-125.5' - yellowish gray, (5Y 7/2), strong HCI reaction, very fossiliferous (microforams, fossil	- - - R18: 13 minutes
- - - - - 130 -87.5	R19-NQ 5 ft 100%	77	1 2 5 1 >10	126.4, 127.05' - Bedding plane or mechanical break (2), horizontal, rough, undulating, tight to 1/4" open 127.5-127.65' - Fracture zone, rock fragments 128.0-128.15' - Fracture zone, angular rock fragments, 1/2"-5/8" 128.25, 128.35, 129.0' - Fracture (3), horizontal and vertical, rough, undulating, open up to 3/4", cavity infilled with gray material at 129'		casts and molds), thinly bedded near 123.5-124.0' with olive gray staining, organic odor from crumbled rock, friable from 121.2' to 123.0', trace cavities up to 3/4" some with white mineralization as 50% infill (rimmed), medium dark gray medium to coarse grained on 25-35% of rock matrix 125.5-130.5' - yellowish gray, (5Y 7/2), strong HCI reaction, very weak (R1), voids (<1/16") over 15-20% (mostly over top 3'), 1/16"k3/16" elongated trace cavities horizontally aligned, cavities in lower 2' have white secondary mineralization	R19: 10 minutes
-87.5 - - - - - - - - - - - - - - - - - - -	R20-NQ 5 ft 98%	D-NQ 5 ft 65	6 4 1 5 2	129.35' - Bedding plane, 10-15 deg, open 3/4" 130.0-130.5' - Fracture zone, vertical 130.55' - Mechanical break or bedding plane, horizontal, smooth, undulating, open 1/8" 131.0' - Mechanical break or bedding plane, horizontal, rough, undulating 131.3, 131.35, 131.4, 131.5, 131.6, 131.65, 131.7, 131.8' - Bedding plane or mechanical break (8), horizontal, rough, undulating, open 1/8" 132.1, 133.0' - Mechanical break (2), tight 132.55' - Bedding plane or mechanical break, horizontal, rough, planar 133.0' - Mechanical break, tight		rimming the outside of the void/cavity, medium dark gray particles up to 10% of rock matrix, trace medium gray cavities up to 3/4" and to trace medium grained black particles/organics throughout entire run; R-19 is highly fossiliferous (microforams and casts/molds)	
	135.5						



WATER LEVELS: 1.0 ft bgs on 4/22/07

PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-11	SHEET	8	OF	15	

ROCK CORE LOG

LOGGER: T. Stewart, R. McComb, A. Bonilla

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

START: 4/21/2007

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

END: 5/9/2007

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

****	LLVLLS . I.	it bg.	J 011 7	22/01 STANT . 4/21/2001 LIND . 3/3	7/200	LOGGER . T. Slewart, R. Miccor	no, 7 t. Borilla					
≥∩≎	. 6			DISCONTINUITIES	g	LITHOLOGY	COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.					
ПОП	Olk	IĽ.	NR/		S		-					
-			1	133.6' - Bedding plane, 0-5 deg, rough, undulating, tight 134.1, 134.35, 134.45, 134.5, 134.8' - Bedding plane (5), horizontal, rough, planar,	Ė	Limestone 130.5-133.65' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak to weak (R1 to R2), grades from a	_					
-	R21-NG		1	open 1/16" - 134.6' - Bedding plane, 0-5 deg, rough, undulating, open to 1/16"	Ħ	very lightly fossilliferous (microforams, molds) to a thinly bedded and laminated very fine	-					
-	5 ft 94%	72	1	135.75' - Bedding plane or mechanical break, - horizontal, rough, undulating, open 1/2" 137.1' - Fracture, 70 deg, rough, undulating,	edding plane or mechanical break, rough, undulating, open 1/2" grained limestone. SC-5 collustrations and SC-5 collustrations and SC-5 collustrations are set of the	SC-5 collected at 138- 138.85' -						
-			1	tight - 138.0' - Bedding plane or mechanical break, horizontal, rough, planar, tight	Ħ	cavities rimmed with white hard mineralization 3/8"x1/8", up to 25% medium grained medium dark gray	- R21: 10 minutes					
140_ -97.5	140.5		>10 NR	138.85' - Mechanical break — 139.2' - Bedding plane or mechanical break,	E	(N4) particles in matrix; very fine grained wavy thinly bedded	Driller's Remark: 139.5' — Started losing water rapidly					
-	- 1		>10	horizontal, rough, planar, top of fractured zone, 2" open 139.5' - Fracture, vertical, rough, undulating		discontinuity at 133.65' 133.65-135.4' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), thinly						
-			2	139.65-139.9' - Fracture zone, subrounded 1/2"- 1-1/8" fragments, black stains over 80% of surface	Ħ	bedded to laminated and alternating beds, wavy thinly bedded discontinuity at 135.2' (load	-					
-	R22-NC 5 ft 100%	80	2	139.95' - Fracture, 70-80 deg, rough, undulating, black stains over 25% of surface, tight		structures) interval, microforams, medium dark gray (N4) particles as above	SC-6 collected at 143.1-					
-	100%		1	140.15-141.25' - Fracture zone, brownish black staining on fragments, possibly weathered	Ħ	No Recovery 135.4-135.5' Limestone 135.5-139.2' - yellowish gray to	143.9' Driller's Remark: 50-75%					
145 -102.5	145.5		1	142.1' - Bedding plane, 10 deg, smooth, undulating, organic layer, 1/16" — 142.4-142.5' - Fracture zone, brownish black	Ė	yellowish gray, (5Y 7/2 to 5Y 8/1), very fine grained, strong HCl reaction, medium dark gray (N4)	circulation loss – R22: 8 minutes					
-	110.0		1	stains over 40% surface 143.1' - Bedding plane, horizontal, rough, undulating, brownsh black stains over 80%	Ė	particles on 15-20% of surface, trace olive gray (5Y 3/2) laminations and wavy bedded discontinuities at 137.5'	-					
_							0	0	0	surface, 1/16" open 143.9' - Bedding plane, 0-5 deg, rough, stepped, tight 145.2' - Bedding plane or mechanical break,	Ħ	139.2-140.2' - strong HCI reaction, strong (R4), white with yellowish gray (5Y 8/1) cavity infilling, 1-1/2" irregularly shaped cavities, poorly
_	R23-NQ 5 ft 100%	100	0	0-9 deg, rough, undulating, 1/4" 146.4' - Bedding plane or mechanical break, horizontal, rough, undulating, tight	Ħ	fossiliferous (casts-spiral shaped up to 3/4" length), trace medium grained black particles (organics)	-					
_			2	148.0, 148.35, 148.5' - Mechanical break, tight 148.9' - Bedding plane, horizontal, 3/8" infill	F	No Recovery 140.2-140.5' Limestone 140.5-143.1' - Same as 139.2-140.2'	-					
150 -107.5	150.5		1	149.0' - Bedding plane, 0-10 deg, rough, undulating, tight to 1/4" open 150.0' - Fracture, 60 deg, rough, undulating,	Ē	except mottled light gray (N7) over 40% of run, trace organics as wavy laminations 3/16", 1/16" spheroidal	R23: 8 minutes					
-			3	tight 150.7' - Fracture, 70 deg, rough, undulating,	H	voids infilled 10-15% 143.1-145.5' - yellowish gray, (5Y	-					
-			4	tight 141.4, 151.5' - Bedding plane (2), horizontal, rough, planar, tight	Ħ	 7/2), strong HCl reaction, strong (R4), bedded, up to 1/8" voids up to 25% of surface (may be microforams 	-					
-	R24-NQ 5 ft	38	1	151.65' - Bedding plane, horizontal, rough, planar, open 3/4", infill of soft fines 152.15, 152.45' - Bedding plane (2),	Ė	 as casts), trace casts of echinoderm fragments, wavy laminations 145.5-149.0' - yellowish gray, (5Y 						
-	96%		4	horizontal and 5 deg, rough, undulating, open 1/16"-3/8", silt infill at 152.15 152.75' - Fracture, horizontal, rough,	E	7/2), strong HCl reaction, medium grained texture, 5-10% elongated cavities (up to 3/4"x1/8") horizontally]					
155 -112.5			5	undulating, tight to open 1/4" 153.6-154.95' - Bedding plane (9), horizontal, rough, undulating to planar, 1/16"-1/4" open	Ħ	aligned and infilled with hard medium to light gray (N6) mineral, trace voids 1/8"x1/16" rimmed with white mineral	R24: 7 minutes					
	155.5				Ħ							

APPENDIX 2BB-123 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL A-11 SHEET 9 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING	METHOD A	ND E	QUIPM	ENT : CME 550 S/N 186073, mud rotary, NQ tools, NW	casin	g	ORIENTATION : Vertical
WATER	LEVELS : 1.0	ft bg	s on 4/	22/07 START : 4/21/2007 END : 5/	9/200	7 LOGGER: T. Stewart, R. McCon	nb, A. Bonilla
≥∩≘	- (%			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
			(NR)		ш	Limestone	T. Stewart/R. McComb are
-			NR			149.0-150.5' - light olive gray, (5Y 5/2), strong HCI reaction, medium strong to strong (R3 to R4), 1/16" voids on 5-10% of surface, trace cavities up to 3/16"x3/16" with	the loggers. Driller's Remark: Will add 3" NW casing to seal off sand
- - - 160	R25-NQ 5 ft 64%	0	NA			grayish yellow (5Y 8/1) infill, poorly fossiliferous (casts up to 3/8") 150.5-153.6' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, weak to medium strong (R2 to R3), dusky yellowish brown (10YR 2/2) wavy laminations, trace of medium	Driller's Remark: 100% circulation loss On the field log the interval that was not recovered (155.5-157.3') appears to be from the top of the core R25: 14 minutes
-117.5	160.5		2	159.9' - Bedding plane, 0-10 deg, rough,	Ħ	grained organics in laminations 153.6-155.3' - light olive gray, (5Y	SC-7 collected at 160.5-
-	160.5		0	planar, contact with silica sand above 160.1' - Bedding plane, 10 deg	Ħ	5/2), strong HCl reaction, medium strong to very weak (R3 to R1), very fossiliferous (microforams), very	- 161.6' - 9:49, 5/1/07 Water level 4.5' below ground surface
-			2	161.6, 162.4, 162.57' - Fracture (3), horizontal, rough, undulating, tight	Ħ	similar to 145.5-149.0', medium to coarse grained plate-like angular fragments, yellowish gray (5Y 8/1) in	7:50, 5/8/07 Water level – approximately 3' below ground surface
-	R26-NC 5 ft 93%	57	5	162.75, 162.95, 163.0, 163.35, 164.25, 164.3, 164.5, 164.6, 164.73, 164.92' - Fracture (10),		COIOr No Recovery 155.3-157.3' Poorly Graded Silica Sand (SP)	Offset approximately 10' to west of A-11 and drill A-11R, lost bit in A-11; tried
-	93%		4	horizontal, smooth, planar, open 163.65' - Fracture, horizontal, rough, stepped, open		- Hoory Graded Sinca Sand (3F) 157.3-159.9' - loose, fine grained, mild to moderate HCl reaction, clear, subrounded sands with trace	fishing for bit on 5/6/07 to no avail; offset A-11 on 5/7/07, drilled 4-7/8"
165			3	164.3-164.5' - Fracture, vertical, stepped, open	ш	carbonate fines, matrix of fines are	borehole to 160', set NW – casing at 160.5'
-122.5	165.5		NR	<u></u>		very pale orange (10YR 8/2), trace light brown (5Y 5/6) and black	R26: 5 minutes
-			2	165.77' - Fracture, horizontal, rough, planar, tight		particles (sum of fines is up to 5%), this sand grades to siltier with depth	-
-	•		3	165.98' - Fracture, horizontal, rough, undulating, open 166.8' - Fracture, <5 deg, rough, stepped,	Ħ	159.9-160.1' - moderate olive brown, (5Y 4/4), strong HCl reaction, 1/16" elongated voids on 30-35% of	-
-	R27-NG 5 ft	75	1	open 166.95, 167.7' - Fracture (2), <5 deg, smooth,	Ħ	surface, 10° bedding plane disconformity at 160.1'	
-	100%		2	undulating, tight 168.4, 169.51' - Fracture (2), 10 deg and 10-20 deg, smooth, planar, tight	Ē	Limestone And Carbonate Silt (ML) 160.1-160.5' - pale greenish yellow, (10YR 8/2), very stiff, very fine	
170_			2	168.58' - Fracture, horizontal, rough, undulating, open 1/16", silty clayey lining over 80%-90% of surface	H	grained, strong HCl reaction, with 5-10% coarse grained grayish yellow — (5Y 8/4) limestone fragments	R27: 8 minutes
-127.5 -	170.5			169.8' - Fracture, horizontal, rough, undulating 170.05' - Fracture, horizontal, rough,	Ħ	Limestone 160.5-162.2' - yellowish gray, fine	-
-			4	undulating, open 170.7' - Fracture, horizontal, smooth,	H	grained, strong HCl reaction, voids absent to 161.3', 1/16" voids from 161.3' to 161.8' on 5%-10% of]
-	R28-NC		1	undulating, tight, <1/16" brown clay lining over surface 170.95' - Fracture, horizontal, smooth, planar,	Ħ	 surface, fossils casts/molds 162.2-165.15' - dusky yellow, (5Y 6/4), fine to very fine grained, mild to]
-	5 ft 98%	54	3	open, <1/16" silty coating over 100% of surface 171.17' - Fracture, smooth, planar, open	Ħ	 moderate HCl reaction, weak (R2), becoming (R2) weak rock from]
-			4	171.5' - Fracture, 40 deg, rough, stepped, tight 172.2' - Fracture, 60 deg, rough, undulating,		approximately 163.5' to 164.5', voids variable over interval from 15-20% to <1% in some intervals (especially R2	-
175 -132.5	175.5		3	tight, length is from 172.0-172.9'	Ħ	rock), fractures in 163.7-164.2' — interval, trace organic laminae at 163.2'	R28: 7 minutes
					ſ	-	



PROJECT NUMBER:	BORING NUMBER:
338884.FL	A-11

A-11

SHEET 10 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

	METHOD A			UNITED SEASON TRACTOR. Only elsa Lingui		, , ,	•
				IENT : CME 550 S/N 186073, mud rotary, NQ tools, NW			ORIENTATION : Vertical
WATER	LEVELS : 1.0) ft bg	s on 4		9/200		
≩∩⊋	<u> </u>			DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ATIC	J. H. H.	(%) Q	150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무유실	S S S S S S S S S S S S S S S S S S S	RQD	ZAC ER F	PLANARITY, INFILLING MATERIAL AND	YMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	0,25	ď		THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	1 1, 1 11 1, 1
			NR/ 2	173.15' - Fracture, horizontal, smooth,	Ш	No Recovery 165.15-165.5' - Limestone	
			-	undulating, open 173.7' - Fracture, <5 deg, smooth, stepped,	ш	165.5-166.1' - moderate olive brown.	1
_				tight	Н	(5Y 4/4), strong HCl reaction,	
-			1	174.08, 174.2, 174.35, 164.55' - Fracture (4),	世	- laminated, voids up to 3/8" to 3/4"	-
-	R29-NC			horizontal, smooth, planar, tight (open at 174.35)	ш	covering 50-60% of surface, some cavity infilling with gray limestone	_
_	5 ft	51	10	174.7' - Fracture, horizontal, smooth, planar,	ш	- (nodules/intraclasts), trace fossil	_
_	94%			open, <1/16" thick brown clay over 100% of	Н	molds and casts	_
			>10	surface 175.1' - Fracture, <5 deg, rough, stepped,		166.1-166.8' - yellowish gray to very light gray, (5Y 7/2 to N8), very fine	
			/10	open	Ш	grained, strong HCl reaction, 1/16"	1
180			>10	175.6' - Fracture, <5 deg, smooth, stepped,	ш	voids on 5-10% of surface, cavities	R29: 6 minutes
-137.5				open, dark brown to black stain over — 95%-100% surface	\vdash	— (>5) 3/8"x3/16", fossil casts/molds common	-
-	180.5		NR	176.1' - Fracture, horizontal, rough, stepped,		166.8-170.5' - yellowish gray to	-
-			1	open .	Щ	 dusky yellow, (5Y 7/2 to 5Y 6/4), fine] -
-				177.1' - Fracture, horizontal, smooth, planar,	Ш	to very fine grained, moderate to]
			ا م	tight 177.6, 177.7, 177.82' - Fracture (3),	Н	strong HCl reaction, becoming stronger with depth (up to R2), voids	
			3	horizontal and <10 deg, smooth, planar, tight	Ш	up to 1/16" on 15-25% of surface	1
_	R30-NC	! !		177.9' - Fracture, 0-40 deg, smooth, stepped,	ш	with some zones of very fine grained	1
-	5 ft	46	2	open, dark brown/black stain over 40% 178.1-178.4' - Fracture zone, 0-60 deg,	ш	limestone with 0% voids, cavities rare, laminated from 167.6-167.8'	-
-	100%			rough, undulating, open	\vdash	(very weak rock [R1]), some	-
_			4	178.55' - Fracture, <5 deg, smooth,	Н	brownish gray to light gray mottling	1 -
l _				undulating, open 179.17' - Fracture, horizontal, rough,	ш	especially from 168.7-169.3' - 170.5-175.1' - dusky yellow to	_
185			3	stepped, open	Н	yellowish gray, (5Y 6/4 to 5Y 7/2),	R30: 9 minutes
-142.5	185.5		٥	179.25-181.2' - Fracture zone, rough to	\vdash	moderate to strong HCl reaction,	
-				smooth, planar to undulating, open to tight 180.8' - Fracture, <5 deg, rough, stepped,	ш	voids up to 1/16" over 10-15% of surface, 3/8"x3/16" cavities, trace	1 7
-			4	open	ш	fossil molds//casts, laminated at	-
-				181.8, 181.87' - Fracture (2), horizontal,	ΗП	 171.0', fine grained with occasional 	-
_			7	smooth, planar, open	\vdash	thin beds of very fine grained	-
_				182.0' - Fracture, 0-90 deg, smooth, undulating, tight	Н	limestone with few voids especially near base of interval	_
	R31-NC	62	0	182.6' - Fracture, <5 deg, rough, undulating,	Ш	175.1-175.4' - dusky yellow, (5Y 6/4),	
	5 ft 99%	02		open		strong HCl reaction, laminated with]
-				182.95' - Fracture, 40 deg, rough, undulating to stepped, tight	П	 black organic laminae, minimum voids and cavities covering 50-60% 	1
-			1	183.65, 184.4, 186.4' - Fracture (3),	Ľ	of surface	-
-				horizontal, rough, undulating, open	Ш	- No Recovery 175.4-175.5'	R31: 8 minutes
190 -147 5			5	183.8' - Fracture, 0-<5 deg, smooth, planar to _ stepped, open	Ш	Limestone 175.5-180.2' - variegated dusky	-
-147.5	190.5		NR/	184.17' - Fracture, horizontal, smooth, planar,	曱	- yellow to light olive brown, (5Y 6/4 to	
			NR /	tight	H	5Y 5/6), fine grained, moderate to	End drilling on 5/8/07
			+	184.93, 185.2' - Fracture, rough, undulating,	Ш	strong HCl reaction, very weak (R1), light gray mottling (N8), fine grained	Water level 3.5' below
_				tight 185.25' - Fracture, 40-50 deg, rough,	\Box	limestone especially from	ground surface on 5/9/07 - Begin drilling at 190.5' on
-			3	undulating, tight	口	176.8-177.8', voids (1/16") common	5/9/07
-	R32-NG			185.95, 186.0' - Fracture, horizontal, smooth,	+	in fine grained material up to 15-20%	SC-8 collected at 191.15-
-	5 ft	40	2	open 186-186.4' - Fracture, vertical, rough,	П	of surface, some cavities up to 3/8"-3/4"x3/8" deep, voids 1-3% in	192'
l _	90%			undulating, tight	Н	very fine grained material, some]
			,	186.4' - Fracture, horizontal, rough,		cavity infilling, laminated very weak	
-			4	undulating, open 186.6, 186.7' - Fracture, <5 deg, rough,	\mathbb{H}	rock from 177.9-180.2' with black carbonaceous material]
195			>10	undulating, open	ш	No Recovery 180.2-180.5'	R32: 6 minutes
-152.5			NR	186.95' - Fracture, <5 deg, rough, stepped,	H	<u> </u>	-
<u> </u>	195.5		INIX	open	柙		_
1		l			1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-11	SHEET	11	OF	15

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

WATER	LEVELS : 1.0	ft bg	s on 4/	22/07 START: 4/21/2007 END: 5.	/9/200	7 LOGGER: T. Stewart, R. McCon	nb, A. Bonilla
> 0 00	(9			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE	S.E.A	Q D (%)	F.00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FFF	ORE	ØΒ	RAC ER F	PLANARITY, INFILLING MATERIAL AND	ΥMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	225	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	,, -
			2	187.05-187.2' - Fracture zone, horizontal, rough to smooth, planar, open	\bot	Limestone - 180.5-180.9' - yellowish gray, (5Y	_
			_	187.8, 188.0, 188.51' - Mechanical break		7/2), very fine grained, moderate HCl	
				188.51' - Fracture, <5 deg, rough, undulating	\top	reaction, weak to medium strong (R2	_
-			2	to stepped, open, black carbonaceous material over 40% in upper surface	F	 to R3), voids/cavities absent to <1%, fossils absent 	Driller's Remark: 197' 50%
-	R33-NG			189.55' - Fracture, <5 deg, rough, stepped,		180.9-181.6' - variegated light olive	loss of circulation -
-	5 ft 100%	54	3	open 189.65, 190.65, 190.8, 190.97' - Fracture (4),	╁	brown with thin very dark gray/black carbonaceous/organic laminae, very	-
-	100 /6			horizontal, smooth, planar, open	ፗ	weak rock (R1), <1/16" voids over	-
-			>10	189.96' - Fracture, <5 deg, rough, undulating,	+	- 10-15% of surface, cavities absent	-
-				tight 190.05' - Fracture, horizontal, smooth, planar,	+	181.6-183.8' - dusky yellow to yellowish gray, (5Y 6/4 to 5Y 7/2),	R33: 6 minutes
200 <u>-</u> -157.5			6	open, black carbonaceous material on 30% -	#	moderate HCl reaction, voids	
-107.5	200.5			of surface 190.15' - Fracture, <5 deg and 30 deg, rough,	╀	covering 50-60% up to cavity size ranging from 3/4" to 1-3/16"x1/8" to	_
_			>10	undulating, open	\perp	3/4", fossil voids and casts common	_
l -				191.15' - Fracture, horizontal, smooth, planar,	上	with some clasts/nodules/cavity	<u> </u>
l _			>10	tight 191.95, 192.65, 194.05' - Fracture (3), 30 deg	\bot	infilling 183.8-185.5' - yellowish gray, (5Y	_
_			- 10	and 40 deg, rough, undulating, open	上	7/2), fine grained, moderate to strong	_
	R34-NG		>10	192.3, 192.4' - Fracture (2), <5 deg, rough, undulating, open	\vdash	HCI reaction, weak to medium strong (R2 to R3), variegated very light gray	
_	5 ft 60%	0	>10	193.4' - Fracture, 20 deg, rough, undulating,		(N8), predominantly very fine grained	_
_				open 193.55' - Fracture, 70-80 deg, rough,		with some fine grained thin beds and laminae, voids on 20-30% of surface,	-
_				stepped, open	1	voids on 1-2% of surface in very fine	-
205			NR	194.55-194.85' - Fracture zone, gravel	仁	grained materials	R34: 4 minutes
-162.5	205 5			194.85, 195.5' - Fracture (2), horizontal, _ rough, undulating, open and tight	廿	185.5-187.8' - yellowish gray with very light gray mottling, (5Y 7/2 with	
-	205.5			196.25' - Fracture, 50 deg, rough, undulating,	╨	 N8), moderate to strong HCl 	-
-			>10	open 197.3' - Fracture, <5 deg, rough, stepped,	+	reaction, fine to very fine grained nodules, voids and cavities up to	-
-			>10	tight	-	- 3/8"-3/4"x3/16"-3/8' over 50-60% of	-
-			>10	197.43, 197.65' - Fracture (2), horizontal and <5 deg, smooth, undulating, tight	+	surface, voids in very fine grained intervals on 3-5% of surface, fossil	Note: Not sure where
_	DOE NO			197.8' - Fracture, horizontal, smooth, planar,	丰	- voids/casts common, abundant	missing intervals actually -
-	R35-NQ 5 ft	0		tight	╀	cavities 70-80% from 187.2-187.75'	occur, assumed missing
_	30%			198.25' - Fracture, <5 deg, smooth, undulating to planar, open	\mathbf{P}	187.8-188.93' - yellowish gray, (5Y - 7/2), black and dark gray mottled,	interval from bottom of core run, however, texture -
_			NR	198.5-199.60' - Fracture zone, 0-90 deg,	上	very fine grained, moderate to strong	of limestone very variable
-				rough, undulating to stepped, open 199.68' - Fracture, 40 deg, rough, undulating,	\perp	HCl reaction, laminated (black carbonaceous /organic laminae).	indicating that missing zones are interspersed –
210_				open		voids over 5-10% of surface	throughout interval
-167.5	210.5			200.07' - Fracture, smooth, stepped to planar, tight	片	188.93-190.45' - Same as - 185.50-187.8' except thinly bedded	R35: 4 minutes
				200.17-200.3' - Fracture zone, <5-90 deg,	\vdash	very fine to fine grained	
1			>10	rough, stepped, tight 202.5-203.5' - Fracture zone, 0-90 deg, rough	\mathbf{H}	No Recovery 190.45-190.5' Limestone	·
_				to smooth, planar to undulating, tight to open	\perp	190.5-195.0' - yellowish gray, (5Y]
-			3	205.5-206.7' - Fracture zone, 0-<5 deg, rough	1	7/2), very fine grained, mild to	-
-	R36-NG	!		to smooth, planar to undulating, tight to open 206.7-207.0' - Fractures, 60-80 deg, rough to	二	 moderate HCl reaction, chalk-like grained, voids and cavities up to 	-
-	5 ft 64%	9	10	smooth, planar to undulating, tight	世	3/4"x3/16" covering 5-15% of	
-	0470			210.52-210.8' - Fracture zone, various fracture angles, rock fragments	$+$ \square	 surface, laminated in upper 0.5', variegated browns and grays (few 	-
-				210.8' - Fracture, 0-50 deg, rough,	士	fossils voids/casts), becoming more	-
l			NR	undulating, open 211.15-211.4' - Fracture zone, rough to	+	common with depth, becoming coarse grained with depth	R36: 4 minutes
215 <u>-</u> -172.5				smooth, undulating to planar, gravel-sized	+	No Recovery 195.0-195.5'	_
1,72.5	215.5			fragments, open	+	· · · · · · · · · · · · · · · · · · ·	_
I							



FRACTURES PER FOOT

>10

>10

>10 8

NR

3

NR

>10

>10

0

NR

>10

NR

0

RQD(%)

WATER LEVELS: 1.0 ft bgs on 4/22/07

CORE RUN, LENGTH, AND RECOVERY (%)

R37-NQ

5 ft

52%

R38-NO

15%

R39-NO

5 ft

50%

R40-NO

5 ft 0

10%

0 5 ft

DEPTH BELOW SURFACE AND ELEVATION (ft)

220

-177.5

225

-182.5

230 187.5

235 -192.5 230.5

235.5

225.5

220.5

PROJECT NUMBER:	BORING NUMBER:				_
338884 FI	Δ-11	QUEET	12	ΩE	

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724091.7 N, 457813.3 E (NAD83)

START: 4/21/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

211.8' - Fracture, horizontal, smooth, planar,

211.65' - Fracture, horizontal, smooth,

212.3' - Fracture, horizontal, rough, undulating, open 212.5-212.7 and 212.85-212.95' - Fracture

zone, <5 deg, rough, undulating, open

213.4' - Fracture, <5-70 deg, rough,

213.55' - Fracture, <5-90 deg, rough

215.5-215.75' - Fracture zone, various

216.15' - Fracture, 0-40 deg, rough,

undulating, open, black staining on 85-90%

fracture orientations, gravel-sized fragments,

215.75' - Fracture, 0-<5 deg, rough, stepped,

undulating, open 216.15-217.1' - Fracture zone, horizontal,

rough to smooth, planar to undulating, open

217.1' - Fracture, <5 deg, rough, undulating,

217.3' - Fracture, 30 deg, rough, undulating,

220.6' - Fracture, <5-30 deg, rough, stepped,

undulating, open 225.5-228.0' - Fracture zone, 0-90 deg, rough

230.5-231.0' - Fracture zone, rock fragments

217.6-218.1' - Fracture zone, <5-70 deg,

220.95, 221.2' - Fracture, <5 deg, rough,

rough, undulating, open

to smooth, undulating, open

DISCONTINUITIES

ELEVATION: 42.5 ft (NAVD88) $DRILLING \underline{\ CONTRACTOR: Universal\ Engineering\ Sciences,\ Gainesville,\ FL;\ Driller:\ M.\ Boatright;\ Cathead\ Operator:\ G.\ Davis$

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

undulating, tight

undulating, open

of surface

open

open

open

open

tiaht

ORIENTATION: Vertical END: 5/9/2007 LOGGER: T. Stewart, R. McComb, A. Bonilla LITHOLOGY COMMENTS 90 ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 195.5-197.5' - yellowish gray, (5Y R. McComb is the logger. 7/2), mild HCI reaction, void and cavities up to 3/4" to 1-1/16"x1-3/16" to 3/4" on 20-30% of surface, voids and cavities less common with depth, fossiliferous (molds and casts), some thin carbonaceous laminae 218' circulation 100% loss 197.5-200.5' - yellowish gray, (5Y 7/2), very fine grained, very weak to weak (R1 to R2), 1/16" variable voids on 0-10% of surface, cavities rare (3/16"x3/16"), trace fossil R37: 4 minutes molds/casts, very carbonaceous at 199.75-199.8' with thin occasional black laminae below 200.5-200.67' - very similar to 197.5-200.5', "chalky" with dark brown carbonaceous layers 200.67-202.8' - yellowish gray, (5Y 7/2), mild HCl reaction, voids and cavities covering 80-90% surface up to several inches up to 3/4"-1-3/16" medium grained fossiliferous molds and casts conglomeratic from 201.7-202.0' 202.8-203.5' - yellowish gray, (5Y 7/2), very fine grained, mild HCI R38: 4 minutes reaction, with laminae, 1/16" voids over <1% of surface area No Recovery 203.5-205.5 Limestone 205.5-207.0' - yellowish gray, (5Y 226' Regain approximately 7/2), very fine to fine grained, mild to 20% circulation moderate HCI reaction, voids variable from <1% to over 50%-60% of surface, very fine grained rock contains <1-5% voids No Recovery 207.0-210.5' Limestone 210.5-211.4' - yellowish gray, (5Y 7/2), mild to no HCI reaction, voids up to 1/16" on 35-40% of surface, R39: 3 minutes few 3/8"- 3/4"x3/8" cavities, trace fossils as voids/casts, very fine to fine grained, becoming very fine grained at bottom 0.1', little to no voids, no fossils, medium strong (R3) rock 211.4-212.0' - yellowish gray, (5Y 7/2), fine grained, no to mild HCl reaction, laminated with black carbonaceous/organic material, thin vertical fracture extends from 211.4-211.5'

R40: 3 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-11	SHEET	13	OF	15	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

WATER	LEVELS : 1.0	ff has	s on 4	/22/07 START : 4/21/2007 END : 5/9	3/200.	7 LOGGER : T. Stewart, R. McCon	nh A Bonilla
		it by	J UI 17/	DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱᇷ	RUN H. A VER	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
THE AND	ORE NGT	αD	RACT R F	PLANARITY, INFILLING MATERIAL AND	'MB(AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
교양교	SEE	ñ	R B	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	BIXOLO, TEOLINEOGETO, ETO.
_					Ш	212.0-212.7' - yellowish gray, (5Y - 7/2), fine grained, friable, becoming	
					Ш	coarser grained with depth,	
					Ш	voids/cavities up to	1
_				_	Н	 3/8"-3/4"x1-3/8"-3/4", voids over 30-40% of surface, very weak rock 	1
_	R41-NQ			-	H	(R1)	1
_	5 ft 0%	0	NR	-	Ш	 Limestone 212.7-213.7' - very similar to 	1
-	0,0			-	Ш	210.5-211.4', fine to very fine	1
-				-	ш	 grained, fossil molds/casts common, becoming very fine grained at bottom 	1
				-	Н	0.1' with little to no voids, no fossils,	R41: 2 minutes
240_ -197.5				_	H	— approaching medium strong (R3) No Recovery 213.7-215.5'	_
-	240.5			-	H	Limestone	-
-				-	버	 215.5-217.0' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, 	-
_				-	Ш	very fine grained (chalk-like),	-
-				-	ш	becoming laminated with depth	1 -
_	D42 NO			-	Н	(black to dark gray carbonaceous/organic laminae),	1
_	R42-NQ 5 ft	0	NR	-	H	voids and cavities were common	-
_	0%			-		from 216.6-217.0', voids over 0-1% above grading to 5-10% with depth,	1
_				_	Ш	cavities few, 3/8"x3/16", with fossil	1
_				<u>-</u>	Ш	molds/casts becoming more common with depth, microfractures	na
245_					П	(healed) abundant in upper 0.6'	R42: 2 minutes
-202 <u>.5</u> -	245.5			_	Ш	217.0-218.1' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction,	
l _				_	Н	voids and cavities common (up to	
_				_		several centimeters), fossiliferous (molds/casts) and worm burrows	
_				_		(unfilled-open), gastropods, forams	
					Ш	No Recovery 218.1-220.5' Limestone	No special cores have been pulled since SC-8
	R43-NQ		NR		Ш	220.5-221.25' - yellowish gray to very	because RQDs <0.8' (for a
	5 ft 0%	0	INIX	_		light gray, (5Y 7/2 to N8), moderate HCl reaction, 1/16" voids on 10-15%	continuous length)
_				_	Н	of surface, cavities (up to several	1
_				_	H	centimeters), fossiliferous	1
250				-	Ш	 (casts/molds) becoming less common with depth, "chalk-like" 	R43: 3 minutes
-207.5	250.5			_	Н	texture	
-	_55.5		>10	250.5-250.9' - Fracture zone, gravel-sized	Щ	 No Recovery 221.25-225.5' Limestone 	1
-				rock fragments	Ш	225.5-228.0' - yellowish gray, (5Y	1
_				-	$\vdash \vdash$	 7/2), fine grained, mild HCl reaction, extremely weak (R0), becoming 	
_				-	\Box	more friable with depth, rock strength	
-	R44-NQ			-	H	 decreases with depth, voids/cavities over 30-40% of surface, fossiliferous 	
-	5 ft	0	NR	-	Н	casts/molds, occasionally laminated	-
-	8%		\	-	Ш	No Recovery 228.0-230.5'	-
-				-	Ш	-	-
				-	\vdash	_	R44: 5 minutes
255_ -212.5					\Box	_	_
- · <u>-</u> · ·	255.5				H		_
I							1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-11 SHEET 14 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

WATER	LEVELS: 1.0	ft bgs	s on 4/	/22/07 START : 4/21/2007 END : 5/	9/200	7 LOGGER: T. Stewart, R. McCon	nb, A. Bonilla
≥D₽	<u>(%</u>			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			>10	255.5-256.1' - Fracture zone, gravel-sized rock fragments 256.1' - Fracture, <5-50 deg, rough, stepped, open 256.3, 256.5' - Fracture (2), 0-60 deg, rough,		Limestone - 230.5-231.0' - yellowish brown, (5YR 7/2), no to mild HCl reaction, gravel-sized fragments, cavities and voids on 30-40% of surface, voids up	-
- - - - 260 -217.5	R45-NQ 5 ft 34% 260.5	0	NR	stepped to undulating, open 256.5-256.7' - Fracture, vertical, rough, stepped, open 256.7' - Fracture (2), <5-60 deg, rough, stepped 256.7-257.2' - Fracture zone, open, sand to gravel-size rock fragments		to 3/16"x3/8", fossil voids/casts common No Recovery 231.0-250.5' Limestone 250.5-250.9' - yellowish gray, (5Y 7/2), mild HCl reaction, fossiliferous (casts/molds), voids (<1/16") covering 80-90% of surface No Recovery 250.9-255.5' Limestone	
- - -	200.0		>10	260.5-261.35' - Fracture zone, horizontal and vertical, rough, undulating to stepped, open 261.5' - Fracture, <5 deg, rough, stepped,		255.5-256.1' - yellowish gray, (5Y 7/2), fine to very fine grained, moderate to strong HCI reaction, voids on 20-30% of surface, rare voids in very fine grained limestone,	-
- - - - 265	R46-NQ 5 ft 26%	0	NR	open 261.55' - Fracture, 20 deg, rough, stepped, open 261.7' - Fracture, 20 deg, rough, undulating to stepped		some fossil molds and casts 256.1-257.2' - yellowish gray, (5Y 7/2), moderate to mild HCl reaction, extremely weak (R0), friable becoming gravel to sand-sized limestone fragments with depth, voids over 40-50% of surface No Recovery 257.2-260.5'	- - - - R46: 5 minutes
-222.5 -	265.5		10	265.5-265.7' - Fracture zone, rock fragments	Ħ	Limestone 260.5-261.8' - yellowish gray, (5Y 7/2), laminated from 260.5-261.0', some bluish gray banding at	-
 270 -227.5	R47-NQ 5 ft 8%	0	NR	265.7' - Fracture, horizontal, rough, undulating, open 265.8' - Fracture, <5 deg, rough, undulating, tight		sofile bluish gray bailding at 261.5-261.6', very weak (R1) to extremely weak (R0), voids and cavities rare in upper laminated section becoming common with depth, some fossil casts/molds No Recovery 261.8-265.5' Limestone 265.5-265.9' - yellowish gray, (5Y 7/2), fine to very fine grained, mild HCl reaction, very weak (R1), voids and few cavities, very fine grained limestone containing few <5% voids, cavities 3/8"x3/16", trace fossil	R47: 3 minutes
-227.5 - - - - - - - 275 -232.5	270.5 R48-NQ 5 ft 1 70%	0	>10 4 >10 10 NR	270.5-271.25' - Fracture zone, variable fracture orientation 271.25' - Fracture, 40 deg, smooth, planar, open 271.75' - Fracture, horizontal, smooth, undulating to planar, open 272.0' - Fracture, 10 deg, smooth, planar, tight 272.18' - Fracture, 40 deg, smooth, stepped, loose, conical in shape 272.35' - Fracture, horizontal, smooth, stepped, tight 272.5, 272.62, 272.73, 272.95, 273.03' - Fracture (5), horizontal, smooth, planar, open		cavities 3/8 x3/16°, trace rossil voids/casts No Recovery 265.9-270.5' Limestone 270.5-271.9' - yellowish gray, (5Y 7/2), very fine grained, moderate HCI reaction, gravel-sized limestone to 271.25', voids and cavities becoming more common with depth, sparse through upper part of interval	R48: 6 minutes
-232.5	275.5						

APPENDIX 2BB-129

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-11	SHEET	15	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

WATER	LEVELS : 1.0) ft ba	s on 4	/22/07 START : 4/21/2007 END : 5/	9/200	7 LOGGER : T. Stewart, R. McCon	nb, A. Bonilla
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
 280 -237.5	R49-NQ 5 ft 26% 280.5	0	>10 0 NR	273.6' - Fracture, horizontal, smooth, undulating, tight 273.8' - Fracture, <5 deg, rough, stepped 273.8-274.0' - Fracture zone, various fracture angles, rock fragments 275.5-275.95' - Fracture zone, variable fracture orientation, rock fragments 275.95' - Fracture, <5 deg, rough, stepped, open 276.3' - Fracture, <5 deg, rough, undulating, open 276.3-276.8' - Fracture zone, smooth to rough, planar to undulating, variable fracture		Limestone 271.9-274.0' - yellowish gray, (5Y 7/2), moderate to strong HCI reaction, becoming stronger at 273.6-273.8' (R2) and returning to very weak rock below 273.8', very fine grained (chalky), voids covering 5-10% of surface, laminated in upper 0.5-0.7', trace cavities (3/8"x3/8"), trace fossil molds/casts, gravelly and blue with some black carbonaceous/organic material No Recovery 274.0-275.5' Limestone 275.5-276.8' - yellowish gray to very	R49: 4 minutes
285 -242.5 	R50-NQ 5 ft 64%	0	>10 3 >10 1 NR	orientation, rock fragments 280.5' - Fracture, <5 deg, rough, stepped, open 280.5-281.8' - Fracture zone, numerous fractures, some vertical 282.2' - Fracture, <5-40 deg, rough, stepped, open		light gray, (5Y 7/2 to N8), fine to very fine grained, mild to strong HCI reaction, light gray thin bed at 276.55', voids and cavities common up to 3/8"-3/4"x3/16"-3/8", voids and cavities on 40-50% of surface, rock (except for N8 limestone where voids are absent), fossil casts/molds, strong HCI reaction for very fine grained N8 rock No Recovery 276.8-280.5' Limestone 280.5-282.75' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCI reaction, voids and cavities common over 60-70% rock with occasional intraclastic limestone rock fragments (darker gray) with cavity infilling, cavities 3/8"-3/4" to 3/16"-3/8", fossiliferous (molds and casts) 282.75-283.7' - variegated pale blue to yellowish gray, (5PB 7/2 to 5Y 7/2), fine to medium grained, mild to moderate HCI reaction, becoming laminated with depth, fossil casts/molds common in upper 0.3' (gastropods), voids and cavities present (up to several centimeters) No Recovery 283.7-285.5' Bottom of Boring at 285.5 ft bgs on 5/9/2007	R50: 3 minutes Total Depth is 285.5', no special cores since SC-8, no lengths >0.8'



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-12	SHEET	1	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit

ORIENTATION · Vertical

DRILLIN	G METH	DNA DC	EQUIPMI	ENT : CME 550 S	/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 5.3 ft bo	s on 05/0	03/07	START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb
				STANDARD	SOIL DESCRIPTION COMMENTS
(#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL ON		RECOVE	RY (ft)	TEST NESOLIS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
TH YEAC			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
DEPTH BELOW SURFACE AND ELEVATION (ft)			# · · · · L	(N)	\times \sqrt{\sq}}\sqrt{\sq}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}
42.1	0.0				Poorly Graded Sand (SP)
		1.0	SS-1	1-2-2 (4)	0.0-0.8' - light gray, (N7), moist, very loose, very fine to fine grained, trace nonplastic fines, black (N1) Water level is based on Ground Water
-	1.5			(+)	organic bed with plant roots at 0.2-0.3', sand is silica Monitoring at LNP site (FSAR Table
-					
-					\loose, very fine to fine grained, approximately 20%
-					nonplastic fines, gradational contact with overlying material, sand is silica
-					malenal, sand is silica
-					-
-					-
					-
5 37.1	5.0				Silty Sand (SM) Water table about 5' below ground surface
" -		ا ـ ر ا	00 -	4-4-4	5.0-5.5' - yellowish gray, (5YR 7/2), wet, loose, very
-		1.3	SS-2	(8)	fine to fine grained, grading more silty with depth, approximately 46% nonplastic fines, sand is silica
-	6.5				Lean Clay (CL)
_					\ 5.5-6.3' - light olive gray with dusky yellow mottling, │
_					(5YR 5/2 with 5YR 6/4), medium stiff, medium plasticity, no dilatancy, with increasing plasticity and
					less sand at 6.0', 10% very fine grained silica sand
					1
					1
10	10.0				1
32.1	10.0				Silt (ML)
-		1.1	SS-3	20-29-50	10.0`11.´1' - grayish orange, (10YR 7/4), wet to moist, hard, nonplastic, rapid dilatancy, moderate to strong
-	11.5			(79)	├ HCl reaction, 10-15% very fine grained sand, all
-	11.5				\carbonate \
-					-
-					-
-					-
-					-
-					-
_					<u> </u>
15 <u> </u>	15.0 15.3	0.0	CC 4	50/2 F	No Deceyany 15 0 15 2!
	13.3	0.0	SS-4	50/3.5 (50/3.5") /	No Recovery 15.0-15.3'
_				(11111)	<u> </u>
]
]
					1
					1
					1
-					1
20					1
20					



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-12	SHEET	2	OF	10

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit

WATER	WATER LEVELS: 5.3 ft bgs on 05/03/07				START : 5/2/2007 END : 5/4/2007 LOGGEF			R: W. Elliott, R. McComb				
				STANDARD	SOIL DESCRIPTION		C.	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG					
H H H H		RECOVE	RY (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLO	DR,	임	DEPTH OF CASING, DRILLING RATE,				
H H A		1.20012	#TYPE	011 011 011	MOISTURE CONTENT, RELATIVE DENSITY CONSISTENCY, SOIL STRUCTURE, MINERAL	OR	ABO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
			#IYPE	6"-6"-6" (N)	GONOIGTENOT, GOIE OTTIGOTOTIE, WIINETUNE	.001	SYI	INCTIONENTATION				
22.1	20.0			, ,	Silty Sand With Limestone (SM)		П					
-	1	1.0	SS-5	24-21-22	20.0-21.0' - grayish orange, (10YR 7/4), wet, d	ense,		-				
-	-	1.0	33-3	(43)	fine to coarse grained, moderate HCl reaction, nonplastic fines, 30% fine to coarse gravel size	24%	1.1:1.1	-				
	21.5				to 1"), fragments are very porous and fossilifer	ous, all		_				
l .					carbonate			_				
						1						
-	1					=		_				
-	1					-		-				
-	1							-				
-	-					4		-				
25_	25.0							_				
17.1	1	0.7	SS-6	12-50/4.5	Silty Sand (SM) 25.0-25.7' - Same as 20.0-21.0' except 25-30%	<u>,</u>]:						
	25.9		000	(62/10.5")	nonplastic fines, 25% fine gravel sized	° /†	ŀЦŀ					
-	1					1		_				
-	1					1		_				
-	1					- 1		-				
-	-					-		-				
-						_		-				
								_				
Ι.								Driller's Remark: Soft at 28.5'				
30	30.0					1		_				
12.1	00.0				Silty Sand With Gravel (SM)	1	H	_				
-	1	1.0	SS-7	20-11-15	30.0-31.0' - Same as 20.0-21.0' except dark ye	ellowish -		-				
-	1	1.0	00 /	(26)	orange, medium dense		1.11.	-				
-	31.5					4		-				
_	1							_				
								Driller's Remark: Harder at 32.5'				
-]					1		1				
-	1					1		1				
-	1					- 1		-				
	35.0							Driller's Remark: Switch to NQ at 35'				
35_ 7.1	35.1	0.0	SS-8	50/1	No Recovery 35.0-35.1'	- , 	_					
] ··· -	-			(50/1")	Begin Rock Coring at 35.0 ft bgs			-				
-	1				See the next sheet for the rock core log	4		_				
l .]											
I -]					1		Ī				
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-12

SHEET 3 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

	, <u>.</u>		<u> </u>	1211 . ONE 330 3/11 1000/3, Indu totally, 11Q 10013, 11VV	000		ONENTATION: Vertical
WATER	LEVELS: 5.3	ft bg	s on 0	5/03/07 START : 5/2/2007 END : 5/	4/2007	LOGGER: W. Elliott, R. McComb)
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	F06	DOOK TVDE 201 00	
O A A	3 4 5	(5)	FRACTURES PER FOOT	DEGOMETION	<u> </u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACE	I RES	(%) Q	ĬξĞ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무유한	8888	Ø	A A C	PLANARITY, INFILLING MATERIAL AND	₽	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
		ď	F F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	·
7.1	35.0		_		Ш	Limestone	HW casing set at 35'
-			2	35.4' - Fracture, <5 deg, rough, stepped,	+	- 35.0-39.9' - moderate yellowish	1
-	-			open .		brown, (10YR 5/4), fine grained, mild HCl reaction, very weak (R1),	-
_			3	35.6' - Fracture, 0-40 deg, rough, stepped, tight	₽₩	- becoming extremely weak (R0) and	
			ľ	36.05' - Fracture, 40-70 deg, rough, stepped,	Н	friable at 38.9-39.3', fossiliferous	
_	R1-NQ			approximately 0.3-0.4' long, open to tight		(molds and casts) with voids	1
-	5 ft	50	0	36.2' - Fracture, 40-70 deg, rough, stepped,	╁┷╂	- covering 50-60%, cavities >5 up to	1
-	98%			approximately 0.3-0.4' long, open to tight	╂┼╂	3/8"-3/4"x3/16", mottled, less voids	-
			1	36.8' - Fracture, 30 deg, rough, undulating,		through extremely weak rock zone	
			'	tight 38.2' - Fracture, 70 deg, rough, undulating,	Н		
-				tight	1 1	-	R1: 6 minutes
-			3	39.05, 39.25, 39.5' - Fractures (3), <5-90	口	-	-
40	40.0		NR.	deg, rough, stepped, tight to open	╀┼┤	No Recovery 39.9-40.0'	_
2.1			0			Limestone	
I -			U		Ш	40.0-43.2' - Same as 35.0-39.9'	1
-	1			•	₩	except with interbeds of very weak to	1
-			2		ш	extremely weak (R1 to R0) rock at	1
_				41.65' - Fracture, 60 deg, rough, stepped,	Н	40.5-41.3'	
	R2-NQ			open	Н		
_	5 ft 64%	8	>10	41.9' - Fracture, 40-60 deg, rough, stepped, open	Ш	=	1
-	0-7/0			42.3-42.9' - Fracture zone, <5-90 deg, rough,	╁┼┤	-	1
_				stepped to undulating, open	Ш	No Recovery 43.2-45.0'	Driller's Remark: Very soft
l _					ш	_	drilling at 43.5'
			NR		Н		R2: 3 minutes
45	45.0				П	-	1
-2.9	40.0			45.0-45.3' - Fracture zone, <5-90 deg, rough,	╂┼╂	Limestone	
-			>2	stepped, open	ш	- 45.0-48.4' - moderate yellowish	-
l -				45.65' - Fracture, horizontal, rough,	$oldsymbol{H}$	brown, (10YR 5/4), fine grained, mild	
				undulating, tight	Н	HCl reaction, very weak (R1),	
_			1	46.3' - Fracture, horizontal, rough, undulating, open	Ш	 fossiliferous (casts/molds), voids typically up to 1/16" over 40-50%, 	1
-	R3-NQ			орсп	╁┼┤	cavities (>5) up to	1
-	5 ft	47	3	-		- 1-3/16"-1-9/16"x3/8" (fossil casts),	-
I -	68%			47.7' - Fracture, 10 deg, rough, planar, tight	Щ	cavities more common from	l J
			3	47.8' - Fracture, 60 deg, rough, planar, tight	H	45.0-46.0']
1 -				47.9' - Fracture, <5 deg, rough, undulating,	口	No Recovery 48.4-50.0'	1
-			NR	open 48.0' - Fracture, 40 deg, rough, planar, open	╁┴╂	-	R3: 3 minutes
-			1411	48.2' - Fracture, <5 deg, rough, undulating,		-	
50	50.0			open	口		
-7.9			۱ ۵	48.25' - Fracture, 80-90 deg, rough,	$\vdash \vdash \vdash$	Limestone	7
_			10	undulating, tight 50.4-51.1' - Fracture zone, 0-90 deg, rough,	ш	 50.0-54.2' - Same as 45.0-48.4' except becoming mottled with 	1
-				undulating to stepped, open to tight	\Box	brownish gray patches of irregularly	1 -
-			1		╂┼╂	- distributed finer grained limestone	-
I -				54.01 Freeture 20.20 des securit	Ш	_	l J
	R4-NQ		آ _م ا	51.9' - Fracture, 20-30 deg, rough, undulating, tight	H]
1 -	5 ft 84%	68	2	52.1' - Fracture, rough, undulating, tight	Ш	-	1
-	U -1 /0			52.7' - Fracture, 30 deg, rough, stepped to	$+\Box$	-	SC-1 collected at 52.75-
-			1	undulating, tight, very soft on either side of	╂┼┨	-	53.75'
I _			'	fracture	口	_	l J
1				53.7' - Fracture, 40 deg, rough, stepped, open	Ш	No Recovery 54.2-55.0'	R4: 4 minutes
	EE 0		NR		\Box	_ 110 11000 701 9 0-12-00.0	1
55	55.0				\Box		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-12	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 5.3	3 ft bgs	s on 0	5/03/07 START : 5/2/2007 END : 5/	4/2007	7 LOGGER : W. Elliott, R. McComb)
₹ □⊊	(%)			DISCONTINUITIES	ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAC	E RU GTH OVE	(%) O	CTUI	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR	RQ	FRA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-12.9				55.0-55.6' - Fracture zone, 0-90 deg, rough,	ш	Limestone	
_			10	undulating to stepped, open to tight	ш	 55.0-59.8' - Same as 50.0-54.2' except with very fine grained 	
			10	56.0-56.5' - Fracture zone, 0-90 deg, rough, undulating to stepped, open, very soft brown		yellowish gray limestone at 55.7-55.9' (irregular), generally weak (R2) and	
			10	"clayey" infilling at 56.4-56.5'		free of voids and cavities compared	
_	R5-NQ 5 ft	64	2	57.45L Frankus 50 day saveh standad		with adjacent rock, very weak (R1) with thin friable zone of extremely	
_	96%		_	57.45' - Fracture, 50 deg, rough, stepped, tight, black organics over 10-15% of surface	\vdash	weak rock (R0), adjacent to some fracture traces	_
-			1	57.65' - Fracture, 10 deg, rough, stepped, open, black organics over 5% surface	\Box	-	_
-					H	-	R5: 6 minutes
			2	59.3' - Fracture, horizontal, rough, undulating,	H	-	-
-17.9	60.0		NR.	tight	Ħ	— No Recovery 59.8-60.0' Limestone	-
-			0	fine grained sandy carbonate covering 100% of surfaces	Ħ	60.0-61.5' - Same as 55.0-59.8'	-
-					H	-	
-			1	61.55' - Fracture, 0-50 deg, rough, stepped,	Н	61.5-62.3' - moderate yellowish	
	R6-NQ 5 ft	20	10	open 62.0-62.9' - Fracture zone, 0-90 deg, rough,	Н	 brown, (10YR 5/4), mild to no HCl reaction, extremely weak to very 	SC-2 collected at 63.1-
_	96%	20	10	stepped, open to tight, soft clay at 62.1' and 62.3' lining fracture trace		weak (R0 to R1), cavities <1-3%, fossils (casts/molds) absent, thinly	64.1'
_			0	oz.o ming racture race		laminated, mottled.	_
_					\vdash	62.3-64.0' - moderate yellowish - brown, (10YR 5/4), fine to very fine	R6: 7 minutes
-			0			grained, weak to medium strong (R2 to R3), voids up to 1/16" over 5-10%,	Ro. / Illillutes
-22.9	65.0		NR.	_	Н	— few cavities up to 3/16"x3/16", trace	_
-			1		Ш	fossil molds/casts. 64.0-64.8' - Same as 62.3-64.0'	-
_				65.75' - Fracture, smooth, planar, tight, horizontal	扛	 except very weak (R1), thinly laminated at 64.2' (possible 	-
-			10	66.2-67.1' - Fracture zone, 80 deg, smooth, undulating, dominated by fracture trace	Ш	organics), trace fine grained stronger rock	
_	R7-NQ		10	inclined approximately 80 deg from	Ш	No Recovery 64.8-65.0'	
	5 ft 100%	50	10	66.2-68.1', with horizontal fracture at 66.2' 67.3-68.1' - Fracture zone, 80-90 deg, rough,	Ш	Limestone 65.0-69.35' - moderate yellowish	
_			3	undulating, tight to open	Ш	brown, (10YR 5/4), fine to very fine grained, moderate HCl reaction, very	
_				68.55' - Fracture, horizontal, rough, undulating, open	\Box	weak to weak (R1 to R2), voids	D7: 5 minutos
-			3	68.6' - Fracture, 50 deg, rough, stepped,	団	(generally 1/16" or less) over 10-30%, more dense at 65.0-66.0'	R7: 5 minutes
70 <u> </u>	70.0			open 69.35' - Fracture, 40 deg, rough, undulating, —	\Box	and 68.5-69.35', cavities more abundant in same two intervals up to	-
-			2	tight 69.65' - Fracture, horizontal, rough, stepped,		- 3/4"-1-3/16"x3/8", some mottling,	-
-				open 69.8-70.0' - Fracture, 0-90 deg, rough,	\Box	possible void with cavity infilling at 68.5-69.35', very weak (R1) zone at	-
-			1	stepped, open	\Box	 approximately 66.0' 69.35-70.0' - moderate yellowish 	
_	R8-NQ		2	70.2' - Fracture, 0-90 deg, smooth, stepped, open	H	brown, (10YR 5/4), very fine grained,	1
	5 ft 98%	78	2	70.65' - Fracture, 70 deg, rough, undulating, tight	厈	 moderate HCl reaction, weak (R2), thinly laminated, with trace very fine 	Driller's Remark: 80% loss
-			1	71.85' - Fracture, 10 deg, smooth, undulating,	Ħ	grain limestone rock nodules up to 1/8" voids become more common	of circulation water at 75'
_				tight 72.15' - Fracture, 40 deg, rough, stepped,	H	with depth from <1% up to 10-15%	D0: 12 minutes
-			2	open	H	-	R8: 13 minutes
75	75.0				H		

APPENDIX 2BB-134 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-12

SHEET 5 OF 10

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) $DRILLING \underline{\ CONTRACTOR: Universal\ Engineering\ Sciences,\ Gainesville,\ FL;\ Driller:\ M.\ Boatright;\ Cathead\ Operator:\ G.\ Davis$

ORIENTATION : Vertical CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing WATER LEVELS: 5.3 ft bgs on 05/03/07 START: 5/2/2007 END: 5/4/2007 LOGGER: W. Elliott, R. McComb DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -32.9 NR 72.2' - Fracture, 80-90 deg, rough, 70.0-72.6' - moderate yellowish Driller's Remark: Soft undulating, extends to 72.45', open brown, (10YR 5/4), very fine grained, drilling from 75-77 NR 73.95' - Fracture, 0-90 deg, smooth, stepped, weak (R2) with some medium strong tiaht (R3) zones, voids up to 1/16" over 74.1' - Fracture, <5 deg, rough, stepped, 15-20% of core surface, decreasing with depth, rock becoming thinly laminated and weaker with depth, NA open 74.7' - Fracture, horizontal, rough, stepped, R9-NQ SC-3 collected at 77.1punctuated with light gray/yellowish 5 ft 70% 26 1 open, clay (brown) over 90% of surface 78.4 gray very fine grained, (sandy) 77.1' - Fracture, <5 deg, smooth, undulating, irregular-shaped nodules/clasts, 2 open voids generally lacking in lighter Driller's Remark: Advanced gray, very fine grained nodules/clasts 78.45' - Fracture, 0-30 deg, rough, NW casing to 80', regained undulating, open, gravel filled 72.6-74.9' - Same as 70.0-72.6' circulation 78.7' - Fracture, horizontal, rough, undulating, except with thick (6"") beds of 1 R9: 8 minutes yellowish gray, very fine grained open, gravel filled 80 80.0 Driller's Remark: Very hard 79.65' - Fracture, 20 deg, rough, undulating, limestone, weak to medium strong -37 💆 from 80' to approximately tight, black organic film over 100% of surface (R2 to R3), thinly laminated with 3 80.1' - Fracture, horizontal, rough, undulating, organics, in matrix of void/cavity open, dark gray staining over 30% 80.2' - Fracture, horizontal, rough, undulating, characterized limestone No Recovery 74.9-76.5' 3 Driller's Remark: Hard open, dark gray staining over 30% Silt (ML) again at 84' 80.43' - Fracture, horizontal, rough, 76.5-77.1' - moderate yellowish R10-NO brown, (10YR 5/4), wet, soft, rapid dilatancy, mild HCl reaction undulating, open, dark gray staining over 2 5 ft 72% 48 100% 81.05' - Fracture, horizontal, rough, Limestone 1 undulating to stepped, open, brown clay lining 77.1-78.4' - pale yellowish brown to <1/16" thick over 100% of surface dark yellowish brown, (10YR 5/4 to 81.35, 81.5' - Fractures (2), smooth, planar, 10YR 4/2), very fine grained, strong R10: 10 minutes NR black organic stains over 15-20% HCl reaction, medium strong to weak 82.35' - Fracture, horizontal, rough, stepped, (R3 to R2), voids up to 1/16" over 85 85.0 open, brown clay lining (silty and sandy), up 42.9 10-15% decreasing with depth, to 1/16" thick cavities typically 3/8 to 3/4"x1/16" 0 82.65, 83.6' - Fractures (2), <5 deg, rough, (fossil casts/molds), becoming lighter undulating, tight, clayey in color and containing less voids 2 with denth 78.4-79.5' - fine to very fine grained, 86.7, 86.8' - Fractures (2), <5 deg, rough, moderate HCl reaction, very weak to R11-NO smooth, undulating weak (R1 to R2), voids up to 1/16", cavities 1-3/16"-1-9/16"x3/8", clay laminae at 78.3-78.4' (brown, soft) 2 76 5 ft 100% 87.9' - Fracture, <5 deg, smooth, undulating, film of black organic stains over 100% of 79.5-80.0' - very light gray to bluish 2 surface, open white, (N8 to 5B 9/1), very light gray 87.95' - Fracture, 60-70 deg, rough, stepped, mottling, very fine grained, medium R11: 7 minutes strong (R3), voids (up to 1/16" or open 2 88.25, 88.4' - Fractures (2), <5 deg, rough, less) over 3-5%, several cavities up 90.0 stepped, open 89.42, 89.7' - Fractures (2), horizontal, rough, to 3/16"x3/16", several vertical to -47.9 subhorizontal hairline fractures 0 80.0-81.5' - Same as 79.5-80.0' undulating, open except becoming darker (brownish) with depth, cavities common at 80.4' 91.15' - Fracture, horizontal, smooth, 1 undulating, tight 81.5-83.6' - moderate yellowish brown, (10YR 5/4), fine to very fine R12-NO grained, moderate HCI reaction, very 74 3 5 ft 92.4' - Fracture, 40 deg, rough, undulating, weak (R1), voids up to 1/16" over 99% 30-40% surface, cavities up to 92.4-92.95' - Fracture, vertical, rough, 1-3/16"-1-9/16"x2", fossiliferous 2 undulating, tight (molds/casts), extremely weak (R0) 92.95' - Fracture, <5 deg, rough, undulating, rock from 82.35-82.65' R12: 10 minutes No Recovery 83.6-85.0' 2 93.5' - Fracture, 80 deg, smooth, stepped, 95 95.0



PROJECT NUMBER: BORING NUMBER: A-12

ROCK CORE LOG

SHEET 6 OF 10

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

WATER	LEVELS : 5.3	ft bgs	s on 0	5/03/07 START : 5/2/2007 END : 5/	4/200	7 LOGGER: W. Elliott, R. McComb)
≥∩≘	(%)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B	RE RU GTH,	(%) _Q	CTU	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BOL	WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	COF LEN REC	a Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-52.9			(NR)	93.65' - Fracture, <5 deg, smooth, undulating to stepped, tight	ш	Limestone	
			1	94.05' - Fracture, horizontal, smooth,	ightharpoons	 85.0-88.35' - Same as 81.5-83.6' except black organic laminae at 88.0' 	00.4
l _			2	undulating, tight, black organic coating 94.55' - Fracture, 80 deg, smooth, undulating,	厂	and traces of black organic laminae – from 87.0-88.0'	SC-4 collected at 98.15- 99.05'
-	546.110		_	tight	Ш	88.35-89.45' - variegated very pale	_
-	R13-NQ 5 ft	72	0	95.7' - Fracture, horizontal, smooth, planar, open	世	orange and very pale blue, (10YR 8/2 and 5B 8/2), strong HCl reaction,	-
-	98%			96.2' - Fracture, vertical, smooth, undulating, tight	ш	very weak (R1), possibly cavity fill with brownish limestone; fossil	-
-			1	96.75' - Fracture, <5 deg, rough, stepped,	\pm	 casts/molds, voids over 15-20%, few cavities 3/8"x3/16", three 2"x3/16" 	-
-				open 98.15' - Fracture, 60 deg, rough, undulating,		black coated cavities (possible worm	R13: 6 minutes
100	100.0		1	tight 99.05' - Fracture, 60 deg, rough, undulating,	╁	 burrows) 89.45-90.0' - Same as 85.0-88.35' 	1
-57.9	100.0		NR)	tight 100.0-102.0' - Fracture zone, undulating,	F	except fossiliferous, molds/casts and original material	-
_			>10	stepped, horizontal to inclined, open to tight	H	90.0-91.15' - moderate yellow brown,	1
			>10		厈	(10YR 5/4), fine to very fine grained, strong HCl reaction, very weak (R1),]
_			- 10		F	voids up to 1/16" over 40-50%, cavities generally 3/16"x1/16", fossil	_
_	R14-NQ 5 ft	54	1		H	casts/molds with whitish fossil layer	-
-	100%			102.8' - Fracture, <5 deg, rough, undulating,	H	at 90.8', thin discontinuous black organic laminae	-
-			0	tight, clayey	片	_ 91.15-94.95' - yellowish gray, (5Y 7/2), very fine grained, moderate to	-
-					Ħ	strong HCl reaction, very weak (R1),	R14: 5 minutes
105	105.0		1		Ħ	voids 1/16" or less over 1-5% (up to 10-15% at 92.0-92.5'), thinly	End at 13:05 on 5/3/07
-62.9	103.0			104.9' - Fracture, <5 deg, rough, undulating, tight, clayey	世	laminated at 93.8' No Recovery 94.95-95.0'	depth to water 5'3" — Start on 5/4/07 depth to
_			2		Ľ	Limestone	water 5'3"
			10	105.9' - Fracture, 70 deg, rough, planar, open 105.9-107.9' - Fracture zone, 0-90 deg,	\vdash	 95.0-95.7' - Same as 91.15-94.95' 95.7-95.9' - organic zone, thinly 	
_			10	rough, undulating to stepped, open, dominated by vertical fracture that	H	laminated, black peat, soft, platy - 95.9-99.9' - yellowish gray, (5Y 7/2),]
_	R15-NQ 5 ft	40	>10	propagates to 108.9'		fine grained, strong HCl reaction, very weak (R1), voids over 40-50%,	-
-	100%			105.95' - Fracture, 0-90 deg, rough, undulating, open	╀	cavities up to 3/4"-1-3/16"x3/8"-3/4"	-
-			2	108.15' - Fracture, horizontal, rough, stepped, open	П	with thin (1/16"x3/8") black worm tubes, some cavity fill at 97.8-98.0',	-
-				108.4' - Fracture, horizontal, rough,	仠	 fossiliferous (casts/molds) No Recovery 99.9-100.0' 	R15: 7 minutes
110	110.0		>10	undulating, open 109.25' - Fracture, 0-90 deg, rough, stepped,	口	Limestone	-
-67.9	110.0			tight — 109.35-110.0' - Fracture zone, 0-90 deg,	圧	— 100.0-105.0' - Same as 95.9-99.9' 105.0-110.0' - yellowish gray, (5Y	
				rough, stepped, undulating, varying orientations from vertical to horizontal		7/2), fine to very fine grained, strong HCl reaction, very weak (R1), voids	1
			NR	Onemations nom vertical to nonzontal	Щ	covering 10-15% in upper half of]
_					Щ	core, becoming less common with depth; cavities more common in]
_	R16-NQ 5 ft	45			口	upper half also, typically 3/8"x3/16" becoming absent with depth, some	
-	45%			112.75-115.0' - Fracture, horizontal, there are	世	_ molds/casts in upper half, absent	Driller's Remark: Upper
-			0	vertical fracture planes when rock has separated in thin (1/16") slices	世	below. No Recovery 110.0-112.75'	2.75' was lost (soft-no recovery)
-					\Box	-	R16: 7 minutes
115	115.0		0		\perp	-	
110	1 10.0						
					1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-12	SHEET	7	OF	10

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

				12141 : CIVIE 330 3/14 100073, Hidd Totally, 14Q tools, 1144		J	ORIENTATION: Vertical
WATER	LEVELS: 5.3	ft bg	s on 0	5/03/07 START : 5/2/2007 END : 5/	4/200	7 LOGGER: W. Elliott, R. McComb)
I				DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG		
O A E	Z, ₹.Z	_	FRACTURES PER FOOT	DESCRIFTION	<u></u> 0	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
	동토씨	(%) □	28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	O 	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EK	868	OΩ	AC.	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SU	Sää	8	FR.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-72.9				115.0' - Fracture, 0-40 deg, rough, stepped,	+	Limestone	
1 72.5			3	tight		- 112.75-115.0' - yellowish gray, (5Y	_
			ľ	115.6' - Fracture, 0-20 deg, rough, stepped,	Ш	7/2), very fine grained, strong HCl	
-				tight	1—	reaction, very weak (R1), voids <1%,	1
_			2	115.7' - Fracture, horizontal, rough, planar to	₽	- 4-5 cavities at approximately 114.2'	-
				stepped, open	Н	generally 3/8"x3/8", fossils absent	
_	R17-NQ			116.02' - Fracture, horizontal, smooth, planar,		115.0-119.35' - Same as	1
-	5 ft	60	>10	tight	╨	 112.75-115.0' except fossiliferous 	-
	100%			116.65' - Fracture, 0-70 deg, rough, stepped,	┵	zone at 118.5', casts/molds possibly	
				tight	\vdash	original material	Fossiliferous zone at 118.7'
-			0	117.0-117.45' - Fracture zone, 0-90 deg,	+	-	1
_				rough, stepped to undulating, tight to open		-	
				117.72' - Fracture, horizontal, smooth, planar,	Ш	440.05.400.01.0	R17: 9 minutes
100	1,,,,,		>10	tight 119.3-120.0' - Fracture zone, various	1—	119.35-120.0' - Same as	1
120 <u> </u>	120.0			orientations, up to gravel sized limestone	┸	115.0-119.35' except except coarser	
-//.9			1	fragments	Ш	grained (gravelly to sandy), voids and	
I -			'	120.15' - Fracture, 10 deg, rough, undulating,	\Box	- cavities more common than 115.0-119.35'	1
-				open	╁┷	115.0-119.35 120.0-121.3' - yellowish gray, (5Y	-
I _			0	opo	┰	- 7/2), fine grained, strong HCl	
			0			reaction, very weak (R1), voids up to	
-	R18-NQ				ш	1/16" covering approximately	1
_	5 ft	95	0		ᅪ	- 15-20%, few cavities 3/8"x3/8", some	_
	97%					mottling and some nodules of very	
_					1	fine grained limestone with no	1
-			0		L	voids/cavities	-
					Ш	121.3-122.7' - Same as 120.0-121.3'	SC-5 collected at 123.27-
					\vdash	except voids and cavities more	124.3'
-			0		+-	common, covering 60-70% of	R18: 6 minutes
125_	125.0		NR.	_	Щ	surface, fossils (casts/molds)	
-82.9						common 122.7-124.85' - Same as	
_			1	125.45' - Fracture, horizontal, smooth, planar,	1—	120.0-121.3'	1
-				tight	╂┰	No Recovery 124.85-125.0'	-
			0			Limestone	
			U		Ш	125.0-128.5' - Same as	
-	R19-NQ				╁	122.7-124.85' except fine to very fine	-
I -	5 ft	70	0		┵	grained, voids over 1-3%, cavities	<u> </u>
	100%	, 0				rare, some cavity infilling/nodules,	
I -	,			128.0-129.0' - Fracture zone, <5-90 deg,		sharp undulatory contact between	1
I -			>10	rough, undulating to stepped, open to tight	+	_ different color limestone at 125.5'	-
			••	5 , 5	\vdash	(possible stylolite)	
1 -]			129.0' - Fracture, 60 deg, rough, undulating,	1	128.5-129.0' - Same as 125.0-128.5'	R19: 7 minutes
-			10	open, gravel-filled	\Box	except some thin laminae, voids	-
	130.0			129.5-129.9' - Fracture zone, 60-90 deg,	$oldsymbol{\perp}$	becoming more common, transitional	
-87.9				multiple fractures	\vdash	── with 129.0-130.0' 129.0-130.0' - yellowish gray, (5Y	
I -			1	130.1' - Fracture, horizontal, smooth, planar,	+	7/2), fine grained, strong HCl	
I -				open		reaction, very weak (R1), somewhat	
						friable, cavities cover 70-80%, fossil	
I -]		0		1	molds/casts, cavity infillings/nodules	1
-	B00 1:0				+	- 130.0-130.6' - yellowish gray, (5Y	-
	R20-NQ	88	0		┸	7/2), fine to very fine grained, strong	
I -	5 ft 96%	ÖÖ	U			HCl reaction, very weak (R1), voids	1
-	90 /0				-Ш	 over 1-3% of surface, cavities 	-
I -			2	133.15, 133.85' - Fractures (2), horizontal,		1/16"x1/16", thinly laminated, fossils]
				smooth, planar, tight	\vdash	(molds/casts) rare and interlaminated]
-						 between very fine grained limestone 	R20: 7 minutes
-			3			-	-
135	135.0				ш		
					1		
1							l l



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-12	SHEET	8	OF	10	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

WATER	LEVELS : 5.3	ft has	s on O	5/03/07 START : 5/2/2007 END : 5/	4/200	7 LOGGER : W. Elliott, R. McComb	
		n by	. 0.1 0	DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	- FOG	ROCK TYPE, COLOR,	
BH	RUN A.Y.	(%) _Q	FRACTURES PER FOOT	DEDTH TYPE ODIENTATION DOLLOUNEGO	SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
PTH	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	о О	ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SU	응필분	S.	FR.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-92.9			NR/	134.47, 134.62' - Fractures (2), horizontal,	Ш	130.6-132.65' - yellowish gray, (5Y	
-			1	smooth, planar, open 134.72' - Fracture, horizontal, rough to	Ш	 7/2), fine grained, strong HCl reaction, very weak (R1), voids and 	1
-				smooth, stepped, open	Ħ	cavities common covering 50-60% of	-
-			2	135.25' - Fracture, 10 deg, smooth, planar,	Ш	- surface, some fossil molds/casts,	-
-	R21-NQ			tight 136.5' - Fracture, <5 deg, rough, stepped,	ш	some cavity infilling/nodules, some very fine grained thin laminae	-
_	5 ft	86	0	open	Щ	 132.65-134.8' - Same as 	-
_	98%			136.8' - Fracture, <5 deg, rough, undulating,	╌	130.0-130.6' except thinly laminated,	_
_			0	open		very weak (R1), yellowish brown and light olive gray mottling associated	_
			Ü		Н	with laminae, becoming darker with	
			2	139.2' - Fracture, <5 deg, rough, undulating,	Ш	depth, some cavities and voids up to approximately 5-10% coverage	R21: 8 minutes
140	140.0			open		No Recovery 134.8-135.0'	1
-97.9	110.0		NR)	139.3' - Fracture, <5 deg, rough, undulating, — open, gravel between fracture planes	Н	Limestone	Driller's Remark: 80% loss
-			0	open, graver between fracture planes	Ħ	 135.0-135.25' - light olive gray, (5Y 7/2), very fine grained, strong HCI 	of circulation at 140'
-					Н	reaction, very weak to weak (R1 to	-
-			1		ш	R2), thinly laminated, voids <1%	-
-	D22 NO			141.7' - Fracture, <5 deg, rough, undulating,	╁┼	(1/16" or less), 1 cavity 1-9/16"x9/32" (approximately 3/8" deep)	SC-6 collected at 142.88-
_	R22-NQ 5 ft	76	5	open, dark brown organic stains 142.03' - Fracture, horizontal, rough,	\blacksquare	_ 135.25-137.7' - vellowish grav	144.13' -
_	87%			undulating, open with black organic coating		grading to moderate yellowish brown, (5Y 7/2 to 10YR 5/4), fine grained,	_
			0	over 100% 142.15' - Fracture, horizontal, rough,	Ш	very weak (R1), thinly laminated from	_
			U	undulating, open, dark brown coating over		135.25-135.5' and from 137.3-137.7'	
			1	100%	Н	(sharp contact with underlying rock), voids up to 1/16" over 15-20%, few	R22: 10 minutes
145	145.0		NR	142.4' - Fracture, horizontal, rough, undulating, open with black organic coating	Н	cavities generally 3/16"x3/16", trace	1
-102.9	110.0			over 100%	Ш	── fossil molds/casts 137.7-139.2' - Same as	_
-			3	142.5' - Fracture, <5 deg, rough to smooth, undulating, open, no coatings	ш	135,25-137,7' except vellowish gray.	-
-				142.85' - Fracture, 10 deg, smooth,	ш	 (5Y 7/2), voids <3-5%, few cavities 	-
-			1	undulating, tight	+	generally 3/8"x3/16", fossil hash accumulation at 139.0-139.2', some	-
-	D22 NO			144.12' - Fracture, horizontal, rough, stepped, tight	H	- mottling, possible cavity	-
-	R23-NQ 5 ft	97	0	145.1' - Fracture, horizontal, rough,	Ш	infilling/nodules	-
	100%			undulating, open	Ш	139.2-139.9' - yellowish gray, (5Y - 7/2), very fine grained, very weak]
			1	145.8' - Fracture, 50-60 deg, rough, planar, open	Ш	(R1), cleaves very easily due to large	
				145.9' - Fracture, 50-60 deg, rough, planar,	\mathbb{H}	cavities (worm burrows), voids over 1-3% (<1/16") cavities up to	
]			0	open 146.4' - Fracture, horizontal, rough,	Ħ	2"-2-3/8"x3/8"-3/4" (extending	R23: 6 minutes
150	150.0		U	undulating, open	Ш	completely through core), fossil]
-107.9				148.7' - Fracture, <5 deg, rough to smooth,	Ш	— molds/casts (gastropods) No Recovery 139.9-140.0'	
-			0	undulating 150.55' - Fracture, horizontal, smooth, planar,	Ш	Limestone	
-				tight	+	 140.0-142.5' - Same as 139.2-139.9' except becoming grayish yellow at 	-
-			3	150.58' - Fracture, horizontal, smooth, planar, tight	目	140.0' and grading to yellowish	
-	R24-NQ			ายฐาน 150.83' - Fracture, horizontal, rough,	₩	gray/light olive gray (5Y 7/2 to 5Y	-
-	5 ft	70	0	stepped, open	Ш	5/2) with depth, sharp boundary between grayish-yellow and yellowish	-
-	95%				\Box	grey at 140.6', cavities becoming	_
			0		\Box	more frequent/dense with small voids (1/16") covering 10-15% of	
					Щ	limestone, perhaps becoming]
			1		H	somewhat coarser grained in depth	R24: 6 minutes
155	155.0				Ш		1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-12	SHEET	9	OF	10	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

				112141 : ONIE 330 3/14 100073, mad rotary, 149 tools, 1144		.9		ORIENTATION: Vertical
WATER	LEVELS: 5.3	ft bg	s on 0	5/03/07 START : 5/2/2007 END : 5/4	4/200)7	LOGGER: W. Elliott, R. McComb)
				DISCONTINUITIES		Γ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			<u> </u>	SYMBOLIC LOG	⊦	202001	33
U.₹Z	zÃ≿		FRACTURES PER FOOT	DESCRIPTION	5		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
쁍병은	5±6	(%) Q	N N N	DEDTIL TYPE OPIENTATION POLICINIESS	7 ặ		MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
±₹,¥	598) O	PF	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	β		WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
바늘		Ø	RA ER	THICKNESS, SURFACE STAINING, AND TIGHTNESS	😤		CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0716	œ			0)	┸		
-112.9			NR/	154.67' - Fracture, <5 deg, rough, undulating,	Н	1	142.5-144.35' - yellowish gray	
_			2	open -	╁	七	mottled with dusky yellow, (5Y 7/2	1
-				155.25' - Fracture, horizontal, rough to	+	1-	and 5Y 6/4), fine to very fine grained,	00 7 11 1 150 00
			4	smooth, undulating, open 155.85' - Fracture, horizontal, rough, planar, -		1	distinct boundaries between fine and	SC-7 collected at 156.68-
			1		Ъ.	1	very fine grained, voids more common in fine grained material	157.65' -
-	DOE NO			tight 156.7' - Fracture, horizontal, rough, planar,	₩	₽	covering 20-30%, 1-3% voids in very	-
l _	R25-NQ 5 ft	76	1	tight -	Н	L	fine grained material occuring in	
	100%	70	' '	157.65' - Fracture, <5 deg, rough, undulating,		1	irregular-shaped nodules, thinly	
-	10070			open	ш	┢	laminated near top of interval, trace	1
_			4	·	┢	Ł	fossil molds/casts	_
			·	158.45-158.65' - Fracture zone, 70 deg,	Н	1	No Recovery 144.35-145.0'	
_				rough, undulating to stepped, open to tight	T	t	Limestone	R25: 6 minutes
-			1	-		1	145.0-148.7' - yellowish gray to	
160	160.0			450.071.5		1	dusky yellow and light olive brown,	
-117.9				159.87' - Fracture, horizontal, rough,	1	П	(5Y 7/2 to 5Y 6/4 and 5Y 5/2), fine	
-				\undulating, tight	1	\mathbb{H}	grained, strong HCl reaction, weak	-
I _				_	1	L	(R2), voids (<1/16") over 95-100%]
1					1		surface, becoming fossiliferous with	1
-				-	1	H	depth, casts/molds with some	1
_				<u>-</u>	4	L	cavities near base of interval 148.7-149.7' - dusky yellow to	_
						П	moderate olive brown, (5Y 6/4 to 5Y	
_				-	1		5/6), moderate to mild HCl reaction.	1
_				<u>-</u>	4	Ы	very weak (R1), thinly laminated at	-
						П	148.9' and with very fine grained	
						L	beds at 149.0' (yellowish gray)	1
-				-	1	Н	149.7-150.0' - Same as 148.7-149.7'	-
I _				_		L	except very fine grained, few voids	
						П	150.0-151.0' - yellowish gray mottled	
-					1	Н	with dusky yellow, (5Y 7/2 and 5Y	_
I _				_	1	L	6/4), very fine grained, strong HCI	_
							reaction, weak (R2), voids <1/16"	
_				-	1	r	over 1-3%, few cavities	1
_				-	4	L	3/4"-1-3/16"x3/8"	-
							151.0-151.85' - Same as	
_				-		Г	150.0-151.0' except becoming thinly	1
-				-	1	F	laminated with light olive brown (5Y	-
					1	L	5/6) bands, voids over 10-15% surface area	l l
1					1	ľ	151.85-152.5' - light olive brown,	1
-				-	1	F	yellowish gray and light gray, (5Y 5/6,	⊣
1 -				-	1	F	5Y 5/2 and N5), fine to very fine] _
1					1		grained, very weak (R1), thinly	
1 -				-	1	r	laminated, voids and cavities	1
-				_	1	H	covering 40-50% surface (more so in	
1					1		fine grained, darker colored	
				_	1	Γ	material), some fossil hash	1
-				-	1	H	152.5-154.75' - yellowish gray, (5Y	-
				_	1	L	7/2), very fine to fine grained, strong	
1					1		HCl reaction, very weak (R1), coarse	1
1 -				-	1	H	grained at 154.5-154.75', voids	-
I -				_	1	L	covering 10-15% with cavities up to]
					1		3/8"x2" over 10%, grades to fossil	
1 -				<u>-</u>	1	F	hash below 153.8' with fossils (molds/casts) common below 154.5'	1
I -				-	1	F	where rock becomes friable]
					1		No Recovery 154.75-155.0'	
1 -				-	1	r	140 Recovery 134.79-133.0	1
-				-	1	F		-
					1	l		
					1	Г	-	
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L					1	1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-12	SHEET	10	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

00.1				MEINT . CIVIE 990 9/IN 180073, ITIUG TOLATY, I	14 100.0, 1.111	,,,,,,	9		ORIENTATION : Vertical
WATER	LEVELS: 5.3	3 ft bgs	s on 0	5/03/07 START : 5/2/2007	END : 5/4	/200	7	LOGGER: W. Elliott, R. McComl	
>0.0	()			DISCONTINUITIES		(J)		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION		SYMBOLIC LOG		BOCK TYPE COLOR	
E HO	, A A S	(9	FRACTURES PER FOOT	BESSIAI HOIV		2		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AASE	E E	(%) Q	ΤΩ	DEPTH, TYPE, ORIENTATION, ROUG		3OL		WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무류의	SCO	οD	RAC	PLANARITY, INFILLING MATERIA		ME		AND ROCK MASS	DROPS, TEST RESULTS, ETC.
2 2 U	225	ď	FH	THICKNESS, SURFACE STAINING, AND	HIGHTNESS	S		CHARACTERISTICS	Bron o, reon reodero, ero.
							П	Limestone	
-					-		\vdash	155.0-155.25' - light olive gray	-
I _					_		L	mottled with yellowish gray, (5Y 5/2	_
								and 5Y 7/2), strong HCl reaction,	
1 7					_			very weak (R1), thinly laminated with	1
-					_		H	organic material, voids over 20-30%, soft and friable from 155.0-155.1'	-
					_		L	155.25-155.9' - light olive brown, (5Y	
								5/6), very fine to fine grained, strong	
-					-		r	HCl reaction, very weak (R1), voids	1
-					-			(<1/16") covering 60-70% surface,	-
					_		L	trace fossil molds/casts	_
							1	155.9-156.65' - yellowish gray, (5Y	
1 7					_		r	7/2), fine to very fine grained, moderate to strong HCl reaction,	1
-							\vdash	very light gray (N8) interbeds, thinly	
					_		L	laminated, especially from]
							1	156.5-156.65', voids (<1/16")	
1 7					-		r	covering 50-60%, voids <10% in gray	1
-					-		F	very fine grained limestone	-
1 -					_		L	156.65-160.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl	_
								reaction, very weak (R1), becoming	
					-		Г	more coarse grained and more	1
-					-		F	fossiliferous (molds/casts) with	-
_					_		L	depth, voids increase from 1-2%	_
								coverage to 60-70% with depth,	
1 7					_		Г	possible void/cavity infilling from	_
-					-		F	158.0-160.0' (possible nodules/intraclasts)	-
_							L	Bottom of Boring at 160.0 ft bgs on	_
								5/4/2007	
1 7					_		Γ	Si 112001	1
-					-		F		-
I -					_		F		_
							Г		
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-					_		F		-
							1		
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-					_		F		-
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-13	SHEET	1	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

DRILLIN	G METH	OD AND	<u>EQUIPMI</u>	ENT: CME 55 S/N	N 252345; CME 75 S/N 252437, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 2.0 ft bo	gs on 5/6/	07 S	TART : 5/6/2007
>				STANDARD	SOIL DESCRIPTION COMMENTS
A A N	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, 으로 DEPTH OF CASING, DRILLING RATE,
ASE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
40.6	0.0			(N)	Poorly Graded Sand With Organics (SP) Borehole located in staked wetlands area
-	0.0		00.4	0-1-2	0-0.5' - moist, very loose, very fine to fine grained, drill rig and equipment staged on swamp -
-		1.1	SS-1	(3)	30-40% organics and roots, sand is silica mats, surface conditions are dry Poorly Graded Sand (SP)
-	1.5				\ 0.5-1.1' - light gray, (N7), moist, very loose, very fine -
-					to fine grained, trace nonplastic fines, organics decreasing with depth, sand is silica Water table 2.0' below ground surface
-					decreasing with depth, sand is silica Water table 2.0' below ground surface
-					
_					.
_					
_					_
5	5.0				
35.6				110	Silty Sand (SM) 5.0-6.25' - grayish brown, (5YR 3/2), wet, very loose,
_		1.3	SS-2	1-1-2 (3)	very fine to fine grained, 20-25% nonplastic fines,
	6.5				fines appear to be organic material, slight sulfur odor, trace medium to coarse sand-sized grains, iron
<u> </u>					cemented silica sand concretions
					1
-					1
-					1
-					1
10	10.0				1
30.6	10.0				Clayey Sand (SC) SS-3A 10.0-10.2'
-		1.1	SS-3	2-3-7 (10)	\\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-	11.5			(10)	⊤ \fragments incorporated (slough)
-	11.5				Well Graded Sand With Silt (SW-SM) 10.2-11.1' - yellowish gray, (5Y 8/1), wet, loose, fine to Drilling's Remark: Approximately 10% loss of circulation (limestone zones)
-					10.2-11.1 - yellowish gray, (5Y 8/1), wet, loose, fine to - circulation (limestone zones) -
-					nonplastic fines, material appears to be predominantly
-					fossil fragments
-					
-					- 1
1	15.0				
15 <u> </u>	15.0				Well Graded Sand With Silt (SW-SM)
-		1.0	SS-4	0-1-2	↑ 15.0-15.4' - Same as 10.2-11.1' except pale yellowish / ↑ ↑ ↑ ↑ SS-4 15.4-16.0' -
-	46.5	1.0	00.4	(3)	\brown, (10YR 6/2), silty fines (slough)
-	16.5				│ 15.4-16.0' - verý light gray, (N8), wet, very loose, very │
-					fine to fine grained, sand is predominantly silica, 20% _ fine to medium grained carbonate sand, 20-25%
-					nonplastic fines, scattered pockets of very pale green / -
-					(10G 8/2) medium plasticity clay, moderate HCl reaction in carbonate materials
-					Driller' Remark: Drilling rate slowing down at
-					- 18.5'
-					
20					
1	I	I	I		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-13	SHEET	2	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

-					N 252345; CME 75 S					
WATER	LEVELS	: 2.0 ft bg	gs on 5/6/		START : 5/6/2007	END: 5/23 SOIL DESCRIPT		LOGGER	: 0.	Sump, P. De Sa'rego COMMENTS
≥Q⊋ I	CAMPIE	INTERVA	1 (6)	STANDARD PENETRATION		SOIL DESCRIP	ION		OG	CONINICIALO
BELO CE AN TION (SAMPLE	RECOVE	, ,	TEST RESULTS	SOIL NAME	E, USCS GROUP S CONTENT, RELA	SYMBOL, COLO	OR,	OLIC L	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)		CONTENT, RELA CY, SOIL STRUCT			SYMBOLIC LOG	INSTRUMENTATION
20.6	20.0	0.2	SS-5 ,	50/2.5	¬ Sandy Silt With	Limestone (ML)		Ш	
- - - - -				(50/2.5")	nonplastic, very HCl reaction, 35	y pale orange, (10 rapid dilatancy, 1 5% fine to coarse carbonate mater	moderate to s sand-sized, 1	trong /		- - - - -
25 15.6	25.0 25.8	0.8	SS-6	39-50/3.5 (89/9.5")	Silty Sand (SM 25.0-25.8' - pale	e yellowish orang	e, (10YR 8/2),	- - , moist -		Stop drilling for 5/6/07 due to thunderstorm/lightning hazard
- - - - -	25.6			(60/6/6/6)	to wet, very den	ise, fine to coarse eaction, 25-30%	e grained, mile	d to ┌	111	Resume drilling 5/7/07, water level approximately 2.0' below ground surface Install surface casing (4") to approximately 28.5'
30 10.6	30.0 30.3	0.3	SS-7	50/3.5	Silty Sand (SM)				-
- - - - -				<u>(50/3.5")</u>		ne as 25.0-25.8'				- - - - - - -
35 5.6	35.0				Silty Sand (SM	1			717	-
-	36.5	1.2	SS-8	37-47-19 (66)	35.0-36.2' - pale yellowish brown dense, fine to c	e grayish orange I, (10YR 8/2 to 10 oarse grained, m stic fines, 10-15%	YR 6/2), mois ild HCl reactio	st, very		Transitional to very weak limestone rock
- - - - - 40					carbonate		o gravor s	- - - - -		Much softer material, no loss of circulation



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-13	SHEET	3	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.0 ft b	gs on 5/6/	07 S	START : 5/6/2007 END : 5/23/2007 LOGGE	R : (C. S	Sump, P. De Sa'rego
				STANDARD	SOIL DESCRIPTION			COMMENTS
N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCO OPOUR OVAROU COLOR]	ᇬ[DEDTIL OF CACINIC PRILLING DATE
H BE ACE		RECOVE			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	3	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	2	SYM	INSTRUMENTATION
0.6	40.0	0.7	SS-9	26-50/2	Silty Gravel With Sand (GM)	•	M	
	40.7			(76/8")	40.0-40.7' - light olive gray, (5Y 5/2), moist to wet, very dense, moderate HCl reaction, predominately	╬	4	
_					fine gravel to 1", 30-35% fine to coarse sand-sized, 20-25% low plastic fines, all carbonate, pyrite coating	1	1	_
-					on some large fragments	-	1	-
-						+	1	-
-						+	1	-
-						1	1	-
-						1	1	-
45	45.0		00.10	F0/4 0F	- 11 - 12 - 13 - 13 - 13 - 13 - 13 - 13	1		
-4.4	45.1	0.0	(SS-10)	50/1.25 (50/1.25")	No Recovery 45.0-45.1' Begin Rock Coring at 45.0 ft bgs			_
_					See the next sheet for the rock core log	1	1	
-						1	1	-
-						-	1	-
-						1	1	-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-13	SHEET	4	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	NIE I NOD AI	ND EC	JUIPIV	1ENT : CME 55 S/N 252345; CME 75 S/N 252437, mud	rotary,	NQ 1001S, HW casing	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bgs	s on 5	/6/07 START : 5/6/2007 END : 5	/23/200	17 LOGGER : C. Sump, P. De Sa're	ego
>	<u> </u>			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
		R Q D (%)	FRAC PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-4.4 -	45.0		1	45.3' - Fracture or mechanical break, 50 deg, rough, undulating to mostly planar	#	Limestone 45.0-45.9' - pale yellowish brown, (10YR 6/2), moderate HCl reaction,	Switch to rock coring (45.0')
-			0	45.9-47.9' - Fracture zone, friable, disaggregated material, numerous "breaks" handling material (unconsolidated)	扭	medium strong (R3), 10-20% coverage of 1/6" to 1/8" small voids on surface, larger lenticular shaped	-
-	R1-NQ 5 ft 58%	0	0		揖	cavities (up to 1/2" long 1/6"-3/16" high), exhibit preferred horizontal orientation	_
-			NR			45.9-47.9' - Same as 45.0-45.9' - except very weak (R1) and disaggregated, easily broken by hand into silty sand material - No Recovery 47.9-50.0'	R1: 4 minutes
50	50.0			_			
-9.4 - - - - -	R2-NQ 5 ft 88%	13	NA	50.0-53.3' - unconsolidated silty, sandy, gravel material		Silty Sand With Limestone Fragments (SM) 50.0-53.3' - moderate yellowish brown, (10YR 5/4), moderate HCI reaction, 20-25% fines, 35-40% sand, 35-40% gravel-sized fragments of friable limestone with fragments 1/4"->1" size	-
-			2	53.3-54.4' - Fracture zone, rough, irregular, non planar 54.1' - Fracture, 10 deg, rough, planar, tight		- Limestone 53.3-54.4' - pale yellowish brown, (10YR 6/2), moderate HCl reaction,	- R2: 7 minutes
55	55.0		NR		\perp	 medium strong (R3), 10-20% coverage of 1/16"-1/8" voids on 	
-14.4 - -	33.0		1	- 55.4' - Fracture or mechanical break, rough, undulating, nonplanar		surface, few larger cavities/fossil molds (<1%) up to 3/4" No Recovery 54.4-55.0' Limestone	-
-	R3-NQ		2	56.4, 56.8' - Fractures (2), 15 deg, rough, planar		55.0-56.8' - yellowish brown, (10YR 5/4), very fine grained, mild to moderate HCl reaction, weak (R2),	- Horizontal partings -
-	5 ft 96%	47	3	57.0' - Bedding plane, 10 deg, rough, planar to stepped 57.7' - Mechanical break, rough, nonplanar 57.95, 58.3' - Bedding plane (2), 5 deg,		 20-25% coverage of 1/16"-1/8" small voids on surface, very fine dark black laminations (<1/16") 1/2"-1" spacing 	associated with black laminations (soft) laminae are sinuous and exhibit more pinch and swell
-			3	smooth, planar, (organic layer) 58.6' - Bedding plane, 5 deg, smooth, 0.5" thick zone		 56.8-59.8' - Same as 55.0-56.8' except weak (R2), finer grained (silt sized particles), reduced small void density (<10%) and pronounced fine 	more pinch and swell patterns and are often slightly inclined to core diameter
60 -19.4	60.0		NR.	58.8' - Bedding plane, smooth, planar 59.1' - Fracture or mechanical break, horizontal, rough, undulating		black laminations (lignite, organics) — throughout interval and concentrated	R3: 6 minutes —
-			2	59.4' - Fracture, 10 deg, rough, planar to undulating 60.5, 60.7, 61.4, 61.7' - Fractures or	甘	in zones up to 1/2" thick No Recovery 59.8-60.0' Limestone	-
-	_		3	mechanical break (4), horizontal, rough, undulating to planar	坩	60.0-63.8' - Same as 56.8-59.8' except weak to medium strong (R2 to R3), decreasing density of fine black	
-	R4-NQ 5 ft 76%	40	3	62.1, 62.3, 62.5' - Fractures (3), <10 deg, rough, undulating to semi planar	且	layering, variable density of small voids (5-15% surface area), weak unconsolidated zone at 63.5' of silt	
-			2	63.4' - Fracture, rough, undulating 63.5' - Fracture, 45 deg, rough, undulating	掛	and sand with gravel No Recovery 63.8-65.0'	-
65 65	65.0		NR		Ħ		R4: 6 minutes
							1

APPENDIX 2BB-144 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				-	
338884.FL	A-13	SHEET	5	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 5/	6/07 START : 5/6/2007 END : 5/	23/20	07 LOGGER : C. Sump, P. De Sa're	ego
>∩≘	(%)			DISCONTINUITIES	ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S L	DESCRIPTION	5000	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΒ	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_оош -24.4	074	ď	╙┛	THICKNESS, SON ACE STAINING, AND HOTTINESS	S		
-24.4			NA	65.4, 65.5, 65.6, 65.7' - Mechanical break (4),		Silty Sand (SM) - 65.0-65.8' - moderate yellowish	_
_				horizontal, rough, undulating to planar, fine	\mathbf{H}	¬ brown, (10YR 5/4), with gravel-sized ┌	1 _
_			4	sand/silt material on fracture surface	F	limestone fragments 1/2"-2" size / (disaggregated by drilling)	_
_						_ Limestone	_
	R5-NQ 5 ft	10			┵	65.8-66.8' - moderate yellowish brown, (10YR 5/4), very fine grained,	
	36%	10				strong HCl reaction, weak to medium	
			NR			strong (R2 to R3), 15-20% coverage	
			1411		┰	of 1/16" to 1/8" small voids on surface, 1-2% coverage of larger	1
_						cavities/fossil molds up to 1/4"	R5: 10 minutes
70	70.0				t	 diameter, fine silt infilling in many voids/molds 	
-29.4	70.0			_	╁	No Recovery 66.8-70.0'	-
_			0		口	 Limestone 70.0-74.9' - moderate yellowish 	-
-				71.1, 71.2' - Fracture or mechanical break	士	brown, (10YR 5/4), fine grained, mild	-
_			2	(2), horizontal, rough, undulating	╁	 to moderate HCl reaction, medium strong (R3), fossiliferous, with 4"-6" 	SC-1 collected at 71.3-
-	R6-NQ				亡	thick poorly fossiliferous, fine grained	72.5'
_	5 ft	67	1	72.5-73.5' - Fracture or mechanical break,	世	 intervals, low to medium density, up 	-
_	98%			vertical, rough, undulating	\vdash	to 17-20% coverage of small (1/16"-1/8") voids and larger (up to	-
_			2	73.4' - Fracture, 45 deg, rough, planar	口	 3/4") cavities/fossil molds, lenticular 	-
_					世	inclusions of soft black organic material up to 1-1/2"x1/4" thick at	DO: 0 minutes
_			0	74.1' - Fracture or mechanical break, horizontal, rough, undulating	\vdash	_ 73.2-73.8', few fine (1/16"-3/16")	R6: 8 minutes
75	75.0		NR)	Honzontal, rough, undulating		organic inclusions No Recovery 74.9-75.0	
-34.4			1	75.2' - Fracture or mechanical break,	Ľ	Limestone	_
_				horizontal, rough, undulating	$oldsymbol{oldsymbol{\perp}}$	75.0-80.0' - Same as 70.0-74.9' except mild HCl reaction, weak (R2),	_
			5	76.2' - Fracture, 5 deg, rough, planar	\perp	5-15% coverage of small (1/16"-1/8")	_
				76.3, 76.4' - Fractures (2), 30-45 deg, rough, undulating and planar	ь	voids, loose sand-sized limestone	_
	R7-NQ	50	1	76.8, 76.95' - Fractures (2), horizontal, rough,	Н	particles on fracture surfaces	
	5 ft 100%	50	'	undulating			
			_	77.7' - Fracture, 60 deg, rough, non planar (radial)	Ľ]
			2	78.0' - Fracture, 45 deg, rough, planar	\Box		1
				78.3' - Mechanical break, horizontal, rough	Ҵ	=	R7: 7 minutes
80	80.0		1	79.5' - Mechanical break, 0-15 deg, rough,	$^{\perp}$	T .	1
-39.4	55.0			undulating —	F	80.0-84.0' - Same as 75.0-80.0'	
-			>10	80.4-80.7' - unconsolidated zone	Ħ	 except mild HCl reaction, weak to medium strong (R2 to R3), with 	
-						friable, extremely weak (R0), partially	-
-			1	81.4, 82.0' - Fractures (2), horizontal, rough,	F	unconsolidated zones at 80.4-80.7',	-
-	R8-NQ			undulating and planar, (either end of unconsolidated material)	世	81.4-81.6', and 82.0-82.5'	-
-	5 ft	23	>10	82.0-84.0' - Fracture zone	+	-	-
-	80%				F	-	-
-			>10		片	-	-
_					╀	No Bookson, 94 0 05 01	Do: 6 minutos
			NR		П	No Recovery 84.0-85.0'	R8: 6 minutes
85	85.0				ፗ		_



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-13 SHEET 6 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

CORING	NETHOD A	ND EC	JUIFIV	MENT: CME 55 S/N 252345; CME 75 S/N 252437, mud r	otary,	NQ tools, HVV casing	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bgs	s on 5	/6/07 START : 5/6/2007 END : 5/3	23/200	D7 LOGGER : C. Sump, P. De Sa're	go
>00	(6)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
N A P O	7.N O⊗ O⊗		SI.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	0175 4415 555711 65 6461116
불병은	RUN H. H.	Q D (%)	URI	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	12	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
₽₽₩	#RE 00	۵	ACT R F(PLANARITY, INFILLING MATERIAL AND	MB(WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-44.4						Limestone	1/2" thick "greasy" organic
-			1	95.6' Eractura 45 dog rough planar	Н	- 85.0-89.9' - moderate yellowish	layer at 85.2
-				85.6' - Fracture, 45 deg, rough, planar 86.0-88.0' - Fracture zone, 0-30 deg,	Ħ	brown, (10YR 5/4), moderate HCI reaction, medium strong (R3),	-
_			>10		₩	- fossiliferous (molds/casts), surface	_
l _				fragments exhibit semi planar surfaces		coverage of voids 20%, with very	
	R9-NQ	4-			Н	weak to weak (R1 to R2) zones of	
	5 ft 98%	47	>10			 limestone disaggregated into carbonate sands or silt from 	
-					ш	86.0-86.6' and 87.2-88.1'	1
-			2	88.2, 88.8, 89.3, 89.5' - Fractures or mechanical break (4), horizontal, rough,	ш	=	-
-				undulating	H	_	DO: 7 minutos
-			3	89.4' - Fracture, 45 deg, rough, planar	ᆫ	<u>-</u>	R9: 7 minutes
90	90.0			00.7 - Hacture, 40 deg, rough, planai	Ш	— N. B	
-49.4			NR	00.21 Fracture 70 des recent planes	Ы	No Recovery 89.9-90.0' Limestone	Small flazer structure on
I -			>10	90.3' - Fracture, 70 deg, rough, planar 90.7' - Fracture, horizontal, rough, undulating	П	90.0-94.2' - Same as 85.0-89.9'	fragment material, – bioturbation
-				to planar, black organics on surface (or fine	₩	except highly fossiliferous zone with	
-			>10	laminae controlling break)	ш	greater density of small voids from 90.8-91.1' (fragments <1"), finer	SC-2 collected at 91.75-
_	B40.110			90.7-91.2' - Fracture zone	Н	grained with decreased density of	92.5' -
_	R10-NQ 5 ft	58	1	_		small voids, weak to medium strong	
	84%	50	'		Н	(R2 to R3) below 91.1'	
				93.0' - Fracture, horizontal, rough, undulating,		_	
_			2	open - 93.5' - Fracture, 25 deg, rough, undulating,	Н	-	1
-			0	1/16" open		-	R10: 12 minutes
-			NR	93.9' - Mechanical break, horizontal	Н	No Recovery 94.2-95.0'	-
95 <u> </u>	95.0			_	ш		_
-54.4			2	95.2' - Fracture, 5 deg, planar	Н	Limestone - 95.0-98.0' - yellowish gray, (5Y 4/2),	
_			_	95.7' - Fracture, 60 deg, rough, planar		variable density of small voids	SC-3 collected at 95.6-
				, G. G.	Н	(1/16"-1/8") across interval ranging	96.8'
_			1	-	Ш	 from sparse up to >20% in discrete zones, typically 5%, few larger 	1
-	R11-NQ			96.8' - Mechanical break, rough, undulating	Н	cavities/fossil molds 1/4" or larger,	-
-	5 ft	62	2	97.3, 97.35' - Fractures (2), 60 deg, rough,		 dark brown/black (organic) inclusions 	-
-	96%			planar 97.9' - Fracture, horizontal, rough, nonplanar,	₽	(1/16"-1/8") and as thin (1/16") fine stringers	1 4
I -			>10	brownish black coating on surface (soft)	Ш	98.0-98.7' - fine grained, strong to]
				98.0-98.7' - Fracture zone, rock fragments,	$\vdash\vdash\vdash$	very strong (R4 to R5), dense	
I -			>10	conchoidal fracture faces, undulating, near vertical break, few 45-60 deg fractures on		98.7-99.8' - Same as 95.0-98.0'	R11: 11 minutes
100	100.0			fragments	\mathbb{H}	 except mild to moderate HCl reaction, weak to medium strong (R2 	1
-59.4	100.0		NR	98.9, 99.2, 99.8' - Fractures (3), horizontal,	ш	to R3)	I
-			>10	rough, undulating 100.0-101.0' - Fracture zone, vertical, rough,	++	No Recovery 99.8-100.0'	1 -
-				planar to undulating, 3/4"-1" angular rock		Limestone 100.0-104.5' - Same as 95.0-98.0'	1 -
_			1	fragments with large (4"-5") long partial core	$\vdash \vdash$	except medium strong (R3),	_
I _				pieces	ш	increasing density of small voids and	l J
	R12-NQ			101.3' - Fracture, 70 deg, rough, planar 102.0-102.7' - Fracture zone, limestone	$\vdash \vdash$	larger (up to 1/2") cavities/fossil molds (10-20%), irregular zones of]
I -	5 ft 90%	33	>10	fragments		dark gray (N6) (redox boundary), few	1
-	00,0			102.8' - Fracture, 45 deg, rough, undulating	${\mathbb H}$	fossil molds/casts infilled with soft	1 1
-			>10		口	_ clayey carbonate material	1
-				horizontal, rough, undulating 103.3-104.5' - Fracture zone, horizontal,	\vdash	_	R12: 6 minutes
_			>10	rough, planar to undulating, partings with 1-2"	H	 _	N 12. 0 IIIIIIules
105	105.0		NR	spacing	Ш	No Recovery 104.5-105.0'	

APPENDIX 2BB-146 Rev. 4



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-13 SHEET 7 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

				/IENT : CME 55 S/N 252345; CME 75 S/N 252437, mud r	olary,	11Q tools, 11W casing	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bgs	s on 5		23/200	D7 LOGGER : C. Sump, P. De Sa're	
>00	<u>.</u>			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SI.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUTE AND DEDTIL OF GARING
ᆱ끯은	ER, T	(%) O	N N	DEDTIL TYPE OPIENTATION POLICINESS		MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	SOV	0	SCT P.F.C	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUB	SHE	S Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-64.4	-				H	Limestone	
-			>10	105.2-105.8' - Fracture zone, limestone		- 105.0-107.5' - grayish orange to light	-
_				fragments (1/2"-1-1/2")	₽	olive gray, (10YR 7/4 to 5Y 5/2), mild	
			>10			to moderate HCl reaction, weak (R2), - <5% coverage of small (1/16"-1/8")	
			/10	106.7' - Fracture, 45 deg, rough, undulating	\vdash	voids on surface, moderately friable	
_	R13-NQ			106.8-107.1' - Fracture zone, weak friable		_ 10.00 0.1 00.1000, 111000.010., 11100.0	1
-	5 ft	40	0	material, 1/2"-2" fragments, dark brown/black	ш	_ 107.5-109.1' - yellowish gray to light	-
_	82%			staining (possibly pyrite) on few	$+ \Box$	- olive gray, (5Y 7/2 to 5Y 5/2), mild	-
1 _			>10	fragment/fracture surfaces		HCI reaction, medium strong (R3),	<u>_</u>
			/10	108.7-109.1' - Fracture zone, rough,	Н	small voids (1/16"-1/8") and larger - cavities/fossils/molds (up to 1/2" max	
				undulating		dimension) 5-10% coverage on	R13: 10 minutes
110	440.0		NR	-	\vdash	surface, few fossil casts, partial fine	1
110 <u> </u>	110.0			-		recrystallization	_
-			2	110.1' - Fracture or mechanical break, horizontal, rough, planar	\vdash	No Recovery 109.1-110.0' Limestone	-
I _				110.7' - Fracture, rough, undulating		- 110.0-113.9' - Same as 107.5-109.1'	
				111.21 Eracture rough undulating fine	Н	except medium strong to strong (R3	
			2	111.3' - Fracture, rough, undulating, fine limestone fragments	\vdash	to R4), fewer cavities/fossil molds	1
	R14-NQ			111.6' - Fracture, rough, undulating to	ш	_ >1/4"	1
-	5 ft	57	2	partially stepped	+	-	-
-	78%			112.0' - Fracture, 70 deg, rough, undulating, with thin spalls, black staining/coating on		_	_
			1	surface (pyrite) somewhat radiased surface	Ш	_	
				112.6, 113.7' - Fractures (2), 45 deg, rough,			
				planar	\vdash	No Recovery 113.9-115.0'	R14: 9 minutes
115	115.0		NR	-		-	1
115 <u> </u>	115.0				₩	Limestone	_
-			>10			- 115.0-119.5' - intermingled zones of	-
_				orientation, planar surfaces	↓ ⊢	pale yellowish orange and light olive	
			3	116.1, 116.2' - Fractures or mechanical break		gray, (10YR 8/6 and 5Y 5/2), moderate HCl reaction, medium	
			3	(2), horizontal, rough, undulating		strong (R3), 5-10% coverage of	
-	R15-NQ			116.5' - Fracture, 75 deg, rough, undulating to planar	\vdash	small (1/6"-1/8") voids on surface,	1
-	5 ft	37	1	117.0' - Mechanical break, horizontal, rough,		 partial recrystallization 	-
-	90%			undulating .	╀┤	_	4
1 4			1	118.0' - Fracture, 45 deg, rough, planar	П	 	_
			L'	118.5' - Fracture or mechanical break, 15	\vdash	_	
]			1	deg, rough, planar 119.1' - Fracture or mechanical break, rough,			R15: 10 minutes
120	120.0		NR	undulating	₽₩	No Recovery 119.5-120.0'	1
120 -79.4	120.0		- · · ·	-	\Box	Limestone	_
-			1		+	 120.0-124.0' - Same as 115.0-119.5' 	1 4
				120.6' - Fracture, 15 deg, rough, planar		except mild HCl reaction, strong]
			4	121.0' - Mechanical break, rough, undulating	Ш	(R4), larger cavities (1/4"-1/2") – present in discrete zones of variable	
1 7			4	121.1-121.3' - Fracture zone 121.3' - Mechanical break, rough, undulating	\vdash	 present in discrete zones of variable spacing, most prominent in 	1
-	R16-NQ			122.1' - Mechanical break, horizontal, rough,		fragmented zones (123.0-123.4'),	1
-	5 ft	55	>10	undulating	╀┤	- blackish brown staining on some	-
-	80%			122.9-123.3' - Fracture zone, limestone	\Box	fracture/fragment surfaces, minor recrystallization, color becoming	4
_			1	fragments (1/2"-1-1/2"), dark brown staining	\vdash	- darker with depth light olive gray (5Y]
			L'	on surfaces		5/2) to medium olive brown (5Y 4/4)	
1 7				123.3, 124.0' - Fractures or mechanical break (2), horizontal, rough, undulating and planar	$\vdash \vdash$	No Recovery 124.0-125.0'	R16: 11 minutes
125	125.0		NR	(2), nonzoniai, rough, andulating and plana	\Box	-	1
120	120.0				\Box		
					1		



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-13 SHEET 8 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

00111110	METHODA	ND LC	ZOII IV	1ENT : CME 55 S/N 252345; CME 75 S/N 252437, mud i	otal y,	14Q tools, 1144 casing	ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bgs	s on 5	/6/07 START : 5/6/2007 END : 5/	23/200	D7 LOGGER : C. Sump, P. De Sa're	ego
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-84.4 	R17-NQ 5 ft 78%		4 1 >10 1 NR >10	125.35, 123.55' - Mechanical break (2), horizontal, rough, undulating 125.7' - Fracture, vertical, rough, undulating, healed fracture, tight 125.75, 125.9' - Bedding plane (2), horizontal, planar 126.0' - Fracture, horizontal, rough, undulating 126.2' - Bedding plane, horizontal, smooth 127.3-127.7' - Fracture zone, irregular limestone fragments, undulating surfaces 128.6' - Fracture or mechanical break, horizontal, rough, undulating 130.0-132.1' - Fracture zone, rough, undulating surfaces on most fragments, few		Limestone 125.0-128.9' - yellowish orange to pale yellowish brown, (10YR 8/6 to 10YR 6/2), mild HCI reaction, medium strong to strong (R3 to R4), 10-20% coverage of 1/16"-1/8" small voids on surface, larger oval shaped (fossil molds) cavities (1/4"-1/2") occur variably throughout depth but <5% surface area, very fine grained dense interbeds at 125.75-125.9' and 126.0-126.3' yellowish gray (5Y 7/2), laminated, with <5% small (1/16"-1/8") voids No Recovery 128.9-130.0' Limestone 130.0-130.5' - grayish orange to	Fresh fracture faces indicate possible partial recrystallization
-	R18-NQ 5 ft 1 42%	0	>10	horizontal, planar, thin (1/4") bedding plane partings 130.0-130.5', 1/2"-1-1/2" fragments with 2"-4" full diameter core pieces between zones		yellowish gray, (10YR 7/4 to 5Y 7/2), moderate HCl reaction, medium strong (R3), thin (3/4") zones of dark gray fine laminations, thin (<25) bedding plane partings 130.5-132.1' - grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0'	Driller's Remark: 100% loss of circulation at 132.0' below ground surface, soft drilling, possible void
105	405.0					-	
135 -94.4 - - - - - - - - - - - - - - - - - -	135.0 R19-NQ 5 ft 74%	27	>10 1 >10 1 NR	135.0-135.2' - Bedding plane, horizontal, smooth, multiple 1/4"-1/2" thick partings 135.4' - Fracture or mechanical break, horizontal, rough, planar 135.7' - Fracture, horizontal, rough, planar 136.7' - Mechanical break, rough, undulating 136.9-138.2' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 138.2' - Mechanical break, 60 deg, rough, planar		Limestone 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCI reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCI reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0'	Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' R19: 10 minutes
-99.4 - - - - - - 145	R20-NQ 5 ft 60% 145.0	13	1 2 3 NR	140.9' - Fracture, 40 deg, smooth, planar 141.1' - Fracture or mechanical break, vertical, rough, undulating 141.4-142.2' - Fracture zone, limestone fragments <1" 142.5' - Fracture or bedding plane, horizontal, smooth 142.8' - Fracture, vertical, rough, undulating, healed, tight 143.0' - Fracture, rough, undulating, black coating (possibly pyrite) on surface		Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/18" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	Exhibits "punky" texture on fresh surfaces

APPENDIX 2BB-148 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884 FI	Δ-13	QUEET	۵	ΩE	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mult rotary, NO tools, HW casing ORIENTATION: Vertical

CORING METHOD AN	D EC	UIPM	IENT : CME 55 S/N 252345; CME 75 S/N 252437, mud r	otary,	NQ tools, HW casing	ORIENTATION : Vertical
WATER LEVELS : 2.0	ft bgs	on 5/	/6/07 START : 5/6/2007 END : 5/3	23/20	07 LOGGER : C. Sump, P. De Sa're	ego
			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%)	DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
-104.4 - - -		>10	145.0-145.4' - Fracture zone, rock fragments 1/2" thick		140.5-143.0' - very pale yellowish gray, (5Y 7/2), moderate HCl reaction, medium strong to strong (R3 to R4), small zones (<1") of dark gray, fossil molds up to 3/4", numerous small voids (5%-20%	- - Disaggregate carbonate -
R21-NQ - 5 ft - 80%	17	>10	146.4' - Bedding plane, horizontal, rough, discontinuity with fine grained limestone 146.6' - Fracture, >80 deg, rough, undulating, healed		surface area) becoming denser, hard below 142.0', black coating on some fracture faces (pyrite) No Recovery 143.0-145.0'	sand 146.8-147.2'
450 450 0		3 NR	146.8' - Bedding plane, discontinuity with yellowish brown, weak, loose, carbonate sand zone 147.5-147.8' - Fracture zone, vertical, limestone fragments 1-1/2"-3"		Limestone 145.0-146.8' - yellowish gray, (5Y 7/2), mild HCl reaction, medium strong to strong (R3 to R4), small voids (1/16"-1/8") and larger	R21: 15 minutes -
150 150.0 -109.4 -		2	147.8, 148.0' - Bedding plane (2), horizontal, smooth 148.6' - Mechanical break, horizontal, rough, undulating		cavities/fossil molds up to 1/2" variable across interval from trace to >10%, thin (1") fine grained beds show indications of very fine	-
- - R22-NQ	-	>10	148.9, 149.0' - Fractures (2), 45 deg, rough, planar 150.8' - Fracture or mechanical break,		_ laminations 146.8-147.2' - medium olive brown, 「fragmented (1/4"-3/4" size), friable,	-
- 5 ft 100%	15	6	horizontal, rough, planar 150.9' - Fracture, >80 deg, rough, undulating 151.0-152.0' - Fracture zone, mostly rough, undulating horizontal fractures, few 45 deg		coarse carbonate sand 147.2-147.7' - medium olive brown, weak (R2) 147.7-149.0' - Same as 145.0-146.8'	Weak along laminae, dark - laminations may be
155 155.0		>10	rough, planar fractures, limestone fragments 3/4"-2-1/2" in length 152.0, 152.1, 152.3, 152.5, 152.7, 152.9' - Fractures (6), horizontal, rough, undulating		except light olive gray, (5Y 5/2) No Recovery 149.0-150.0' Limestone 150.0-152.8' - Same as 145.0-146.8'	biofeature (algae) R22: 15 minutes
-114.4	-	2	153.0-154.0' - Fracture zone, horizontal, rough, undulating, partings controlled by bedding lamination 154.0-155.0' - Fracture zone, 20-45 deg,		except light olive gray, (5Y 5/2), mild HCl reaction, medium strong (R3) 152.8-153.9' - mottled grayish yellow and light olive gray, (5Y 8/4 and 5Y	- - -
	25	3 >10	rough, undulating 155.3' - Fracture, 15 deg, rough, planar 155.4, 155.6' - Fractures (2), 10-15 deg, rough, undulating 156.5' - Fracture, horizontal, rough, planar		5/2), medium strong (R3), thin (1"-2") dark yellowish brown (10YR 4/2) fine wavy laminations, dark laminations slightly inclined (5-10 deg) 153.9-155.0' - Same as 150.0-152.8'	-
68% 	-	>10	156.6' - Fracture, rough, undulating 156.8' - Fracture, horizontal, rough, planar 157.2' - Bedding plane, 4-5 deg, break on	H	except strong (R4), denser, fewer voids 155.0-156.3' - yellowish gray to light	-
160 160.0		NR	fine grained layer 157.2-158.4' - Fracture zone, horizontal, planar, rock fragments 3/4"-2" in length		 olive gray, (5Y 7/2 to 5Y 5/2), strong (R4), mottled appearance, <5-10% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds up to 	R23: 11 minutes -
-119.4	-	>10		Ė	1/2" increasing with depth, dense 156.3-158.4' - Same as 155.0-156.4' except increasing percentage of	-
- - R24-NQ	•	1	161.3' - Fracture, 75 deg, undulating, slightly radial, 6" long	Ħ	small voids uniformly distributed, color darkening to medium olive brown (5Y 4/4), very fine laminated dense interbed at 157.6-158.1'	The rig CME 55 (S/N
5 ft 50%	0	NR			No Recovery 158.4-160.0' Limestone 160.0-162.5' - light olive gray to olive gray, (5Y 5/2 to 5Y 3/2), medium strong (R3), dense, few small voids or cavities/fossil molds (<5%) No Recovery 162.5-165.0'	252345) was changed to CME 75 (S/N 252437) at depth 162 feet below ground surface R24: 10 minutes Core barrel stuck at 162.3'
165 165.0				Ė	-	



WATER LEVELS: 2.0 ft bgs on 5/6/07

PROJECT NUMBER: BORING NUMBER:

END: 5/23/2007

338884.FL

A-13

LOGGER: C. Sump, P. De Sa'rego

SHEET 10 OF 11

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722927.1 N, 457933.5 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing

START: 5/6/2007

180.75-180.9' - Fracture zone, possibly due

181.2' - Fracture, horizontal, smooth to rough, undulating, 1/4"-3/8" relief 181.5, 181.55' - Fractures (2), 25 deg,

smooth, planar, along laminae of darker

181.75, 181.80' - Fractures (2), <10 deg, rough, undulating, 1/4"-3/8" relief

182.4' - Bedding plane, smooth, planar, 1/8"

182.0-182.2' - Fracture zone

182.5-182.9' - Fracture zone

to cavities in rock

material

6

>10

1

NR

R28-NQ

5 ft

90%

185

185.0

20 >10

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD SYMBOLIC MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -124.4 165.0-166.1' - Fracture zone 5/9/07, 14:00 hrs - Rig Limestone >10 165.0-167.4' - medium dark gray, changed to one with a (N5), fine grained, mild HCI reaction, cathead to allow pull-back hammering 16:00 hrs - Only 10' of rods strong (R4), 10-15% coverage of small (<1/8") voids, 10% coverage of >10 166.35' - Fracture, <10 deg, rough, undulating, 1/8"-3/16" relief 166.35-165.55' - Fracture zone, vertical, 1"-1-3/8" fossil molds/cavities, trace removed, decide to carbonate infill of cavities, light olive overdrill with HQ tools R25-NQ gray (5Y 6/1) coloration of fractured 16:20 hrs - Start installing 5 ft 76% 0 8 rough, planar, <1/16" gray carbonate infill 166.6' - Fracture, horizontal, smooth, planar surfaces HO 167.4-168.8' - medium dark gray to 19:00 hrs - HQ tools will 166.8, 166.9, 167.0, 167.2' - Fractures (4), >10 yellowish gray, (N5 to 5Y 5/2), fine <10 deg, smooth, undulating not go through 4" bit, HQ 167.4, 167.8, 167.9' - Bedding plane (3), grained, mild to moderate HCI tools pulled and resumed horizontal, smooth, planar reaction, medium strong to strong back hammering NR (R3 to R4), trace to 10% coverage of Driller's Remark: Core 167.7' - Mechanical break 167.9-168.8' - Fracture zone 1/16" voids increasing with depth, barrel retrieved, hole 170 170.0 visible casts/cavities currently cased from 0-60' 170.0-170.2' - Fracture zone -1294 No Recovery 168.8-170.0' with HW casing 8 170.2-170.8' - Fracture, 60 deg, smooth, Limestone Driller's Remark: extending undulating 170.0-170.2' - Same as 165.0-167.4' HW casing to 90' 170.8' - Mechanical break 170.2-171.1' - Same as 165.0-167.4' Driller's Remark: HW >10 170.95-171.25' - Fracture zone except no visible casts/cavities casing installed to 90', NQ 171.4, 171.6, 172.05, 172.2, 173.1, 173.45, 171.1-172.1' - Same as 165.0-167.4' 172.1-174.5' - Same as 167.4-168.4' rod and tri-cone bit 173.8, 174.2' - Fractures (8), <10 deg, rough, R26-NO equipped to reach >10 undulating 172.4-172.6' - Fracture zone 7 5 ft except size of large casts/cavities up sampling depth of 165' 90% 172.8-173.0' - Fracture zone to 1-3/16"x3/4" over 30% of rock at P. De Sa'rego begins 173.5-174.5' logging 6 R25: 28 minutes Driller's Remark: Chatter 1 approximately 145' No Recovery 174.5-175.0' Driller's Remark: Chatter NR 175 175.0 approximately 150'-155' 134.4 175 0-176 1' - Fracture zone Limestone Driller's Remark: Chatter at 175.0-176.0' - pale yellowish brown to dark gray, (10YR 8/2 to N3), fine >10 approximately 160' R26: 24 minutes grained, mild HCI reaction, medium Driller's Remark: Chatter strong to strong (R3 to R4), trace voids up to 1/16" in size, 10-15% >10 176.35, 176.45, 176.7, 176.75, 176.8' -Driller's Remark: Chatter Fractures (5), horizontal, smooth, planar to undulating coverage of 1-3/16"x3/8" R27-NQ 2 casts/cavities, with infill/ 8 176.45-176.7' - Fracture zone 5 ft 58% 176.8-177.0' - Fracture zone recrystallization of yellowish brown, fine to medium grained carbonate 177.4' - Fracture, horizontal, rough, planar to 176.0-177.9' - pale yellowish brown, undulating 177.75' - Fracture, 60 deg, rough, undulating (10YR 8/2), fine to medium grained, NR mild to moderate HCI reaction, 177.76' - Mechanical break R27: 58 minutes medium strong (R3), 10-15% coverage of <3/16" voids 180 180.0 No Recovery 177.9-180.0' 139.4 Driller's Remark: Chatter Limestone >10 180.0-184.5' - Same as 176.0-177.9'

except 40-50% casts/cavities at

1-3/16" at 183.1-184.1' and thin

(1/16"-3/16") dark laminae from

to 1-3/16"x9/16"), and highly fossiliferous with 50% voids up to

No Recovery 184.5-185.0'

181.4-182.4

180.75-181.1' and 183.7-183.9' (up

Driller's Remark: Chatter

R28: 46 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-13	SHEET	11	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 5/	/6/07 START : 5/6/2007 END : 5/	23/20	07 LOGGER : C. Sump, P. De Sa're	go	
> 0 00	6)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SIL	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
H BE ATIC	TH,	(%) O	TE O	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Š	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND	
EPT URF	ORE ENG ECC	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Y ME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
-144.4	Olk	œ	ша	183.2-183.9' - Fracture zone	8	Limestone		
-			>10	184.1' - Bedding plane, horizontal, rough,	Ħ	 185.0-187.6' - pale yellowish brown, 	-	
-				planar 185.2-185.9' - Fracture zone	世	fine to medium grained, mild to moderate HCl reaction, medium	-	
-			>10	186.0' - Mechanical break	╀	 strong to strong (R3 to R4), 10% 	-	
-	R29-NQ			186.3' - Fracture, horizontal, rough, undulating, 3/8" relief, <1/16" carbonate infill		coverage of <3/16" voids, trace casts/cavities up to 9/16"x3/8" with	-	
-	5 ft	22	3	186.4' - Mechanical break	\perp	 partial carbonate recrystallization on 	-	
-	86%			186.7-186.95' - Fracture zone 187.5' - Fracture, <5 deg, smooth, undulating	\pm	surfaces 187.6-189.3' - Same as 185.0-187.6'	-	
-			>10	187.8' - Fracture, <5 deg, rough, undulating,	+	 except 15-35% voids up to 1/8" 	-	
-			2	<1/8" relief 187.95' - Fracture, horizontal, rough,	H	increasing with depth, with trace casts/cavities up to 9/16"x1"	R29: 37 minutes	
-			NR	undulating, <3/16" relief	Ë	- No Recovery 189.3-190.0'	1\23. 37 Hilliates	
190 <u> </u>	190.0			188.2-188.4' - Fracture zone 188.55, 188.9, 189.0, 189.1, 189.15' -	世	Limestone		
-			>10	Fractures (5), horizontal, smooth, planar to	₽	190.0-193.6' - Same as 175.0-176.0'	-	
-				undulating, 1/16" relief 190.0-190.55' - Fracture zone	\perp	except 10-15% voids up to 3/16" and black laminations from 190.5-192.3',	-	
-			>10	190.9-191.1' - Fracture zone	仜	 increased (50% by volume) 	-	
-	R30-NQ			191.3' - Fracture, 15 deg, smooth to rough, undulating	士	_ carbonate infill of cavities and casts	-	
-	5 ft	8	>10	191.5-191.6' - Fracture zone 191.8-192.1' - Fracture zone	\vdash	-	=	
-	72%			192.3' - Fracture, 30 deg, rough, undulating	H	-	-	
-			3	192.4-192.6' - Fracture zone, 60 deg, smooth to rough, undulating, gray staining over <10%	Ħ	No December 402 C 405 O	-	
-			NID	of fracture surface	Ľ	No Recovery 193.6-195.0'	R30: 51 minutes	
			NR	192.95' - Fracture, 30 deg, smooth to rough, undulating, gray staining over 75% surface	₩	-	-	
195 <u> </u>	195.0			193.15-193.3' - Fracture zone —	+	Limestone	_	
-			>10	195.0-195.4' - Fracture zone	┰	 195.0-196.1' - yellowish gray, (5Y 	-	
-				195.7-196.0' - Fracture zone	仜	7/2), fine to medium grained, mild HCl reaction, strong (R4), 40-50%	-	
-			1	196.3-196.8' - Fracture zone or mechanical		 lenses of medium dark gray (4N), 5% 	-	
-	R31-NQ			break, 40 deg, rough, undulating, pale yellowish brown recrystallization (carbonate,	╁	coverage of small (1/16") voids on surface, trace casts/cavities up to	Driller's Remark: 100%	
-	5 ft 36%	16		fine to medium grained) on 100% of surface, 3/16"-3/8" relief	Ħ	- 3/8"x3/8" 196.1-196.8' - Same as 175.0-176.0'	fluid loss at 196'	
-	30%			3/10 -3/0 Tellel	Ħ	except 5-10% casts/cavities up to	-	
-			NR		L	 9/16"x1-3/16" No Recovery 196.8-200.0' 	-	
					世		R31: 15 minutes	
200	200.0				F	-	-	
-159.4	200.0				T	Bottom of Boring at 200.0 ft bgs on		
1 -				-	1	- 5/23/2007	-	
					1	-		
1 1				•	1	<u> </u>		
				-	1	<u> </u>		
					1	<u> </u>	1	
					1	<u> </u>		
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					1		_	
1 1					1		_	



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-14	SHEET	1 OF 12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

					N 299205, Dietrich D-50 S/N 240, mud rotary, auto			
WAIER	LEVELS	: 1./ tt bg	gs on 03/2	20/0 <i>/</i> S	START : 3/14/2007 END : 4/9/2007	LOGGEF	{ : C.	Wallestad
300				STANDARD PENETRATION	SOIL DESCRIPTION		ဗ္ဂ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	COIL NAME LICCO CROUD OVARDOL O	OL OP	SYMBOLIC LOG	DEDTH OF CACINIC DOILLING DATE
ᆲ끯읃		RECOVERY (ft)		RECOVERY (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR				DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PT- EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINE		MB	INSTRUMENTATION
SU				(N)			S	
42.4								16:35 - Began drilling
						-	1	_
-						-	1	-
-						-	1	-
-						-	1	-
-						-	1	-
-						_		_
_	3.5					_		
					Silty Sand (SM) 3.5-5.0' - dark yellowish orange to light brown	wn (10VR -		6" slough removed for photo
		1.5	SS-1	2-2-1 (3)	6/6 to 5YR 5/6), wet, very loose, fine graine	d, no HCl		
5	5.0			(0)	reaction, 20-25% nonplastic fines, trace me	edium to		_
37.4					coarse grained sand-sized iron-cemented of	concretions —		_
-						-	1	-
-						-		-
-						-	1	-
-						-	1	-
-						-		-
_						_		_
_	8.5						777	_
_				0.45	Clayey Sand (SC) 8.5-9.7' - very light gray, (N8), wet, loose, fi	ne grained -		
		1.2	SS-2	3-4-5 (9)	no HCl reaction, 30% medium plastic fines.	trace		
10	10.0			(0)	organics (roots), trace green mineral		<i>Y//</i> /	
32.4							1	
-						_	1	-
_						_	1	_
-						_		=
-						-		-
-						-		-
-						-		-
-	13.5				Clayey Sand (SC)		////	-
-				1-3-5	13.5-14.0' - medium light grav. (N6), wet, lo	ose, no	///	=
-		1.3	SS-3	(8)	HCl reaction, fine silica sand with 3 distinct	CH layers	$\ \ \ $	_
15	15.0				at 13.5-13.55', 13.7-13.75', and 13.8-14.0'; greenish gray (5G 6/1) to greenish black (5	CH is GY 2/1), ⊢	Ш	
27.4					highly plastic			
					Silt (ML)	t modi::==		
					14.0-14.8' - grayish orange, (10YR 7/4), we stiff, nonplastic, rapid dilatancy, strong HCI	reaction.]
]					carbonate material		1]
-							1	7
-						-	1	-
-	46.5					-		-
-	18.5				│ │ Clayey Sand (SC)	r	///	17:30 - Stopped drilling for the day at 20'
-		1 , .	00.4	2-4-2	\ 18.5-18.6' - very light gray, (N8), wet, loose	, fine /-		Stopped drilling for the day at 20
_		1.3	SS-4	(6)	grained, no HCl reaction, 30% medium to h	igh \int_{Γ}	///	-
20	20.0				prasticity lines, silica sand		1//	



PROJECT NUMBER:	BORING NUMBER:
338884.FL	A -14

SHEET 2 OF 12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

					I 299205; Dietrich D-50 S/N 240, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 1.7 ft bo	gs on 03/2	20/07 5	TART: 3/14/2007 END: 4/9/2007 LOGGER: C. Wallestad
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	6"-6"-6" (N)	· ·
22.4	23.5				Poorly Graded Sand (SP) 18.6-19.4' - very light gray, (N8), wet, loose, fine grained, <5% fines, no HCl reaction, silica sand Clayey Sand (SC) 19.4-19.8' - very light gray, (N8), wet, loose, fine grained, 30% fines, medium to high plasticity, no HCl reaction, silica sand Clayer Sand (SC) 18.6-19.4' - very light gray, (N8), wet, loose, fine grained, 30% fines, medium to high plasticity, no HCl reaction, silica sand Clayer Sand (SC) 18.6-19.4' - very light gray, (N8), wet, loose, fine grained, 30% fines, medium to high plasticity, no HCl reaction, silica sand Clayer Sand (SC) 18.6-19.4' - very light gray, (N8), wet, loose, fine grained, 20% fines, no HCl reaction, silica sand Clayer Sand (SC) 19.4-19.8' - very light gray, (N8), wet, loose, fine grained, 30% fines, medium to high plasticity, no HCl reaction, silica sand Clayer Sand (SC) 19.4-19.8' - very light gray, (N8), wet, loose, fine grained, 30% fines, medium to high plasticity, no HCl reaction, silica sand Clayer Sand (SC) 19.4-19.8' - very light gray, (N8), wet, loose, fine grained, 30% fines, medium to high plasticity, no HCl reaction, silica sand Clayer Sand (SC) 19.4-19.8' - very light gray, (N8), wet, loose, fine grained, 30% fines, medium to high plasticity, no HCl reaction, silica sand Clayer Sand (SC) 19.4-19.8' - very light gray, (N8), wet, loose, fine grained, 30% fines, medium to high plasticity, no HCl reaction, silica sand Clayer Sand (SC) 19.4-19.8' - very light gray, (N8), wet, loose, fine grained, silica sand (N8), wet, loose, fine grained, sili
25_ 17.4	25.0	1.2	SS-5	5-7-8 (15)	Clayey Sand (SC) 23.5-24.6' - medium light gray, (N6), wet, medium dense, fine grained, no HCl reaction, 22% medium plastic fines, trace very fine sand-sized black minerals, CH lenses at 23.55-23.6', 24.2-24.25' and
17.4 - - - -					\[\frac{24.55-24.6'}{\text{Silt (ML)}} \] \[24.6-24.7' - grayish orange, (10YR 7/4), wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% fine sand, all carbonate material \] \[\frac{1}{2} \]
- - 30	28.5	1.1	SS-6	5-8-29 (37)	Silt With Sand (ML) 28.5-29.6' - grayish orange, (10YR 7/4), wet, hard, low plasticity, slow to rapid dilatancy, 15% fine sand, 5-10% medium to coarse sand, lenses of coarse sand at 28.6' and 29.4-29.6', 1" limestone fragment near
12.4 - - - - -	00.5				bottom of sample; Sandy Fat Clay (CH) lenses at 28.65' and 29.0'
- 35 7.4 - - -	33:5	0.1	SS-7 /	50/1.5 (50/1.5")	Sandy Silt (ML) 33.5-33.6' - dark yellowish orange, (10YR 6/6), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 40-45% fine to coarse grained sand, all carbonate material Driller's Remark: Lost circulation at 36.5' at 10:07 36.5-38.5' Intermittent medium chattering 37.0-38.5' Hard/slow drilling
- - - 40	38.5 38.8	0.0	SS-8	50/3 (50/3")	Limestone Fragments 38.50-38.55' - light olive gray, (5Y 6/1), mild HCl reaction, fragments up to 1/2", voids up to 1/16" over 15-20% of surface



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-14	SHEET	3	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

							_	
WATER	LEVELS	: 1.7 ft bo	gs on 03/2	20/07	START : 3/14/2007 END : 4/9/2007	LOGGER	: C.	Wallestad
				STANDARD	SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG	
		RECOVE	BV (ft)	1201 NEOULIO	SOIL NAME, USCS GROUP SYMBOL, C		CIC	DEPTH OF CASING, DRILLING RATE,
A PET		11.200	<u> </u>		MOISTURE CONTENT, RELATIVE DENS		BO	DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINE	RALOGY	ΜX	INSTRUMENTATION
о́о́ш 2.4				(N)			6)	M-1
2.4						_		Water level at 1.7' at 12:30 on 3/20/07 Driller's Remark: Set HW casing from 20-38'
								at 15:00
_						_		Driller's Remark: Begin drilling from 38.5'
-						-		with AWJ rod and 2-7/8" tricone bit (new bit)
_						_		at 15:20
	42.5 42.8							
	42.8	0.2	SS-9	50/3	→ Silt With Limestone (ML)	. Г	Н	SS-9 collected from 42.5' to 44.0'
-				(50/3")	42.5-42.65' - light olive gray, (5Y 5/2), wet,	low -		-
-					plasticity, mild to moderate HCl reaction, m coarse sand-sized and fine gravel-sized lim			-
_					voids up to 1/16" in diameter covering 15-2	5% of -		_
					surface, no visible casts or molds			
45								1
-2.6								Driller's Remark: Tagged hole at 52.5', 1'
-						_		short of presumed depth on 3/21/07
_						_		at 08:40; Assuming change in bit on morning
								of 3/20/07 reconciles loss of 1' in measured
1 7						_		depth -
-	4					_		-
_	47.5	0.0	00.10	50/4.5	Sandy Silt (ML)			SS-10 collected from 47.5-49.0'.
_	47.9	0.3	SS-10	(50/4.5")	↑ 47.5-47.75' - pale yellowish brown, (10YR 6	5/2) wet ==	Ш	16:45 Stopped drilling at 53.5' for the day on
				(00, 110)	hard, nonplastic to low plasticity, rapid dilat			3/20/07
					to moderate HCl reaction, 30-35% fine to c	oarse		
-					sand, all carbonate material			-
-						-		-
50								
-7.6								Driller's Remark: Reamed borehole from
						_		38.5' to 52.5' with 3-7/8" tricone bit on - 3/21/07
-						_		At 08:50; hole tagged at 52.5'
-						_		
_						_		
]						-		1
-						_		-
-	53.5				Sandy Silt (MI)		Ш	_
_				33-50-50/4	Sandy Silt (ML) 53.5-54.8' - moderate yellowish brown, (10)	YR 5/4) -		
		1.3	SS-11	(100/10")	wet, hard, low plasticity, slow to rapid dilata	ncy, mild		
55	54.8			, ,	HCl reaction, 30% fine to medium grained	sand, 3/16"	Ш	1
-12.6					thick grayish black (N2) organic lens at 53.	75', other +		
					irregular organic lenses and stringers throu sample	ignout / _		-
_					βαπρισ			
						_		1
-						-		-
-						-		_
_						_		
	58.5							
-				26-50/5			Ш	1
-	E0 4	0.9	SS-12	(76/11")		_		-
_	59.4			(/	h	Γ=	ш	-
60								
							L	



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-14	CHEET	4 OF 12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

-						END: 4/0/2007			
WATER	LEVELS	: 1.7 ft bo	IS OH 03/2		START : 3/14/2007	END: 4/9/2007 SOIL DESCRIPTION	LOGGE	n : (C. Wallestad COMMENTS
≥Q⊋	CAMPIT	INTERVA	1 (4)	STANDARD PENETRATION		SOIL DESCRIPTION		- 5	S CONTINUENTS
ELO ON (SAMPLE		. ,	TEST RESULTS	SOIL NAMI	E, USCS GROUP SYMBO	COLOR.	<u></u>	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE	_ ` '		MOISTURE	CONTENT, RELATIVE DI	ENSITY OR	Š	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTEN	CY, SOIL STRUCTURE, M	INERALOGY	PO I OI IOBMAS	INSTRUMENTATION
-17.6				(14)	Silt (ML)			╫	
-					58.5-59.4' - mo	derate yellowish brown,	(10YR 5/4),	+	-
-					wet, hard, low p	olasticity, rapid dilatancy, reaction, 10-15% very fin	mild to e to fine	+	-
-					grained sand, t	race black particles, carb	onate	+	-
_					material			4	_
-								4	_
_								1	_
_	63.5							1.,	_
	63.9	0.4	SS-13	50/5 (50/5")	Silt With Sand	(ML) me as 58.5-59.4' except	dark vellowish	Щ	<u></u>
				(30/3)	orange, (10YR	6/6), up to 20% fine to m	edium sand		
65							,	1	
-22.6							-	1	
								1	1
-								1	1
-								1	Driller's Remark: 66.5-67' hard layer, light
-								1	chatter -
-								1	-
-								+	-
-	68.5			25-50/4	Silty Sand Witl	h Limestone Lenses (SI	M)	+	,
-	69.3	0.7	SS-14	(75/10")	68.5-69.15' - m	oderate vellowish brown	, (10YR 5/4),	Ш	<u>- 11</u>
-	00.0			, ,	wet, very dense	e, fine to coarse grained, reaction, 25% low plastic	mild to	-	-
70 <u> </u>					around 50% of	sample is limestone lens	ses up to 1" in	4	Drillaria Damanic Class drilling and maderate
-27.0						o 1/16" in size over 5-10	% of surface,	1	Driller's Remark: Slow drilling and moderate chattering, hard rock
_					all carbonate m	ialeriai		1	_
_									_
_									_
								1	
	7 3:ā							1]
]	70.0	0.0	SS-15	50/1 (50/1")	Limestone Fra		City (T	Driller's Remark: Advance HW casing from
1 7				(50/1")	∖73.5-73.55' - Fr ∖Sand (SM) as i	ragments up to 1/2" in siz n 68.5-69.15'	e, with Silty	1	38.0' to 73.5'
75					(2) 40 1			1	1
-32.6							-	1	
-								1	1
-								+	-
-								+	-
-								+	-
-								+	-
-								+	-
-	78.5	0.0	00.40	EO/F	□ Limostana F:	amonto		\bot	4
-	78.9	0.0	SS-16	50/5 (50/5")	Timestone Fra 78.50-78.55' - r	i gments moderate yellowish brow	n, (10YR 5/4).	4	
				, , ,	mild HCl reaction	on, up to 1/2" in size, voi	ds up to 1/16" /	1	
80					over 50-70% of	f surface, no visible fossi	is or cavities	\bot	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-14	SHEET	5	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

WATER	LEVELS	: 1.7 ft bo	as on 03/2	20/07	START : 3/14/2007 END : 4/9/2007 LOGGEI	R : 0	C. Wallestad
				STANDARD	SOIL DESCRIPTION	Т	COMMENTS
AND (#)	SAMPLE	LE INTERVAL (ft) PENETRATION TEST RESULTS				1	
YCE,		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	1 2	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		INSTRUMENTATION
-37.6				(N)		+	Driller's Remark: 81.5-82.5' soft rock
-						┨	Driller's Remark: 82.5-83.5' hard, heavy -
-						┨	chattering _
-						┨	Driller's Remark: Stopped drilling at 83.5' at - 18:10
-						1	1 1
-						1	Driller's Remark: Start SPT with AWJ rod on - 3/22/07 at 08:10
_	83.5					1	1
_	00.0	0.0	SS-17	37-50/5	Silty Sand With Limestone (SM)	✝	7
	84.4	0.0	33-17	(87/11")	83.5-83.55' - moderate yellowish brown, (10YR 5/4), wet, very dense, fine to coarse grained, mild to	1	1
85					moderate HCl reaction, 29% low plasticity fines, 50% of sample is gravel-sized limestone fragments up to]	
-42.6					1/2" in size, voids up to 1/16" over 40-60% of surface,	1	
_					all carbonate material	1	_
_						1	
_						1	B # B 07.5.00 014
_						1	Driller's Remark: 87.5-88.0' heavy chatter, hard rock
_						1	-
_	88.5 88.8	0.0	SS-18	50/3	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	╄	-
-	00.0	0.0	33-16	(50/3")	Limestone Fragments 88.50-88.55' - pale yellowish brown, (10YR 6/2),	┨	-
_					moderate HCI reaction, very poor recovery, fragments up to 1/2", voids up to 1/16" over 15-25% of surface,	┨	-
90 <u> </u>					moderately fossiliferous, no visible cavities	1	Driller's Remark: 90.0-93.5' moderate
_						┨	chatter, slow drilling, hard rock -
-						1	-
_						1	1
_						1	1
-						1	1
_	93.5					1	1
-	93.8	0.1	SS-19	50/3 (50/3") /	Sandy Silt With Limestone (ML) 93.5-93.6' - grayish olive, (10YR 4/2), wet, hard, very	T	1
				(50/3)	dense, low plasticity, moderate HCl reaction, 30% fine]	
95					to medium grained sand, pale yellowish brown (10YR 6/2) limestone lenses up to 1/4" thick		<u> </u>
-52.6					6/2) introductions tenses up to 1/4 think	1	_
_						1	
_						1	_
-						1	
-						-	-
-	98.5	0.3	SS-20	50/5	Limestone	╀	- -
-	98.9	0.3	33-20	(50/5")	¬ 98.5-98.8' - pale yellowish brown, (10YR 6/2),	╪	-
-					moderate HCl reaction, limestone fragments up to //1/2"x3/4"	┨	-
100					Begin Rock Coring at 98.4 ft bgs	┨	-
100					See the next sheet for the rock core log	╁	



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-14

SHEET 6 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS: 1.7	ft bgs	s on 0	3/20/07 START : 3/14/2007 END : 4/9	9/2007	7 LOGGER : C. Wallestad	
≥0.0	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	OTH,	(%) O	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF	SORE	ROL	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	98.4	ш	ш.п.	-	0)	Limestone	Water level 2.9' below
_			>10	98.9-99.2' - Fracture zone (2), rough,	Н	98.4-102.6' - yellowish gray, (5Y 7/2),	ground surface on 3/23/07
	7.6 R1-NQ			undulating, 1-3/4"x1-3/4" fragments, many fracture orientations		fine to medium grained, strong HCl reaction, very weak to medium	at 08:20, borehole depth at 98.5'
100_ -57.6			5	99.4' - Fracture or mechanical break, 20 deg, —	H	strong (R1 to R3), 40% of rock mottled with irregularly shaped	Driller's Remark: Assembled NQ coring
-				rough, undulating, potential mechanical break, tight, fossils on surface	H	infilled cavities (bioturbation zones),	assembly (NW casing with
-	5 ft 83%	10	>10	99.6, 99.75, 99.95' - Fractures or mechanical		voids (1/16") over <5% of surface (25-50% in bioturbated zones), up to	attached drill bit is 8.15' _ long)
-	3070			break (3), 30, 90, 90 deg, smooth, undulating _ 100.15-101.1, 101.6-102.6' - Fracture zone	Н	1/4"x3/4" trace fossils, highly	Driller's Remark: At 98.5'
-			>10	(4), 45 deg, smooth, undulating, 1"-3"	H	_ fractured, many discontinuities; very weak rock from 98.4-99.2',	switch to NQ rock coring _ assembly at 10:25, length
-			>10	fragments, broken along weaker rock	囯	 100.15-101.1' and 101.6-102.6' No Recovery 102.6-103.4' 	from kelly down position to - ground is 3.3'
-	103.4		NR	-	ш	_ NO Recovery 102.6-103.4	Start coring at 11:50
-			1	400.01 Franking 45 d	Ш	Limestone 103.4-107.5' - grayish orange, (10YR	R1: 19 minutes -
_			'	103.8' - Fracture, 15 deg, smooth, undulating, - potential mechanical break, tight	Н	7/4), medium grained, moderate to	1
105			>10	104.5' - Fracture or mechanical break, 20	Ħ	strong HCl reaction, medium strong (R3), voids (1/16") over 0-20% of	1
-62.6			- 10	deg, rough, stepped to undulating, tight — 104.7-104.9' - Fracture zone (2), 1/2"-1-1/2"	H	surface in mottled pattern, fossils up	
	R2-NQ 5 ft	30	>10	fragments, multiple orientations	Ш	to 1/4"x1/2" over 5-10% of surface	1
	82%			104.9' - Fracture, 70 deg, smooth, undulating, open	Ш	_	1
			>10	105.0' - Fracture or mechanical break, 80 deg, smooth, undulating, open, intersects -	Н		
				104.9' fracture	Н		
			0 NR	105.1' - Fracture, <10 deg, rough, undulating, open -	Ш	No Recovery 107.5-108.4'	R2: 18 minutes
_	108.4			105.2' - Mechanical break, 45 deg, rough,	Ш	- Limestone	
_			6	undulating, open 1/2" to tight 105.5' - Fracture, 50 deg, smooth, undulating	Ш	_ 108.4-112.8' - moderate yellowish	
_				106.1-106.9' - Fracture zone (2), fragments up to 1"x2", multiple orientations, tight to	Ш	brown, (10YR 5/4), medium grained, moderate to strong HCl reaction,	
110 <u> </u>			5	open 1/4"	Н	medium strong (R3), voids (1/16")	_
-07.0	R3-NQ			107.1' - Fracture, 55 deg, smooth, undulating, tight	H	over 35-45% of surface, fossil casts up to 1/4"x1/2" over <5% of surface	
_	5 ft 88%	38	2	107.3' - Fracture, 45 deg, rough, undulating	H	_	-
-	00%			to stepped, tight 108.5' - Fracture, 70 deg, rough, undulating,	H	_	-
-			5	loose 108.8' - Fracture, 20 deg, rough, undulating	H	_	-
-			0	to stepped, loose	Ш	_	R3: 15 minutes
-	113.4		NR	108.9-109.1' - Fractures (2), 5 deg, rough, undulating, tight	H	- No Recovery 112.8-113.4'	-
-				109.0' - Fracture, 80 deg, smooth, undulating,	Ħ	Limestone	Driller's Remark: 115-
-			1	black staining (crystal faces) on surface, tight to open 1/4"	囯	_ 113.4-118.2' - Same as 108.9-112.8'	115.5', void, lost _ circulation, using more
115			4	109.7' - Fracture zone, black staining, up to 1/2"x1-1/4" fragments	Ш	_	pressure to drill
-72.6			4	109.9-110.2' - Fractures (2), 80 deg, rough,	Ш		SC-1 collected at 114.8- — 115.9'
-	R4-NQ 5 ft	82	1	undulating, loose 110.0' - Fracture, 70 deg, same as 109.9'	Н	-	
	96%	υZ		110.1' - Fracture or mechanical break, 5 deg,	\square	_	1
			1	rough, stepped, tight 110.7' - Fracture, 10 deg, rough, undulating,	H		1
				open 110.9' - Fracture, 10 deg, rough, undulating,	H		1 1
			1	black metallic crystals, tight to open 1/8"	H		R4: 10 minutes Stop drilling for day at
	118.4			_	H		17:10 on 3/23/07 at 118.4'
			I		ш		



PROJECT NUMBER:	BORING NUMBER:
338884.FL	A-14

SHEET 7 OF 12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				1ENT : CIVIE 35 3/N 299203, DIEURICH D-30 3/N 240, IIIU		<u>-</u>	
WATER	LEVELS : 1.7	ft bg:	s on 0		/9/200		
≥□≎	(%)			DISCONTINUITIES	ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUZE AND DEDTH OF GAGING
ᆱ끯은	RH, /	(%) Q	골	DEDTH TYPE OPIENTATION POLICINESS	7	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YF A	SGE SOGE	0	Z.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	요른뜻	S S	동변	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		_	NR/	111.6-111.7' - Fractures or mechanical break	 "	No Recovery 118.2-118.4'	Start drilling on 3/24/07 at
			>10	(2), 5 deg and 70 deg, rough, undulating,		Limestone	08:05
				tight	\perp	118.4-122.0' - Same as 108.9-112.8'	1
400				111.8-111.9' - Fractures (2), 10 deg and 70	1	except voids up to 1/16" over 15-25%	Still no circulation -
120_ -77.6			>10	deg, smooth, undulating, tight	-	of surface	Driller's Remark: 121.4-
-11.0	DE NO			112.8-113.4' - Fracture zone (2), 1"x1-1/2" fragments	\bot		121.6' small void
	R5-NQ 5 ft	20	>10	114.2-114.4' - Fracture zone (2), 1"x1-1/2"	Н		
	72%	20	10	fragments		=	-
-			4	114.5-114.6' - Fractures (2), 30 deg, smooth,	+	-	-
_			_	undulating, intersecting, tight to open 1/4"	+	- N B 400 0 400 41	_
				114.65-114.8' - Bedding plane or mechanical		No Recovery 122.0-123.4'	
]			NR	break (2), horizontal, smooth, undulating, tight to open 1/4"	\vdash		R5: 9 minutes
-	123.4			115.9' - Fracture, same as 114.65', tight	t	-	-
-	120.7			117.3' - Fracture, 45 deg, smooth, undulating	+	Limestone	-
			9	to stepped, tight	\bot	_ 123.4-125.9' - Same as 108.9-112.8'	
				117.8' - Fracture or mechanical break, 10		except voids up to 1/16" over 15-40%	
125			.	deg, smooth, undulating to stepped, tight to open 1/4"	1	of surface increasing with depth,	Drillor's Remarks Vaid at
-82.6			4	118.6,-118.7' - Bedding plane or mechanical	+	trace fossil casts up to 1/16"x1/4"	Driller's Remark: Void at 124.7-125.8'
	R6-NQ		4	break (2), horizontal, smooth to undulating,	$-\Box$	-	124.7-125.0
	5 ft	16	1	stepped, tight to open 1/8"	\bot	L	
	50%			118.7-119.6' - Fracture zone (2), up to		No Recovery 125.9-128.4'	
_				1-3/4"x2" sized fragments, many fractures at 0 deg, a few at 70-80 deg	\pm	-	
-			NR	119.7' - Fracture, 80 deg, smooth, undulating,	+-	-	-
_			1411	tight	#	=	R6: 12 minutes
				120.3' - Fracture, 40 deg and 45 deg,			Ro. 12 minutes
	128.4			smooth, undulating, tight	\vdash	_	
-				120.8' - Fracture, 80 deg, rough, undulating, tight	世	Limestone	Water level at 1.9' below
-			7	120.9' - Mechanical break	+	_ 128.4-131.2' - pale yellowish brown,	ground surface on 3/26/07
_				121.0-121.5' - Fracture zone (2), breaks at	\perp	(10YR 6/2), fine to medium grained, mild to moderate HCl reaction,	at 08:00 Water level 1.9' below
130			7	80-90 deg, many discontinuities up to		medium strong (R3), voids up to	ground surface on 3/27/07
-87.6			·	1-3/4"x1-3/4" fragments	\vdash	3/16" over 10-20% of surface, trace	at 08:08
-	R7-NQ		. 40	121.5' - Bedding plane, horizontal, smooth, undulating, open	\pm	fossil casts up to 1/4" diameter	Driller's Remark: No
-	5 ft	9	>10	121.8-121.9' - same as 121.5' except tight	+-	-	circulation during run
	56%			121.85' - Fracture, 80 deg, rough, undulating,	\bot	No Recovery 131.2-133.4'	Driller's Remark: Light chatter from 128.4-132.4'
				open			Driller's Remark: no
1 7			NR	123.4-123.7' - Fracture zone (2), three rock	1		chatter, faster drilling from
-			````	fragments 123.9, 124.2, 124.45' - Fracture or	+	-	132.4-132.9'
-				mechanical break (3), horizontal and 10 deg,	\perp	-	R7: 12 minutes
] _	133.4		_	rough, undulating, open	_	Limestone	Driller's Remark: Very soft
			>10	124.7-124.75' - Bedding plane or mechanical	Ľ	Limestone L 133.4-134.25' - light olive gray, (5Y	from 133.4-135.4', harder
1 7			10	break (2), horizontal, smooth, planar to undulating, tight to 1/4" open	\perp	5/2), very fine to fine grained, mild to	from 135.4-135.4, narder
			>10	125.0' - Bedding plane or mechanical break,	+	moderate HCl reaction, medium	from 137.4-138.4'
135 <u> </u>				horizontal, smooth, planar to undulating,	-	strong (R3), voids (1/16") over <10%	_
-92.0	D0 1/2			open	\perp	of surface, trace fossil casts up to	
	R8-NQ 5 ft	0		125.4' - Fracture, 60 deg, planar to stepped,		- 1/2"x1/4" _ 134.25-134.65' - dusky yellow, (5Y	
1 7	28%			open 1/4"-1/2" 128.5' - Fracture, 40 deg, rough, undulating,	T	6/4), medium to coarse grained,	1
-			NR	open	++	 moderate HCl reaction, medium 	-
-				128.8' - Fracture, 70 deg, rough, undulating,	40	_ strong (R3), voids (3/16") over	-
				tight to open 1/5"	\bot	15-30% of surface, 5-10% fossil	D0: 0it
				128.85' - Fracture, 30 deg, rough, undulating,	\mathbb{H}	- casts up to 3/6"x1/2" 134.65-134.8' - Same as	R8: 8 minutes
-	138.4			tight to open 1/8"	口	133.4-134.25'	-
	. 50. 1						
							1

APPENDIX 2BB-158 Rev. 4



338884.FL A-

A-14 SHEET 8 OF 12

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722999.7 N, 457929.8 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

WATER LEVELS: 1.7 ft bgs on 03/20/07 START: 3/14/2007 END: 4/9/2007 LOGGER: C. Wallestad DISCONTINUITIES LITHOLOGY COMMENTS DEPTH BELOW SURFACE AND ELEVATION (ft) 90 CORE RUN, LENGTH, AND RECOVERY (%) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD SYMBOLIC RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 129.05' - Fracture, 20 deg, smooth, No Recovery 134.8-138.4 3 undulating, tight Limestone 138.4-139.2' - pale yellowish brown 129.25' - Fracture, 10 deg, rough, undulating, open 1/8"-1/4" to medium dark gray, (10YR 6/2 to 4 140 N4), dark mottling, very fine to fine granded, medium strong (R3), voids 129.4' - Fracture, 85 deg, smooth, undulating, dark staining, open 129.-129.75' - Fracture (2), 70 deg, smooth, -97.6 (1/16") over 5-20% of surface, R9-NQ undulating, dark staining, tight 129.85' - 70 deg, smooth, undulating, tight 130.0' - Fracture, 20 deg, smooth, undulating, dissolution cavities (1.5"x1/4") over 0 5 ft 5% of surface, mineralization (pyrite) 30% mottling associated w/cavities NR tight, dark staining 139.2-139.9' - very fine grained, trace 130.05' - Fracture, 35 deg, smooth, voids (1/16"), no visible cavities or undulating, tight fossils R9: 15 minutes 130.3-130.35' - Fractures (2), 15 deg, smooth, undulating, tight 133.5' - Fracture, 70 deg, smooth, undulating, No Recovery 139.9-143.4' Driller's Remark: 143.4 Continued circulation loss. potentially rock fragment Limestone black staining, open 2 143.4-148.05' - light olive gray, (5Y jammed in core barrel shoe 133.65' - Mechanical break, horizontal, smooth, planar, tight, open 1/2" 133.8' - Fracture, 75 deg, smooth, undulating, tight to open 1/4" 5/2), fine to medium grained, mild to and unable to capture rock moderate HCI reaction, weak to core 145 2 medium strong (R2 to R3), thin Driller's Remark: End -102.6 drilling for the day at 143.4' bedding, voids (1/16") over 5-40% of 134.05' - Mechanical break, horizontal, surface (varies with bedding), trace on 3/27/07 at 18:00 R10-NO smooth, planar, open 2 fossil casts (1/4"x1/8") concentrated Water level at 2.4' below 65 5 ft 93% 134.25' - Fracture zone, up to 1"x1-1/2" at 144.4-145.3'. 5% dissolution ground surface on 3/28/07 fragments cavities at 143.4-143.7' and at 08:00 134.5-134.65' - Fracture zone (2), up to 1"x1-1/2" fragments Driller's Remark: Retrieved 1 144.2-145.3 1.3' core from bottom of 138.4-138.7' - Fracture zone, up to 1"x2" NO bit 1 fragments 138.95, 139.2, 139.5, 139.7, 139.8' -Driller's Remark: Add <1 NR No Recovery 148.05-148.4' 148 4 Mechanical break (5), horizontal and 10 deg, cup synthetic mud mix at Limestone rough, undulating, tight to open 1/2" 148.4-151.7' - yellowish gray to medium gray, (5Y 7/2 to N5), very 1 139.65' - Fracture, 60 deg, smooth to rough, undulating, tight to open 1/4" fine to fine grained, mild HCI 143.7' - Fracture, vertical and horizontal, rough, undulating to stepped, tight to open 150 SC-2 collected at 144.5-2 reaction, medium strong (R3), voids 145.3' -107.6 (1/16") over 10-25% of surface, 1/5' R10: 35 minutes dissolution cavities up to 1"x3" R11-NO 144.0, 144.5, 145.3, 145.4, 146.15' -Driller's Remark: 2nd gear 3 following 60-70% angle fracture 58 5 ft Mechanical break (5), 0-5 deg, smooth, with 500psi down pressure. 92% planar to undulating, tight to open 1/5" 147.3' - Fracture, 50 deg and horizontal, then switched to 3rd gear at 300psi for R11-NQ in 10 151.7-153.0' - moderate vellowish smooth, undulating, tight to open 1/8" order to decrease run time brown, (10YR 5/4), fine to medium 147.85' - Fracture, 60 deg, smooth, at 14:35 grained, mild to moderate HCI >10 undulating, open R11: 17 minutes reaction, weak to medium strong (R2 147.9' - Fracture, 40 deg, smooth, planar, NR to R3), voids (3/16") over 20-40% of 153.4 open surface, trace fossil casts up to 147.95-148.05' - Fracture zone (2), up to 1/4"x1/8", dissolution cavities up to 1-1/2"x1" over 10-15% of surface >10 1"x1-1/2" fragments 148.5' - Fracture, 55 deg, smooth, undulating, No Recovery 153.0-153.4' tight 155 Limestone 4 150.2' - Mechanical break, horizontal, rough, 153.4-157.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 7/2), fine to -112.6 dark metallic staining, tight R12-NQ 150.8' - Fracture, 60 deg, smooth, undulating, medium grained, mild to moderate 22 2 5 ft HCI reaction, medium strong (R3), 73% 150.4' - Fracture, 50 deg, smooth, planar, voids (1/16") over 15-30% of surface heavy dark metallic staining, tight (increasing percentage with depth), poorly fossiliferous, trace casts to 4 151.35' - Fracture, 60 deg, smooth, undulating, dark metallic staining, open 1/4"x2", trace cavities up to 1/4"x2" 151.5' - Mechanical break, 40 deg, rough, No Recovery 157.1-158.4' NR undulating to stepped, tight 158.4



ROCK CORE LOG

SHEET 9 OF 12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				1ENT : CIVIE 33 3/N 299203, DIEUICH D-30 3/N 240, MICC		,	ORIENTATION : Vertical
WATER	LEVELS: 1.7	ft bgs	s on 0		9/2007		
>	(9)			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표보인	N A K	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
Ε₩Ε	E R	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
- RB-	SN S	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	C LE R	Я		THICKNESS, SORFACE STAINING, AND HOTTINESS	Ś	CHARACTERISTICS	
_				152.0' - Fractures, 80 deg, rough, undulating,	Ш	Limestone	Driller's Remark: Heavy -
-			1	dark metallic staining, intersecting, tight	+	_ 158.4-160.65' - light olive gray, (5Y	chatter from 154.0-155.5', _
				152.1' - Fracture, 10 deg, smooth, undulating,		5/2), fine to coarse grained, mild to	at 155.5' - cannot advance,
160			4	open 1/4", lightly stained 152.25-153.0' - Fracture zone (2), up to 2"x2" _		moderate HCl reaction, weak to medium strong (R2 to R3), laminated	removing casing to check bit, stop drilling on 3/28/07
-117.6			4	fragments	╁	bedding, voids (3/16") over 10-40%	at 16:10 at approximately
-	R13-NC			153.4-153.55' - Fracture zone (2), up to	++	of surface (variable), trace fossil	155'
	5 ft	78	2	3/4"x1-1/4" fragments		casts up to 1/8" diameter, cavities	
	98%			153.7' - Fracture, 10 deg, smooth, undulating,		over 5-10% up to 1/4"x1/8", trace	Water level at 2.1' below
-				light tan thin coating on surface, tight to open	+	infill of weak rock (R2) dusky yellow	ground surface on 3/29/07 -
_			1	1/4"	+	_ (5Y 6/4); 160.65-160.85' weak rock	at 08:20 _
			<u> </u>	153.8' - Fracture, vertical, same as 153.7'		(R2) moderate yellowish brown,	Water level at 2.7! below
]			2	153.95-154.05' - Fracture zone (2), up to 1/2"x1" fragments	$\vdash \vdash$	 voids (1/16") over 20-25% of surface 160.65-160.85' - moderate yellowish 	Water level at 2.7' below - ground surface on 4/3/07
-	163.4		_	154.25' - Fracture, same as 153.7'	+	brown, (10YR 5/4), weak (R2), voids	at 09:10
-	100.4		NR	154.35' - Fracture, 30 deg, smooth,		- (1/16") over 15-25% of surface	-
			7	undulating, tight to open 1/4"	Ш	_ 160.85-163.3' - moderate yellowish	Water level at 2.8' below
				154.6' - Mechanical break, horizontal, rough,	Н	brown, (10YR 5/4), voids (1/16") over	ground surface on 4/4/07
				undulating, tight		- 15-25% of surface, trace cavities	at 08:20 -
165_			4	155.1-155.15' - Fractures (2), 60 deg and 40	μ	(1/16"-1/2"), trace fossils (1/8"-1/4")	Water level et 7 Cl halani
-122.6				deg, rough, undulating, open 155.15-155.4' - Fracture zone (2), fragments	\Box	No Recovery 163.3-163.4' Limestone	Water level at 7.6' below ground surface on 4/5/07
	R14-NC		_	up to 3/4"x1-1/2"		163.4-168.25' - grayish orange,	at 08:10, inside core barrel
-	5 ft 97%	18	7	155.4' - Fracture, 75 deg, rough, undulating,		(10YR 7/4), fine to coarse grained,	casing
-	37 70			dark staining	₩	 mild to moderate HCl reaction, 	R 12: 25 minutes –
			7	156.05-156.2' - Fractures (2), 70 deg and 55		laminated bedding, alternating beds	SC-3 collected at 161.35-
				deg, rough, undulating, tight to open 1/8"		up to 1" thick, mottled with light olive	162.4'
-				156.6' - Fracture or mechanical break, vertical, rough, undulating, tight	+	gray (5Y 5/2), contains grayish	R13: 17 minutes –
_			4	156.65, 156.7, 156.8, 156.9' - Bedding plane	\vdash	orange beds that are weak rock (R2) and coarse grained, voids (3/16")	R14: 16 minutes
	168.4		NR.	or mechanical break (4), smooth, horizontal		over 10-40% of surface; light olive	
			2	to 10 deg, planar to undulating, tight	\blacksquare	beds are medium strong rock (R3),	
-			-	156.9-157.1' - Fracture zone (2), up to	₩	fine grained, voids (1/16") over	1
_				1/2"x1-1/2" fragments		_ 5-15% of surface, fossil casts up to	-
170			1	158.4-158.55' - Fracture zone (2), up to 1"x2"		1/4"x1/8" over 5-10% of surface from	
-127.6			L ·	fragments —	\vdash	167.0-168.25'	
-	R15-NC			158.55' - Fracture, 40 deg, rough, undulating, open		No Recovery 168.25-168.4' Limestone	-
-	5 ft	58	4	159.8-160.0' - Fractures (2), 30 deg, rough,		168.4-173.35' - pale yellowish brown,	-
	98%			undulating, tight	Щ	_ (10YR 6/2), fine to medium grained,	
1 1			_	160.2' - 70 deg, same as 159.65'	\Box	mild to moderate HCI reaction,	1
-			5	160.65' - Fracture or bedding plane,		medium strong (R3), voids (1/16")	-
-				horizontal, smooth, planar, tight	₽₽	_ over 15-25% of surface, void size	R15: 17 minutes
			4	161.35-162.4' - Fractures (2), 20 deg, rough,	H	increasing up to 3/16" with depth,	
	173.4		L	undulating, tight 163.05' - Fracture, 20 deg, smooth,		 trace dissolution cavities (up to 1-1/2"x1/8"), trace organic]
-			NR/	undulating, tight	ш	laminations	-
-			>10	163.65, 163.9, 164.0, 165.2, 165.05, 165.35,	+	No Recovery 173.35-173.4'	-
			<u> </u>	165.45, 165.5, 165.55, 166.05, 166.45, 166.6,		Limestone	
175			\10	166.9, 167.25' - Mechanical break (14),	Ш	173.4-177.1' - pale yellowish brown,	1
-132.6			>10	nonzoniai and 30 deg, sinootii, pianai, tigit	╫	— (10YR 6/2), fine to medium grained,	⊣
	R16-NC		\vdash	163.8, 165.1, 165.6' - Fractures (3), rough,	+	mild to moderate HCl reaction,	-
	5 ft	0	>10	undulating, horizontal to 10 deg, tight 164.15' - Fracture, 60 deg, same as 163.8'		medium strong (R3), voids (3/16") over 15-25% of surface, trace	
	73%			166.2' - Fracture, 60 deg, rough, undulating,	\vdash	cavities up to 1-1/2"x1/16". trace	1
-			>10	tight	11	fossil casts up to 1/8"x1/16", trace	-
_			_10	166.65' - Fractures (2), 30 deg, rough,	\Box	- laminations	-
				undulating, intersecting fractures, tight	\Box	No Recovery 177.1-178.4'	1-10-1
1 7			NR	167.1-167.15' - Fractures (2), 40 deg and 70	$\vdash \vdash$		R16: 17 minutes
-	178.4			deg, rough, undulating, tight	\Box	<u></u>	-
	170.4				\Box		
					1		



338884.FL A-14

SHEET 10 OF 12

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722999.7 N, 457929.8 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

WATER LEVELS: 1.7 ft bgs on 03/20/07 START: 3/14/2007 END: 4/9/2007 LOGGER: C. Wallestad DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 167.6-167.7' - Fractures (2), 40 deg and 70 Limestone >10 deg, rough, undulating, intersecting, tight 178.4-182.1' - Same as 173.4-177.1' 167.85-167.95' - Fractures (2), 30 deg and 70 except trace cavities up to deg, rough, undulating, intersecting, tight 1-1/2"x1/4", dark discoloration 180 8 168.55' - Fracture, 10 deg, rough, undulating, associated with cavities -137<u>.6</u> tiaht 169.05' - Fracture, 50 deg, rough, undulating, R17-NQ 22 0 tiaht 5 ft 169.7' - Fracture, 60 deg, smooth, undulating 73% to stepped, tight 5 170.15' - Fracture or mechanical break, 5 deg, smooth, stepped, open 1/8", dark No Recovery 182.1-183.4' staining R17: 15 minutes NR 170.55' - Fracture, 55 deg, rough, undulating, open 1/8"-3/4" 183.4 170.8' - Fracture zone, 3/4"x1-1/2" fragments Limestone 171.2' - Fracture, 20 deg, rough, undulating, 2 183.4-188.4' - dark yellowish brown tight to pale yellowish brown, (10YR 4/6 to 171.35, 171.5, 171.8, 172.0, 172.45, 173.2' -10YR 6/2), fine to coarse grained, Bedding plane or mechanical break, 185 2 mild to moderate HCI reaction, horizontal, smooth, undulating, tight to open 142.6 medium strong (R3), abrupt color 1/8' change at 184.45', voids (1/16" to R18-NQ 172.1' - Fracture, 60 deg, rough, undulating, 5 3/16") over 5-30% of surface, 77 5 ft tight moderately fossiliferous, fossil casts 100% SC-4 collected at 186.25-172.4' - same as 172.1' except 30 deg up to 1"x1/2" over 5-10% of surface 187.05 173.25' - same as 172.1' except vertical (percent increases with depth), trace 4 173.4-174.4' - Fracture zone (2), cavities up to 1-1/4"x1/4" 1-1/2"x2-1/2" fragments R18: 18 minutes 175.2' - Fracture, 20 deg, smooth, undulating, 3 tight to open 1/4" 188 4 175.6' - Fracture zone, 1"x1/2" fragments Limestone Driller's Remark: Hard 175.9' - Fracture, 30 deg, rough, undulating, 188.4-193.25' - light olive gray to material, about 2" thick at 4 tiaht moderate yellowish brown, (5Y 5/2 to 176.0-176.1' - Fracture zone (2), fragments 10YR 5/4), fine to coarse grained, up to 1"x1/2" Driller's Remark: Hard 190 3 mild to moderate HCl reaction, weak 176.3' - Fracture, 70 deg, rough, undulating, material, about 2" thick -147.6 to medium strong (R2 to R3), voids tight to open 1/4" up to 3/16" over 30% of surface, R19-NQ 176.4' - Fracture, horizontal, rough, 3 moderately fossiliferous from 67 5 ft undulating, tight 97% 188.4-190.1', poorly fossiliferous 176.5' - Mechanical break, horizontal, from 190.1-191.9', casts up to smooth, planar, tight 1/2"x1/4", trace laminations, fine 3 176.6-177.1' - Fracture zone (2), up to grained infill over 20-40%, trace 1-1/2"x1-1/2" fragments cavities up to 1-1/2"x1/8", short 178.4-179.3' - Fracture zone (2), up to 2 (1/4"x1/2") stacked 60 deg fractures 1/2"x1-3/4" fragments from 188.95-189.0' (micro structural 193.4 179.3' - Fracture, 40 deg, smooth, undulating, NR feature) R19: 14 minutes open No Recovery 193.25-193.4' 7 179.55' - Fractures (2), 20 deg and 10 deg. **Limestone** 193.4-193.75' - Same as rough, undulating, open, intersecting 179.75' - Fracture, 50 deg, rough, undulating, 195 188.4-191.9' 5 tight -152<u>.6</u> 179.85' - Fracture, 40 deg, rough, undulating, R20-NQ open 4 5 ft 26 180.0' - Fracture, 20 deg, smooth, undulating 98% to stepped, tight, dark staining 180.15' - Fracture, 10 deg, rough, undulating, 2 open 180.33- 180.37' - Fractures (2), <10 deg. smooth, undulating, tight to open 1/2" 6 181.45' - Bedding plane, horizontal, smooth, 198.4 planar, dark staining, tight



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-14

SHEET 11 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.7	ft bgs	on 0	3/20/07 START : 3/14/2007 END : 4/9	9/2007	7 LOGGER : C. Wallestad	
				DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
200 -157.6 -	R21-NQ 5 ft 63%	11	NR) 3 2 >10	181.65' - Fracture, 70 deg, smooth, planar to undulating, tight 181.7' - Bedding plane, horizontal, smooth, planar to stepped, open 181.8' - Mechanical break, hardness test 181.9' - Fracture, vertical, rough, undulating, tight 184.05, 184.2, 184.5, 185.6, 185.65, 185.7, 185.85, 186.25, 188.05' - Fractures or bedding plane (9), 5 deg, smooth, undulating,		193.75-198.3' - yellowish gray to moderate yellowish brown, (5Y 7/2 to 10YR 5/4), fine to coarse grained, mild to moderate HCl reaction, very weak to medium strong (R1 to R3), voids up to 3/16" over 5-25% of surface increasing percentage with depth, trace fossil casts up to 1/4"x1/8", 196.4-197.7' has moderate coverage (15-10%) of cavities up to	R20: 14 minutes End drilling on 4/5/07 at 18:00 at 198.4' Water level at 3.3' below ground surface on 4/6/07 at 07:56 Begin coring at 08:00 Driller's Remark: Slow, hard coring from 201.0-
-	203.4		NR	tight 185.7-185.85' - Fracture zone (2), up to 1-1/2"x2/3" fragments 187.05, 187.2, 187.35' - Fractures (3), 10 deg and 20 deg, rough, undulating, tight		1"x1/2", grain size coarsens with depth No Recovery 198.3-198.4' Limestone 198.4-199.9' - moderate yellowish brown, (10YR 5/4), medium grained,	201.5', rock core fragment was jammed inside shoe of core barrel R21: 26 minutes
- 205_ -162.6 - -	R22-NQ 5 ft 0%	0	NR	187.25' - Fracture, vertical, rough, undulating, tight 188.4' - Fracture, 45 deg, rough, undulating, tight 188.5, 189.1, 189.2, 189.3, 189.55' - Bedding plane (5), horizontal, smooth, planar, open to tight 189.1-189.2' - Fracture zone (2), 1"x1-1/4" fragments 189.5' - Fracture, horizontal, smooth, planar 190.05' - Fracture, 10 deg, rough, undulating, tight 191.05-191.2' - Fractures (2), 30 deg and 60 deg, smooth, undulating, intersecting, tight		brown, (10/R 5/4), medium grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" over 15-20% of surface, trace cavities up to 1/4" diameter, trace fossii casts up to 1/4"x1/3" 199.9-201.55' - grayish orange, (10/R 7/4), mild HCl reaction, medium strong (R3), trace voids up to 1/16" No Recovery 201.55-218.25'	R22: 15 minutes -
- 210 -167.6 - - -	208.4 R23-NQ 5 ft 0%	0	NR	191.3' - horizontal, same as 190.05' 191.55' - Fracture, 65 deg, rough, undulating, tight 192.3' - same as 190.05' 192.95-193.15' - Fractures (2), 40 deg and 25 deg, smooth, undulating, intersecting, tight 193.75-193.85' - Fractures (2), smooth, planar, tight 193.8' - Fracture, 75 deg, smooth, planar, tight 193.95, 194.1, 194.6' - Fractures (3), 30 deg and 60 deg, rough, undulating, tight 194.3' - 50 deg, same as 194.1' 194.85' - vertical, same as 194.1' 195.0-195.2' - Fracture zone (2), up to 2"x1" fragments		- - - - - - -	slough at bottom of boring
- 21 <u>5</u> -172.6 - - - - -	213.4 R24-NQ 5 ft 3%	0	NR	195.45, 195.65, 195.85' - Fractures (3), 60 deg, rough to smooth, undulating, tight 196.3, 196.5, 196.9' - Fractures (3), 10 deg and 20 deg, rough, undulating, tight 197.4-197.55' - Fracture zone (2), up to 1"x3/4" fragments ————————————————————————————————————			- - - - - - -
				-			

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-14	SHEET	12	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

LOW AND N (ft)	₽ ^(%)			DISCONTINUITIES		LITUOLOGY	
OAS	<u> </u>			2.000.11011.20	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
220 -177.6	R25-NQ 5 ft 0%		0 NR	_		Limestone 218.25-218.4' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate HCI reaction, medium strong (R3), trace voids up to 1/16" over 5-10% of surface No Recovery 218.4-223.4'	R24: 12 minutes Driller's Remark: Circulation almost returned, hard coming up casing; harder rock at bottom of run
- - ,	223.4				Ħ	-	R25: 18 minutes -
-	<u></u>			-	-	Bottom of Boring at 223.4 ft bgs on 4/9/2007	Driller's Remark: Switched to split spoon to attempt to recover a sample Stop coring for day on 4/6/07 at 13:45
					-	-	Water level at 2.4' below ground surface on 4/7/07 at 07:50
					-	- - - -	End of boring at 223.4'. Driller's Remark: Hole terminated short of 250.0' total depth due to borehole collapse from 174.0-223.0' and ground collapse around the surface casing and under the drill rig
-				-	-	-	_
-					-	-	- -
					1	- -	- -
-					-	-	- -
				-	-	-	- -
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-					-	-	-
					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-14A

SHEET 1 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.6 N, 457934.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-15/16 tri-cone bit ORIENTATION: Vertical

WATER LEVELS: 3.6 ft bgs on 6/13/07										
	-			STANDARD	SOIL DESCRIPTION		Ö	COMMENTS		
A P P P P P P P P P P P P P P P P P P P	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			C LO	DEDTIL OF GLONIC DRIVING DATE		
H BE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		3OLI(DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMBOLIC LOG	INSTRUMENTATION		
42.2	0.0			(. 1)	Silty Sand With Organics (SM)	┪	Ī	11:30 - Start sampling using AWJ rods, 2'x2"		
-		1.3	SS-1	2-2-3 (5)	0.0-0.55' - brownish black, (5YR 2/1), moist, loose, bark and root matter present, sand is light gray (N7),	/†		split spoon, drilling with 2-15/16" tri-cone bit		
-	1.5			(3)	\fine grained, silica, 22% fines /	/,‡		Wet at 1'		
_					Poorly Graded Sand (SP) 0.55-1.3' - pale yellowish brown to moderate yellowish	/1		_		
					brown, (10YR 6/2 to 10YR 5/4), moist to wet, loose, very fine to fine grained, trace non-plastic fines, 10%	\prod				
-					roots and organics			_		
_						4		_		
_						4		_		
-						4		-		
5 37.2	5.0				Poorly Graded Sand (SP)	4	7 53	-		
-		1.1	SS-2	1-1-0	5.0-6.1' - yellowish gray, (5Y 7/2), wet, very loose,	\dashv		-		
-	0.5	1.1	33-2	(1)	very fine to fine grained, medium plasticity, 4% nonplastic fines, sand is silica	/ ‡		-		
-	6.5							-		
-						1		-		
-						1		-		
_						1		-		
_						1		-		
-						1		_		
10	10.0					\perp				
32.2				0-0-1	Clayey Sand (SC) 10.0-10.25' - light bluish gray, (5B 7/1), wet, very			_		
_		0.3	SS-3	(1)	loose, no HCl reaction, 33% high plasticity fines, fine	4		_		
-	11.5				to coarse sand and fine gravel-sized limestone			_		
-					\HCI reaction	/		 Driller's Remark: Slight loss of circulation at		
-						+		12' -		
-						\exists		-		
-						\exists		-		
-						\exists		-		
15	15.0					1		-		
27.2	15.4	0.3	SS-4	50/5	Silt (ML)	士	Ш	14:40 - 15' of HW casing installed		
-				(50/5")	15.0-15.33' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), wet, hard, nonplastic, rapid	\int				
					dilatancy, mild to moderate HCl reaction, 3% fine sand, trace organics, all carbonate material	/1		_		
					Sand, trace organics, all carbonate filaterial					
-]		15:00 - Add bentonite chips around surface casing and borehole to prevent caving		
_						4		-		
-						4		_		
-						4		-		
-						+		-		
20						+				
						_				



PROJECT NUMBER:	BORING NUMBER:
338884.FL	A-14A

SHEET 2 OF 6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.6 N, 457934.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-15/16 tri-cone bit ORIENTATION: Vertical

						y, auto nammer, Avvj rous,			ORIENTATION : VEItical
WATER	LEVELS	: 3.6 ft bo	49 011 0/T		START : 6/12/2007	END : 6/13/2007 SOIL DESCRIPTION	LUGGE	<u>π.υ</u>	. Whitaker COMMENTS
≥ 9€	CAMPIT	INTERVA	1 (#)	STANDARD PENETRATION		JOIL DECOMM HON		8	GOMMENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE		. ,	TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBOL	COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE	<u> </u>		MOISTURE	CONTENT, RELATIVE DE	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
SUR!			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE, MII	NERALOGY	SYM	INSTRUMENTATION
22.2	20.0			(**)	Silt With Sand	(ML)		T	
-		1.0	SS-5	10-16-13	20.0-21.0' - gray	yish orange, (10YR 7/4),	wet, very stiff,	111	-
-		1.0		(29)		d dilatancy, moderate HC o medium grained sand, o		₩	4
-	21.5				to fine gravel-size	zed lenses at 20.0-20.5',	all carbonate	1	-
-					\material			┨	-
-								1	-
_								┨	-
-								-	-
_								4	-
_								4	_
25	25.0		00.0	50/4.5	Oile Mile O	(841.)		╂	4 -
17.2	25.4	0.4	SS-6	50/4.5 (50/4.5")	Silt With Sand ((ML) vish orange to dark vellov	vish orange.	╨	4
_				(55:115)	\ (10YR 7/4 to 10	ÝR 6/6), moist, hard, nor	plastic, rapid	1	_
_					\dilatancy, mode \sized, all carbor	erate HCl reaction, 15% fi	ne sand	1	
_					(=====			1	_
]	_
									_
								1	
-								1	1
30	30.0							1	1
12.2					Sandy Silt (ML)			Ш	1
-		0.6	SS-7	14-5-9		yish orange to dark yellow YR 6/6), wet, stiff, nonpla		₩	4
-	31.5			(14)	dilatancy, mode	erate HCl reaction, 40% fi	ne to coarse	1	1
-	01.0				sand sized, 10%	% fine gravel-sized grains	, all	1	1
-					Carbonate			1	-
-								1	-
-								1	-
-								1	-
-								1	16:10 - Recover SS-8, decide to start rock
-								1	coring; add 20' HW casing to 34' (1' stickup)
35 7.2	35.0 35.3	0.3	SS-8	50/3.5	Silt And I impet	tone Fragments (ML)		$\frac{1}{1}$	SS-8 may be slough/cuttings
'		\	00-0	(50/3.5")	35.0-35.3' - gray	yish orange to pale yellow	vish brown,	-	Borehole drilled from 35.3-36.0' without
-					(10YR 7/4 to 10	OYR 6/2), wet, moderate to of sample is silt (similar to	o strong HCl	4	sampling to set stroke
-					of sample is lim	nestone fragments up to 1		-	-
-					carbonate mate			-	
_					Begin Rock Cor	ring at 36.0 ft bgs neet for the rock core log		1	
-								1	
-								1	_
_								1	_
								1	
40							_		



338884.FL A-14A

SHEET 3 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.6 N, 457934.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 3.6	ft bg	s on 6	/13/07 START : 6/12/2007 END : 6/	13/20	07 LOGGER : D. Whitaker	_
30₽	<u> </u>			DISCONTINUITIES	၅၉	LITHOLOGY	COMMENTS
E AN ON (#	AN, AND SRY (%	<u></u>	RES JT	DESCRIPTION	IC LC	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_	36.0		1		F	Limestone - 36.0-41.0' - light olive gray, (5Y 7/2),	Water level at 3.6' below ground surface on 6/13/07
-				36.7' - Mechanical break or bedding plane, 10 deg, rough, undulating, tight to 1/4" open	H	fine grained, moderate HCl reaction, weak (R2), 25% voids up to 1/16"	at 07:30 Begin rock coring at 36'
-			1	To deg, rough, undulating, light to 1/4 open	H	 increasing to 40% at 37.5', many oblong cavities (3/16" to 9/16") with 	below ground surface – 07:55 on 6/13/07
-	R1-NQ			37.9' - Mechanical break or bedding plane, 10 deg, smooth to rough, undulating, tight	Ħ	trace recrystallization on inner surfaces, trace infill	07.33 011 0/13/07
_	5 ft 100%	91	2	88.55, 38.9' - Mechanical break or fractures 2), 25 deg and 45 deg, rough, undulating,	Ħ	- Surfaces, trace initial	SC-1 collected at 36.7- 37.85'
			0	tight	Ħ	_	-
40 <u> </u>				_	\blacksquare	_	R1: 11 minutes
-	41.0		0		Ш	-	-
_			0		Н	41.0-43.8' - Same as 36.0-41.0' - except very weak (R1) at 42.6-43.8']
_					Ħ	-	-
-			2	42.6, 42.9, 43.7, 43.9, 44.7, 44.95, 45.3, 45.6'	H	-	-
-	R2-NQ	84	1	 Mechanical break (8), 5-15 deg, smooth to rough, undulating, tight 		-	-
_	5 ft 96%	04		rough, undudung, ught	Н	- 43.8-45.8' - light olive gray, (5Y 7/2),	
l			2		H	fine to medium grained, extremely weak (R0), 60% voids up to 1/16"	_
45 <u> </u> -2.8				_	Ħ	with some silt-sized infill and minor recrystallization, few black 1/16"	R2: 6 minutes
	46.0				Ħ	diameter fossils, thin laminations of organic material from 45.65-45.8'	
-			2 - Be	46.1, 46.5, 47.6, 47.8, 48.8, 49.15, 49.6, 49.9 - Bedding plane or mechanical break (8), <15		No Recovery 45.8-46.0'	_
-				deg, smooth, undulating, tight to 1/4" open	Ь	 46.0-47.3' - moderate yellowish brown, (10YR 5/4), fine to medium 	Additional mechanical
-			2	-	ш	grained, strong HCl reaction, very weak (R1), up to 1/16" voids over	breaks created when – placing core into box, due
	R3-NQ 5 ft	53	2		」	40% of surface, trace black	to rock conditions
_	80%	55			Ħ	fragments at 46.1', some silt-sized infill, some recrystallization in void	_
			3		\blacksquare	space, many (>5) black organic fragments up to 3/16" diameter	_
-7.8				_	H	47.3-50.0' - Same as 46.0-47.3' except extremely weak (R0), with	R3: 5 minutes
	51.0		NR		\mathbb{H}	trace black fragments at 48.8' No Recovery 50.0-51.0'	
_			5	51.15, 51.4' - Fractures or mechanical break (2), 30 deg, smooth, planar to undulating,	H	Limestone 51.0-53.35' - moderate yellowish	-
-				tight to 1/2" open 51.75, 51.82' - Bedding plane (2), <10 deg,	H	brown, (10YR 5/4), fine to medium grained, moderate HCl reaction,	-
-			>10	smooth, undulating 51.75-51.82' - Fracture, 85 deg, smooth,	Ħ	extremely weak (R0), 5-15% voids <1/16" on surface, trace 1/32" to	-
_	R4-NQ 5 ft	0	2	planar, extends between 2 bedding plane		1/16" black laminations, many 1/16" black organic particles]
-	47%			fractures 52.0-52.3' - Fracture zone	団	No Recovery 53.35-56.0'	-
- 55	-		NR	53.0, 53.15' - Bedding plane or mechanical break (2), 5 deg, rough, undulating	団	-	-
-12.8				_	囯	_	R4: 2 minutes
	56.0				H		
ь			I		1		I .



338884.FL A-14A

SHEET 4 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.6 N, 457934.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER LEVELS: 3.6 ft bos on 6/13/07 START: 6/13/2007 END: 6/13/2007 LOGGER: D. Whiteker

WATER	LEVELS: 3.6	ft bgs	s on 6/	13/07 START : 6/12/2007 END : 6/	13/20	D7 LOGGER : D. Whitaker	
≥O.⊋	<u> </u>			DISCONTINUITIES	Jg J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - - 60 -17.8	R5-NQ 5 ft 0% 61.0	0	NR			No Recovery 56.0-61.0'	Driller's Remark: All sand/silt-sized particles fell out/washed out of core barrel during retrieval Driller's Remark: Fragments/pieces of rock could be felt at 59.0' R5: 2 minutes
 65 -22.8	R6-NQ 5 ft 31%	0	>10 2 NR	61.0-61.2' - Fracture zone, 2 subrounded gravel sized fragments 61.4' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight 61.65' - Bedding plane, horizontal, rough, planar, black staining on surface, <1/2" open 61.9' - Bedding plane or mechanical break, <10 deg, rough, undulating, tight 62.05' - Fracture or mechanical break, 25 deg, smooth, undulating, tight 62.35' - Fracture or mechanical break, 10 deg, smooth, undulating, tight to 1" open		Limestone 61.0-62.55' - dusky yellow, (5Y 6/4), fine to medium grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), 40% surface voids up to 1/16", trace very thin (<1/32") black laminations at 61.25-61.3', oblong black material up to 1-3/16" x 1/16", spherical black material at 3/8" diameter, many cavities up to 3/8"x 3/16" No Recovery 62.55-66.0'	
- - - - - - 70 -27.8	R7-NQ 5 ft 75% 71.0	14	3 >10 >10 2 NR	66.1' - Bedding plane, horizontal, rough, stepped, up to 1" open 67.05-67.55' - Fracture zone 67.7, 69.1' - Fracture (2), 75 deg, rough, undulating to stepped, tight to <1/2" open 67.9, 68.05' - Bedding plane or mechanical break (2), <10 deg, smooth, undulating 68.25, 68.45, 68.6' - Bedding plane or mechanical break (3), <15 deg 68.7' - Fracture, 45 deg, rough, stepped, tight69.34-69.5' - Fracture zone		Limestone 66.0-69.75' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate HCI reaction, weak (R2), 30% surface voids <1/16" diameter many cavities up to 3/8"x3/16", minor recrystallization, trace black laminations up to 3/16" thick, trace black organic material up to 5/16" diameter moderately fossiliferous (molds, casts) No Recovery 69.75-71.0'	09:50 Driller's Remark: Hole started caving due to loose interval at 56.0-61.0', installed HW casing from 35.0-60.0' 11:20 Casing installed, borehole flushed R7: 5 minutes
- - - - - 75 -32.8	R8-NQ 5 ft 62%	22	1 3 3 0	71.8' - Bedding plane, 10 deg, rough, stepped 72.1' - Bedding plane, horizontal, rough, stepped 72.6, 72.9, 73.65, 73.9' - Mechanical break or bedding plane (4), <15 deg, smooth, planar to undulating, tight 73.2' - Fracture, 40 deg, tight		Limestone 71.0-72.15' - Same as 66.0-69.75' except very weak (R1), 40% surface voids <1/16" 72.15-74.1' - Same as 66.0-69.75' except extremely weak (R0), 5% surface voids <1/16" No Recovery 74.1-76.0'	



338884.FL A-14A

SHEET 5 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.6 N, 457934.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 3.6	ft bgs	s on 6/	13/07 START : 6/12/2007 END : 6/	13/200	D7 LOGGER : D. Whitaker	
30₽	<u>(</u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 80 -37.8	R9-NQ 5 ft 80% 81.0	0	1 2 >10 1 NR >10 3 >10 0	76.55' - Mechanical break 76.9-77.05, 77.25-77.43' - Fracture zone, sand to gravel-sized limestone fragments 78.05' - Bedding plane, 5 deg, rough, stepped, up to 1/4" open 78.15' - Bedding plane, horizontal, rough, stepped, up to 3/4" open 78.25-78.5, 78.7-78.8' - Fracture zone 79.65' - Mechanical break, <15 deg, rough, stepped 81.1' - Fracture, horizontal, smooth, planar, black organic infill or staining 81.3-81.75' - Fracture zone, angular rock fragments 81.7' - Fractures (2), 60 deg and 45 deg, smooth, stepped, intersecting, tight 81.85' - Fracture, vertical, rough, undulating, 1/8" open 82.5, 82.65, 83.4, 83.55' - Fracture (4), 50 deg, rough, undulating to stepped, tight to 1/4" open		Limestone 76.0-80.0' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), 50% surface voids <1/16", many (5+) cavities, few large cavities up to 1-3/16"x5/16", minor silt-sized infill, minor recrystallization, trace black fossil casts, poorly fossiliferous, zone from 77.95-78.75' is weak rock (R2), 5% surface coverage of voids <1/16" with minor recrystallization No Recovery 80.0-81.0' Limestone 81.0-81.4' - very pale orange, (10YR 8/2), fine grained, very weak (R1), laminated bedding, 3/4" black organic layer at 81.0' 81.4-82.9' - pale olive, (10Y 6/2), weak to medium strong (R2 to R3), 20-25% coverage of surface voids up to 1/16", fossiliferous 82.9-83.6' - grayish orange, (10YR 7/4), fine grained, moderate to strong	Driller's Remark: Slight mud loss at 80.0' R9: 5 minutes
8542.8	86.0 R11-NQ 5 ft 1 60%	40	1 NR 3 1	83.0-83.2, 83.76-83.95' - Fracture zone 84.1' - Fracture, 45 deg, rough, stepped 86.4-86.6' - Fracture zone, bound by 45 deg fractures, rough, undulating 87.1' - Fracture, 75 deg, smooth, undulating 87.3' - Bedding plane, horizontal, rough, undulating, bedding plan splits into 45 deg fractures above and below 88.4' - Mechanical break, smooth, stepped, tight		HCl reaction, very weak (R1) 83.6-85.2' - yellowish gray, (5Y 7/2), medium strong (R3), 20-25% voids up to 1/16" over surface, 1-2% fossil molds up to 5/16" No Recovery 85.2-86.0' Limestone 86.0-89.0' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, medium strong (R3), 15-20% surface coverage of voids up to 1/8", <2% surface coverage of cavities/molds up to 3/8" (1"x2" cavity at 88.9'), sparse soft white infilling in some of the larger molds	R10: 5 minutes
90 -47.8 - - - - - - - - - - - - - - - - - - -	91.0 R12-NQ 5 ft 82%	7	3 2 >10 2 NR	91.1, 91.4' - Bedding plane (2), <10 deg, smooth, undulating 91.5' - Fracture, 45 deg, smooth, undulating 91.88, 92.2, 92.6' - Bedding plane or mechanical break (3), <5 deg, rough, undulating to stepped, tight except 1/4" open at 92.2' - Mechanical break, horizontal, smooth, undulating, tight 93.0-93.33' - Fracture zone 93.33' - Fracture, 60 deg, rough, stepped 93.5' - Fracture, 45 deg, smooth, stepped, black staining, tight 93.8, 93.95, 94.2' - Fractures (3), 45-60 deg,		No Recovery 89.0-91.0' Limestone 91.0-91.7' - Same as 86.0-89.0' 91.7-95.1' - moderate yellowish brown, (10YR 5/4), fine to medium grained, strong HCI reaction, extremely weak (R0), 5-10% surface coverage of voids <1/16", trace black oblong material up to 3/8"x1/16", minor recrystallization No Recovery 95.1-96.0'	R11: 9 minutes
	96.0			rough, planar to stepped			



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-14A

SHEET 6 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.6 N, 457934.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 3.6	ft bgs	on 6	/13/07 START : 6/12/2007 END : 6/	13/20	07 LOGGER : D. Whitaker	
< □ €	_ @ \			DISCONTINUITIES	ပ္ထ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI ATIC	JE STE	(%) Q	T.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
URF	ECC	ROL	RAC ER I	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	Olk	Ľ.	шп	94.5, 94.8, 95.0' - Bedding plane (3), <10	S	Limestone	
-			5	deg, rough, undulating, black staining at	Ħ	 96.0-97.8' - light olive gray grading to 	_
_				94.5', tight to 1/4" open 96.1' - Bedding plane, horizontal, smooth,	H	yellowish gray, (5Y 5/2 to 5Y 7/2), fossiliferous (molds/casts), voids up	_
-			>10	undulating	⊬	 to 1/16" over 10-15% of surface, 	_
_	D40 NO			96.4' - Fracture, 55 deg, smooth, undulating, tight	П	1-2% coverage of molds/casts up to 3/8" diameter	_
_	R13-NQ 5 ft	18	>10	96.7-96.95' - Fracture zone	仜	97.8-100.3' - yellowish gray, (5Y 5/2),	_
_	86%			97.5' - Fracture or mechanical break, 40 deg, rough, undulating, tight	╁┼	fine grained, strong HCl reaction, weak to medium strong (R2 to R3),	_
_			6	97.85, 98.3' - Bedding plane (2), horizontal,	H	 15-30% surface coverage of voids up 	_
100_ -57.8			1	rough, undulating, tight 98.0' - Fracture, 80 deg, smooth to rough,	Ħ	to 1/8", few large cavities up to 3/8", fossiliferous (molds)	D40: 7
-57.6			_1_	undulating, with fragments along length from		No Recovery 100.3-101.0'	R13: 7 minutes
-	101.0		NR	97.55-98.5' 98.5, 98.7' - Fracture (2), 50 deg, smooth,	╀	 	_
			1	stepped, V-shaped fractures -	Ш	Limestone - 101.0-103.9' - Same as 97.8-100.3'	_
_				98.8, 99.2, 99.4' - Bedding plane or mechanical break (3), horizontal	口	 -	_
_			>10	99.4-99.5' - Fracture zone	士	_	_
_				99.5' - Bedding plane, horizontal, rough, planar	╁┼	_	_
_	R14-NQ 5 ft	16	>10	99.7. 100.0' - Bedding plane or mechanical		-	_
_	58%			break (2), <10 deg, smooth to rough, undulating, tight to 1" open	Ľ	No Recovery 103.9-106.0'	_
_				101.75' - Fracture, 40 deg, smooth to rough,	₽	-	_
105_			NR	stepped, up to 3/4" open 101.9-102.45' - Fracture zone	lacksquare		
-62. 8				102.7' - Fracture, rough, undulating,	ш	-	R14: 9 minutes
_	106.0			conchoidal fracture plane, 1/4" open 102.9, 103.1' - Fractures (2), 50 deg, smooth,	上	 -	_
_			>10	stepped	╁	Limestone - 106.0-110.5' - pale yellowish brown,	_
_				103.25-103.9' - Fracture zone 103.55' - Fracture, 45 deg, smooth, planar	┢	(10YR 6/2), fine to medium grained,	_
_			>10	106.0-106.7' - Fracture zone	Ħ	moderate HCl reaction, weak to medium strong (R2 to R3), 25%	_
_	D. 5.10			106.8, 107.2' - Fractures (2), 70 deg, rough, stepped, tight to 1/8" open	Ľ	voids <1/16" on surface, 5+ cavities	_
_	R15-NQ 5 ft	37	1	107.05, 107.3' - Bedding plane (2),	₽	up to 3/4"x1/4", faint horizontal white and black bands throughout core	_
-	90%			horizontal, rough, undulating 107.4-107.9' - Fracture zone	F	-	16:00 Dooghed total
_			1	107.9, 108.2' - Fractures (2), 60 deg, rough, undulating to stepped, up to 3/4" open	╆	_	16:00 - Reached total depth of 111.0'
110 -67.8				109.2' - Mechanical break, 65 deg —	仜	_	D15: 10 minutes
-07.6			1	110.2' - Bedding plane or mechanical break,	\vdash	No Receivery 110 5 111 0'	R15: 10 minutes
-	111.0		NR	horizontal, smooth, undulating, tight to 1/2" open	F	No Recovery 110.5-111.0' Bottom of Boring at 111.0 ft bgs on	_
_					4	- 6/13/2007	_
_				-	4	_	_
_				-	-	-	_
-				-	-	-	Mater level is 4.7! helevi
_				-	-	-	Water level is 1.7' below ground surface on 6/14/07 -
-				-	-	-	at 08:00 before grouting and with casing still in hole
-				-	-	-	and with casing still in note
-				_	-	_	_
-				-	-	-	-
_					1		
							ı



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-15	SHEET	1	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

ORIENTATION: Vertical

						ry, cathead, AWJ rods, 3-7/) . A	OHIENTATION: Vertical
WATER	LEVELS	: 4.41 ft b	ogs on 3/0		START : 2/11/2007	END: 2/20/2007 SOIL DESCRIPTION	LOGGER	(: A.	Teal, R. Gomez COMMENTS
≷9 €	SAMPLE	INTERVA	I (ft)	STANDARD PENETRATION		COIL BLOOM THOM		SYMBOLIC LOG	COMMENTE
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAIVII LL			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,				DEPTH OF CASING, DRILLING RATE,
FAC		RECOVE			MOISTURE (CONTENT, RELATIVE DEN Y, SOIL STRUCTURE, MIN	NSITY OR	IBOI	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SCR			#TYPE	6"-6"-6" (N)	CONSISTENC	T, SOIL STRUCTURE, WIII	NENALOGY	SYN	INSTRUMENTATION
42.5				. ,					Water level is based on Ground Water
-							-		Monitoring at LNP site (FSAR Table - 2.4.12.08)"
-							-		
-							-		-
-							-		Water levels not recorded during drilling
-							-		-
-							_		-
-							_		-
-	4.5						_		-
	4.5				Poorly Graded S	Sand (SP)		12.52	-
5 37.5		1.5	SS-1	3-3-4	4.5-6.0' - gravish	n orange pink. (5YR 7/2).	wet, loose, —		-
-		1.5	33-1	(7)	very fine to fine g	grained, no HCl reaction, nonplastic fines, trace fine	20% tine e rounded		-
-	6.0				gravel, silica sar	nd '			-
-							-		-
-							-		-
-							-		-
-							-		-
-							_		-
-							-		-
-	9.5				Poorly Graded S	Sand (SD)		1. 1.	-
10 32.5		1,0	SS-2	6-6-8	9.5-10.5' - pinkis	sh grav. (5YR 8/1), wet, n	nedium —		
- 02.0		1.0	55-2	(14)	dense, very fine	to fine grained, no HCl re trace black minerals, sili	eaction, trace		-
-	11.0				(Horipiaotio IIIIoo,	, trace black minorale, on			-
-							_		-
-							_		-
-							-		-
-							_		-
-							-		-
-							-		-
-	14.5				Poorly Graded S	Sand (SP)			-
15 <u> </u>			00.0	3-3-2	14.5-15.4' - Sam	ne as 9.5-10.5' except loc	ose —		
		0.9	SS-3	(5)					-
-	16.0				-		-		-
-							-		-
-							-		_
-							-		_
-							-		_
-							-		-
-							-		-
-	19.5								-
20									
				l	I				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-15	SHEET	2	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 4.41 ft k	gs on 3/0	06/07	START : 2/11/2007 END : 2/20/2007 LOGGER : A. Teal, R. Gomez
\				STANDARD	SOIL DESCRIPTION _© COMMENTS
LOW AND	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	070
A BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
<u> </u>		4.4	SS-4	(N) 1-1-0	Poorly Graded Sand (SP) Weight of hammer drove last 6"
		1.1	55-4	(1)	19.5-20.35' - Same as 14.5-15.4'
-	21.0				Sandy Lean Clay (CL) 20.35-20.6' - light olive gray, (5Y 5/2), moist, very soft,
-					low to medium plasticity, slow dilatancy, no HCl
-					reaction, 35-40% very fine to fine silica sand
-					
-					
-					
-					
	24.5				Clayey Sand (SC)
25 <u> </u>		1.5	SS-5	2-1-1	24.5-26.0' - very pale orange, (10YR 8/2), moist, very —
-		1.5	33-3	(2)	loose, very fine to fine grained, no HCl reaction, 27% fines, fat clay interbeds 1/8"-5/8" thick at 24.6', 24.8',
-	26.0				25.2', 25.5', 25.85' and 25.95' (olive gray [5Y 4/1],
-					\moist, very soft, high plasticity, no dilatancy)
-					
-					
-					
_					
-					
-	29.5				Silt With Sand (ML)
30 12.5		1.2	SS-6	18-19-13	29.5-30.7' - grayish orange, (10YR 7/4), moist, hard,
-		1.2	33-0	(32)	nonplastic, very rapid dilatancy, mild to moderate HCI reaction, 19% fine to medium sand sized, carbonate
-	31.0				-
-					<u> </u>
-					
-					
-					
-					
-	34.5				
35	34.3				Silt With Sand (ML)
7.5		1.1	SS-7	21-42-50/4 (92/10")	34.5-35.6' - dark yellowish orange, (10YR 6/6), moist, —
-	35.8			(32/10)	to medium sand-sized (varies in sample), laminated
-					\beds of white at 35.1' and 35.3-35.6', all carbonate / -
-					
-					
-					
-	39.5				
-	39.6	0.0	SS-8	50/1.5	☐ Limestone Fragments
-				(50/1.5")	\ 39.5' - olive gray, (5Y 3/2), voids over 80-90% of - - - -
40					moderate HCl reaction when scratched Switch to rock coring at 40'
70_					Begin Rock Coring at 40.0 ft bgs
					See the next sheet for the rock core log



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-15	SHEET	3	OF	11

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 4.4	1 ft bo	as on	3/06/07 START : 2/11/2007 END : 2/	20/20	D7 LOGGER : A. Teal, R. Gomez	
			•	DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
H BE ATTO	TH./	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
E RA	ORE	Ø	ZAC.	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
2.5		ď	ᇤᇟ		S		
2.5	40.0		3	40.0-40.2' - Fracture zone 40.35' - Fracture, vertical, rough, planar, tight	H	Limestone - 40.0-41.9' - light olive gray, (5Y 5/2),	Begin rock coring at 40' Core run times were not
_	R1-NQ 2 ft	70		40.5' - Fracture, 10 deg, rough, undulating,	Н	moderate to strong HCl reaction,	recorded at the time of
_	95%		0	open -	戸	medium strong to strong (R3 to R4), fossiliferous (casts) voids 60-70%	drilling
_	42.0		NR.	-	П	coverage, few cavities up to 1/16"	
_			0	-	Ш	No Recovery 41.9-42.0' Limestone	_
_				<u>-</u>	Н	42.0-47.0' - Same as 40.0-41.9'	_
_			4	43.3-43.4' - Fracture zone, rock fragments,	Ħ	except many cavities up to 1/4", – voids (1/16") up to 60% coverage,	
_				coarse sand (1/16") to gravel (1") size	Ħ	very weak (R1) below 46.0'	
_	R2-NQ 5 ft	60	6	44.1' - Fracture, 5 deg, rough, undulating,	H	<u>-</u>]
45	100%	-		open 44.25, 44.4' - Fracture (2), 88 deg and —	Щ		_
-2.5			5	vertical, rough, planar, tight 44.5, 44.6' - Fractures (2), 10 deg, rough,	\square	-	
_				undulating, <1" relief	П	_	_
-			2	44.85, 45.35' - Fractures (2), 40 deg, rough, planar, tight	Н	 -]
_	47.0			45.55-45.7' - Fracture zone, rock fragments	1.11.	0 1 034 (014)	_
_				from fine gravel (3/16") to coarse gravel (1"x2") size		Sandy Silt (SM) - 47.0-50.1' - light olive gray, (5Y 5/2),	
_				45.9' - Fracture, 50 deg, rough, undulating,		wet, 20-25% very fine to coarse	
_			NA	open 46.6' - Mechanical break		grained sand, trace gravel-sized limestone fragments, thin (1/16-1/8")	
_			' ' '	46.9' - Fracture zone, 10 deg, smooth,		organic layers throughout (30%	
_	R3-NQ 5 ft	0		undulating, 1-1/4" relief 47.0-50.1' - Fracture zone, sandy silt, mostly		coverage), section compacted at 49.0-50.0' with no cementation	
50 -7.5	62%			loose indurated material, fractures very		_	_
-7.5				easily, some fractures may be mechanical		No Recovery 50.1-52.0'	_
_			NR	-		<u>-</u>	_
_				-		_	
_	52.0			50 0 57 0l		Limandana	
_			>10	52.0-57.0' - Fractures or mechanical break, mostly mechanical breaks due to soft	Ш	Limestone - 52.0-53.8' - light olive gray, (5Y 5/2),	Loggers: A. Teal/ C. Dougherty
_				material, partially lithified compacted fragments from silt to coarse sand, up to 1"	Н	fine grained, strong HCl reaction,	' '
_			>10	sections -	尸	very weak (R1), black organic fragments (1/16"x3/16") distributed	
-	D4 NG			E4.01 Frontiuro horizontal receb conductiva	Ш	throughout the rock (<5%), generally horizontal orientation, poorly	-
-	R4-NQ 5 ft	20	2	54.0' - Fracture, horizontal, rough, undulating, 3/8" relief	Ш	- fossiliferous	-
55 <u> </u>	84%			54.4' - Fracture, 3/16" open	Ы	53.8-55.0' - moderate olive brown, (5Y 4/4), fine grained, strong HCl	
- 12.5			>10	-	\Box	reaction, very weak (R1), (<1/16")	-
-			0	-	Ħ	voids about 70% of surface, poorly fossiliferous, black organic fragments	-
-			NR	-	H	as for 52.0-53.8' above, but more	-
-	57.0		· " `	-	H	(still <5%) 55.0-56.2' - Same as 52.0-53.8'	-
-			4	57.25' - Fracture, 15 deg, smooth, undulating,	Щ	 except more abundant black 	-
-				<1" open 57.5, 60.8' - Fractures (2), 20 deg, rough,	Щ	organics No Recovery 56.2-57.0'	-
-			0	undulating, open	Ш	• • • • • • • • • • • • • • • • • • •	-
-	R5-NQ			57.8' - Fracture, 10 deg, smooth, planar, tight, lignite lamination 3/8" thick	Н	_	-
-	5 ft	80	1	57.95' - Fracture, 60 deg, rough, undulating	\vdash	-	-
60	100%			to planar, tight	Ħ		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-15	SHEET	4	OF	11

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING	METHOD A	ND E	QUIPM	MENT : CME 550 S/N 186073, mud rotary, NQ tools, NW	casin	g	ORIENTATION : Vertical
WATER	LEVELS : 4.4	11 ft b	gs on (3/06/07 START : 2/11/2007 END : 2/	20/20	D7 LOGGER : A. Teal, R. Gomez	
≥∩ ≘	- (%			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-17.5 - - - - - - - - - - -	62.0 R6-NQ 5 ft 28%	0	3 2 5 0	58.3, 58.7, 59.1, 59.7, 61.1' - Mechanical break (5) 59.4' - Fracture, 10 deg, smooth, undulating, tight 60.5' - Fracture, 10 deg, rough, undulating 61.7' - Fracture, 5 deg, smooth, undulating, <1" relief 62.0' - Fracture, 15 deg, rough, undulating, open, 1-1/4" relief 62.1, 62.3, 62.4, 62.5' - Fracture zone (4), 10 deg, smooth, undulating, open 62.15' - Fracture, 25 deg, rough, undulating, <1" relief 62.5-63.4' - Fracture zone, soft, partially lithified limestone fragments		Limestone 57.0-62.0' - Same as 53.8-55.0' except laminations of organic material present throughout, apparent bioturbation zone from 61.7-62.0' Limestone 62.0-62.5' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak (R1), laminations of organic material about 25% 62.5-63.4' - dusky yellow, (5Y 6/4), fine grained, strong HCl reaction, extremely weak (R0), crumbles easily to silt-sized particles	- - - - - -
-22. 5 - - -	67.0		NR			No Recovery 63.4-67.0'	17:00 7/12/07 End of drilling for the day, at 67'
- - - - 70_	R7-NQ 5 ft 88%	46	3 1 3	67.2, 67.4' - Fractures (2), 15 deg, rough, undulating, open 67.3' - Fracture, 30 deg, rough, undulating, open 68.4' - Fracture, 70 deg, rough, planar, tight 69.4, 69.7' - Fractures (2), 10 deg, rough, undulating, tight, open at 69.7'		Limestone 67.0-70.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak (R2), voids (<1/16") over 60% of surface, laminations of organic material (<5%) most are in zone from 67.8-68.7'	
-27.5 - - - -	72.0		>10 >10 NR	69.5, 70.0' - Fractures (2), 80 deg and vertical, rough, planar, tight 70.2-72.0' - Fracture zone, soft, partially lithified limestone fragments		70.2-71.0' - Same as 62.5-63.4' 71.0-71.4' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak (R1), voids (<1/16") over 30% of surface, few organic	- - -
- - - - 75_	R8-NQ 5 ft 86%	68	>10 1 0	fragments from silt to gravel-sized 73.4, 75.2' - Mechanical break 73.9' - Fracture, 60 deg, rough, planar, tight		 laminations No Recovery 71.4-72.0' Limestone 72.0-74.7' - yellowish gray, (5Y7/2), fine grained, strong HCl reaction, weak (R2), voids (<1/16") over 80% of surface, few larger (up to 3/8") voids, except larger voids are 10% of 	- - - -
-32. 5 - - - -	77.0		0 1 NR	76.3' - Fracture, 5 deg, rough, undulating, tight		surface from 74.0-74.7', moderately fossiliferous, few black organic fragments 74.7-76.3' - dusky yellow, (5Y 6/4), fine grained, strong HCI reaction, very weak to weak (R1 to R2), voids (<1/16") over 75% of surface, few	SC-1 collected at 77.0-
- - - - 80	R9-NQ 5 ft 78%	70	1 1 >10	77.85' - Fracture, horizontal, smooth, undulating, tight 78.65' - Fracture, 10 deg, rough, undulating, tight 79.2-79.4' - Fracture zone, limestone fragments, gravel to cobble-sized		black organic fragments No Recovery 76.3-77.0' Limestone 77.0-79.4' - Same as 74.7-76.3'	77.85' -
00	10/0			riaginoria, graver to counte-sized			

APPENDIX 2BB-173 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-15	SHEET	5	OF	11	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION: Vertical WATER LEVELS: 4.41 ft bgs on 3/06/07 START: 2/11/2007 END: 2/20/2007 LOGGER: A. Teal, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -37.5 79.8, 78.3, 80.4' - Mechanical break (3) Limestone 0 79.4-80.9' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 80% of surface, few larger (up to 3/16") voids, moderately fossiliferous NR 82.0 82.0-82.5' - Fracture zone, limestone Many of the fragments at No Recovery 80.9-82.0' >10 fragments, coarse sand cobble-sized 82.0-82.5' show tooling Limestone 82.65' - Fracture, 60 deg, smooth, undulating, marks from drilling; 82.0-86.7' - dusky yellow, (5Y 6/4), open fragmentation could be fine grained, moderate to strong HCI 2 83.35' - Fracture, 25 deg, rough, undulating, result of drilling reaction, very weak to weak (R1 to open 83.7, 84.0, 84.1, 84.15' - Bedding plane (4), R2), voids (<1/16") over 80% of R10-NO organic beds, black, thin laminations surface, moderately fossiliferous, >10 5 ft 94% 30 zones at 83.7-84.0' and 86.3-86.7' 85 84.4-85.3' - Fracture zone, limestone have few voids, black organic -42 5 fragments from silt to cobble-sized laminations (20%), and color closer 1 to yellowish gray 5Y 7/2 85.75' - Fracture, 25 deg, rough, undulating, 2 tight 86.0, 86.2' - Fractures (2), 30 deg, rough, 87.0 NR undulating, 2-1/2" relief at 86.0', open at 86.2' No Recovery 86.7-87.0' Limestone 87.0-90.95' - yellowish gray, (5Y 7/2), 87.1, 87.15' - Fractures (2), 5 deg and 10 3 deg, smooth, undulating, open fine grained, moderate HCl reaction, 87.45-87.75' - Fracture zone, limestone weak to medium strong (R2 to R3), voids (<1/16") over 85% of surface fragments, gravel to cobble-sized 2 88.0, 89.0' - Fractures (2), 20 deg and 10 (only 30% below 90.3'), larger (up to deg, rough, undulating, open 3/8") voids over <5% of surface with R11-NO 88.45' - Fracture, 70 deg, smooth, planar, most between 89.0 -90.3', larger 46 3 5 ft voids are fossil molds, moderately 90 89.2, 90.4' - Fractures (2), 40 deg and 20 $-47\overline{5}$ fossiliferous deg, rough, undulating, open at 89.2', 2-1/2" 1 relief at 90.4' 89.45' - Fracture, 70 deg, rough, planar, open 89.8, 90.0' - Mechanical break (2) No Recovery 90.95-92.0' NR 92.0 Limestone 92.2' - Fracture, 75 deg, smooth, planar, 92.0-96.6' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, 3 open 92.75, 92.95' - Fractures (2), 20 deg, smooth, weak to medium strong (R2 to R3), undulating, tight voids (1/16") over 30% of surface, 3 93.0' - Fracture, vertical, smooth, planar, tight few larger (up to 3/8") voids, poorly to moderately fossiliferous, rock 93.2, 93.4' - Fractures (2), 20 deg, smooth, undulating, open at 93.2', tight at 93.4' R12-NQ appears to continue from material at 49 3 5 ft 93.7' - Mechanical break 92% 90.3 -91.0', some organic 95 94.0' - Fracture, 70 deg, rough, planar, open -52.5 laminations below 96.0', also more SC-2 collected at 94.95-94.2, 94.35' - Fractures (2), 15 deg, rough, abundant fossils 0 undulating, open 4 NR No Recovery 96.6-97.0' 97.0 Limestone 2 97.3' - Fracture, 20 deg, rough, undulating, 97.0-97.5' - dusky yellow, (5Y 6/4), <1" relief fine grained, moderate HCl reaction, 97.95-98.3' - Fracture zone, 60 deg, smooth, medium strong (R3), matrix with planar, tight/multiple fractures abundant voids (<1/16"), very 2 fossiliferous at 97.3-97.5', yellowish 98.6' - Fracture, horizontal, rough, undulating, gray (5Y 7/2) fragments held in R13-NQ 2 99.3' - Fracture, 10 deg, rough, undulating, matrix have few voids 5 ft 100% 60 2-1/2" relief 100

> APPENDIX 2BB-174 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-15	SHEET	6	OF	11

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION: Vertical WATER LEVELS: 4.41 ft bgs on 3/06/07 START: 2/11/2007 END: 2/20/2007 LOGGER: A. Teal, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) **DESCRIPTION** ROCK TYPE, COLOR FRACTURES PER FOOT SIZE AND DEPTH OF CASING, MINERALOGY, TEXTURE FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -57.5 99.9' - Fracture, 50 deg, rough, planar, tight Limestone 1 100' - Fracture, 75 deg, rough, planar, tight 97.5-98.3' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, 100.5' - Fracture, 45 deg, rough, undulating, medium strong (R3), few voids open 98.3-102.0' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, 1 102.0 101.6' - Fracture, 70 deg, rough, undulating, medium strong (R3), voids (<1/16") 1-1/4" relief 101.65' - Fracture, 25 deg, rough, undulating, 3 over 85% of surface, few larger (up tiaht to 3/8") voids, few organic 102.25, 102.7' - Fractures (2), 30 deg and 10 laminations, moderately fossiliferous Bioturbation zones are deg, rough, undulating, open 102.4' - Fracture, 70 deg, smooth, planar, 3 102.0-106.6' - Same as 98.3-102.0' highly HCl reactive, matrix except area of intermixed material has slow to moderate HCI tight (yellowish gray 5Y 7/2, with few R14-NQ reaction 103.2' - Fracture, 5 deg, smooth, undulating, voids) from 102.3-103.3', larger voids 51 2 5 ft 92% tight (up to 3/8") and fossil molds/casts 105 103.5' - Fracture, 40 deg, rough, undulating, more common, zone from -62 5 3-1/2" relief 104.0-104.5' appears more moderate 1 103.8' - Fracture, 40 deg, smooth, planar, olive brown (5Y 4/4) in color SC-3 collected at 105.75tiaht 106.6' 1 104.2' - Fracture, 25 deg, smooth, undulating, open No Recovery 106.6-107.0' NR 107.0 104.2-104.7' - Fracture zone, cobble-sized Limestone rock fragments 107.0-111.8' - dusky yellow, (5Y 6/4), 1 105.75' - Fracture, 60 deg, rough, stepped, fine grained, moderate to strong HCI 3-1/2" relief reaction, weak (R2), voids (<1/16") 106.6' - Fracture, 15 deg, rough, undulating, 2 over 80% of surface, larger (up to open 3/8") voids and fossil molds/casts 107.7, 109.4' - Fracture (2), 25 deg, rough, cover up to 5% of surface, R15-NO undulating, 2-1/2" relief for 107.7', open for moderately fossiliferous, particularly 86 2 5 ft 109 4 at 107.8-109.5' 110 108.0, 108.5' - Fractures (2), 35 deg, rough, -67 5 undulating, tight for 108.0', open for 108.5' SC-4 collected at 110.35-1 109.7' - Fracture, 20 deg, rough, undulating, 111.35' 109.85' - Mechanical break 2 110.35, 111.35' - Fractures (2), 40 deg and 5 112.0 NR deg, rough, undulating, tight for 110.35', open No Recovery 111.8-112.0' for 111.35' Limestone 2 111.6' - Fracture, 15 deg, smooth, undulating, 112.0-117.0' - Same as 107.0-111.8' except medium strong (R3) open 112.0-112.5' - Fracture zone, limestone 5 fragments, gravel to cobble-sized 112.8, 113.2' - Fractures (2), 70 deg, smooth, R16-NQ planar, open 3 5 ft 44 113.2, 113.5' - Fractures (2), 10 deg and 15 100% deg, rough, undulating, open 113.7, 113.85' - Fractures (2), 20 deg, rough, 6 undulating, open 114.0' - Fracture, 30 deg, rough, undulating, tiaht 0 114.1' - Fracture, 40 deg, smooth, undulating, 117.0 tight 117.0-118.7' - Same as 112.0-117.0' 114.9, 115.0' - Fractures (2), 50 deg, smooth, 4 planar, tight 115.2, 115.6' - Fracture (2), 60 deg, smooth, SC-5 collected at 117.7planar, tight 115.45' - Fracture, 25 deg, smooth, 118 7 1 undulating, tight 115.7' - Fracture, 30 deg, smooth, undulating, R17-NQ 5 ft 94% 62 3 open 120



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-15	SHEET	7	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER.	LEVELS: 4.4	1 ft b	gs on 3	3/06/07 START : 2/11/2007 END : 2/	20/20	D7 LOGGER : A. Teal, R. Gomez	
≥∩≘	(%)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-77.5 - - - - - - 125 -82.5	122.0 R18-NQ 5 ft 46%	9	3 1 NR >10 >10	115.75' - Fracture, 5 deg, rough, undulating, open 117.25, 117.30, 119.1' - Fractures (3), 25 deg, smooth, undulating, tight for 117.25' and 117.30', open for 119.1' 117.6, 119.3' - Fractures (2), 5 deg, smooth, undulating, tight for 117.6', open for 119.3' 117.7, 118.7' - Fractures (2), 45 deg, smooth, planar, tight 119.25' - Fracture, 20 deg, smooth, undulating, tight 120.1' - Fracture, 15 deg, smooth, undulating, open 120.8, 120.9' - Fractures (2), 30 deg and 45 deg, smooth, planar, tight 121.2' - Fracture, 25 deg, smooth, undulating, open		Limestone 118.7-120.7' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 60% of surface, few larger (up to 3/16") voids, gradual color change to dusky yellow (5Y 6/4) at bottom foot of interval 120.7-121.7' - mottled dusky yellow and yellowish gray, (5Y 6/4 and 5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), voids (<1/16") over 80% of surface of yellow-colored areas and 30% in gray areas No Recovery 121.7-122.0'	Inner sample barrel not locked in while coring runs R18 and R19 and no core was recovered in sample barrel; after pulling outer core barrel 2.3' of core was found in outer barrel; recovered core is assumed to come from 122.0-124.3' at top of R18
- - - -	127.0 R19-NQ		NR	122.0-124.3' - Fracture zone or mechanical break, fragmented		Limestone Fragments 122.0-124.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, moderate to strong HCl reaction, medium strong to strong (R3 to R4), voids (<1/16") over 30-60% of surface, a 5" section core has no voids, with laminated alternating colors, strong (R4), fine grained, strong HCl reaction No Recovery 124.3-132.0'	- - - - - -
-130 -87.5 - - - -	5 ft 0% 132.0	0	NR	132.0-132.2' - Fracture zone, gravel-sized			
- - -	R20-NQ 5 ft	19	5 4	limestone fragments 132.35' - Fracture, 5 deg, rough, undulating, open 132.85' - Fracture, 5 deg, smooth, planar, open 133.0, 133.3' - Fractures (2), 40 deg and 5 deg, smooth, planar, open for 133.0', very		 132.0-133.4' - light olive gray grading to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), voids (<1/16") over 30% of surface, larger (up to 3/8") voids and fossils molds/casts over 5% of surface. laminated 	outer core barrel, driller had to pull outer barrel (137.0') out of hole; 3.6' of core recovered; scratches, scores, and tool marks on many pieces of core from drilling; many fractures in
135 -92.5 -	72%	19	4 4 NR	tight for 133.3' 133.05, 133.35' - Fractures (2), 5 deg, smooth, planar, very tight 133.5, 134.55' - Fractures (2), 5 deg and 15 deg, rough, undulating, open 134.0, 134.25' - Fractures (2), horizontal, rough, undulating, open		coloration and few voids from 132.7-133.2' 133.4-135.0' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (<1/1/6") over 80% of surface, larger (up to 3/8"x3/4") voids and	R20 could be drilling induced
- - - -	R21-NQ 5 ft	50	2	134.7' - Fracture, 10 deg, smooth, undulating, open 135.0' - Fracture, 5 deg, rough, undulating, open 135.0-135.2' - Fracture zone, limestone fragments, gravel to cobble-sized 135.3' - Fracture, horizontal, smooth, planar, very tight		fossil molds over 10% of surface 135.0-135.6' - light olive gray, (5Y 5/2), fine grained, moderate HCI reaction, medium strong to strong (R3 to R4), voids (1/16") over 5% of surface, laminated coloration, some laminations of organic material No Recovery 135.6-137.0'	- - - - -
140	84%		•		H		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-15	SHEET	8	OF	11

ORIENTATION : Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS: 4.4	1 ft bo	gs on 3	8/06/07 START : 2/11/2007 E	END : 2/20)/200	7 LOGGER : A. Teal, R. Gomez	_
<0 €	(%			DISCONTINUITIES		စ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIC	TH.,	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNES	SS,	Į Į	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPTI JRF, EV4	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND	TNESS	₹MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	Z E C	2	F.F.	THICKNESS, SURFACE STAINING, AND TIGH		Ś	CHARACTERISTICS	1 1, 1 1.212.11, 2.0.
-97.5 _			1	135.5' - Fracture, 5 deg, smooth, undulati open	ing,	+	Limestone - 137.0-137.6' - Same as 135.0-136.6'	_
				137.3' - Fracture, vertical, rough, planar,	tight _	Щ	except light colored (dusky yellow	
			2	137.6' - Fracture, horizontal, smooth,	<u> </u>	П	(5Y 6/4)) laminations have increasing amount of voids	
_	142.0		NR	undulating, open 137.8, 138.15' - Fractures (2), 5 deg, roug	gh, T	\exists	137.6-141.2' - dusky yellow, (5Y 6/4),	1
_				undulating, tight	*	\dashv	fine grained, moderate to strong HCl	_
_			>10	137.9, 138.6' - Fractures (2), 15 deg and deg, rough, undulating, tight for 137.9', or			 reaction, medium strong (R3), voids (<1/16") over 75% of surface 	1
_				with gray staining at 138.6'	1	\perp	decreasing to 40% below 139.5',	SC-6 collected at 143.0-
-			>10	139.0, 139.55' - Fractures (2), 70 deg and deg, rough, undulating, open, gray staining		П	 moderately fossiliferous, molds up to 3/16"x9/16", few black organic 	144.0' -
_	R22-NQ			139.2' - Fracture, 50 deg, rough, planar,	' ⁹ +	\dashv	laminations at 138.5-139.8', few	-
	5 ft	55	>10	open, gray staining		\dashv	inclusions (3/16"x3/4") of grey	-
145 <u> </u>	94%			139.9, 141.1' - Fractures (2), 5 deg, smoo undulating, tight	otn,		limestone material at 138.0' and 139.9'	
102.0			3	140.45, 141.25' - Fractures (2), 30 deg ar	nd 📙	Н	No Recovery 141.2-142.0'	-
_				20 deg, rough, undulating, open 142.0-143.0, 144.0-145.1' - Fracture zone		П	Limestone 142.0-144.0' - mottled medium light	-
_			2	mechanical break (2), sections crushed,	`	\top	gray and yellowish gray, (N6, 5Y 7/2),	_
_	147.0		NR	limestone fragments from gravel to		\exists	fine grained, moderate HCl reaction,	_
			3	cobble-sized 145.2' - Fracture, 60 deg, rough, undulati	ng,	1	yellowish gray is in bands around cavities, few voids (<1/16"), several	_
			3	open		Н	larger (up to 3/8") voids and fossil	
			0	145.3, 145.5' - Fractures (2), 15 deg, rougundulating, open, moderate yellowish bro		Ш	⁻ molds _ 144.0-145.5' - yellowish gray, (5Y	
			2	(10Y 5/4) to dusky brown (5Y 2/2) staining		\Box	7/2), fine grained, moderate HCI	1
_	R23-NQ			145.9' - Mechanical break 146.6, 146.9' - Fractures (2), horizontal a	nd T	\neg	reaction, medium strong (R3), voids (<1/16") 30% coverage, larger voids	1
150	5 ft 88%	62	4	50 deg, smooth, planar, tight	"" ‡	\exists	(up to 3/4") 15%, organic material on	-
-107.5	0070			147.30, 147.6' - Fractures (2), 60 deg,	-	┵	irregular bedding plane and fracture	_
-			6	smooth, planar, tight 147.35' - Fracture, 20 deg, smooth,		\Box	surfaces, moderately to very fossiliferous, gradational contact with	-
_			2	undulating, open	- ‡	\Box	material below	-
_			NR	148.22' - Fracture, 5 deg, smooth, planar tight, moderate yellowish brown (10Y 5/4)		П	145.5-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl	-
_	152.0		1411	dusky brown (5Y 2/2) staining	` ∔	\exists	reaction, medium strong (R3), few	-
_			1	148.4' - Fracture, 15 deg, rough, undulation open, partial coverage up to 20% of	ng,		voids (1/16"), no larger voids, organic lamination	-
_				moderate yellowish brown (10Y 5/4) to du	usky -	4	- No Recovery 146.7-147.0'	-
_			0	brown (5Y 2/2) staining 149' - Fracture, 70 deg, rough, planar, op	‡	П	Limestone 147.0-151.4' - light olive gray, (5Y	-
_				149.3' - Fracture, 20 deg, rough, undulati			- 5/2), fine grained, moderate HCl	-
_	R24-NQ 5 ft	78	2	open	<u> </u>	\dashv	reaction, medium strong (R3), voids	_
155_	100%	. •		149.4, 149.6' - Fractures (2), 75 deg, roug planar, tight	gn,	\dashv	 (<1/16") over 30% of surface, more abundant in zone from 147.3-148.8' 	
-112.5			2	150' - Fracture, 60 deg, rough, planar, tig	ht	Н	and 150.0-151.0', fossiliferous in	_
				150.1' - Fracture, 60 deg, slickensided, planar, very tight, light to dark brown stair	_{ning} F	Ц	same zones, black staining is on uneven and irregularly laminated	
			4	(possibly hematite)	ľ	Ц	bedding at 148.1-148.8', clasts (up to]
	157.0		1	150.6' - Fracture, 50 deg, smooth, undula open	ating,	± 1	3/8"x1-3/16") of yellowish gray (5Y 7/2) limestone without voids appear]
				150.65, 150.8' - Fractures (2), 30 deg and	d 10	\exists	imbedded in the core from	1
-			3	deg, smooth, undulating, tight	+	⇉	147.0-148.0', coloration on bedding	
-				150.9' - Fracture, 40 deg, smooth, undula tight	aung, –	\dashv	ranging from light olive gray (5Y 5/2) to dusky yellow (5Y 6/4)	
-			1	151.3, 151.5' - Fractures (2), 5 deg and 3	35 	Ц	No Recovery 151.4-152.0'	-
-	R25-NQ			deg, smooth, undulating, open 152.0-152.9' - Fracture zone, limestone	+		-	-
	5 ft	50	2	fragments, gravel to cobble-sized	+	귀	-	
160	100%							



PROJECT NUMBER:	BORING NUMBER:				
338884.FI	A-15	SHEET	9	OF	11

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS: 4.4	1 ft b	gs on 3	3/06/07 START: 2/11/2007 END: 2	/20/200	17 LOGGER : A. Teal, R. Gomez									
>∩ ∵	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS								
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASINO								
HU	RUN H, / ÆR	(%)	JUR DO	DEDTH TYPE OPIENTATION POLICHNESS	7 5 1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND								
FFF EVA	NG1 CO	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD								
E S E	CELEG	R	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.								
-117.5				152.9' - Fracture, 5 deg, smooth, undulating,	Ш	Limestone									
-			1	open	+	- 152.0-155.7' - Same as 147.0-151.4'	-								
-				154.4' - Fracture, 45 deg, rough, planar, tight 154.9, 156.7, 156.9' - Mechanical break (3)	廿	except fewer (now 10%) voids (<1/16") covering surface, thin	-								
_			3	155.2' - Fracture, 10 deg, smooth, undulating,	₽₩	- bedding from 153.5-155.0', uneven	-								
	162.0			open	Ш	and irregular laminations from									
				155.7' - Fracture, horizontal, smooth, planar,		155.2-155.7'									
_			1	tight 156.5' - Fracture, 30 deg, rough, undulating,	\mathbb{H}	 155.7-157.0' - light olive gray, (5Y 5/2), fine grained, moderate HCI 	-								
-				open	$-\square$	reaction, medium strong to strong	-								
_			5	157.2' - Fracture, 75 deg, rough, planar, open	+	- (R3 to R4), few (<5%) voids or fossil	-								
_				157.4' - Fracture, 20 deg, rough, undulating,	\Box	molds/casts, thin bedding (1/4") from	_								
_	R26-NQ 5 ft	32	3	open 157.8, 158.4' - Fractures (2), 25 deg and 10	+	155.7-157.0', olive gray (5Y 3/2) - coloration along healed fracture at	_								
165	84%	32	٦	deg, rough, undulating, tight for 157.8', open		156.8-157.0'									
-122.5				for 158.4'	╁┼	157.0-157.4' - Same as 155.7-157.0'	_								
-			4	158.4-159.0' - Fracture zone, limestone fragments, gravel to cobble-sized		 157.4-158.8' - fragments of light olive gray (35%) and yellowish gray (15%) 	-								
_			2	159.5- 159.7' - Fracture zone, limestone	+	in a dusky yellow matrix (50%), (5Y	-								
_			NR	fragments, gravel to cobble-sized	廾	5/2 and 5Y 7/2 in 5Y 6/4), fine	_								
	167.0		INIX	159.5' - Fracture, 5 deg, smooth, planar, tight	Щ	grained, moderate HCl reaction,	_								
				159.9, 160.4' - Fractures (2), 40 deg, smooth, undulating, tight	Н	medium strong (R3), voids (<1/16") over 50% of matrix area but only									
_			0	161.0' - Fracture, 15 deg, smooth, undulating,	Ш	10% of other areas, larger (up to	-								
_				open	╂┼╂	3/16"x3/8") voids and fossil	-								
_			0	161.2' - Fracture, 85 deg, smooth, planar,	$+\Box$	_ casts/molds over 5% of area overall	_								
_				tight 161.3' - Fracture, 20 deg, smooth, undulating,	₽	158.8-160.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl	_								
	R27-NQ 5 ft) 62	62 2	open	Ш	reaction, strong (R4), voids (<1/16")	_								
170	100%	02	_	161.3-162.0' - Fracture, limestone fragments,	\vdash	over 5% of surface, mainly in thin									
-127.5				gravel to cobble-sized – 162.4, 163.15' - Fractures (2), 10 deg and 25		— (1/2") zones, thinly bedded, few fossil casts									
-			2	deg, rough, undulating, open	╁┼┼	160.0-162.0' - mottled light olive gray	-								
_				163.0' - Fracture, 20 deg, smooth, planar,	$\pm \Box$	and dusky yellow, (5Y 5/2 and 5Y	-								
_			0	tight	+	6/4), fine grained, moderate to mild	_								
_	172.0			163.15-164.2' - Fracture zone, limestone fragments, gravel to cobble-sized	廾	HCl reaction, medium strong to strong (R3 to R4), voids (1/16") cover	_								
			6	164.0' - Fracture, 60 deg, rough, undulating,	Ш	70% of surface, few large voids,									
			О	tight	Н	fragments of other limestone material	_								
-				165.0, 165.05' - Fractures (2), 15 deg and 5 deg, smooth, undulating, open		 imbedded in dusky yellow matrix below 161.0' 	_								
-	D20 NO						-				>10	165.3' - Fracture, 80 deg, rough, planar, open	╂┴╂	162.0-166.2' - moderate olive brown	-
-				165.5' - Fracture, 35 deg, rough, undulating,	田	 grading to light olive gray by 165.0', 	-								
_	R28-NQ 5 ft	30	>10	open	╁┼┨	(5Y 4/4 to 5Y 5/2), fine grained,	_								
175_	100%			165.5-166.0' - Fracture zone, limestone fragments, gravel to cobble-sized –	岸	moderate to mild HCl reaction, — strong (R4), voids (1/16") only 5%	_								
-132.5				167.0-168.8' - Fracture zone, limestone	Ш	from surface area except zones from	_								
-			4	fragments, gravel to cobble-sized	団	163.0-163.3' and 165.4-166.0', few	_								
-				169.2' - Fracture, 5 deg, smooth, planar, tight 169.4' - Fracture, 30 deg, rough, undulating,	+	 larger voids (up to 3/16") below 165.4', uneven and disturbed 	-								
-			3	tight	世	bedding below 165.6'	-								
_	177.0			170.2, 170.4' - Fractures (2), 10 deg, smooth,	μ	No Recovery 166.2-167.0'	_								
			>10	undulating, tight	\mathbf{H}	Limestone									
]			/10	172.25' - Fracture, 40 deg, rough, planar,	П	167.0-167.9' - Same as 162.0-166.2' except presence of breccia (1"									
-				tight 172.3, 172.8' - Fractures (2), 5 deg, rough,	╁┼┼	fragments) at 167.3-167.9'	-								
-			>10	undulating, tight	団	167.9-169.0' - dusky yellow, (5Y 6/4),	-								
-	D00 N0			172.55' - Fracture, 15 deg, rough, stepped,	+	_ mild to moderate HCl reaction,	-								
	R29-NQ 5 ft	0	3	open 172.75' - Fractures, 10 deg, rough,	井井	medium strong (R3), voids (<1/16") over 80% of surface	_								
180	100%			undulating, tight	$oldsymbol{oldsymbol{eta}}$										
1			1		1 1										

Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-15	SHEET	10	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING	METHOD A	ORIENTATION : Vertical					
WATER	LEVELS : 4.4	11 ft b	gs on	3/06/07 START : 2/11/2007 END : 2/2	20/20	07 LOGGER : A. Teal, R. Gomez	
≥∩a				DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
185 -142.5 - 190 - 152.5 - 152.5	182.0 R30-NQ 5 ft 90% 187.0 R31-NQ 5 ft 100% 192.0	27	1 0 >10 >10 NR 1 3 3 1 0 2 >10 NR 4 N	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 172.95' - Fracture, 40 deg, rough, stepped, tight 173.2' - Fracture, 40 deg, rough, planar, tight 173.4' - Fracture, 50 deg, rough, undulating, open 173.45, 174.5' - Fractures (2), 5 deg and 20 deg, smooth, undulating, tight 174.5-175.0' - Fractures (2), 10 deg, smooth, undulating, tight 174.5-175.0' - Fracture zone, limestone fragments, gravel to cobble-sized 175.2' - Fracture, 10 deg, smooth, undulating, tight 175.25, 175.4' - Fractures (2), 75 deg and 15 deg, rough, undulating, open 175.8' - Fracture, 80 deg, rough, planar, open to tight 176.5' - Mechanical break 176.75' - Fracture, 30 deg, rough, planar, tight 177.0-182.0' - Fracture, no piece longer than 5", most fractures could be from drilling, others appear to be in place 179.1' - Fracture, 70 deg, rough, planar, open 180.2' - Fracture, 20 deg, rough, planar, open 182.0-185.0' - Fracture zone or mechanical break, no piece longer than 5", most fractures could be from drilling, others appear to be in place 182.3, 182.5' - Fractures (2), 70 deg and 25 deg, rough, undulating, open for 182.3', tight for 182.5' 182.8' - Fracture, 30 deg, smooth, undulating, tight, dusky brown to dusky yellow infilling 100% 182.9' - Fracture, 15 deg, smooth, undulating, tight to open up to 1/16" 187.4' - Fracture, 20 deg, smooth, undulating, open 187.4-188.15' - Fracture zone, limestone fragments, gravel to cobble-sized 188.25' - Fracture, 5 deg, smooth, undulating, open 187.4-188.15' - Fracture zone, limestone fragments, gravel to cobble-sized 188.5' - Fracture, 5 deg, smooth, undulating, open 189.0', tight for 189.2' 189.4' - Fracture, 5 deg, smooth, undulating, open 189.0', tight for 189.2' 189.4' - Fracture, 5 deg, smooth, undulating, open 189.4'		AND ROCK MASS CHARACTERISTICS Limestone 169.0-169.4' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), few voids or cavities 169.4-172.0' - light olive gray, (5Y 5/2), fine grained, moderate HCI reaction, medium strong (R3), voids (<1/16") over 20% of surface (up to 50% from 169.4-170.0'), laminated bedding below 171.0' at an angle of 5-10 degrees 172.0-177.0' - Same as 169.4-172.0' except more voids (up to 50% coverage) from 173.5-174.5' and presence of cavities (up to 3/16"x3/4") below 175.0', laminated bedding 174.8-175.3' 177.0-178.0' - Same as 172.0-177.0' 178.0-178.6' - light olive gray, (5Y 5/2), fine grained, moderate HCI reaction, weak (R2), voids (<1/16") over 40% of surface 178.6-182.0' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), fine grained, moderate HCI reaction, medium strong (R3), voids (1/16") over 50% of surface area below 180.0', breccia and dark stained laminated bedding below 180.5', some larger (3/16"x3/4") cavities below 180.5' 182.0-186.5' - light olive gray with laminations (uneven and irregular) of yellowish gray, (5Y 5/2 with 5Y 7/2), moderate HCI reaction, strong (R4), few areas of voids, few fossil molds, apparent breccia zones at 182.8-184.0' and 186.0-186.3', color of core mainly yellowish gray below 186.0' No Recovery 186.5-187.0' Limestone 187.0-189.0' - mottlled yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2), fine grained, mild to moderate HCI reaction, strong (R4), mottling resolves into laminated bedding by 188.0', few voids or fossil molds 189.0-192.0' - dusky yellow with thin beds (1/2" thick) of pale olive, (5Y 6/2 with 10Y 6/2), fine grained, moderate to strong HCI reaction, medium strong (R3), voids (<1/16") over 70% of the dusky yellow with thin beds (1/2" thick) of pale olive, (5Y 6/2 with 10Y 6/2), fine grained, moderate to strong HCI reaction, medium strong (R3), voids (<1/16") over 70% of the dusky yellow areas, larger voids (up to 3/8") also present,	
200	R33-NQ 5 ft 48%	0	0	189.4-190.0' - Fracture zone, limestone fragments, gravel to cobble-sized 190.35, 190.8' - Fractures (2), 25 deg, rough, undulating, tight for 190.35', open for 190.8'		pale olive areas have few voids, fewer voids overall below 191.0', possible breccia from 189.4-190.0'	-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-15	SHEET	11	OF	11

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 4.4	11 ft b	gs on	3/06/07 START : 2/11/2007 END : 2/2	0/20	07 LOGGER : A. Teal, R. Gomez	
\$ D ₽	(%)			DISCONTINUITIES	90	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	O A III THICKNESS CHEEKS MALE TICHTHESS >		MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
-157.5	202.0	RG	REAL PROPERTY OF THE PROPERTY	THICKNESS, SURFACE STAINING, AND TIGHTNESS 190.7, 191.0' - Fractures (2), 20 deg, rough, undulating, open 191.5' - Mechanical break 192.0-193.0' - Fracture zone, limestone fragments, gravel to cobble-sized 193.6' - Fracture, 20 deg, rough, stepped, open 193.8, 194.3' - Fractures (2), 15 deg and 10 deg, rough, undulating, tight for 193.8', open for 194.3' 194.5' - Fracture zone, 15 deg, smooth, planar, open 194.5-195.5' - Fracture zone, limestone fragments, gravel to cobble-sized 197.3' - Fracture, 35 deg, rough, undulating, open 197.6, 197.7, 197.9' - Mechanical break (3) 197.9-198.2' - Fracture zone, limestone fragments, gravel to cobble-sized 198.8' - Fracture, 20 deg		Limestone 192.0-195.0' - Same as 189.0-192.0' except with laminated bedding (uneven and irregular), cavities (up to 3/8"x3/8") and some fossil molds from 192.0-193.5' 195.0-195.5' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, medium strong (R3), voids (<1/16") over 5% of surface, fossil molds and larger voids <5% of surface, moderately fossiliferous No Recovery 195.5-197.0' Limestone 197.0-199.4' - Same as 195.0-195.5' except fossil molds and cavities (up to 3/16"x3/8") now cover 10% of core surface No Recovery 199.4-202.0' Bottom of Boring at 202.0 ft bgs on 2/20/2007	Total Depth 202.0' below ground surface -
			l				



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-16	SHEET	1	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 2.5 ft bo	gs on 4/5/	07 S	START : 4/5/2007 END : 4/8/2007 LOGGEF	R : A.	Teal
				STANDARD	SOIL DESCRIPTION	G	COMMENTS
LOW (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SLO	DEDTILOF CACING DRIVING DATE
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	30LIG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
42.7	0.0			(11)	Poorly Graded Sand With Organics (SP)	-	
-		1.0	SS-1	0-2-3	0.0-1.0' - black to light brownish gray, (N1 to 5YR 6/1), moist, loose, no HCl reaction, very fine to fine silica		08:33 Water level at 2.5' below ground - surface
_	1.5			(5)	\bigcap sand, trace nonplastic fines, 30-35% fine organics, \bigcap		3-7/8" tricone bit
-					\trace roots	1	_
						1	1
_					_		_
_					<u>.</u>	1	_
_					-	4	-
5 37.7	5.0				Sandy Lean Clay With Silt (CL-ML)		-
-		0.3	SS-2	4-4-2	\ 5.0-5.3' - greenish gray, (5G 6/1), wet, stiff, low to		-
-		0.3	33-2	(6)	medium plasticity, slow dilatancy, no HCl reaction, 30-35% very fine silica sand, trace roots	┨	-
-	6.5					┨	-
-					-	1	-
-					-	1	-
-					-	1	1
_					-	1	1
]	
10	10.0					<u> </u>	_
32.7				11-15-6	Silt And Limestone (ML) 10.0-10.8' - moderate yellow, (5Y 7/6), wet, very stiff,	4111	_
_		0.8	SS-3	(21)	very fine grained, 10-15% sand, nonplastic, rapid dilatancy, strong HCl reaction, 50% limestone, light	╫	-
-	11.5				olive brown, fine to coarse gravel-sized, strong rock	-	-
-					-	┨	-
-					-	1	-
-					-	┨	-
-						1	-
_						1	-
15	15.0				-	1]
27.7		1.0	SS-4	39-50/6	Silt And Limestone (ML) 15.0-16.0' - Same as 10.0-10.8'		Set casing to 20'
	16.0	1.0	33-4	(89/12")	13.0-10.0 - Same as 10.0-10.0	Ш	
_						1	
_						1	
-						-	_
-					-	-	-
-						1	-
-					-	┨	-
20					-	1	-
						\vdash	-
						1	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-16	SHEET	2	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATE	ER LE	VELS	: 2.5 ft bo	gs on 4/5/	07	START : 4/5/2007	END: 4/8/2007	LOG	GER	: A.	Teal
					STANDARD		SOIL DESCRIPTION			G	COMMENTS
DEPTH BELOW SURFACE AND	ELEVATION (#)	AMPLE	RECOVE		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	MOISTURE (E, USCS GROUP SYMBO CONTENT, RELATIVE DE CY, SOIL STRUCTURE, M	ENSITY OR		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
22.	7 2	20.8	0.1	SS-5	50/3.5 (50/3.5")	Limestone Frag	k vellowish orange. (10Y	R 6/6), weak	[-		21.0': End soil sampling switch to rock coring
25 17.	7 _ 2	20.6	0.1	SS-5	50/3.5	20.0-20.1' - dark rock (R2), voids 1/8"-1/2" Begin Rock Cori	gments (yellowish orange, (10Y) to 1/16", limestone frag ing at 21.0 ft bgs eet for the rock core log	ments to			21.0': End soil sampling switch to rock coring
	-								-		-
40									-		- -
40	+										-



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-16 SHEET 3 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

VV/ (I L I C	LEVELS : 2.5	ft bgs	on 4/	5/07 START : 4/5/2007 END : 4/5	8/2007	LOGGER : A. Teal	
200	<u></u>			DISCONTINUITIES	ß	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A S S S S S S S S S S S S S S S S S S S	DE J. F.	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F F F F	ORE	Ø	SAC.	PLANARITY, INFILLING MATERIAL AND	/MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		ď	# #	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	1, 1, 1
	21.0		>10	21.0-21.7' - Fracture zone, limestone fragments from gravel to cobble-sized	Н	Limestone - 21.0-23.2' - grayish orange, (10YR	_
			- 10	21.7-22.7' - Fracture zone	Ш	7/4), medium grained, strong HCI	
			>10		Ш	reaction, extremely weak to very weak (R0 to R1), highly fossiliferous	Fossils including echinoids, gastropods and brachipods
			-10		Н	(molds/casts), voids (<1/16") over	gastropous and bracilipous –
	R1-NQ		_0_	22.9' - Fracture, 45 deg, rough, planar, open	\vdash	70-75% of surface - No Recovery 23.2-26.0'	
1 7	5 ft 44%	0		-		No Recovery 23.2-26.0	
1 7				-	Н		1
25			NR	-	ш		_
17.7				-	ш		R1: 2 minutes
	26.0			-	Н	_	_
†	20.0			26.0-26.9' - Fracture zone, limestone	\sqcap	Limestone	_
-			>10	fragments from gravel to cobble-sized	Н	 26.0-30.0' - Same as 21.0-23.2' except dusky yellow, (5Y 6/4) 	_
		ŀ		-	ш	_ except dusky yellow, (31 0/4)	-
			>10	27.3-28.8' - Fracture zone, fragments up to -1-1/2"	ш	<u>_</u>	-
-	R2-NQ	ł		1-1/2	ш		-
-	5 ft	25	>10	-	ш	<u>_</u>	-
-	80%			-	Н	_	-
			4	29.4-29.7' - Fracture or mechanical break (4),	\Box	_	-
30 <u> </u>		ł		horizontal and 15 deg, rough, undulating,	ш	No Recovery 30.0-31.0'	R2: 2 minutes
'-' -			NR	open -	ш	-	TVZ. Z ITIITUICS
1 +	31.0			31.0-32.5' - Fracture zone, limestone	ш	Limestone	_
-			>10	fragments from gravel to cobble-sized	ш	- 31.0-34.5' - moderate yellow and light	_
-		-		-	Н	olive gray, (5Y 7/6 and 5Y 5/2), light olive gray mottling from 32.6-33.4',	11:06 Stopped drilling to
-			>10	20 El Fractiva 40 des reurals atomand	Н	 fine grained, strong HCI reaction. 	remix mud
	50.110			32.5' - Fracture, 40 deg, rough, stepped, open -	ш	weak to medium strong (R2 to R3),	Dellada Damadu Last
	R3-NQ 5 ft	50	2		Н	predominately weak rock, medium strong from 32.3-33.8', voids (<1/16")	Driller's Remark: Lost circulation at 34.0-35.0'
	70%			33.75' - Fracture, 25 deg, rough, undulating,	Щ	over 80% of surface, fossiliferous	_
			0	open	ш		_
35 7.7				_	Ы	No Recovery 34.5-36.0'	
'./			NR		\square	_	R3: 5 minutes
↓	36.0				H		
			>10	36.0-37.2' - Fracture zone, limestone fragments from gravel to cobble-sized	Н	Limestone - 36.0-40.2' - Same as 31.0-34.5'	
 			10	-	Н	except light olive gray, (5Y 5/2), color	
			1	37.25' - Mechanical break	Ш	transition from above run complete by 37.0', voids <1/16" and abundant	
				37.55' - 25 deg, smooth, undulating, very tight	Ш	larger cavities to 3/16" yielding a]
	R4-NQ	47	>10	38.3-38.75' - Fracture zone, limestone	Н	rough surface]
7	5 ft 84%	4/	-10	fragments from gravel to cobble-sized	H]
7				38.9' - 75 deg, rough, planar, very tight	Ш]
40			0	-	\mathbb{H}	_	1
2.7			>10	40.0-40.7' - Fracture zone, limestone	Ш	No Recovery 40.2-41.0'	R4: 4 minutes
1	41.0		NR	fragments from gravel to cobble-sized	Ш		_
				-	T		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-16	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	I WIL IT IOD AI	ND LC	ZUIFIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	asiii	ıg		ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bgs	s on 4/	/5/07 START : 4/5/2007 END : 4/	8/20	007	LOGGER : A. Teal	
>00	<u> </u>			DISCONTINUITIES	ניו	, [LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	OUTE AND DEDTIL OF CLOSE
ᆱᇬ	RUN H. A ÆRY	(%) Q	FRACTURES PER FOOT	DEDTH TVDE ODIENTATION DOLLGUNESS	1		MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
PTH EVA	NGT COV	σD(ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	Í	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	응희분	RG	K H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λS	5	CHARACTERISTICS	DRUPS, IEST KESULIS, EIG.
				41.0-42.1' - Fracture zone, fragments up to	П	1	Limestone	
-			>10	1-1/2"	Ъ	╅	41.0-42.1' - moderate olive brown, (5Y 4/4), fine grained, strong HCl	-
-					H	╁	reaction, extremely weak (R0), friable	-
-					世	⇉	No Recovery 42.1-46.0'	-
-	R5-NQ				╫	+		-
-	5 ft	0			┲	4		-
-	22%		NR		世	1		-
-					+	4		-
45 <u> </u>				_	片	1	_	
-2.3					廾	1		R5: 2 minutes
	46.0				Д	4		
			>10	46.0-46.4' - limestone fragments, silt to fine	Д		Limestone 46.0-51.0' - Same as 41.0-42.1'	004
]			/10	sand-sized particles	\vdash	+	except very weak (R1), voids <1/16"	SC-1 collected 46.4-47.45'
					Ľ	1	and cavities to 3/16" yielding rough	_
			1	47.45' - Fracture, 35 deg, smooth, undulating,	₽	╁	appearance, trace black organic material 49.0-50.5'	
_	R6-NQ			open	П	1	Material 40.0 00.0	-
-	5 ft 100%	70	0	48.3, 48.5, 48.7, 49.0' - Mechanical break (4)	口	╁		-
-	100%				╁	+		-
			0		Ħ	1		-
50 -7.3				_	世	╁	_	R6: 2 minutes
-, .5			0		П	7		1.0. 2 minutes
-	51.0				口	⇉	E4.0.E4.01. light alice area (EV.E/0)	-
			0		廾	4	51.0-51.9' - light olive gray, (5Y 5/2), fine grained, moderate to strong HCl	_
					F	7	reaction, weak (R2), voids <1/16"	
							over 35% of surface, cavities to 3/16" / over <5% of surface, fossiliferous	_
							Silt (ML)	
	R7-NQ				111		51.9-53.5' - light olive gray, (5Y 5/2),	· ·
	5 ft 50%	18			111		strong HCl reaction, carbonate material	_
-	55,3		NA		111		No Recovery 53.5-56.0'	-
					111	$\ \cdot\ $	·	-
55 <u> </u>				_	111	$\ \cdot\ $	_	R7: 2 minutes —
-					$\ \ $	$\ \cdot\ $		-
-	56.0				$\ \ $	$\ \cdot\ $	Silt (ML)	-
-					4	$\ \cdot\ $	56.0-58.7' - Same as 51.9-53.5'	-
_					411			-
			NA		411			_
								_
	R8-NQ	10						
	5 ft 78%	10		58.75-59.0' - Fracture zone, limestone	14	#	Limestone	1
			3	fragments from gravel to cobble-sized	Г	7	58.7-59.9' - moderate olive brown,	· ·
60				59.1' - Fracture, 80 deg, rough, planar, open		╁	(5Y 4/4), fine grained, moderate HCl reaction, weak (R2), voids <1/16"	<u> </u>
-17.3				59.25' - Fracture, 30 deg, rough, stepped, tight	F	1	over 15% of surface, trace cavities to	R8: 3 minutes
-	04.0		NR	59.4' - 35 deg, rough, undulating, tight	口	╁	9/16"x3/4" on surface	-
-	61.0				+	+	No Recovery 59.9-61.0'	-
					_			



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-16 SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

			<u> </u>	IENT . CIVIE 33 3/N 3 10023, ITIUU TOLATY, NQ LOOIS, HW C	uo.i.i	9		ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bg	s on 4	/5/07 START : 4/5/2007 END : 4/	8/20	07	LOGGER : A. Teal	
>	· ·			DISCONTINUITIES	U	L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	Г	ROCK TYPE, COLOR,	
표원인	Z, Z E, A	(%	FRACTURES PER FOOT		일		MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	GT SOV	(%) Q	FOL	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO		WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
P. E. E.	E E S	a Q	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	0715	IĽ.	шп		S	┸		
					Ш		Silt (ML)	
					111	Г	61.0-63.0' - Same as 51.9-53.5' except trace organics 61.0-61.3',	
-			NA	•	111	╟	carbonate material	1
-					411	ŀ		-
					Ш			
	R9-NQ			63.0' - 60 deg, rough, planar, tight	ш	4	Limestone	
_	5 ft	43	1	63.4, 64.3' - Mechanical break (2)	╁	十	63.0-65.8' - moderate olive brown,	SC-2 collected at 63.4-
-	96%				Ľ	╊	(5Y 4/4), fine grained, moderate HCl reaction, very weak (R1), voids	64.3'
_			0	64.4-65.2' - Mechanical break (>10)	ш	╁	<1/16" over 15% of surface, trace	_
65				04.4-05.2 - Mechanical Dreak (>10)	Н	+	cavities to 9/16"x3/4" on surface	
-22.3				_			-	R9: 3 minutes
-			2	65.3' - Fracture, 15 deg, smooth, undulating,	₽	╁		1 +
-	66.0		NR	open 65.7' - Fracture, 40 deg, rough, undulating,	十	╁	No Recovery 65.8-66.0'	-
			1	open open open	户	1	Limestone]
			' '	66.4' - Fracture, 10 deg, rough, undulating,	Н	-	66.0-70.4' - dusky yellow, (5Y 6/4),	
-				open .	T	†	fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids	1
-			2	67' - Fracture, 10 deg, smooth, undulating,	E	1	<1/16" on 25% of surface increasing	1
_				tight	\vdash	╁	from 68.8', extremely weak (R0) zone	
	R10-NQ			67.8' - Fracture, 65 deg, rough, planar, tight 68.1, 68.3' - Fracture (2), 20 deg, rough,	Н	1	from 67.2-67.5', 3/4"x1-3/16" cavity	
	5 ft 88%	50	3	undulating, open		1	at 70.2', very fossiliferous below	1
-	00 /6			andalating, opon	₩	╁	68.5', solution cavity at 68.5-69.0'	1
_			3		łт	╁		1
70				69.5, 69.8' - 40 deg, rough, undulating, open				
-27.3			1	70.1' - Fracture, 20 deg, rough, undulating,	Н	+		R10: 3 minutes
_	74.0		NR	open	ш	1	No Recovery 70.4-71.0'	1
-	71.0				╁	╁	Limestone	-
_			2	71.25' - 10 deg, rough, undulating, open	╨	╁	71.0-73.3' - Same as 66.0-70.4'	
			_	71.5' - 85 deg, rough, planar, tight	П	1	except moderate olive brown, (5Y	
				72.0' - Mechanical break, strong to very	Н	╌	4/4)	1
-			>10	strong (R4-R5)	+	+		1
_	544 110			72.25 - Fracture, 20 deg, rough, undulating,	ш	4		-
	R11-NQ 5 ft) 67	5	open 73.2' - Fracture zone, limestone fragments	Ь	Ł	73.3-74.4' - light olive gray to	
	98%	"		from gravel to cobble-sized	Ľ		moderate olive brown, (5Y 5/2 to 5Y	
-				73.4, 73.5, 73.7' - Mechanical break	П	1	4/4), fine grained, moderate to mild	1 1
-			0	73.95' - 25 deg, smooth, undulating, tight	\vdash	+	HCl reaction, weak (R2), laminated	1
75				74.5' - Mechanical break, medium strong	片	1	bedding, voids <1/16" over 10%-15%	I ₂₄₄
-32.3			>10	(R3) 75' - 10 deg, smooth, undulating, tight	Ш	-{	of surface, trace organics 74.4-75.9' - dusky yellow, (5Y 6/4),	R11: 4 minutes
1 7	76.0			75.4-75.9' - Fracture zone, limestone	\vdash	ſ	fine grained, moderate HCl reaction,	1
1 -	. 3.0		NR.	fragments from gravel to cobble-sized	E	1	very weak (R1), voids <1/16" over	1
[-			0	·	\vdash	+	<10% of surface, lower strength rock	1 -
				76.75' - Mechanical break	口	1	from 75.5-75.9']
				77.0-77.35' - Fracture zone, limestone	F	1	No Recovery 75.9-76.0' Limestone	
1 7			>10	fragments from gravel to cobble-sized	₽	┨	76.0-77.2' - Same as 74.4-75.5'	1
-	R12-NQ	l)			\Box	1	77.2-79.0' - light olive brown, (5Y	1 +
-	5 ft	47	>10		F	+	5/6), fine grained, moderate HCI	-
	60%			78.75' - 10 deg, rough, undulating, tight	尸	1	reaction, weak to medium strong (R2	l J
				78.9-79.0' - Fracture zone, limestone		1	to R3), voids <1/16" over 40% of surface, cavities up to 3/4"x1-9/16"	1
				fragments from gravel to cobble-sized	H	+	over 15% of surface, fossiliferous,	1 1
-37.3			NR	-	╁	╁	trace organics	R12: 2 minutes
					П	1	No Recovery 79.0-81.0'	INIZ. Z IIIIIIules
	81.0				\vdash	-1		
					Γ			
					1			
					_	_		

Rev. 4



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-16 SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

CORING	IVIL IT IOD AI	ND LC	אורוטג	/IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW	Jasing		ORIENTATION : Vertical
WATER	LEVELS: 2.5	ft bgs	s on 4	/5/07 START : 4/5/2007 END : 4	/8/200	7 LOGGER : A. Teal	
	(DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	ER'A	<u>@</u>	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A A	R H TO	(%) O	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
925		a	ER.	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ×	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БОЛШ	014	ш	ш.п.		100		
_			>10	81.1' - 5 deg, smooth, undulating, 1/16" clay		Limestone - 81.0-83.5' - dusky yellow grading to	_
			'	infilling, dark brown clay infilling 81.6-82.6' - Fracture zone, limestone		yellowish gray, (5Y 6/4 grading to 5Y	
-				fragments from gravel to cobble-sized	\vdash	7/2), fine grained, moderate to mild	4/6/07 08:04 Water level at
-			>10			 HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 25% of 	5.4' below ground surface -
-	R13-NQ		1	83.05' - 15 deg, smooth, undulating, open	+	surface, cavities up to 3/16"x3/8"	-
-	5 ft	27		65.05 - 15 deg, smooth, dhadiating, open	-Ш	over <5% of surface	-
_	50%				\bot	No Recovery 83.5-86.0'	
85			NR		Ш	_	1
-42.3				-	T	_	R13: 5 minutes
-					一	-	-
-	86.0			OC O OC OF! Freeture !!t	+	- 	-
-			>10	86.0-86.95' - Fracture zone, limestone fragments from gravel to cobble-sized	Д	Limestone - 86.0-89.5' - dusky yellow, (5Y 6/4),	_
			'	agonto nom gravor to obblic bized	H	fine grained, moderate to strong HCI	
					\Box	reaction, medium strong (R3), voids	1
-			4	87.3' - 45 deg, rough, planar, tight 87.5' - 80 deg, rough, planar, open	╨	 <1/16" over 35% of surface, cavities to 3/4"x3/4" and fossil molds on 15% 	1
-	R14-NQ			87.55' - 10 deg, rough, undulating	世	of surface, very fossiliferous	-
_	5 ft	37	10	87.85' - 50 deg, rough, planar, tight	+	- transitioning to moderately	-
_	90%			88.2, 88.5' - 60 deg, rough, planar, tight		fossiliferous at 88.0'	
			. 10	88.7' - 20 deg, rough, undulating 89.1-89.4' - Fracture zone, limestone			
90			>10	fragments from gravel to cobble-sized	1	89.5-90.5' - yellowish gray, (5Y 7/2),	1
-47.3			0	89.5' - 30 deg, smooth, undulating, open	\top	— fine grained, moderate HCl reaction,	R14: 6 minutes
-			<u> </u>	89.6' - rough, undulating, tight	+	weak (R2), voids <1/16" on 5-10% of surface, trace cavities to 3/16".	-
-	91.0		NR	04.0.00.01		- moderately fossiliferous (molds)	-
l _			>10	91.0-92.6' - Fracture zone, limestone fragments from gravel to cobble-sized	┰	No Recovery 90.5-91.0'	
			''	raginerita from graver to cobbie 3/254		Limestone	
_					Ъ	 91.0-93.0' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, 	1
-			>10		\pm	weak to medium strong (R2 to R3),	1
-	R15-NQ			92.8' - 25 deg, smooth, undulating, tight	╁	 voids <1/16" on 30% of surface, 	-
_	5 ft	0			+-	cavities to 3/8"x3/4" No Recovery 93.0-96.0'	-
l _	40%				\perp	- No Necovery 33.0-30.0	
			ND		Н		
95			NR				1
-52.3				_	1—	_	R15: 6 minutes
-					口	-	-
-	96.0		-		+	L Limostono	-
-			3	96.25, 96.6, 96.7' - 30 deg, smooth, planar,	\perp	Limestone − 96.0-97.9' - Same as 91.0-93.0'] _
			Ľ	very tight	\coprod	except inclusion fragments (to	
I -				97.2-97.25' - 45 deg, rough, planar, high		1-3/16") of yellowish gray	1
-			>10	angle fracture zone, very tight	干	-	1
-	R16-NQ		-	97.9-98.6' - Fracture zone, limestone	╁	97.9-101.0' - yellowish gray, (5Y 7/2),	-
-	5 ft	65	>10	fragments from gravel to cobble-sized	\blacksquare	fine grained, moderate to strong HCl	-
_	100%			98.8' - 60 deg, rough, planar, tight	\bot	reaction, weak (R2), voids <1/16" on 5% of surface, trace fossil molds to	_
1				98.95' - 25 deg, rough, undulating, open	厂	3/16"	
100			4	99.05, 99.3' - 5 deg, rough, undulating, tight	1		1
-57.3				99.2' - 15 deg, rough, undulating, tight – 99.9' - 10 deg, rough, undulating, tight	ፗ	_	R16: 7 minutes
-			1	100.2' - 60 deg, smooth, planar, tight	+-	-	-
	101.0		<u> </u>	, , , , , , , , , , , , , , , , , , ,	+		
			l				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-16	SHEET	7	OF	10	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 4/5/07 START: 4/5/2007 END: 4/8/2007 LOGGER: A. Teal LITHOLOGY DISCONTINUITIES COMMENTS DEPTH BELOW SURFACE AND ELEVATION (#) 90 CORE RUN, LENGTH, AND RECOVERY (%) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone SC-3 collected at 101.0->10 101.0-103.1' - Same as 97.9-101.0' 102.0-102.2' - Fracture zone, limestone fragments from gravel to cobble-sized 2 102.65' - 10 deg, rough, undulating, open 102.9' - 60 deg, rough, planar, open R17-NQ Silt (ML) 62 5 ft NA 103.1-104.2' - moderate olive brown, 94% (5Y 4/4), soft, strong HCI reaction, trace organics 0 Limestone 105 104.2-105.7' - yellowish gray, (5Y $-62.\overline{3}$ R17: 6 minutes 7/2), mild to moderate HCl reaction, 1 105.4' - 60 deg, rough, planar, tight weak to medium strong (R2 to R3), NR 106.0 voids <1/16" on 30% of surface, 106.0-106.2' - Fracture zone, limestone trace fossil molds 6 fragments from gravel to cobble-sized No Recovery 105.7-106.0' 106.6' - 30 deg, rough, undulating, open Limestone 106.0-110.0' - Same as 104.2-105.7' 107.1-107.8' - 85 deg and vertical, planar, 9 high angle fracture zone, multiple planar except color grades to mottled dusky yellow and light olive gray (5Y 6/4 and 5Y 6/1) by 107.0' then transitions features open to moderately tight R18-NO 58 3 5 ft 80% to only dusky yellow by 109.0' 108.5-110.0' - vertical, rough, planar, 15-20% charcoal gray to black, same as 107.1-107.8' 6 110 -67.3 No Recovery 110.0-111.0' R18: 5 minutes NR 111 0 111.0-111.2' - Fracture zone, limestone Driller's Remark: Boring Limestone 111.0-115.1' - dusky yellow grading to light olive gray by 112.4' grading to pale olive by 114.5', (5Y 6/4 to 5Y 5/2 >10 "cave-in" 15.0' from bottom fragments from gravel to cobble-sized (111.0')Advance HW casing from to 10Y 6/2), fine grained, moderate 3 112.35' - 60 deg, smooth, planar, tight 70.0-110.0' HCI reaction, medium strong (R3), 112.9' - 10 deg, rough, undulating, tight voids <1/16" on 35% of surface R19-NQ 10 33 5 ft 82% SC-4 collected at 113.8-114.5' 7 114.55-114.7' - Fracture zone, limestone 115<u>-</u>72.3 fragments from gravel to cobble-sized R19: 4 minutes No Recovery 115.1-116.0' 114.9' - 20 deg, smooth, undulating, open NR 116.0 116.0-116.3' - Fracture zone, rough, Limestone undulating, fragments 1/2"-1-1/2" 116.5, 117.0' - 20 deg, rough, undulating, >10 116.0-120.3' - Same as 114.5-115.1' 2 117.35' - 10 deg, rough, undulating, tight 118' - horizontal, smooth, undulating, open R20-NQ 52 1 118.25' - horizontal, smooth, undulating, 5 ft 86% black, open to 1/16" 118.25-118.5' - Mechanical break, limestone fragments from gravel to cobble-sized 119.3-119.8; 120.0-120.3' - 70 deg, rough, 1 120 -77.3 1 undulating, black, open to 1/16" R20: 6 minutes No Recovery 120.3-121.0' NR 121.0



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-16 SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bgs	on 4/	5/07 START : 4/5/2007 END : 4/	8/200	7 LOGGER : A. Teal	
>∩≘				DISCONTINUITIES	စ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		LES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	J. H.	(%) Q	TINE IN	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ĭ S S S	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ECC	ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ОΩШ	Olk	ď	шД	,	S	Limestone	
_			3	121.1' - 5 deg, smooth, undulating, open	Ė	- 121.0-122.3' - Same as 111.0-115.1'	-
-				121.5' - 20 deg, rough, undulating, open 121.65' - 20 deg, rough, undulating, open	Ľ	except yellowish gray and pale olive mottling, (5Y 7/2 and 10Y 6/2)	-
-			>10	122.3-122.5' - Fracture zone, limestone	\vdash	 122.3-122.75' - dusky yellow, (5Y 	-
-	DOI NO			fragments from gravel to cobble-sized	П	6/4), fine grained, moderate to strong HCl reaction, very weak (R1), voids	-
_	R21-NQ 5 ft	20			\perp	- <1/16" on 25% of surface, cavities	-
-	35%				\vdash	and fossil molds to 3/8" on 5% of surface	-
_			NR		F	- No Recovery 122.75-126.0'	_
125_ -82.3				_	Ħ	_	
-82.3					世	-	R21: 6 minutes
	126.0				\vdash		4
			>10	126.2-127.35' - Fracture zone, horizontal and	口	Limestone - 126.0-126.2' - Same as 122.3-122.8'	
				60 deg, 1/2"-2"	口	126.2-130.2' - dusky yellow, (5Y 6/4),]
			1		┢	fine grained, moderate HCl reaction, - medium strong (R3), voids <1/16" on	
				127.65-128.1' - Fracture zone, vertical,	Ė	10% of surface, trace cavities to	
	R22-NQ 5 ft	33	3	rough, undulating, black, open to 1/16", 127.65' 45 deg	H	3/16" and fossil molds, zone of light olive gray which has neither voids	SC-5 collected at 128.1-
	84%	33	J	128.2, 128.9' - horizontal, rough, undulating,	₽	nor fossils from 127.7 -128.1'	128.9'
			>10	open 129.05' - 10 deg, smooth, undulating, open			
130				129.35' - 50 deg, smooth, planar, open	L		
-87.3			_0_	129.6-130.0' - Fracture zone, fragments up to		No Recovery 130.2-131.0'	R22: 8 minutes
	131.0		NR		Н	_	
			4		F	Limestone - 131.0-133.9' - yellowish gray, (5Y	
				131.7' - 70 deg, rough, planar, tight	Ļ	7/2), fine grained, mild to moderate	
			4	131.7-132.4' - Fracture zone, 70 deg and vertical, rough, planar, tight to open	H	HCl reaction, medium strong (R3), voids <1/16" on 25%, cavities to	
			7	vertical, rough, planar, light to open	⊬	3/16" and fossil molds on <5% of	
	R23-NQ 5 ft	50	3		Ш	surface, moderately fossiliferous	
	58%	50		133.8' - 10 deg, smooth, undulating, open		[_	
				100.0 To dog, smooth, undulating, open	Ь	No Recovery 133.9-136.0'	1
135			NR		F		1
-92.3			1411	_	片		R23: 5 minutes
	136.0	_			片		1
			-10	136.0-136.5' - Fracture zone, rough,	\vdash	Limestone	1
			>10	undulating, fragments 1/16"-2"	Ш	 136.0-139.75' - grayish yellow with pale olive from 138.8-139.5', (5Y 8/4 	SC-6 collected at 136.5-
			F		Т	with 10Y 6/2), fine grained, strong	137.4' -
			5	137.75-138.4' - Fractures or mechanical	\mathbb{H}	 HCl reaction, weak (R2), voids <1/16" on 35% of surface, fossil 	1
	R24-NQ			break, 5 deg, smooth, planar, tight	\vdash	molds to 3/16"x3/8" from	1
1 7	5 ft 75%	38	3	138.75' - 10 deg, rough, undulating, open	Ħ	 138.4-139.8', moderately fossiliferous 	1
			3	100.70 - 10 dog, rough, undulating, open	世		1
140				139.5' - 15 deg, rough, undulating, open	╨	No Pocovory 139 75 144 0'	1
-97.3			NR	139.75' - 25 deg, smooth, undulating, open —	Ή	— No Recovery 139.75-141.0'	R24: 5 minutes
	141.0		1417		仜		1
					1		1



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-16

SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 2.5	ft bgs	s on 4/	5/07 START : 4/5/2007 END : 4/	8/200	7 LOGGER : A. Teal	
≥∩≎	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	(%) _Q	FOOT FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF	SORE	RQE	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	034	ш.	ш.ш		0)	Limestone	
-			10	141.2' - 10 deg, smooth, undulating, open 141.35' - 15 deg, smooth, undulating, open	╁	- 141.0-141.8' - yellowish gray, (5Y	
-				141.5' - 30 deg, smooth, undulating, open	Ħ	7/2), fine grained, strong HCl reaction, weak (R2), voids <1/16" on	1
-			>10	141.75' - 20 deg, smooth, undulating, open 141.76-142.4' - Fracture zone, black,	t	- 30% of surface, cavities and fossil	1
-	R25-NQ			irregular fragments to 1-1/2"		molds up to 3/16" on 5% of surface 141.8-142.6' - yellowish gray, (5Y	1
-	5 ft 56%	0	6	142.6-143.7 - Fracture (6), 20 deg and 30 deg, rough, undulating, open	₩	 7/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4). 	1
-	50%			5.	H	voids <1/16" on 5% of surface	1
145					恤	 142.6-143.8' - light olive gray, (5Y 5/2 with 5Y 7/2), 10% yellowish gray 	1
145 -102.3			NR	-	╁╴	mottling, fine grained, strong HCl	R25: 5 minutes
-	146.0				F	 reaction, strong (R4), voids <1/16" on 25% of surface, trace cavities and 	
-	146.0			146.0-147.3' - Fracture zone, dark, limestone	Ħ	fossil (molds) to 9/16"	
-			>10	fragments from gravel to cobble-sized	片	No Recovery 143.8-146.0' Limestone	1
-			>10		世	146.0-147.5' - yellowish gray, (5Y 7/2	Set casing to 150.0' due to
-					尸	and 5Y 5/2), light olive gray mottling, fine grained, mild HCl reaction,	cave-in on last run; stop - coring at 151.0' for the day
-	R26-NQ				Ħ	strong (R4), trace voids <1/16",	4/7/07
-	5 ft 30%	0			仜	cavities 1/16"x1/16" and fossil molds No Recovery 147.5-151.0'	1 1
-	0070		NR			_	1 1
150					╁	-	1
-107.3				_	Ħ		R26: 10 minutes
-	151.0				Ħ	_	1
-	101.0			151.0-151.5' - Fracture zone, subangular	Ľ	Limestone	1
_			>10	fragments predominately 1"-1/2"	₩	 151.0-155.5' - yellowish gray, (5Y 7/2 with 5Y 5/2), light olive gray mottling 	1 1
				152' - 25 deg, smooth, undulating, open	\vdash	from 152.5-153.8', mild to moderate	Water level at 5.3' below
			5	152.3' - Mechanical break 152.45-153.2' - Fracture zone, rough,	H	HCl reaction, medium strong (R3), laminar bedding below 153.5'	ground surface -
	R27-NQ		. 40	undulating, dark, staining on vertical fracture	世	- 	1
	5 ft 90%	48	>10	153.7-154.2' - Fracture zone, fragments		_	1
]			-10	1/16"-1/2"	\vdash		1
155			>10	154.4, 154.7, 155.05' - Mechanical break	H		1
-112.3			4	155.25' - 15 deg, smooth, planar, open,	片		R27: 10 minutes
	156.0		NR	solution cavity	片	No Recovery 155.5-156.0']
			>10	155.3' - 10 dég, smooth, planar, tight 155.4' - 15 deg, smooth, planar, tight	H	Limestone - 156.0-159.0' - yellowish gray]
			- 10	156.0-156.4' - Fracture zone, rough,	F	transitions to dusky yellow below]
			1	undulating, small fragments 1/16"- 1-1/2"	Щ	158.0', (5Y 7/2 to 5Y 6/4), fine grained, mild HCl reaction, medium]
			'	157.65' - Mechanical break	Щ	strong (R3), laminated bedding,	
	R28-NQ 5 ft	47	>10	157.9' - 20 deg, smooth, undulating, open	上	voids <1/16" on 5% of surface, cavities and fossil molds to 3/16" on]
	60%	''	. 10	158.7-158.9' - Fracture zone	\vdash	<5% of surface (predominantly on]
					F	lighter colored laminations), increased voids and fossil]
160			NR	_	ļ,	abundance below 158.0'	
-117.3			`		片	No Recovery 159.0-161.0'	R28: 9 minutes
	161.0				\vdash		



PROJECT NUMBER:	BORING NUMBER:		
338884.FL	A-16	SHEET	10 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bg	s on 4/	/5/07 START : 4/5/2007 END : 4/6	3/200	7 LOGGER : A. Teal	
\$ □ ≎	(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 165 -122.3	R29-NG 5 ft 86%	37	1 6 >10 >10 1 NR	161.65' - Mechanical break 161.8' - Fracture or mechanical break, horizontal, smooth, planar, open 162.1' - 20 deg, rough, undulating, open, solution cavity 162.25' - Fracture or mechanical break, horizontal, smooth, planar, open 162.35' - Mechanical break 162.7' - 20 deg, rough, undulating, open 162.9-163.5' - Fracture zone 163.5-164.2' - Fracture zone, 45 deg and 75 deg 164.2-164.6' - Fracture zone		Limestone 161.0-162.9' - dusky yellow with moderate olive brown from 161.8-162.7', (5Y 6/4 with 5Y 4/4), fine grained, mild HCl reaction, medium strong (R3), thin bedding, voids <1/16" on 50% of surface, cavities up to 3/8"x3/4" and fossil molds on <5% of surface, evenly distributed thin (1/2"-1") bedding 162.9-165.3' - yellowish gray with zone of dusky yellow and light olive from 164.6-165.3', (5Y 7/2 with 5Y 6/4 and 5Y 5/2), fine grained, mild HCl reaction, medium strong (R3),	R29: 4 minutes
- - - - -	R30-NQ 5 ft 90%	77	1 2 >10 2	164.9,164.95, 165.05' - 10 deg, smooth, planar, tight 166.35, 167.7' - 40 deg, rough, planar, tight 167.8' - 55 deg, rough, planar, tight 167.95' - Mechanical break 168.75-169.2' - Fracture zone, dark, staining on vertical fractures		laminar bedding from 164.2-164.6', trace voids <1/16" No Recovery 165.3-166.0' Limestone 166.0-170.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong (R3), laminar bedding from 167.8-169.4', voids <1/16" on 20% of surface from 166.0-168.0', <5% below 168.0', cavities 3/8"x3/8" and fossil molds on 5% of surface from 166.4-168.0'	SC-7 collected at 167.95- 168.75' -
170 -127.3 -	171.0		1 NR	169.7' - Mechanical break 169.9' - 30 deg, smooth, undulating, tight 170.4' - horizontal, smooth, planar, open	H	No Recovery 170.5-171.0'	R30: 6 minutes
- - - - - 175	R31-NC 5 ft 100%	73	5 >10 0	171.45' - 5 deg, smooth, planar, tight 171.5' - 5 deg, smooth, planar, open 172.2' - 5 deg, smooth, undulating, open 172.4' - 85 deg, rough, planar, tight 172.55-173.9' - Fracture zone, 45 deg and 75 deg, smooth, planar, black staining, tight		Limestone 171.0-171.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCI reaction, medium strong to strong (R3 to R4), voids <1/16" on 5% of surface 171.5-172.2' - yellowish gray, (5Y 7/2), mild HCI reaction, strong (R4), laminated bedding at 5-10 deg. 172.2-176.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), mild HCI reaction, medium strong (R3),	SC-8 collected at 173.9-
-132.3 - - - - -	176.0		4	175.1, 175.2, 175.35' - 10 deg, smooth, undulating, open, brownish staining at 175.2'		laminated bedding 175.0-176.0', " voids <1/16" on <5% of surface Bottom of Boring at 176.0 ft bgs on 4/8/2007	R31: 6 minutes 15:07 End boring at 176.0', met recovery and RQD requirements -
-						- - - -	- - -



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-17 SHEET 1 OF 14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit

						Ty, auto nammer, AVVJ 1005,) · A	Tool N. Jorzypiecki M. Faurete
WATER	LEVELS	: 2.5 ft bo	JS 011 4/10		START : 4/9/2007	END : 4/18/2007 SOIL DESCRIPTION	LUGGER	(. A.	Teal, N. Jarzyniecki, M. Faurote COMMENTS
STANDARD PENETRATION PENETRATI				STANDARD					OliviiviLivio
DN (SAMPLE		` ,	TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMBOL,	COLOR.	IC L	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE			MOISTURE	E CONTENT, RELATIVE DEI	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTEN	ICY, SOIL STRUCTURE, MIN	NERALOGY	SYMBOLIC LOG	INSTRUMENTATION
42.3	0.0			(14)	Poorly Graded	d Sand With Organics (SP	P)		4/9/07, 17:20 no water encountered
-		1.2	SS-1	1-3-6	0.0-1.2' - browr	nish black to pale brown, (5YR 2/1 to -		-
-		1.2	33-1	(9)	□ 5YR 5/2), mois □ HCl reaction u	st, loose, very fine to fine g up to 30% fine organics and	rained, no d roots silica –		- 04/10/07 08:01: Begin drilling for the day
-	1.5				sand	.p to 00 /00 0. ga00 a	-	1	-
-							-		-
-							-		Water level: 2.5' below ground surface,
_							-		08:01 on 4/10/07
-							_	.	_
_							-		_
_							-		_
5	5.0								
37.3				1-1-1	Silty Sand (SN 5.0-5.9' - mode	/l) erate yellowish brown, (10\	(R 5/4) wet -		_
_		1.2	SS-2	(2)	very loose, ver	ry fine to fine grained, no H			_
	6.5			. ,	Lean Clay Witl	c fines, silica sand	/г_	///	
					5.9-6.2' - areen	nish gray to dark vellowish	orange to		
					pale purple, (50	G 6/1 to 10YR 6/6 to 5P 6/	2), wet, very		
						o high plasticity, no dilatan 5% very fine to fine grained			
					,	, ,			
-							-		_
-							-	1	1
10	10.0						-	1	1
32.3				5-10-5		ne Fragments With Sand		Ш	7
-	11.0	1.0	SS-3	(15)	10.0-11.5' - whi	nite to yellowish gray, (N9, se, strong HCl reaction, fine	5Y 9/1), wet, - to coarse		-
_	11.0				gravel, 20% lov	w plastic fines, grained pre	edominantly /		1
-					\fine to medium	sand, all carbonate		1	Driller's Remark: Slight mud loss at 12.0'
-							-	1	below ground surface -
-							-	1	-
-							-	1	
-							-		
-							-		
,	45.0						-		-
15 <u> </u>	15.0				Silt (ML)			$\parallel \parallel \parallel \parallel$	-
-		1.3	SS-4	34-39-42	15.0-16.3' - gra	ayish yellow, (5Y 8/4), mois	st to wet,	$\ \ $	
-	46 -	1.3	33-4	(81)		ic, rapid dilatancy, modera ery fine to medium sand, tr		$\ \ \ $	-
-	16.5					e black minerals, all carbon			08:39 set casing to 20.0'
-							-		- 55.55 55t 555m/g to 25.5
-							-		-
-							-		-
-							-		
_							-		
-							_		_
20									



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-17	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote											
				STANDARD	SOIL DESCRIPTION COMMENTS							
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft) SAMPLE INTERVAL (ft) EST RESULTS RECOVERY (ft)				SOIL NAME, USCS GROUP SYMBOL, COLOR, P. DEPTH OF CASING, DRILLING RATE,							
PTH E		RECOVE	#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY							
22.3	20.0	0.3	SS-5		I I							
22.3	- 20.0 20.2	0.3	SS-5	(N) 50/3 (50/3")	Sandy Silt (ML) 20.0-20.2 - grayish orange, (10YR 7/4), moist, hard, nonplastic, very rapid dilatancy, mild to moderate HCI reaction, 25-30% fine to medium sand, two fine gravel-sized limestone fragments, all carbonate Begin Rock Coring at 20.3 ft bgs See the next sheet for the rock core log							



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-17	SHEET	3	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				ENT: CME 55 S/N 316625, mud rotary, NQ tools, HW (ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bg	s on 4/		/18/2	007		
ŞΩ⊋	(%			DISCONTINUITIES	چ ا	L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H B	JAT.	(%) Q	ĮŠ.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEV EV	ECC	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	NQ-1	œ	NA	THORNESS, SOLVINGE STANKING, AND HOLLINGS	S	4		
	21 0 0.8 ft	0			111	Ш	Silt (ML) 20.3-20.85' - Same as 15.0-16.3'	-
-	75%		NR 0		П	\top	except strong HCl reaction	-
-					Т	1	No Recovery 20.85-21.0'	-
-			0		Ъ	╁	21.0-24.1' - grayish orange, (10YR	-
-					F	7	7/4), medium to fine grained, mild HCl reaction, extremely weak to very	-
-	R2-NQ		0		Ħ	1	weak (R0 to R1), voids <1/16" on	-
-	5 ft 62%	0	0		╨	十	90-95% of surface, trace rounded to subrounded white casts, at 22.55'	-
-	0270				П	+	sandy clay lens, greenish gray, 0.1'	Casing advanced to 25.0'
25					口	丰	thick, 22.56-22.9' trace linear white bedding, moderately to very	-
17.3			NR	-	\pm	╁	fossiliferous	
-					F	╊	No Recovery 24.1-26.0'	-
-	26.0			26.0-27.0' - Fracture zone or mechanical	廿	‡	Limestone	-
-			1	break, 0-70 deg, rough, undulating, open to 3/16"	世	+	26.0-29.4' - grayish orange, (10YR	-
-				27.0-29.4' - Fracture zone, silt and rock	╫	╁	7/4), fine grained, moderate HCl reaction, extremely weak to very	-
-			>10	fragments to 1-1/2"	┲	1	weak (R0 to R1), voids <1/16" on	-
-	R3-NQ				士	╁	25% of surface, zones of silt 27.0'-29.4', 6" thick	-
-	5 ft	0	>10		+	╁		-
-	90%				+	+		-
			>10	29.4-30.5' - Fracture zone, sand to	H	1	29.4-30.5' - grayish orange, (10YR	-
30 12.3			> 10	cobble-sized limestone fragments	世	╆	_ 7/4), fine grained, moderate HCl reaction, medium strong (R3), few	
-			>10 NR		₽	+	voids <1/16"	-
-	31.0		INIX		₽	7	No Recovery 30.5-31.0' Limestone	-
-			>10		-	╊	31.0-34.2' - gravish orange with olive	-
-				31.9-34.2' - Fracture zone, 0-65 deg, rough,	\pm	╁	gray mottling over 60-70% of surface, (10YR 7/4, 5Y 4/1), very fine	-
-			>10	undulating, lighter coloration (grayish orange)	+	+	to fine grained, mild HCl reaction,	-
-	R4-NQ		. 40	up to 1/8" wide along 65 deg fracture at 33.0-33.3'	F	1	weak (R2), predominately olive gray by 34.0', grayish orange material	-
1 -	5 ft	18	>10		世	+	becoming associated with	-
-	64%		0		╀	+	casts/molds, moderately fossiliferous, voids vary from 10-15%	-
-					\perp	7	up to 50% in matrix	-
35 7.3			NR	_	中	╄	No Recovery 34.2-36.0'	
'					占	+		-
-	36.0			26.0.26.51 Eractura zono 0.70 dos recish	F	+	Limestone	-
-			>10	36.0-36.5' - Fracture zone, 0-70 deg, rough, undulating, grayish orange coloration on most	片	1	Limestone 36.0-38.0' - olive gray, (5Y 4/1), fine	-
-				surfaces, rock fragments to 2" 36.5-36.7' - Fracture, 65 deg, rough,	上	‡	grained, moderate HCl reaction,	-
-			1	undulating, tight	╀	╁	voids <1/16" on 20% of surface, very fossiliferous, few cavities to 3/16"	-
1 -				37.6' - Fracture, 60 deg, rough, planar, tight	Д	4	(molds)	-
1 -	R5-NQ 5 ft	27	>10	38.0-38.8' - Fracture zone, smooth, planar to undulating, fragments <1"	口	1	38.0-38.8' - moderate yellowish brown, (10YR 5/4), fine grained,	-
-	56%			3, 3 - 3	\vdash	╁	moderate HCl reaction, extremely	-
-					斤	1	weak (R0), friable, trace organics No Recovery 38.8-41.0'	-
40			NR	_	片	1	-	_
2.3					+	╁		
					-	-		•



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-17	SHEET	4	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NETHOD AL	ND EC	JUIPIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bg	s on 4	/10/07 START : 4/9/2007 END : 4/	18/20	D7 LOGGER : A. Teal, N. Jarzynieck	i, M. Faurote
≥∩ ⊙	(9)			DISCONTINUITIES	ပ္	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
불병은	2 E E E E E E E E E E E E E E E E E E E	(%) Q	JUR OO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF F	A POS	οD	ACI R F	PLANARITY, INFILLING MATERIAL AND	MB(AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
吕S급	잉필뿐	A.	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-					ш	_	_
-	41.0			44.0.44.41.5	十一	,	_
l _			>10	41.0-44.4' - Fracture zone, 20-30 deg, rough to smooth, undulating, fragments	厂	Limestone - 41.0-42.3' - pale yellowish brown,	<u> </u>
				predominately 1/2" up to 2"	\vdash	(10YR 6/2), fine grained, moderate	
						HCl reaction, very weak (R1), voids	
_			>10			 <1/16" on 50% of surface, moderately fossiliferous, trace 	-
-	R6-NQ					organics	-
-	5 ft	0	>10			- 42.3-44.4' - Same as 41.0-43.0'	-
-	68%		>10		₩	except extremely weak (R0), 42.3-42.5' seam of sandy lean clay	-
-			/10		世	No Recovery 44.4-46.0'	-
45				_	ig		_
-2.7			NR			_	_
	46.0				\vdash		
I -				46.0-47.7' - Fractures (8), 20 deg, rough,	ш	Limestone	-
-			5	undulating, to smooth and undulating, face angles parallel, open to 1/16"	╁	 46.0-48.2' - pale yellowish brown, (10YR 6/2), fine grained, moderate 	-
-				angles parallel, open to 1710	亡	HCI reaction, extremely weak (R0),	-
-			4		╂┴	- friable, trace organics	-
-	D7.NO			47.9' - Fracture, horizontal, smooth,	山	_	_
_	R7-NQ 5 ft	0	>10	undulating, open to 3/16"	┢┯	48.2-48.6' - pale yellowish brown,	_
_	68%			48.2, 48.4, 48.6' - Fracture (3), 0-20 deg,		(10YR 6/2), fine grained, moderate HCl reaction, very weak (R1), voids	_
			>10	rough, undulating 48.6-49.4' - Fracture zone, rough, undulating,		<1/16" on 40-50% of surface.	
50				rock fragments to 1"	Ш	laminations of organic material	_
-7.7			NR	_	\top	<1/16" 48.6-49.4' - Same as 46.0-48.2'	
-	54.0				\vdash	No Recovery 49.4-51.0'	-
-	51.0					Limestone	-
-			>10	51.3' - Fracture, 20 deg, smooth, undulating,	₩	- 51.0-52.5' - Same as 46.0-48.2'	_
-				open to 3/16" 51.4-52.0' - Fracture zone, 0-90 deg, rough,	口	except laminations of organic	_
_			4	undulating, to smooth and undulating,	┢	material <1/16" from 51.0'-51.5'	_
			·	fragments <3/16"-1-1/2"		52.5-55.5' - Same as 48.2-48.6' - except few voids <1/16", organics	_
	R8-NQ	25		52.1, 53.4, 53.6, 54.0, 54.9' - Mechanical break (5)	\vdash	more abundant	
-	5 ft 90%	35	1	52.2, 52.3, 52.5, 52.8' - Fracture (4), 20 deg,	\Box		_
I -	0070			rough, undulating, to smooth and planar,	1	-	-
			2	fractures non-parallel, open to 1/8" 53.1' - Fracture, 40 deg, smooth, undulating,		-	-
55_ -12.7			1	open to 1/16"	+	<u> </u>	
			<u> </u>	54.3, 54.5' - Fractures or mechanical break	\Box	No Recovery 55.5-56.0'	-
-	56.0		NR	(2), 10-20 deg, smooth, undulating, open to 3/16"	仜	_	50 0 70 01 1- 11 0
I _			3	55.4' - Fracture, 20 deg, rough, planar, open	\Box	Limestone - 56.0-57.5' - Same as 52.5-55.5'	56.0-76.0' re-logged by C. Dougherty -
				to 1/16"		55.0-57.5 - Same as 52.5-55.5	Dougherty
				56.1' - Fracture, horizontal, smooth, undulating, open to 1/16"			Casing advanced to 60.0'
-			>10	56.3, 56.5' - Fractures (2), 20-40 deg,	\Box	57.5-60.2' - light olive gray, (5Y 5/2),	-
-	R9-NQ			smooth, undulating, open to 3/16"	+	- fine grained, mild HCl reaction,	-
-	5 ft	38	2	57.2' - Fracture, 0-20 deg, 20 deg on upper surface, 0 deg on lower surface, open	世	strong (R4), laminated bedding, voids <1/16" on 0-30% of surface,	-
-	84%			57.5-58.1' - Fracture zone, 0-65 deg, smooth,	\vdash	 voids concentrated in zone from 	-
-			>10	undulating, trace silt and/or clay sized	口	58.4'-59.4', cavities to 3/4"x3/8"	_
60				infilling, black staining on 65 deg fracture faces, fragments from 1/2"-2"	\vdash	(fossil molds), trace organics, some — laminated bedding inclined 10 deg	_
-17.7			>10	idoco, ilaginonio iloni 1/2 -2	Ħ		
Щ					1		

APPENDIX 2BB-194

Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-17

SHEET 5 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				HENT . CIVIE 33 3/N 3 10023, HILL TOTALLY, NQ 1001S, HW			-
WATER	LEVELS : 2.5	ft bg	s on 4		/18/20		
≥∩≘	(9)			DISCONTINUITIES	ပ္ခ	US LITHOLOGY COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱ႘ᇋ	Z,H A,H	(%	I R P		-	MINERALOGY, TEXTURE, MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE	
ĔĞ.¥	RE FICE	(%) Q	12 %	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽ B	WEATHERING, HARDNESS, AND ROCK MASS WEATHERING, HARDNESS, SMOOTHNIESS, SMOOTHNIESS	ROD
	SEN	a	F.F.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ξ	CHARACTERISTICS DROPS, TEST RESULTS, I	ETC.
В 07 Ш	014			50.75' Fracture 25 dag rough planer tight	+ "	No Recovery 60.2-61.0'	
	61.0		NR	58.75' - Fracture, 25 deg, rough, planar, tight 58.9-59.0' - Fracture, horizontal, 2 fragments,		No Recovery 60.2-61.0	
-	01.0			open	╨	Limestone	-
-			2	59.2-59.5' - Fracture zone, 70 deg, black	╁┰	- 61.0-62.7' - Same as 57.5-60.2'	-
_				staining on face, closed		except intervals of laminated	_
				59.7' - Fracture, 35 deg, closed 59.8-60.2' - Fracture zone, 0-65 deg, rough,		bedding, voids <1/16" and cavities up	
-			8	undulating, dark staining	1	to 3/8" diameter from 61.5-62.7	7
-	R10-NQ			61.1-61.3' - Fracture, 80 deg, dark staining,		62.7-63.9' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction,	- 1
-	5 ft	30	>10		╨	medium strong (R3), voids <1/16" on	-
_	58%			61.5' - Fracture, 45 deg, smooth, planar, tight	丁	25% of surface, very fossiliferous,	
				62.05' - Fracture, 10 deg, smooth, undulating, tight		molds up to 3/8"diameter	
65				62.3' - Fracture, 30 deg, fracture not	╁	No Recovery 63.9-66.0'	_
-22.7			NR	completely through core	仜	<u> </u>	
				62.65' - Fracture, 15 deg, smooth, undulating,	+	_ _	-
I -	66.0			tight	世	<u>'</u>	
				62.8-63.0' - Fracture zone, smooth to rough, undulating, fragments 3/8"-1"	ш	Limestone	
-			>10	63.3' - Fracture, 10 deg, smooth, undulating,	1—	66.0-69.5' - moderate olive brown to light olive gray, (5Y 4/4 to 5Y 5/2),	1
-				loose	亡	Ignt olive gray, (5Y 4/4 to 5Y 5/2), fine grained, mild HCl reaction, weak	- 1
_			>10	63.3-63.9' - Fracture zone, 0-90 deg, rough,	₽	to medium strong (R2 to R3), voids	-
_				undulating, dark staining, fragments <1/16"-2-1/2", staining on one 45 deg face	上	<1/16" on 15% surface, cavities to	
	R11-NQ			66.0-66.4' - Fracture zone, smooth,		3/8" over <5%, moderately	
-	5 ft 100%	50	>10	undulating, some dark staining, fragments to	┰	fossiliferous, trace organics	1
-	100 /6			3/8"	十二	<u>⊤</u> }-	- 1
_			>10	67.6-68.9' - Fracture zone, 0-90 deg, rough,	+	1 00 5 74 01	-
70				undulating, fragments <1/16"-2", some organic material on some fragment faces –	┵	69.5-71.0' - moderate yellowish brown, (10YR 5/4), fine grained, mild	
-27.7				69.15' - Fracture, 75 deg, rough, planar, tight		to moderate HCl reaction, weak (R2),	
-	71.0		>10	69.4-70.4' - Fracture zone, similar to	1	laminated bedding, inclined 30 deg,	7
-	71.0			67.6-68.9'		organics present along bedding, SC-2 collected at 71.0-	- 1
-			1		₩	moderately fossiliferous at 70.5-71.0' 71.0-76.0' - Same as 69.5-71.0' 71.9'	-
_				74.01 Frankura harizantal amanth	ᅪ	- except voids <1/16" on 5% of	
			١	71.9' - Fracture, horizontal, smooth, undulating, tight		surface, laminated bedding with	
_			1	72.35' - Fracture, 50 deg, smooth, planar,	1	30-45 deg angles, more pronounced	1
-	R12-NQ			loose	\pm	<u></u>	-
_	5 ft	100	0	72.8' - Mechanical break	+-		-
l _	100%			73.1, 73.6, 75.5' - Mechanical break (3)	╨	└ ᡶ ┃	
75			0		\vdash	_	1
-32.7				-	t		_
-			0		₩	<u></u> ↓ ∤	- 4
I _	76.0				ᅪ		
						76.0-78.6' - moderate yellowish	
_			0	76.6' - Mechanical break	╨	brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak	7
-				77.0' - Fracture, 55 deg, smooth, planar, tight	+	(R1), thinly laminated (1/4"), inclined	- 1
-			3	Trio Tractare, co deg, emecan, planar, agin	\perp	5-10 deg, voids <1/16" on 15% of	-
I -				77.65' - Fracture, 20 deg, rough, undulating,	₽	surface and trace organics	
	R13-NQ		3	loose	П	predominately along bedding, trace 1/16"-1/8" gray clasts	
I -	5 ft 52%	33		77.9' - Fracture, 30 deg, smooth, undulating, tight	1—	No Recovery 78.6-81.0'	1
-	02/0			78.3' - Fracture, 25 deg, smooth, undulating,		Casing advanced to 80.0'	-
-				tight	\perp	end of day 4/10/07 at	4
80			NR	78.4' - Fracture, horizontal, smooth,	╁┼	101.0'	
-37.7				undulating, loose	F	-	
1					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-17 SHEET 6 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

-				TENT . CIVIE 33 3/N 310023, HILL TOTALLY, NO TOOLS, FIVE			ORIENTATION: Vertical
WATER	LEVELS : 2.5	ft bg	s on 4		18/20		
> 0 =				DISCONTINUITIES	ڻ ن	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
出병은	\(\frac{\pi}{2}\frac{\pi}{2}\)	(%	FRACTURES PER FOOT		- 1 ≥	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΞĂΞ	# <u>F</u>	(%) □	CT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	βΘ	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
953		S O	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ξ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ПОШ	0716	IL.	шп		0)	6.7.4.6.2.4.6.1.66	
-				78.5' - Fracture, 45 deg, smooth, undulating, loose	╁┷	-	1
-	81.0			10036	╼	Limestone	1
l _			>10		ᅪ	- 81.0-81.5' - grayish orange, (10YR	_
				81.5-81.9' - Fracture zone, rough, undulating,	_	7/4), fine grained, moderate HCl	
I -	1			fragments <3/16-1-1/2" 82.2' - Mechanical break		reaction, very weak to weak (R1 to	1
-			>10	82.5-82.8' - Fracture zone, same as	╁	R2), voids <1/16" on 25% of surface	1
-	5,,,,,			81.5-81.9'	+-	81.5-83.75' - very pale orange to	-
I _	R14-NQ 5 ft	20	>10	82.8' - Fracture, 60 deg, rough, planar, loose		grayish orange, (10YR 8/2 to 10YR 7/2), fine grained, moderate HCl	
	55%	20		83.1' - Fracture, 40 deg, rough, undulating,	\vdash	reaction, medium strong (R3), voids	
-				tight	╁┷	<1/16" on 25% of surface, cavities to	1
-				83.35-83.75' - Fracture zone, same as 81.5-81.9'	-Ш	- 3/8"x3/8" over 10% from 81.9-82.8',	-
85			NR	-	╁	moderately fossiliferous	_
-42.7						No Recovery 83.75-86.0'	
I -	86.0				Ш		1
-	00.0				╁	_ Limestone	1
I -			3			- 86.0-90.9' - yellowish gray, (5Y 7/2),	-
l _				86.75' - Fracture, 45 deg, rough, planar, tight	╨	fine grained, mild HCl reaction,	
				86.95-87.3' - Fracture zone, 0-60 deg,	Н	medium strong (R3), voids <1/16" on	
-			10	smooth, undulating, fragments 3/8"-1-1/2"	1	- 25-30% of surface, trace cavities to	1
-	l R15-NQ			87.75, 88.2' - Fractures (2), 20-30 deg,	╨	3/16" except 5% at 89.4-90.9', very fossiliferous from 89.4-90.9'	-
_	5 ft	80	2	smooth, undulating, tight	╁┰	-	SC-3 collected at 88.2-
	98%		-				89.35'
_					Ш	_	1
-			0	89.35' - Fracture, 20 deg, rough, undulating,	+	-	1
90				loose, clay seam 1/32" thick	-		_
-47.7			2		╨	_	
	91.0			90.5' - Fracture, 30 deg, smooth, undulating,			
-			NR.	tight , clay seam 1/4" thick 90.6' - Fracture, 15 deg, smooth, undulating,	1_	No Recovery 90.9-91.0'	1
-			>10	loose	╫	Limestone 91.0-91.5' - moderate yellowish	1
-				91.0-91.7' - Fracture zone, 0-90 deg,	-Ш	brown, (10YR 5/4), fine grained, mild	1 -
_			1	fragments <3/8"-1-1/2", clay films	ᅪ	HCl reaction, medium strong to	
			'	92.5' - Mechanical break	\vdash	strong (R3 to R4)	
-	R16-NQ			92.9' - Fracture, 60 deg, rough, planar, open	口	91.5-94.2' - moderate yellowish	1
1 -	5 ft	25	>10	to 1/16"	+	brown, (10YR 4/2), fine grained, moderate HCl reaction, laminated	-
I -	64%			93.15' - Fracture, 80 deg, rough, planar, tight 93.25' - Fracture, 75 deg, smooth, planar,	上	rioderate HCI reaction, laminated rorganics 1/16" thick at 91.7' and 92.4'	
			>10	tight	Ш	with trace laminated organics	
95				93.5-94.2' - Fracture zone, 0-70 deg, smooth,	\vdash	elsewhere, voids <1/16" on 25% of	1
-52.7			NR	undulating, fragments 3/8"-2-1/2"	亡	— surface, few larger cavities along	-
-					╨	apparent healed fracture planes No Recovery 94.2-96.0'	-
I -	96.0				十	- -	_
				96.0-98.0' - Fracture zone, smooth to rough,		Limestone	
I -			>10	undulating, fragments 3/8"-3"	₽	 96.0-98.0' - grayish orange and light gray, (10YR 7/4 and N6), fine 	1
-					仜	grained, mild to moderate HCl	1
-			>10		\blacksquare	reaction, strong (R4), few voids	-
I _					╨	<1/16" over 20% from 97.0-97.5'	l J
	R17-NQ					No Recovery 98.0-101.0']
I -	5 ft 40%	0			1	<u> </u>	1
-	4070				╁	-	-
I -			NR		工	-	1 4
100_					ᅪ		
-57.7					\vdash		Casing advanced to 100.0'



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-17 SHEET 7 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyni DISCONTINUITIES LITHOLOGY ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyni DISCONTINUITIES LITHOLOGY ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	COMMENTS
OR PERTURNATION CONTINUENCE OF THE PROPERTY OF	COMMINICIATO
ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	
THOSE REPORT TO DEPTH TYPE OPENIATION BOUNDEDGE TO THE TOTAL	SIZE AND DEPTH OF CASING,
프로토 교통장 이 등요 DEPTH, TYPE, ORIENTATION, ROUGHNESS, Î	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LE MAND ROCK MASS	DROPS, TEST RESULTS, ETC.
101.0	
101.0-101.35' - Fracture zone, to 90 deg, Limestone	7
>10 fragments 3/8"-2-1/2" - 101.0-106.0' - pale yellowish brown, (10YR 6/2), fine grained, moderate	-
HCI reaction, medium strong (R3)	Water level at 1.9' below
1 102.15' - Fracture, 60 deg, rough, planar to undulating, tight voids < 4/16" on 15% of surface,	ground surface -
R18-NQ trace cavities to 3/8" predominately fossil molds and casts, very	SC-4 collected at 102.15- 103.5'
- 5 ft 82 1 103.5' - Fracture, 50 deg, smooth, undulating fossiliferous	-
to planar, tight	
1 104.0, 105.4' - Fractures (2), 15 deg, rough,	_
105 undulating, tight	'
-62.7	1
106.0 2 105.6' - Fracture, 70 deg, smooth, planar,	7
tight 106.0-111.0' - Same as 101.0-106.0'	7
- 3 106.1-106.4' - Fracture, 60 deg, rough, - except olive gray mottling (5Y 4/1), at undulating, tight to open to 1/16" 107.0' laminated bedding from	-
106.4-106.7' - Fracture, apparent healed 109.6-110.2' inclined 40 deq	-
2 fractures 106.5' - Fracture, 40 deg, rough, undulating,	SC-5 collected at 107.25- 108.5'
R19-NQ tight	100.5
5 ft 77 1 106.8' - Fracture, horizontal, rough,	_
undulating, tight 107.0, 107.25, 108.5' - Fractures (3), 60 deg,	
>10 smooth, planar, tight	_
110 109.0-109.3' - Fracture zone, 0-80 deg, rough, undulating, fragments 3/16"-2"	'
109.8' - Fracture, 60 deg, rough, undulating,	
111 0 open to 1/16", organic material on faces	Į.
110.15' - Fracture, 45 deg, smooth, undulating	SC-6 collected at 111.0-
110.25' - Fracture, 50 deg, rough, undulating, 113.6-114.3' cayities to 3/8"y1.3/16"	112.1'
open to 1/16" 110.65' - Fracture, 60 deg, rough, undulating,	-
1 1 110.03 - 11actate, 60 deg, 10dgil, diludiating,	-
R20-NQ 112.1' - Fracture, 75 deg, rough, undulating,	-
- 5 ft 100 0 ugnt	_
100% 113.6, 114.45' - Mechanical break (2)	_
1 - 0	_
115	
-72. 7	
116.0	
116.0-119.5' - Same as 101.0-106.0'	1
	٦
	7
1 117.6' - Fracture, 25 deg, smooth, undulating,	-
charcoal gray staining on 30%, tight	-
5 ft 50 7 118.0-118.2' - Fracture zone, 0-50 deg,	_
118.2' - Fracture, 50 deg, rough, planar, tight	-
118.65' - Fracture, 30 deg, smooth,	-
120 undulating, tight No Recovery 119.5-121.0'	
 ''' 	
	i '



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-17 SHEET 8 OF 14

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.5	ft bgs	s on 4	/10/07 START : 4/9/2007 END : 4/	18/20	07 LOGGER : A. Teal, N. Jarzynieck	LOGGER : A. Teal, N. Jarzyniecki, M. Faurote				
				DISCONTINUITIES	₀	LITHOLOGY	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,				
ATIC	STH.,	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30[[MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD				
SURF	SOR	RQ	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.				
	0	_	NR	118.9' - Fracture, 10 deg, smooth, undulating,	Ü	<u> </u>	_				
_	121.0			loose 119.05' - Fracture, 25 deg, smooth,	士	_ Limestone	-				
-			>10	undulating, loose	╁	 121.0-122.1' - grayish orange, (10YR 	-				
-			0 /	119.2' - Fracture, 15 deg, smooth, undulating, loose		7/4), fine grained, moderate HCl reaction, medium strong (R3), voids	-				
-				119.3-119.5' - Fracture zone, rough, undulating, to smooth and planar, fragments	Ħ	 <1/16" on 40% of surface, trace cavities to 3/8" diameter 	-				
-	R22-NQ			3/8"-1"	Ħ	predominately fossil casts/molds	-				
-	5 ft 22%	12		121.0-122.2' - Fracture zone, 0-90 deg, rough, undulating, fragments <3/16"-2"	Ħ	- No Recovery 122.1-126.0'	-				
-	22/0		NR	121.3-121.9' - Fracture, vertical, rough,	L	-	-				
125				undulating, dark gray staining, open to 1/16"	L	-	-				
-82.7				_	\vdash	_	-				
	126.0			-	\vdash		1				
			>10	126.0-126.6' - Fracture, 80 deg, rough, undulating, open to 1/16"		Limestone - 126.0-128.0' - moderate yellowish					
			- 10	126.3' - Fracture, 45 deg, rough, undulating,	厂	brown with light olive gray]				
_			>10	tight 126.6-128.0' - Fracture zone, 0-75 deg,	Ш	laminations 1/4" thick, (10YR 5/4 with 5Y 4/2), fine grained, moderate HCl					
_				smooth, planar, to rough and undulating,	Ш	reaction, medium strong (R3), voids	_				
-	R23-NQ 5 ft	18	4	fragments 3/8"-3" 128.3' - Fracture, 35 deg, rough, undulating,	Ь	<1/16" over 20% of surface trace cavities to 3/16", moderately	-				
_	86%			tight 128.4' - Fracture, 35 deg, rough, undulating,	\vdash	fossiliferous, trace organics 128.0-130.3' - light olive gray, (5Y	-				
			2	tight, intersects fracture at 128.3'	H	 5/2), fine grained, mild HCl reaction, 	-				
130 <u> </u>			2	128.5' - Fracture, 15 deg, smooth, undulating, open	H	medium strong (R3), voids over 20% of surface, few cavities to 3/16"					
-	404.0		NR	128.5-128.9' - Fracture, 60-70 deg, smooth, undulating, tight	Ħ	 predominately fossil casts/molds, moderately fossiliferous 	-				
-	131.0			129.25' - Fracture, 60 deg, rough, undulating,	Ħ	No Recovery 130.3-131.0'	-				
-			>10	tight . 129.4' - Fracture, 20 deg, rough, undulating,	H	Limestone 131.0-133.5' - Same as 128.0-33.5'	-				
-				tight to open to 3/8"	L	except less cavities to 3/16" diameter	-				
-			>10	130.0, 130.1' - Fractures (2), 30 deg, smooth, undulating, open, intersecting 130.1'	╙	-	=				
-	R24-NQ		0	131.3-131.6' - Fracture zone, up to 70 deg, rough, undulating, to smooth and undulating,		-					
	5 ft 50%	25		fragments 3/8"-1"		No Recovery 133.5-136.0'	1				
				131.9-132.2' - Fracture zone, 0-90 deg, rough, undulating, fragments 3/8"-1"	Д	_]				
135			NR	132.2' - Fracture, 25 deg, smooth, undulating, open	口	_	_				
-92.7 -				132.7' - Fracture, 50 deg, rough, undulating,	口	<u>-</u>]				
-	136.0			tight	上	Limentone	-				
-			>10	136.0-136.8' - Fracture, 60 deg, smooth, planar, loose	\vdash	Limestone - 136.0-139.0' - moderate yellowish					
-				-	F	brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium	-				
-			2	137.5' - Fracture, 75 deg, smooth, planar,	厈	 strong (R3), voids <1/16" on 20% of 	-				
-	R25-NQ			loose	岸	surface, moderately fossiliferous, trace molds to 3/8"x3/16", possible	-				
-	5 ft	38	0	137.65' - Fracture, 60 deg, smooth, planar, charcoal gray to black staining on 90-95% of	世	healed fractures at 136.4' and 136.7'					
-	60%			surface, loose	世	No Recovery 139.0-141.0'	-				
140				-	E	<u> </u>	-				
-97.7			NR		\vdash	_	-				
1	1				1		ı				

Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-17	SHEET	9	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	NIETHOD A	ND E	JUIPIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	asing		ORIENTATION: Vertical
WATER	LEVELS : 2.5	ft bg	s on 4	10/07 START : 4/9/2007 END : 4/	18/20	D7 LOGGER : A. Teal, N. Jarzynieck	ri, M. Faurote
<0.5	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING
표 등 등	25. 1. T.	(%) O	L N	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	7 5 1	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AN
PTF EVA	8 8 8 8 8	ΩØ	ACI R F	PLANARITY, INFILLING MATERIAL AND	MB(AND ROCK MASS	SMOOTHNESS, CAVING ROLL
SU	SHR	8	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC
-					┰	_	
_	141.0				╁┼	- 15	
			>10	141.25-142.7' - Fracture zone, up to 75 deg,	耳	Limestone - 141.0-144.6' - Same as 136.0-139.0'	
				rough to smooth, undulating, dark staining,	┰	except mainly light olive gray, (5Y	
				fragments <3/8"-3"		5/2), very fossiliferous below 142.0',	
_			>10		Ш	molds to 3/16"x3/8" on 5% of surface	
_	R26-NG)			╁	-	
-	5 ft	38	1	143.25' - Fracture, 45 deg, rough, planar, tight	世	-	
_	72%			ugitt	₩	-	
_			0		┰		
145 <u> </u>				_	╆┪	No Recovery 144.6-146.0'	
102.7			NR		\Box	-	
_	146.0				\perp	_	
						Limestone - 146.0-150.6' - Same as 136.0-139.0'	
			1	146.7' - Fracture, horizontal, rough,	\Box	except several healed fractures at	
_				undulating, open	Н	147.0-148.0', inclined 55 deg	
-			1	147.2' - Fracture, 55 deg, rough, undulating,	世	_	
-	R27-NC)		tight	₩	_	
_	5 ft	77	4	148.3-148.5' - Fractures (4), 30-70 deg,	-Ш	-	SC-7 collected at 148.5-
_	92%			rough, undulating, 3 fragments to 1-1/2", tight to 1/16" open	+	-	149.45'
_			4	149.45' - Fracture, 30 deg, rough, undulating,	\Box	-	
150				tight —	╨	_	
107.7			1	149.75, 149.8, 149.9' - Fractures (3), 20 deg,	₽	=	
	151.0		NR	rough, undulating, loose 150.6' - Fracture, 70 deg, rough, planar, tight	」口	No Recovery 150.6-151.0'	
			1		\Box	Limestone	
			1		\Box	 151.0-155.0' - Same as 136.0-139.0' except cavities from 3/16" diameter 	
				151.85' - Fracture, 75 deg, rough, planar, tight	ш	to 3/4"x1-3/16" on 15-20% of surface	
_			2	152.2' - Fracture, 25 deg, rough, undulating,	╨	 from 153.5-154.5' and 151.9-152.3', trace organics from 152.0-152.3' 	
-	R28-NC])		loose, organics on lower faces	世		
-	5 ft	63	1	152.3' - Fracture, 25 deg, rough, undulating, tight to open to 3/8"	+	-	
-	80%			153.2, 153.5' - Mechanical break (2)	口	_	
_			>10	153.8' - Fracture, 15 deg, rough, undulating, loose	┸	_	
155_				154.5-155.0' - Fracture zone, 0-75 deg, -	Д	No Bossess 455 0 450 0	
112.7 _			NR	rough, undulating, fragments 3/8"-1"	ш	No Recovery 155.0-156.0'	
	156.0				Н	_	
			>10	156.0-156.5, 157.0-157.35' - Fracture zone	二	Limestone	
			>10	(2), 0-60 deg, rough, undulating, brown staining on some fracture planes, fragments	Ж	 156.0-160.7' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, 	
_				to 1-1/2"	Ш	medium strong to strong (R3 to R4),	
-			>10		╁┤	 trace voids <1/16" except from 158.5-160.5' where voids present 	
-	R29-NG	l)			H	over 25% of surface, cavities to 9/16"	
_	5 ft	60	3		世	 diameter throughout core and 	
-	94%			158.8' - Fracture, 80 deg, rough, undulating,	柙	associated with healed fractures	
_			>10	tight 158.95-159.5' - Fracture zone, 20-80 deg,	\Box	<u>-</u>	
160_				rough, undulating, fragments to 3"	\bot	_	
-117.7				3, 3, 3	H		
		<u> </u>					



PROJECT NUMBER: BORING NUMBER:

338884.FL A-17

SHEET 10 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bg	s on 4	10/07 START : 4/9/2007 END :	4/18/20	D7 LOGGER : A. Teal, N. Jarzyniech	ki, M. Faurote
≥ □₽	(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	(%) 🛭	FOG	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E S S S S S S S S S S S S S S S S S S S	SECC	RO	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	. KME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0116	IL.	1		- O		
	161.0		NR	160.5' - Fracture, 30 deg, rough, undulating, tight at center, open to 3/8"	上	No Recovery 160.7-161.0'	
			1	light at center, open to 5/6		Limestone	
			'		1	 161.0-162.4' - moderate yellowish brown, (10YR 5/4), fine grained, mild 	1
-			- 10	161.9' - Fracture, 20 deg, rough, undulating, loose	\perp	to moderate HCl reaction, medium	1
			>10	162.0' - Fracture, 35 deg, rough, undulating,		 strong (R3), laminated bedding at 161.0-161.5', trace organics at 	1
_	R30-NQ			loose 162.4-162.7' - Fracture zone, rough,	\perp	162.0', voids <1/16" on 15% of	1
-	5 ft 84%	67	3	undulating, brown staining on some surfaces,	E	 surface grouped along bedding, trace cavities to 3/4" diameter 	1
-				fragments 3/16"-1-1/2" 163.0, 163.9' - Fractures (2), 45 deg, closed,	T	162.4-165.2' - light olive gray with	1
165			3	healed	+	 moderate yellowish brown, (5Y 5/2 with 10YR 5/4), fine grained, mild 	1
-122.7			0	163.6' - Fracture, 60 deg, rough, planar, open 164.7' - Fracture, 25 deg, rough, undulating,	T	HCl reaction, medium strong (R3),	
-	166.0		NR	loose	扛	 some cavities up to 1-9/16" oriented along healed fractures 	1
-	100.0			164.7-164.9' - Fracture zone, rough, undulating, small fragments	\pm	No Recovery 165.2-166.0'	
-			2	166.3, 166.4' - Fractures (2), 20 deg, smooth,	+	 Limestone 166.0-170.8' - moderate yellowish 	1 1
-				planar, tight	Ħ	brown and light olive gray, (10YR 5/4	1
-			3	167.55' - Fracture, 85 deg, smooth, planar,		 and 5Y 5/2), fine grained, mild HCl reaction, medium strong (R3), 	1 1
-	R32-NQ			tight	+	laminated bedding at 166.0-166.8'	1
-	5 ft	57	8	167.7' - Fracture, 20 deg, smooth, undulating, tight	+	 and 169.7-170.1' inclined 30-35 deg with voids <1/16" on 25% of surface, 	1
-	96%			167.85' - Fracture, 80 deg, smooth, planar,		trace cavities to 3/16"x1-3/4"	-
l			1	tight 168.05' - Fracture, 40 deg, smooth,	+	-	1
170_ -127.7				undulating, tight	\pm	-	Casing advanced to 110.0'
-			2	168.15' - Fracture, 25 deg, smooth, undulating, tight	+	-	end rock coring 4/12/07
-	171.0		NR	168.4-168.6' - Fracture zone, same as		- No Recovery 170.8-171.0'	04/17/07 13:10 resume
-			0	29.4-30.5' 168.85' - Fracture, 25 deg, rough, undulating,	+	Limestone 171.0-175.7' - pale olive to light olive,	coring -
-				loose	$-\Box$	 (10Y 6/2 to 5Y5/2), mild to moderate 	R31 Not recorded in field 13:35 casing advanced to
-			3	169.65, 170.1' - Fractures (2), 35 deg, rough, undulating, loose	+	HCI reaction, medium strong (R3), cavities to 1.2"x2.4"x3.6",	115.0'
-	Day NO			170.6' - Fracture, 50 deg, rough, undulating,	+	 fossiliferous (casts/molds) up to 	Corehole reamed from
_	R33-NQ 5 ft	88	2	loose 172.25' - Fracture, 45 deg, rough, flat,		10-15% of surface	115-171' begin coring at
-	94%			angular, dissolution break with healed 45 deg		-	171.0'
-			1	fractures 172.35, 172.8' - Fractures (2), 2-5 deg, rough	+	-	-
175 -132.7				173.25' - Mechanical break, 35 deg, smooth	\perp	_	D22: 10 minutes
-132./			0	174.0' - Fracture, 5-10 deg	上	-	R33: 10 minutes
-	176.0		NR		+	No Recovery 175.7-176.0'	M. Farmeta I. I. I. I.
-			3	176.3, 176.5, 176.8, 178.1, 178.25, 178.3,	F	Limestone - 176.0-178.9' - yellowish pale gray to	M. Faurote begins logging at 176.0'
_			Ľ	178.55, 178.9-179' - Fractures (8), these		pale olive, (5Y 7/2 to 10Y 6/2), fine to	<u> </u>
_			0	fractures are related to breccia clast separations and high angle fractures that	\perp	medium grained, mild HCl reaction, medium strong to strong (R3 to R4).	Heavy chatter at 176.0- 177.0'
I _				were partially healed	\perp	_ cavities to 1" on 15% of surface]
I _	R34-NQ 5 ft	43	10		\perp	associated with healed fracture traces, poorly fossiliferous	
	98%	73			上	_ (casts/molds), trace recrystallization	
I -			179-179.2, 179.3, 179.45, 179.8, 180.1,		_]	
180			10	180.15' - Mechanical break (6)			1
-137.7					+		R34: 8 minutes



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-17

SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 2.5	ft bg	s on 4	/10/07 START : 4/9/2007 END : 4/	18/200	D7 LOGGER : A. Teal, N. Jarzyniec	ki, M. Faurote
≥∩≘	(9)			DISCONTINUITIES	၂ ဥ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	(%) □	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
URF LEV	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	075	œ	2	THIORNESS, SOLA FISE STANDING, FIND THE HITTERS	S	- 178.9-180.9' - pale olive, (10Y 6/2),	
	181.0			_	Ħ	very fine grained, mild HCl reaction,	1
			NR.	- 181.25' - Fracture, 7 deg, smooth, planar,	Н	medium strong to strong (R3 to R4), 15% voids due to fossil	1
			2	minor iron oxide staining	Н	(casts/molds), cavities to 1" long by	1
-				181.95' - Fracture, 45 deg, rough, angular,	Ш	1/4"x1/2"	1
-			>10	solution expanded 182.55' - Fracture zone, fragments to		 No Recovery 180.9-181.0' Limestone 	1
-	R35-NQ			1"x1-1/2"	Н	181.0-184.25' - Same as	R35: 9 minutes
_	5 ft 84%	59	1	183.25' - Fracture, 45 deg, planar to slightly undulating, with some carbonate	Н	_ 178.9-181.0'	SC-8 collected at 183.25-
_				recrystallization	H	40.4.25.405.21. light brown to	184.2'
185			1		Н	 184.25-185.2' - light brown to medium brown, (5YR 5/6 to 5YR 	1
-142.7			0	184.8' - Fracture, rough, undulating, with — carbonate recrystallization on fracture	囯	4/4), fine grained, strong HCl	
-	186.0		NR	surface, break is at the base of a clast in	Ш	 reaction, medium strong (R3), containing very fine to fine grained 	1
-	100.0			breccia 186.0-187.0' - Fracture zone, moderate to	Ш	clasts with <10% fossil void space No Recovery 185.2-186.0'	1
-			>10	heavy iron oxide, multiple fracture	Н	Limestone	1
-			1	orientations -	Ħ	186.0-186.9' - medium brown to dark	1
-			· ·	187.25' - Fracture or mechanical break, very angular surface	Ħ	brown, (5YR 4/4 to 5YR 3/4), heavily iron-oxide stained	1
-	R36-NQ			_	Ш	186.9-187.6' - pale olive, (10Y 6/2), very fine grained, moderate HCl	1
-	5 ft 32%	0		-	H	reaction	1
-	0270		NR	-	Ш	No Recovery 187.6-191.0'	1
190			' ' '	-	ш	-	1
-147.7					Ш	_	R36: 18 minutes
-	191.0			-	H	-	1
-	101.0			191.0-192.0' - Fracture zone, multiple	Ħ	Limestone Fragments	1
_			>10	fractures, random orientations, fragments to -1"	Ħ	 191.0-192.0' - multiple rock fragments 	1
_				· -	Ш	No Recovery 192.0-196.0'	1
-				-	Н	-	1
_	R37-NQ			-	Ш	=	1
_	5 ft 20%	0		-	ш	=	1
			NR	-	Ш		1
195				-	\mathbb{H}		1
-152.7				_	Ħ	_	R37: 11 minutes
	196.0			-	H		1
1 7				400 01 Frankling 00 description 1 1 2	Ш	-	1
			2	196.3' - Fracture, 20 deg, rough, undulating -	Н	-	1
				196.95' - Fracture, 40 deg, rough, undulating,	Ш	-	1
			3	<5% recrystallization on surface 197.3' - Fracture, 30 deg, rough, minor	Ш	-	1
	R38-NQ			recrystallization	Ш		1
	5 ft 86%	67	2	197.65-197.75' - Fracture zone, fragments - <1", recrystallization on surfaces, fragments	\mathbb{H}		1
	,			may be from cavity break down 198,5-198,8' - Fracture zone or bedding	Ħ		1
200			1	plane, 1-3 deg, smooth, planar, minor	Ш		1
-157.7			0	recrystallization, fragments <1"	H		R38: 4 minutes
			l				<u> </u>



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-17 SHEET 12 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NQ tools, HW casing

00111110	INICTITIOD AL	ND EC	JUIPIV	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW o	casing	9		ORIENTATION : Vertical						
WATER	LEVELS: 2.5	ft bg	s on 4		/18/20	007	LOGGER : A. Teal, N. Jarzynieck							
≥∩≘	_ @ .			DISCONTINUITIES	၂ ဖွ		LITHOLOGY	COMMENTS						
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.						
-			NR	199.05' - Fracture, 1-5 deg, rough, undulating	╁		imestone	-						
- -	201.0		>10	201.1-201.2' - Fracture zone, intersecting fractures, open <1/4"	丰	- m - (5	96.0-198.4' - dusky yellow with noderate brown and dusky brown, sY 6/4 with 5YR 6/4 and 5YR 2/2),	N. Jarzyniecki begins logging at 201.0' -						
-			4	201.85' - Mechanical break, 10 deg 202.15, 202.65' - Fractures (2), rough,	Ē	re	ery fine grained, moderate HCl eaction, medium strong to strong R3 to R4), infill along bedding or	-						
_	R39-NQ 5 ft	54	0	undulating, open to 1/2" 202.3, 204.65' - Bedding plane, 40 deg, rough, undulating, open to 1/2"	片	_ de	ubsidence planes inclined 65-80 eg, organic material as iscontinuous, lenticular to planar	-						
_	76%	•	54	01	2	202.95' - Bedding plane, 10 deg, smooth to rough, undulating, open to 1/4" 204.1' - Mechanical break	上	to	ccumulations, 196.9-198.4 cavities o 1"x1/2" on 35% of surface, trace crystallized infill of cavities, trace	SC-9 collected at 203.5- 204.4' - 204.0-205.0' hard drilling				
205 <u> </u>						NR	204.8' - Fracture, 70-80 deg, smooth, – undulating, open, organic staining	healed fractures 198.4-198.8' - pale brown, (5YR 5/2), very fine grained, mild to moderate						
-	206.0			206-206.4, 209.05-209.9' - Fracture zone (2),	\blacksquare	H st	CI reaction, medium strong to crong (R3 to R4), laminated edding, irregular discontinuous	-						
_			20	organic staining, intersecting fractures, open <1/4" 206.6' - Bedding plane, 30 deg, smooth,	Ħ	co	ontact at high angle, and healed 98.8-200.3' - yellowish gray, (5Y	- Chatter throughout						
-	R40-NG		2	undulating, tight 207.55' - Bedding plane, <5 deg, smooth, undulating	Ħ	st (F	(2), very fine grained, moderate to trong HCl reaction, medium strong R3), highly fossiliferous	-						
-	5 ft 78%	37	1	207.8' - Fracture, 40-45 deg, rough, stepped, open to 1/2" 208.8' - Fracture, 65 deg, rough, undulating,		fo N	casts/molds), 20% voids related to ossil molds and casts o Recovery 200.3-201.0'	- -						
210 -167.7			>10	organic staining, open	上	20	imestone 01.0-204.8' - yellowish gray to usky yellowish, (5Y 8/1 to 5Y 6/4),	- 						
-107.7	211.0		NR		井	- ve	ery fine grained, weak to medium crong (R2 to R3), voids <1/16" on 5% of surface and cavities to 1/2"	-						
_			>10	211.0-211.5' - Fracture zone, rough, undulating, some organic staining, open to 1/4"	Ħ	or 10	n 15% of surface, organics up to 0% of surface except 201.7-201.9' nd 204.25-204.4' which have 50%	Chatter throughout R41						
_									0	212.6' - Mechanical break	Ė	ar fo	nd 30% laminar organics, ssiliferous o Recovery 204.8-206.0'	-
_	R41-NQ 5 ft 60%	45	3	213.4, 213.5' - Bedding plane (2), <10 deg, smooth, undulating, open to 1/4"	\pm	Li 20	imestone 06.0-209.9' - light gray from 06.0-208.1' to dusky yellow below,	-						
215				213.9' - Bedding plane, 10 deg, rough, undulating, organic staining, open to 1/4"	Ħ] (N m	vary fine grained, N7 to 5Y 6/4), very fine grained, ledium strong (R3), trace voids to 1/16" except from 208.0-209.0'	-						
-172.7 -	216.0		NR	_	Ē	vo fo	oids on 30-50% of surface, ossiliferous (casts/molds)	-						
_			1	216.45, 218.6, 218.85, 219.35, 219.45,	#	Li - 2	o Recovery 209.9-211.0' imestone 11.0-213.1' - dusky yellow with	- -						
- -			0	219.6, 219.7, 220.75' - Bedding plane (7), 5-10 deg, rough, undulating, open to 1/4" 217.4' - Bedding plane, 25 deg, rough,	Ħ	- wi gr	ellowish gray and light gray, (5Y 6/4 ith 5Y 7/2 and N7), very fine rained, weak to medium strong (R2	- -						
- -	R42-NQ 5 ft	73	3	undulating, open to 1/4"	E	Su th	0 R3), voids <1/16" on up to 50% of urface, fossiliferous, with fragments nat are poorly fossiliferous with	-						
- 220_	98%		5	218.9' - Bedding plane, rough to smooth, planar, organic staining, open to 1/4"	<u> </u>	 <15% voids to <1/16" 213.1-213.5' - yellowish gray, (5Y 7/2), very fine grained, trace voids <1/16", poorly fossiliferous, organic 		- - -						
-177.7						la	minations throughout							



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-17 SHEET 13 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IENT : CIVIE 55 5/N 510025, MILLI TOTALLY, INQ 10015, MIV C			ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bg	s on 4/		18/20 	·	
ŞQ₽	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	20	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	Ä, ANĽ	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A CE	J.H.	(%) □	<u> </u> 28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FFF	ORE ING	Ω	AC R	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	CC LE RE	ď	F 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	2.10. 0, 1201 11200210, 2.0.
-			1	220.3' - Mechanical break	Ш	- 213.5-214.0' - dusky yellow with pale	-
-	221.0		NR.	-	+	olive, (5Y 6/4 with 10YR 6/2), weak to medium strong (R2 to R3), voids	10:50 chatter at 223.0-
_			1	221.35' - Fracture, 45 deg, rough, undulating,	\vdash	 <1/16" on up to 50% of surface, 	224.0' –
l _				open to 1/8"		fossiliferous	_
			. 10	221.9, 223.4' - Mechanical break		No Recovery 214.0-216.0' Limestone	
-			>10	222.35-222.5, 222.8-222.9, 224.0-225.3' - Fracture zone (3), rough, undulating, organic		216.0-220.9' - Same as 211.0-213.1'	1
-	R43-NQ			staining, open to <1/8"	Ь.	except dusky yellow, (5Y 6/4),	1
-	5 ft	48	1	222.7' - Fracture, 85 deg, smooth, undulating,		 medium strong (R3), voids to 1/8" on up to 70% of surface, highly 	-
_	86%			organic staining, open to 1/2" 223.65' - Bedding plane, <5 deg, smooth,	₩	fossiliferous (casts) decreasing with	-
_			>10	planar, open to 1/8"	\perp	_ depth, clasts 1/2"-3" diameter,	-
225_				-	\vdash	laminated organics from 219.0-219.65'	_
-182 . 7			>10	225.3' - Fracture zone, rough, undulating,	Ľ	_ No Recovery 220.9-221.0']
	226.0		NR	organic staining, intersecting fractures, open	\vdash	Limestone	1
-				to <1/8"	╙	221.0-222.35' - dusky yellow with yellowish gray infill, (5Y 6/4 with 5Y] 1
-			2	226.55' - Bedding plane or mechanical break,	╁	7/2), fine grained, voids <1/16"	1
-				30 deg, rough, undulating to stepped		15-50% of surface, very fossiliferous	-
-			3	226.95' - Bedding plane, 15 deg, smooth, undulating, open to 1/4"	₽	_ (casts/ molds) 222.35-223.7' - dusky yellow , very	-
_	DAANO			227.4' - Bedding plane, 15 deg, rough,		pale orange and pale olive, (5Y 6/4,	SC 10 cells stad at 227.0
_	R44-NQ 5 ft	48	>10	undulating, open to 1/4"	╁┯	10YR 8/2 and 10Y 6/2), trace voids	SC-10 collected at 227.9- 228.8'
_	64%			227.8' - Bedding plane, 15 deg, rough, undulating, tight		<1/16", poorly fossiliferous 223.7-225.3' - Same as 216.0-220.9' 	
			>10	227.9' - Bedding plane, 15 deg, rough,		except weak to medium strong (R2 to	
230				undulating, open to 1/2"	Ш	R3)	1
-187.7			NR	228.8' - Fracture zone, intersecting fractures, — open to 1/4"	T	No Recovery 225.3-226.0' Limestone	1
-	004.0			open to 1/4	F	226.0-229.2' - Same as 216.0-220.9'	1
-	231.0			231.0-231.3, 232.1-232.4, 232.75-233.3' -		- No Recovery 229.2-231.0'	-
-			>10	Fracture zone (3), rough, undulating,		Limestone 231.0-232.1' - Same as 216.0-220.9'	-
_				intersecting fractures, open to 1/4"	\perp	except medium strong (R3),	_
			>10	231.5' - Bedding plane, 10 deg, smooth, undulating, open to 1/4"	┢	laminations from 231.8'-231.9'	_
			10	231.55, 231.66' - Fractures (2), 60 deg,		232.1-233.3' - pale olive, (10Y 6/2), - fine grained, very weak to weak (R1	
_	R45-NQ		>10	smooth, undulating, open to 1/4"	\vdash	to R2), voids <1/16" on 50% of	1
_	5 ft 46%	10		231.75' - Mechanical break 232.5' - Fracture, 60 deg, smooth, undulating,	仜	surface, very fossiliferous	1
-	7070			open to 1/4"	╁	No Recovery 233.3-236.0'	
-			NR	-	Ė	-	-
235 <u>-</u> -192.7				_	╀	_	-
-				-	\Box	-	-
_	236.0			_	一	- 	_
			>10	236.35-237.9' - Fracture zone, some organic	广	Limestone - 236.0-237.9' - Same as 232.1-233.3'	
			- 10	staining, intersecting fractures, open to 1/4"	\vdash	except pale olive to dusky yellow and	1
_					Ш	light gray, (10Y 6/2 to 5Y 6/4, and] 1
-			>10	-	t	 N7), very weak to medium strong (R1 to R3), trace organics and voids 	1
-	R46-NQ			-	厂	10 R3), trace organics and voids <1/16", poorly fossiliferous, light gray	-
-	5 ft	0		-	世	 laminations at 236.75-237.1' and 	-
-	38%			-	\vdash	237.8-237.85' No Recovery 237.9-241.0'	-
_			NR	_	\Box	- 140 Necovery 201.3-241.0	_
240_				_	\vdash		
-197.7					Ë		
					1		
					1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-17	SHEET	14	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW ca			ORIENTATION: Vertical
WATER	LEVELS : 2.5	ft bgs	s on 4/		8/20		
⊋□≨	<u> </u>			DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ELEVATION (ff) CORE RUN, LENGTH, AND RECOVERY (%) R Q D (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B C A T I	SFR	D (%)	F.00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
H.F.F.	NG- CO	αD	AC.	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SC	SHR	S.	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	BROFG, FEOT REGGETG, ETG.
_				-	\Box	-	-
_	241.0			244 0 244 65 244 4 244 75! Freetire Tone	ЬT	Limontono	_
_			>10	241.0-241.65, 244.4-244.75' - Fracture zone (2), open to 1/4", intersecting fractures -	H	Limestone - 241.0-241.65' - Same as	_
			. •		H	236.0-237.9' except no laminations	_
				241.9' 243.9' - Bedding plane or mechanical break (2), 10 deg, rough, undulating, tight _		241.65-243.6' - Same as	
			1	242.4' - Fracture, 60 deg, rough, undulating,		- 216.0-220.9'	_
_	R47-NQ			tight -	Н	-	_
-	5 ft	53	5	243.1' - Bedding plane or mechanical break, _ 10 deg, rough, undulating, open to 1/4"		_ 243.6-245.0' - pale olive, (10Y 6/2),	-
_	80%			243.4, 243.6' - Bedding plane (2), 10-15 deg,	Н	very fine grained, weak (R2), poorly	_
_			>10	rough, undulating, open to 1/4" fossiliferous			_
245_				243.8' - Bedding plane or mechanical break,		L.,	_
-202.7			NR		Ľ	No Recovery 245.0-246.0'	
	246.0		IVIX		Ш		
				246.0-246.4, 246.5-246.7, 247.6-247.7' -		Limestone	14:38 end drilling
_			>10	Fracture zone (3), intersecting fractures, - open to 1/8"	Н	- 246.0-247.7' - Same as 243.6-245.0'	Note: 4/19/07 grouted hole, used 59 bags guickcrete, 1
-				- Open to 1/6		-	bag hole plug
-			10	-	⊢	-	-
_	5,0,10			-	Ш	No Recovery 247.7-251.0'	_
	R48-NQ 5 ft	13		_	⊢	_	_
	34%			_			
			NR		Ш		
250				-	Ш	-	_
-207.7					Н	_	
-				-		-	-
-	251.0				H	Bottom of Boring at 251.0 ft bgs on	
-				-	l	- 4/18/2007	_
_				-	Į į	-	_
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-18	SHEET	1	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

			gs on 3/25		START : 2/24/2007	END: 3/8/2007		· R	Gomez, C. LeBlanc
	LLVLLO	. 2.0 10 0	go 011 0/ <u>E</u>	STANDARD		SOIL DESCRIPTION	LOGGE		COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				100	
L BEL		RECOVE	ERY (ft)	TEOTTIEGGETG	SOIL NAME MOISTLIRE	E, USCS GROUP SYMBO CONTENT, RELATIVE D	L, COLOR, ENSITY OR	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE, N	IINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
42.3									
- - -	3.5						- - - -		Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08) Soil relogged by J. Schaffer Rock relogged by C. Dougherty Water levels in boring not recorded
_	0.0				Silty Sand (SM)				
5 37.3	5.0	0.4	SS-1	2-2-1 (3)	3.5-3.9' - grayisl no HCl reaction	h orange, (10YR 7/4), w , fine silica sand, 25% r	vet, very loose, /- nonplastic fines /		
- -							- - -		
- -	8.5				Clayey Sand (S	(C)	- -		
- 10 32.3	10.0	0.9	SS-2	2-2-3 (5)	8.5-9.4' - light b	luish gray, (5B 7/1), wet ica sand, 40% medium	, loose, no HCl - plastic fines		
- - - - -	13.5						- - - - -		
- -		1.1	SS-3	3-3-5 (8)	Clayey Sand (S 13.5-14.1' - San Poorly Graded	ne as 8.5-9.4'	to N8) wet		
15 27.3 -	15.0				│ \ loose, no HCl re	eaction, fine silica sand, , trace black minerals	trace		
-							-		
-	18.5				No Recovery 18	2 5 20 0'	-		
- 20	20.0	0.0	SS-4	0-0-0 (0)	No necovery 18	J.J-2U.U	-		
	20.0								



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	Δ-18	SHEET	2	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

WATER	LEVELS	: 2.0 ft bo	gs on 3/2	5/07 5	START : 2/24/2007 END : 3/8/2007 LOGGE	R : I	R. Gomez, C. LeBlanc
>				STANDARD	SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCS CROUP SYMPOL COLOR		DEPTH OF CASING DRILLING DATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
URF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	INSTRUMENTATION
22.3				(14)			
-						1	-
-						1	-
-						1	1
-						1	1
-						1	1
-	23.5					1	1
					Fat Clay (CH) 23.5-24.2' - light to medium light gray, (N7 to N6), wet,		
		1.5	SS-5	0-0-0 (0)	\setminus very soft, high plasticity, no dilatancy, no HCl reaction $/$		
25	25.0			(-)	Sandy Lean Clay (CL) 24.2-25.0' - very light to light gray, (N8 to N7), wet, 7		_
17.3					very soft, medium plasticity, no to slow dilatancy, no	1	_
-					HCl reaction, 41% fine silica sand	1	_
-						-	-
-						4	-
-						┨	-
-	00.5					1	-
-	28.5 28.9	0.4	SS-6	50/5	Silt With Sand (ML)	+	,
-				(50/5")	28.5-28.9' - grayish orange, (10YR 7/4), moist to wet, hard, nonplastic, very rapid dilatancy, mild to	Ŧ	-
30					moderate HCl reaction, 20% fine to medium sand,	1	1
12.3					trace organics in laminar lenses, all carbonate	1	Change from 3-1/2" drag bit to 3-3/8" tricone
-						1	roller bit at 30.0'
]	
]	
_							<u> </u>
_						1	_
-	33.5				Sandy Silt (ML)	╁,	귀 -
-		, -	00.7	17-29-65	33.5-35.0' - Same as 28.5-29.0' except moderate	$\ \ $	-
-		1.5	SS-7	(94)	yellowish brown, (10YR 5/4), moist, rapid dilatancy, 25-30% fine to medium sand, all carbonate	$\ \ $	-
35 7.3	35.0					╨	4 -
-						1	-
-						1	1
-						1	1
-						1	1
						1	1
	38. <u>5</u> 38.7					1	Grinding at 38.0'
	38.7	0.2	SS-8	50/2.5 (50/2.5") /	Limestone Fragments 38.5-38.7' - moderate to strong HCl reaction, coarse	T	-
_				(00/2.0)	sand to fine gravel, fine grained, <1/16" voids	1	
40						\bot	
	l						



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	l Δ-18	SHEET	3	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

WATER	/ATER LEVELS : 2.0 ft bgs on 3/25/07										
				STANDARD	SOIL DESCRIPTION	ű	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCO COCUD CVAROU. COLOR	SYMBOLIC LOG	DEDTIL OF CACING POUL INC DATE				
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	30 LK	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
EPT URF LEV			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	XME	INSTRUMENTATION				
2.3				(N)		0)	Moderate grinding				
-					-	1	-				
-					-	1	1				
-					-	1	1				
-					-	1	1				
-					-	1	Driller's Remark: Clay, softer				
	43.5					<u> </u>]				
_				7-9-61	Silt With Sand (ML) 43.5-44.1' - medium dark gray, (N4), moist to wet,		_				
_		0.6	SS-9	(70)	hard nonplastic to low plasticity, rapid dilatancy		_				
45 <u> </u>	45.0				moderate HCl reaction, 25% fine to medium silica sand, trace organics, all carbonate, organics in SS-9	1	Set LIM agains to 20.0'				
-2.7					appear to be grass	1	Set HW casing to 30.0'				
-					-	┨	-				
-					-	ł	-				
_					-	1	1				
_					-	1	1				
_	48.5				-	1	1				
					Silt With Sand (ML) 48.5-49.0' - Same as 43.5-44.1']				
		1.3	SS-10	14-38-43 (81)	Sandy Silt (ML)						
50	50.0			. ,	49.0-49.8' - dark yellowish brown, (10YR 4/2), wet, hard, nonplastic, rapid dilatancy, mild to moderate	₩					
-7.7 -					HCl reaction, 43% fine to coarse sand, 3/8" thick clayey seams, all carbonate	1					
-					clayey seams, all carbonate	1	-				
_					-	-	-				
-					-	1	-				
-					-	1	1				
-	53.5				-	1	1				
	53.9	0.4	SS-11	50/5 (50/5")	Sandy Silt (ML)	Ш	1				
				(30/5)	organics]				
55 <u>-</u> 12.7						1					
-12./					_	1	Trip out 3" casing				
-					<u>-</u>	-	-				
-					-	1	-				
-					-	1	-				
-					-	1	-				
-	58.5				-	1					
-	58.8	0.2	SS-12	50/4		ш	1				
-				(50/4")	[]	1	1				
60				_							
1						1					



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-18	CHEET	4 OF 11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

WATER	NATER LEVELS : 2.0 ft bgs on 3/25/07										
				STANDARD	SOIL DESCRIPTION COMMENTS						
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
H BE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND						
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY						
-17.7				, ,	Silt With Sand (ML) Circulation loss at 60.0'						
-					58.5-58.7' - moderate yellowish brown, (10YR 5/4), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 15% fine to medium sand, 10% organics in						
					reaction, 15% fine to medium sand, 10% organics in laminar beds						
l _					-						
-					_						
-	-										
-	63.5 63.8	0.3	SS-13	50/4	Silt With Sand (ML)						
-			00 10	(50/4")	63.5-63.8' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moist, hard,						
	_				I ∖nonplastic, rapid dilatancy, moderate HCl reaction. / I I I						
65 <u> </u>					24% fine to medium sand, all carbonate — — —						
-	-				Driller's Remark: Hard drilling at 65.5'						
-					1 1						
]						
_											
_					<u> </u>						
-	68.5 68.8	0.2	00.14	F0/0	- Cit (MIL)						
-	00.0	0.2	SS-14	50/3 (50/3")	68.5-68.65' - Same as 63.5-63.8' except 10-15%						
					\coarse sand to fine gravel-sized limestone in \ - \ \left						
70 <u> </u>					<u></u>						
-					<u> </u>						
-	-				†						
_					1 1						
] [
_					<u> </u>						
-	73.5 73.7	0.0	00.45	F0/0	No December 70 5 70 7						
-		0.0	SS-15)	50/2 (50/2")	No Recovery 73.5-73.7'						
75 <u> </u>											
-					<u> </u>						
-	-				<u> </u>						
-	1										
-]				1 1						
] [
-	78.5										
-				53-50-39							
-		1.2	SS-16	(89)	<u>_</u>						
80	80.0										



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-1 8	SHEET	5	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

WATER	LEVELS	: 2.0 ft bo	gs on 3/25	5/07 S	START : 2/24/2007 END : 3/8/2007 LOGG			R : R. Gomez, C. LeBlanc				
				STANDARD	SOIL DESCRIPTION		g	COMMENTS				
LOW AND	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG					
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVERY (ft)			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
EPT JRF/			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	'	YMB	INSTRUMENTATION				
-37.7				(N)	│ Silty Sand With Gravel (SM)		S					
-					78.5-79.7' - moderate yellowish brown, (10YR 5/4), wet, very dense, mild to moderate HCl reaction, fine	/-		-				
-					wet, very dense, mild to moderate HCl reaction, fine to coarse carbonate sand, 20% nonplastic fines,	•		-				
-					35-40% fine to coarse gravel-sized limestone			-				
-						-		-				
-						-		-				
-	00 E					-		-				
-	83.5				Silty Sand With Gravel (SM)		ПТ	-				
-		1.3	SS-17	15-11-34	83.5-84.8' - Same as 78.5-79.7' except black organi in laminar beds from 84.6-84.8'	ics -		-				
95	85.0		00	(45)	iii lailiillai beus iloili 64.0-64.6			-				
85 <u> </u>	65.0							-				
-						-		1				
-						-		1				
_						1		1				
-	88.5					1		HW casing set to 30.0', set NW casing to				
-		0.6	SS-18	22-52/4	Silty Sand With Gravel (SM) 88.5-89.1' - Same as 83.5-84.8'		Ш	55.0'				
	89.3	0.0	00 10	(74/10")		-	Ш					
					Begin Rock Coring at 88.5 ft bgs See the next sheet for the rock core log							
					Gee the flext sheet for the fock core log							
90								_				
-47.7								_				
_						_		_				
_						4		_				
_						-		-				
_						-		-				
-						-		-				
-						-		-				
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95 <u> </u>						\dashv		-				
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						1		1				
						1		1				
100												
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-18	SHEET	6	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing

00111110	WETTIODA	VD L	ZOII IV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, NW/F	IVV Ca	Sili 19	ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bg	s on 3	/25/07 START : 2/24/2007 END : 3/	8/2007	7 LOGGER : R. Gomez, C. LeBland	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			•	SYMBOLIC LOG		
N S	ΣΑΣ	_	ZES T	DESCRIPTION	CL	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	S F, A	Q D (%)	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E F ≯	#50 850	Q	AC.	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
吕S믑	잉필쀲	æ	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	88.5				т	Limestone	Core run R0-NQ advanced
-			1	88.7' - Fracture, horizontal, rough, undulating	\Box	- 88.5-90.0' - dusky yellow, (5Y 6/4),	88.5-91.0' to set 5-feet
I _	R0-NQ				Н	fine grained, moderate to strong HCI	stroke for remainder of
90	2.5 ft	47	1	20.01.5	Ш	reaction, weak to medium strong (R2	borehole
-47.7	60%			89.8' - Fracture, horizontal, rough, undulating, — break is along plan of 1-3/16" clam shell		— to R3), 80% coverage of 1/16" voids	SC-1 collected at 89.1-
-			NR	fossil	\vdash	on surface, few larger 3/16" voids near lower end of run, moderately	89.8' R0: 4 minutes
l _	91.0			103311	Н	- fossiliferous (casts), lignite disk 1/8"	
						thick, silty matrix when grains broken	2/25/08 08:00 Begin
I -			1	·	ш	down	inserting NQ rods
-				91.7' - Fracture, 25 deg, rough, undulating,	$\vdash \vdash \vdash$	No Recovery 90.0-91.0'	-
I -			1	3/16" open, semi-tight		Limestone	_
				02.91 Fracture horizontal amanth	ш	91.0-96.0' - Same as 88.7-89.0'	
-	R1-NQ			92.8' - Fracture, horizontal, smooth, undulating, open	Н	 except more abundant cavities (up to 9/16") from 93.5-94.5', cavities 	-
-	5 ft	75	0	andulating, open		appear to be fossil molds, some	-
I -	100%				Ш	small (1/16"x1/8") fragments of dark	
				94.0' - Fractures, 30-50 deg, multiple	\vdash	organic material from 94.5-96.0'	Driller's Remark: Loss of
95			>10	fractures	Ħ	_	circulation between 94.0- 96.0'
-52.7				_	ш		R1: 14 minutes
			2	95.4' - Fractures (2), 45 deg, almost	Н	_	-
	96.0		-	perpendicular, one is smooth and undulating			
_				with some dark staining, other is rough and	Ш	Limestone	<u> </u>
-			>10	undulating with no staining	Н	- 96.0-97.3' - yellowish gray with pale	-
_			> 10	96.0-97.3' - Fractures, 0-90 deg, rough,		olive (20%), (5Y 7/2 with 10 6/2), fine	-
_			>10	undulating, slightly weathered, 3/16" relief,		grained, moderate to strong HCl reaction, weak (R2), 50-60%	_
				open	Н	coverage of 1/16" voids on surface,	
-	R2-NQ					areas with voids mix irregularly with	-
-	5 ft	0			ш	 areas without voids, moderately 	-
l _	26%				Н	fossiliferous, few voids >1/16"	
			NR			No Recovery 97.3-101.0'	
100				-	ш		<u> </u>
-57.7				_	+		R2: 7 minutes
_						_	-
	101.0				Ш	<u></u>	
_				101.0-102.8' - Fractures, 0-45 deg, rough,	Н	Limestone	· ·
1 -			>10	undulating, up to 3/16" relief, open, one 2"	口	- 101.0-102.0' - Same as 96.0-97.3'	-
I -				fragment shows coring marks in two different	ш	except up to 20% voids, 6-7	Drillaria Damarici I
I _			>10	directions (at 101.9'), fracture at 102.1' is moderately tight and 30% rough and	Н	gastropod casts up to 3/16" - 102.0-102.3' - dusky yellow, (5Y 6/4),	Driller's Remark: Low recovery possibly from
1 -			<u> </u>	undulating		fine grained, moderate to strong HCl	losing inner core from
I -	R3-NQ				ш	reaction, weak (R2), 85% coverage	broken pieces during
-	5 ft	17			\vdash	of 1/16" voids on surface	drilling actions -
I -	36%			_	ഥ	102.3-102.8' - light olive gray, (5Y	Drilling head appears loose
			NR		Ш	5/2), fine grained, moderate to strong	during coring causing an
105			'''`	-	Н	 HCl reaction, 30% coverage of 1/16" voids on surface 	eccentric advancement, - breaking up rock
105 -62.7				_		No Recovery 102.8-106.0'	R3: 11 minutes
					ш	-	13. I i illillutes
	106.0				Н		
1 -					Ш		·
-			>10	106.3-107.0' - Fractures, 0-60 deg, rough,	Ш	_	-
-				undulating, fragments range from 3/16" to	H	_	-
			5	1-1/2", open 107.0-107.4' - Fracture, vertical, rough,			
I -				undulating, tight	Ш		· ·
-	R4-NQ			5/-5 -	H	_	·
_					F		-
I					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-18 SHEET 7 OF 11

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing

				1EINT : CIVIE 33 3/14 3 10023, Midd Totally, NQ 10013, 1444/1		- 9	ORIENTATION: Vertical
WATER	LEVELS : 2.0	ft bg	s on 3/	/25/07 START : 2/24/2007 END : 3/	8/200	LOGGER : R. Gomez, C. LeBland	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	F00	DOOK TYPE COLOR	
NO NO NO	N A Y	(9)	FRACTURES PER FOOT	BEOOK! HOW	SYMBOLIC	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AHE	IN THE	(%) Q	ΞĞ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F 문 공		Ø	\X IR	PLANARITY, INFILLING MATERIAL AND	ğ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E		ď	# #	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
	5 ft	35	2	107.4, 107.7, 107.8, 107.10' - Fractures (4),		Limestone	
-	100%			0-20 deg, rough, undulating, open	Н	 106.0-111.0' - yellowish gray, (5Y 	-
_			2	108.3' - Fracture, 10 deg, rough, undulating,	Н	7/2), fine grained, moderate to strong	-
110				open up to 3/16" 108.8' - Fracture, 60 deg, rough, undulating, —		HCI reaction, weak (R2), 90% — coverage of 1/16" voids on surface,	
-67.7				tight	Н	Coverage of 1716 Volds of Sulface, 5% coverage of 3/16" fossil molds	R4: 10 minutes
_			2	109.2' - Fracture, 45 deg, rough, undulating,	+	on surface, particularly in top half of	-
_	111.0			open up to 1/16"		 section, some very small fragments 	_
			4	109.7' - Fracture, 10 deg, rough, undulating,	Н	of organic material below 110.0'	
			1	open	Н	111.0-116.0' - Same as 106.0-111.0'	SC-2 collected at 111.55-
-				110.6' - Fracture, 65 deg, rough, undulating,	Ш	except mild to moderate HCI	112.35'
-			3	tight 110.8' - Fracture, 10 deg, rough, undulating,	\Box	reaction, moderately fossiliferous from 112.0-114.0', 1/16" voids-molds	-
				open to 1/16"	Н		
	R5-NQ			111.2' - Fracture, 45 deg, smooth, undulating,	Ш]
-	5 ft	75	2	dark staining on 60%	口	_	-
-	100%			112.5, 112.7, 112.8' - Fractures (3), 0-45 deg,	$\vdash\vdash$	_	-
			0	rough, undulating, open	Н		
115			ا ا	113.2, 113.9' - Fractures (2), horizontal,	\Box]
-72.7				rough, undulating, 3/16" relief, open 113.8' - Mechanical break	ш		R5: Run time not recorded —
-			2	115.8 - Mechanical break 115.2' - Fracture, horizontal, rough,	廾	-	-
	116.0			undulating, open	口	_	
				115.7' - Mechanical break, rounded ends	ш	Limestone	
1 7]		2	116.4' - Fracture, 60 deg, rough, undulating,	H	- 116.0-118.0' - Same as 111.0-116.0'	1
-				tight to 1/16" open	口	-	-
			1	116.9' - Fracture, 5 deg, smooth, undulating,	ш	_	_
			'	open	Н		
	R6-NQ			117.8' - Fracture or mechanical break, 5 deg, rough, undulating, tight to open 1/16"	\Box	118.0-121.0' - light olive gray, (5Y	1
-	5 ft	68	4	118.1, 118.9' - Fractures (2), horizontal,	₽₽	 5/2), fine grained, moderate to strong 	-
-	100%			smooth, undulating, dark staining, open	H	HCl reaction, weak (R2), fine grain,	_
				118.3, 118.5' - Fractures or mechanical break		50-60% coverage of 1/16" voids on	
120			1	(2), 10 deg and 20 deg, rough, undulating,	Ш	 surface, few larger voids <1/16", voids are fossil casts]
-77.7				tight —	\Box		R6: Run time not recorded
_			3	119.7' - Fracture or mechanical break, 10 deg, rough, undulating, tight to open 1/16"	♬	<u>-</u>	- 10. 10.1 (
	121.0			120.1-120.4' - Fractures, 0-45 deg, dark	Ш	_	
1 7				staining at 120.4', open	Н	Limestone	SC-3 collected at 121.0-
-			1	J /	口	- 121.0-121.9' - yellowish gray, (5Y	121.9' -
-				121.9' - Fracture, horizontal, rough,	Ш	7/2), fine grained, moderate HCl	From 100 0 105 01
			>10	undulating, rounded surface, open	Н	reaction, <30% coverage of <1/16" - voids on surface, poorly fossiliferous	From 122.0-125.0' coring increased with loss of
1 7			- 10	122.0-122.4' - Fractures, 0-90 deg, rough,	Ш	121.9-122.5' - yellowish gray, (5Y	circulation, possibly a void
-	R7-NQ			undulating, open	Ш	7/2), fine grained, strong HCl	or unconsolidated sands
-	5 ft	18		122.7' - Fracture or mechanical break, 20	++	 reaction, very weak to weak (R1 to 	Lack of recovery may have -
	40%			deg, rough, undulating, open to 1/16"		R2), 85% coverage of <1/16" voids	occurred from 122.0-125.0'
			l		Ш	on surface, remainder is larger 3/8"	based upon a drop in the
405			NR	•	H	 cavities, moderately fossiliferous, grades into below 	drilling head that stopped – at 125.0' followed by hard
125_ -82.7				_	世	grades into below 122.5-123.0' - light olive gray, (5Y	drilling
JZ.,					Ш	- 5/2), fine grained, mild to moderate	Core barrel having trouble –
	126.0				$\vdash\vdash$	HCl reaction, weak (R2), 90%	pulling out of casing
]					Ш	coverage of 1/16" voids on surface,	Inner/outer core barrels
-			4	126.3-126.5' - Fractures, 0-45 deg, open,	Ш	moderately fossiliferous	lodged in borehole –
_				fragments up to 1-1/2"	$\vdash\vdash$	No Recovery 123.0-126.0'	R7: Run time not recorded
				126.6' - Fracture, horizontal, rough,	Н		
1 7			1	undulating, relief 3/16" open	Ш	-	1
-	R8-NQ		-40	,	╂┼┤	-	-
	DNI-07i		>10		H	_	
	1				1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-18 SHEET 8 OF 11

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS : 2.0	ft bgs	s on 3/	/25/07 START : 2/24/2007 END : 3/	8/200	7 LOGGER : R. Gomez, C. LeBland	
≥∩ <i>چ</i>	(%)			DISCONTINUITIES	DG.	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	5 ft 66%	<u>~</u>	NR	126.9' - Fracture or mechanical break,	S	Limestone	After substantial downtime
130	0070		2	horizontal, rough, undulating, tight to 1/16" open 127.9' - Fracture, horizontal, rough,	H	 126.0-126.9' - light olive gray, (5Y 5/2), mild to moderate HCI reaction, weak (R2), 75% coverage of 1/16" 	due to casing/core barrel lock, the borehole has been reamed inside HW
-87.7	131.0		NR	undulating, open to 3/8" 128.1-128.5' - Fracture zone, 0-90 deg, open, fragments up to 1-1/2"		 voids on surface, <5% coverage of larger voids (up to 3/16") on surface, moderately fossiliferous 	casing with 3-7/8" tricone bit to 126.0', HW casing spun to 126.0' (NQ is at
-	101.0		0 NR >10	129.1' - Fracture, horizontal, rough, undulating, open, thin layer of carbonate derived silt face	Ħ	 126.9-128.5' - dusky yellow, (5Y 6/4), moderate to strong HCl reaction, very weak to weak (R1 to R2), 90% 	126.0' also) – C. LeBlanc begins logging –
-			>10	129.8' - Fracture, horizontal, rough, undulating, open 131.2-131.7' - Fracture zone, 0-70 deg,	H	 coverage of 1/16" voids on surface, poorly fossiliferous No Recovery 128.5-129.1' 	Driller's Remark: Soft - drilling at 128.5' Driller's Remark: Soft -
-	R9-NQ 5 ft	40	NR	rough, undulating, open 132.1' - Mechanical break 132.7' - Fracture, 60 deg, rough, undulating		 Limestone 129.1-129.8' - light olive gray, (5Y 5/2), moderate HCl reaction, weak 	drilling below 130.0' R8: 9 minutes No recovery intervals at
-	53%		>10 0	133.6' - Fracture, horizontal, smooth, undulating, open, film of carbonate derived silt infill	Ħ	 (R2), 85% coverage of 1/16" voids on surface, few larger (up to 1/8") at 129.1-129.3' 	131.2-131.5' and 132.7- 133.6' based on drilling rate
135 -92.7 -			NR	133.9' - Mechanical break		 No Recovery 129.8-131.0' Limestone 131.0-131.2' - dusky yellow, (5Y 6/4), 	Driller's Remark: Soft drilling Driller's Remark: Soft
-	136.0		3	136.2, 136.5, 136.6' - Fractures (3), horizontal, rough, undulating, open	H	 moderate HCl reaction, very weak to weak (R1 to R2), 90% coverage of 1/16" voids on surface 	drilling _ R9: 7 minutes _
-			NR 2	137.4' - Fracture, horizontal, smooth, planar	Ħ	No Recovery 131.2-131.5' Limestone 131.5-132.7' - Same as 131.0-131.2'	- -
-	R10-NQ 5 ft	10	3	to stepped, open 137.9' - Fracture, 5 deg, rough, undulating, dark staining, open up to 1/16"	H	No Recovery 132.7-133.6' Limestone 133.6-134.7' - Same as 131.0-131.2'	- -
140	30%		NR	138' - Fracture, 45 deg, smooth, undulating, dark staining, open up to 3/16" 138.1, 138.9' - Fractures (2), horizontal, rough, undulating, open		except with fossil molds and casts up to 3/8" over <5% of surface No Recovery 134.7-136.0' Limestone	-
-97. 7 -	141.0					136.0-136.6' - Same as 131.0-131.2' - except more abundant larger voids (1/16"-3/16"), moderately	R10: 6 minutes
-			>10	141.0-141.8' - Fracture zone, 0-75 deg, black staining on some surfaces, open		fossiliferous No Recovery 136.6-137.4' Limestone	-
-			0			137.4-138.2' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2), moderate to strong HCI reaction,	-
- - 145	R11-NQ 5 ft 30%	13	NR			medium strong to strong (R3 to R4), laminated layers, laminations are at angle of 10 deg, some have 1/16" voids, otherwise small voids are limited to a few small areas, few fossil molds	<u>-</u> -
-102.7	146.0			_		No Recovery 138.2-141.0' Limestone 141.0-141.2' - Same as 138.9-139.0'	R11: 3 minutes
_			>10	146.0-146.9' - Fracture zone, 0-60 deg, rough, undulating		 141.2-141.8' - dusky yellow, (5Y 6/4), moderate to strong HCl reaction, weak (R2), 85% coverage of 1/16" 	-
-	D40 NO		3	147.2, 147.4, 147.8' - Fractures (3), horizontal, rough, undulating, black staining, open, faces don't match		voids on surface - -	-
	R12-NQ				Ħ		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-18 SHEET 9 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS : 2.0	ft bg:	s on 3/	25/07 START : 2/24/2007 END : 3/	8/200	7 LOGGER : R. Gomez, C. LeBland	
>00	(9)			DISCONTINUITIES	ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H H H H	ID T. KEN	Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	7 5	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FPT.	NG CO	Ω	RAC.	PLANARITY, INFILLING MATERIAL AND	ΜB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E		ď		THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	BRG1 6, 1261 R266216, 216.
	5 ft 66%	18	3	148.2' - Fracture or mechanical break, 25	Н	141.8-142.5' - yellowish gray, (5Y - 7/2), moderate HCl reaction, weak	
	30,0		0	deg, rough, undulating, tight to open 3/16" 148.3' - Fracture, 25 deg, smooth, undulating,	ш	(R2), 80% coverage of 1/16" voids	_
150				open	Н	on surface, fossil molds (3/16") from	_
-107.7			NR	148.6' - Fracture or mechanical break, 45 — deg, rough, undulating, tight to 3/8" open		— 141.8-142.1', layer without voids from 142.3-142.5'	R12: 13 minutes
-	151.0			deg, rough, undulating, light to 0/0 open		No Recovery 142.5-146.0'	-
-	151.0				╁	- Limestone	-
-			1		╁	146.0-146.9' - yellowish gray, (5Y 7/2), fine grained, moderate to strong	-
_				151.8' - Fracture, 10 deg, rough, undulating,	+	 HCl reaction, weak (R2), 75% 	-
_			2	open 152.1' - Fracture or mechanical break, 10		coverage of <1/16" voids on surface, larger voids (up to 9/16") over 10% of	-
_				deg, rough, planar, tight to open up to 3/16"	L	- surface	_
_	R13-NQ 5 ft	71	1	152.8' - Fracture, horizontal, rough,	\vdash	146.9-149.3' - light olive gray, (5Y	_
_	82%		لـــٰــا	undulating, open up to 3/16" 153.3' - Fracture, horizontal, rough,	Т	5/2), mild to moderate HCl reaction, medium strong (R3), <5% coverage	_
			2	undulating, dark staining on lower face, open	\vdash	of 1/16" voids on surface, most being	
155				154.1' - Mechanical break 154.6' - Fracture, horizontal, rough, —		below 148.5', few larger <3/16" voids (fossil molds) below 148.5'	
-112.7			0	undulating, open to 3/16"	H	No Recovery 149.3-151.0'	R13: 12 minutes
_	156.0		NR		╨	Limestone	-
-	130.0					_ 151.0-155.1' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), fine	-
_			2		╁	grained, moderate HCl reaction,	-
-				156.75, 156.85' - Fractures (2), horizontal,		weak (R2), 90% coverage of 1/16" voids on surface to 154.2', then only	-
-			>10	rough, undulating, open 157.2-157.9' - Fracture zone, horizontal,	H	over 40% of surface, cavities (fossil	-
_	D44 NO			rough, undulating, every 0.05-0.1' is a	\perp	_ molds) up to 3/8" up to 5% of surface	-
_	R14-NQ 5 ft	50	4	fracture, open to 3/16", rock fragments from 157.6-157.8'	上	throughout interval No Recovery 155.1-156.0'	-
_	90%			158.2, 158.7, 158.9, 159.1' - Fractures (4),	╁╌	Limestone	_
_			3	horizontal, rough, undulating, olive brown staining on face at 158.7', open, faces do not		156.0-158.1' - yellowish gray, (5Y - 7/2), fine grained, moderate HCl	_
160				match		reaction, weak (R2), 60% coverage	
-117.7			1	159.2, 159.9, 160.0' - Fractures (3),	ш	of 1/16" voids on surface, most are	R14: 14 minutes
	161.0		NR	horizontal, rough, undulating, rounded at 159.2', faces match poorly	ш	 present from 156.5-157.0' and 157.4-158.1' 	_
					Ъ	158.1-158.9' - light olive gray, (5Y	_
1 -			0	•	F	 5/2), fine grained, moderate HCl reaction, weak (R2), laminated with 	
-				162.0, 162.3' - Fractures (2), horizontal and	Ľ	dusky yellow 5Y 6/4, laminations are	-
-			4	10 deg, undulating, black staining on lower face at 162.0', rough at 162.3', smooth at	₩	 irregular and uneven, <1/16" voids present along laminations 	-
-	R15-NQ		4	162.6', faces poorly match	仜	158.9-160.5' - light olive gray, (5Y	-
-	5 ft	28		162.7' - Fracture, 5 deg, planar, coarse	士	 5/2), fine grained, moderate HCI 	-
-	46%			grained bedding plane 163.0' - Fracture, horizontal, rough, planar,	+	reaction, weak (R2), <1/16" voids, few fossil molds (up to 3/16")	-
-			NR	open	Ë	– No Recovery 16ù.5-161.0'	-
165 -122.7			'\'`	163.0-163.3' - Fractures, horizontal, rough, dark staining on upper face at 163.2', planar	₽	Limestone 161.0-162.0' - Same as 158.9-160.5'	D45: 5 minutes —
-122./				to undulating, faces match poorly	\coprod	except 20% coverage of <1/16" voids	R15: 5 minutes
1 _	166.0			163.7' - Fracture or mechanical break,	口	on surface, larger voids (3/16"), fossil	_
			3	horizontal, rough, undulating, tight to 3/16" open	\vdash	molds also visible _ 162.0-163.3' - dusky yellow, (5Y 6/4),	_
			Ľ	166.1, 166.4, 166.8' - Fractures (3),		fine grained, moderate to strong HCl	
1 7				horizontal, rough, undulating, faces match poorly, open up to 3/8"	₽	reaction, weak (R2), 95% coverage of <1/16" voids on surface, cavities]
1 7			>10	poorty, open up to 0/0		(up to 3/16") on remaining 5%]
-	R16-NQ			•		No Recovery 163.3-166.0'	-
					1	-	
					L		



PROJECT NUMBER: BORING NUMBER: 338884.FL A-18 SHEET 10 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing ORIENTATION : Vertical									
WATER									
>00	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
- 170 -127.7			2 0 NR	167.0-167.6' - Fracture zone, 0-90 deg, black staining on vertical faces, fragments from 3/16" to 3-1/2", faces match poorly 167.9' - Fracture zone, horizontal, rough, undulating, open 168.3' - Fracture, horizontal, rough, undulating, open		Limestone 166.0-169.1' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, medium strong (R3), 10% coverage of 1/16" voids on surface, few larger (up to 3/16") voids and fossil molds, except from about	R16: 18 minutes -		
	171.0 R17-NQ 5 ft 88% 176.0	34	3 3 2 5 1 NR 3 8	168.5' - Fracture, horizontal, rough, undulating on upper face, smooth and planar on lower, open, some 3/8" fragments 169.0' - Mechanical break 171.1, 171.2' - Fractures (2), horizontal, smooth, planar, open up to 3/16" 172.0' - Fracture or mechanical break, 45 deg, rough, undulating 172.2' - Fracture or mechanical break, horizontal, rough, undulating, open up to 3/8" 172.3-172.7' - Mechanical break or fractures, 0-65 deg, open to 3/16" 173.4, 173.6' - Fractures (2), horizontal, smooth, planar, open up to 3/16" 174.1, 174.2, 174.3' - Fractures (3), 0-5 deg, smooth, planar, open up to 3/16" 174.6' - Fracture or mechanical break, horizontal, rough, undulating, open up to 1/16" 174.8, 175.1' - Fractures (2), horizontal, rough, undulating on upper face and planar on lower face 176.4, 176.6' - Fractures (2), horizontal, rough, undulating, open to 3/16"		- 166.9-167.4', zone from 167.5-167.9' has no voids but is laminated with darker zone from 167.7-167.9', brass colored to dark colored staining on broken surface across darker zone No Recovery 169.1-171.0' Limestone 171.0-172.0' - light olive gray, (5Y 5/2), fine grained, moderate HCI reaction, medium strong (R3), some <3/16" fossil molds 172.0-173.5' - yellowish gray, (5Y 7/2), moderate HCI reaction, weak to medium strong (R2 to R3), 50% coverage of 1/16" voids on surface, larger (up to 3/8") voids up to 5%, moderately fossiliferous 173.5-175.4' - Same as 171.0-172.0' No Recovery 175.4-176.0' Limestone 176.0-180.7' - Same as 172.0-173.5' except fewer large voids and fossil molds, poorly fossiliferous	SC-4 collected at 171.2- 173.0' - - - R17: 16 minutes -		
- 180 -137.7 -	94%		5 2 NR	176.7' - Fracture, horizontal, smooth, planar, open to 1/16" 177.1, 177.15, 177.2, 177.4, 177.7, 177.75, 177.8, 177.9' - Fractures (8), horizontal, smooth, planar to slighty undulating, open 1/16" to 3/16" 178.3' - Fracture, horizontal, rough, undulating, open, fragments up to 1/2"		_ _ _ No Recovery 180.7-181.0' _ Limestone	R18: 19 minutes -		
-			>10 0	178.9-179.4' - Fractures (4), 0-45 deg, rough, undulating, open, fragments up to 1" 179.8, 179.9' - Fractures (2), horizontal, rough, undulating, open to 3/16" 180.3' - Fracture, horizontal, smooth, planar		 181.0-182.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), few voids <1/16", voids are present in thin bands about 20-50 	-		
1 -	R19-NQ 5 ft	18	>10	to stepped, open to 3/16" 180.4' - Fracture, horizontal, rough,	Ħ	deg from horizontal, few larger voids - 182.0-183.7' - Same as 176.0-180.7'	_		
- 185 -142.7 -	54%		NR	undulating, open, rounded faces 181.0-182.0' - Fracture zone, 0-90 deg, rough, undulating, some slight dark staining at 181.6' 182.0-183.0' - Mechanical break 183.0-183.7' - Fracture zone, 0-90 deg, rough, undulating, fragments up to 1-1/2"		No Recovery 183.7-186.0'	R19: 15 minutes		
-			3	186.0-186.4' - Fractures, horizontal, multiple 1" fragments, open -		Limestone 186.0-186.5' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, weak (R2), 90% coverage of <1/16"	-		
-	R20-NQ 4.5 ft		1			 voids on surface, few cavities (up to 9/16") 	-		
1									

APPENDIX 2BB-214 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-18	SHEET	11	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0) ft bg	s on 3	/25/07 START : 2/24/2007 END : 3/8	3/200	7 LOGGER : R. Gomez, C. LeBland	
≷ ∩ລ	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- 190 -147.7	69%		>10 (>10) NR	188.2-189.1' - Fracture zone, rough, undulating, fragments up to 2" - -		186.5-189.1' - yellowish gray, (5Y - 7/2), fine grained, moderate HCl reaction, weak (R2), 40% coverage of <1/16" voids on surface to 187.3', over 90% of surface with larger (up to 3/16") below 187.3', moderately	R20: 14 minutes
- - - - - 195 -152.7	R21-NC 5 ft 76%	17	3 >10 >10 NR	190.7, 190.9, 191.5' - Fractures (3), horizontal, rough, undulating, black staining on face at 190.9', open up to 3/8" 191.7, 192.5' - Fractures (2), horizontal, rough, undulating, open to 3/16" 191.9' - Fracture, 45 deg, rough, undulating, open 192.7-194.3' - Fracture zone, 0-45 deg, rough, undulating, open, fragments up to 2" long		fossiliferous No Recovery 189.1-190.5' Limestone 190.5-194.3' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak (R2), 40% coverage of <1/16" voids on surface in zone from 191.3-192.8' and 193.5-194.3', moderately fossiliferous in same zone, color grades to dusky yellow (5Y 6/4) by 193.0', dark thin (1/16") irregular laminations visible at 192.5-192.7' No Recovery 194.3-195.5'	R21: 52 minutes On 3/7/07 all day was spent addressing/fixing borehole cave-in issues, casing was set to 175.0' drilled with tricone bit to 190.5'
- - - - - 200 -157 7	R22-NQ 5 ft 80%	20	5 2 >10 >10 NR	195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" 196.9' - Fracture or mechanical break, rough, undulating, open 3/8" 197.4-197.6' - Fractures, open, fragments up to 1" 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2"		Limestone 195.5-196.3' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, weak (R2), thin irregular dark laminations, 20% coverage of <1/16" voids on surface, few larger voids 196.3-199.5' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak (R2), moderately fossiliferous, 60% coverage of <1/16" voids on surface, cavities (up to 3/8") over 10% of surface No Recovery 199.5-200.5'	
-157.7 	200.5		NR			Bottom of Boring at 200.5 ft bgs on 3/8/2007	R22: 17 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-18A	SHEET	1	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						y, auto riammer, Avvo rous,			ONIENTATION : Vertical			
WATER	LEVELS	: 2.0 ft bo	gs on 3/25		START : 6/14/2007	END : 6/15/2007	LOGGE	₹ : D. T	Whitaker			
>				STANDARD PENETRATION TEST RESULTS		SOIL DESCRIPTION		ı	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS				SYMBOLIC LOG				
		RECOVE	ERY (ft)		SOIL NAME	E, USCS GROUP SYMBOL	, COLOR,	Ę	DEPTH OF CASING, DRILLING RATE,			
T A A			#TYPE	011 011 011	CONSISTENC	CONTENT, RELATIVE DE CY, SOIL STRUCTURE, MII	NSITY OR NERALOGY	β	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
			#IYPE	6"-6"-6" (N)	OONOIOTEN	OT, COIL OTTOOTOTAL, WIII	VEI VIEO I	SY.	INOTICOMENTATION			
42.1				()				+	06/14/07 Drill 10.0' pilot hole, install 10.0' of			
							-	-	SW (6") casing -			
l _							-	1	Blind drill to 25.0'			
]						•	1	_			
-	1						-	1	Water level obtained from boring A-18			
-							-	1	-			
_							-		_			
							_		_			
_	1						-		-			
							-		-			
5 37.1								4				
37.1	[_		_			
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1								1				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-18A	SHEET	2	OF	6	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-15/16 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.0 ft bo	gs on 3/2	5/07 S	START : 6/14/2007 END : 6/15/2007 LOGGE	R : [D. Whitaker
				STANDARD	SOIL DESCRIPTION	,	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOS OBOLIS STATES COLOS	SVMBOLICIOS	DEDTILOF CARING PRILLING PATE
ACE VIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	2	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FEN			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	INSTRUMENTATION
<u>о</u> о ш				(N)		۲	7
-						1	-
-						1	-
-						1	-
-						1	1
-						1	1
_							
]	
l _							
25	25.0						_
17.1				20-24-23	Fat Clay With Sand (CH) 25.0-25.05' - light bluish gray, (5B 7/1), wet, very stiff, high plasticity, no dilatancy, no HCl reaction, 15% very		<u>-</u>
_		1.3	SS-1	(47)	high plasticity, no dilatancy, no HCl reaction, 15% very fine to fine silica sand, (slough)	4	-
-	26.5				Silty Sand (SM)	╫	06/15/07 Install 5' more of SW casing
-					\ 25.05-26.35 - yellowish gray, (5Y 8/1), wet, dense, fine to coarse grained sand-sized, moderate HCl	1	Begin split spoon sampling at 25.0'
-					reaction, 24% nonplastic fines, all carbonate	┨	09:00 Pull out split spoon 25.0-26.5'
-						1	-
-						1	-
-						1	1
30	30.0					1	1
12.1		0.5	SS-2	50/5.5 (50/5.5")	Silty Sand (SM)		09:15 Pull out 30.0-31.5' interval SPT; decide to start rock coring
				(50/5.5)	\orange, (10YR 7/4) /	Ι	decide to start rock coring
_					Begin Rock Coring at 30.5 ft bgs See the next sheet for the rock core log	1	
-					dee the flext sheet for the fock core log	1	_
-						-	-
-						┨	-
-						┨	-
-						┨	-
35						1	-
7.1					_	1	_
-						1	1
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_						1	
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40						╀	-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-18A

SHEET 3 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, SW/HW casing ORIENTATION : Vertical

,		VD L	<u> </u>	ENT . CIVIE 33 3/N 3 10023, Mud Totally, NQ tools, SW/		5119	ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bg	s on 3/	25/07 START : 6/14/2007 END : 6	/15/20	7 LOGGER : D. Whitaker	
1.				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ß	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
M H N	, A S		FRACTURES PER FOOT	DECORN HOW	<u> </u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H N N N	E E E	(%) Q	ΪŽΫ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
민류년	SNE	Ø	AR R	PLANARITY, INFILLING MATERIAL AND	Ĭ,	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	SES	ď	F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	1 1, 1 1, 1
	30.5					No Recovery 30.5-35.5'	09:55 Begin rock coring
-					-	_	1
-					-	-	-
l -					_	_	
							Driller's Remark: Sand
-	R1-NQ				1	-	layer that washed out – (30.5-35.5') - felt resistance
-	5 ft	0	NR		-	-	during drilling
-	0%				-	_	
l _					_	_	_
35					1	-	R1: 4 minutes
7.1				-	-	_	-
I	35.5				+	- Limantona	-
I -			2		\bot	Limestone - 35.5-39.5' - pale olive, (10Y 6/2),	
				36.2' - Fracture (2), 60 deg and 70 deg,	Ш	very fine to fine grained, moderate to	
-				rough, undulating, open (1/8"), intersecting	1-1	strong HCl reaction, very weak (R1),	1
-			>10		\pm	- 15% surface voids (<1/16")	-
_	50.110			37.12-37.45' - Fracture zone	\perp	35.5-38.5', 40% surface voids from 38.5-38.5', many cavities up to	SC-1 collected at 37.45-
_	R2-NQ 5 ft	60	0		\mathbf{H}	- 3/16"x9/16", many fossil molds with	38.55'
	80%	00				minor silt infill, sporadic black	00.00
_				38.55-38.75' - Fracture zone	\mathbb{H}	(organic) material up to 3/16", trace	1
-			>10	38.95' - Bedding plane or mechanical break,	\pm	- (few) fossil casts	<u> </u>
-				horizontal, rough, undulating, tight	+	No Recovery 39.5-40.5'	R2: 8 minutes
40			NR	-			K2. 6 Illillutes
2.1	40.5				Щ	_	
					Н	Limestone	
-			0			 40.5-42.9' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI 	1
-					+	reaction, weak (R2), extremely weak	Core run times not
-			>10	41.65' - Bedding plane or mechanical break, 5 deg, rough, undulating, open (1/8")	$-\Box$	rock (R0) from 42.2-42.9', 40.5-42.2'	recorded beyond run R2-
_				42.1-42.53' - Fracture zone	\perp	40% small surface voids (<1/16"),	NQ _
	R3-NQ		2	42.67' - Fracture, horizontal, rough, stepped,	\perp	many small cavities up to 3/16" in	
_	5 ft 48%	31					
1 -				open (1/2"), intersecting	+	 diameter, few fossil molds and casts, 	-
	40%			open (1/2"), intersecting	井	 diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into 	- -
-	40%		ND	open (1/2"), intersecting		 diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds 	-
-	40%		NR	open (1/2"), intersecting		 diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into 	- - -
- 45	4076		NR	open (1/2"), intersecting		 diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds 	- - - -
- 45_ -2.9			NR	open (1/2"), intersecting		 diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds 	- - - -
	45.5			open (1/2"), intersecting		 diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone	- - - - -
			NR 2	open (1/2"), intersecting		diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16' infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2),	- - - - - -
				-		 diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak 	- - - - - -
			2	-46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1, 49.45, 50.15' - Mechanical break, <5 deg,		diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak (R0), 25-40% surface voids (<1/16")	- - - - - - -
				46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1,		 diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak 	- - - - - - -
	45.5 R4-NQ		2	-46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1, 49.45, 50.15' - Mechanical break, <5 deg,		diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak (R0), 25-40% surface voids (<1/16") variable over core, void infill, many cavities up to 3/16"x3/8", many black (organic) oblong and spherical fossils	- - - - - - - -
	45.5 R4-NQ 5 ft	63	2	-46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1, 49.45, 50.15' - Mechanical break, <5 deg,		diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak (R0), 25-40% surface voids (<1/16") variable over core, void infill, many cavities up to 3/16"x3/8", many black (organic) oblong and spherical fossils up to 3/16" in diameter, horizontal	- - - - - - - - -
	45.5 R4-NQ		2	-46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1, 49.45, 50.15' - Mechanical break, <5 deg,		diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCI reaction, extremely weak (R0), 25-40% surface voids (<1/16") variable over core, void infill, many cavities up to 3/16"x3/8", many black (organic) oblong and spherical fossils up to 3/16" in diameter, horizontal black laminations from 47.4-47.8'	- - - - - - - - -
	45.5 R4-NQ 5 ft		2	-46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1, 49.45, 50.15' - Mechanical break, <5 deg,		diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak (R0), 25-40% surface voids (<1/16") variable over core, void infill, many cavities up to 3/16"x3/8", many black (organic) oblong and spherical fossils up to 3/16" in diameter, horizontal	
	45.5 R4-NQ 5 ft		2 2 2	-46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1, 49.45, 50.15' - Mechanical break, <5 deg,		diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak (R0), 25-40% surface voids (<1/16") variable over core, void infill, many cavities up to 3/16"x3/8", many black (organic) oblong and spherical fossils up to 3/16" in diameter, horizontal black laminations from 47.4-47.8' varying in size up to 3/16" thick, fine	- - - - - - - - - - -
-2.9 	45.5 R4-NQ 5 ft		2 2 3	-46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1, 49.45, 50.15' - Mechanical break, <5 deg,		diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16' infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCI reaction, extremely weak (R0), 25-40% surface voids (<1/16'') variable over core, void infill, many cavities up to 3/16"x3/8", many black (organic) oblong and spherical fossils up to 3/16" in diameter, horizontal black laminations from 47.4-47.8' varying in size up to 3/16" thick, fine grained with local medium grained	- - - - - - - - - -
-2.9 	45.5 R4-NQ 5 ft 98%		2 2 2	-46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1, 49.45, 50.15' - Mechanical break, <5 deg,		diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16' infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCI reaction, extremely weak (R0), 25-40% surface voids (<1/16'') variable over core, void infill, many cavities up to 3/16"x3/8", many black (organic) oblong and spherical fossils up to 3/16" in diameter, horizontal black laminations from 47.4-47.8' varying in size up to 3/16" thick, fine grained with local medium grained	- - - - - - - - - - -
-2.9 50	45.5 R4-NQ 5 ft		2 2 3	-46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1, 49.45, 50.15' - Mechanical break, <5 deg,		diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16' infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCI reaction, extremely weak (R0), 25-40% surface voids (<1/16'') variable over core, void infill, many cavities up to 3/16"x3/8", many black (organic) oblong and spherical fossils up to 3/16" in diameter, horizontal black laminations from 47.4-47.8' varying in size up to 3/16" thick, fine grained with local medium grained	- - - - - - - - - -
-2.9 50	45.5 R4-NQ 5 ft 98%		2 2 3	-46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1, 49.45, 50.15' - Mechanical break, <5 deg,		diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16' infill into void space, few fossil molds No Recovery 42.9-45.5' Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCI reaction, extremely weak (R0), 25-40% surface voids (<1/16'') variable over core, void infill, many cavities up to 3/16"x3/8", many black (organic) oblong and spherical fossils up to 3/16" in diameter, horizontal black laminations from 47.4-47.8' varying in size up to 3/16" thick, fine grained with local medium grained	- - - - - - - - - -



PROJECT NUMBER: BORING NUMBER:

338884.FL A-18A

SHEET 4 OF 6

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, SW/HW casing

				112141 . CIVIL 33 3/14 3 10023, Midd Totally, 14Q (0013, 344/1		9	ONLIVIATION: Vertical
WATER	LEVELS : 2.0	ft bgs	s on 3		15/200		
≥Q⊋	(%			DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B H	S F F	(%) _Q	150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLI I	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FRE	ORE	Oρ	SAC ER F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	8.5	ď		THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	5.10. 0, 120. 11202. 0, 2.0.
			NR/			No Recovery 50.4-50.5'	
			0			 Limestone 50.5-55.3' - pale yellowish brown, 	1
				51.5, 53.8' - Mechanical break, 60 deg, tight	\vdash	(10YR 4/2), moderate HCl reaction,	1
_			2	51.85' - Mechanical break, 50 deg, tight		 extremely weak (R0), small surface voids (<1/16") 15-25% variable over 	1 1
-	R5-NQ				+	core length, many cavities up to	1
-	5 ft	73	3	52.85, 53.85, 53.95, 54.5' - Mechanical	\blacksquare	- 9/16"x3/16", trace black elongate	1
_	96%			break, horizontal, tight	+	shaped material (organics) up to 9/16"x1/16", trace black lineations	1 -
_			3		\perp	from 51.65-51.85', fine grained with	1
_						local medium grained accumulations	_
55			1		ш		
-12.9	55.5					No Dogovory EE 2 EE El	
-	- 5.0		NR_	FE 75 55 0 50 45 50 00 57 00 57 4 57 0	\vdash	- No Recovery 55.3-55.5' Limestone	1
_			3	55.75, 55.9, 56.15, 56.63, 57.02, 57.4, 57.9, 58.4, 59.08' - Mechanical break, <10 deg,		55.5-60.5' - Same as 50.5-55.3'	1 1
-				rough, planar, tight	₩	except 5-15% surface voids (<1/16"),	1
_			3		ш	many black lineations throughout, few cavities up to 1/8" diameter	-
_	50.110				\vdash	-	-
_	R6-NQ 5 ft	82	3	57.6' - Mechanical break, 50 deg, rough,		_	<u> </u>
	100%			planar, tight	Н	_	
			4				
			1			-	1
60				•	\Box	-	1 1
-17.9	00.5		0	_			
-	60.5				╁┼	Limestone	-
-			3	61.0' - Bedding plane or mechanical break,	ш	- 60.5-61.1' - pale yellowish brown,	-
_				horizontal, rough, undulating, tight	+	(10YR 4/2), moderate HCl reaction, weak (R2), hard, moderate density,	
_			2	61.1' - Mechanical break, 40 deg, rough,		- fossiliferous, small voids and fossil	_
				undulating, tight 61.5, 61.9, 62.46, 63.05, 64.0, 64.6, 65.23' -	\vdash	molds (1/16"-1/8") over 10-15% of	<u> </u>
	R7-NQ	00	2	Mechanical break, <10 deg, rough, planar to		surface - Limestone	
	5 ft 100%	88		undulating, tight		61.1-65.5' - pale yellowish brown,	1
_					\vdash	(10YR 4/2), moderate HCl reaction,	1 1
-			2			 extremely weak to weak (R0 to R2), hard, localized zones of small voids 	1
					₩	(1/16"-1/8") up to 15% of surface,	-
65 <u> </u>			1	_	口	— very sparsé black organic inclusions	-
	65.5				+	Limestone	-
_			1		\Box	- 65.5-70.5' - moderate yellowish	-
_					\vdash	brown, (10YR 5/4), moderate to]
			3	66.5' - Fracture (2), 50 deg, rough, stepped, tight, intersecting	Щ	strong HCl reaction, extremely weak to very weak (R0 to R1), some of the	
			٥	66.9, 67.13, 67.8, 69.13, 70.2' - Bedding		rock from 68.0-70.5' poorly	1
	R8-NQ			plane or mechanical break, <5 deg, rough,		fossiliferous, up to 3/16" thick, sparse	1
-	5 ft 100%	86	1	planar to undulating, tight to open (up to 1/4")		 very thin (<1/16" thick) lineations, few cavities up to 1/16"x1/8", few black 	1 1
-	100%				Ш	blebs up to 3/16" diameter, mostly	-
-			1		団	fine grained	
-					+	-	SC-2 collected at 69.12- 70.23'
70			2	_			
-27.9	70.5				igspace		



PROJECT NUMBER: BORING NUMBER:

338884.FL A-18A

SHEET 5 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, SW/HW casing ORIENTATION : Vertical

WATER	LEVELS: 2.0	ft bgs	on 3/	25/07 START : 6/14/2007 END : 6/	15/200	D7 LOGGER : D. Whitaker	
≥D≎				DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B	E RU 3TH, 3VEF	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	SOR!	ROI	-RAC	PLANARITÝ, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
2002	024	_		70.25' - Fracture, 70 deg, rough, planar	U,	Limestone	11:40 20.0' More HW
1 -			2	71.1, 72.15, 72.25' - Fracture, 50 deg,	Н	 70.5-74.75' - moderate yellowish brown, (10YR 5/4), strong HCl 	casing put in to 50.0'
				smooth, undulating, open (up to 1/4")	Ħ	reaction, weak (R2), 25% surface	-
-			2	71.2' - Bedding plane, horizontal, rough, planar, black staining, open (1/8")	Ħ	 voids (<1/16") from 70.5-73.0', 50% surface voids (<1/16") from 	1
1 1	R9-NQ			72.6' - Fracture (2), 60 deg and 5 deg, rough,	Ш	73.0-74.75', many cavities up to 3/8",	1
	5 ft 85%	52	3	undulating, tight, intersecting 73.03' - Mechanical break or bedding plane,	Ш	 very fossiliferous, many molds, casts, trace black (organics) lineations 	1
			6	rough, planar, tight to open (1/16")	Ш	_ ,	1
			>10	73.9, 74.0, 74.15, 74.3, 74.5, 74.6' - Bedding plane, <10 deg, rough, undulating to stepped,	Н		1
75				open (up to 3/4")	Ш	_ No Recovery 74.75-75.5'	
-32.9	75.5		NR	74.6-74.75' - Fracture zone	Щ	_]
]	Ţ		2	75.5-75.6' - part of core is fractured	Ш	Limestone - 75.5-78.85' - Same as 70.5-74.75']
			_	75.9, 76.6' - Fracture (2), 50 deg, rough, planar, open (up to 3/4")		except extremely weak (R0), black	
			>10	76 05 77 21 Fracture 7000	Н	organic material up to 1"x1/8"	_
				76.95-77.3' - Fracture zone	H	_	_
1 -	R10-NQ 5 ft	33	5		H	_	-
-	67%		э	78.05, 78.2, 78.3' - Bedding plane or mechanical break, horizontal, smooth,	H	_	-
-				undulating, tight to open (1/16") 78.45' - 20 deg and 70 deg, rough,	Ш	No Recovery 78.85-80.5'	-
			NR	undulating, tight to open (1/8"), intersecting	Н	_	-
80 <u> </u>			1411		Н	<u> </u>	-
1 +	80.5		>10	80.5-80.9' - Fracture zone	Н	Limestone	-
-				-	Ш	 80.5-80.9' - Same as 75.5-78.85' except pale olive, (10Y 6/2) 	-
-				-	ш	No Recovery 80.9-85.5'	1
				-	ш	_	-
	R11-NQ			-	Ш	=	1
	5 ft 8%	0	NR	-	Ш		1
				-	\mathbb{H}		1
				_	H		1
85					Ħ		
-42.9	85.5			_	Ħ]
			1	-	Ш	Limestone - 85.5-88.1' - light olive gray to dusky	
				86.15' - Mechanical break or bedding plane,	Ш	_ yellow, (5Y 5/2 to 5Y 6/4), strong HCl	
			1	30 deg, rough, undulating, tight 86.9' - Mechanical break or bedding plane,	Н	reaction, weak (R2), 87.7-88.1' - extremely weak rock (R0), 40-50%	SC-3 collected at 86.9-
	D40 NO			horizontal, rough, undulating, tight	Ш	surface voids (<1/16") many cavities up to 3/8"x3/16", highly fossiliferous,	87.72'
	R12-NQ 5 ft	43	>10	87.72-88.1' - Fracture zone	Ш	many (>5) molds, few casts, minor	-
-	52%			-	Ш	recrystallization No Recovery 88.1-90.5'	-
-				-	Ш	-	-
			NR	-	Ш	_	-
90 <u> </u>	00.5			-	\mathbb{H}		-
	90.5			<u> </u>	Ħ		-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-18A	SHEET	6	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, SW/HW casing ORIENTATION : Vertical

CORING	NETHOD A	ND E	אורווטג	MENT: CME 55 S/N 316625, mud rotary, NQ tools, SW/H	vv cas	billy	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bg	s on 3	5/25/07 START : 6/14/2007 END : 6/	15/200	7 LOGGER : D. Whitaker	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		<i>(</i> 0	DESCRIPTION	SYMBOLIC LOG		-
N A E	₹ _₹ ₹	_	FRACTURES PER FOOT	DESCRIPTION	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AAE	SE E	(%) Q	[<u>₹</u> 8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	걸	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무유짓	8888	οD	R AC	PLANARITY, INFILLING MATERIAL AND	J MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
필요리	용필문	ď	E E	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ς	CHARACTERISTICS	BROI G, TEGT REGGETG, ETG.
					\Box	Limestone	
-			>10		╁┼	90.5-95.0' - Same as 85.5-88.1'	-
-				horizontal, rough, stepped, tight 91.3-92.4' - Fracture, 85 deg, rough,	H	except very fossiliferous with many	_
_			>10	• • • • • • • • • • • • • • • • • • •		cavities up to 1-3/4"x1-3/16", minor silt infill, secondary carbonate	
			-10	91.3, 91.8' - Bedding plane or mechanical	Н	crystals within cavities and voids	
-	R13-NC			break, 35 deg, rough, stepped, tight	1	space present, minor black staining	-
-	5 ft	57	4	91.9' - Fracture, smooth, stepped, missing	ш	- in some cavities	-
-	90%			part of fracture 92.6, 92.7, 93.4, 94.25' - Bedding plane, <25	Н	_	_
			ر ا	deg, rough, stepped, fragments in fractures,			
			2	open (up to 1")	Ш	-	
			0	93.8' - Bedding plane or mechanical break,	Н	_	-
95 <u> </u>				30 deg, rough, undulating, tight		No Deceyor: 05 0 05 51	_
-52.9	95.5		NR]	Ш	No Recovery 95.0-95.5'	
			_ ا		Н	Limestone	
I -	1		1	95.95' - Bedding plane or mechanical break,	口	95.5-97.35' - Same as 85.5-88.1'	1
-	1			10 deg, smooth, undulating, tight	₽	except 15-25% surface voids (<1/16")	-
_			1	96.6' - Bedding plane, smooth, undulating,	H	- (17 10)	_
				open (3/4-2"), fragments in fracture, also 50 degree fracture smooth, undulating, black		N - D 07 05 400 51	
_	R14-NG			staining	Ш	No Recovery 97.35-100.5'	
-	5 ft	32			\Box	-	-
_	37%			-		_	_
l _			NR	_	Н	_	_
100	1				Н	-	_
-57.9				-	╁┼		6/15/07 15:30, Total depth —
_	100.5				\Box	D-4 f D + 400 F # h	of boring 100.5'
_						Bottom of Boring at 100.5 ft bgs on 6/15/2007	
						0/13/2007	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	Δ-19	SHEET	1	OF	14	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

					TART - 2/02/2007 END - 2/06/2007 LOCCER - R McComb
WATER	LEVELS	. ∠.∪ II D(gs on 3/20		TART : 3/23/2007
≥ 9€	SAMPLE	INTERVA	J (ft)	STANDARD PENETRATION	O O O O O O O O O O O O O O O O O O O
DEPTH BELOW SURFACE AND ELEVATION (ft)	. J, 11411 LL	RECOVE	. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
TH E		TILOUVE	#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUR			#IYPE	(N)	Soliditation, solidinidational, minicipaled in solidinidation in s
43.1	0.0				Poorly Graded Sand With Silt And Gravel (SP-SM)
		4 -	00.4	3-3-3-3	\(\sqrt{0.0-0.5'} - \text{grayish yellow, (5Y 8/4), dry, loose, fine to coarse grained sand and gravel, 11% fines, limestone \(\sqrt{1.5} \)
-		1.5	SS-1	(6)	road base
-	2.0				Poorly Graded Sand (SP) 0.5-1.5' - dusky brown to pale yellowish brown, (5YR
-					│ 2/2 to 10YR 6/2), moist, loose, fine grained, trace │ │ │ │ │ │ │ │ Water level at 2.0' below ground surface
-				2-4-4-6	\tag{\nonplastic fines, up to 25% organics, wood fragments \frac{1111}{1111}
-		1.2	SS-2	(8)	\\Silty Sand (SM)
-	4.0				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
_					Poorly Graded Sand With Silt (SP-SM)
5				3-3-4-4	2.5-3.2' - grayish orange, (10YR 5/6), wet, loose, fine
38.1		1.4	SS-3	(7)	Silty Sand (SM)
-	6.0				4.0-5.4' - light gray, (N8), wet, loose, fine grained, 20-25% low plastic fines, trace fine sand-sized black
-					minerals / Till
-				2-2-1-0	Silty Sand (SM) 6.0-7.2' - light gray to medium gray, (N7 to N6), wet,
-		1.6	SS-4	(3)	very loose, fine grained, 20% low plastic fines
-	8.0				Lean Clay With Sand (CL) 7.2-7.6' - medium gray to dark gray, (N4 to N3), wet,
-					soft, low to medium plasticity, slow dilatancy, 15% fine
_				2-3-7-12	\\grained sand, 5% wood and organics \\ \frac{\frac{1}{2}}{1} \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
-		0.9	SS-5	(10)	∥ 8.0-8.4' - medium gray to dark gray, (N4 to N3), wet, ∥ ┃
10	10.0				\stiff, high plasticity, no dilatancy, 15-20% fine grained - -
33.1					Silt With Sand (ML)
-				3-47-11-9	8.4-8.9' - grayish orange, (10YR 7/4), wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction,
-		0.9	SS-6	(58)	\\18% fine grained sand
-	12.0				Silty Gravel With Sand (GM) 10.0-10.9' - grayish orange, (10YR 7/4), moist, very
					\\dense, moderate to strong HCl reaction, fine to \\/ \ \ \ \
			00.7	6-12-8-10	coarse gravel-sized up to 2", 25% fine to to 2", 25%
		0.9	SS-7	(20)	Silt With Sand (ML)
1 7	14.0				12.0-12.9' - grayish orange, (10YR 7/4), moist to wet, very stiff, nonplastic, rapid dilatancy, moderate HCl
1 7					\reaction, 5-10% fine grained sand, 5% medium to /
15		0.7	00.0	3-8-9-8	\text{\coarse grained sand} \text{\square} - \text{\left}
28.1		0.7	SS-8	(17)	14.0-14.7' - moderate olive brown, (5Y 4/4), moderate
1 7	16.0				HCI reaction, coarse sand to coarse gravel-sized, angular to subrounded limestone fragments, with silt
1 7					∖that is grayish yellow (5Y 8/4), wet, very stiff, 10-15% // ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑
1 7		4.0	00.0	9-13-18-30	\fine grained sand, moderate to strong HCl reaction / -
1 7		1.3	SS-9	(31)	16.0`-17.3' - yellowish gray, (5Y 7/2), wet, hard,
]	18.0				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
1 7					Limestone Fragments
1 7		1 4	00 10	12-18-25-13	\ \ 18.0-18.2' - moderate to dark yellowish orange, (10YR / -
1 7		1.4	SS-10	(43)	gravel-sized, angular fragments up to 2"
20					Silt (ML) 18.2-19.4' - Same as 16.0-17.3'



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-19 SHEET 2 OF 14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

					TART - 2/22/2007 FND - 2/22/2007 LOCCED - D	MaCamb
WATER	LEVELS	. ∠.∪ II D <u>(</u>	gs on 3/23		TART : 3/23/2007	COMMENTS
≩Q≆ I	CAMPIE	INTERVA	1 (#\	STANDARD PENETRATION	SOIL DESCRIPTION O	OCIVIIVILINIS
ELO ON (SAMPLE		. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION
23.1	20.0			(14)	Silt (ML)	
-					20.0-21.4' - Same as 16.0-17.3' except 10-15% fine	-
-		1.4	SS-11	12-19-17-17 (36)	grained sand, trace medium to coarse grained sand	-
-				(66)	 ``	-
-	22.0				Sandy Silt (ML)	-
-					22.0-22.5' - grayish orange, (10YR 7/4), moist, hard,	-
_		1.7	SS-12	38-43-38-44	\ nonplastic, rapid dilatancy, moderate HCl reaction, _	
_				(81)	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	_
_	24.0				22.5-23.7' - Same as 22.0-22.5' except 10-15% fine	_
_					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	_
25		1.4	SS-13	37-27-20-31	24.0-25.4' - Same as 22.5-23.7'	
18.1		1	00 10	(47)		_
	26.0					
					Sandy Silt (ML) 26.0-27.4' - Same as 22.0-22.5'	
			00.44	21-18-16-11	26.0-27.4 - Same as 22.0-22.5]
		1.4	SS-14	(34)]]
-	28.0				1	1
_					Sandy Silt (ML)	1
_				4-3-2-17	28.0-29.7' - yellowish gray, (5Y 7/2), moist to wet, medium stiff, nonplastic, rapid dilatancy, moderate	1
-		1.7	SS-15	(5)	HCI reaction, 32% fine to coarse grained sand	1
30	30.0					- 1
13.1	30.0				Sandy Silt To Silt (ML)	
-			00.40	10-20-21-50/3	30.0-31.4' - yellowish gray, (5Y 7/2), wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl	1
-		1.4	SS-16	(41)	reaction, 25-30% fine to coarse grained sand,	1
-	31.8				\uparrow decreasing to 10-15% fine grained sand at 30.0-30.3', $\uparrow = 1111$	1
-	32.0 32.4	0.3	SS-17	50/5	thin laminae, white calcareous stringers <1/16" thick, oriented horizontal to 30 deg	-
-	32.4	0.0	00 17	(50/5")	Sandy Silt With Limestone (ML)	-
-					32.0-32.3' - dark yellowish orange, (10YR 6/6), wet, hard, nonplastic, rapid dilatancy, moderate HCl	-
-					reaction, 25-30% very fine to coarse grained sand,	-
-	34.0	0.4	SS-18	50/5	20% disc-shaped limestone fragments up to 1/10"	
-	34.4	0.4	33-18	(50/5")	Limestone And Sandy Silt (GM)	-
35 8.1					\ 34.0-34.4' - Same as 32.0-32.3' except low plasticity, mild to moderate HCl reaction, 75% fine to coarse	
3.1					grained sand and fine to coarse gravel-sized; 25% silt	-
-	36.0 36.1	0.1	\SS-19/	50/1	Limestone Fragments	SPT discontinued at 36.0'
	30.1	/	\	(50/1")	\ 36.0-36.1' - yellowish gray, (5Y 7/2), fine grained, \ \ _	Surface casing set to 36.0'
					strong HCl reaction, 3 coarse gravel-sized pieces recovered	
					Begin Rock Coring at 36.0 ft bgs]
I _					See the next sheet for the rock core log]
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-19	SHEET	3	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 2.0	ft bgs	s on 3/	23/07 START : 3/23/2007 END : 3/	26/20	07 LOGGER : R. McComb	
≥∩≘	. (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - 40 3.1	36.0 R1-HQ 5 ft 20%	0	>10 NR	36.0-37.0' - Fracture zone, rough, undulating, rounded limestone fragments, some surface staining		Limestone 36.0-36.5' - yellowish brown, (10YR 6/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2) 36.5-37.0' - pale yellowish brown, (10YR 6/2), fine to very fine grained, mild HCl reaction, extremely weak (R0), friable, voids over 80-90% of surface No Recovery 37.0-41.0'	Driller's Remark: Soft at 40.0-41.0' - R1: 7 minutes
 45 -1.9	R2-HQ 5 ft 78%	35	4 2 3 NR	41.1' - Fracture, horizontal, smooth, planar, open 3/8" 41.35' - Fracture, <5 deg, smooth, undulating, open 3/4" 41.6-41.9' - Fracture zone, 0 to <5 deg, rough, stepped 42.3' - Fracture, <5 deg, smooth, undulating, open 3/4" 42.7' - Fracture, horizontal, rough, planar, open 3/4"-1-3/16" 43.0, 43.9' - Fractures (2), horizontal, rough, undulating, open 3/16" at 43.0', open 3/8" at 43.9' 44.4, 44.6' - Fractures (2), horizontal, rough, undulating, open 3/16"-3/8"		Limestone 41.0-43.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, extremely weak (R0), thin bedding, very friable, thinly laminated from 41.3-41.55' 43.5-44.9' - yellowish gray, (5Y 7/2), fine grained, no to mild HCl reaction, weak to extremely weak (R2 to R0), trace organics, voids over 40-50% of surface becoming larger with depth, trace organic material No Recovery 44.9-46.0'	- - - - - - R2: 2 minutes
- - - - - - 50 -6.9	R3-HQ 5 ft 88%	20	4 3 3 2 3 NR	44.7' - Fracture, <5 to 40 deg, rough, undulating 46.2' - Fracture, horizontal, smooth, planar, open 1/16" 46.4' - Fracture, horizontal, rough, undulating, open 3/16" 46.6' - Fracture, horizontal, smooth, planar, tight 46.9, 47.15' - Fractures (2), horizontal, rough, undulating, open 1/16"-3/16" 47.30' - Fracture, <5 deg, rough, undulating, tight 47.85' - Fracture, horizontal, smooth, undulating, open <1/16" 48.03, 48.55' - Fractures (2), horizontal,		Limestone 46.0-50.4' - yellowish gray, (5Y 7/2), fine grained, no to mild HCl reaction, extremely weak (R0), trace organics, voids over 10-15% of surface No Recovery 50.4-51.0'	R3: No runtime recorded
- - - - - - 55 -11.9	R4-HQ 5 ft 46%	0	>10 >10 >10	48.03, 48.35 - Fractures (2), monizonial, smooth, planar, tight 48.85, 49.35' - Fractures (2), smooth, planar to undulating, tight 49.60' - Fracture, <5 deg, smooth, stepped, tight 50.0' - Fracture, <5 to 30 deg, rough, stepped, open 3/8" 50.2' - Fracture, rough, planar to undulating, open 3/8" 50.4' - Fracture, horizontal, smooth, planar, open 51.7' - Fracture zone 51.7' - Fracture, 80 deg, rough, undulating, 0.4' long, open		Limestone 51.0-53.3' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), voids on 15-25% of surface, cavity up to 3/8" length at 52.3' No Recovery 53.3-56.0'	
	50.0						

APPENDIX 2BB-224 Rev. 4



PROJECT NUMBER:	BORING NUMBER:			
338884 FI	Δ_19	CHEET	OE	4

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 3/	23/07 START : 3/23/2007 END : 3/	26/20	07 LOGGER : R. McComb			
≥∩≘	. (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS		
ELO,	Ä, AND ≪ (%		ZES T	DESCRIPTION	O'C	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
		_		52.9' - Fracture zone, <5 to 90 deg, rough,	Ű	Limestone			
-			1	undulating 56.6' - Fracture zone, 80 to 90 deg, rough,	世	 56.0-60.9' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very 			
_				undulating	Ь	weak to weak (R1 to R2), voids variable from 1-2% to 20-25% of	1		
			1			surface]		
	R5-HQ 5 ft	87	0	58.0' - Fracture, 30 deg, smooth, planar, open	\vdash	_	SC-1 collected at 58.0- 59.3'		
_	98%	0,		-	F	-	-		
-			2	59.3' - Fracture, horizontal, smooth, planar,	F	-	-		
60 <u> </u>				open 59.9' - Fracture, horizontal, smooth, planar,	F	_	R5: 4 minutes		
-			1	open <1/16" 60.5' - Fracture, horizontal, smooth, stepped,	Ħ	-	-		
-	61.0		NR/	open 3/8"	Ħ	No Recovery 60.9-61.0'			
-			3	61.3, 61.75' - Fractures (2), horizontal, smooth, planar, open 3/16"	Ħ	Limestone 61.0-66.0' - Same as 56.0-60.9'			
_			_		Ħ	except cavities vary from 15-20% decreasing with depth, trace organics	1		
]		2	62.8' - Fracture, horizontal, smooth, planar,	片	as thin discontinuous laminae]		
	R6-HQ 5 ft	90	0	tight	H	_]		
	100%			63.0' - Fracture, horizontal, smooth, stepped, tight	片	<u>-</u>			
-	_		1	64.4' - Fracture, 50 deg, smooth, stepped,	片	-	SC-2 collected at 64.5-		
65 <u> </u>				open	世	_	65.5'		
-	66.0		1	65.5' - Fracture, horizontal, smooth,	出	-	R6: 4 minutes		
-	66.0			undulating, open 66.1' - Fracture, horizontal, smooth, planar,	世	Limestone			
-			2	open	L	- 66.0-68.5' - Same as 61.0-66.0'	1		
					3	66.8' - Fracture, <5 deg, smooth, stepped, open	L		1
			3	67.03' - Fracture, <5 deg, smooth, undulating, tight	F	_]		
	R7-HQ 5 ft	65	1	67.35' - Fracture, horizontal, smooth, planar,	H	- 00 5 70 05L valle 11 (5V 70)			
-	97%	-		open 67.9' - Fracture, 0 to 50 deg, rough, stepped,	₽	68.5-70.85' - yellowish gray, (5Y 7/2), very fine to fine grained, no to	-		
			2	open 68.45' - Fracture, 70 deg, smooth, planar,	F	moderate HCl reaction, very weak to weak (R1 to R2), some strong	-		
70 <u> </u>				tight — 69.6, 69.7' - Fracture (2), 0 to 50 deg, rough,	F	hydrochloric acid reaction in some cavities, voids over 20-25% of	SC-3 collected at 69.7- 70.85'		
-	71.0		0	undulating, open	厈	surface, trace cavities to 3/8"x3/16"	R7: No runtime recorded -		
-	7 1.0		NR)	71.25' Fracture horizontal amouth	匚	 No Recovery 70.85-71.0' Limestone 			
			2	71.25' - Fracture, horizontal, smooth, undulating, tight to open 3/16"	F	71.0-71.3' - Same as 68.5-70.85'	1		
			0	71.8' - Fracture, horizontal, smooth, stepped, tight, organic black covering 15-20% of	Щ	 71.3-73.5' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), very fine to]		
			J	surface	Ш	fine grained, mild to moderate HCI reaction, very weak to weak (R1 to]		
-	R8-HQ 5 ft	88	1	70.551.5	口	R2), laminated in zones with black organic material, fossil plant	-		
-	100%			73.55' - Fracture, horizontal, smooth, planar, open	口	 impression along fracture and 	-		
			1	· ·	士	bedding planes, voids <5%, trace cavities	-		
75 <u> </u>				74.8' - Fracture, horizontal, smooth, — undulating, tight	士	— 73.5-76.0' - Same as 68.5-70.85'	SC-4 collected at 74.9-		
-	76.0		2	andulaung, ugitt		_	75.7' _ R8: 9 minutes		
	7.5.0				1	-			



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-19

SHEET 5 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	on 3/	23/07 START : 3/23/2007 END : 3/2	26/20	07 LOGGER : R. McComb			
\$ D €				DISCONTINUITIES)G	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,		
H BI	TRU OVER	(%) Q	FRACTURES PER FOOT	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD		
JEPT SURF SLEV	SECO	ROL	'RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3.Y.ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.		
ЦОШ	0716	Ľ.	шп	75.6, 75.9' - Fractures (2), <5 deg, rough,	0)	Limestone			
_			>10	stepped -	Ħ	 76.0-77.5' - yellowish gray, (5Y 7/2), 	-		
_			. 40	76.0-77.5' - Fracture zone	世	very fine to fine grained, mild to moderate HCl reaction, very weak to	-		
_	-				>10	-	₽	 weak (R1 to R2), voids on 15-25% of 	-
_	R9-HQ		NR	-	П	surface, friable No Recovery 77.5-78.5'	-		
_	5 ft	30		-	扛	Limestone	SC-5 collected at 78.5-		
_	67%		1	-	士	- 78.5-80.35' - yellowish gray, (5Y 7/2),	79.65' -		
_				-	╁	fine to very fine grained, no to mild HCl reaction, becoming very soft	-		
80 <u> </u>			NR	79.65, 80.0' - Fractures (2), <5 deg, rough, stepped, open 3/8-3/4"		— (clay like) at base, organic material in	R9: 3 minutes		
-			1417		广	clayey to sandy limestone material No Recovery 80.35-81.0'	-		
-	81.0			-	世	Limestone	SC-6 collected at 81-82.75'		
-			0	-	₽	 81.0-86.0' - yellowish gray, (5Y 7/2), 	-		
_				-	Н	very weak to weak (R1 to R2), voids over 30-40% of surface, rare cavities	-		
_			1	-	扛	 up to 3/16", friable at 83.5-85.6', with 	-		
_	R10-HQ			82.7' - Fracture, 45 deg, rough, stepped, open, dark brown clay over 50% surface	士	interbedded clay to sand sized carbonate grains, some organic	-		
_	5 ft	46	>10	82.9-83.1' - Fracture zone, <5 deg,	╁	- material	-		
_	100%			undulating, thin brown clay lined <1/16", thick covering 100% surface		-	-		
			>10	83.7-86.0' - Fracture, <5 deg, rough, stepped,	H	-	-		
85 <u> </u>				open, various fractures having different orientations	H		R10: 7 minutes		
-			>10	-	₽	-	- Trimides		
-	86.0			OC 41. Freeture 20 to 40 dec. amouth	F	86.0-89.0' - Same as 81.0-86.0'	-		
-			0	86.1' - Fracture, 30 to 40 deg, smooth, planar, open	仜	 except cavities up to 3/4" over 1-5% 	-		
-				86.4' - Fracture, horizontal, rough, stepped 86.95' - Fracture, 30 deg, rough, stepped,	士	of surface	-		
-				tight	Н		SC-7 collected at 87.3-		
_	R11-HQ			-	F	-	88.7'		
-	5 ft	48	10	-	Ħ	-	-		
-	79%			88.65' - Fracture, 60 deg, rough, planar 88.9-89.1' - Fracture zone, <5 deg, rough,	世	89.0-89.95' - yellowish gray with light	-		
			>10	stepped, open -	₽	 olive brown mottling, (5Y 7/2 with 5Y 	-		
90 <u> </u>				89.4' - Fracture zone, 0 to 60 deg, rough, undulating, tight	F	5/6), mild to moderate HCl reaction, voids on 5-10% of surface, rare small	R11: 9 minutes		
-			NR		仜	 cavities, friable 	=		
-	91.0			91.1' - Fracture, horizontal, smooth, planar,	世	No Recovery 89.95-91.0' Limestone	-		
-			2	open	╁	91.0-91.3' - moderate olive brown to	-		
-				91.3' - Fracture, 10 deg, smooth, planar, tight	\vdash	olive gray, (5Y 4/4 to 5Y 3/2), fine to very fine grained, moderate HCl	-		
-			1	-		 reaction, extremely weak (R0), 	-		
-	R12-HQ			92.8' - Fracture, 90 to 80 deg, rough, planar, tight	廿	organics 91.3-94.5' - Same as 86.0-89.0'	-		
-	5 ft 100%	56	2	93.5' - Fracture, horizontal, smooth, planar,	世	 except thinly laminated at 91.3-91.4', with organics 	-		
-	100%			open -	仠	_ with diganics	-		
0.5			2	93.9' - Fracture, horizontal, rough, planar, open	揮	-	SC-8 collected at 94.6-		
95 <u> </u>				94.6' - Fracture, 80 deg, rough, planar — 95.1-95.65' - Fracture, horizontal, smooth,	口	-	95.4'		
-	96.0		10	planar, open	Ь	-	R12: 9 minutes –		
-	20.0								
L									

APPENDIX 2BB-226 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-19

SHEET 6 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

CONING	NIETHOD A	ND EC	JUIPIV	MENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	Casii	<u>ıg</u>	ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bg	s on 3	/23/07 START : 3/23/2007 END : 3/2	26/200	D7 LOGGER : R. McComb	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
SEL ON	N. A. Y.		FRACTURES PER FOOT	DESCRIPTION	<u> </u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AT AC	R F F F	(%) Q	E S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	屃	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	ORI	Ø	ZA ER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	OIK	œ	ш а	THIORNESS, SORI AGE STAINING, AND HOTTINESS	S		
					Н	Limestone	
-			3	96.4' - Fracture, 0 to 90 deg, rough,	Ш	 94.5-96.0' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong 	
-				undulating, open 96.7' - Fracture, horizontal, smooth, planar		HCl reaction, very weak to medium	1
_			1	96.8' - Fracture, continuation of 96.4'	Н	- strong (R1 to R3), voids over less	4
				97.8' - Fracture, 30 deg, smooth, planar	Ш	than 10% of surface, trace organics	
	R13-HQ			98.1' - Fracture, horizontal, smooth, planar,	\vdash	96.0-97.2' - yellowish gray, (5Y 7/2),	
_	5 ft 96%	70	2	tight -	Н	 fine grained, mild HCl reaction, very weak to weak (R1 to R2), laminated, 	1
-	90%			98.85' - Fracture, horizontal, rough,	ш	voids over 25-30% of surface,	1
-			1 1	undulating, tight	\vdash	- cavities over 10-15% of surface, near	SC-9 collected at 99.35-
100				99.35, 100.35' - Fractures (2), horizontal,	Н	base of interval, possible bioturbation	100.35'
-56.9			2	rough, undulating, open, silty infilling covering — 2-3%	Ш	at 96.5'	R13: 9 minutes
-	404.0			-	⊣	 97.2-99.1' - yellowish gray, (5Y 7/2), very fine grained, weak to medium 	1 1
-	101.0		NR	100.65' - Fracture, horizontal, rough, undulating, open	Ш	strong (R2 to R3), thinly laminated	SC-10 collected at 101.0-
_			0	andulating, open	Щ	with thin (<1") softer zone where	102.35'
					Н	voids are more prevalent, voids	
1 7				_	Ш	generally <5% of surface, rare	1
-			2	102.35' - Fracture, 30 deg, rough, undulating,	ш	cavities, rare fossils 99.1-100.8' - yellowish gray, (5Y 7/2),	1
-	DAALIO			open	H	very fine grained, moderate to mild	-
_	R14-HQ 5 ft	36	1	102.5' - Fracture, 60 deg, rough, planar, tight 103.0' - Fracture, <5 deg, rough, stepped, -	П	HCl reaction, very weak to weak (R1	
	86%	00	'	open	Ш	to R2), fossiliferous (casts/molds),	
_				=	ш	increasing with depth, voids over	1
			>10	-		 20-25% of surface, cavities increasing with depth 	-
105 <u> </u>			>10		Н	No Recovery 100.8-101.0'	D44: No montines as a said of
-01.9				_	Ш	Limestone	R14: No runtime recorded
	106.0		NR		Н	101.0-103.5' - Same as 99.1-100.8'	
				106.1' - Fracture, horizontal, rough,	Ш	 except fine grained, mild HCl reaction 	1
-			3	undulating, open	ш	103.5-105.3' - yellowish gray, (5Y	
-				106.6, 106.95' - Fractures (2), <5 deg, rough, -	Н	7/2), fine grained, mild HCl reaction,	-
_			3	stepped, open	П	very weak to weak (R1 to R2), some	
				107.1' - Fracture, 70 deg, rough, planar, open 107.4' - Fracture, horizontal, rough,	Н	fossils (molds/casts), voids over	
1 7	R15-HQ			undulating, open	Ш	 25-30% of surface, cavities (up to 1/16"-1/8") over 5% 	1
-	5 ft	64	2	107.6' - Fracture, 70 deg, rough, undulating,	曰	No Recovery 105.3-106.0'	SC-11 collected at 108.35-
-	100%			tight	₽┦	- Limestone	109.8'
1 _			1	108.2, 108.5, 109.0, 110.1' - Fractures (4), <5	Ш	_ 106.0-114.7' - Same as 103.5-105.3'	
110				deg, rough, undulating, open	$\vdash\vdash$		
-66.9					Ш		R15: No runtime recorded
-			2	110.45' - Fracture, 60 deg, rough, planar,	口	-	1
-	111.0			tight -	$\vdash\vdash\vdash$	_	-
			2	_	ш	_	
				111.7, 111.9' - Fractures (2), 80 deg, rough,	Щ		
				undulating, tight fracture, extends to 112.3'	${\mathbb H}^{\dagger}$	=	1
-			2	112.3' - Fracture, <5 deg, rough, undulating,	口	-	1
-	Bialia			open	ш	-	1 4
	R16-HQ 5 ft	78	0	112.45' - Fracture, 60 deg, rough, undulating, tight -	Ш	_	
	100%	70		ugiit	口		SC-12 collected at 113.5-
1 7				-	Н	-	114.7'
-			1	-	団	-	1
115				114.65' - Fracture, <5 deg, smooth,	尸		I 540 N
-71.9			2	undulating, open 115.02' - Fracture, 30 deg, rough, undulating, -	Н	_	R16: No runtime recorded
1	116.0			open	Ш		1
	. 10.0			- r ·	H		
			I				

APPENDIX 2BB-227 Rev. 4



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-19

SHEET 7 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

CORING	I WE I HOD AI	ND EC	JUIPIV	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v casi	<u>ıg</u>	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bgs	s on 3	/23/07 START : 3/23/2007 END : 3/	26/200	D7 LOGGER : R. McComb	
>	~			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELEN	COR	a Q	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
_			2	115.55' - Fracture, <5 deg, rough, undulating, open	Ш	Limestone - 114.7-115.7' - yellowish gray, (5Y	SC-13 collected at 116.4-
_				116.2, 116.4' - Fractures (2), horizontal,	Н	7/2), fine to medium grained, mild to	117.2'
l _			>10	rough, undulating, open 117.2-117.5' - Fracture zone, 0 to <5 deg,	Ш	moderate HCl reaction, very weak to weak (R1 to R2), 1/16" voids over	_
				smooth to rough, planar to stepped, open	Н	10-15% of surface, some cavities up	Driller's Remark: Possible void from 117.5-120.0'
	R17-HQ				\vdash	to 3/8"-3/4" irregular shaped, irregular distribution, fossil	Lost circulation at 118.0'
	5 ft 50%	17	NR			casts/molds rare to absent	
_					Н	115.7-116.0' - Same as 103.5-105.3'	1
120					ш	 except very fine grained, moderate HCl reaction, weak to medium strong 	1
-76.9				_	ш	(R2 to R3), <5% voids on surface	R17: 5 minutes
-	404.0		>10		╁┼	 116.0-117.5' - Same as 103.5-105.3' except possible voids 	1
-	121.0				甘	No Recovery 117.5-120.0'	-
-			2	121.2' - Fracture, horizontal, rough, stepped, open	Н	Limestone	-
-				121.4' - Fracture, stepped	ш	120.0-121.0' - Same as 103.5-105.3' except light olive brown, 15-20%	-
_			1		ш	_ cavities up to 3/8"	-
_				122.75' - Fracture, 75 deg, rough, stepped,	₽	121.0-123.1' - Same as 103.5-105.3' except light olive gray to grayish	_
_	R18-HQ 5 ft	63	1	tight	Ш	_ olive, (5Y 5/2 to 10Y 4/2),	
	100%	00	Ŀ	123.10' - Fracture, 40 deg, rough, undulating, tight	Н	fossiliferous zone (cavities) at 122.8'	
			2			123.1-124.9' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very	SC-14 collected at 123.10-
125			-	124.4, 124.92' - Fractures (2), horizontal, smooth, planar, tight	Ш	fine grained, strong HCl reaction,	124.4'
-81.9				Smooth, plantar, agric	Н	weak to medium strong (R2 to R3), thinly laminated with <5% voids (up	R18: 10 minutes
_	126.0		1	125.45' - Fracture, <5 deg, rough, undulating,	Н	to 10-15%)	1
-	0.0			tight	ш	124.9-130.15' - light olive gray, (5Y 5/2), fine grained, moderate to mild	1
-			1	126.9' - Fracture, 60 deg, rough, undulating,	₩	HCl reaction, weak (R2)	1
-				tight	ш	_	1
-			0		Н	<u></u>	1
-	R19-HQ				H	_	Driller's Remark: Softer at
_	5 ft	82	1	128.5' - Fracture, horizontal, rough, stepped,	世	_	130.0' and below -
-	88%			open	₽	_	SC-15 collected at 128.6- 130.15'
_			0		Ш	_	100.10
130				_	Ш		D40: 0it
-86.9			NR		\mathbb{H}	No Recovery 130.15-130.75'	R19: 8 minutes Driller's Remark: Lost core -
	131.0		1	120.0' Eracture harizantal amouth	H	_ Limestone	from 130.15-130.75'
			3	130.9' - Fracture, horizontal, smooth, undulating, open	oxdot	130.75-131.8' - Same as	
			3	131.15' - Fracture, vertical, rough, planar,	Ш	124.9-130.15' - 131.8-133.35' - yellowish gray to light	1
			40	tight 131.5' - Fracture, <5 deg, rough, undulating,	Ш	olive gray, (5Y 7/2 to 5Y 5/2), no to	1
-			10	open	Н	mild HCl reaction, very weak to weak	1
-	R20-HQ			131.7' - Fracture, 40 deg, rough, undulating, tight	Ħ	 (R1 to R2), voids on 20-25% of surface, <10% cavities, trace fossils 	1
-	5 ft 100%	28	6	132.0-133.0' - Fracture zone	Ш	133.35-133.5' - yellowish gray, (5Y	
-	100 /0			133.15, 133.18, 133.22, 133.40, 133.70,	Н	 7/2), strong HCl reaction, weak to medium strong (R2 to R3), <2% 	SC-16 collected at 133.75 134.84'
			1	133.80' - Fracture zone, <5 deg, rough, planar	団	voids, trace cavities	-
135 <u> </u>				_	╂┼┤	133.5-133.85' - Same as	R20: 6 minutes
-			10	135.22, 135.52, 135.6' - Fractures (3),	仠	133.35-133.5' except very weak (R1), laminated bedding	
	136.0			horizontal, smooth, planar, tight to open	H	- · · · · · · · · · · · · · · · · · · ·	

APPENDIX 2BB-228 Rev. 4



PROJECT NUMBER: BORING NUMBER:

338884.FL A-19

SHEET 8 OF 14

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	VATER LEVELS : 2.0 ft bgs on 3/23/0		s on 3/		26/20		,
≥O.⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A SCE	S.F.P	(%) Q	F.00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLK	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무유	ORE	Ø	AAC ER F	PLANARITY, INFILLING MATERIAL AND	YMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
교호피	225	ď	E 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
l _			0		Н	Limestone - 133.85-135.25' - Same as	SC-17 collected at 136.0- 137.3' -
					ш	133.35-133.5'	137.3
-	1			407.0 407.5L Frankings (0) hard-autal	Н	135.25-137.3' - Same as	1
-			3	137.3, 137.5' - Fractures (2), horizontal, rough, stepped, open	Н	- 131.85-133.35' 137.3-137.9' - yellowish gray, (5Y	1
-	R21-HQ			137.9' - Fracture, 50 deg, rough, stepped,	Ш	7/2), fine to very fine grained, mild	1
-	5 ft 64%	40	NR	open -	Н	 HCl reaction, very weak to weak (R1 to R2), voids over 15-20% of surface, 	1
-	0470		IVIX	-	ш	trace cavities up to 1-3/16", thinly	-
	-			-	Н	- laminated	1
140 <u> </u>			_1_	139.70' - Fracture, 50 deg, rough, stepped,	H	No Recovery 137.9-139.7' Limestone	R21: 6 minutes
-30.3			4	open 140.4' - Fracture, 15 deg, rough, stepped,		 139.7-141.0' - light gray to very light 	K21. 0 Illillutes
_	141.0			tight .	₽₩	gray, (N7 to N6), very fine grained, weak (R2), 2-3% voids over surface,	
_			1	140.55' - Fracture, <5 deg, rough, stepped, tight	ш	cavities over 5-10%, voids and	_
_			· I	140.56' - Fracture, horizontal, rough,	Ы	cavities more common with depth,	
			. 10	undulating, tight		cavities up to 1/16"-1/8" 141.0-142.05' - Same as	
l -	1		>10	140.72' - Fracture, 40 deg, rough, stepped, tight	Ш	139.7-141.0' except voids up to	1
_	R22-HQ			141.6' - Fracture, <5 deg, rough, stepped,	Н	10-15% of surface cavities up to 3/16", cavities interconnected	1
-	5 ft 100%	72	2	tight	ш	142.05-142.5' - yellowish gray to light	1
-	10070			142.05-142.35' - Fracture zone, horizontal, rough, stepped, open	Н	gray, (5Y 5/2 to N7), strong HCl	
	-		1	142.5' - Fracture, horizontal, rough,	H	reaction, weak to medium strong (R2 to R3)	SC-18 collected at 144.15- 145.05'
145 <u> </u>	-			undulating, tight 142.65' - Fracture, horizontal, rough,	世	— 142.5-142.6' - moderate olive brown,	R22: 10 minutes
-	-		3	stepped, tight	Н	_ fine to very fine grained, extremely weak (R0)	-
-	146.0			143.65' - Fracture, 0 to 20 deg, rough, planar, tight	ш	- 142.6-143.5' - Same as	SC-19 collected at 146.0-
-	.		0	143.95' - Fracture, 20 deg, rough, undulating,	ш	142.05-142.5'	147.3' -
-				tight	₽₽	143.5-144.65' - yellowish gray, (5Y - 5/2), strong HCl reaction, weak (R2),	-
_			1	144.25' - Fracture, horizontal, rough, stepped, open		voids over 15% of surface	
_			•	145.05' - Fracture, horizontal, rough,	Н	144.65-145.05' - yellowish gray, (5Y – 5/2), very fine to fine grained, mild to	_
_	R23-HQ 5 ft	70	1	undulating, open 145.85, 145.90' - Fractures (2), 20 deg,	Щ	moderate HCl reaction, voids rare to	_
	100%	70		rough, undulating, open	Щ	absent - 145.05-145.4' - light olive gray, (5Y]
l -				147.3' - Fracture, 0 to 20 deg, rough, undulating, open	\mathbb{H}	5/2), moderate to strong HCI]
150	1		1	148.55' - Fracture, 50 deg, rough, undulating,	H	reaction, weak (R2), voids over	1
-106.9	1			tight	H	 30-40% of surface, cavities over 5-10% of surface, angular to round 	R23: 5 minutes
-	151.0		2	149.9' - Fracture, 60 deg, rough, planar, tight 150-150.5' - Fracture, 70 deg, rough,	Н	limestone clasts of very fine grained	-
-	101.0			undulating, tight	世	limestone145.4-148.1' - light olive gray, (5Y	1
-			2	150.95' - Fracture, 0 to 90 deg, rough, undulating, tight	H	5/2), mild to moderate HCl reaction,	-
-			$\vdash \vdash \vdash$	151.0-151.4' - Fracture, 70 deg, rough,	Ħ	very weak (R1), voids on 5-15% of	-
-			0	stepped, tight	世	surface - 148.1-151.0' - Same as 145.4-148.1'] -
-	B04110			151.95' - Fracture, 50 deg, rough, undulating, tight	dash	 except weak (R2), trace cavities up] -
-	R24-HQ 5 ft	82	2	· · · · · · · · · · · · · · · · · · ·	Ш	to 3/8", voids over 15-25% of surface 151.0-153.35' - yellowish gray to light] -
-	100%			153.75' - Fracture, horizontal, rough, planar,	H	olive gray, (5Y 7/2 to 5Y 5/2), mild to]
_]		3	open	Ħ	moderate HCI reaction, medium	
155				154.15' - Fracture, horizontal, smooth, undulating, open	Н	strong to weak (R3 to R2), voids over 5-15% of surface	SC-20 collected at 154.7-
-111.9]			154.30, 154.55' - Fractures (2), horizontal,	Ш	153.35-154.7' - fine grained, no to	156'
-	156.0		0	smooth, undulating, tight	Ш	mild HCl reaction, very weak (R1), thinly laminated below 154.0'	R24: 6 minutes -
						Timity laminated below 154.0	

APPENDIX 2BB-229 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-19
SHEET 9 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IENT . CIVIE 330X 3/N 340233, ITIUU TOLAIY, FIQ 10015, FIV			ORIENTATION: Vertical
WATER	LEVELS : 2.0) ft bgs	s on 3		26/20	D7 LOGGER : R. McComb	
> 0 0	<u></u>			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표실한	N. Y.	(9)	FRACTURES PER FOOT		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
F ₹	E R OVE	(%) Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
989	RNIO	Ø	RA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ОΩШ	074	ď	шД	THIORNEOU, OUTH AGE CTAINING, AND HOTTINEOU	S		
			0		ш	154.7-156.0' - Same as	
_			0		т	- 151.0-153.35' Limestone	1
-						156.0-158.03' - moderate olive	1
-			1	157.15' - Fracture, 20 deg, smooth, planar,	Н	brown, (5Y 4/4), fine grained, very	
l _				tight, open <1/16", brown clay infilling <1/16" over 10%	Ш	weak to weak (R1 to R2), voids on	
	R25-HQ			158.02-159.0' - Fracture zone, horizontal,		15-20% of surface with interlaminate	
-	5 ft	74	>10	rough to smooth, planar to undulating, open	ш	- zones of finer grained limestone with	1
-	100%			to tight	Н	_ <5% voids, rare cavities _ 158.03-158.5' - yellowish gray, (5Y	-
l _			2	150 Al. Frantissa havirantal amanth planes		- 7/2), fine grained, mild to moderate	
160			-	159.4' - Fracture, horizontal, smooth, planar, tight	Н	HCl reaction, weak (R2), <3% voids,	SC-21 collected at 159.5-
-116.9					ш	thinly laminated	160.3' — R25: 7 minutes
-			2	160.3' - Fracture, horizontal, rough, planar,	\Box	- 158.5-159.4' - yellowish gray, (5Y	R25. / Illillutes
l -	161.0			open	Н	7/2), strong HCl reaction, medium	_
			5	160.4' - Fracture, horizontal, rough, undulating, tight		strong (R3), <1% voids, thinly laminated	
I -)	161.2, 161.25' - Fractures (2), 30 deg, rough,	Ш	159.4-161.65' - light olive gray to light	
-				stepped, open	Н	olive brown, (5Y 5/2 to 5Y 5/6), fine	-
-			3	161.55' - Fracture, 40 deg, rough, stepped,	ш	grained, very weak to weak (R1 to	-
I _				open	Н	R2), voids on 25-30% of surface,	
	R26-HQ			161.65' - Fracture, <5 deg, rough, undulating,	Н	3/8" voids up to 3-5%, very thinly laminated	
_	5 ft 100%	8	>10	open 161.9' - Fracture, horizontal, smooth, planar,	ш	161.65-161.87' - light olive gray, (5Y	1
-	100 /6			open	╁	5/2), fine to very fine grained, weak	-
l -			>10	162.6' - Fracture, horizontal, rough,	╨	(R2), voids over 5-10% of surface	1
165				undulating, open	Ш	161.87-162.2' - olive gray to medium	
-121.9				162.75' - Fracture zone, 30 to 90 deg, rough,	Н	olive brown, (5Y 3/2 to 5Y 4/4), fine to very fine grained, extremely weak	R26: 6 minutes
-	100.0		4	stepped, tight 162.9' - Fracture, <5 deg, rough, stepped,	ш	(R0), thinly laminated	1
-	166.0			open	ш	- 162.2-162.72' - Same as	-
l _			>10	162.9-163.5' - Fracture zone, <5 to 90 deg,	Н	_ 159.4-161.65'	_
			"	rough, undulating to stepped, open		162.72-166.0' - yellowish gray, (5Y	
I -				163.5-165.1' - Fracture zone, horizontal,	ш	 5/2), fine grained, moderate to strong HCl reaction, weak (R2), voids over 	
-			1	smooth to rough, planar, open 165.1' - Fracture, 0 to 50 deg, smooth,	H	5-10% of surface	-
-	507.10			planar, open		- 166.0-166.95' - dusky yellow to light	-
_	R27-HQ 5 ft	64	1	165.3' - Fracture, 30 deg, smooth, stepped,	ш	olive brown, (5Y 6/4 to 5Y 5/6), fine	_
	100%	0-	'	tight	П	grained, moderate HCl reaction, very	SC-22 collected at 168.7-
I -				165.5, 165.8' - Fractures (2), 0 to 90 deg,	П	 weak (R1), thin laminae of extremely weak rock (R0), voids over 5-10% of 	169.7'
I			3	rough, stepped, open 166.0-167.0' - Fracture zone, 0 to 40 deg,	╀┦	_ weak rock (RO), voids over 5-10% or surface	-
170_				smooth to rough —	ш	— 166.95-168.5' - yellowish gray to light	D07: 0 it
-126.9			10	167.15' - Fracture, 50 deg, rough, planar,	\vdash	olive gray, (5Y 7/2 to 5Y 5/2), fine to	R27: 8 minutes
1	171.0		'0	tight	Н	very fine grained, laminated with very]
I -				167.85' - Mechanical break 168.70' - Fracture, horizontal, rough,	ш	 fine grained limestone with <1% voids, rest of rock up to 15-20% 	1
-			2	undulating, tight	+	voids, rest of fock up to 15-20 % voids, rare cavities	1
I -				169.7' - Fracture, horizontal, rough,		_ 168.5-169.9' - yellowish gray, (5Y	
			2	undulating, open	Ш	7/2), fine grained, very weak to weak	
I -				169.7-170.1' - Fracture zone, 0 to 90 deg,	\vdash	(R1 to R2), voids over 5-10% of	1
-	R28-HQ			rough, undulating, tight	世	surface169.9-171.0' - yellowish gray, (5Y	1
I -	5 ft	74	2	170.1' - Fracture, <5 deg, rough, undulating, open	μП	7/2), fine grained, weak (R2), voids	-
I -	100%			170.65' - Fracture, 5 deg, rough, undulating,	Н	over 15-25% of surface, 1/8"-3/16"	l J
			_	tight	口	cavities over 5% of surface]
175			5	171.55' - Fracture, horizontal, rough,	ш	-	R28: 8 minutes
175 <u></u> -131.9				stepped, tight	H		⊢
.51.5			1	171.85' - Fracture, 60 deg, rough, undulating, tight		_	
	176.0			ugiit	Ш		
					_		

APPENDIX 2BB-230 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-19

SHEET 10 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 2.0) ft bgs	s on 3/	23/07 START: 3/23/2007 END: 3/	26/20	07 LOGGER : R. McComb	
≥∩ ∵	(9)			DISCONTINUITIES	ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIC	TH.,	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	O LIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF	ORE	Ø	ZAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	025	ď	# 5		Ś		5 1 1 1111
1 _			10	172.20' - Fracture, 50 deg, rough, undulating, tight		171.0-177.4' - yellowish gray to pale - olive, (5Y 7/2 to 10Y 6/2), fine	End drilling on 3/24/07 at 176.0' at 17:00 hrs
				172.70' - Fracture, horizontal, smooth, planar,	\perp	grained, moderate to strong HCl	Water level at 2.0' below
			7	infilling, tight, brown silty infilling over 5% 173.1' - Fracture, horizontal, rough,		reaction, weak (R2), generally <3-5% voids, voids up to 10-15% of surface	ground surface Begin coring at 176.0' on
			<i>'</i>	undulating, tight	Ъ	from 174.0-174.7', rare cavities up to	3/25/07, continuing to have
-	R29-HQ			173.3' - Fracture, <5 deg, rough, undulating,		3/4" to 1-3/16"	lost circulation
_	5 ft 72%	28	2	open 174.05' - Fracture, horizontal, rough,	\vdash	 Limestone 177.4-178.5' - light olive gray, (5Y 	1
_	1270		>10	undulating, black stain over 5%	1	5/2), mild to moderate HCl reaction,	1
100			- 10	174.45' - Fracture, 10 deg, rough, planar, tight	\perp	 weak (R2), voids on 10% of surface, 3/4" to 1-3/16" cavities on 3-5% of 	1
180 <u> </u>			ND	174.7' - Fracture, <5 deg, rough, stepped,	╁	surface, thin organic laminae at	R29: 8 minutes
-			NR	open -	F	 177.8' inclined at 30-40 deg 	-
-	181.0			174.82' - Fracture, 10 deg, smooth, planar, dark brown clay over 80%, open	世	178.5-179.6' - yellowish gray, (5Y 7/2), fine grained, strong HCl	-
-			2	174.87' - Fracture, 10 deg, smooth, planar,	\vdash	 reaction, weak (R2), voids over 	4
-				dark brown clay over 80%, open 175.4-176.0' - Fracture, vertical, rough,	ፗ	5-10% of surface, cavities over 5-10% of surface, typically 3/8" long,	Drillorio Domori:: 0-#
			>10	undulating to stepped, tight	\vdash	_ fossiliferous	Driller's Remark: Soft at 183.0-184.0'
_			. 10	176.3-176.8" - Fracture, 0 to 90 deg, rough,		No Recovery 179.6-181.0'	100.0 101.0
	R30-HQ 5 ft	1 14	>10	undulating to stepped, open 177.15, 177.25, 177.3' - Fractures (3), 20		Limestone 181.0-183.0' - yellowish gray, (5Y	
	96%	14	-10	deg, smooth, planar, open		7/2), fine grained, moderate to strong	
				177.5' - Fracture, <5 deg, rough, undulating, tight		HCI reaction, weak (R2), voids on 3-5% of surface, some cavities up to	
185			4	177.6' - Fracture, <5 deg, smooth,	\top	3/4" to 1-3/16" long	Ī
-141.9				undulating, open 177.75, 177.85' - Fractures (2), 20 deg,	1—	183.0-183.5' - moderate olive brown, (5Y 4/4), fine grained, very weak	R30: 8 minutes
-	186.0		2	rough, planar, open	Ħ	(R1), voids on 5-10% of surface	1
-	100.0		NR)	178.3' - Fracture, 30 deg, rough, undulating,	╁	183.5-184.2' - yellow gray to light	1
-			3	tight 178.85' - Fracture, 60 deg, rough, undulating,	\perp	olive gray, (5Y 7/2 to 5Y 5/2), strong HCl reaction, weak (R2)	1
_				open	仜	- 184.2-185.3' - yellowish gray,	-
_			2	181.7' - Fracture, <5 deg, rough, stepped, tight	╁	moderate to strong HCl reaction, weak (R2), voids over 28-30% of	SC-23 collected at 187.3-
_	R31-HQ			181.8' - Fracture, vertical, smooth,	F	 surface, cavities over 5-10% of 	188.6'
_	5 ft	68	3	undulating, tight 181.95' - Fracture, <5 deg, rough, stepped,	H	surface, fossiliferous 185.3-185.8' - Same as 183.5-184.2'	_
_	100%			tight	₽	No Recovery 185.8-186.0'	_
			3	182.5-182.75' - Fracture zone, rough to	口	Limestone	_
190_				smooth, various fracture plane orientations 182.5' - Fracture, <5 deg, rough, undulating, —	\vdash	186.0-187.0' - yellowish gray, (5Y — 7/2), very fine grained, moderate to	<u> </u>
-146.9			1	open	F	strong HCl reaction, weak (R2),	R31: 7 minutes
	191.0			182.75' - Fracture, <5 deg, rough, undulating, open	片	voids on 1-3% of surface - 187.0-187.3' - Same as 186.0-187.0'	
]			9	183.0' - Fracture, <5 deg, rough, undulating,	\vdash	except voids increase to 15-20% with	1
1			3	open		some cavity infilling and staining on vertical fractures	SC-24 collected at 191.55-
				183.2' - Fracture, 30 deg, rough, undulating, open		187.3-189.2' - yellowish gray, (5Y	192.55'
			1	183.45-183.65' - Fracture zone	\vdash	7/2), strong HCl reaction, weak (R2),	1
-	R32-HQ			183.65-185.7' - Fracture, vertical, undulating to planar, tight	Ħ	voids over 1-3% of surface 189.2-190.0' - moderate olive brown,	
-	5 ft 100%	40	4	184.2' - Fracture, horizontal, rough, planar to	世	(5Y 5/6), fine grained, no to mild HCl	
-	100%			stepped 184.3' - Fracture, 50 deg, rough, stepped,	H	reaction, extremely weak to very weak (R0 to R1), voids over 40-50%	1
			>10	open	士	of surface, irregular cavities up to	-
195 <u> </u>				184.6, 185.1' - Fracture (2), 0 to 90 deg,	╂┬	3/8"-3/4"	R32: 9 minutes
.35			>10	rough, undulating 186.0-186.9' - Fracture, vertical, rough,	F	_	
	196.0			stepped, tight	H		_
ldot					1		

Rev. 4



PROJECT NUMBER:	BORING NUMBER
338884.FL	A-19

A-19

SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 2.0) ft bgs	on 3/	23/07 START : 3/23/2007 END : 3/2	26/20	07 LOGGER : R. McComb	
≥ ∩ ⊕	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - -	R33-HQ 5 ft	75	0 0	186.25' - Fracture, horizontal, smooth, planar 186.8' - Fracture, <5 deg, rough, stepped, tight 187.3, 187.4, 187.55' - Fractures (3), 50 deg, rough, undulating, tight 188.6' - Fracture, <5 deg, smooth, undulating, open 188.7' - Fracture, <5 to 90 deg, rough,		190.0-191.0' - light olive brown, (5Y 5/6), fine grained, no to mild HCl reaction, very weak (R1), voids on 25-30% of surface, small cavities on 1-3% of surface Limestone 191.0-193.5' - yellowish gray, (5Y 7/2), fine to very fine grained,	SC-25 collected at 196.0- 196.9' - - - -
- 200 -156.9 -	96% 201.0		3 4 NR	stepped, open 189.35' - Fracture, horizontal, rough, planar, open, black organics over 95% 189.5' - Fracture, horizontal, rough, undulating, open 189.95, 190.0' - Fractures (2), horizontal, rough, planar, open 191.1' - Fracture, 50 deg, rough, undulating,		moderate to strong HCI reaction, weak (R2), trace cavities up to 3/8"-3/4" in length, voids on 10-15% of surface 193.5-193.65' - light olive brown, (5Y 5/6), moderate HCI reaction, very weak (R1), voids over 1-5% of surface, thinly laminated at base,	R33: 9 minutes
 205_ -161.9	R34-HQ 5 ft 1 98%	52	4 2 2	open 191.25' - Fracture, <5 deg, rough, undulating, open 191.5' - Fracture, 50 deg, rough, stepped, tight 192.55' - Fracture, 40 deg, rough, undulating, tight 193.55, 193.65' - Fractures (2), <5 deg, rough, undulating, open 193.8' - Fracture, 40 deg, smooth, undulating, open 193.95-196.0' - Fracture zone, various orientations, rough, open		trace organics 193.65-195.0' - yellowish gray, (5Y 7/2), fine grained, strong HCI reaction, very weak (R1), voids over 1-5% of surface 195.0-196.0' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCI reaction, very weak (R1), voids on 1-5% of surface 196.0-196.9' - yellowish gray, (5Y 7/2), fine grained, mild to strong HCI reaction, very weak (R1), voids on 15-20% of surface, cavities over 10%	- - - - - - R34: 10 minutes
- - - - - 210 -166.9	206.0 R35-HQ 5 ft 100%	42	0 NR/ 2 4 4 10	196.9' - Fracture, <5 deg, rough, stepped 199.74' - Fracture, horizontal, rough, stepped, open 199.8' - Fracture, horizontal, rough, undulating, open 199.95, 200.03' - Fractures (2), horizontal, rough, stepped, open 200.20' - Fracture, 20 deg, smooth, undulating, open 200.5, 200.65' - Fractures (2), horizontal, rough, stepped, open 201.05' - Fracture, <5 deg, rough, stepped, open 201.3' - Fracture, 0 to 90 deg, rough, undulating, open 201.4, 201.5' - Fractures (2), <5 deg, rough,		196.9-197.8' - yellowish gray, (5Y 7/2), fine grained, strong HCI reaction, very weak to weak (R1 to R2), voids over 1-5% of surface, cavities rare 197.8-199.4' - Same as 196.0-196.9' 199.4-200.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, strong HCI reaction, very weak (R1), voids over 5-10% of surface, trace cavities 200.2-200.8' - yellowish gray, very fine grained, very weak to weak (R1 to R2), voids on 1-3% of surface, cavities over 10-15% up to 3/4"-1-3/16" length, abundant	SC-26 collected at 206.6- 207.65' - - - - R35: 9 minutes
- - - - - 215 -171.9	R36-HQ 5 ft 46%	14	>10 10 >10 NR	undulating, open 202.2-202.35' - Fractures (2), 50 deg, rough, planar, tight 202.75-203.1' - Fracture zone, 50 to 60 deg, rough, planar, tight 203.85, 204.55' - Fractures (2), <5 deg, rough, undulating, tight 204.8-205.5' - Fracture zone, 50 to 60 deg, rough, undulating, open 206.25, 206.6' - Fractures (2), <5 deg, rough, undulating, tight 207.65, 207.85' - Fractures (2), <5 deg, smooth, planar, open, organic material over 30% 207.94' - Fracture, horizontal, rough,		hair-line fractures No Recovery 200.8-201.0' Limestone 201.0-202.5' - Same as 200.2-200.8' 202.5-203.0' - light olive gray, (5Y 5/2), fine grained, very weak (R1), voids on 1-3% of surface, laminated organics in lower section	R36: 10 minutes
	216.0			undulating, open	Ë		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-19	SHEET	12	OF	14

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

WATER	LEVELS : 2.0) ft bgs	s on 3/	23/07 START : 3/23/2007 END : 3/	26/20	07 LOGGER : R. McComb	
≥∩≘	(9)			DISCONTINUITIES	စ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	(%) _Q	FOOT FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EN SEPT	SORE ENG SECC	ROE	'RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014	ш.		207.98, 208.1' - Fractures (2), horizontal,	+ "	203.0-205.9' - yellowish gray to light	
-			4	smooth, planar, organic material over 40%	F	 olive yellow, (5Y 7/2 to 5Y 5/2), very 	-
-				208.13' - Fracture, 40 deg, smooth, planar, open	Ė	fine grained, mild to moderate HCl reaction, weak (R2), voids over	1
-			>10	208.4-208.55' - Fracture, rock has	L	 40-50% of surface, cavities up to 	1
-	R37-HQ			semi-circular fracture pattern, discontinuous, unbroken fracture plane		1-3/16"-1-9/16" penetrating into core, some recrystallization infilling with	-
_	5 ft	0		208.55' - Fracture, 10 deg, smooth, planar,	ш	 very fine grained limestone in 	
-	37%			tight 208.80' - Fracture, horizontal		cavities, trace fossil casts No Recovery 205.9-206.0'	-
-			NR	209.05' - Fracture, horizontal, smooth, planar,	+	Limestone Limestone	1
220 -176.9				open 209.20' - Fracture, <5 deg, rough, undulating,	F	206.0-207.65' - Same as 203.0-205.9'	R37: 8 minutes
-170.5				open -	t	_ Limestone	NS7. 6 minutes
-	221.0			209.85-211.0' - Fracture zone, numerous fractures of different orientations	世	207.65-209.75' - yellowish gray, (5Y 5/2), very fine grained, very weak	-
_			>10	211.0-212.05' - Fracture zone, numerous		(R1), voids over 10-15% of surface,	-
_				fractures of different orientations 212.75, 212.9' - Fractures (2), 10 deg, rough,	口	trace cavities (up to 3/8"x3/16") ellipsoidal in shape	-
_			>10	planar, tight	上	_ 209.75-212.0' - light olive gray, (5Y	-
_	D00 110			212.9-212.15' - Fracture zone, various orientations	╁	7/2), fine grained, mild HCl reaction, very weak (R1), voids on 20-30% of	-
_	R38-HQ 5 ft	21	>10	216.0-216.2' - Fracture zone, horizontal,		_ surface	1
_	76%			rough, planar, open 216.55' - Fracture, <5 deg, rough, undulating,		212.0-213.3' - very fine grained, mild to moderate HCl reaction, voids on	1
-			2	open		_ 15-20% of surface, 10-15% cavities	1
225				216.75' - Fracture 216.9' - Fracture, horizontal, smooth,	₽	up to 3/4" to 1-3/16" in length No Recovery 213.3-216.0'	I
-181 <u>.9</u> -			NR	undulating, open	ш	Limestone	R38: 8 minutes
_	226.0			217.05-217.3' - Fracture zone, horizontal, smooth, planar, open	仜	216.0-216.8' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak	1
_			10	217.3' - Fracture, horizontal, rough, planar,	┢┰	(R2), fossiliferous, laminated with	_
_				open 217.57-217.8' - Fracture zone, rough, planar,	\vdash	black organic material,voids over 20% of surface, cavities up to 3/8" on	_
_			>10	various orientations		5% of surface	_
_				221.0' - Fracture, horizontal, rough, undulating, open	Ľ	216.8-216.9' - yellowish gray, (5Y - 7/2), very fine grained, moderate HCl	_
_	R39-HQ 5 ft	0	>10	221.6-222.05' - Fracture zone, horizontal,	₽	reaction, weak (R2)	_
-	56%			rough, undulating, open 221.7-222.0' - Fracture zone	\Box	216.9-217.85' - Same as - 216.8-216.9' except color is lighter	_
-				222.3' - Fracture, horizontal, rough, stepped,	口	No Recovery 217.85-221.0'	
230 -186.9			NR	open 222.5' - Fracture zone, 20 deg, rough, —	上	Limestone — 221.0-222.3' - yellowish gray, (5Y	D20: 40 minute -
-100.9				undulating, open 222.7-223.6' - Fracture zone	╁	7/2), fine to very fine grained, very weak (R1), rounded to subrounded	R39: 10 minutes
_	231.0			224.05, 224.3' - Fractures (2), 60 to 70 deg,	F	 rock fragments, voids on 5-10% of 	
_			>10	rough, undulating, open 224.65' - Fracture, <5 deg, rough, undulating,	片	surface, 3/4"-3/16" cavities on 10% of surface	
-				open -	片	_ 222.3-223.4' - yellowish gray, (5Y	4
_			>10	226.4' - Fracture, <5 deg, rough, undulating, open	\vdash	7/2), very fine grained, mild to moderate HCl reaction, very weak]
-				226.4-226.65' - Fracture zone, rough,	\vdash	(R1)	_
_	R40-HQ 5 ft	9	>10	undulating, gravel-sized limestone fragments, open	口	223.4-223.5' - Same as 221.0-222.3' 223.5-224.8' - pale gray, (5Y 6/2),	
_	64%			226.5' - Fracture, horizontal, rough,	上	fine grained, mild HCl reaction, very	
_			_1_	undulating, open 227.05-228.8' - Fracture zone, <5 deg, rough,	\vdash	weak (R1), fossiliferous, voids on 20-25% of surface, cavities (<3/8")	_
235_			NR	stepped, open	F	over 1-3% of surface	D40: 0
-191.9 -			INIT	231.0-232.0' - Fracture zone, various orientation, gravel-sized rock fragments,	片	No Recovery 224.8-226.0'	R40: 9 minutes
	236.0			black coating on fragments from 231.0-231.2'	\vdash		
					1		
1			1		1		

APPENDIX 2BB-233 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-19	SHEET	13	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 3/	23/07 START : 3/23/2007 END : 3/2	26/20	07 LOGGER : R. McComb					
≥∩≘	. (9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.				
- - -	R41-HQ		>10	232.4-232.8' - Fracture, vertical, rough, undulating, tight - 233.0-233.6' - Fracture zone, various orientations 233.7' - Fracture, 0 to 90 deg, smooth, planar, open 234.2' - Fracture, horizontal, rough,		Limestone - 226.0-228.8' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, very weak (R1), voids over 5-10% of surface, concentrated to 20-30% of surface in thin (1") beds, trace organics, cavities up to	- - -				
- 240 -196.9	5 ft 30%	0	NR	undulating, open 236.0-236.75' - Fracture zone, 0 to <5 deg, rough, stepped to undulating, open, distinct fracture planes at 236.12', 236.4', 236.75' 237.0-237.5' - Fracture zone, gravel-sized rock fragments		- 3/4"-1-3/16" present at 226.0-226.7' No Recovery 228.8-231.0' Limestone - 231.0-231.8' - light olive brown, (5Y 5/6), fine grained, very weak (R1), voids over 15-20% of surface - Limestone					
-	241.0		>10	241.0-243.0' - Fracture, 0-90 deg, rough, planar, open		231.8-233.5' - yellowish gray, (5Y 7/2), very fine grained, very weak (R1), gravel-sized limestone fragments, trace voids 233.5-234.2' - yellowish gray, (5Y	- - -				
-	R42-HQ	0	0	0	0	0	>10	- -		7/2), very fine to fine grained, moderate to mild HCl reaction, very weak (R1), trace to 10% voids increasing with depth, some organic	- -
- 245 -201.9	5 ft 40%	U	NR	- - - -		staining at 234.1' No Recovery 234.2-236.0' Limestone 236.0-236.75' - yellowish gray, (5Y 7/2), fine grained, no to mild HCl reaction, very weak (R1), sandy	R42: 9 minutes				
-	246.0		>10	246.0-247.0' - Fracture zone		texture with inclined fracture traces - 236.75-237.5' - Same as - 233.5-234.2' No Recovery 237.5-241.0'	-				
- - -	R43-HQ 5 ft 46%	0	10	247.1' - Fracture, horizontal, smooth, planar, open 247.4' - Fracture, 80 deg, rough, stepped, open 247.6' - Fracture, horizontal, rough,		Limestone 241.0-243.0' - yellowish gray, (5Y 7/2), very fine to fine grained, no to mild HCI reaction, limestone fragments, voids and cavities present on some surfaces	- - -				
250 -206.9 -206.9	251.0		NR	undulating to stepped, open 248.05, 248.25, 248.35' - Fracture (3), horizontal, rough, undulating, open		 No Recovery 243.0-246.0' Limestone 246.0-248.3' - fine to very fine grained, mild HCl reaction, extremely weak to weak (R0 to R2), voids over 30-40% of surface to 247.8', 0-5% of surface on 247.8-248.3' 	R43: 9 minutes -				
- - -	R44-HQ 5 ft 0%	0	NR	- - - -		No Recovery 248.3-251.0' No Recovery 251.0-256.0'	- - - -				
255_ -211.9 _	256.0					- -	R44: 6 minutes				
<u> </u>											

APPENDIX 2BB-234 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-19	SHEET	14	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

CORING	METHOD A	ND FC	JUIPN	IENT : CME 550X S/N 340253, mud rotary, HQ tools, HW	casi	ng	ORIENTATION : Vertical
WATER	LEVELS : 2.0) ft bas	s on 3	/23/07 START : 3/23/2007 END : 3/2	26/200	D7 LOGGER : R. McComb	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG		
HH	L.A.A.	(%)	JRE OT		잌	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HAY W	E R STH OVE	(%) _Q	STU	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BOL	WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P. S. S.	SOR	Ø	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ПОП	Olk	ď	шп		S		
_			>10	256.0-257.0, 261.0-261.5' - Fracture zone, various orientations, gravel-sized rock -		Limestone - 256.0-257.0' - yellowish gray, (5Y	_
_				fragments		7/2), fine grained, no to mild HCl	_
					Ш	reaction, extremely weak to very	
_				-	Н	 weak (R0 to R1), poorly fossiliferous, some organic staining 	1
-	R45-HQ			-		No Recovery 257.0-261.0'	1
-	5 ft	0		-	Ш	-	-
-	20%		NR	-		-	-
_				_	Н	_	-
260							
-216.9					Ш		R45: 13 minutes
	261.0			_			1
-			>10	-	$\vdash \vdash$	Limestone	1
-				-		- 261.0-261.5' - Same as 256.0-257.0'	-
-				-	Н	No Recovery 261.5-266.0'	-
-				-		-	-
_				_	Н	_	-
_	R46-HQ 5 ft	0		_		_	_
	10%	0	NR		Ш		
_				_		_	1
265				-	Н	-	1
-221.9						-	R46: 9 minutes
-				-	H	-	-
-	266.0				Н	Bottom of Boring at 266.0 ft bgs on	-
_				-	l I	- 3/26/2007	-
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PROJECT NUMBER: BORING NUMBER: 338884.FL A-20

SOIL BORING LOG

SHEET 1 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 wing bit ORIENTATION: Vertical

WATER	LEVELS	: 1.61 ft b	ogs on 6/	14/07 S	START : 4/24/2007 END : 5/1/2007 LOGGE	R:	C.	Dougherty, R. McComb
				STANDARD	SOIL DESCRIPTION	J	G	COMMENTS
AND (f)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		7	CLO	
1 BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	ı	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ı	SYMBOLIC LOG	INSTRUMENTATION
42.3	0.0			(N)	Poorly Graded Sand With Organics (SP)	+	S	
-	0.0			0004	0.0-1.0' - light gray, (N6), moist, loose, very fine to fine	+		-
-		1.6	SS-1	2-2-3-4 (5)	grained, up to 30% fine organics, trace nonplastic fines, grades to silty sand below	+		-
-				(-)	Silty Sand (SM)	41		-
-	2.0				1.0-1.6' - grayish brown, (5YR 3/2), moist, loose, fine grained, 20% nonplastic fines, fines may be organics	+	11	-
-				2004	Silty Sand (SM)	+		-
-		1.0	SS-2	3-6-8-4 (14)	2.0-3.0' - Same as 1.0-2.0' except moderate yellowish brown, (10YR 5/4), wet, medium dense, trace roots	┦		-
-	4.0			, ,	(· · ·), · · · · · · · · · · · · · · ·	1		-
-	4.0				Poorly Graded Sand With Silt (SP-SM)	+	H	Water level is based on Ground Water
				1101	4.0-6.0' - pale yellowish brown, (10YR 6/2), wet, very loose, fine grained, 8% low plastic fines, grades to	1		Monitoring at LNP site (FSAR Table -
5 37.3		2.0	SS-3	1-1-0-1 (1)	dusky brown (5YR 3/2)	٦į		2.4.12.08) Driller's Remark: Spoon fell through 3rd 6
-	6.0					Hi	H	inches -
-	6.0				Silty Sand (SM)	#		Driller's Remark: Spoon fell through entire 2'
-				0-0-0-0	6.0-6.4' - Same as 4.0-6.0' except 10% nonplastic fines	Ŧ		interval -
-		0.4	SS-4	(0)	lines	1		1
-	8.0					1		1
-	0.0				Lean Clay With Sand (CL)	1		1
-				1-2-6-15	8.0-8.8' - yellowish gray, (5Y 8/1), wet, medium stiff,	1		1
-		1.4	SS-5	(8)	to coarse gravel, lens of light bluish gray (5B 7/1), fat	Ш		1
10	10.0				\(\sigma \text{(CH), no HCl reaction in CH.}\)	Ŧ		-
32.3	10.0				8.8-9.4' - grayish orange, (10YR 7/4), wet, hard,	T	П	7
-				12-33-46-50/5"	nonplastic, rapid dilatancy, moderate HCl reaction, 5-10% very fine sand, all carbonate	1		1
_		1.6	SS-6	(79)	Silt (ML)	1		1
-	12:8				10.0-11.6' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction,	オ┸	ш	1
					√5-10% very fine sand, all carbonate	T	П	1
-		1.3	SS-7	22-46-50/4" (96/10")	Silt (ML) 12.0-13.3' - Same as 10.0-11.6'	1		1
	13.4			(==: -= /		4	Ш	1
	14.0					1		1
					Silt (ML)]	\prod	1
15		4 7	SS-8	29-41-46-50	14.0-15.7' - Same as 12.0-13.3' except trace sand	1		
27.3		1.7	33-0	(87)]		
	16.0					1	Ш]
					Silt With Sand (ML) 16.0-17.7' - grayish orange, (10YR 7/4), wet, hard,		\prod]
		1.7	SS-9	29-18-14-12	nonplastic, rapid dilatancy, moderate HCl reaction,]
		1./	33-8	(32)	10-15% very fine to fine sand-sized, 5% medium to coarse sand, all carbonate.]
	18.0					냅	Щ]
					Silt With Sand (ML) 18.0-20.0' - Same as 16.0-17.7' except moist]
_		2.0	SS-10	21-41-40-19	13.0 23.0 Came as 10.0 17.7 CACOPETIOISE]		<u> </u>
		0	55 15	(81)		$ \mathbf{J} $		_
20						Ш	Щ	
						┸		



PROJECT NUMBER: BORING NUMBER: 338884.FL A-20

SHEET 2 OF 14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 wing bit

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

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DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-20
SHEET 3 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

CORING	NETHOD A	ND EC	JUIPIV	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v casi	<u>ıy</u>	ORIENTATION : Vertical
WATER	LEVELS: 1.6	1 ft b	gs on	6/14/07 START: 4/24/2007 END: 5/	1/200	Z LOGGER : C. Dougherty, R. McC	Comb
				DISCONTINUITIES	(2)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG		<u> </u>
SEL ON ON	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	9	FRACTURES PER FOOT	DEGORIF HON	ਰੂ	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH		Q D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ŭ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
말류폇	N S S S S S S S S S S S S S S S S S S S	О	AC ER F	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	232	ď	표표	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
7.3	35.0				Ш	Limestone	Rock coring begins at 35'
-			1	35.4' - Fracture, horizontal, rough, undulating	╁┼	- 35.0-39.7' - light olive gray, (5Y 5/2),	below ground surface, -
-						 moderate to strong HCl reaction, medium strong (R3), small voids 	continuing after soil boring from surface to 34'
l -			1	36.2' - Fracture, 20 deg, rough, undulating,	ш	- (1/16") over 20% of surface, few	Water level at 07:35 hrs on
			l .	thin (1/16") infill of carbonate derived silt	Н	cavities up to 3/8", moderately	4/25/07
-	R1-HQ			27.01 Machaniaal brook berinantal record		fossiliferous	1 1
-	5 ft	77	3	37.2' - Mechanical break, horizontal, rough, undulating, open up to 3/4"	ш	_	1 -
-	94%			37.5' - Fracture, 50 deg, rough, undulating,	+	_	1 -
			0	black staining on faces, open 1/4-1/2", fossil			
			"	cast on surface	Н		
-				37.85' - Fracture, 10 deg, rough, undulating,		_	R1: 9 minutes
-			0	fossil casts on surface, tight	口	_	-
40	40.0		NR	_	H	No Recovery 39.7-40.0'	↓
2.3					_	Silt (ML)	
						40.0-43.2' - dusky yellow, (5Y 6/4),	1
-					1	 wet, high dilatancy, fine sand up to 15%, very weakly indurated 	1
I -			NA		-	40.8-41.2'] -
_			" .		4	_]
	R2-HQ	•			Ш		
_	5 ft 64%	0			111111	_	1 1
-	0470			-	┨║Ш	<u>_</u>	1 -
_					4	No Recovery 43.2-45.0'	
l _			l		11111]
			NR		Ш		R2: 5 minutes
15	45.0				111111	_	1 1
45 -2.7	45.0			45.4 45.0 45.41 Freetings == =================================	╂┼┼┤	Limestone	∤ −
			4	45.1, 45.2, 45.4' - Fractures or mechanical break (3), horizontal, rough, undulating, open	\Box	- 45.0-49.2' - light olive gray, (5Y 5/2),	
_				1/4" to 1/2"	Щ	fine grained, moderate HCl reaction,	Layers up to few inches thick of apparently non
				45.9' - Mechanical break	Н	extremely weak (R0), trace organics	indurated material at 48.0-
I -			4	46.15' - Mechanical break	П	- from 48.0-49.0'	48.9'
-	D2 □0			46.4' - Fracture, 15 deg, rough, undulating,	₽	_	-
_	R3-HQ 5 ft	22	3	1/16" of carbonate derived silt infilling 46.6' - Fracture, horizontal, rough, undulating,			-
	84%			1/16" of carbonate derived silt infilling			1
				46.7' - Mechanical break	\mathbb{H}	_	1
-			1	47.2' - Mechanical break	Ш	_	1
-				47.7' - Mechanical break	\Box	_	P3: 4 minutos
I -				47.95' - Mechanical break 48.4' - Mechanical break	╁┼┤	No Recovery 49.2-50.0'	R3: 4 minutes
50	50.0		NR	40.4 - Mechanical Dreak	Ш	-	1
-7.7				_	1	Limestone	
-			2	50.5' - Fracture, 10-70 deg, rough,	++	 50.0-51.7' - light olive gray, (5Y 5/2), 	1
-				undulating, multiple fragments up to 1",	Ш	fine grained, moderate HCl reaction,	1 -
			0	1/2-3" open	\mathbf{H}	very weak (R1), trace organics, small voids (1/16") over 20% of surface.	1
I -				50.95' - Fracture, horizontal, rough,		few larger (3/16"x3/8") cavities	1
-	R4-HQ			undulating, open up to 1"	Ш	(molds/casts)	1
-	5 ft	22			+	No Recovery 51.7-55.0'] -
_	34%				口	_] _
			NR		Щ		1
_	1				H	_	1
-					口	<u></u>	R4: 7 minutes
-					₽Ч		-
55_	55.0				ш		
			<u> </u>		\perp		
		_	_				



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-20 SHEET 4 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

CORING	INCTITOD A	ND L	ZOIFIV	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v Casi	ng .	ORIENTATION : Vertical
WATER	LEVELS: 1.6	1 ft b	gs on (6/14/07 START : 4/24/2007 END : 5/	1/200	LOGGER : C. Dougherty, R. Mc	Comb
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
E A	N A A	(9)	FRACTURES PER FOOT	2200.111	익	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAE	SER	°)	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEY EP	NING	Q D (%)	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ×	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	OIR	œ	ш а	THICKNESS, SORI ACE STAINING, AND HOTTINESS	S		
-12.7					ш	Limestone	SC-1 collected at 55.0-
-			1		т	- 55.0-57.7' - Same as 50.0-51.7'	55.8'
-				55.8' - Mechanical break		57.7-59.4' - moderate yellowish	1
_			1	FO FL Mashanias basely for an aid and	Н	brown, (10YR 5/4), fine grained,	-
				56.5' - Mechanical break, for special core	Ш	moderate HCl reaction, very weak to	
	R5-HQ					weak (R1 to R2), small (1/16") voids	
-	5 ft	60	3	57.5, 57.7' - Fractures (2), horizontal, rough,	Н	over about 30% of surface, few	1
-	94%			undulating, organic material on faces, open	ш	larger (up to 3/16") voids and fossil molds	-
_			3	up to 1/2"	Н	-	
				57.7-58.0' - Fracture, vertical, rough, undulating, tight	Н		
			>10	58.3' - Mechanical break	Ш		R5: 5 minutes
	000			58.8-59.5' - Fracture, vertical, rough,	$\Pi\Pi$	Silty Sand (SM)]
60 <u> </u>	60.0		NR	undulating, tight —		59.4-59.7' - moderate yellowish	
_ '''-			3	58.8-59.3' - Fracture, 75 deg, rough,	H	brown, (10YR 5/4), fine grained, moderate HCl reaction, carbonate	1 4
			الل	undulating, open to 1/4" 60.1' - Fracture, horizontal, smooth,	Щ	_ \derived	1
				undulating, open to 1/4"	Н	No Recovery 59.7-60.0'	SC-2 collected at 60.9-
-			1	60.35' - Mechanical break	亡	Limestone	61.95'
_	De HO			60.9' - Fracture, 45 deg, rough, undulating,	Н	_ 60.0-60.5' - Same as 55.0-57.7'	-
_	R6-HQ 5 ft	57	1	tight	Н	except no organics 60.5-62.0' - yellowish gray, (5Y 7/2),	
	84%	٠.		61.95' - Fracture, 5 deg, smooth, undulating, open up to 1/4"		_ fine grained, moderate HCl reaction,	
				62.4' - Fracture, horizontal, rough, undulating,	Н	very weak to weak (R1 to R2), small	1
-			2	carbonate derived silt infill about 0.1" thick	ш	(1/16") voids over up to 15% of	1
-			>10	63.0, 63.6' - Fractures (2), horizontal, rough,	131	surface	R6: 5 minutes
_				undulating, open up to 1/2"	拉拉	62.0-62.8' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl	Ro. 5 minutes
65	65.0		NR		Hill	reaction, extremely weak (R0)	
-22.7					Ш	62.8-63.4' - yellowish gray, (5Y 7/2),	
-			>10	65.3-65.7' - Fracture zone, fragments up to 2"	Н	fine grained, mild HCl reaction,	1
_				65.7-66.15' - Mechanical break, vertical,		_ medium strong (R3), small (<1/16")	-
_			3	rough, undulating, tight 66.15' - Mechanical break, 15 deg, rough,	ш	voids over about 10% of surface - 63.4-63.9' - Same as 62.0-62.8'	<u> </u>
				undulating, open up to 1/2"	Н	Sand With Silt (SP-SM)	
	R7-HQ			66.5-66.95' - Mechanical break, 25 deg,		63.9-64.2' - yellowish gray, (5Y 7/2),	SC-3 collected at 68.1-
-	5 ft	58	1	rough, undulating	₩	fine grained, carbonate derived	69.4'
-	90%			66.95' - Fracture, smooth, undulating, open up to 1/2"	ш	No Recovery 64.2-65.0'	-
_			1	67.4' - Fracture, horizontal, rough, undulating,	\Box	Limestone	1
			Ľ	open up to 1/2"	Н	65.0-66.9' - pale yellowish brown, (10YR 6/2), fine grained, moderate	
]			0	68.1' - Mechanical break	Ш	HCl reaction, medium strong (R3),	R7: 8 minutes
	70.0		NR	•	Н	small (<1/16") voids cover about 25%	1 1
70 -27.7	70.0		1417	-	世	of surface, few larger voids or	-
			0		Щ	cavities except in zones from 65.7-65.9' and 66.7-66.9' (about 10%	1
					Н	coverage, voids up to 1/16"	
					П	diameter), moderately fossiliferous,	1
-			1	-	ш	trace organics	1 1
-	Do IIO			71.9' - Mechanical break	Ш	_ 66.9-67.4' - yellowish gray, (5Y 7/2),	1 -
	R8-HQ 5 ft	92	1		口	fine grained, strong HČI reaction, extremely weak (R0), trace organics	
	100%	~_		72.5' - Mechanical break, horizontal, smooth,	Н	67.4-69.5' - yellowish gray, (5Y 7/2),	
1 7				undulating, along bedding plane, tight, organic material on faces	ш	fine grained, moderate HCl reaction,	1
-			1	73.2' - Fracture, horizontal, smooth,	Н	very fossiliferous, voids (fossil	1 1
-				undulating, coating of carbonate derived silt	Н	_ molds) up to 3/8" over about 30% of	D9: 7 minutes
			1	on faces	Ш	core surface No Recovery 69.5-70.0'	R8: 7 minutes
75	75.0				$\vdash \vdash$	140 Necovery 03.0-70.0	
					Γ		
			•		•		•



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-20
SHEET 5 OF 14

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

				12.111 . CIVIL 330X 3/11 340233, Hidd Totally, Fig 10013, FIV			ORIENTATION: Vertical
WATER	LEVELS : 1.6	31 ft b	gs on (6/14/07 START : 4/24/2007 END : 5/	1/200	7 LOGGER : C. Dougherty, R. McC	Comb
> -	_			DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	F00	DOCK TYPE COLOR	
ÄÄN NN	N, A'S'		R	DESCRIPTION	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH	R.E.R	(%)	ĮΣ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
뚜뚜릿	NG NG S	OΩ	AC R F	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
밀Տ핔	822	æ	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ς	CHARACTERISTICS	DROI 9, TEST RESOLTS, ETC.
-32.7				74.6' - Fracture, horizontal, smooth,	tП	Limestone	
_			2	undulating, coating of carbonate derived silt		70.0-72.5' - yellowish gray with some	-
_				on faces	ш	light olive gray mottling, (5Y 7/2 with	
				75.0-75.3' - Fracture zone, multiple	Н	5Y 5/2), fine grained, mild to	
-			2	fragments, possible mechanical break	t d	 moderate HCl reaction, medium 	-
_				75.3-75.5' - Fracture, 70 deg, rough,		strong to strong (R3 to R4), small	_
	R9-HQ			undulating, possible mechanical break	\vdash	(<1/16") voids cover about 20% of	
-	5 ft 84%	48	1	76.3-76.5 - Fracture zone, multiple fragments	Н	 surface, but not uniformly, few larger (3/16") voids, trace organics 	1
_	04%			76.9' - Fracture, horizontal, rough, undulating,	Н	72.5-75.0' - moderate yellowish	-
_			>10	tight		brown, (10YR 5/4), fine grained,	_
			- 10	77.4-77.8' - Fracture, 65 deg, rough,	ш	moderate to strong HCl reaction,	
-			>10	undulating, coating of carbonate derived silt	H	very weak (R1), trace organics, voids	R9: 8 minutes
-			NR	78.2-79.2' - Fracture zone		up to 3/8" x 1-3/16" at 72.6 and 74.0',	-
80	80.0		1417		Щ	trace clasts (3/16") of gray limestone.	
-37.7				80.0-80.7' - Fracture zone, multiple	H	Slightly harder zones from 73.6-74.2'	
-			>10	fragments, up to 1-1/2"	Н	and 74.7-75.0', with small (<1/16")	-
I -					Ш	voids covering about 25% of surface 75.0-78.2' - dusky yellow to moderate	l
					Н	yellowish brown, (5Y 6/4 to 10YR	SC-4 collected at 80.7-
_			>10		т	5/4), fine grained, weak to very weak	81.8'
_	Danio			81.8-82.7' - Fracture zone (2), multiple	łП	(R2 to R1), small (<1/16") voids	-
_	R10-HQ 5 ft	43	1	fragments, up to 2"		cover about 35% of core surface, few	_
	90%	40	'		ш	larger (3/16") voids	
_				82.9-83.4' - Fracture, vertical, tight	т	78.2-79.2' - light olive gray, (5Y 5/2),	1
_			0			_ moderate HCl reaction, extremely	-
l _					ш	weak (R0), mixed with carbonate	
			0		Н	derived fine sand and silt No Recovery 79.2-80.0'	R10: 6 minutes
			NR		+-	Limestone	1 -
85	85.0		INK	_	ш	— 80.0-82.8' - moderate yellowish	
-42.7			2		Н	brown, (10YR 5/4), fine grained,	
_			3	85.5' - Fracture, horizontal, rough, undulating,	Н	moderate HCl reaction, weak (R2),	1
-				coating of carbonate derived silt	ш	small (<1/16") voids cover about 50%	-
_			0	85.7' - Fracture, 45 deg, rough, undulating,	\perp	of core surface.	_
				open up to 1/2"	Н	82.8-84.5' - moderate olive brown,	
_	R11-HQ			86.0' - Fracture, horizontal, rough, undulating, open up to 1/2"	т	- (5Y 4/4), moderate HCl reaction,	1
-	5 ft	70	1	87.4' - Mechanical break		weak (R2), fine grained, small (<1/16") voids cover about 25% of	-
l -	100%			87.8' - Mechanical break	ш	core surface, few larger (3/16")	SC-5 collected at 87.8-
					Н	voids, trace organics	89.1'
I -]		0			No Recovery 84.5-85.0'	1 1
-					Ш	- Limestone	R11: 8 minutes
I -			>10	89.1-90.0' - Fracture zone, multiple	H	85.0-90.0' - yellowish gray, (5Y 7/2),	IX11. O IIIIIIutes
90	90.0			fragments up to 3"		fine grained, mild HCl reaction,	
-47.7				_	Ш	medium strong (R3), very fossiliferous, trace organics, small	-
-			>10		+	(<1/16) voids cover about 25% of	
I _				fragments up to 2", most are 1/2-3/4", some	H	surface, larger (3/8") cavities cover]
				fragments with organic material and coating		30% of surface from 85.5 to 86.4 but	
I -			>10		Ш	<5% elsewhere, most larger voids	1
-	D40.110			91.75-93.1' - Fracture zone	Н	are fossil molds	-
I _	R12-HQ 5 ft	10	>10		П	90.0-93.1' - Same as 85.0-90.0']
	62%	10	10			except weak to medium strong (R2 to]
I -	52,3		<>10 _/		ш	 R3), moderately fossiliferous, few larger cavities, zone of light olive 	-
-			التنا		\vdash	gray (5Y 7/2) from 91.3-91.75	-
						No Recovery 93.1-95.0'	
-			NR		Ш		R12: 7 minutes
l					H	-	1 -
95	95.0			_	H	_	_
1	1		1		1		1



PROJECT NUMBER: BORING NUMBER: A-20

ROCK CORE LOG

SHEET 6 OF 14

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

WATER	LEVELS: 1.6	1 ft b	gs on 6	6/14/07 START: 4/24/2007 END: 5	/1/200	LOGGER: C. Dougherty, R. McC	Comb
≥∩≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	E RU STH, OVEF	D (%)	T.O.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	3OLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEV.	CORE	Ø	RAC ER I	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-52.7	0715	α.	шп	95-95.9' - Fracture zone	S	Limestone	
-52.7			>10	93-93.9 - Flacture Zone	丰	 95.0-95.5' - light olive gray, (5Y 5/2), 	1
-				95.9-96.3' - Fracture, vertical, rough,	₽	fine grained, mild HCl reaction, medium strong (R3), includes small	1
_			2	undulating, open up to 1/4"	₽	- (<3/16") clasts of yellowish gray (5Y	1
_				96.6' - Fracture, horizontal, rough, undulating, multiple fragments	ш	7/2) material, small (<1/16") voids	_
_	R13-HQ 5 ft	58	0	. •	╁┼	cover 10% of surface - 95.5-99.5' - yellowish gray, (5Y 7/2),	_
_	98%	00		97.5' - Mechanical break	戸	very fine grained, moderate HCl	
			2	98.1, 98.5' - Fractures (2), 65 deg, rough,	上	reaction, weak to medium strong (R2 to R3), small (1/16"), voids over <5%	
				undulating, tight	\mathbb{H}	of surface, concentrated in 1" wide	
			2	99.1-99.7' - Fracture, 60 deg, rough,	Ш	zones, fossil casts and molds moderately abundant, laminated	R13: 10 minutes
100	100.0			undulating, tight 99.2' - Fracture, 60 deg, rough, undulating, _	Ш	bedding from 97.7-99.5'	1
-57.7			(NR)	tight	1-1	99.5-99.9' - light olive gray, (5Y 5/2),	
]			3	100.2' - Fracture, horizontal, smooth, undulating, open to 1/2", black staining on	\Box	 fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), 	1
-				surface (70%)	ш	laminated bedding , few small	1
-			0	100.7-100.9' - Fracture zone	╨	_ (<1/16") voids No Recovery 99.9-100.0'	1
-	I R14-HQ			101.35' - Mechanical break	口	Limestone	SC-6 collected at 101.35-
-	5 ft	53	1	102.5' - Mechanical break	\pm	_ 100.0-100.9' - moderate yellowish brown, (10YR 5/4), fine grained, mild	102.5'
-	94%				+	HCl reaction, very weak (R1), trace	1
-			1	103.0-104.0' - Fracture, 70 deg, rough,	士	_ organics 100.9-104.7' - light olive gray, (5Y	1
-				undulating 104.0-104.7' - Fracture, vertical, rough,	+	5/2), fine grained, medium strong	R14: 6 minutes
-			1	undulating	₽	(R3), small (1/16") voids over 30% of surface, larger cavities (3/16" to	1714. O Millitates
105_ -62.7	105.0		NR	_	╼	- 1-3/16") over <5%, moderately	-
-02.7			1		-	fossiliferous, a cavity about	1
_				105.9' - Mechanical break	+	1-3/16"x2" is present at about 103.3' No Recovery 104.7-105.0'	1
_			1	100.0 Modifical Broak	上	Limestone	_
_				106.6' - Fracture, 45 deg, rough, undulating,	\bot	105.0-110.0' - Same as 100.9-104.7' - except larger cavity (3/16"x1-9/16")	_
_	R15-HQ 5 ft	93	2	open up to 1/8" 107.0-107.3' - Fracture zone, multiple	$oldsymbol{\perp}$	at 108.1 and 109.0'	
l _	100%	00	_	fragments, up to 1-1/2"	┸	_	
			2	107.85' - Fracture, 45 deg, rough, undulating, open up to 1/8"	Н	_	
]				108.15 - Fracture, 20 deg, rough, undulating,			SC-7 collected at 108.85- 110.0'
]			0	tight 108.6' - Fracture, 40 deg, rough, undulating,			R15: 8 minutes
110	110.0		U	tight	\mathbb{H}		1
-67.7				_	Щ	110.0-114.8' - Same as 100.9-104.7'	SC-8 collected at 113.65-
			0		ш	 except fewer fossils and fewer cavities larger than 3/16" 	114.5'
					Ш		1
-			1		+	-	
-	R16-HQ			111.8-112.1' - Fracture, 45 deg, rough, undulating, dark staining on 5% of surface,	甘	-	
-	5 ft 96%	82	2	open <1/8"	╁┤	-	
-	90%			112.1-112.6' - Fracture, 65 deg, open up to 1/4"	円	-	R16: 8 minutes
-			1	112.5-112.7' - Fracture, 45 deg, tight	口	-	-
-				113.25-113.45' - Fracture, 55 deg, tight		-	-
-			0	113.65, 114.5' - Mechanical break (2)	H	_	-
115	115.0				H		_



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-20 SHEET 7 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

				IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV			ORIENTATION : Vertical
WATER	LEVELS : 1.6	1 ft b	gs on (1/200		
≥0£	<u> </u>			DISCONTINUITIES	စ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
AAGH	S.F.A	(%) Q	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE	Ø	ZAC ER F	PLANARITY, INFILLING MATERIAL AND	¥₩B	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	222	œ		THICKNESS, SURFACE STAINING, AND TIGHTNESS	်	CHARACTERISTICS	
-72.7			NR/ NA		Ш	No Recovery 114.8-115.0'	
			0	115.5-116.3' - Fracture zone	Ш	Silty Sand (SM) 115.0-115.5' - light olive gray, (5Y	
				446 05 446 51. Fractives 65 dec. revents		5/2), fine grained, strong HCl	1
_			1	116.25-116.5' - Fracture, 65 deg, rough, undulating, open	Н	reaction, carbonate derived	1
-	R17-HQ			-		Limestone 115.5-118.2' - yellowish gray, (5Y	1
_	5 ft	37	1	117.5' - Mechanical break	₽	7/2), moderate HCl reaction, medium	1
_	78%			117.7' - Mechanical break		strong (R3), fine grained, moderately	1 -
_			NA	-	Ш	fossiliferous, (casts and molds), small (<1/16") voids cover about 20%	-
_				_		_ \of corè surface, several large	
			NR			(3/8"x3/4") voids below 117.5'	R17: 7 minutes
120	120.0		\		Ш	Silty Sand (SM) → 118.2-118.9' - Same as 115.0-115.5'	
-77.7				_	Ш	No Recovery 118.9-120.0'	1
-			1	-	ш	Limestone	1
_				120.8' - Fracture, horizontal, rough, undulating, open up to 1/2"	╁	- 120.0-124.6' - light olive gray, (5Y 5/2), fine grained, moderate HCl	1
-			0	undulating, open up to 1/2	Ľ	reaction, weak (R2), moderately	1
-	R18-HQ			-	₽┺	 fossiliferous, particularly from 	1
_	5 ft	85	2	122.4' - Mechanical break		120.0-121.0, small (1/16") voids over 25% of surface, larger (3/8"x3/4")	1 -
_	96%			122.65' - Fracture, horizontal, smooth, planar,	Н	- voids (fossil molds) 5-10% of surface	1
_			1	open up to 1/4", coating of carbonate derived sandy silt	F	from 120.0-121.0'	SC-9 collected at 122.8- 123.9'
			·	122.8' - Fracture, 45 deg, rough, undulating,			
			1	open up to 1/8", coating of carbonate derived			
125	125.0		NR	sandy silt 123.9' - Fracture, 30 deg, rough, undulating,		124.6-124.8' - Same as 120.0-124.6'	
-82.7			\sim	open up to 1/2"	Н	except medium strong (R3), 3/16" fossil molds/casts on 5% of surface,	
-			2	124.2' - Fracture, horizontal, rough, undulating, open up to 1/4"	F	small (<1/16") voids on 10% of	1
_				125.1-125.4, 125.2-125.4' - Fractures (2), 60	L	surface ´	1
-			3	deg, rough, undulating, tight	₩	No Recovery 124.8-125.0' Limestone	1
_	R19-HQ			126.45, 126.6' - Fractures (2), horizontal, smooth, undulating, coating of carbonate	仜	125.0-129.3' - light olive gray, (5Y	1
_	5 ft	68	1	derived silt on faces, open up to 1/8"	+	_ 5/2), moderate HCl reaction, medium	-
_	86%			126.9' - Mechanical break	Ë	strong to strong (R3 to R4), laminated bedding with areas of few	0040 114- 4 1 407 7
			2	127.7' - Fracture, horizontal, smooth, undulating, coating of carbonate derived silt	\vdash	small voids and light gray (N7) color	SC10 collected at 127.7- 128.6'
				on faces	Д	to 126.5, zone of larger (3/8") cavities from 127.4-127.8	
			0	128.6' - Fracture, 45 deg, rough, undulating, open up to 1/8"	口	No Recovery 129.3-130.0'	R19: 7 minutes
130	130.0		NR	128.7' - Fracture, horizontal, smooth,	\vdash	140 14000 VGI y 123.0-130.0	1
-87.7				undulating, open up to 1/4"	Ľ	Limestone	
-			2	130.4' - Mechanical break	╙	- 130.0-133.0' - Same as 124.6-124.8' except very fossiliferous below 131.0'	1
-				131.0' - Fracture, horizontal, rough,	仜	_ SACOPE VOLY TOCOMINGTONS DOLOW TO 1.0	1
-			1	undulating, open to 1/4"	\vdash	+	-
-	R20-HQ			131.65' - Fracture or mechanical break, 35 deg, rough, undulating	F	-	-
-	5 ft	40	>10	131.8-132.8' - Fracture zone, multiple -	世	-	-
-	94%			fragments	\vdash	422 0 424 0L limbt -live (5)	-
			3	131.1, 133.6' - Fractures (2), horizontal,	ഥ	133.0-134.2' - light olive gray, (5Y - 5/2), moderate HCl reaction, very]
				smooth, planar, coating of carbonate derived silt, open to 1/4"	\vdash	weak (R1), small (1/16" voids) over	
			4	133.9' - Fracture, 15 deg, rough, undulating,	Ė	50% surface, larger (up to 3/8") over	R20: 7 minutes
135	135.0		NR	coating of silt, open		- <5% of surface	1
.55				-	ſ		
					L		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-20

SHEET 8 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

				IENT : CIVIE 330A 3/N 340233, Midd Totally, Fig tools, Fiv			ORIENTATION : Vertical
WATER	LEVELS : 1.6	1 ft b	gs on		1/200		
≥0€	(%			DISCONTINUITIES	ပ္ထ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	0.75 445 55574 65 64646
ᆱ႘뎓	₩,H	(%) _Q	I R D		- 일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
HA A	SGT	0	PF	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	ВG	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S O	F.RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-92.7	014	ш.	шш		0)		<u> </u>
-92.7			4	134.2, 134.5, 134.6' - Fractures (3), smooth, planar, along bedding planes, coating of silt	┸	Limestone - 134.2-134.7' - yellowish gray and	_
			"	135.2, 135.4, 135.6, 138.8' - Fractures (4),		light olive gray, (5Y 7/2 and 5Y 5/2),	
_				horizontal, smooth, planar, no stains, open	╁┼	fine grained, mild to moderate HCl	1
-			>10		+	 reaction, thinly laminated bedding. 	
_				136.1-137.0' - Fracture zone, horizontal,	Ш	Yellowish gray areas are very weak	_
	R21-HQ		_	smooth to rough, open up to 1/4"	\vdash	rock (R1) with small (<1/16") voids	
	5 ft 98%	40	0	137.0, 137.4, 138.45' - Mechanical break (3)	\top	 over 30% of area. Olive gray areas have no small voids, medium strong 	1
_	3070					rock (R3). Cavities up to	SC-11 collected at 137.4-
_			1		+H	 3/8"x1-3/16" are along bedding 	138.45'
				138.7-139.2' - Fracture, 60 deg, rough,	\perp	planes.	
			1	undulating, tight		No Recovery 134.7-135.0'	R21: 8 minutes
140	440.0			139.3' - Fracture, horizontal, rough,	+	 Limestone 135.0-139.2' - Same as 133.0-134.2' 	1
140 <u> </u>	140.0		NR.	undulating, coating of carbonate-derived silt, _ open up to 1/2"	╂╫╣	except with thinly laminated bedding	
3,.,			0	Open up to 1/2	Щ	from 135.0-136.1' and predominantly	1
					Н	the stronger light olive gray rock	Driller's Remark: Loss of
1 7					Ш	139.2-139.9' - light olive gray, (5Y	circulation at 141'
-			>10	141.3-142.7' - Fracture zone, fragments up to	\Box	_ 5/2), fine grained, moderate HCI reaction, very weak (R1), small	1
_				2"	H	(<1/16") voids over about 25%	-
	R22-HQ	25	>10			_ surface larger (3/16") voids over 5%	
	5 ft 80%	25	-10			of surface	1
_					┰	No Recovery 139.9-140.0'	1
_			>10		-	Silt (ML)	-
_					\perp	140.0-140.5' - light olive gray, (5Y	_
					Н	5/2), carbonate derived Limestone	R22: 9 minutes
145	145.0		NR			140.5-141.1' - yellowish gray and	1
-102.7	140.0			-	╁┼┤	medium light gray, (5Y 7/2 and N6),	_
_			3		╀┪	 fine grained, strong HCl reaction, 	-
l _					ш	medium strong to strong (R3 to R4),	_
				146.0' - Fracture, horizontal, rough,	Н	very fossiliferous.	
			3	undulating	T	 141.1-144.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl 	1
-	R23-HQ			146.1' - Fracture, 10 deg, rough, planar, black staining on surface	$+\square$	reaction, weak (R2), very	-
_	5 ft	42	1	146.15' - Fracture, 65 deg, rough, undulating,	+	- fossiliferous	SC-12 collected at 147.1- 148.2'
	64%	_		dark staining on surface		No Recovery 144.0-145.0'	170.2
1			0	146.5, 146.63' - Fractures (2), smooth,	Ш	Limestone]
-				planar, dark staining on surface 147.05' - Fracture, horizontal, rough,	+	 145.0-146.0' - yellowish gray, (5Y 7/2), strong HCl reaction, weak to 	-
-			NR	undulating, possible mechanical break	口	medium strong (R2 to R3), few small	R23: 6 minutes
_			'"`	aaaidang, poodbio moonamoa broak	щ	(1/16") voids, poorly fossiliferous	1120. U IIIIIIules
150	150.0				\Box	146.0-147.05' - yellowish gray, (5Y	
-107.7				_	П	7/2), moderate HCl reaction, weak to	
-			2	150.35' - Fracture, horizontal, rough, planar,	+	 medium strong (R2 to R3), moderately fossiliferous, small 	-
-			<u> </u>	open up to 1/4"	$-\Box\Box$	(<1/16") voids cover about 10% of	-
			2	150.85 ⁱ - Fracture, 15 deg, rough, planar, tight	\Box	core, few larger (3/16") voids,]
				151.3-152.1' - Fracture, 60-40 deg, rough,	$\vdash\vdash$	laminated bedding at about 146.5']
1 7	R24-HQ			undulating, open up to 1/8"	Ш	147.05-148.2' - light olive gray, (5Y	1
-	5 ft	70	1	151.6' - Fracture, horizontal, rough,	+	_ 5/2), fine grained, moderate HCl reaction, small (1/16") voids over	-
1 -	94%			undulating, open up to 1/8"	$\vdash \vdash$	- 40% of surface	
			0	152.95' - Fracture, 45 deg, rough, undulating, tight	Ш	No Recovery 148.2-150.0'	
1 7			ا ا	ugiit	\vdash	Limestone	1
-				154.0-154.7' - Fracture zone, multiple	+	150.0-151.8' - Same as	R24: 8 minutes
-			>10	fragments up to 1-1/2"	Щ	_ 147.05-148.2' except gradual contact at bottom	
155	155.0		NR	-	Ы	at DULLOTTI	
			<u> </u>				



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-20

SHEET 9 OF 14

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 1.6	1 ft b	gs on (S/14/07 START: 4/24/2007 END: 5/	1/200	7 LOGGER: C. Dougherty, R. McC	Comb
≥D≎	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
ON (#	ANG RY (9		ZES	DESCRIPTION	CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COA	R Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-112.7				155.1, 155.4, 155.5, 155.6' - Fractures (4),	ш	Limestone	
			5	smooth, planar, staining present on faces at 155.4' and 155.5'		 151.8-154.0' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, 	SC-13 collected at 155.6-
			2	155.2-155.45' - Fracture, 45 deg, rough,	Ш	medium strong to strong (R3 to R4), fossiliferous (casts and molds), small	156.5'
				undulating 156.65, 156.7' - Fractures (2), horizontal,		(<1/16") voids cover 15% of surface,	
_	R25-HQ 5 ft	58	1	smooth, undulating, open up to 1/2"		few clasts (<3/16") of lighter colored material, laminated bedding from	
_	92%			157.9-158.1' - Fracture, 45 deg, rough,	+	153.5 -154.0 154.0-154.7' - light olive gray, (5Y	_
_			>10	undulating, dark staining on faces (50% of	F	 5/2), moderate HCl reaction, weak 	_
-				area) 158.3-158.9' - Fracture zone, most fractures		(R2), small (1/16") voids over 20% of surface	R25: 7 minutes
-			1	appear to be horizontal 159.5' - Fracture, horizontal, smooth, planar	岸	 No Recovery 154.7-155.0' 	-
160 <u> </u>	160.0		NR	160.0-160.3' - Fracture zone, multiple	t	Limestone 155.0-155.5' - Same as 154.0-154.7'	End of drilling for 4/25/07, 160' at 15:45.
-			1	fragments up to 1-1/2"	H	 except with irregular uneven thinly laminated bedding 	Resume coring at about – 07:35, 4/26/07
-				161.1' - Fracture, horizontal, smooth, planar,	₩	155.5-158.0' - light olive gray, (5Y	Core barrel was clogged.
-			2	open up to 1/8"	₽	5/2), moderate HCl reaction, medium strong (R3), poorly fossiliferous,	Barrel was cleared and run - completed.
-	R26-HQ		1	161.4' - Fracture, horizontal, open up to 1" 162.0' - Mechanical break	F	gradual contact below, few small	Rock fragments at top of
-	5 ft 42%	27				_ (<1/16") voids 158.0-158.9' - moderate olive brown,	run are probably pieces - from first attempt; bit
-						(5Y 4/4), fine grained, mild HCl reaction, weak (R2), small (<1/16")	marks in 2 directions are
_			NR			voids cover about 50% of surface	on some fragments – End of R26-HQ fits
						158.9-159.6' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction,	together with start of R27- HQ -
165_	165.0			_		medium strong to strong (R3 to R4), — few small (<1/16") voids, group of	R26: 4 minutes
-122.7			2	165.2' - Fracture, 15 deg, rough, undulating,	H	healed vertical fractures from	
_				open to up to 1/4" 165.5' - Fracture, horizontal, rough,	F	158.9-159.3' - No Recovery 159.6-160.0'	_
-			4	undulating, open up to 1/2" 166.1' - Fracture, horizontal, rough,	H	Limestone 160.0-161.5' - moderate yellowish	-
-	R27-HQ			undulating, open up to 1/2"	岸	 brown, (5Y 4/4), fine grained, mild 	-
-	5 ft	38	2	166.55-167.2' - Fracture zone, horizontal, smooth, planar, spaced at about 0.05'	世	HCI reaction, medium strong (R3), small (<1/16") voids cover about 25%	-
-	84%			167.7' - Fracture, horizontal, smooth to planar	世	 of core surface, thin (1/2") zones 	-
-			3	on one side, rough to undulating on the other, open to about 3/4"		have no small voids 161.5-162.1' - moderate yellowish	R27: 6 minutes
-			0	168.3' - Fracture, horizontal, rough, undulating, dark staining on 40% of surface,	oxdot	 brown, (10YR 5/4), fine grained, mild HCl reaction, strong (R4), small 	-
170	170.0		NR	open to 1/4"	F	(<1/16") voids, few fossil molds and	End of core at 169.2' fits
-127.7				168.3-168.7' - Fracture, 75 deg, rough, — undulating, open <1/4"	T	— casts No Recovery 162.1-165.0'	together with start of core — at 170.0'
-	1		0	168.9' - Mechanical break		Limestone - 165.0-168.0' - Same as 161.5-162.1'	
			0		Ш	except except larger voids and fossil]
			U		上	molds/casts (3/16") over 5% of area from 165.0-166.3', laminated bedding]
_	R28-HQ 5 ft	85	2	172.1' - Fracture, horizontal, rough,	上	at 166.0-167.5' 168.0-169.2' - light olive gray, (5Y	SC-14 collected at 172.0- 172.85'
_	100%			undulating on one face, smooth to planar on the other, open up to 1/2"		_ 5/2), moderate HCl reaction, weak	
-			3	172.95' - Fracture, horizontal, rough, undulating, coating of carbonate derived silt	F	(R2), small (1/16") voids over 15% of surface, clasts of light gray (N7),	_
-				on one face, open up to 1/2"	F	limestone up to 3/16"x1-3/16" cover	R28: 6 minutes
-			3	173.15-173.3' - Fracture, 45 deg, rough, undulating, tight	+	<5% of surface, clasts are oriented horizontally	1\20. 0 Hilliules
175	175.0			<u> </u>	\vdash	No Recovery 169.2-170.0'	
	I		1 1		1		



PROJECT NUMBER: BORING NUMBER: A-20

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

SHEET 10 OF 14

WATER LEVELS -1 141 hours of 1407 START 40/20007 END 51/007 LOCGER C, Doucherly R, McComb COMMENTS					CIAA/OZ			ORIENTATION : Vertical
DEPTH_TYPE_ORDITION Section Se			ιπ Ο	ys on (1/200/		
1737, 1739 - Fractures (2), horizontal, smooth, planar, open up to 14" 174, 4, 174, 5 - Fractures (3), horizontal, rough, undusting, costing of sit to the process of t	₹ 9€	(%)				8	LITHOLOGY	COIVIIVIENTS
173.7 173 - Fractures (2) 170 170 172 - Same as 168.0-169.2	ON (Ä, ANI RY (ZES	DESCRIPTION	CL		SIZE AND DEPTH OF CASING,
173.7 173 - Fractures (2) 170 170 172 - Same as 168.0-169.2	H B ATIC	E RU STH, OVE	%) (150-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	l S		FLUID LOSS, CORING RATE AND
173.7 173 - Fractures (2) 170 170 172 - Same as 168.0-169.2	LEAN HELL	ORE	Ø	ZAC ER F		ΥME	AND ROCK MASS	
1		022	œ	# 5		Ś		, i
174.0, 174.4, 174.5 - Fractures (3), morzonals, rough, undulating, coaling of sit infill at 174.0 : open up to 1/2	-132.7			5		Н		
Table						Ш		
175.2 175.3 175.3 175.5 175.5 175.7 176.2 175.3 175.3 175.5 175.					horizontal, rough, undulating, coating of silt	Н	(molds and casts), gray clasts now	_
Fractures (6), horizontal, rough, planar, open 172.2-173.7 - yellowish gray, (5Y 172.6 - 173.7 - yellowish gray, (5Y 172.6 - 173.6 -	-			1		Ħ		-
180	-	R29-HQ				╁┼		-
180	-	5 ft		>10	1/8" to 1/4"	Ш	 7/2), fine grained, moderate HCl 	-
180 180	_	72%				\Box		-
180	_			2		\vdash		_
180						Ш		_
180.0 180.0 Up to 1/8" 178.4" - Fracture, 45 deg, rough, undulating, open + 1/8" 180.0 + 180.6" - soil and rock fragments 180.1 + 180.5" - Fractures (2), horizontal, smooth, planar, coating of carbonate derived sitt, open up to 1/8" 181.1 + 181.7" - Fracture zone 182.0" - Fracture, 20 deg, rough, undulating, open up to 1/8" 182.3" - Fracture, horizontal, rough, undulating, open up to 1/8" 185.0" 13 185.0 18				NR		Щ	moderate HCl reaction, weak (R2), small (<1/16") voids cover about 20%	R29: 4 minutes
137.7	180	180.0			up to 1/8"	Ш	of core surface	
180.0-180.6" - soil and rock fragments 180.1180.95" - Fractures (2), horizontal, smooth, planar, coating of carbonate derived silt, open up to 1/8" 181.1-181.7" - Fracture, porizontal, rough, undulating, coating of carbonate derived silt, open up to 1/8" 182.1" - Fracture, horizontal, rough, undulating, coating of carbonate derived silt, open up to 1/8" 182.7" - Fracture, horizontal, rough, undulating, rock fragments up to 17", open 1/42.7" 182.3" - Fracture, horizontal, rough, undulating, rock fragments up to 17", open 1/42.7" 183.0, 183.2, 183.4, 183.5" - Fractures (4), horizontal, rough, undulating, open fracture, 30 deg, rough, undulating, dark staining on 40% of surface, tight 186.4-181.1" - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strop strong (R3) thinly laminated bedding with few small (1716") voids from 1/42 in 1/2" 180.4-181.1" - yellowish gray, (6Y 7/2), fine grained, mild HCl reaction, medium strop (R3) thinly laminated bedding few small (1716") voids from 1/42 in 1/42.7" 186.4-181.7" - Fracture, horizontal, smooth, undulating, dark staining on 40% of surface, tight 186.4-181.1" - yellowish gray, (6Y 7/2), fine grained, mild HCl reaction, medium strop (R3) thinly laminated bedding few small (1716") voids, few fossil molds/casts (3/16"), large (3/8"1-3/16") voids (aver small (1716") voids (aver					178.4' - Fracture, 45 deg, rough, undulating,]
180.1.180.95'-Fractures (2), horizontal, smooth, planar, coating of carbonate derived slit, open up to 1/8" 180.1-181.7'- Fracture zone 182.0'-Fracture, 20 deg, rough, undulating, open up to 1/8" 182.0'-Fracture, open up to 1/8" 182.0'-Fracture, horizontal, rough, undulating, coating of carbonate derived slit, open to 1/4" 182.0'-Fracture, horizontal, rough, undulating, coating of carbonate derived slit, open to 1/4" 182.7'-Fracture, horizontal, rough, undulating, coating of carbonate derived slit, open to 1/4" 182.7'-Fracture, horizontal, rough, undulating, rock fragments up to 1'1, open 183.0, 183.2, 183.4, 183.5'-Fractures (4), horizontal, rough, undulating, open up to 3/8" 185.5'-Fracture, 30 deg, rough, undulating, dark staining on 40% of surface, tight 186.4'-87.0'-Fracture, 6(), horizontal, smooth, planar, except at 186.4'-which is rough and undulating, all are open up to about 1/4" 186.4'-87.0'-Fracture, horizontal, smooth, planar, except at 186.4'-which is rough and undulating, all are open up to about 1/4" 186.8'-87.0'-Fracture, horizontal, smooth, planar, except at 186.4'-which is rough and undulating, all are open up to 1/2" 188.8'-Fracture, horizontal, smooth, planar, except at 186.4'-which is rough and undulating, all are open up to 1/4" 187.4'-Fracture, horizontal, smooth, planar, except at 186.4'-which is rough and undulating, all are open up to 1/2" 188.8'-Fracture, horizontal, smooth, planar, except at 186.4'-which is rough and undulating, all are open up to 1/2" 188.8'-Fracture, horizontal, smooth, undulating, undulating, undulating, open up to 1/2" 188.8'-Fracture, horizontal, rough, undulating, open up to 1/2" 1	-			2	- 1	Ш		_
R30-HO Sit 13 Sit, open up to 1/8" 181.1-181.7 - Fracture zone 182.0' - Fracture, 20 deg, rough, undulating, open up to 1/8" 182.0' - Fracture, horizontal, rough, undulating, coating of carbonate derived silt, open to 1/4" 182.3' - Fracture, horizontal, rough, undulating, coating of carbonate derived silt, open to 1/4" 185.5' - Fracture, horizontal, rough, undulating, open up to 1/5" 184.3' - Fracture, horizontal, smooth, undulating, open up to 3/8" 185.5' - Fracture, horizontal, smooth, undulating, open up to 3/8" 185.5' - Fracture, so deg, rough, undulating, dark staining on 40% of surface, tight 186.8-187.0' - Fractures (6), horizontal, smooth, planar, except at 186.4' which is rough and undulating, sight 186.8-187.0' - Fracture, vertical, rough, undulating, dark staining on 50% of surface, open up to 1/2" 188.0' - Fracture, 15 deg, rough, undulating, coating of carbonate derived silt, and the surface, open up to 1/4" 190 190 190 190 190 190 190 190 190 190	-					Ш		-
R30-HO Sit 13 181.1-181.7' - Fracture zone 182.0' - Fracture, zo Geg, rough, undulating, open up to 1/8" 182.3' - Fracture, horizontal, rough, undulating, rock fragments up to 1', open to 1/4" 182.7' - Fracture, horizontal, rough, undulating, rock fragments up to 1', open to 1/4" 183.0, 183.2, 183.4, 183.5' - Fractures (4), horizontal, rough, undulating, open up to 3/8" 185.0' - Fracture, horizontal, smooth, undulating, open up to 3/8" 185.0' - Fracture, sole, horizontal, smooth, planar, except at 186.4' which is rough and undulating, sight 186.4' 187.0' - Fracture, sole, horizontal, smooth, planar, except at 186.4' which is rough and undulating, sight 187.1' - Fracture, vertical, rough, undulating, sight 187.4', 187.5, 187.6' - Fracture, sole, horizontal, smooth, planar, except at 186.4' which is rough and undulating, sight 187.1' - Fracture, vertical, rough, undulating, sight 187.4', 187.5, 187.6' - Fracture, sole, horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, togh, undulating, open up to 1/2" 188.0' - Fracture, vertical, rough, undulating, open up to 1/2" 188.0' - Fracture, vertical, rough, undulating, open up to 1/2" 188.0' - Fracture, vertical, rough, undulating, open up to 1/2" 188.0' - Fracture, vertical, rough, undulating, open up to 1/2" 188.0' - Fracture, vertical, rough, undulating, open up to 1/2" 188.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, horizontal, rough, undul	-			>10		++		-
18.5 ft 13	-	D20 110				丗	light olive gray, (51 7/2 and 51 5/2),	-
open up to 1/8" 182.7 - Fracture, horizontal, rough, undulating, cock fragments up to 1'.0 open up to 1/8" 185.0 - 187 Fracture, horizontal, rough, undulating, cock fragments up to 1'.0 open up to 1/8. 185.0 - 187 Fracture, horizontal, rough, undulating, cock fragments up to 1'.0 open to 1/8'. 185.0 - 187 Fracture, horizontal, smooth, undulating, open up to 188 Fracture, 30 deg, rough, undulating, dark staining on 40% of surface, open up to 1/4". 187.1 - Fracture, horizontal, smooth, undulating, dark staining on 40% of surface, undulating, open up to 1/2". 188.2 - Fracture, horizontal, smooth, planar, expect at 186.4 which is rough and undulating, all are open up to 1/2". 188.3 - Fracture, horizontal, smooth, planar, expect at 186.4 which is rough and undulating, and undulating, open up to 1/2". 188.6 - Fracture, horizontal, smooth, planar, expect at 186.4 which is rough and undulating, open up to 1/2". 188.6 - Fracture, horizontal, smooth, planar, expect at 186.4 which is rough undulating, open up to 1/2". 188.7 - Fracture, horizontal, smooth, planar, expect at 186.4 which is rough undulating, open up to 1/2". 199.0 190.0 19	_			3		₽₩	_ medium strong to strong (R3 to R4),	_
undulating, coating of carbonate derived silt, open to 1/4" 1 185.0	_	90%				Ш		_
open to 1/4" 182.7' - Fracture, horizontal, rough, undulating, rock fragments up to 1", open 142.7 185				4		Н		_
undulating, rock fragments up to 1", open 185.0								
185.0 NR 183.0, 183.2, 183.4, 183.5' - Fractures (4), horizontal, rough, undulating, open up to 3/8' 190.0 1				1		Ш		R30: 9 minutes
norizontal, rough, undulating, open from 1/4 to 1/2" 184.3' - Fracture, horizontal, smooth, undulating, open up to 3/8" 185.5' - Fracture, 30 deg, rough, undulating, dark staining on 40% of surface, tight 100% 5 tf 1	185	185.0		NR	183.0, 183.2, 183.4, 183.5' - Fractures (4),	Ш		_
184.3' - Fracture, lorizontal, smooth, undulating, open up to 3/8" 180.4-181.1' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong (R3), thinly laminated bedding, few small (<1/16") voids 181.1-183.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, were weak to strong (R3) thinly laminated bedding, few small (<1/16") voids 181.1-183.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, were weak to strong (R1) thinly laminated bedding, few small (<1/16") voids, few fossil molds/casts (3/16"), large (3/8"X1-3/16") void at 183 (3/8"X1-3/		100.0				ш		_
undulating, open up to 3/8" 185.5' - Fracture, 30 deg, rough, undulating, dark staining on 40% of surface, tight 186.4-187.0' - Fracture, 4 thick is rough and undulating, all are open up to about 1/4" 180.0 190.0 1	-			1		${\mathbb H}$		SC-15 collected at 185.6-
dark staining on 40% of surface, tight 186.4-187.0' - Fractures (6), horizontal, smooth, planar, except at 186.4' which is rough and undulating, all are open up to about 1/4" 190 190.0 -147.7 190 190.0 -147.7 R32-HQ 5 ft 90% R32-HQ 7 fracture, horizontal, rough, undulating, open up to 1/2" 188.8-8-8-7-reacture, horizontal, rough, undulating, open up to 1/2" 188.8-8-8-8-7-reacture, horizontal, rough, undulating, open up to 1/2" 188.8-8-8-80'-Fracture, horizontal, rough, undulating, open up to 1/2" 188.8-8-80'-Fracture, horizontal, rough, undulating, open up to 1/2" 188.8-8-85.0'-Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9'-Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9'-Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9'-Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9'-Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9'-Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9'-Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9'-Fracture, horizontal, rough, undulating, dark staining on 70% of	-					П	7/2), fine grained, mild HCl reaction,	
186.4-187.0" - Fractures (6), horizontal, smooth, planar, except at 186.4' which is rough and undulating, all are open up to about 1/4" 186.8-187.0" - Fracture, vertical, rough, undulating, tight 187.1" - Fracture, horizontal, smooth, planar, open up to 1/4" 180.9-187.0" - Fractures (3), horizontal, rough, undulating, open up to 1/2" 188.0 - Fracture, 15 deg, rough, undulating, coating of carbonate derived slit, dark staining on 50% of surface, open to 1" 188.2" - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8" - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8" - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8" - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8" - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8" - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8" - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8" - Fracture, horizontal, rough, undulating, open up to 1/2" 189.7" - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9" - Fracture, horizontal, mouth, undulating, dark staining on 70% of surface 189.9" - Fracture, horizontal, smooth, undulating, open up to 1/2" 190.2" - Fracture, horizontal, mouth, undulating, dark staining on 70% of surface 189.9" - Fracture, horizontal, mouth, undulating, dark staining on 70% of surface 189.9" - Fracture, horizontal, mouth, undulating, dark staining on 70% of surface 189.9" - Fracture, horizontal, mouth, undulating, dark staining on 70% of surface 189.9" - Fracture, horizontal, mouth, undulating, dark staining on 70% of surface 189.9" - Fracture, horizontal, mouth, undulating, dark staining on 70% of surface 189.9" - Fracture, horizontal, mouth, undulating, dark staining on 70% of surface 189.9" - Fracture, horizontal, mouth, undulating, dark staining on 70% of surface 189.9" - Fracture, horizontal, mouth, undulating, dark staining on 70% of surface 189.9" - Fracture, horizontal, mouth, undulating, dark staining on 70% of surface 189.	_			7		Ш		-
Signature of the street of the	-	D24 LIO				ш		-
about 1/4" 186.8-187.0' - Fracture, vertical, rough, undulating, tight 187.1' - Fracture, horizontal, smooth, planar, open up to 1/4" 187.4, 187.5, 187.6' - Fractures (3), horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, 15 deg, rough, undulating, coating of carbonate derived silt, dark staining on 50% of surface, open to 1" 188.2' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9' - Fracture, horizontal, rough, undulating, open up to 1/2" 189.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 180.0' - Fracture,	_			4		Ш	 7/2), fine grained, mild HCl reaction, 	_
186.8-187.0' - Fracture, vertical, rough, undulating, tight 187.1' - Fracture, horizontal, smooth, planar, open up to 1/4" 187.1, 187.5, 187.6' - Fractures (3), horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, 15 deg, rough, undulating, coating of carbonate derived silt, dark staining on 50% of surface, open to 1" 188.2' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, vertical, rough, undulating, open up to 1/2" 188.8' - Fracture, vertical, rough, undulating, open up to 1/2" 188.8' - Fracture, vertical, rough, undulating, open up to 1/2" 188.8' - Fracture, vertical, rough, undulating, open up to 1/2" 188.8' - Fracture, vertical, rough, undulating, open up to 1/2" 189.9' - Fracture, vertical, rough, undulating, dark staining on 70% of surface 189.9' - Fracture, 55 deg, smooth, undulating 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8" R32: 9 minutes	_	100%				Н	very weak to strong (R1 to R4), few	_
undulating, tight 187.1' - Fracture, horizontal, smooth, planar, open up to 1/4" 187.4, 187.5, 187.6' - Fractures (3), horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 189.9' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface larger voids. 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8" R31: 10 minutes R31: 10 minutes R31: 10 minutes R31: 10 minutes				2	186.8-187.0' - Fracture, vertical, rough,	耳		
open up to 1/4" 187.4, 187.5, 187.6' - Fractures (3), horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, 15 deg, rough, undulating, open up to 1/2" 188.2' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 189.7' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9' - Fracture, horizontal, smooth, undulating 190.2' - Fracture, horizontal, smoo				Ľ		Н	(3/8"x1-3/16") void at 183'	
190 190.0 187.4, 187.5, 187.6' - Fractures (3), horizontal, rough, undulating, open up to 1/2" 188.0' - Fracture, 15 deg, rough, undulating, coating of carbonate derived silt, dark staining on 50% of surface, open to 1" 188.2' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, tight 188.8' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.7' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9' - Fracture, horizontal, smooth, undulating 190.2' - Fracture, horizontal, smooth, undulating 1 undulating, open up to 1/8" 1 R32-HQ 5 ft 90% 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 7					Ш		R31: 10 minutes
-147.7 188.0' - Fracture, 15 deg, rough, undulating, open up to 1/2 about 25% of surface, larger (3/16") voids and fossil molds are about 5%, moderately fossiliferous No Recovery 184.5-185.0' Limestone 188.8' - Fracture, horizontal, rough, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8-189.0' - Fracture, vertical, rough, undulating, tight 189.7' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9' - Fracture, horizontal, smooth, undulating, open up to 1/8" 1	190	190 0		3	187.4, 187.5, 187.6' - Fractures (3),	Ш	reaction, weak to medium strong (R2	1
coating of carbonate derived silt, dark staining on 50% of surface, open to 1" 1	-147.7	. 55.5				\Box	to R3), small (<1/16") voids cover	
staining on 50% of surface, open to 1" 1	1 -			3	coating of carbonate derived silt, dark	口	_ about 25% of surface, larger (3/16") voids and fossil molds are about 5%	-
R32-HQ 5 ft 90% 1 undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8-189.0' - Fracture, vertical, rough, undulating, tight 1 undulating, tight 1 88.7' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9' - Fracture, borizontal, smooth, undulating 190.2' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 186.6-187.5' - yellowish gray, (5Y 7/2), fine grained, mild HCI reaction, strong (R4), laminated bedding (1/2"-1" thick), small (<1/16") voids present in alternating bedding laminations	-					╂┴╂	moderately fossiliferous	-
R32-HQ 5 ft 90% 1 188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2" 188.8-189.0' - Fracture, vertical, rough, undulating, tight 1 189.7' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9' - Fracture, borizontal, smooth, undulating 1 190.2' - Fracture, horizontal, smooth, undulating, u	1 -			1	undulating, open up to 1/2"	口		-
- R32-FIQ 5 ft 90% 65 1 1 1 88.8-189.0' - Fracture, vertical, rough, undulating, tight 189.7' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9' - Fracture, borizontal, smooth, undulating 190.2' - Fracture, horizontal, smooth, undulating 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8" except few fossil casts/molds, few larger voids. 186.6-187.5' - yellowish gray, (5Y 7/2), fine grained, mild HCI reaction, strong (R4), laminated bedding (1/2"-1" thick), small (<1/16") voids present in alternating bedding laminations	1 -	D00 110			188.8' - Fracture, horizontal, smooth,	╆╫		-
undulating, tight 189.7' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9' - Fracture, 55 deg, smooth, undulating 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8" Appl	1 4			1		\Box	except few fossil casts/molds, few	_
189.7' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface 189.9' - Fracture, 55 deg, smooth, undulating 190.2' - Fracture, horizontal, smooth, undulating 190.2' - Fracture, horizontal, smooth, undulating 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8" R32: 9 minutes present in alternating bedding laminations	1 4				undulating, tight	Ш		_
189.9' - Fracture, 55 deg, smooth, undulating 1 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8" strong (R4), laminated bedding (1/2"-1" thick), small (<1/16") voids present in alternating bedding laminations				2		Ш	_ 7/2), fine grained, mild HCl reaction,	
1 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8" 1 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8" 1 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8" 1 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8" 2 1 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8" 3 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8"	1 7				unuulating, dark staining on 70% of surface 189.9' - Fracture, 55 deg smooth undulating	団]
undulating, open up to 1/8" Jaminations	1 1			1	190.2' - Fracture, horizontal, smooth,	H		R32: 9 minutes
	105	195.0		NR	undulating, open up to 1/8"	口		
	133	100.0				1 '	-	
						<u></u>		



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-20

SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS: 1.6	1 ft bo	gs on 6	6/14/07 START : 4/24/2007 END : 5/	1/200	17 LOGGER : C. Dougherty, R. McC	Comb
>00	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	COR LEN REC	RQ	FRA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-152.7 -			1	190.6' - Fracture, 5 deg, rough, planar, open up to 1/4"	H	Limestone - 187.5-188.7' - yellowish gray, (5Y	
_			·	190.9' - Fracture, horizontal, rough, undulating, fragments, open up to 1"	₽	7/2), fine grained, mild to moderate HCl reaction, strong (R4), very	SC-16 collected at 195.5- 196.8' -
-			2	191.1-191.3' - Fracture, 45 deg, rough,	\vdash	 fossiliferous, small (<1/16") voids 	-
-	R33-HQ			undulating, tight 192.1' - Fracture, horizontal, rough,	Ш	cover about 25% of surface, larger (> 3/8") voids and fossil molds/casts	-
-	5 ft 94%	23	>10	undulating, open up to 1/4" 193.3' - Fracture, horizontal, rough,	H	- cover about 5% of surface 188.7-190.0' - Same as 185.0-186.6'	-
			>10	undulating, tight 193.7, 193.8' - Fractures (2), horizontal,	H	except with zone of small (<1/16") voids 10% and fossil molds from]
_			- 10	rough, undulating, open up to 3/4" 195.0-195.5' - rock fragments with rough and	H	189.0-189.3', laminated bedding at top and bottom of interval	R33: 7 minutes
_			0	undulating surfaces	H	- 190.0-190.5' - light olive gray, (5Y	End of drilling, 200',
200 <u> </u>	200.0		NR	196.8' - Fracture, 45 deg, rough, undulating, tight	H	5/2), fine grained, mild HCl reaction, strong (R4), laminated bedding (1/4"	4/25/07 at 10:57 Resume drilling 5/1/07
-			6	169.9-197.3' - Fracture, 70 deg, rough, undulating, open up to 1/2"	Ħ	to 3/4" thick beds), small (<1/16") voids present in alternating beds,	R. McComb is the logging – person from 200' to the end
-			>10	197.4-197.8' - Fracture, 60 deg, rough, undulating, open up to 1/8"	Ħ	10% overall coverage 190.5-191.0' - moderate olive brown,	of borehole
			>10	197.8-198.5' - Fracture zone, multiple fragments up to 3" long	Ħ	(5Y 4/4), fine grained, mild to moderate HCl reaction, medium	
_	R34-HQ 5 ft	48	4	200.1' - Fracture, <5 deg, rough, undulating,	Ħ	_ strong (R3), very fossiliferous,	_
_	100%			loose 200.2' - Fracture, <5 deg, rough, stepped,	H	fragments (up to 1.5") of light olive grey (5Y 5/2) limestone, cavities up	SC-17 collected at 202.95-
_			0	loose 200.55, 200.82' - Fractures (2), horizontal,	Ħ	to 1.5" diameter occupy about 25% of core surface.	204.05' -
_			1	rough, undulating, loose 200.9, 200.95' - Fractures (2), horizontal,	Ħ	191.0-194.5' - dusky yellow to light olive, (5Y 6/4 to 5Y 5/2), fine grained,	R34: 9 minutes
	205.0		'	smooth, stepped, loose 200.95-201.85' - Fracture zone, horizontal,	Ь	mild HCl reaction, weak to medium strong (R2 to R3), with dusky yellow	
-162.7 -			1	rough, stepped to undulating, loose 202.25' - Fracture, 20 deg, rough, stepped,	上	areas being weaker, crenelated bedding lamination grading into more	-
-				loose	世	uniform laminated bedding by 194.0',	-
-			3	202.35' - Fracture, 40 deg, rough, stepped to undulating, loose	ш	small (<1/16") voids about 10% coverage, trace organics, large	-
	R35-HQ 5 ft	52	1	202.8' - Fracture, horizontal, rough, stepped to undulating, loose	口	- (3/8"x1-3/16") cavity at about 192.0' No Recovery 194.5-195.0']
_	97%	52		202.95' - Fracture, horizontal, smooth, planar, loose	Þ	Limestone 195.0-198.0' - yellowish gray, (5YR	SC-18 collected at 207.55- 209.04'
-			0	204.05' - Fracture, 40 deg, rough, stepped, tight	H	7/2), moderate HCl reaction, weak to medium strong (R2 to R3), very	-
-				205.4' - Fracture, <5 deg, rough, stepped, loose	H	fossiliferous, small voids (1/16") over 30% of surface, larger (3/16")	R35: 6 minutes
210	210.0		3	206.2' - Fracture, 0-90 deg, rough, stepped,	E	cavities over < 5% of surface	-
-167.7 -			NR >10	tight — 206.8, 206.9' - Fractures (2), 40 deg, rough,	E	(molds/casts) 198.0-199.7' - yellowish gray to light]
_			- 10	stepped, loose 207.7' - Fracture, 70 deg, rough, stepped,	H	olive gray, (5Y 7/2 to 5Y 5/2), fine grained, mild HCl reaction, weak to	_
-			>10	loose 209.01' - Fracture, horizontal, smooth, planar,	H	medium strong (R2 to R3), laminated bedding 198.0-198.8, few fossil	-
-	R36-HQ			loose 209.1, 209.27' - Fracture (2), <5 deg, smooth,	Ħ	 molds/casts, small (<1/16") voids about 10% coverage 	-
	5 ft 80%	0	>10	undulating, loose 210.1' - Fractures (2), horizontal, smooth,	 	No Recovery 199.7-200.0'	
			>10	planar, loose 210.3' - Fracture, 60 deg, smooth, stepped.	Ħ	 -]
_				loose 210.5, 210.6' - Fractures (2), horizontal,	F	1	R36: 5 minutes
245	245.0		NR	smooth, planar, loose	F	}	-
215	∠15.0				f		_



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-20

SHEET 12 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 1.6	31 ft bg	gs on (6/14/07 START : 4/24/2007 END : 5/	1/200	7 LOGGER : C. Dougherty, R. McC	Comb
>00	6)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIO	E RUI	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	JOCIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF	ORE ENG ECO	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	035	α.	# 4		Ś		· · · · · · · · · · · · · · · · · · ·
-172.7 -			3	210.9' - Fracture, <5 deg, rough, stepped, loose		Limestone - 200.0-205.0' - yellowish gray, (5Y	_
_				210.9-211.5' - Fracture zone, various	╨	7/2), very fine grained, weak to	
			2-10	orientations, rock fragments 211.5' - Fracture, 20 deg, rough, stepped,	口	medium strong (R2 to R3), cavities up to 1/16" over to 40% of surface	
			2-10	loose	Н	(more common 204.0-205.0) with	
	R37-HQ		2 40	212.0, 212.1' - Fractures (2), 40 deg, rough, undulating, loose		zone of cavities interbedded with zones of few cavities. Cavities	
	5 ft 98%	55	3-10	212.25, 212.55' - Fractures (2), <5 deg,		typically 1/16"x1/16" (casts/molds),	SC-19 collected at 217.45-
			. 40	rough, undulating, loose	╁	largest is 2"x1/2" at 203.55	218.25'
_			>10	212.8-213.1' - Fracture zone, 40-0 deg, rough, loose	Ш	 Limestone 205.0-206.0' - yellowish gray to light 	1
_				213.3, 213.45' - Fractures (2), <5 deg, rough,		olive gray, (5Y 7/2 to 5Y 5/2), fine to	R37: 6 minutes
220	220.0		>10	stepped, loose 213.75, 213.85' - Fractures (2), horizontal	\vdash	 very fine grained, weak (R2), with angular medium strong (R3) 	
-177.7	ZZU.U		NR)	and vertical, rough, stepped, loose	广	limestone fragments (brecciated),	-
-			>10	214.0' - Fracture, horizontal, rough, undulating, loose		 cavities cover 50% in fine grained material, about 3-5% in fine grained 	1
-				215.1' - Fracture, horizontal, smooth,	╀	angular limestone rock fragments	-
_			3	undulating, loose 215.6, 215.75' - Fractures (2), <5 deg, rough,	仜	206-208.7' - light olive gray, (5Y 5/2), fine to very fine grained, mild HCl	1
-	R38-HQ			stepped, loose	世	reaction, very weak (R1), cavities of	1
_	5 ft	14	>10	216.2' - Fracture, <5 deg, rough, undulating,	+	_ 1/16" to 1/32" covering 40-50% of	-
-	66%		0	loose 216.65' - Fracture, 40 deg, rough, undulating,	Ħ	surface, trace fossil casts/molds 208.7-209.85' - yellowish gray, (5Y	
_			Ů	loose		_ 7/2), very fine grained, moderate HCl	1 -
_			NR	216.85-217.1' - Fracture zone, 0-90 deg, rough, undulating to stepped, loose	╀	reaction, very weak (R1), voids/cavities up to 3/8"x3/8"	Dan 5 minutes
_			INIX	217.45' - Fracture, <5 deg, rough, undulating,	Ш	covering 30-40% of surface,	R38: 5 minutes
225_ -182.7	225.0			loose 218.3' - Fracture, horizontal, smooth, —	缸	becoming very thinly laminated with depth	_
-102.7			>10	stepped, loose	廾	No Recovery 209.85-210.0'	_
_				218.45-219.3' - Fracture zone, 0-90 deg, smooth to rough, undulating, loose	F	Limestone - 210.0-210.6' - Same as	_
_			3	219.3' - Fracture, <5 deg, rough, stepped,		208.7-209.85' except voids <10%	_
_				loose 220.01-220.45' - Fracture zone, various		210.6-211.4' - yellowish gray, (5Y - 7/2), very fine to fine grained,	_
	R39-HQ 5 ft	12	>10	orientations	尸	moderate HCl reaction, very weak	<u> </u>
	70%			220.85' - Fracture, 50 deg, rough, stepped, loose	Д	(R1), cobble- to gravel-sized - limestone, voids up to 1/16" covering]
			>10	221.2' - Fracture, 20 deg, smooth, planar,	上	20-30%, trace fossil mold/casts]
]				loose 221.65' - Fracture, 60 deg, rough, undulating,	厂	211.4-213.3' - yellowish gray to light - olive gray, (5Y 7/2 to 5Y 5/2),]
			NR	loose	片	extremely weak (R0), voids and	R39: 7 minutes
230	230.0			221.85' - Fracture, <5 deg, rough, stepped to undulating, loose —	L	cavities up to 1"x1-3/16" cover 100% of surface, fossil molds/casts	1
-187.7				222.3' - Fracture, 0-50 deg, rough, stepped,	\vdash	213.3-214.0' - light olive gray to	7
]			>10	loose 222.55-222.7, 222.9 - 223.1' - Fracture zone,	Ш	yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, weak (R2),	1
			. , ,	horizontal, rough, stepped, loose	Ш	interlaminated with very fine grained,	1
-			>10	225.0-226.0' - Fracture zone, limestone	\vdash	weak (R2) limestone	1
-	R40-HQ		0	fragments, various orientations 226.55' - Fracture, horizontal, rough,	Ħ	L No Recovery 214.0-215.0' Limestone	1
-	5 ft 48%	8		stepped, loose	Ħ	[–] 215.0-218.4' - yellowish gray, (5Y	1
-	10,0			226.7, 226.85' - Fractures (2), horizontal, smooth, planar, loose	╙	 7/2), very fine to fine grained, moderate HCl reaction, very weak to 	
-			NR	227.1-227.6' - Fracture zone, 0-90 deg,	匚	weak (R1 to R2), coarser grained	
-				rough, stepped 227.6' - Fracture, horizontal, smooth, loose	口	limestone with voids and cavities up to 3/8"x3/16" over 30-40% of surface.	R40: 5 minutes
225	225.0			227.6-227.8' - Fracture, vertical, rough,	Ь	fossiliferous (molds/casts),	
235	∠35.0			stepped, tight	Г		_
					•		•



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-20
SHEET 13 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

				IEINT : CIVIE 330X 3/N 340233, IIIdd Tolai y, Fig tools, Fiv			ORIENTATION : Vertical
WATER	LEVELS : 1.6	1 tt b	gs on (1/200		
ŞQ€	(%			DISCONTINUITIES	 8	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	~	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AAC	E RI STH OVE	(%) _Q	FOC	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E SEP	SOR	ā	RA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	₩X	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-192.7	014			227.8-228.8' - Fracture zone, 0-90 deg,	H ₀	218.4-219.9' - yellowish gray, (5Y	
_			>10	rough, stepped to undulating, loose	\Box	 7/2), fine grained, weak (R2), with 	-
-				230.1' - Fracture, 0-40 deg, rough, stepped, loose	世	gravel- to cobble-sized, angular limestone rock fragments (very fine	-
-				230.7' - Fracture, 30 deg, smooth to rough,	₽₩	 grained, weak (R2)), voids/cavities 	-
_	D44.110			stepped, loose 230.7-232.4' - Fracture zone, 0-90 deg,	ш	up to 3/4"x3/4" over 15-20% of surface	_
_	R41-HQ 5 ft	0		smooth to rough, stepped to planar, loose to	Ш	- No Recovery 219.9-220.0'	_
_	20%		NR	tight	┢┼┤	Limestone	_
_				235.0-236.0' - Fracture zone, 0-90 deg, smooth to rough, stepped to planar, loose to	H	220.0-220.1' - yellowish gray, (5Y – 7/2), very fine grained, strong HCl	_
_				tight	Ш	reaction, weak (R2), no voids/cavities	_
_					Ш	Limestone 220.1-220.5' - dusky yellow, (5Y 6/4),	R41: 4 minutes
240	240.0				Д	moderate HCl reaction, weak to very	
-197.7			>10	240.0-242.0' - Fracture zone, 0-90 deg,	Ш	weak (R2 to R1), cavities/voids up to 3/8"x3/8" over 20-30%, sharp contact	
1			/10	smooth to rough, stepped to planar, loose to tight	\mathbb{H}	with underlying limestone]
1 -				·	Ħ	220.5-221.9' - yellowish gray and light olive brown, (5Y 7/2 and 5Y]
_			>10		Ш	5/6), mottled, very weak (R1), voids	1
_	R42-HQ		2	242.0' - Fracture, 0-30 deg, rough, undulating	Ш	over 10-15%, cavities up to 3/8"x3/16"	_
_	5 ft 54%	8		242.2' - Fracture, 0-30 deg, rough, undulating, loose	ш	221.9-223.3' - yellowish gray, (5Y	1
_				and dialing, 10000	ш	7/2), fine grained, mild HCl reaction,	
-			NR		╁┼	very weak (R1), voids and cavities up to 3/8"-3/4" x 3/8"-3/4" over 70-80%	-
-			INIX		Ħ	of surface. Very fine grained	R42: 5 minutes
245	045.0				Ш	limestone in fine grained matrix No Recovery 223.3-225.0'	-
245 <u>-</u> -202.7	245.0			245.0-245.8' - Fracture zone, various	╂╫	- Limestone	_
-			>10	orientations, gravel and cobble sized rock	囯	225.0-228.5' - yellowish gray, (5Y 7/2), extremely weak to weak (R0 to	-
-				fragments	団	R2), fossiliferous (cast/molds),	-
-					+	becoming predominantly gravel to sand-sized limestone fragments,	-
_	R43-HQ				\Box	 cavities up to 3/4" to 1-3/16" in 	-
_	5 ft	0			世	diameter, thinly laminated, with few voids (<15%) from 226.5-226.9'	-
-	16%		NR		H	 No Recovery 228.5-230.0' 	-
-					ĮП	Limestone 230.0-232.4' - yellowish gray, (5Y	-
-					Ш	 7/2), very fine to fine grained, 	D42: 2 minutes
1 -					H	moderate to strong HCl reaction, weak to very weak (R2 to R1), trace	R43: 2 minutes
	250.0			-	Ħ	— fossil molds/casts, voids (<1/16")	_
-207.7			>10	250.0-250.9' - Fracture zone, various orientations, gravel and cobble sized rock	H	covering 5-10% with occasional	_
1 -				fragments	Н	20-30% coverage in fine grained limestone	
1 _					Щ	No Recovery 232.4-235.0'	
					Ш	Limestone 235.0-236.0' - yellowish gray, (5Y	
	R44-HQ	0			Н	7/2), fine grained, moderate HCl]
1 -	5 ft 18%	U	NR		Ħ	reaction, very weak (R1), voids]
1 -			INIX		Ш	No Recovery 236.0-240.0']
1 -					\mathbb{H}]
1 -					Ш		R44: 4 minutes
255	255.0				Ш	-	
				_	Ħ		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-20	SHEET	14	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.6	31 ft b	gs on (6/14/07 START : 4/24/2007 END : 5/1	1/200	7 LOGGER : C. Dougherty, R. McC	Comb
				DISCONTINUITIES	_O	LITHOLOGY	COMMENTS
SELOV E ANE ON (ft	UN, , AND :RY (%	(9)	IRES JT	DESCRIPTION	IC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-212.7 - -			NA	-		Limestone 240.0-242.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl	-
	R45-HQ		NA	- 257.2-257.7' - Fracture zone, 0-90 deg,		reaction, very weak (R1), voids typically 1/16" or less over 60-70% surface, rare cavities (3/8"x3/8"), fossil casts/molds rare, sandy/friable	- -
-	5 ft 54%	0	>10	smooth to rough, undulating to stepped -	H	texture, 1 to 2 thin very fine grained limestone laminae 241.0-242.0	-
	260.0		NR	- - -		No Recovery 242.7-245.0' Limestone 245.0-245.8' - Same as 240.0-242.7' No Recovery 245.8-250.0' Limestone 250.0-250.9' - Same as 245.0-245.8'	R45: 4 minutes
-217.7 - -			>10	260.0-267.7' - Fracture zone, 0-90 deg, rough, stepped to undulating, loose, gravel sized rock fragments		No Recovery 250.9-255.0' Poorly Graded Sand (SP) 255.0-256.8' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), wet,	-
			>10	_ _		loose, mild to moderate HCl reaction, very poorly sorted, silty to clayey	-
- - - - - 265	R46-HQ 5 ft 34%	0	NR	- - - - -		Silt With Limestone Fragments (ML) 256.8-257.2' - pale greenish yellow, (10Y 8/2), wet, loose Limestone 257.2-257.7' - yellowish gray, (5Y 7/2), moderate to mild HCI reaction, very weak (R1), fossiliferous, molds and casts, voids and cavities No Recovery 257.7-260.0'	- - - - -
-222.7 - - - - - - - - - - - - - - - - - - -						Limestone 260.0-261.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, very weak (R1), voids <1/16" over 50-60%, cavities typically 3/16"x3/8", fossiliferous (mold/casts) 261.0-261.7' - pale greenish yellow, (10Y 8/2), very fine grained, mild to moderate HCI reaction, very weak (R1), becoming silty to sandy, soft, and loose with depth No Recovery 261.7-265.0' Bottom of Boring at 265.0 ft bgs on 5/1/2007	- - - - - - - - - - - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:
338884.FL	A-21

SOIL BORING LOG

SHEET 1 OF 11

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit

					N 310023, Hidd Totally, auto Hammer, AW3 Tous, 2-176			ONLINIATION : Vertical
WATER	LEVELS	: 4.72 ft t	ogs on 3/	12/07	START : 3/11/2007 END : 3/20/2007	LOGGER	} : C.	LeBlanc, M. Faurote
≥∩≘				STANDARD PENETRATION	SOIL DESCRIPTION		ဗ္ဂ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	OOU NAME LIGOS OPOLID SYMBOL OO	.00	SYMBOLIC LOG	DEDTIL OF CACING DRILLING DATE
불병		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COI MOISTURE CONTENT, RELATIVE DENSIT		OLI	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FAYS VA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERA		MB	INSTRUMENTATION
				(N)			ŝ	
42.4								Start with 2-7/8" bit
_						_	1	
-						-	1	J. Schaffer and Le Blanc start logging
-						-	i	-
-						-		-
-						-		_
_						_		_
_	3.5					_		_
l _					Silty Sand (SM) 3.5-4.6' - yellowish gray, (5Y 7/2), moist to we	at loose -		
		1.1	SS-1	4-3-3 (6)	very fine to fine grained, no HCl reaction, trac	et, 100se, – ce		
5	5.0			(0)	organics, 20% low plastic fines, trace organic			_
37.4	0.0				\fragments, sand is silica		i	_
-						-		-
-						-		-
-						-		_
_						_		_
_						_		
	8.5					_	1	
_	0.0				Silt (ML)		Ш	-
-		1.0	SS-2	4-8-13	8.5-9.5' - dark yellowish orange, (10YR 6/6),	wet, very -		-
		1.0	00-2	(21)	stiff, nonplastic, very rapid dilatancy, mild to r HCl reaction, very strong (R5), 5-10% very fir	noderate ne to fine /	ш	-
10 32.4	10.0				\sand, carbonate materials	_		Driller's Remark: Harder drilling at 10.5'
-								
_						_		_
_						_		
_						_	1	
-						-	1	-
-	40.5					-	1	-
-	13.5			17-50/3	Silt (ML)			-
-	14.3	0.8	SS-3	(67/9")	13.5-14.3' - dark yellowish orange, (10YR 6/6	s), wet, -	$\ \ \ $	_
1 -					hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 13% very fine to fine	_	Ш	_
15					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_		
27.4								Driller's Remark: Slight circulation loss at 15.0'
1								10.0
1						_		
1 -						_]
1 -						-	1	-
1 -						-		-
1 -						-		-
1 -	18.5	0.1	CC 4	50/5	Limostono Fragmonto		Щ	_
1 -	18.9	0.1	SS-4	50/5 (50/5")	Limestone Fragments 18.5-18.6' - yellowish gray, (5Y 8/1), mild to n	noderate /-		_
1 -					HCl reaction, highly fossiliferous			
20								



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-21	SHEET	2	OF	11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit

						y, auto nammer, Avvo re			_	ORIENTATION : VEILICAL
WATER	LEVELS	. 4.12 1([ogs on 3/		START : 3/11/2007	END: 3/20/2007 SOIL DESCRIPTION		JOGER :		LeBlanc, M. Faurote COMMENTS
<u></u>	SAMDIE	INTERVA	J (ft)	STANDARD PENETRATION		JOIL DESCRIPTION			90,	COMMENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAWIFLE	RECOVE		TEST RESULTS	SOIL NAME	E, USCS GROUP SYME	BOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
FAC		RECOVE				CONTENT, RELATIVE CY, SOIL STRUCTURE		,	/BOI	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEP SUR ELE			#TYPE	6"-6"-6" (N)	CONSISTENC	51, SOIL STRUCTURE	WIINLIVALOGI		SYN	INSTRUMENTATION
22.4				,						
-								-		-
-								-		-
-								-		-
-								- 1		-
-								Ⅎ		-
_	00.5							-		-
-	23.5				Silt With Sand	(ML)			П	-
-		1.5	SS-5	17-26-20	23.5-25.0' - darl	k yellowish orange, (1	0YR 6/6), mois	st -		-
		1.5	33-3	(46)	to wet, nard, no moderate HCl r	nplastic, rapid dilatan eaction, 15% very fine	cy, mild to e to medium			-
25 <u> </u>	25.0				sand-sized grai	ns, all carbonate			Щ	
-								-		-
-										-
_										-
-								4		-
-								4		-
_								4		-
_	28.5				Ciltur Comed Mitth	Croval (CM)			e l'ile	-
_				3-2-2	Silty Sand With 28.5-29.6' - mod	derate yellowish brow	n, (10YR 5/4),	4		-
_		1.1	SS-6	(4)	wet, very loose,	fine to coarse graine	d, mild HCl	l		-
30	30.0				gravel-sized ma	ne gravel-sized, 39% aterial appears to be li	nonplastic line mestone	es, /		
12.4					∖fragments			_/ 4		-
_								4		-
_								4		<u>-</u>
_								_		_
_										_
										_
	33.5									_
		0.0	SS-7	26-36-50/2	Gravelly Silt W 33.5-34.25' - da	ith Sand (ML) irk yellowish orange to	dark olive ora	av.		_
	34.7	0.8	33-1	(86/8")	(10YR 6/6 to 5Y	7 5/2), wet, hard, nong	lastic, very rap	oid		-
35	O 1.1				dilatancy, strong	g HCl reaction, 30% fi nents, 20% fine to coa	ne gravel-size irse sand. mild	a I to I		
7.4					∖moderate HCl r	eaction for limestone	,			_
										_
										_
										_
								Ţ		_
										_
	38.5									
		0.9	SS-8	37-50/5				J		_
	39.4	J.5		(87/11")	L				Ш	_
40										



PROJECT NUMBER: BORING NUMBER:

338884.FL A-21

SHEET 3 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

	ڻ	COMMENTS
ND	C LO	DEDTILOF CACINO DOWN INC. DATE
OR	3OLI(DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
.OGY	3YME	INSTRUMENTATION
	0,	
5/4), -		1
stic		1
pears -		1
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_	nana	_
5/4), –		-
d, mild	111	-
stic –		-
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	21 121	
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dense,		
stic 7		-
/ -		
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Ī]
ents 🗇		No chatter, smooth drilling
]
	5/4), - grained, stic - pears - 5/4), - stic	OR OGY OGY Sold of the control of th



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-21 SHEET 4 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit ORIENTATION: Vertical

WATER	LEVELS	: 4.72 ft b	gs on 3/1	12/07 S	START : 3/11/2007 END : 3/20/2007 LOGG	SER	: C.	LeBlanc, M. Faurote
				STANDARD	SOIL DESCRIPTION		G	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	OOL NAME 11000 ODOLID OVARDOL OOLOD		SYMBOLIC LOG	DEDTIL OF GAGING DOULING DATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		30LI(DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT URF LEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		3YME	INSTRUMENTATION
<u>-17.6</u>				(14)		\dashv	0)	
-						-		-
-						1		1
-						1		1
_						1		1
-						1		1
	63.5							
	63.9	0.4	SS-13	50/5 (50/5")	Silt With Sand (ML)	,	Ш	SS-13 appears like extremely weak limestone
_				(00/0)	moist to wet, hard, nonplastic, very rapid dilatancy,			-
65					mild HCl reaction, 15-20% fine to coarse sand, all carbonate	\square		OF 071 Min an deill ab attan
-22.6						' ┨		65-67' Minor drill chatter
-						\exists		-
-						-		-
-						\dashv		Driller's Remark: "Soft" at 67' but maintained
-						-		circulation -
-	68.5					4		-
-	68.9	0.2	SS-14	50/4	Limestone Fragments With Silt And Sand	\exists	\Box	-
-				(50/4")	68.5-68.8' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to10YR 4/2), wet, dense,			1
70					nonplastic, mild HCl reaction, all carbonate	/ 1		1
-27.6								Driller's Remark: "Soft" 70-72', but maintained circulation
_						4		_
_						4		Minor drill chatter 72-73'
-						4		Willion drill chatter 72-73
-						-		-
-	73.5 73.9	0.1	SS-15	50/4.5	→ Limestone Fragments	7		-
-				(50/4.5")	73.5-73.6' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, coarse gravel-sized fragments,	/1		-
75					fossiliferous	/		1
-32.6								Driller's Remark: "Soft" at 75-77'
]]
] _]
_								Minor drill chatter 77-78'
-						4		Drillar's Romark: "Soft" at 70 70 51
-	78. <u>5</u> 78.7	0.0	SS-16,	50/2	→ Limestone Fragments	_		Driller's Remark: "Soft" at 78-78.5' -
-		0.0	(33-10)	(50/2")	\ 78.5' - one coarse sand-sized limestone fragment	/-		-
-					recovered	/ ┨		-
80						\dashv		-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-21 SHEET 5 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit

ORIENTATION: Vertical

					N 3 10025, Mud Totary, auto Hammer, AWJ Tous, 2-1/6			ORIENTATION : Vertical
WATER	LEVELS	: 4./2 tt k	gs on 3/	12/0/ 5	START : 3/11/2007 END : 3/20/2007	LOGGER	:: C.	LeBlanc, M. Faurote
				STANDARD PENETRATION	SOIL DESCRIPTION		၅၉	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COL	OP	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BE ATIO	RECOVERY (ft)			MOISTURE CONTENT, RELATIVE DENSIT	Y OR	30LI	DRILLING FLUID LOSS, TESTS, AND	
THE YE			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERA	ALOGY	YME	INSTRUMENTATION
-37.6				(N)			S	Oisself and drill abotton 00 001
-37.6						_		Significant drill chatter 80-82'
_						_		_
_								
						_		Driller's Remark: 82-83.5', soft drilling
-						-		-
-	83.5					_		-
-	63.5			47-50/5	Silty Gravelly Sand (SM)	_	717	-
-	011	8.0	SS-17	47-50/5 (97/11")	83.5-84.3' - moderate yellowish brown, (10YR	R 5/4), -		-
-	84.4			(31111)	wet, very dense, fine to coarse grained, mild l reaction, 32% fine to coarse gravel-sized lime	HCI /-	111	-
85					\fragments, 19% nonplastic fines, all carbonate			0 1: 1:11 1 1: 05 071
-42.6								Sporadic drill chatter 85-87'
								_
-						-		Drill chatter 87-88'
-						-		-
_						=		 Driller's Remark: "Softened considerably"
-	88.5				Silt (ML)	_	ш	88-88.5' –
-				7-2-15	→ 88.5-89.0' - moderate yellowish brown, (10YR)	R 5/4),	44	_
_		1.0	SS-18	(17)	\ wet, stiff, low plasticity, rapid dilatancy, mild H	ICI /_		_
90	90.0				reaction, 10-15% very fine sand-sized grains, contact at bottom	sharp		
-47.6					Silty Gravelly Sand (SM)	//_		Circulation loss at 90' Water level on 3/12/07 at 08:00 4.72' from -
					\89.0-89.5' - Same as 83.5-84.3'			top of 10" casing
						_		Set 15' of 6" casing then set 90' of 4" casing
_						-		(HW); changed to 3-7/8" bit
-						-		-
-						-		-
-						-		-
-	93. <u>5</u> 93.7	0.1	SS-19	50/2	│ Limestone Fragments		\vdash	-
-		<u> </u>	(30-13)	(50/2")	\ 93.5-93.6' - moderate vellowish brown. (10YR	R 5/4), -		-
_					mild HCl reaction, 20% coverage of small (1/	16") /		_
95					voids on fragment surfaces, several fine grave limestone fragments	ei-sizea		_
-52.6								
						_		Maintained circulation from 90-115'
						_		
-						-		-
-						-		-
-						-		-
-	98.5			07.50//		_	7.17.	-
_	00.3	0.8	SS-20	37-50/4 (87/10")		_		-
1 4	99.3			(37710)	h	Г	ш	
100								



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-21

SHEET 6 OF 11

SOIL BORING LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit

WATER	LEVELS	: 4.72 ft I	bgs on 3/1	12/07	START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Fau	rote
				STANDARD	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE	ERY (ft)	PENETRATION TEST RESULTS	MOISTURE CONTENT, RELATIVE DENSITY OR	CASING, DRILLING RATE, FLUID LOSS, TESTS, AND
DEP1 SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	STRUMENTATION
-57.6 - -	-				Silty Gravelly Sand (SM) 98.5-99.3' - moderate yellowish brown, (10YR 5/4), wet, dense, fine to coarse grained, mild HCl reaction, 30% fine to coarse gravel-sized material, 25% fines, sand and gravel-sized material appears to be limestone fragments	illing with no chatter - - -
-					Slight drill cha	tter at 102.5'
-	103.5				1	-
105	104.5	0.4	SS-21	10-50/5.5 (60/11.5")	Silt With Sand And Gravel (ML) 103.5-103.9' - moderate yellowish brown, (10YR 5/4), wet, hard, nonplastic, mild HCl reaction, interbedded layers of silt and sand-sized and fine to coarse	- -
-62.6 -	-				\aravel-sized limestone fragments	rk: Smooth soft drilling from
- - -	100.5					- - -
-	108.5 108.9	0.2	SS-22	50/5		at 107' and 108'
-				(50/5")	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	-
110_						_
-67.6 -					Soft drilling from a maintained cit	om 110-112' with minor chatter, reculation
-	-					-
-	1				- Driller's Rema	rk: Soft drilling at 112'
-	1				- Minor chatter	at 113' -
	113.5					
-	114.8	1.3	SS-23	21-12-20 (32)	113.5-115.0' - moderate yellowish brown, (10YR 5/4),	level on morning of 3/13/07 is
115 <u> </u>					particles, scattered fine to coarse sand-sized particles, coarse gravel-sized limestone fragments Maintained circ	culation from 115'
-					115-117' Soft	drilling with no chatter -
-	_]	-
-					117-117.5', S Drill chatter 1	ooradic minor drill chatter 17.5'-118', softened 118'-118.5' -
-	1					-
-	118.5			9 20 FO/4 F		-
1 -	119.6	1.1	SS-24	8-30-50/1.5 (80/7.5")	1111	-
120	118.0				<u> </u>	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-21 SHEET 7 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit

ORIENTATION : Vertical

DRILLIN	G METH	DIA DC	EQUIPM	<u>ENT : CME 55 S/I</u>	N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit		ORIENTATION : Vertical
WATER	LEVELS	: 4.72 ft b	gs on 3/	12/07	START : 3/11/2007 END : 3/20/2007 LOGGE	R : C	. LeBlanc, M. Faurote
1				STANDARD	SOIL DESCRIPTION	(D	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
BEL TOP		RECOVE	RY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	12	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MB	INSTRUMENTATION
DE SU ELE				(N)		λ	
-77.6 - - - -					Silty Sand With Gravel (SM) 118.5-119.6' - moderate yellowish brown, (10YR 5/4), wet, very dense, mild HCl reaction, fine to coarse sand-sized limestone fragments, 20% gravel-sized limestone fragments, 15% nonplastic fines, all carbonate	- - - -	Driller's Remark: Drill chatter 120-122', soft 122-123', drill chatter 123-123.5'
-						4	-
-	123.5 123.8	0.3	SS-25	50/4	_ Silty Sand With Gravel (SM)	+117	-
- 125	120.0	0.5	33-23	50/4 (50/4") /	123.5-123.8' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, very dense, mild HCl reaction, fine to coarse sand-sized limestone fragments, 20% gravel-sized limestone		
-82. 6					fragments, 15% nonplastic fines, all carbonate	- - - -	Chatter 125-126' Driller's Remark: Softened considerably on 126-128.5', circulation maintained to 136'
-						-	-
-	128.5				Silty Gravelly Sand (SM)	+11	-
-		1.1	SS-26	19-25-33	128.5-129.6' - pale yellowish brown to moderate	-	-
120	400.0	1.1	00 20	(58)	yellowish brown, (10YR 6/2 to 10YR 5/4), wet, very ¬\ dense, mild HCl reaction, fine to coarse sand-sized //	##	-
130 -87.6	130.0				limestone fragments, 30% gravel-sized limestone fragments, 22% nonplastic fines, all carbonate	1	Driller's Remark: Soft 130-132.5' Driller's Remark: Harder 132-133.5', minor
_						-	chatter observed on 133-133.5'
-						1	_
_						1	
-	133.5 133.8	0.3	SS-27	50/3	Silty Sand With Gravel (SM)	+	4
-	100.0	0.5	33-21	(50/3")	133.5-133.75' - pale yellowish brown to moderate	4	
-					yellowish brown, (10YR 6/2 to 10YR 5/4), wet, very dense, mild HCl reaction, fine to coarse sand-sized	4	-
135 <u> </u>					limestone fragments, 20% gravel-sized limestone fragments, 15% nonplastic fines, all carbonate	-	Steady chatter 135-138.5'
-						1	1
_						1	Significant chatter 136-138.5'
_						1	Circulation loss at 136.5'
-						1	1
						1]
	138.5 138.7				Limestone Fragments	1	1
	138.7	0.2	SS-28	50/2.5	- 138.5-138.7' - light olive gray, (5Y 5/2), mild to	干	Very hard at 139.0'
				(50/2.5")	moderate HCl reaction, fine to coarse sand-sized fragments, few voids or fossils, trace black particles,]	End of soil boring at 139', begin rock coring
140					possibly pyrite	1	
					Begin Rock Coring at 139.0 ft bgs See the next sheet for the rock core log		
					233 L.O HOAL GHOOL IOF WID TOOK GOTO TOG		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-21	SHEET	8	OF	11	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

	J WETTIOD 7 W	ND LC	ZUIFIV	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical		
WATER	LEVELS: 4.7	2 ft bo	gs on 3	3/12/07 START : 3/11/2007 END : 3/2	20/20	D7 LOGGER : C. LeBlanc, M. Fauro	te		
				DISCONTINUITIES		LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
140 -97.6	139.0 R1-NQ		>10	139.0-140.0' - Fracture zone, multiple laminated wavy discontinuities and fractures 140.0' - Bedding plane or mechanical break,		Limestone 139.0-141.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong to strong	Ground water level at 4.49' below top of casing Le Blanc and T. Stewart start logging at 139'		
-	2.5 ft 80%	14	5 NR	10 deg, smooth, planar, tight 140.2' - Bedding plane, 5 deg, smooth, planar, tight 140.7' - Bedding plane, 5 deg, rough,		(R3 to R4), 25% unfilled surface voids (< 1/16") spheroidal to irregular shaped, thinly bedded to laminated, poorly fossiliferous (molds/casts)	HW casing advanced to 138.5' R1: 29 minutes		
-			2	undulating, gray discoloration over 60% of surface, tight 140.9' - Bedding plane, 5 deg, rough, undulating, 1/4" fossil molds/casts on fracture		No Recovery 141.0-141.5' Limestone 141.5-142.3' - Same as 139.0-141.0' 142.3-143.9' - light olive gray, (5Y	-		
- -	R2-NQ 5 ft 48%	17	>10	surface 141.0' - Bedding plane or mechanical break, rough, planar, fracture along bedding plane, open 1/16" 141.8' - Fracture, 80 deg, rough, undulating,		5/2), medium grained, mild to moderate HCl reaction, 1/16" voids on 40% of surface, fine to medium carbonate subrounded granules, granular/sucrosic texture, traces of	Slight circulation loss at		
145_ -102.6 -			NR	stains over 20% of surface 142.3-142.6' - Fracture zone, 1/4" to 3/4" rock fragments 143.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open 2"		fine grain medium dark gray (N4) particles No Recovery 143.9-146.5'	R2: 46 minutes		
- - -	146.5		>10	143.3' - Fracture, 50 deg, rough, undulating, tight 143.6' - Fracture, 70 deg, rough, undulating, open		Limestone - 146.5-147.6' - Same as 142.3-143.9'			
-	R3-NQ 5 ft	20	>10	143.6-143.9' - Fracture zone, 3/16" - 1-9/16" subangular rock fragments 146.6' - Fracture, 10 deg, rough, undulating, open 1/8" 147.1' - Mechanical break, 5 deg, rough,		147.6-150.6' - light olive gray, (5Y 5/2), fine to medium grained, moderate HCl reaction, medium strong (R3), 30-40% small (1/16") voids, trace of unfilled elongated	Harder drilling at 148'		
150 -107.6	82%		20	>10	undulating 147.2-147.6' - Fracture zone, rough, >10 undulating, rock fragments	undulating 147.2-147.6' - Fracture zone, rough, undulating, rock fragments — 147.8' - Fracture, 30 deg, smooth, undulating,		(3/16" x 1/16") cavities, stains on 20% of surface, trace to 10% fine to medium grained medium dark gray (N4) particles	- -
-	151.5		NR	trace staining of black speckles 148.2-148.7' - Fracture zone, 30-40 deg 148.2' - Fracture, 30-40 deg, rough, stepped, tight		No Recovery 150.6-151.5'	R3: 15 minutes -		
-			6	148.7' - Fracture, 5 deg, rough, undulating, open 1/8" 148.95' - Fracture, 5-10 deg, rough, undulating, pink discoloration, open 1/4" 149.2' - Bedding plane, horizontal, rough,		 151.5-155.8' - light olive gray with medium light gray and very pale orange mottling, (5Y 5/2 with N6 and 10YR 8/2), fine grained, moderate to strong HCl reaction, medium strong 			
- - 155	R4-NQ 5 ft 86%	23	>10	undulating, gray stains, open up to 1/2" 149.6' - Fracture, 40-45 deg, rough, undulating, trace black staining 149.7-150.6' - Fracture zone, 40-50 deg,		(R3), poorly fossiliferous, 1/16" voids on 25% of surface, massive bedding except laminated from 153.4-159.9'			
-112.6 			5 NR	multiple 40-50 deg fractures and angular fragments with black staining 150.25, 158.3' - Bedding plane (2), horizontal, rough, undulating, tight		 - - No Recovery 155.8-156.5'	R4: 28 minutes		
- - -	156.5		2	152.1' - Fracture, 25 deg, rough, undulating, tight 152.3' - Fracture, 70 deg, rough, undulating, black stains over 85% of surface 152.4' - Fracture, horizontal, rough,		<u>-</u> -			
_	R5-NQ		4	undulating, open 1/4" 152.55' - Bedding plane, horizontal, rough, undulating, open 1/4"		-			



PROJECT NUMBER:	BORING NUMBER:			-	
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ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS: 4.7	'2 ft b	gs on 3	3/12/07 START : 3/11/2007 END : 3/	20/20	07 LOGGER : C. LeBlanc, M. Fauro	te
≥O≎	(%)			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU	(%) _Q	.00-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Lí	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
Оνщ	0 ∃ œ 5 ft	<u>∝</u> 53	4		S		
_	84%	55		152.7' - Bedding plane, horizontal, rough, planar, grayish orange (10YR 7/4) stains on	L	Limestone - 156.5-160.7' - yellowish gray to light	SC-1 collected at 158.95- 159.9' -
160			4	25% of surface	₽	olive gray, (5Y 7/2 to 5Y 5/2), olive	
-117.6			4	153.0' - Fracture, 75-80 deg, rough, undulating, black stain over 10-15% of	ш	gray (5y 3/2) mottling at 157.3', fine grained, moderate HCl reaction,	
_				surface		weak to medium strong (R2 to R3),	R5: 47 minutes
l _	161.5		NR	153.2, 153.3, 153.4, 153.55, 153.7' - Bedding plane (5), horizontal, rough, planar, open <	┢	3/8" voids on 15% of surface (40-45% at 158.0-159.0'), casts over	_
			2	1/16"	片	45% of surface, trace cavities	
			2	153.7-153.95' - Fracture zone, fragments <3/4"	Ľ	(3/16-1/8"), voids and cavities have]
_				<3/4" 153.95, 154.1, 154.3, 154.4, 154.6' -	\vdash	 an elongated subhorizontal alignment, cavities concentrated 	
-			1	Bedding plane (5), 5-10 deg, tight, brownish	仜	from 156.5 -157.0' and 160.0-160.5'	
_	R6-NQ			black staining on surface 154.9' - Fracture, 80 deg, rough, undulating,	Ь	No Recovery 160.7-161.5' Limestone	
_	5 ft 73%	27	5	tight, 5-10% staining as black speckles	F	161.5-165.2' - yellowish gray to light	
165	7370		_	155.2, 155.25' - Bedding plane (2), horizontal, rough, planar, tight	Ħ	 olive gray, (5Y 7/2 to 5Y 5/2), fine grained, moderate to strong HCl 	-
165_ -122.6			3	155.4' - Bedding plane or mechanical break, —	╁	reaction, weak to medium strong (R2	
-				30-40 deg, rough, undulating, open 1/4" 156.6' - Mechanical break, horizontal, rough,	\vdash	to R3), fossiliferous (casts/molds, 1/16" and smaller), 30% voids	R6: 35 minutes
-			NR	open 1/16"	世	(1/16"), 5-10% elongated cavities	-
-	166.5			156.8' - Fracture, 60-70 deg, rough,	+	_ (3/16-1/16"), massive/homogeneous	-
-			>10	undulating, tight 157.6' - Bedding plane, 30 deg, rough,	F	fine grained appearance 164.0-164.7' No Recovery 165.2-166.5'	-
_				undulating, tight	片	_ Limestone	SC 2 collected at 167 FF
_			3	157.85' - Bedding plane, horizontal, rough, planar, tight	╀	166.5-169.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl	SC-2 collected at 167.55- 168.25' -
-				158.5, 158.7, 158.8' - Bedding plane (3),	H	reaction, 35-40% small (1/16") voids	Significant circulation loss _
_	R7-NQ 5 ft	22	1	horizontal, rough, planar, tight 158.95' - Bedding plane, 15-20 deg, rough,	上	concentrated at 166.5-167.3, moderately fossiliferous (molds up to	_
_	50%			undulating, tight	\vdash	_ 3/8" x 1-3/8")	_
170_				159.9' - Bedding plane, horizontal, rough, — planar, open 1/16"	厈	No Recovery 169.0-171.5'	
-127.6			NR	160.0, 160.4, 160.5' - Bedding plane (3),	Ľ	_	
_				horizontal, rough, undulating, tight 161.7' - Fracture, 80 deg, rough, undulating,	\vdash	_	R7: 26 minutes
	171.5			tight	\vdash	_	End drilling for day (3/14/07) at 171.5'
			>10	161.9' - Bedding plane, horizontal, rough, undulating, open 1/4"	口	Limestone	Water level at 4.52' below
			-10	163.2' - Fracture, 60 deg, rough, undulating,	\vdash	 171.5-175.4' - light brown to yellowish gray, (5YR 6/4 to 5Y 7/2), 	top of casing 3/15/07
				tight	F	fine to medium grained, mild to	Advanced HW casing to – 168' on 3/15/07
			>10	163.5, 163.6' - Bedding plane (2), horizontal, rough, undulating, open 1/16"		 moderate HCl reaction, medium strong to strong (R3 to R4), 	Water level is at top of
-	R8-NQ			163.8, 163.95' - Bedding plane (2),	╙	laminated bedding 172.6-173.1' with	casing when drilling – resumed 3/20/07
_	5 ft 78%	22	2	horizontal, rough, undulating, 1/16" open 164.2' - Fracture, 65-75 deg, rough,	仜	 alternating beds of very dark and light crystallized materials (pyrite and 	
175	7070			undulating, open 1/16", stains on 25% of	\Box	hematite), very fossiliferous (35%	
-132.6			3	surface 164.6' - Fracture, 5-10 deg, rough,	\vdash	— void spaces from fossil molds) from 173.1-175.4'	
-				undulating, 1/4" open	广	No Recovery 175.4-176.5'	R8: 129 minutes
-			NR	164.75-164.9' - Fracture zone, angular rock fragments	世	-	-
-	176.5			165.15' - Mechanical break, horizontal,	╀	Limestone	-
-			10	rough, undulating, tight	仜	 176.5-176.8' - medium grained, mild 	-
-				166.6' - Mechanical break, horizontal, rough, undulating, tight	\vdash	HCl reaction, medium strong (R3), 35-40% fossil related void spaces	-
_			6	167.1-167.25 - Fracture zone, rock	\vdash	-	-
-	B2 115			fragments 167.4' - Mechanical break, horizontal, rough,	片	-	_
	R9-NQ			undulating, tight	片		
1					1		

APPENDIX 2BB-258 Rev. 4



FRACTURES PER FOOT

>10

NR

0

5

NR

>10

9

>10

NR

>10

6

3

NR

>10

4

1

tight

tiaht

fragments

fracture

horizontal

breaks

break

feature

and a broken zone

beyond this piece

smooth, planar faces

staining on surface

very rough surface

oxide stains

small rock fragments

minerals on fracture faces

188.40' - Fracture, healed

smooth, planar

RQD(%)

WATER LEVELS: 4.72 ft bgs on 3/12/07

CORE RUN, LENGTH, AND RECOVERY (%)

181.5

186.5

191.5

196.5

5 ft

78%

R10-NQ

5 ft

40%

R11-NQ

5 ft 0

68%

R12-NQ

5 ft 72%

R13-NQ

3.8 ft 9

61%

7 >10

20

DEPTH BELOW SURFACE AND ELEVATION (ft)

180

-137.6

185

-142.6

190

-147.6

195

-152.6

PROJECT NUMBER:	BORING NUMBER:
338884.FL	A-21

90

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A-21 SHEET 10 OF 11

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723168.5 N, 458055.6 E (NAD83)

START: 3/11/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS

167.5' - Fracture, 25 deg, rough, undulating,

168.2' - Fracture, 30 deg, rough, undulating,

168.45' - Fracture, 80 deg, rough, undulating, black stains on 15% of surface 168.65' - Fracture, 20 deg, rough, undulating

171.75-172.3' - Fracture zone, multiple small

172.55, 172.75, 172.8' - Bedding plane (3),

172.8-172.95' - Fracture, rough, "L" shaped

172.95-173.6' - Fracture zone or mechanical

173.85' - Mechanical break, rough,

174.25' - Fracture or mechanical break,

174.5-175.35' - Fracture zone, multiple

rough to smooth, undulating, multiple fractures, most appear horizontal

177.45-178.45' - Fracture zone, mostly

look like shatter cones at 177.80'

182.45' - Mechanical break, rough

176.45-177.45' - Fracture zone, horizontal,

horizontal fractures, mechanical breaks that

178.45-179.5' - Fracture zone or mechanical

179.5-180.35' - Fracture zone, 2 flat surfaces

182.75-183.05' - Fracture, 80 deg, vertical fracture, not separated, and does not extend

183.0-183.35' - Fracture zone, multiple

186.5' - Fracture zone, multiple broken

fragments smaller than 1.5", no defined

187.75-188.35' - Fracture, vertical, rough,

188.65-188.95' - Fracture, vertical, exhibits

very heavy solution erosion features and

infilling or plating of iron oxides creating a

191.5-191.9' - Fracture zone, numerous

192.15' - Fracture, 0-7 deg, rough, staining or

recrystallization on the face that is very rough

191.7' - Fracture, smooth, planar 191.9' - Fracture, slightly rough, planar, iron

192.55' - Fracture, 60 deg, rough,

undulating 188.35' - Fracture, rough, planar, iron

undulating, irregular, no fill

174.0' - Fracture, rough

171.6' - Fracture, 45 deg, rough

DISCONTINUITIES

DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler ELEVATION: 42.4 ft (NAVD88)

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical END: 3/20/2007 LOGGER: C. LeBlanc, M. Faurote LITHOLOGY COMMENTS ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS Faurote start logging at 179' to the end of borehole 176.8-177.35' - yellowish gray, (5Y 7/2), very fine grained, moderate HCI reaction, medium strong to strong (R3 to R4), thin to laminar bedded 177.35-180.4' - moderate yellowish brown, (10YR 5/4), fine to very fine R9: 67 minutes grained, moderate to strong HCI reaction, indistinctly bedded and presents about 25% void space due to fossil casts and molds No Recovery 180.4-181.5' Limestone 181.5-183.5' - light brown, (5YR 6/4), very fine grained, mild HCl reaction, medium strong (R3), 25% void space from fossil molds and casts No Recovery 183.5-186.5' R10: 23 minutes Limestone 186.5-188.1' - light brown, (5YR 5/6), very fine grained, mild HCl reaction, medium strong to strong (R3 to R4), exhibits fossil related voids to 35% of the visible rock 188.1-188.5' - moderate yellowish brown, (10YR 5/4), very fine grained, mild HCI reaction, medium strong to strong (R3 to R4), thinly to laminar bedded or pseudo bedded 188.5-189.9' - pale yellowish brown, Lost circulation from 189' to 195' (10YR 6/2), mild HCl reaction, weak R11: 35 minutes to medium strong (R2 to R3), highly fossiliferous with large echinoderm and gastropod casts, total void space about 30%, organic traces along some fossil casts No Recovery 189.9-191.5' Limestone 191.5-191.8' - Same as 188.5-189.9' 191.8-192.1' - yellowish gray, (5Y 7/2), very fine grained, mild HCl reaction, laminar bedded 192.1-193.5' - mild HCl reaction, medium strong (R3), highly fossiliferous exhibiting 30% void spaces from casts and molds, and Void at 195.5' numerous shell fragments, apparent R12: 78 minutes clasts of fine grained rock are visible within the fossil rich rock, solution cavities with iron oxide minerals or The rock presents an stains overall picture of 193.5-195.1' - Same as 191.8-192.1' subsidence or collapse and No Recovery 195.1-196.5' reinduration due to the Limestone 196.5-197.0' - Same as 191.8-192.1' size, shape, and orientation

of some of the fragments



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-21	SHEET	11	OF	11	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 4.7	72 ft b	gs on 3	3/12/07 START : 3/11/2007 END : 3/	20/20	2007 LOGGER : C. LeBlanc, M. Faurote	
>00	(9)			DISCONTINUITIES	G	LITHOLOGY COMMENTS	
ELOV N (ft	IN, AND ∛Y (%	_	ZES T	DESCRIPTION	C LO	ROCK TYPE, COLOR, SIZE AND DEPTH OF CASI	NG
FH BI	E RU STH, OVEF	(%) O	FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, MOOTHNESS, MOOTHNESS, MOOTHNESS, MOOTHNESS	AND
DEP SURI ELE\	COR LEN(REC	ROI	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS AND ROCK MASS DROPS, TEST RESULTS, E	
DEPTH BELOW SURFACE AND OF THE STATE OF TH	CORE RUN LENGTH, AND RECOVERY (%)	Ø	FRACTURES 5 PER FOOT	PLANARITY, INFILLING MATERIAL AND	AVMBORIC TOO	197.0-198.1' - moderate yellowish brown to light brown, (10YR 5/4 to 5YR 6/4), mild HCl reaction, medium and differential	OD TC.
					1		
					1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-21A	SHEET	1 OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

								DIL	
WATER	LEVELS	: 4.72 ft k	ogs on 3/	12/07	START : 5/22/2007	END: 5/23/2007	LOGGI	ER : I	R. Gomez
				STANDARD		SOIL DESCRIPTION		COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS					
ON A P		RECOVE	DV (#)	TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMBO	OL, COLOR,	2	DEPTH OF CASING, DRILLING RATE,
AHE		RECOVE	<u> </u>			E CONTENT, RELATIVE [3	DRILLING FLUID LOSS, TESTS, AND
F 문 문 년			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE,	MINERALOGY	3	INSTRUMENTATION
				(N)	F.111				
42.8	0.0			4.5.0	Fill	stone, derived silt, sand	and gravel mix	$\mathbb{Z}^{\!$	<u> </u>
		0.4	SS-1	4-5-6 (11)	0.0-0.4 - 111163	storie, derived siit, said	and graver mix		Water level is based on Ground Water
_	4.5			(11)				1	Monitoring at LNP site (FSAR Table -
-	1.5							+	2.4.12.08) A-21A drilled in construction road; road
-								4	material is silty sand with gravel limestone –
								_	derived product
								1	Relogged by J. Schaeffer and T. Stewart
-								1	Water levels not recorded during drilling -
-								-	-
-								4	-
								1]
5	5.0								
37.8					Clayey Sand (SC)			7
-		0.8	SS-2	1-1-2	5.0-5.75' - light	t bluish gray with light bi /R 5/6), moist, very loos	rown staining,	1/2	4
-		0.0	00-2	(3)	fine grained no	o HCl reaction, 20% me	se, very tine to	/┨	
-	6.5				plasticity fines,		diditi to tilgit	4	1
					, ,]
-								1	1
-								1	1
-								4	-1
-								4	-
								┚	
10	10.0								
32.8					Silt (ML)			\neg	∄
-		1.3	SS-3	12-11-15	10.0-11.3' - gra	ayish orange, (10YR 7/4), wet, very stiff,	-111	
-		1.5	33-3	(26)	nonplastic, ver	y rapid dilatancy, mild to % very fine to fine sand-	o moderate HCI	-	-
-	11.5				carbonate	o very line to line sand-	5126u, ali	/╬"	┧
					(00.00			J]
								1	1
-								1	1
-								1	-
-								4	-
_								1	
								J	
15	15.0							1	1
27.8	. 5.0		00.4	21-50/3	Silt With Lime	stone (ML)		$ \uparrow $	
-	15.8	0.6	SS-4	(71/9")	_ 15.0-15.6' - Sa	me as 10.0-11.3' excep	t scattered	дШ	<u> </u>
-					\ lenses of coars \fragments, all o	se sand- to fine gravel-s	izea iimestone	/ ┨	1
-					magments, all	oui Doi iale		4	1
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	Α-21Α	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

						otary, auto naminer, Avvo rou			- ONIENTATION : Vertical			
WATER	LEVELS	: 4.72 ft l	ogs on 3/	12/07 S	START : 5/22/2007	END : 5/23/2007	LOGGEF	<u>≀ : R.</u>				
>				STANDARD		SOIL DESCRIPTION		ق	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG				
BRA		RECOVE	ERY (ft)	1	SOIL NAM	IE, USCS GROUP SYMBOL, E CONTENT, RELATIVE DEN	COLOR,	Ę	DEPTH OF CASING, DRILLING RATE,			
T A Y			#TYPE	6"-6"-6"		E CONTENT, RELATIVE DEN ICY, SOIL STRUCTURE, MIN		[¶] BC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
			#ITPE	(N)	00.10.012.1	.0., 00.2 000.0		SY				
22.8	20.0			` '	Silty Sand (SM	/)		111				
-			00.5	19-16-15	20.0-21.5' - gra	avish orange to dark vellow	ish orange, -	111	-			
_		1.5	SS-5	(31)	(10YR 7/4 to 10	0YR 6/6), wet, dense, fine	to coarse	.	_			
I _	21.5				grained, mild to	o moderate HCl reaction, 3 s, all carbonate derived	30%	Ш	_			
					Tioripiastic fines	5, an oarbonate derived						
-							-	1	-			
-							-	1	=			
-							-	1	=			
_							=	1	_			
_							_					
							·					
25	25.0						-	1	1			
17.8	20.0				Sandy Silt (ML	L)		Ш				
-		, ,	000	23-22-26	25.0-26.4' - gra	ayish orange to dark yellow	ish orange, -	$\ \ $	-			
_		1.4	SS-6	(48)	(10YR 7/4 to 1)	0YR 6/6), wet, hard, nonpla	astic, 41%	4	=			
l _	26.5				fine to medium	n grained sand		ш	_			
							-	1	_			
-							-	1	-			
-							-	1	-			
_							-	1	_			
							_		_			
30	30.0						-	1				
12.8	30.0				Silty Sand (SM	/)		111	-			
-		1.1	SS-7	4-20-50/1	30.0-31.1' - Sa	me as 25.0-26.4' except ve	ery dense, -	111	-			
_	31.1			(70/7")	25-30% nonpla	astic fines	_		_			
_							_		_			
							-	1	_			
-							-	1	-			
-							-	1	Heavy grinding and chattering; 10 minutes to			
_							-		drill 33.0-35.0'			
_							_		_			
35	35.0							<u>l</u>	Cat LIM againg to 251 and switch to you!			
7.8	35.1	0.0	SS-8	50/1	No Recovery 3	35.0-35.1'		Г	Set HW casing to 35' and switch to rock coring; see rock core log			
-				(50/1")	Begin Rock Co	oring at 35.0 ft bas	-	1	End of drilling for the day, 5/22/07			
_					See the next si	heet for the rock core log	-	1				
_							_	1	_			
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338884.FL A-21A

SHEET 3 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 4.7	'2 ft b	gs on 3	3/12/07 START : 5/22/2007 END : 5/	23/20	07 LOGGER : R. Gomez	
≥∩ <i>⊊</i>	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	(%) O	TUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	SORI	RO	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
7.8	35.0	ш	ш.п.	· · · · · · · · · · · · · · · · · · ·	0)	Limestone	Begin rock coring at 08:17,
-			1	35.6' - Bedding plane, 0-30 deg, rough,	H	 35.0-38.6' - pale yellowish brown, 	5/23/07
-				planar, tight	Ħ	(10YR 6/2), moderate to strong HCl reaction, very weak (R1), thin	-
-			1		世	 bedding, moderately fossiliferous 	-
-	R1-HQ			36.8' - Bedding plane, 5-10 deg, rough,	╫	(casts/molds), sample is 20-30% voids/casts <1/8", trace irregular	-
-	5 ft	50	4	undulating, tight to open (1/8")	₽	 shaped cavities 1/4"x1/8", trace 	-
-	72%		2	37.7' - Fracture, 50 deg, rough, undulating 37.85, 37.95,' - Bedding plane (2), horizontal,	扛	coarse grain organic fragments, carbonate silt lenses present at	-
-				wavy bedding plane contacts with carbonate	仜	- 37.9-38.1' No Recovery 38.6-40.0'	-
-			NR	fines 38.5' - Mechanical break	╁╴	No Recovery 36.6-40.0	R1: 5 minutes
- 40			INIX	-	F	-	-
40 2.8	40.0			_	╁	Limestone	-
-			2	40.3, 40.4' - Mechanical break (2), horizontal, rough, undulating, tight	#	40.0-43.0' - pale yellowish brown,	-
-				41.0, 41.1' - Mechanical break (2), horizontal,	世	(10YR 6/2), fine to medium grained, moderate to strong HCl reaction,	-
-			4	rough, undulating, tight 41.6, 41.8' - Bedding plane (2), horizontal,	F	extremely weak to very weak (R0 to R1), 3-5% fine grain moderately dark	-
-	R2-HQ			rough, undulating, tight	扛	gray (N4) particles in matrix, 5-7%	-
-	5 ft 60%	23	4	42.15' - Fracture, 40 deg, smooth, planar, tight	仜	 coarse grain black particles, moderately fossiliferous 	-
-	0070			42.2, 42.5, 42.9' - Mechanical break (3), <5	\vdash	(casts/molds), fossils (up to 3/8"),	-
-				deg, rough, undulating, tight	╁	 15-25% voids/casts (<1/16") No Recovery 43.0-45.0' 	-
-			NR		Ħ	_ 110 11000 101 40.0 40.0	R2: 3 minutes
45	45.0				Ħ	-	-
-2.2	45.0			45.0-46.4' - Mechanical break, multiple	H	Limestone	
-			>10	irregular breaks	₽	45.0-48.9' - dark yellowish brown, (10YR 4/2), extremely weak to very	-
-					H	weak (R0 to R1), 3-7% black organic	_
-			>10		Ҵ	 lamination (<1/16") and coarse grain particles, 25-35% spheroidal voids 	_
_	R3-HQ			47.2, 47.4, 47.6, 47.8, 48.4, 48.8, 48.9' -	世	(<1/8"), moderately fossiliferous	-
-	5 ft 78%	15	6	Mechanical break (7), horizontal, rough,	╁	 (casts and molds), most fossils <1/8", trace dissolution cavities 	-
-				undulating, tight	F	across the entire run	-
-			3	-		T	1
-			NID		Ħ	No Recovery 48.9-50.0'	R3: 2 minutes
50	50.0		NR		世		1
-7.2			. 40	50.0-50.3' - Fracture zone, subangular rock	$oxed{\mathbb{H}}$	Limestone	
			>10	fragments 1/2"-1-1/8" in size 50.0, 50.1, 50.3, 50.45' - Bedding plane (4),	H	 50.0-54.2' - dark yellowish brown, (10YR 4/2), very fine to fine grained, 	1
_			E	5-10 deg, rough, undulating, open (1/16"),	口	moderate HCl reaction, very weak to]
_			5	occuring on organic laminations 50.6, 50.7' - Bedding plane (2), 5-10 deg,	Ш	weak (R1 to R2), 15-20% spheroidal and elongated voids <1/8", 5-10%]
	R4-HQ 5 ft	28	2	rough, undulating, open (1/16") 51.7' - Bedding plane, horizontal, rough,	\vdash	elongated dissolution cavities unfilled, both elongated voids and]
	84%	20		undulating, open (1/8")	F	cavities appear to be sub horizontally	
			3	52.1, 52.65, 53.0, 53.15' - Bedding plane (4), 15-20 deg, rough, undulating, tight	片	aligned, 3-5% organic material as coarse black particles and	
_				53.25' - Bedding plane, 30 deg, rough,	片	laminations at 51.3' and 52.3'	
_			5 (0	undulating, organics on upper surface	H	No Recovery 54.2-55.0'	R4: 5 minutes
55	55.0		NR		H		
					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-21A

SHEET 4 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 4.7	'2 ft b	gs on 3	3/12/07 START : 5/22/2007 END : 5/	23/20	07 LOGGER : R. Gomez	
≥∩≘	(9)			DISCONTINUITIES	စ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-12.2 -	016	ш.	>10	55.2-55.45' - Fracture zone, 1/4" to 1-1/2" rock fragments 55.65' - Bedding plane, 2-5 deg, rough,		Limestone - 55.0-58.9' - pale yellowish brown with trace olive gray mottling, (10YR 6/2	-
-	R5-HQ		3	planar, open (<1/16") 55.95' - Bedding plane, 5 deg, rough, stepped, open (<1/16") 56.1, 56.3' - Mechanical break		with 5Y 4/1), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 10-15% voids (<1/16"), elongated,	- -
-	5 ft 78%	47	1	56.5' - Fracture, 60 deg, rough, undulating, open (<1/8") 57.3' - Fracture, 50 deg, rough, undulating,	Ħ	poorly fossiliferous (casts), fossils are <1/16", 3-7% medium grained angular shaped black particles, trace short (<1/16") discontinuous black	SC-1 collected at 57.5- 58.9'
- 60	60.0		NR	open (<1/8") 57.4' - Bedding plane or mechanical break 57.5' - Bedding plane, horizontal, rough, stepped, 3/8" relief on surface	Ħ	laminations grading from weak rock (R2) at top to medium strong rock (R3) at the bottom No Recovery 58.9-60.0'	R5: 7 minutes
-17.2 -	55.0		1	58.9' - Bedding plane or mechanical break, — horizontal, rough, planar, open (< 1/16") 60.3' - Bedding plane, horizontal, rough, undulating, open (1/2")		Limestone 60.0-61.2' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), moderate to strong HCl	
-	R6-HQ		2	61.2, 61.4' - Bedding plane or mechanical break (2), 5-10 deg, rough, undulating, open (3/4") 62.0' - Bedding plane, horizontal, rough,		 reaction, medium strong (R3), 3-5% voids <1/16", 5-10% horizontally aligned <3/8" flat black flakes 	-
-	5 ft 92%	35	4	undulating, open (1/8") 62.3' - Bedding plane, 5-10 deg, rough, undulating, tight 62.5' - Mechanical break		- 61.2-61.4' - Same as 60.0-61.2' except weak (R2), 25-35% voids <1/16", 5-10% coarse grain black particles	- - -
	65.0		0 NR	62.8, 63.05, 63.3, 63.5, 63.8' - Bedding plane or mechanical break (5), horizontal, rough, undulating, open (<1/16")	Ħ	61.4-62.0' - Same as 60.0-61.2' 62.0-64.6' - Same as 61.2-61.4' No Recovery 64.6-65.0'	R6: 6 minutes
-22. <u>2</u> - -			>10	65.6-65.78' - Fracture zone, rock fragments		Limestone - 65.0-71.0' - mottled pale yellowish brown and dark yellowish brown, (10YR 6/2 and 10YR 4/2), fine	- SC-2 collected at 65.78- 66.77'
- - -	R7-HQ 5 ft 100%	68	1	67.2' - Bedding plane, horizontal, rough, undulating		grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 10-15% voids <1/16", voids restricted to pale yellowish brown color, 3-7% medium grain black	-
- -			0	69.0' - Bedding plane, horizontal, rough, planar, 1/16" silt and/or clay sized infilling		flakes present as short discontinuous laminations across rock sample, very thinly bedded at 69.0-69.3', mottled areas appear to be bioturbated zones oriented subhorizontally	R7: 10 minutes
70 -27.2	70.0		2	69.3' - Bedding plane, horizontal, rough, planar, tight medium grained black flakes on surface 69.6' - Fracture, 20-30 deg, smooth, stepped.			
-	DO LIG		2	69.8' - Fracture, 20-30 deg, smooth, stepped, 1-3/4" fossil on fracture surface 69.8' - Fracture, 80 deg, rough, planar, tight 70.68' - Bedding plane, 10-15 deg, rough, undulating, at top of extremely weak rock		71.0-74.4' - pale yellowish brown, (10YR 6/2), fine grained, moderate to strong HCl reaction, 20-30% voids/casts <1/16", moderately	
-	R8-HQ 5 ft 88%	60	1	70.8' - Bedding plane, 5-10 deg, rough, undulating, top of fractured rock 71.0' - Bedding plane, <5 deg, rough, undulating, base of fractured zone		fossiliferous with casts (up to 1/2"), 5-10% medium to coarse grain black particles, 3-5% medium to coarse	-
-			1 1 NR	71.3' - Fracture, 80 deg, rough, undulating, tight, fracture up to 7" long 72.7' - Bedding plane, 5-10 deg, rough,		grained dark gray angular to subangular shaped particles, 1/2" thick organic layer at 73.6', below 73.6' rock looks more weathered	R8: 7 minutes
75	75.0		INIT	undulating, tight		than above	

APPENDIX 2BB-264 Rev. 4



338884.FL A-21A

SHEET 5 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 4.7	2 ft bo	gs on 3	3/12/07 START : 5/22/2007 END : 5/	<u>23/2</u> 0	07 LOGGER : R. Gomez	
>00	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H B H	E RU STH, OVE	D (%)	FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	SOR	RQI	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-32.2	024	_		73.6' - Bedding plane, 0-5 deg, rough,		No Recovery 74.4-75.0'	
-			0	undulating, 1/2" thick organic layer	╁	- Limestone 75.0-78.6' - moderate yellowish	-
-				73.8' - Mechanical break, 30 deg, rough, undulating, tight	F	brown to pale yellowish brown,	-
-			1	74.1' - Bedding plane or mechanical break, horizontal, rough, undulating, tight	Ħ	- (10YR 5/4 to 10YR 6/2), moderate HCl reaction, weak (R2), 25-30%	-
-	R9-HQ			76.6' - Fracture, 30 deg, rough, undulating,		voids <1/16", trace unfilled cavities	-
-	5 ft 96%	40	>10	tight 76.6-77.1' - Fracture, vertical, rough,	₩	 1"x1/2" (mostly near bottom), moderately fossiliferous (casts), 	-
-	3070			undulating, black staining on 15% of surface,		3-7% fine to medium grained black	-
-			>10	multiple intersecting mechanical breaks 77.6-78.6' - Fracture zone, high angle	扛	 particles; 1-1/2" thick organic lense 78.6-79.8' - Same as 75.0-78.6' 	-
-			_	fractures through an interval of apparently	世	except very weak (R1)	R9: 6 minutes
80	80.0		0	weathered rock 78.6, 78.8' - Bedding plane (2), horizontal,	╁	f	=
-37.2	00.0		NR.	rough, undulating, top and base of	F	— No Recovery 79.8-80.0' Limestone	-
-			>10	organic-rich carbonate fines layer 80.0-80.3' - Fracture zone, rock fragments	Ħ	80.0-84.4' - pale yellowish brown,	
-				80.6' - Bedding plane or mechanical break,	Ħ	 (10YR 6/2), moderate to strong HCl reaction, weak (R2), moderately 	-
-			3	horizontal 81.0' - Fracture, 65-75 deg, rough, undulating	H	fossiliferous (cast/molds), 3-7%	-
-	R10-HQ			81.3' - Fracture, 30 deg, rough, undulating, tight	₽	 medium to coarse grain black particles, fossils (up to 5/8"), various 	-
_	5 ft 88%	10	2	81.7' - Fracture, 40 deg, rough, undulating,		fossil types present including tubular shaped organisms, top 0.4' of run	1
_				tight 82.1' - Fracture, 30 deg, rough, undulating,	ш	appears weathered	1
_			2	top of zone of fragmented rock		_	1
_			1	82.7' - Fracture, 70-80 deg, rough, undulating, tight	╁	_	R10: 10 minutes
85	85.0		NR	83.1' - Fracture, 70 deg, rough, undulating,	H	No Recovery 84.4-85.0'	1
-42.2			0	tight — 83.2' - Fracture, horizontal, rough, undulating	Ħ	Limestone - 85.0-85.9' - pale yellowish brown,	SC-3 collected at 85.0- 85.82' -
				83.8-84.3' - Fracture zone 84.3' - Fracture, 30-40 deg, rough,	片	(10YR 6/2), strong HCl reaction,	05.02
_				undulating, base of fractured zone		strong (R4), 5-10% void <1/16", 10-20% unfilled cavities irregularly	_
_				85.9' - Fracture, 30 deg, rough, undulating, infilling on surface	⊬	shaped up to 1" in size, some are	_
_	R11-HQ 5 ft	15	NR		F	dissolution cavities, moderately fossiliferous (casts/molds), fossils up	Circulation loss at 87.0' Core loss assumed to
_	46%	10			Щ	to 5/8" in size, intervals of	occur from 85.9-88.6'
-				00.5.00.01.5	Ь	weathering/dissolution cavities of fragmented core, subrounded to] _
_			>10	88.5-89.6' - Fracture zone, fragments from 3/8" to 1", staining on few surfaces, possibly	上	subangular in shape, brownish black staining on some fragments, stained	D44. 6 minutes
-			>10	weathered rock, possible dissolution cavity	\vdash	 dark yellowish brown over bottom 	R11: 6 minutes
90 <u>-</u> -47.2	90.0			89.7' - Fracture, 60 deg, rough, undulating,	\vdash	0.4' No Recovery 85.9-88.6'	-
-71.2			10	open (<1/16") 90.3-91.0' - Fracture zone, 1/2"-2" rock	F	_ Limestone	-
-				fragments	片	88.6-90.0' - Same as 85.0-85.9' 90.0-91.5' - moderate yellowish	-
-			2	91.1' - Fracture, 40-50 deg, rough, undulating, open (2")	世	brown with 40% mottled with very	-
-	R12-HQ			91.5' - Fracture, 70 deg, rough, undulating,	\vdash	pale orange, (10YR 5/4 with 10YR 8/2), moderately fossiliferous	-
-	5 ft	52	1	open (1/16")	H	(cast/molds), fossils (mostly <1/4"	-
-	94%			92.7' - Fracture, 5-10 deg, rough, undulating, open (<1/16")	仜	but a few are up to 1/2"), 25-30% spheroidal voids (<1/16"), voids	-
-			4	93.0, 93.1' - Fracture (2), 30 deg, rough,	士	mostly restricted to the pale yellowish brown color areas	-
-				undulating, tight 93.3' - Fracture, 50 deg, rough, undulating,	+	- Diowii coloi aleas	R12: 7 minutes
			1	tight	F	-	-
95	95.0		NR		Ħ	-	-
					•		•



338884.FL A-21A

SHEET 6 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 4.7	2 ft b	gs on 3	3/12/07 START : 5/22/2007 END : 5/3	23/20	07 LOGGER : R. Gomez	
>∩≘	. (9			DISCONTINUITIES	စ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	(%) Q	TE SO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EN EN	ENGE	ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-52.2	Olk	ď	шФ	93.95, 94.3' - Bedding plane or mechanical	S	91.5-94.7' - Same as 90.0-91.5'	
-52.2			0	break (2), 5-10 deg, rough, undulating, tight	Ė	except pale yellowish brown,	SC-4 collected at 95.13- 95.96'
-				95.0-95.2' - Fracture zone, zone of mechanical breaks	Ľ	(10YR6/2), with brownish black rippled lamination at 94.5'	-
-			>10	96.0-97.6' - Fracture zone, 50-70 deg,	₽	- No Recovery 94.7-95.0'	1
_	DAGLIG			fractures are intersected by potential mechanical breaks		Limestone 95.0-97.6' - moderate yellowish	1
-	R13-HQ 5 ft	15	>10	inechanical bleaks		brown to pale yellowish brown,	1
_	52%			-	┢	(10YR 5/4 to 10YR 6/2), fine grained, weak to medium strong (R2 to R3),	1
_				<u>-</u>	F	- 15-20% elongated voids <1/8" sub	_
_			NR	_	H	horizontally oriented, moderately	l
_				_	廾	fossiliferous with casts up to 3/8" No Recovery 97.6-100.0'	R13: 4 minutes
	100.0				F]
-57.2			>10	100.0-100.2' - Fracture zone	П	Limestone - 100.0-103.2' - pale yellowish brown,]
				100.5-100.75' - Fracture zone 100.9' - Fracture, 20 deg, rough, undulating,	ь	(10YR 6/2), fine grained, moderately]
			>10	open (1/8")	H	fossiliferous with casts up to 5/8" weathered over top 0.7', color may	
			- 10	101.4' - Fracture, 20 deg, rough, undulating,	Ė	be due to potential staining or	_
	R14-HQ 5 ft	18	0	open (1/2") 101.6' - Fracture, 80 deg, rough, undulating,	Ľ	weathering, 10-15% medium to coarse grain black particles, trace	
	64%	''	_	tight		short (1/16") discontinuous black	
			0	101.7' - Fracture, 0-10 deg, rough, undulating, tight		laminations throughout core run No Recovery 103.2-105.0'	
				101.8' - Fracture, 15-20 deg, rough,		10010000019 100.2-100.0	
			NR	undulating, top of fractured zone 102.0' - Fracture, 60 deg, rough, undulating,			R14: 3 minutes
	105.0			base of fractured zone	Ь		
-62.2	·		2	105.1' - Bedding plane or mechanical break,	F	Limestone - 105.0-109.5' - moderate yellowish	
				horizontal, rough, undulating, open (1/8") 105.35' - Bedding plane or mechanical break,		brown with 15-20% dark yellowish	
			0	30 deg, rough, undulating, tight	H	brown mottling, (10YR 5/4 with 10YR 4/2), fine grained, moderate HCI	
			U		Н	reaction, weak (R2), 15-25% voids	
	R15-HQ	38	>10	407.05L Franking beginning and	П	<1/16", poorly fossiliferous (molds),trace irregular shaped unfilled	1
	5 ft 90%	30	710	107.35' - Fracture, horizontal, rough, undulating, open		cavities up to 5/8"	1
1 7			_	107.35-107.55' - Fracture zone	\vdash	Ţ	1
1 7			9	107.6-107.8' - Fracture, 60 deg, rough, undulating, open (1/4")	Ė		1
1 7			2	107.95-108.7' - Fracture, 80 deg, rough,	Ľ	Ī	R15: 5 minutes
110	110.0		NR	undulating, open 108.2' - Fracture, horizontal, intersects one	片	No Recovery 109.5-110.0'	1
-67.2			_	fragment of fracture at 107.95-108.7'	\vdash	Limestone	1
			9	108.4' - Fracture, horizontal, rough, undulating, open, intersects one fragment of	Ш	- 110.0-112.5' - pale yellowish brown, (10YR 6/2), fine grained, moderate	1
			- 10	fracture at 107.95-108.7'	ш	HCI reaction, weak (R2), 5-10%	1
			>10	undulating, open	Н	 voids up to 1/8", trace cavities up to 3/4"x3/4" infilled with fine grained 	1
1	R16-HQ		>10	109.0-109.5' - Fracture, vertical, rough,	F	weak (R2) carbonate material	1
	5 ft 50%	0		undulating, open 109.5' - Fracture, 15 deg, rough, undulating,	Ħ	No Recovery 112.5-115.0'	1
				open	世	Ī	1
			NR	110.15' - Fracture, horizontal, rough, - undulating, open		Ī	1
				110.15-110.5' - Fracture, vertical, rough, undulating, open, rock fragments on smaller	L	<u> </u>	R16: 7 minutes
115	115.0			side of fracture	\Box	<u>†</u>	1
1.10	. 10.0			-	1		



338884.FL A-21A

SHEET 7 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 4.7	'2 ft b	gs on 3	3/12/07 START : 5/22/2007 END : 5/	23/200	D7 LOGGER : R. Gomez	
≥O≎	. (%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE	ST. F.	(%) O	F.00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	D E	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
HRY LEV	ORE	Ø	ZAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥMΒ	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	072	ď	# 5	,	Ś		,
-72.2 _			>10	111.0-111.5' - Fractures (2), 85 deg and vertical, rough, undulating, open	Н	Limestone - 115.0-118.0' - grayish orange to pale	
_				111.4-111.65' - Fracture, 60 deg, rough,	ш	yellowish brown, (10YR 7/4 to 10YR	
			2	undulating, open 111.65-112.0' - Fractures, 75 deg, rough,	Ш	6/2), fine to medium grained, moderate to strong HCl reaction,	
_			4	undulating, open	Н	weak (R2), except very weak (R1) at	
_	R17-HQ			112.0-112.5' - Fracture zone	Ш	115.0-115.3', moderately	
-	5 ft 60%	18	4	115.0-115.15' - Fracture zone 115.2, 115.35' - Fractures (2), <10 deg,	Н	 fossiliferous, 25% coverage of very small (<1/16") voids, 5-10% small 	
-	0070			rough, undulating, open	ш	(1/16"-3/16") voids, trace cavities up	
-				115.65, 115.75' - Fractures (2), horizontal, rough, stepped, open	ш	 to 1-3/16"x3/8", 50% of cavities infilled with carbonate material 	
-			NR	115.75-116.0' - Fracture zone	Н	similar to 110.0-112.5', visible shell	R17: 4 minutes
-				116.1-116.25' - Fracture, 45 deg, rough,	Ħ	 fragments at 115.0-115.5', large 	- Trivial and the second secon
120 <u> </u>	120.0			planar, tight 116.35' - Fracture, horizontal, rough,	버	(about 50% of core by volume) cavity (not infilled) at 115.45-115.65'.	_
-11.2			>10	undulating, open	Ш	strength of HCI reaction decreases	
_				117.1' - Fracture, <10 deg, rough, undulating,	Ш	with depth No Recovery 118.0-120.0'	SC-5 collected at 120.88-
_			2	open 117.5, 117.6, 117.65' - Fractures (3),	Н	Limestone	121.71'
			_	horizontal, rough, planar, open	Н	120.0-124.5' - grayish orange to pale	
_	R18-HQ		_	120.2' - Fracture, horizontal, rough, undulating, open	Н	yellowish brown, (10YR 7/4 to 10YR 6/2), fine grained, mild HCl reaction,	
_	5 ft 90%	57	1	120.25-120.6' - Fracture zone	Ш	weak (R2), except very weak (R1) at	-
_				120.85' - Fracture, horizontal, rough,	ш	124.1-124.5', very small (<1/16")	-
-			0	undulating, open 121.75, 121.9' - Fractures (2), horizontal,	Н	voids, trace small (1/16"-1/8") voids, trace casts/cavities up to 3/4"x3/8",	-
-			5	rough, undulating, open	\Box	10% casts/cavities at 120.0-120.75'	R18: 4 minutes
-			NR	122.2-122.3' - Fracture, 45 deg, rough, undulating, open	Н	with partial (carbonate) infilling No Recovery 124.5-125.0'	-
125 -82.2	125.0		INIX	124.1, 124.2' - Fractures (2), horizontal, —	ш	Limestone	
-			>10	rough, undulating, open 124.2-124.35' - Fracture, vertical, smooth,	ш	 125.0-126.45' - pale yellowish brown, 	-
_				planar, open	Н	(10YR 6/2), fine grained, mild HCI	-
_			>10	124.3, 124.7' - Fractures (2), 10 deg, rough,	ш	reaction, weak (R2), weathered, - 10-15% (<1/16") voids, trace small	-
_				undulating, open 125.0-125.6' - Fracture zone (8)	Ш	(1/16"-1/4")voids, 5-10%	
_	R19-HQ 5 ft	0		125.6' - Fracture, horizontal, rough,	ш	casts/cavities up to 1-3/16"x3/4", poorly fossiliferous	l .
_	40%	J		undulating, open 125.6-125.9' - Fracture, 75 deg, rough,	団	126.45-127.0' - Same as	
_			ND	undulating, open	\mathbb{H}	125.0-126.45' except weak to medium strong (R2 to R3), trace	
_			NR	125.9-126.05' - Fracture, 75 deg, rough,	H	voids up to 1/16", no fossils	
_				undulating, open 126.05-126.3' - Fracture zone	Ш	casts/cavities	R19: 5 minutes
130	130.0			126.45-126.6' - Fracture zone	Ш	No Recovery 127.0-130.0'	
-87.2	100.0			126.55-127.0' - Fracture, vertical, rough, — undulating, tight	囯	 Limestone	_
-			>10	126.75' - Fracture, horizontal, rough,	H	- 130.0-133.1' - yellowish gray, (5Y	
-				undulating, open	仠	7/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3),	
_			1	126.75-127.0' - Fracture, 60 deg, rough, undulating, tight	世	 trace voids (<1/16), no visible 	SC-6 collected at 131.2- 132.1'
-	Boo Lio			130.0-130.15 - Fracture, vertical, rough,	ш	casts/cavities, dark gray to black	104.1
_	R20-HQ 5 ft	45	2	planar, open 130.15' - Fracture, horizontal, rough, planar,	口	irregular laminae at 130.5-131.0' -	
_	78%	.•		open	\mathbb{H}	<u>-</u>	
_			1	130.15-130.85' - Fracture, vertical, rough,	H	133.1-133.3' - Same as 130.0-133.1'	
_			'	undulating, 1/4" relief 130.75' - Fracture, horizontal, rough,	Н	except very fine to fine grained, moderate HCl reaction, medium	
_			ND	undulating, open	Ш	strong (R3)	R20: 5 minutes
135	135.0		NR	130.8-131.0' - Fracture zone	Ш	-	-
100	100.0				\Box		
					\perp		
					_		



338884.FL A-21A

SHEET 8 OF 8

ORIENTATION : Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

				ILINT: ONE 300X ON 340200, Hidd Totally, Fig tools, Fiv			ORIENTATION: Vertical
WATER	LEVELS: 4.7	'2 ft b	gs on :		23/20		
>00	(9)			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	F00	ROCK TYPE, COLOR,	
핊兴현	ER, A	(%)	굶		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAT AT	ST NO	6) _Q	ET.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
ESE.	RNIO	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	074	ď	ΗД	THIORNESO, SORI AGE STAINING, AND HOTTINESO	S		
-92.2				131.0-131.2' - Fracture, vertical, rough,		133.3-133.9' - moderate yellowish	
			>10		\top	brown, (10YR 5/4), fine grained, mild	1
-				132.3-132.7' - Fracture, 60 deg, rough, undulating, open		HCl reaction, very weak to weak (R1 to R2), trace voids up to 1/16",	-
			1	132.7-132.9' - Fracture, 60 deg, rough,	┵	- 5-10% casts/cavities up to 3/8"x3/8",	_
			'	undulating, open	Н	poorly fossiliferous	
-	R21-HQ			133.1' - Fracture, horizontal, rough,		No Recovery 133.9-135.0'	1 1
-	5 ft	37	6	undulating, open	ш	- Limestone	1 -
_	76%			135.0-135.15' - Fracture zone	\bot	135.0-138.8' - yellowish gray, (5Y	
			5	135.5-135.65' - Fracture, horizontal, rough,		8/1), 30% medium light gray mottling,	
_			,	undulating, open 136.5', 137.2', 137.3' - Fractures (3),	\Box	 very fine grained, moderate HCl reaction, medium strong (R3), trace 	1
-				horizontal, rough, undulating, 1/4" relief	╁	voids to 1/16", 10% casts/cavities up	R21: 7 minutes
_			NR	137.4' - Fracture, horizontal, rough,	₽"	to 2"x3/8", partial infill of cavities	1\21. / Illillutes
140	140.0			undulating, open		No Recovery 138.8-140.0'	
-97.2				137.6' - Fracture, horizontal, rough,	1	Limestone	1
-			8	undulating, open, black organic staining over	++	 140.0-141.8' - yellowish gray with 	1
_				75% of fracture surface 137.9-138.0' - Fracture zone	\perp	very pale orange mottling, (5Y 7/2	1 -
			- 10	138.0-138.3' - Fracture zone, horizontal,	\vdash	with 10YR 8/3), very fine to fine	
			>10	rough, undulating, tight to healed, 1/2"	\vdash	 grained, moderate to strong HCl reaction, weak to medium strong (R2 	1
-	R22-HQ		>10	spacing between fractures	ш	to R3), 10% voids (up to 1/16") at	1 -
_	5 ft	7	/10	140.0-140.2' - Mechanical break (2)	+	- 140.35-140.65', 141.05-141.3' and	-
	50%			140.4-140.5' - Fracture, 60 deg, rough,		141.5-141.6', no visible	
				undulating, open		casts/cavities, trace small (<1/16")	1
-			NR	140.5' - Fracture, horizontal, rough, undulating, open	1	pyrite inclusion present throughout	1 1
-			INIX	140.5-140.9' - Fracture, vertical, smooth,	₽	core but more noticeable along fractures	Door Constructor
				undulating, tight, "V" shaped		- 141.8-142.5' - pale yellowish brown,	R22: 6 minutes
145	145.0			140.65' - Fracture, horizontal, rough,	\vdash	(10YR 6/2), fine to medium grained,	
-102.2				undulating, open —	╁┷	mild to moderate HCl reaction,	1 7
-			>10	140.75, 140.95' - Fracture, horizontal, smooth, planar, tight	\Box	 extremely weak (R0), trace voids up 	1 -
_				141.3' - Fracture, horizontal, rough,	\vdash	to 1/16", no cavities	
				undulating, 1/8" relief		No Recovery 142.5-145.0¹Limestone	
			>10	141.65', 141.8' - Fracture, 75 deg, smooth,		145.0-146.0' - pale yellowish brown	1
-	R23-HQ			undulating, open	╁	to moderate vellowish brown, (10YR	1
_	5 ft	53	3	141.8-142.5' - Fracture zone	₽—	_ 6/2 to 10YR 5/4), medium grained,	1
	78%			145.75-145.9' - Fracture zone		mild HCl reaction, weak (R2), 10%	
]				146.0' - Fracture, 5 deg, rough, undulating, open	\vdash	voids (up to 1/16"), trace	1
-			4	146.75-147.0' - Fracture zone	1	_ casts/cavities (up to 3/4"x3/8"), trace black inclusions (up to 1/16")	-
-				147.45' - Fracture, horizontal, rough, planar,	口	146.0-146.7' - Same as 145.0-146.0'	Dog. 6 minutes
			NR	1/8" relief	\vdash	except fine to medium grained, trace	R23: 6 minutes
150	150.0			147.8', 148.1' - Fracture, 50 deg, rough,	\vdash	voids up to 1/16", trace infilled	1
-107.2	. 50.0			planar, 1/4" relief, 30% black staining pyrite) on surface	T^{-}	cavities	Total depth of hole 150.0'
-				148.35' - Fracture, horizontal, rough,	-	146.7-147.45' - Same as	-
				\undulating, tight	1	145.0-146.0' - 147.45-148.9' - pale yellowish brown]
				5,-5		with very pale orange and light gray	1
					1	mottling, (10YR 6/2 with 10YR 8/2	1
-					1	and N7), fine grained, moderate HCI	-
					4	reaction, weak to medium strong (R2]
						to R3), 5% voids up to 1/16"	
				,	1	 (decreasing with depth), no visible cavities 	1
-					1	No Recovery 148.9-150.0'	-
4					4	Bottom of Boring at 150.0 ft bgs on] -
						5/23/2007	
]					1		1
					1		_
		1					



338884.FL A-22

SOIL BORING LOG

SHEET 1 OF 11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 6.6 ft bo	gs on 3/23	3/07	TART : 3/22/2007 END : 3/27/2007 LOGGER	R : N.	Jarzyniecki			
				STANDARD	SOIL DESCRIPTION	_O	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	DEDT. OF 0.10 NO			
HOE!		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	OFIC I	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND			
PTF PTF A			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MB	INSTRUMENTATION			
				(N)		Ś	40.00 D 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
42.6					_	1	10:08 Begin drilling with 2-7/8" tri-cone bit			
_					<u>-</u>	1	Soil sampling every 5' from 3.5' below			
_					_		ground surface			
_					_	1	_			
_					_	1	_			
_					_	1	_			
	3.5						_			
				2.2.2	Poorly Graded Sand With Silt (SP-SM) 3.5-4.4' - moderate yellowish brown with dusky brown,		_			
		0.9	SS-1	3-3-3 (6)	(10YR 5/4 with 5YR 2/2), wet, loose, very fine to fine	1,1	_			
5	5.0			(-)	grained, 10% organics, 10-15% nonplastic fines, sand /-		_			
37.6					io sinod					
					_					
					_					
	8.5									
					Silt (ML)					
		1.1	SS-2	12-16-13 (29)	8.5-9.6' - yellowish gray, (5Y 7/2), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction,	$\ \ $				
10	10.0			(20)	10% very fine sand-sized material, coarse gravel-size	1''']			
32.6					\8/1] at top of sample, strong HCl reaction), all					
					carbonate					
					_					
_	13.5									
_		0.9	SS-3	28-78/11.5	Silt With Sand (ML) 13.5-14.4' - Same as 8.5-9.6' except hard, 25% very	Ш				
	14.5	0.0	000	(82")	└── fine to fine sand-sized material, one coarse	Ш	_			
15					gravel-sized limestone fragment					
27.6					_	1				
					_	1				
					_	1				
					_	1				
					_	1				
					_	1				
	18.5					L]			
	18.9	0.2	SS-4	50/4.5 (50/4.5")	Limestone Fragments 18.5-18.7' - yellowish gray, (5Y 7/2), mild to moderate	⇈]			
				(55, 7.5)	HCl reaction, fragments to 1/2", 25% silt- and	1				
20					sand-sized carbonate materials similar to 13.5-14.4'					



PROJECT NUMBER:	BORING NUMBER:
338884.FL	A-22

SHEET 2 OF 11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 6.6 ft bo	s on 3/23	3/07 S	START : 3/22/2007 END : 3/27/2007 LOGGER	ER : N. Jarzyniecki			
				STANDARD	SOIL DESCRIPTION	_(j)	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	001 11115 11000 0000 0000	SYMBOLIC LOG	BERTH OF 0400M2		
4 BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	OLIC SOLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	×ΜΒ	INSTRUMENTATION		
22.6				(N)		S			
- - - -					- - - -		- - - -		
_	23.5				_	1	1		
-	23.9	0.4	SS-5	50/5.5	Silt With Sand (ML)	\prod]		
25 17.6 -				(50/5.5") <i>J</i>	23.5-24.0' - yellowish gray, (5Y 7/2), moist to wet, hard, nonplastic, high dilatancy, mild to moderate HCI reaction, 20% very fine to fine grain material, traces of coarse sand-sized grains, all carbonate		- - - -		
- - - -	28.5			20-43-36	Silty Sand (SM) 28.5-29.7' - dusky yellow, (5Y 6/4), moist to wet, very		- - - - -		
-		1.2	SS-6	(79)	dense, fine to coarse grained, rapid dilatancy, mild to moderate HCl reaction, 47% nonplastic fines, trace		-		
30 <u> </u>	30.0				fine gravel, all carbonate	F	-		
- - - - -	33: 5	0.0	66.7	50/0.75			- - - -		
-		0.0_/	SS-7	50/0.75 (50/0.75")	No Recovery 33.5'	l			
35 7.6				, , ,	- - -		- -		
-					<u>-</u>		Driller's Remark: Chatter at 36-37'		
					-	1	1		
]		
_	38.5					<u> </u>]		
_				41-31-50/5.75	<u>-</u>				
_		1.5	SS-8	(81/11.75")	_				
40	40.0					Ш			



PROJECT NUMBER:	BORING NUMBER:
338884.FL	A-22

A-22

SHEET 3 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 6.6 ft bo	gs on 3/20	3/07	START : 3/22/2007 END : 3/27/2007 LOGGER : N. Jarzyniecki	_
				STANDARD	SOIL DESCRIPTION 9 COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
EPTI URF.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
2.6				(14)	Silty Sand (SM)	┪
-					\ \ 38.5-40.0' - moderate olive brown, (5Y 4/4), wet, very \ - \ \ dense, fine to coarse grained, mild to moderate HCl	+
-					\reaction, 20-25% low plastic fines, 10% fine	1
-					gravel-sized material -	1
]	
]]
_	43.5					
_		1.0	SS-9	24-50/6	Silt With Sand And Limestone (ML) 43.5-44.5' - dusky yellow, (5Y 6/4), wet, hard, low	4
_	44.5			(74/12")	plasticity, rapid dilatancy, mild to moderate HCl reaction, 10-25% fine to coarse sand-sized grains	4
45 -2.4					\ (varies throughout sample), limestone lens at $-$	4
-2.4					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	+
-					-	+
-						\exists
-						1
-					1 1	1
	48.5				1	1
		1.0	SS-10	22-9-2	Silty Sand With Limestone (SM) 48.5-50.0' - moderate yellowish brown, (10YR 6/4),]
l _	49.5	1.0	33-10	(11)	wet, medium dense, fine to coarse grained, mild to∐_∐	1
50					moderate HCl reaction, 37% low plastic fines, limestone lenses at 48.6', 48.8', 49.3'	4
-7.4 -					_	4
-						+
_					-	+
-					-	+
-						+
-	53.5					1
-	00.0				Sandy Silt (ML)	1
		1.5	SS-11	19-34-48 (82)	53.5-55.0' - moderate olive brown, (5Y 4/4), wet, hard, low plasticity, slow to rapid dilatancy, mild HCI	
55	55.0			(- /	reaction, 35-40% fine to coarse sand-sized grains, all carbonate, organic lenses (olive gray [5Y 3/4]) at	
-12. 4 -					\\\ 54.5-55.0'_	4
_					- 1	\perp
_						+
-					-	+
-					-	+
-	50 E					+
-	5 8:5	0.1	SS-12	50/2	Sandy Silt (ML)	1
-				(50/2")	\58.5-58.7' - Same as 53.5-55.0' except with organics / -	1
60					11	_
						1
						- 1



PROJECT NUMBER:	BORING NUMBER:			
338884.FI	Δ-22	SHEET	4 OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 6.6 ft b	gs on 3/23	3/07 S	START : 3/22/2007 END : 3/27/2007 L	OGGER	R : N.	Jarzyniecki
				STANDARD	SOIL DESCRIPTION		U	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME LIPOS OPOLID OVARDOL COLLOD		SYMBOLIC LOG	DEDTIL OF CASING DOULING DATE
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	₹	30 E	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
SURF SLEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOG	θY	SYME	INSTRUMENTATION
-17.4				(14)			 	
-						-	l	-
-						_	1	_
-						-	1	1
_						_	1	
						_		_
_	63.5					_	<u> </u>	_
-		0.8	SS-13	40-50/5.5	Silt With Sand (ML) 63.5-64.3' - yellowish gray, (5Y 7/2), wet, hard,	_		_
_	64.5			(90/11.5")	nonplastic, rapid dilatancy, mild to moderate HCl reaction, 15-25% fine to coarse sand-sized grains	. Γ-	Ш	-
65 <u> </u>					light olive gray (5Y 5/2) laminations at 64.1-64.2'	·,	l	
-22.4							1	-
-						-	ł	-
-						-	ł	-
-						-	l	-
-						-	i	-
-	68:5					-		-
_	00.0	0.0	SS-14	50/1.5 (50/1.5")	No Recovery 68.5'			4" HW casing set to 70' below ground surface
				(50/1.5)				surface
70								
-27. 4 -						_		16:56 Resume drilling, clearing hole
_						_		_
-						-		-
-						-	-	-
-						-	ł	-
-	72.5					-	ł	3/22/07 End drilling for the day at 73.5'
-	73.5 73.8	0.3	SS-15	50/4	☐ Elastic Silt (MH)	- F	77	
-				(50/4")	73.5-73.6' - yellowish gray to light olive gray, (5Y 7 to 5Y 5/2), wet, soft, low to medium plasticity, slow	7/2 - v to	1	surface -
75					rapid dilatancy, mild HCl reaction, trace fine to medium sand-sized material, white carbonate clay	11-	1	08:17 Resume drilling by bringing up 73.5'
-32.4					stringers throughout	<u>'</u>		sample —
-					Silty Sand With Limestone (SM) 73.6-73.8' - yellowish gray to light olive gray, (5Y 7	7/2		
-					to 5Y 5/2), wet, dense, fine to coarse grained, mile	_ l		_
-					HCl reaction, 32% low plastic fines, limestone lens 73.6', all carbonate	s at -		=
-								-
-						-	1	-
-	78.5 78.8	0.1	SS-16	50/3	_ Limestone Fragments			-
-				(50/3")	78.5-78.6' - dusky yellow, (5Y 6/4), mild HCl react fragments to 1/2", voids over 50% of surface	ion, /-		-
80					magnients to 1/2, voius over 50% of surface	/ -		-
- 50_								
							l	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-22	SHEET	5	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 6.6 ft bo	gs on 3/23	3/07 S	START : 3/22/2007 END : 3/27/2007 LOGGE	R:1	N. Jarzyniecki
				STANDARD	SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME TIEGG COOLED OVARDOL COLOD		DEDTH OF CASING DRIVING DATE
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	2	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT URF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	INSTRUMENTATION
-37.4				(14)		╁	,
-						1	-
-						1	- Drillar's Domarky Clight shotter during drilling
-						1	Driller's Remark: Slight chatter during drilling _
-						1	1
-						1	1
	83.5 83.7						
	03.7	0.1	SS-17	50/2 (50/2")	Limestone Fragments 83.5-83.6' - Same as 78.5-78.6'	Т	
_				(30/2)	00.0-00.0 - Oame as 70.0-70.0		
85					_	4	_
-42. 4 -						1	_
-						-	-
-						┨	-
-						┨	-
-						+	-
-	00.5					┨	-
-	88.5				Silty Sand With Limestone (SM)	+	₼
-		1.3	SS-18	18-28-27	88.5-89.8' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, very	1	-
90	90.0			(55)	dense, fine to coarse grained, mild to moderate HCI		4
-47.4	- 00.0				reaction, 20-25% nonplastic fines, 5-10% organics, 10% fine gravel-sized grains, limestone lens at 88.95',	1	1 7
-					all carbonate	1	1
]	
]	
_						1	
_						1	-
_	93.5				Limestone With Silty Sand	\bot	- -
-		1,	00.46	33-12-15	93.5-94.7' - moderate vellowish brown. (10YR 5/4).	Ľ	
-		1.2	SS-19	(27)	wet, mild to moderate HCl reaction, 60% limestone fragments to 1", 15-20% nonplastic fines, 20% fine to	Ľ	₫ -
95 <u> </u>	95.0				coarse sand, all carbonate	+	-
-						+	-
-						1	Driller's Remark: Lost circulation at 96'
-						1	1
-						1	1
-						1	1
	98.5					1	1
	-			10.5.5		P	7 1
		1.0	SS-20	10-8-2 (10)		þ]
100	100.0			` -/		上	
ı		ı					1



338884.FL A-22

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 tri-cone bit

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

ORIENTATION : Vertical

SHEET 6 OF 11

						ry, auto nammer, Avvo rous,			ORIENTATION : Vertical
WATER	LEVELS	: 6.6 ft bo	gs on 3/2:	3/07 S	START : 3/22/2007	END : 3/27/2007	LOGGER	: N.	Jarzyniecki
>				STANDARD		SOIL DESCRIPTION		ဖွ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	<u>.</u>			SYMBOLIC LOG	
HOICE TOICE		RECOVE	ERY (ft)		SOIL NAM	IE, USCS GROUP SYMBOL E CONTENT, RELATIVE DE	, COLOR, NSITY OP	<u> </u>	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FF A			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MII		MB	INSTRUMENTATION
SU ELE				(N)				SΥ	
-57.4					Limestone Wit				
1 7					vellowish brow	le yellowish brown to mod n, (10YR 6/2 to 10YR 5/4)	erate -	1	_
-					moderate HCI	reaction, fine to coarse gra	avel-sized	1	Casing advanced to 100'
-					fragments to 1-	-1/2", soil fraction is fine to	medium -	1	-
-					sand-sized gra	ains with 32% nonplastic filestone lens from 98.5-98.8',	nes (varies in _		 Driller's Remark: Slight loss of circulation at
-					(Campio), miles		-		102'
_							_		_
	103.5								_
					Silty Sand Wit	th Limestone (SM) moderate yellowish brown	to dark		
		1.5	SS-21	11-14-6 (20)	vellowish brow	n, (10YR 5/4 to 10YR 4/2)	. wet.		
105	105.0			(20)	medium dense	e, fine to coarse grained, m	nild HCl		_
-62.4	100.0				reaction, 20% i	nonplastic fines, 30% fine mestone fragments, all car	to coarse	1111	Advancing casing to 105'
-					\graver-sized iiii	nestone nagments, an car	bonate / _	1	-
-							-	l	-
-							-		-
_							_		_
_							_		_
							_		
	198:5								
	100.0	0.0	SS-22	50/1.5	No Recovery 1	108.5'			3/23/07, 15:10 End soil sampling at 108.5'
_				(50/1.5")	Begin Rock Co	oring at 109.0 ft bgs		1	3/23/07, 15:46 Preparing for rock coring
110					See the next sh	heet for the rock core log	-	1	-
-67.4								l	_
-							-	1	=
_							-		-
_							-		-
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_							_		_
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-							_		
145							-		-
115 <u> </u>									
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120								\vdash	_
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PROJECT NUMBER: BORING NUMBER: 338884.FL

A-22

SHEET 7 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING	METHOD A	ND E	QUIPN	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW of	casing	, , , , , , , , , , , , , , , , , , , ,	ORIENTATION : Vertical
	LEVELS : 6.6					D7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
110	109.0 R1-NQ		1	109.3' - Fracture, vertical, rough, undulating 109.7' - Fracture, 55 deg, smooth, undulating		Limestone - 109.0-111.4' - light olive gray, (5Y 5/2), very fine grained, moderate HCl	3/23/07, 16:48 Start coring Note: R1 is short run (2.5') - to set stroke
-67. 4	2.5 ft 96%	28	2	110.0' - Fracture, vertical, smooth to rough, undulating 110.7' - Mechanical break	1	reaction, weak to medium strong (R2 to R3), poorly fossiliferous, voids up to 1/16"over 15-20% of surface,	R1: 2 minutes
-	111.5		NR)	111.15, 111.35' - Fracture (2), 70 deg, smooth to rough, undulating		larger cavities/fossil molds up to 1/4" x 1/2" over <5% of surface, <5% fine black inclusions	Slight loss of circulation during run, driller – advancing casing to 111.5'
- -	R2-NQ		3	112.1' - Mechanical break 112.2' - Bedding plane, <10 deg, smooth, undulating 112.85, 113.25' - Bedding plane (2), <20 deg, rough, undulating		No Recovery 111.4-111.5' Limestone 111.5-114.9' - Same as 109.0-111.4' except medium strong (R3), with increasing fossil content, voids up to 1/16" over 20-25% of surface, fossil	3/23/07 End drilling for the day at 111.5' - 3/24/07, 07:54 water level is 8.9' below ground surface - 08:17 Begin drilling
- 115	5 ft 70%	52	2	113.4' - Bedding plane, <10 deg, rough, undulating 113.5, 113.9' - Mechanical break		molds up to 1/4" x 1/8" on 5-10% of surface	SC-1 collected as 112.8- 113.5' – Slight circulation loss
-72.4 - -	116.5		NR	114.9' - Fracture, 50 deg, rough, undulating 115.2' - Bedding plane, <20 deg, rough to smooth, undulating		114.9-115.0' - Same as 111.5-114.9' except extremely weak to medium strong (R0 to R3), limestone has moderate HCI reaction, silts have delayed mild HCI reaction	during R2-NQ run R2: 18 minutes
- -			4	117.05, 117.25, 117.4' - Bedding plane (3), 20 deg, rough, undulating		No Recovery 115.0-116.5' Limestone 116.5-120.6' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2),	- - -
-	R3-NQ		3	117.7, 117.8, 117.9' - Bedding plane (3), <10 deg, smooth, planar 118.0, 118.75, 119.25, 120.0, 120.15' - Bedding plane (5), <10 deg, smooth, planar,	Ħ	very fine grained, very weak to medium strong (R1 to R3), fossiliferous with casts and molds up	-
120 -77.4	5 ft 82%	44	2	infill of fine grained material at 119.25		to 1/4" x 1/2". Voids up to 1/16" over 25% of surface, larger cavities/molds up to 1/2" x 1/2" on <5% of surface, — thinly bedded	
-77.4	121.5		NR			No Recovery 120.6-121.5'	R3: 22 minutes
-	121.5		5	121.95' - Bedding plane, 20 deg, rough, undulating		Limestone 121.5-122.85' - light olive gray, (5Y 5/2), fine grained, weak to medium	- - -
-	R4-NQ		3	122.0, 122.1, 122.3, 122.5, 122.6, 122.75, 122.85, 122.9' - Bedding plane (8), <10 deg, smooth, undulating		strong (R2 to R3), voids (1/16") over 15-20% of surface, moderately fossiliferous with casts up to 1/4" x 1/4", larger cavities up to 1" x 1/2"	-
- - 125	5 ft 84%	58	3	123.65, 123.8, 123.95' - Bedding plane (3), <10 deg, smooth to rough, undulating		 over <5% of surface, thinly bedded 122.85-122.9' - medium light gray, (N6), very fine grained, medium 	SC-2 collected at 124.0-
12 <u>5</u> -82.4 -			0 NR	_		 strong (R3), no voids/fossils/cavities 122.9-125.7' - Same as 121.5-122.85' No Recovery 125.7-126.5' 	125.4' – R4: 15 minutes
-	126.5		3	126.85' - Fracture, 85 deg, rough to smooth,	E	-	SC-3 collected at 127.10-
-			1	undulating 126.95, 127.05' - Bedding plane (2), horizontal, smooth, undulating 128.15' - Bedding plane, <10 deg, rough to			128.15' -
	R5-NQ			smooth, undulating			



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-22

SHEET 8 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	METHOD AL	ND EC	JUIPN	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW c	asıng		ORIENTATION : Vertical
WATER	LEVELS: 6.6	ft bgs	s on 3	23/07 START: 3/22/2007 END: 3/	27/20	D7 LOGGER : N. Jarzyniecki	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q ≀	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SU ELI	SEE	a Q	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
130 -87.4 -	5 ft 80%	48	4 >10 NR	128.55, 128.75' - Bedding plane (2), horizontal, smooth, undulating 129.3, 129.7' - Mechanical break (2) 129.4' - Bedding plane, 20 deg, smooth, undulating 129.95-130.5' - Fracture zone		Limestone 126.5-128.7' - light olive gray, (5Y 5/2), fine grained, weak (R2), small (1/16") voids over 15% of surface, fossiliferous, fossil casts up to 1/2" x 1/4", cavities 1" x 1/2" over <5% of	Circulation loss during run, advancing casing —
_	131.5			131.5-131.7' - Fracture zone, 50-60 deg,	H	surface, light gray (N6) mottling at - 128.15-128.7' with decrease in small	
_			>10	intersecting fractures	I	voids (<1/16") to <5% 128.7-130.5' - dusky yellow, (5Y 6/4), extremely weak to very weak (R0 to	
-			>10	132.4' - Bedding plane, <5 deg, smooth to rough, planar		R1), small (<1/16") voids over 35% of surface, highly fossiliferous No Recovery 130.5-131.5'	
-	R6-NQ 5 ft 80%	53	2	rough, planar 133.1' - Bedding plane, <10 deg, rough, undulating	H	Limestone 131.5-135.5' - light olive gray, (5Y 5/2), fine grained, weak to medium	
135 <u> </u>			3	134.35, 134.5' - Fracture (2), 20 deg, rough, undulating 134.6' - Fracture, 70 deg, rough, undulating		strong (R2 to R3), small (<1/16") voids over 15-30% of surface increasing with depth, larger cavities up to 1" x 1" over 10% of surface,	Lost circulation at 135'
-	136.5		NR	135.0' - Fracture, 15 deg, smooth, planar 135.1' - Bedding plane, horizontal		up to 1 x 1 over 10% of surface, discontinuous black organic laminae (<5%), interbed of very fine grained light olive gray (5Y 5/2) dense	R6: 5 minutes
-			>10	136.8-137.05' - Fracture zone 137.25' - Bedding plane, <15 deg, rough, undulating		limestone with <5% voids (<1/16") over surface No Recovery 135.5-136.5'	
-	R7-NQ		>10	137.4' - Bedding plane, associated with cavity 137.95' - Fracture, 15-20 deg, rough, undulating		Limestone 136.5-139.7' - yellowish gray to light gray, (5Y 8/1 to N7), weak to medium	
- 140	5 ft 64%	36	2	138.4-138.55' - Fracture zone 138.95' - Mechanical break 139.15, 139.45' - Bedding plane or		 strong (R2 to R3), small voids (<1/8") over 10-20%, generally increasing with depth, larger cavities up to 1/2" x 	
-97.4 -			NR	mechanical break (2), 10-15 deg, rough to smooth, undulating		— 1" over up to 10% of surface, partial infilling of cavities with soft medium light gray (N6) material	R7: 8 minutes
_	141.5			-	Н	No Recovery 139.7-141.5'	3/24/07 End drilling for the
-	141.5		>10	141.65-141.8' - Fracture zone 141.9' - Fracture, 60 deg, smooth, partial mineralization on surface, open		Limestone 141.5-141.8' - medium gray, (N5), weak to medium strong (R2 to R3),	day at 141.5' 3/25/07, 07:59 Water level 2.9' below ground surface 08:41 Resume drilling
-	Do No		>10	142.0' - Bedding plane, <5 deg, smooth, undulating, stains on surface 142.1, 142.2' - Fractures (2), 85 deg, smooth		20% small voids (<1/16") over - surface, cavities up to 1/4" x 1/4" <10% of surface - 141.8-143.5' - yellowish gray with	The state of the s
-	R8-NQ 5 ft 74%	35	2	to rough, mineralization on surface 143.15, 143.55' - Bedding plane (2), <10 deg, rough to smooth, undulating		 light gray and brownish gray interbed layering, (5Y 7/2 with N7 and 5Y 4/2), 	
145 <u>-</u> -102.4			6	144.3' - Bedding plane, <5 deg, smooth, undulating to planar, slight staining (<20%)	H	very fine grained, strong to very — strong (R4 to R5), small (<1/16") voids <5" coverage, poorly	-
_	146.5		NR	on fracture surface 144.5' - Bedding plane, <20 deg, smooth to rough, undulating, partially associated with organic lens		fossiliferous 143.5-144.5' - Same as 141.8-143.5' except weak to medium strong (R2 to	R8: 14 minutes
-	-		>10	144.75' - Bedding plane, smooth, undulating 145.05-145.15' - Fracture zone 146.5-146.7' - Fracture zone		R3), interbedded with light olive gray (SY 5/2), highly fossiliferous layers exhibiting small voids (<1/16") over 30% of surface	Driller's Remark: Circulation loss 100% near beginning of run R9
-	D0 N0		3	147.7, 147.85' - Bedding plane (2), <20 deg, smooth, undulating 147.95, 146.9' - Mechanical break		- 50 % OI SUITAGE	SC-4 collected at 147.0- 147.8'
	R9-NQ				H		
			l .				1



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-22
SHEET 9 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

Body Company Company	WATER LEVELS :	3/23/07 START : 3/22/2007 END : 3/27/2007 LOGGER : N. Jarzyniecki	
150	≥∩ a - 9	<u> </u>	
150	DEPTH BELOV SURFACE ANI ELEVATION (ff CORE RUN, LENGTH, AND RECOVERY (%	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS THICKNESS, SURFACE STAININ	ATE AND G ROD
Solution State S	150 -107.4 -	148.15' - Bedding plane, <15 deg, smooth, undulating, associated with slightly softer zone 148.85' - Bedding plane, <5 deg, smooth, planar 149.95, 150.15' - Mechanical break (2) Limestone 144.5-145.2' - dusky yellow, (5Y 6/4), weak to medium strong (R2 to R3), 30% small voids (<1/16"), similar to interbeds 143.5-144.5' No Recovery 145.2-146.5' R9: 7 minutes	-
No Recovery 159.95-161.5' No Recovery 161.5-166.5'	- R10- 51 86' 155 -112.4 - 156.5	yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, medium strong to strong (R3 to R4), poorly to moderately fossiliferous with fossil casts/molds up to 1/2" x 1/4", small 1/16" voids over <10% of surface are 153.95'. Fracture, 65 deg, rough, undulating, medium gray infill (N5) infill on fracture face 153.95'. Fracture, 25 deg, smooth to rough, undulating, black staining on 50% of surface 153.9-154.15'. Fracture zone 154.3'. Bedding plane, <20 deg, organic laminations throughout 155.25'. Bedding plane, <20 deg 155.6'. Mechanical break 156.6, 157.6'. Bedding plane (2), 10 deg, smooth to rough, undulating 157.25, 159.75'. Mechanical break 157.8, 157.9, 158.75'. Bedding plane (3), <5 deg, planar 159.0-159.5'. Bedding plane, 30 deg, smooth, planar, organic staining on 35% of surface at 159.5' To surface at 159.5' yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, medium strong to strong with fossil casts/molds up to 1/2" x 1/4", small 1/16" voids over vinterval from 147.9-148.9' No Recovery 150.25-151.5' Limestone 151.5-155.8'. yellowish gray, (5Y 7/2), fine grained, medium strong to strong (R2 to R3) poorly fossiliferous with fossil casts/molds up to 1/2" x 1/4", small 1/16" voids over vinterval from 147.9-148.9' No Recovery 150.25-151.5' Limestone 151.5-155.8'. yellowish gray, (5Y 7/2), fine grained, medium strong to strong with fossil casts/molds up to 1/2" x 1/4", small 1/16" voids over vinterval from 147.9-148.9' No Recovery 150.25-151.5' Limestone 151.5-155.8'. yellowish gray, (5Y 7/2), fine grained, medium strong to strong was to strong wer <10% of surface increasing to 35% over interval from 147.9-148.9' No Recovery 150.25-151.5' Limestone 151.5-155.8'. yellowish gray, (5Y 7/2), fine grained, medium strong to strong was to medium stro	_
R12-NQ 5 ft 0% 0 NR	- R12- - 51 0% 165 -122.4 - 166.5	No Recovery 159.95-161.5' No Recovery 161.5-166.5' R12: 2 minutes R12: 2 minutes	_



338884.FL A-22

SHEET 10 OF 11

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

00111110	J.W.E.THOB 74	10 L	2011 11	IENT . CIVIE 33 3/N 3 10023, Mud Totally, NQ tools, HW t	aonig		ORIENTATION . Vertical
WATER	LEVELS: 6.6	ft bg	s on 3/	23/07 START: 3/22/2007 END: 3/	27/20	07 LOGGER : N. Jarzyniecki	
)			DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE COLOR	
L L L	Ã,ξ.Σ.	~	FRACTURES PER FOOT	DESCRIFTION	ੂ	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AAGE	JS E S	Q D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
뚜쮸짓	NG NG S	a	AC R F	PLANARITY, INFILLING MATERIAL AND	ξ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
교외교	SHR	ď	유립	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROI G, TEGT REGGETG, ETG.
	5 ft	38		168.4' - Bedding plane, 10 deg, smooth,		Limestone	
-	54%			undulating	╂—	 166.5-169.2' - light olive gray, (5Y 	-
170				168.55' - Fracture zone, 1-3" pieces	┵	5/2), moderate HCl reaction, medium	
-127.4			NR	168.6' - Bedding plane, 15 deg, rough,	I	strong to strong (R3 to R4), zones	
-			\	undulating, open		- and blebs of 30-50% small (<3/16")	R13: 8 minutes
-					╫	voids alternating with fine grained material with few voids, void-rich	Casing advanced to 170'
_	171.5				┸	zones occur along undulating	3/25/07 End of drilling for
				171.5, 171.6, 171.9, 172.2, 172.4, 173.0,		bedding planes, larger cavities/fossil	the day at 171'
-			>10	173.15' - Bedding plane (7), horizontal, smooth, planar	₽	molds (up to 1/2" x 3/4") vary from	3/26/07, 08:05 Cleaning
-				Sillootti, piariai	+	- <5-10% over surface	out hole to resume drilling -
_			>10			No Recovery 169.2-171.5'	_
				173.1' - Fracture, 80 deg, smooth, undulating	\vdash	Limestone - 171.5-176.2' - light olive gray, (5Y	
_	R14-NQ			173.4-173.8' - Fracture zone, 3/4"-2"	1	5/2), dense, very fine grained,	1
-	5 ft	50	>10	fragments	二	moderate HCl reaction, strong (R4),	-
_	94%			173.95' - Fracture, horizontal, rough, undulating, black staining on 50% of surface	╨	thinly laminated in zones 2-4" thick	_
175			>10	174.2' - Fracture or mechanical break, 10	Н	alternating with zones of 25-30%	
-132.4			> 10	deg, rough, undulating		small (<1/8") voids and few (<5%)	
-				174.5' - Fracture, horizontal, rough, planar	╁	_ larger cavities up to 1/2" diameter	SC-5 collected at 175.4-
_			0	174.8-175.2' - Fracture zone	╁┯	-	176.2'
l _	176.5		NR			No Recovery 176.2-176.5'	R14: 13 minutes
					Ш	Limestone	SC-6 collected at 176.5-
-			1		╁	- 176.5-178.8' - light olive brown to	177.45' -
-					-[_	_ yellowish gray, (5Y 5/6 to 5Y 7/2),	_
				177.75' - Fracture, horizontal, rough,	╨	strong HCl reaction, strong (R4), fossiliferous with casts/molds up to	_
			>10	undulating	Н	1/2", small (1/16") voids over 10-20%	
-	R15-HQ			177.75-178.8' - Fracture zone, 3/4"-3"		of surface occuring in zones, very	1
-	5 ft	19		fragments	╨	 fine lens of rock with no voids 	-
_	46%				╁┰	No Recovery 178.8-181.5'	_
180							
-137.4			NR		Ш		
-					+	-	R15: 107 minutes
-					-	-	Stop drilling to mix mud -
	181.5				┵		_
1]	181.5-181.75' - Fracture zone, 1"-2"		Limestone	
1 -			>10	fragments		- 181.5-182.6' - moderate olive brown	1
1 -			×10,	18Ž.05' - Bedding plane 182.3-182.6' - Fracture zone, 1"-3" fragments	╨	with light olive gray zones, (5Y 3/4 with 5Y 3/4), fine to very fine grained,	-
1 -			\ <u></u>	102.0-102.0 - 11aotare 2011e, 1 -0 11agments	┶╌	- moderate to strong HCl reaction,	
1						strong (R4), <5% small (1/16") voids,	
I -	R16-NQ				╨	poorly fossiliferous	1
1 -	5 ft	0			世	- No Recovery 182.6-186.5'	
-	22%		NR		\perp	-	_
185			' '' \		╨		
-142.4				_			
1 -					\perp	-	R16: 15 minutes
1 -					╨	-	-
1 -	186.5				口	_	
1			ا مر ا	186.5-186.9' - Fracture zone, 3/4"-2"	H-		
1 -			>10	fragments	╨	<u> </u>	1
1 -				107 FEL Frontisco OF does records conductations	仜	-	-
1 -			>10	187.55' - Fracture, 25 deg, rough, undulating 187.85' - Bedding plane, rough, stepped	1	 -	_
1			`		╨		
1 -	R17-NQ		>10	188.35-188.65' - Fracture zone	Ш		1
					1		
1							



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-22	SHEET	11	OF	11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 6.6	ft bgs	s on 3/	/23/07 START : 3/22/2007 END : 3/	27/20	D7 LOGGER : N. Jarzyniecki	
> 0 ::	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUF	5 ft 48%	o ⊬ 22	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS 188.7' - Fracture, 80 deg, rough, stepped,	SYN	CHARACTERISTICS Limestone	DROPS, TEST RESULTS, ETC.
190_ -147.4	40 /0		NR	black fine particles on fracture face —		 186.5-188.9' - Same as 181.5-182.6' except increasingly mottled moderate olive brown and light olive gray, (5Y - 4/4 and 5Y 5/2), fossils casts/molds 	
	191.5		5			up to 1/4" x 1/2", small (1/16") voids over 15% of surface, except <5% over 188.2-188.4', moderate HCI reaction, medium strong to strong	- - -
-			4	192.0-193.5' - Bedding plane, numerous 2" long bedding plane 192.25' - Bedding plane, <15 deg, rough, undulating, organic staining	Ħ	(R3 to R4) rock No Recovery 188.9-191.5' Limestone 191.5-193.6' - olive brown, (5Y 4/4),	-
-	R18-NQ 5 ft 42%	25	0	192.75, 193.11 - Fracture (2), 75 deg, rough, undulating, black staining	Ħ	 fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), less than 5% small (<1/16") voids on 	-
195_ -152.4	.2,3		NR	<u>-</u>	Ħ	surface, highly fossiliferous, casts/molds up to 1/4" x 1/4" No Recovery 193.6-196.5'	- -
-	196.5			196.5, 196.6, 197.55, 197.7, 197.9, 198.1' -		_ _ _ Limestone	R18: 10 minutes 3/26/07, 17:31 End drilling – for the day at 196.5' 3/27/07, 07:51 Water level
-			>10	Fractures (6), 0-15 deg, mostly rough and undulating, semi planar, organic black staining 196.5-198.9' - Fracture zone, rough,		 196.5-199.0' - light olive gray to dark yellowish orange mottled, (5Y 5/2 to 10YR 6/6), dense, fine grained, moderate to strong HCl reaction, 	is 3.3' below ground surface 08:05 Resume drilling
_	R19-NQ 5 ft	28	0	undulating, numerous 0-25 deg. fractures over 1-2" intervals 196.85' - Fracture, 50 deg, rough, undulating, black organic staining	H	strong to very strong (R4 to R5), moderately fossiliferous, fossil casts up to 1/4" x 1/4", small 1/16" voids over <10% of surface	-
200 -157.4	50%		NR	Diack Organic Stalling		No Recovery 199.0-201.5'	- -
_	201.5				Ħ	Bottom of Boring at 201.5 ft bgs on	R19: 25 minutes 3/27/07, 09:30 Boring total depth 201.5'
_						- 3/27/2007 -	Water level at 3.5' below ground surface
						- -	_ _ _
-				-	1	_	- -
-						-	- -
-						-	- -
_						_	- -



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	Δ-22Δ	CHEET	4	ΩE	7	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

						ary, cameau, Avvo rous, c			Officintation : Vertical
WATER	LEVELS	: 4.0 ft bo	gs on 6/13	3/07 S	START : 6/13/2007	END: 6/14/2007	LOGGE	R : C.	
1.				STANDARD		SOIL DESCRIPTION		(T)	COMMENTS
88€ Seg	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS] ŏ	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,	
H H H		RECOVE			MOISTURE	E CONTENT. RELATIVE I	DENSITY OR	<u>R</u>	DRILLING FLUID LÓSS, TESTS, AND INSTRUMENTATION
			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE,	MINERALOGY	Σ	INSTRUMENTATION
				(N)				S	A COA is no shill of A CO with intent of starting
42.9									A-22A is re-drill of A-22 with intent of starting rock coring at approximately 35.0'
									Blind drill in soils to 35.0'
1 -	1							1	1
-								1	-
-								4	Dellaria Danasido Canadat O O
l _									Driller's Remark: Sand at 2.0'
-	1							1	1
-								1	-
-								-	
_									Water level 4.0' below ground surface
5									
37.9	1						_	1	_
-	1							1	-
-								-	-
l _								1	_
-	1						•	1	1
-	-							1	1
-								-	Driller's Remark: Tan silt at 8.0'
_								1	Dillier's Heiliaik. Tail siit at 6.0
1 -	1							1	1
								1	-
10 32.9							_	-	
JZ.5 _								4	_
	1								
-	1							1	1
-	-							1	-
-								4	_
1 _									
1 -									1
1 -	1							1	1
1 -	1							1	-
1 -								4	Driller's Remark: Weak sandy limestone at -
15							_	1	14.3'
27.9									
1 -	1						•	1	1
1 -	1							1	
1 -	-							-	-
1 -								1	
1									Driller's Remark: Harder limestone at 17'
1 -	1							1	1
1 -	1							1	-
1 -								4	-
1 -]							1	_
1									
20	1							1	1
								1	
1								1	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-22A	SHEET	2	OF	7	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

	LEVELS				START : 6/13/2007 END : 6/14/2007 LOGG	ER:	: C. Sump
				STANDARD	SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH SURFA(ELEVAT			#TYPE	6"-6"-6" (N)	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
22.9 - - - -						-	Driller's Remark: Sandy silt with weak limestone at 21.5', gravel-sized clasts
25						-	Driller's Remark: Weak sandy limestone at 26.0'
- - - - 30 12.9							Driller's Remark: Carbonate silt at 28-29'
-	35.0					-	Driller's Remark: Hard limestone at 33.5'
35	35.3	0.3	SS-1	50/4 (50/4")	Limestone Fragments 35.0-35.3' Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log		
40				_		_1	



338884.FL A-22A

SHEET 3 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/HW casing ORIENTATION : Vertical

WATER	LEVELS: 4.0	ft bgs	s on 6/	13/07 START : 6/13/2007 END : 6/	14/20	7	LOGGER : C. Sump	
≥∩≘	(9)			DISCONTINUITIES	စ္ခ		LITHOLOGY	COMMENTS
N (#	AND ≪ ₹		ES T	DESCRIPTION	CLC		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
FACE MATIC	E RU 3TH, OVEF	D (%)	STUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG		MINERALOGY, TEXTURE, VEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQI	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
7.9	35.0 R0-NQ			35.0-36.0' - Fracture zone, limestone			tone Fragments	Begin rock core at 35.0'; 6"
-	1 ft 36.0 100%	0	>10	fragments -	口	- 35.0-3	6.0' - Same as 36.0-37.6'	casing installed from - surface to 10.0', HW
-	00.0		3	36.0-36.1' - Fracture zone, limestone		Limes	tone 7.6' - light olive gray, (5Y 5/2),	casing to 35.0'
_			٠ 	fragments 36.1' - Fracture, horizontal, rough, undulating,		moder	ate HCl reaction, medium	Note: core discarded
_			>10	slight clayey infill in fossil mold on surface 36.8' - Fracture or mechanical break, 70 deg,	\vdash	strong - diamet	(R3), 10-15% small (1/16" ter) void space across surface,	_
-	D4 NO			rough, undulating to semi-planar, slightly radiused	┢	fossilife	erous (many more molds than few larger cavities (up to 3/8"	-
-	R1-NQ 5 ft	9		36.9' - Fracture or mechanical break,	H	 diamét 	ter)	-
-	32%		ND	horizontal, rough, undulating 37.2' - Mechanical break, vertical,	H	No Re	covery 37.6-41.0'	-
			NR	non-planar, spall 37.5-37.6' - Fracture zone, limestone	Ħ	-		=
40 2.9				fragments	Ħ	_		R1: 4 minutes
-	41.0			-	Ħ			-
_			0	41.0-43.0' - Compacted silty sand (carbonate derived)			and (SM) 3.0' - moderate yellowish	_
				derived)		brown,	, (10YR 5/4), fine grained,	
_			0	_			ate HCl reaction, compacted, nate derived, preferentially	
_	D0 N0		_	42.0.42.4.42.2.42.2! Freehures or		oriente	ed thin (1/16") dark black c inclusions and laminations	42.5-43.0' More competent limestone beds with softer -
-	R2-NQ 5 ft	20	5	43.0, 43.1, 43.2, 43.3' - Fractures or mechanical break (4), horizontal, rough,	Ħ		ly horizontal), friable	compacted silt material in _ between
-	70%		1	undulating 44.0' - Fracture, >60 deg, rough, undulating,	Ħ	Limes 43.0-4	tone 4.5' - grayish orange, (10YR	-
45			'	non-planar - 44.3' - Fracture, horizontal, rough, with sand	Ħ	7/4), m	noderate HCl reaction, weak to	-
45 -2.1			NR	on surface (possible thin interbed)	H	fossilife	m strong (R2 to R3), erous (more molds than	R2: 3 minutes
-	46.0			-	H		voids over 10% of surface smaller than 1/16"; 40% up to	-
			3		H	3/8" fo	ssil molds), inclusions up to tht gray (N7) (fossil infilling)	_
_			3	undulating, mostly horizontal	H	No Re	covery 44.5-46.0'	_
_			1	<u>-</u>	L	Limes 46.0-49	tone 9.1' - grayish orange, (10YR	SC-1 collected at 47.4-
-	D2 NO			-	₽	5/4), m	noderate HCl reaction, very o weak (R1 to R2), easily	48.5'
-	R3-NQ 5 ft	34	>10	48.5-49.1' - Fractures (2), 75 deg, rough,	\vdash	broken	by hand, void space across	-
-	62%			undulating	H	1/16", :	e 15-20%, (80% smaller than 20% larger cavities up to 1"	-
50 -				-	F	 diamet 	ter, fossiliferous (many more than casts), thin black organic	-
-7.1			NR		F	— lamina	e at 48.5-49.1'	R3: 3 minutes
-	51.0			-		- NO KE	covery 49.1-51.0'	-
			2		Þ	Limes	tone 6.0' - moderate yellowish	
_				51.7, 51.9' - Mechanical break, horizontal,	I	brown,	, (10YR 5/4), mild to moderate	
-			3	rough, undulating to semi-planar 52.1, 52.3, 52.9, 53.2, 53.4, 53.9' - Fractures	口	- lamina	action, weak (R2), silty, finely ted with dark black thin	_
-	D4 NO			(6), 30-40 deg, rough, undulating to semi-planar	口	(<1/16	") organic laminations, iting non-planar bedding	-
-	R4-NQ 5 ft	62	3	Schii-planai -	仜	- planes		-
-	100%			-	仜	-		-
- 55			0	-	口	-		-
35_					1			



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-22A

SHEET 4 OF 7

ORIENTATION : Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/HW casing

WATER	LEVELS: 4.0	ft bgs	s on 6/	13/07 START : 6/13/2007 END : 6/	14/20	D7 LOGGER : C. Sump	
£□≶	(%			DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B FACI	E RU 3TH, OVE	R Q D (%)	FOCT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP' SURI ELE\	COR LEN(REC	S O	FRA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-12.1				55.1' - Fracture, 60 deg, rough, semi planar	Ü		R4: 5 minutes
-	56.0		3	slightly radiused	╁	-	-
-	30.0			55.5' - Fracture, rough, undulating 55.9' - Bedding plane, horizontal, smooth,	F	Limestone	
-			3	parting along organic laminae	Ħ	 56.0-56.5' - moderate yellowish brown, (10YR 5/4), 10-15% voids 	-
_				56.5, 56.8' - Fractures (2), rough, undulating 56.9' - Bedding plane, horizontal, smooth,	L	cover surface, few voids/cavities	-
			1	1/4" thick black organic (lignite) laminae		 >3/16" 56.5-56.9' - moderate yellowish 	1
	R5-NQ	05	. 40	57.8-59.5' - Fracture zone, limestone fragments	Н	brown to dark yellowish brown,	1
	5 ft 70%	25	>10			 (10YR 5/4 to 10YR 4/2), very weak (R1), silt material with black laminar 	_
			>10		I	inclusions (organics, possibly lignite) 56.9-59.5' - moderate yellowish	
60_					口	brown, (10YR 5/4), mild to moderate	1
-17.1			NR	_	\perp	HCl reaction, very weak (R1), small voids (<1/16") occurring in irregular	R5: 4 minutes
	61.0				\vdash	zones (possible bioturbation), thin	
			1	61.3, 62.15, 62.25' - Fractures or mechanical	F	zones containing fine black laminae (organics), slightly friable	
			'	break (3), 30-60 deg, rough, undulating		No Recovery 59.5-61.0'	
			3	_	片	Limestone 61.0-65.7' - moderate yellowish	_
				62.75' - Fracture, horizontal, rough,		brown to dusky yellow, (10YR 5/4 to	_
	R6-NQ 5 ft	46	1	undulating		5Y 6/4), mild to moderate HCl reaction, medium strong (R3),	_
_	94%	.0	L.	63.0, 64.1' - Fractures (2), >80 deg, rough, undulating to semi-planar, open	П	variable (5-15%) small (<1/16") voids across surface, thin silt zones	_
_			1	64.4-64.5' - Carbonate sand interbed	ш	_ (1"-1-1/2" thick) at 62.3' and 64.6'	
65			L.		上	<u> </u>	
-22.1			4	65.0, 65.2, 65.35, 65.7' - Fractures (4), horizontal, rough, undulating to planar	┢	-	R6: 5 minutes
_	66.0		NR	gg	F	No Recovery 65.7-66.0'	_
_			1	66.35' - Fracture, horizontal, rough	Ħ	Limestone - 66.0-67.0' - dusky yellow, (5Y 6/4),	-
_					世	fine grained, weak (R2), fossiliferous,	-
-			1	67.0' - Fracture or mechanical break, rough, stepped		silty, 5-10% small voids (<1/16") over surface	-
-	D7.NO			69.0' Fracture >90 day rough undulating	₽	67.0-68.7' - dusky yellow to moderate yellowish brown, (5Y 6/4 to 10YR	Possible bioturbation
-	R7-NQ 5 ft	74	3	68.0' - Fracture, >80 deg, rough, undulating to semi-planar		 5/4), intermingled zones of fine 	
-	96%			0041 Frankrig 45 da	口	grained silty limestone (no voids) and limestone with 20-25% small voids	-
			4	69.1' - Fracture, 45 deg, rough, undulating to planar	世	– (1/16" - 1/8")	-
70 -27.1				.69.1-70.5' - Fracture, vertical, undulating, —	\vdash	68.7-70.5' - weak (R2), very finely laminated (1/16"-1/8"), silty, with	R7: 3 minutes
			2	tight (possibly healed) 69.7, 69.9, 70.1, 70.5' - Fractures (4),	\vdash	 sparse inclusions of void rich 	-
-	71.0		NR.	horizontal, rough, undulating, (possible bedding planes)	F	(20-25%) limestone preferentially oriented parallel to bedding planes	Start drilling 6/14/07 at
-			1	beduing planes)	片	 70.5-70.8' - grayish yellow, (5Y 8/4), medium strong (R3), fossiliferous, 	08:00, depth at 71.0'
-				71.8, 73.5, 74.1, 74.3' - Mechanical break (4),	世	15% small voids (<1/16")	Water level 3.9' below _ ground surface
-			0	rough, undulating, irregular	\vdash	No Recovery 70.8-71.0'	-
-	R8-NQ				圧	-	-
-	5 ft	62	1		世	-	
-	96%			-	世	-	-
75 -			3	74.5' - Fracture, >80 deg, non-planar (spall)	\vdash	_	-
75					F		



338884.FL A-22A

SHEET 5 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/HW casing

ORIENTATION: Vertical

COMING	IVIL IT IOD AI	ND LC	ZOIFIV	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/	HVV C	asing	ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 6	/13/07 START : 6/13/2007 END : 6/	14/200	D7 LOGGER : C. Sump	
				DISCONTINUITIES	(5)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	D0.01/ T1/D5, 0.01 0.D	
OH A P	NA Y		FRACTURES PER FOOT	DECOMI HON	힏	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H S E		(%) O	F S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	В М	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
민류년	N N N N N N N N N N N N N N N N N N N	Ø	A H	PLANARITY, INFILLING MATERIAL AND	Ĭ.	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	225	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	1 1, 1 11 1, 1
-32.1			2	75.0' - Clay seam, 1/2" silty clay interbed,	Ш	Limestone	R8: 3 minutes
-			-	dark brown/black organics	Н	- 71.0-75.8' - yellowish gray, (5Y 7/2),	1
-	76.0		NR.	75.7' - Mechanical break, rough, undulating,		mild to moderate HCl reaction, weak to medium strong (R2 to R3), void	-
l -			1	irregular 76.2' - Fracture, >60 deg, rough, undulating,	ш	 space over surface varies from 	
			l	irregular, tight (healed)	\Box	10-25% (60-70% small voids <1/16"	
-						with remainder ranging from 3/16" to	1
-			>10	77.4' - Fracture, 60 deg, slightly rough,	ш	>3/4"), fossiliferous (many more	1
-				undulating to planar	+	molds than casts), void rich zone 71.5-71.8', minor clay infilling in	-
	R9-NQ 5 ft	26	>10	77.6-78.5 - Fracture zone, limestone		- larger (1") cavity, fine grained silty	
	80%	20	-10	fragments	Ш	zone (no voids) 73.5-73.7', 1/2" thick	
-	33,1			79.1-79.3' - Fracture zone, limestone	T	organic rich black clay seam at 75.0'	1
-			>10	fragments, dark brownish black coating on		No Recovery 75.8-76.0'	-
80				one fragment, greasy luster on surface, tacky —	igoplus	Limestone	
-37.1			NIE	(organics).		76.0-80.0' - Same as 71.0-75.8' except fractured/fragment zones	R9: 2 minutes
_	81.0		NR	79.8' - Clay seam, 1/2" clay infilling, dark		associated with higher percentage of	1
-	01.0			brownish black, greasy luster, tacky	₩	small voids/cavities (fossil molds),	1
-			>10	(organics) 81.0-81.2' - Fracture zone, limestone		organic seams (black) at 79.5' and	1 4
				fragments		80.0'	SC-2 collected at 81.6-
				81.6' - Mechanical break, horizontal, rough,	Н	No Recovery 80.0-81.0'	82.6'
-			0	undulating	\Box	Limestone 81.0-85.2' - moderate yellowish	1
-	D40 NO				-	brown, (10YR 5/4), moderate HCl	-
_	R10-NQ 5 ft	54	0		$oldsymbol{+}$	reaction, medium strong (R3),	
	84%	04	ਁ			fossiliferous (many more molds than	
-				84.0' - Fracture, rough, undulating, irregular	Н	casts), 10-15% small voids covering	1
			2	84.5, 84.7' - Fracture, >70 deg, rough,	++	surface (90% are <1/16"; 10% are larger cavities [3/16"-3/8"])	1
85 -42.1			_	semi-planar —	ш		
-42.1			0		┸	No Recovery 85.2-86.0'	R10: 7 minutes
	86.0		NR			•	
-	00.0			86.1, 86.2, 86.3, 86.5, 86.7' - Fractures (5),	Ш	Limestone	1
-			5	60-70 deg, rough, undulating to semi-planar,	+	- 86.0-88.7' - Same as 81.0-85.2'	-
l _				irregular, conjugate sets		except strong (R4), increased	_
						percentage of voids and small (<3/8") - cavities, fine grained dark olive gray	
_			>10	87.5-88.7' - Fracture zone, rough, limestone	Н	limestone lense at 88.5-88.7'	1
-	R11-NQ			fragments, irregular surfaces			1
-	5 ft	12	>10		ш		1 4
I -	54%				╁┼┤	No Recovery 88.7-91.0']
							1
90			ND	,	14	_	1
-47.1			NR	_	┢┤	<u> </u>	R11: 6 minutes
I					\Box		1
	91.0				H		Driller's Remark: 50% loss of circulation at 90.0-91.0'
1						Limestone	or circulation at 50.0-91.0
_			5	91.3' - Fracture, 60 deg, rough, undulating to	\square	91.0-91.8' - moderate olive brown,	1 1
-			\vdash	semi-planar 91.5' - Fracture, horizontal, rough, undulating	++	_ (5Y 4/4), fine grained, mild to moderate HCl reaction, strong to	1 -
_			3	91.6, 91.8, 91.9' - Fractures (3), 45 deg,	\Box	- very strong (R4 to R5), dense, no	1
				rough, undulating, irregular	\vdash	voids	1
I -	R12-NQ			92.3, 92.5, 92.6, 93.0' - Fractures (4), 50-60	1	_	SC-3 collected at 93.4 -
-	5 ft	18	2	deg, rough, undulating and planar to	\Box	_	94.4'
_	68%		_	semi-planar, irregular 93.4' - Fracture zone, irregular, with	+		1 4
_			0	limestone fragments	Н	_	j J
95]
					1 1		1
							1
ь					_		



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-22Δ	QUEET	6 OF 7

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/HW casing

WATER	LEVELS: 4.0	ft bg	s on 6/	13/07 START : 6/13/2007 END : 6/	14/200	7 LOGGER : C. Sump	
≥Q⊋	<u> </u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-52.1			NR		Ш	Limestone	R12: 4 minutes
-	96.0		>10	96.0-97.4' - Fracture zone, limestone fragments		 91.8-94.4' - pale yellowish brown, (10YR 6/2), medium strong (R3), 10-15% small voids covering surface (<1/16"), few larger cavities infilled 	
-				raginents	Ш	with fine grained yellowish gray (5Y 7/2) material, marbled zone of	
- - - 100 -57.1	R13-NC 5 ft 28%	0	>10 NR	_		yellowish brown void-rich limestone with yellowish gray fine grained voidless limestone 94.0-94.4' (possible breccia) No Recovery 94.4-96.0' Limestone 96.0-97.4' - pale yellowish brown, (10YR 6/2), mild to moderate HCl reaction, medium strong (R3), 15-20% small voids covering surface	R13: 3 minutes
-	101.0		>10	101.0-102.5' - Fracture zone, limestone	H	(90% are voids <1/16", 10% are larger voids [3/16" - 3/4"]), fossiliferous (many more molds than	
_				fragments with irregular non-planar surfaces	H	casts) No Recovery 97.4-101.0'	
-	R14-NC		>10	102.5' - Fracture or mechanical break, 45 deg, rough, undulating, irregular		Limestone 101.0-104.2' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4),	
-	5 ft 64%	40	^ '	103.4' - Fracture, 45 deg, rough, stepped,	Ħ	 moderate to mild HCl reaction, medium strong (R3), fossiliferous 	
- 105_ -62.1	106.0		NR	irregular –		 (many more molds than casts), 10-15% small voids (<1/16") over surface, variable larger voids/cavities (fossil molds) 3/16" to >3/4" diameter, larger cavities comprise up to 25% volume from 101.6-102.5' 	R14: 3 minutes
_			1	106.6, 107.1, 107.3' - Fractures or		 decreasing with depth No Recovery 104.2-106.0' Limestone 106.0-111.0' - Same as 101.0-104.2' 	
-			3	mechanical break (3), 60-70 deg, rough, undulating to semi-planar, slightly radiused 107.7' - Fracture or mechanical break, low	Ħ	except few voids/cavities greater than 3/16"	
-	R15-NC 5 ft 100%	48	1	angle, undulating 108.7, 109.1, 109.5, 109.6, 109.9, 110.0' -		-	
110	132,0		4	Fractures or mechanical break (6), rough, undulating, irregular	目	-	
-67.1 -	111.0		1	-		 -	R15: 5 minutes
-	111.0		>10	111.0-113.7' - Fracture zone, rough, undulating, limestone fragments, irregular		111.0-113.7' - Same as 106.0-111.0' - except variable percentage of voids (<10-20%), thin zone of yellowish	
-			>10			gray (5Y 7/2) fine-grained limestone at 111.8-112.0'	
-	R16-NC 5 ft 54%	0	>10			- - No December 442.7.440.01	
-	54%				Ħ	_ No Recovery 113.7-116.0' -	
115			NR		\Box		-
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-22A	SHEET	7	OF	7	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/HW casing ORIENTATION : Vertical

CORING	METHOD A	ND EC	JUIPIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/I	IVV C	asing	ORIENTATION : Vertical
WATER	LEVELS : 4.0) ft bas	s on 6/	/13/07 START : 6/13/2007 END : 6/1	4/20	D7 LOGGER : C. Sump	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-72.1							R16: 3 minutes
-	116.0		3	- - 116.3, 116.7, 116.8' - Fractures (3), horizontal, rough, undulating, irregular		Limestone 116.0-116.7' - Same as 111.0-113.7' except increasing percentage voids/cavities 3/16"-3/4" in size (up to	- - -
-			2	117.0' - Bedding plane or fracture, horizontal, smooth, planar	İ	 10% of surface), notable infilling and recrystallization in fossil molds 116.7-117.25' - moderate yellowish]
-	R17-NQ 5 ft 58%	34	1	117.25' - Sharp horizontal contact with light gray, fine grained limestone 117.8' - Contact with fossil and void rich moderate yellowish brown limestone		 brown, with pronounced bedding plane laminations, fine sand particles in fracture surface 117.25-117.8' - light gray, (N7), fine 	
120 -77.1			NR	_ 		grained, strong (R4), dense, no voids 117.8-118.9' - Same as 111.0-113.7' except large 1" fossil cast at end of core No Recovery 118.9-121.0'	R17: 4 minutes
l _	121.0				П		Total depth 121.0'
-						Bottom of Boring at 121.0 ft bgs on 6/14/2007	
- - - -				-		-	- - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-23	SHEET	1	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, NWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

	MATER LEVEL 0 to 5 th bases at 440,007 CTART to 40,0007 C							
			JS 011 4/10		TART : 4/9/2007			
STANDAF		STANDARD PENETRATION	GOIL DECOLUTION					
N (SAMPLE INTERVAL (ft)			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,			
H B		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND			
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
40.8	0.0			(14)	Poorly Graded Sand With Organics (SP)			
-		0.8	SS-1	1-2-2	\0.0-0.1' - topsoil / -			
-		0.6	33-1	(4)	Poorly Graded Sand (SP) 0.1-0.75' - grayish black grading to medium gray, (N2			
-	1.5				to N5), moist, very loose, fine grained, trace			
_					nonplastic fines, organics			
_					_			
_					<u> </u>			
					<u> </u>			
					」			
5	5.0				11			
35.8					Clayey Sand (SC)			
-		0.5	SS-2	2-3-3	5.0-5.4' - greenish gray, (5G 6/1), moist, loose, fine grained, 40% fines, medium to high plasticity, silica			
-	6.5			(6)	\sand \/ \			
-	0.5				Silty Sand (SM)			
-					5.4-5.5' - yellowish gray, (5Y 7/2), moist, loose, fine to medium grained, 20% fines, strong HCl reaction,			
-					nonplastic fines, carbonate material			
-					-			
-					-			
-					-			
-					-			
10 30.8	10.0				Silt And Limestone (ML)			
30.6				10-9-5	10.0-11.0' - very pale orange, light olive brown to light ┩││┃			
_		1.0	SS-3	(14)	yellow, (10YR 8/4, 5Y 5/6 to 5Y 7/6), wet, stiff,			
_	11.5				moderate HCl reaction, nonplastic, carbonate; 20-25% limestone fragments, fine to coarse			
_					gravel-sized End drilling at 11.5' on 4/9/07 Resume drilling 4/10/07 water level is 0.5'			
_					below ground surface (start)			
]]			
] [
] [
]					Driller's Remark: hard drilling from 14-15.0',			
15	15.0				Limestone rock fragments in cuttings			
25.8					Silt (ML)			
		1.1	SS-4	10-11-14	15.0-16.05' - very pale orange, (10YR 8/2), wet, very stiff, rapid dilatancy, moderate HCl reaction,			
-	16.5			(25)	\[\cap \ \ \ \nonplastic, \text{ carbonate; trace coarse sand to fine } \]			
-	10.0				\gravel-sized / -			
-					†			
-					†			
-								
-					- 1			
-					- 1			
-					- 1			
20								
					<u> </u>			



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-23	SHEET	2 OF 13

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, NWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 0.5 ft bo	s on 4/10	0/07	START : 4/9/2007 END : 4/17/2007 LOGGER : R. McComb, C. Dougherty	
>				STANDARD	SOIL DESCRIPTION COMMENTS	
N AN	SAMPLE INTERVAL (ft)			PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
H BI ACE	RECOVERY (ft)			MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LASST, AND		
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
20.8	20.0				Silt With Sand (ML)	
		0.9	SS-5	13-17-16 (33)	20.0-20.9' - very pale orange, (10YR 8/2), moist to wet, hard, rapid dilatancy, mild to moderate HCl	
_	21.5			()	\reaction, 20% fine to medium grained sand, \rangle \nonplastic, all carbonate	_
-						_
-					- 1	-
-						-
-						-
-	_					-
25	25.0				1 1	=
15.8	20.0				Sandy Silt (ML)	
-		0.9	SS-6	19-24-11 (35)	25.0-25.9' - Same as 20.0-20.9' except up to 38% sand-sized grains with carbonate material	
	26.5			(00)		
_						-
_	-					_
-	-					-
-	_				- 1	-
-						-
30	20.0				-	-
10.8	30.0				Silt With Sand (ML)	_
-	•	1.4	SS-7	8-22-35 (57)	30.0-31.4' - moderate yellow, (5Y 7/6), wet, hard, 15-20% sand, nonplastic to low plasticity, rapid	_
	31.5			(37)	dilatancy, moderate HCl reaction, <1/16" thick calcite stringers, all carbonate	
					Stringers, air carbonate	
_						_
-					1 1	_
-						_
-					- 1	-
	35.0				-	-
35 5.8	35.2	0.1	SS-8	50/2 (100")	Limestone Fragments 35.0-35.1' - light olive gray, (5Y 5/2), mild HCl	
-	-			(.50)	\reaction, up to 3/8"	-
-					Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log	=
-						-
-						-
-	-				-	-
	-				-	-
40					+ + +	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-23 SHEET 3 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

CONINC	NIL ITIOD A	ND LC	ZUIFIV	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v cas	sirig		ORIENTATION : Vertical
WATER	LEVELS: 0.5	ft bg	s on 4	10/07 START : 4/9/2007 END : 4	17/20	007	LOGGER: R. McComb, C. Dougl	nerty
> -	· ·			DISCONTINUITIES	(2)	ı	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	- 69	Г	ROCK TYPE, COLOR,	
B H E	A'A'N ER'A	(%	URE		SYMBOLIC	ı	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	Ze F Sov	(%) Q	VCT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BG	ı	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCE	COF	S O	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	ı	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
5.8	35.0				T	╈	Limestone	Change to HQ rock coring
-			>10	35.4-36.0' - Fracture zone, rough, stepped,	╁	╁	35.0-38.4' - pale yellowish brown,	at 35.0' on 4/10/07 at 10:00 -
-				vertical fracture, limestone fragments on top,	世	╊	(10YR 6/2), fine grained, mild to moderate HCl reaction, very weak	hours _
_			0	various orientation	₽	╁	(R1), voids <1/16" over 10-30% of	_
_					Т	1	surface (becoming more numerous	_
	R1-HQ	51	1		\vdash	1	with depth), shallow cavities covering <1% (1/16"-1/8"x3/8"), high angle	
	5 ft 68%	31	'		Ė	1	(60-70 degrees) unbroken fracture	
_			0		₩	╁	zone from 37.7-38.0'	_
-				38.4' - Fracture, 50 deg, rough, stepped,	ш	1	No Recovery 38.4-40.0'	=
-			NR	open	╁	╁		R1: 9 minutes
-			''''		-	1		-
40	40.0			_	#	┺	011/411	
0.8					4	L	Silt (ML) 40.0-43.4' - dusky yellow, (5Y 6/4),	_
						L	wet, soft, rapid dilatancy, mild HCl	
					Ш		reaction, sandy, carbonate material	
-			NA		1111	Г		_
-	R2-HQ				1111	r		_
-	5 ft	0			1	F		-
-	68%				-	F		-
-					4	F	No Recovery 43.4-45.0'	_
-					4111	L	i.e.	
1 _			NR		_	L		R2: 3 minutes
45	45.0				Ш			
-4.2				45.2' - Fractures, rough, stepped, open	${\mathbb H}$	Т	Limestone	
-			2	:0. <u>1</u>	Т	1	45.0-46.0' - dusky yellow, (5Y 6/4), fine grained, mild HCl reaction,	_
-				45.9' - Fractures, rough, planar, open	ΤП	\uparrow	extremely weak (R0), voids <1/16"	-
-			0		┨║╟		over 15-20% of surface, cavities up	-
-	R3-HQ				-	F	to 3/16"x3/16", trace mold/ casts Silt With Sand (ML)	-
_	5 ft	13	0		4	F	46.0-48.2' - dusky yellow, (5Y 6/4),	_
_	64%				4111	L	wet, soft to stiff, fine grained, 15-20%	_
-]		0		_	L	sand, rapid dilatancy No Recovery 48.2-50.0'	
1							10 1000 01 40.2-00.0	
1 -			NR					R3: 6 minutes
50	50.0				1	r		1
-9.2	55.5			50.0-50.45' - Fracture zone	Ш	T	Limestone	
-			>10	50.45' - Fracture zone, 30 deg, rough,	╁	t	50.0-50.45' - Same as 46.0-48.2'	-
-	-		>10	undulating, open	亡	1	except with some limestone fragments	-
-			<u> </u>	51.0' - Fracture zone, 60 deg, rough, undulating, open	╀	╁	50.45-51.3' - light olive brown, dusky	_
-				51.3-55.0 - Fracture zone, 80-90 degrees,	口	1	yellow, (5Y 5/6 to 5Y 6/4), fine	_
-	R4-HQ 5 ft	9		black organic material covering up to 40-50%	╁	╁	grained, mild to moderate HCl reaction, very weak (R1), laminated	
1 _	26%	•		of some surface	厈	1	black organic material from	
1			NR		H	1	50.9-51.3', voids <1/16" over 5-10% of surface	
1 -					${\mathbb H}$	ſ	No Recovery 51.3-55.0'	1
1 -	1				世	1	•	R4: 12 minutes
-	 				╁	t		-
55	55.0			_	Ŧ	╊		
1								
	1					4		



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-23

SHEET 4 OF 13

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 0.5	ft bg	s on 4	/10/07 START: 4/9/2007 END: 4/	17/20	07 LOGGER: R. McComb, C. Doug	herty
≥□₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
ELO E AN	JN, ANE RY (9		RES)T	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-14.2			1			Limestone – 55.0-59.5' - dusky yellow to light olive	
_			'	55.6' - Fractures, 0- <5 deg, rough, stepped,	Ш	brown, (5Y 6/4 to 5Y 5/6), fine	_
_			3	open 56.2' - Fractures, horizontal, rough, stepped,	Ш	grained, mild HCl reaction, extremely weak to very weak (R0 to R1),	_
-	R5-HQ			open 56.65-56.95' - Fractures, <5 deg, rough,		extremely weak rock is friable, voids <1/16" over 3-5% of surface, interval	-
-	5 ft	30	2	stepped, open 57.1' - Fractures, 20-0 deg, rough, stepped	H	of black carbonaceous laminae up to 3/4" thick	-
-	100%			57.85-58.1' - Fractures, <5 deg, rough,	Ħ	- 3/4 trick	-
-			2	stepped, open 58.5-58.8' - Fracture zone, 50 deg, rough,	Ħ	<u> </u>	1
			0	stepped, open		[R5: 8 minutes
60	60.0		Ů	59.4' - Fracture, 50 deg, rough, stepped, — open		59.5-60.0' - yellowish gray, (5Y 7/2), yery fine to fine grained, mild to	
-19. <u>2</u>			1	-		moderate HCl reaction, weak (R2), voids (<3/16") over 10-15% of	-
-				60.6' - Fracture, rough, stepped, planar, open	H	 surface, weak vertical fractures from 	-
-			>10	61.2-61.8' - Fracture zone, stepped, undulating, open	Ħ	59.5-60.0', mottled 60.0-65.0' - yellowish gray, (5Y 7/2),	-
-	R6-HQ		_	_	F	fine grained, mild HCl reaction, extremely weak to very weak (R0 to	-
-	5 ft 100%	38	2	62.35' - Fractures, 50 deg, rough, undulating, tight		R1), voids (<3/16") over 10-15% of surface becoming <1% at 63.0',	1
			2	62.8' - Fractures, <5 deg, rough, undulating, open		fossils (casts/molds) rare to absent	
_			_	63.4' - 30 deg, rough, undulating, open	\vdash	with depth, trace black organic material at 61.0'	D0: 7
			1	63.9 - 64.0' - Fracture zone, horizontal, rough, stepped, undulating, open		-	R6: 7 minutes
65 <u> </u>	65.0			-	H	65.0-66.9' - dusky yellow, (5Y 6/4),	R7: 3 minutes —
-			4	65.3' - Fractures, rough, stepped, open 65.5' - Fractures, horizontal, smooth, planar,		fine grained, mild to moderate HCl reaction, very weak to extremely	-
			>10	open 65.65-66.02' - Fracture zone, horizontal,	Н	weak (R1 to R0), voids <10% of surface becoming more common]
			710	rough, undulating, open	H	with depth, very friable from]
_	R7-NQ 5 ft	20	2	66.25-66.9' - Fracture zone, 0- 90 deg, rough, undulating, various orientations	Н	56.3-66.9' - 66.9-70.0' - yellowish gray, (5Y 7/2),	-
-	100%			67.35' - Fractures, 50 deg, rough, stepped, open	Н	mild to moderate HCl reaction, weak (R2), very fine grained, fine grained	-
-			10	67.60-68.5" - Fracture zone, 50-90 deg, rough, undulating, open		matrix, voids (<1/16") over 15-20% of surface, <5 cavities (3/8" diameter),	-
-				68.9' - Fractures, 0-80 deg, rough, undulating	L	bioturbation zone below 68.4'	SC-1 collected at 68.9-
70	70.0		0		片		170.0
-29.2			>10	70.0-71.05' - Fracture zone, 60 deg, rough, undulating to stepped, open	卅	70.0-70.4' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very]
-				-	屵	weak (R1), voids <1/16" over 10-15% of surface, trace fossil molds/casts] -
-			1			Silt (ML)	-
-	R8-HQ			72.0' - Fractures, rough, undulating to	F	70.4-70.65' - yellowish gray, (5Y 7/2), wet, soft, rapid dilatancy, mild HCl	SC-2 collected at 71.05-
-	5 ft 96%	26	4	stepped, open 72.5' - Fractures, horizontal and 70 deg,	Н	reaction Limestone	72.0' -
			>10	rough, stepped, open 72.7' - Fractures, horizontal, rough, stepped,	L	70.65-72.5' - yellowish gray, (5Y 7/2),]
_			-10	open		fine grained, mild HCl reaction, very weak (R1), voids <1/16" over 10-15%]
-			>10	72.8' - Fractures, 60 deg, rough, stepped, open	E	of surface, trace fossil molds/casts 72.5-73.5' - Same as 70.0-70.4'	R8: 7 minutes
75	75.0				\vdash	except voids 5-10% of surface	-
1	1		ı		1	l	1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-23 SHEET 5 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 0.5	ft bgs	s on 4/	10/07 START : 4/9/2007 END : 4	/17/20	D7 LOGGER : R. McComb, C. Doug	herty
≥ D ⊋	(%)			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H B	E RL STH, OVEI	%) c	JE S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	COR	R Q D (%)	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3YMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-34.2	014	ш.	NR/	73.2-75.5' - Fracture zone, 60 deg, rough,	+"	Limestone	
-			10	stepped, open	\blacksquare	- 73.5-74.8' - yellowish gray, (5Y 7/2),	-
-				73.5-75.0' - Fracture zone, various orientations	\pm	mild HCl reaction, extremely weak (R0), highly fractured, friable, silt and	-
-			0	75.0-75.3' - Fracture zone, horizontal, rough,	+	 clay along fracture planes and on 	1 -
_	D0 110			undulating, open 75.3' - Fractures, horizontal, rough,	\perp	fragments of rock No Recovery 74.8-75.0'	1 -
_	R9-HQ 5 ft	64	2	undulating, open	上	- Limestone	
_	100%			75.9' - Fractures, <5 deg, rough, undulating,	+	75.0-76.4' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2),	1
_			10	open 77.45' - Fractures, <5 deg, rough, stepped,	\perp	yellowish gray, (31 5/2 to 31 7/2), - fine grained, moderate HCl reaction,	_
_				open	上	extremely weak to very weak (R0 to	
_			2	77.7' - Fractures, 60 deg, rough, undulating, tight	\perp	R1), friable along fracture planes, voids <3/16" over 50-60% of surface,	R9: 4 minutes
80	80.0			78.0-79.0' - Fractures, 60 deg, rough,	$oldsymbol{\square}$	1-2 cavities (3/16"x3/16")	
-39.2			1	stepped, open 79.3-79.65' - Fractures, <5 deg, rough,	Д	76.4-79.0' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2),]
_				stepped, open	Н	fine to very fine grained, mild HCI	_
l _			5	80.1' - Fracture, <5 deg, rough, undulating, open	\bot	reaction, very weak (R1), voids <3/16" over 25% to <5% of surface	
			5	81.1-81.3' - Fractures, <5 deg, rough,		(decreasing with depth), >5 cavities	
	R10-HQ	36	2	undulating, open 81.5-81.7' - Fractures, horizontal, rough,	\perp	(3/4"-2"x3/8") and 1/16"x1/16" 79.0-79.5' - light olive gray to	
	5 ft 100%	30		undulating, open	\mathbb{H}	yellowish gray, (5Y 5/2 to 5Y 7/2),	SC-3 collected at 82.7-
			_	81.9-82.05' - Fractures, <5 deg, rough, undulating, open	\blacksquare	fine grained, mild HCl reaction, extremely weak (R0), fragmented	83.6'
_			1	82.65' - Fractures, horizontal, rough, stepped,	Ш	79.5-80.0' - Same as 76.4-79.0'	1
-			40	open 83.65' - Fracture, <5 deg, rough, undulating,	\mathbb{H}	80.0-82.4' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2),	R10: Run time not
85	85.0		10	open	H	fine grained, mild HCl reaction,	recorded - Stop drilling for the day,
-44.2				83.8-84.7' - Fracture, 60 deg and 70 deg, rough, stepped, open		extremely weak (R0), voids over10-15% of surface, >5 cavities up to	4/10/07
_			0	84.95' - Fractures, 60 deg, rough, stepped,	Ш	1-3/4"x3/4"-1-3/16", interconnected	Water level 0.5' below – ground surface
_				open	\mathbb{H}	 82.4-84.3' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), 	Resume drilling on 4/11/07
_			0		\Box	fine grained, mild HCl reaction, very	Water level 0.5' below – ground surface
_	R11-HQ			07.051 Frantisca sough undulating and	Ш	 weak (R1), voids <1/16" over 25-30% of surface, 3 to 4 cavities up to 3/8"x 	1
-	5 ft 74%	64	1	87.25' - Fracture, rough, undulating, open, horizontal	+	3/16", trace fossils molds/casts	1
-	, 3		1	88.15' - Fracture zone, 40 deg, rough,	Ħ	 84.3-85.0' - Same as 82.4-84.3' except with >5 cavities (3/8"x3/8"). 	DR: Soft at 88.2-90.0',
I -			NR	stepped, open		trace fossil molds/casts	assumed core loss from - this interval
I -			'\'\			 85.0-88.2' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very 	R11: 6 minutes
90	90.0		0		H	weak to weak (R1 to R2), voids	1
-49.2	55.0			90.0-94.0' - Fracture zone, gravel	口	— <1/16" over 15-20% of surface, >3 cavities (1/16"x3/16") interconnected,	-
-			>10	00.1 1 ractare 20116, 00 adg, reagin,	世	trace casts/molds	
-				stepped, open 90.8' - Fracture zone, 0-<5 deg, rough,	+	No Recovery 88.2-89.5' Limestone	
-			2	undulating, open	Ħ	89.5-90.0' - yellowish gray, (5Y 7/2),	1
-	R12-HQ			91.1' - Fractures, 60 deg, rough, stepped, open		 fine grained, mild HCl reaction, extremely weak (R0), friable, 	1
-	5 ft 78%	15	10	91.5' - Fractures, 70 deg, rough, stepped,	\Box	gravel-sized rock fragments with	-
-	1070			open, (7-1/5" long) from 91.3-91.9' 92.1' - Fractures, 0-90 deg, rough, stepped,	田	_ carbonaceous material over 15-20% of surface	-
-			10	open from 92.1-92.7'	世		-
-				92.7-92.9' - Fractures, 60 deg, rough, stepped, open	世	-	R12: 10 minutes
-	05.0		NR	93.4-93.8' - Fractures, 0-90 deg, rough,	+	-	-
95	95.0			stepped, open	+		
					-		-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-23 SHEET 6 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING	NETHOD AL	ND EC	JUIPIV	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	casir	<u>ıg</u>	ORIENTATION : Vertical
WATER	LEVELS: 0.5	ft bgs	s on 4	/10/07 START : 4/9/2007 END : 4/	17/200	7 LOGGER : R. McComb, C. Doug	herty
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-54.2					97	Limestone	
-			2	95.4' - Fractures, horizontal, rough, stepped, open 95.8' - Fractures, horizontal, rough, undulating, open		- 90.0-91.0' - light olive gray, (5Y 5/2), very fine grained, moderate to strong HCl reaction, medium strong (R3), voids <1% to absent, (2-3 inches)	SC-4 collected at 95.8- 96.9'
-	R13-HQ			96.9' - Fracture, 50 deg, rough, stepped	H	carbonaceous laminae, 1 cavity 2-3/8"x3/8", 1 cavity 3/8"x3/16"	-
-	5 ft 100%	82	0	-	Ħ	 91.0-93.9' - yellowish, (5Y 7/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), voids <1/16 over 	-
-			3	98.5' - Fractures, 60 deg, rough, stepped, open	Ħ	 25-30% of surface, several cavities (3/8"x3/8"), fragmented at bottom No Recovery 93.9-95.0' 	R13: 9 minutes
100_ -59.2	100.0		10	98.7' - Fractures, rough, undulating, vertical 98.9' - Fractures, <5 deg, rough, undulating, open —		Limestone 95.0-96.9' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to	-
-			>10	99.15-99.4' - Fracture zone, 60-70 deg, rough, stepped 99.9-100.0' - Fracture, 60-70 deg, rough, -	H	moderate HCl reaction, weak (R2), cavities <3/8"x3/8" (many infilled), fine grained contains voids over	
-			>10	stepped, open 100.0-101.0' - Fracture zone, 60-70 deg, rough, planar to undulating, open, some	Ħ	15-20% of surface, very fine grain rock contains less void percentage, trace fossil casts/molds.	-
-	R14-HQ 5 ft 60%	24	>10	black carbonaceous staining 101.0-102.0' - 70-80 deg, 7-1/5"- 8-2/5" long 102.0-103.0' - fractures resulting in		96.9-100.0' - dusky yellow, (5Y 6/4), fine grained, very weak to weak (R1 to R2), voids <3/16" over 35-40% of	-
-			NR	gravel-sized limestone fragments		surface, several cavities (1/16"x3/8"), one cavity through core, cavities more abundant with depth. 100.0-103.0' - yellowish gray to	R14: 5 minutes
105	105.0				П	dusky yellow, (5Y 7/2 to 5Y 6/4), fine	
-64. <u>2</u> -			3	105' - Fractures, rough, stepped, open 105.2' - Fractures, rough, planar, open 105.3' - Fractures, 50 deg, rough, stepped,		grained, mild HCl reaction, very weak (R1), voids <3/16" over 25-30% of surface, cavities (several) 3/16"x3/16", black carbonaceous	SC-5 collected at 105.9-
-			0	open -		laminae at 100.9' No Recovery 103.0-105.0' Limestone	107.4'
-	R15-HQ 5 ft 98%	88	2	107.35-107.5' - Fractures, 30 deg, rough, stepped, open	H	105.0-109.9' - dusky yellow, (5Y 6/4), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to	_
-			0			R2), voids <1/16" over 25-30% of surface becoming less abundant with depth, cavities (>5) 3/16"x3/8"	R15: 5 minutes
- 110_ -69.2	110.0		0 (NR)			No Recovery 109.9-110.0'	- Title 5 minutes
-			3	110.2' - Fractures, horizontal, rough, undulating, open 110.6-110.9' - Fracture zone, 70-0 deg,		Limestone 110.0-115.0' - dusky yellow, (5Y 6/4), fine to very fine grained, mild HCl reaction, very weak to extremely	-
-	D46 UO		>10	rough, stepped, open 111.0-113' - Fracture zone, horizontal, rough, undulating, open		weak (R1 to R0), becoming weaker with depth, voids <1/16" over 10-15% of surface, cavities (>5) below 114.0"	-
-	R16-HQ 5 ft 100%	35	>10			- (1/16"x1/8"), trace fossil mold/casts	-
-			1	113.15' - Fracture, horizontal, rough, undulating		- -	- D16: 7 minutes
115	115.0		1			-	R16: 7 minutes
							ı



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-23	SHEET	7	OF	13

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

				12.111 . ONIE 330X 3/11 340233, Maa Total y, Tig tools, Tiv			ONLINIATION: Vertical
WATER	LEVELS : 0.5	ft bg:	s on 4		17/200	·	
200	(9)			DISCONTINUITIES	ن ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	SFR	(%) Q	TUR 00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ĕ۱	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F F 등	NG S	αD	AC ⁻ R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SS	SER	R	FR	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-74.2				115.0-116.0' - Fracture zone, horizontal,	ш	Limestone	
-			>10	rough, stepped, open	Н	- 115.0-116.0' - dusky yellow, (5Y 6/4),	1
-				116.0-118' - Fracture zone, 90-<5 deg, rough,	\Box	fine grained, mild HCl reaction, extremely weak (R0), abundant	-
-			>10	stepped, open	₽₩	cavities (>5) up to 3/4"-2"x 3/8"-3/4",	-
_					Ш	voids over 60% of surface, fossil	_
l _	R17-HQ 5 ft) 8	>10		Н	molds/casts - 116.0-117.4' - dusky yellow, (5Y 6/4),	
	66%	0	/10		ш	fine grained, mild HCl reaction, very	
-			>10		ш	weak (R1), fossiliferous	1
-					ш	 (molds/casts) and organized shell material 	1
-			NR		Н	117.4-118.3' - light olive brown, (5Y	R17: 4 minutes
-			\		H	 5/6), fine grained, mild HCl reaction, 	-
	120.0			_	₽₩	extremely weak (R0), friable, coarse	
-79.2			5	120.2' - Fractures, horizontal, rough,	Ш	sand to gravel-sized fragments No Recovery 118.3-120.0'	
			5	undulating, open	Н	Limestone	
-				120.3' - Fractures, 40 deg, rough, stepped,	Ш	120.0-121.6' - dusky yellow, (5Y 6/4),	1
-			4	open 120.5-120.65' - Fractures, horizontal, rough,	╫	fine grained, weak (R2), voids up to 1/16" covering 15-20%, > cavities up	1
-	R18-HC			stepped, open	ш	to 3/4-1-3/16"x3/8", fossil	1
_	5 ft	40	10	120.75' - Fractures, 40-60 deg, rough,	+	_ casts/molds	-
_	82%			stepped, open 121.05-121.4' - Fractures, <5 deg, rough,		121.6-121.9' - dusky yellow, (5Y 6/4), fine grained, weak (R2), <10% voids	
			0	stepped, open	Ш	over surface, no cavities at 121.0'	SC-6 collected at 123.0- 124.1' -
			U	121.55-121.85' - Fractures, horizontal, rough,		121.9-124.1' - dusky yellow, (5Y 6/4),	124.1
_			0	planar, open 122.55' - Fractures, rough, stepped, open	Н	fine grained, weak (R2), extremely weak (R0), at 122.6-123.0'	R18: 6 minutes
105	405.0		NR	122.8-103.0' - Fractures, horizontal, rough,	ш	No Recovery 124.1-125.0'	1
125_ -84.2	125.0			open –	₩	Limestone	_
-			10	124.1' - Fracture, horizontal, rough, stepped, open	Ш	- 125.0-129.0' - dusky yellow, (5Y 6/4),	-
-				125.4-125.85' - Fracture zone, 0-<5 deg,	\vdash	fine grained, very weak to extremely	4
_			3	rough, stepped to undulating, open	ш	weak (R1 to R0), punctuated with thin beds up to 2-1/2" thick, fissile,	_
				126.1-126.7' - Fracture zone, 50 deg, rough, stepped, open	Н	very weak, (R1), laminations	
	R19-HC		_	126.5-126.75' - Fractures, horizontal, rough,	Ш	(126.5-126.5'; 126.8-127.5') mild to	1
I -	5 ft 80%	30	0	stepped, open	\mathbb{H}	 moderate HCl reaction, voids up to 1/16" over 30-40% of surface, 	1
-	0070				口	cavities >5 (1/16"x3/16") fossiliferous	1
-			2	128.35' - Fractures, 30 deg, rough, tight,	╂╫	- (molds/casts) and shell material,	-
-				undulating to stepped, clay and silt	Ш	aminated from 128.8-128.9'. No Recovery 129.0-130.0'	R19: 6 minutes
-			NR	128.75' - Fractures, 10 deg, rough, undulating, clay infilling, tight, 10% of surface	H	- 140 Necovery 125.0-130.0	1 13. U IIIIIules
	130.0			<1/16" thick	Д		
-89.2				130 3 131 85' Fracture zone amonth	Н	Lilliestorie	
-			>10	130.3-131.85' - Fracture zone, smooth, planar, open	Ш	- 130.0-131.5' - Same as 125.0-129.0'	1
-				F	\mathbb{H}	-	1
-			10			- 131.5-131.9' - dusky yellow, (5Y 6/4),	-
-	D20 110	ļ		131.85' - Fractures, <5 deg, rough, stepped,	₽₩	 fine to very fine grained, punctuated 	-
l -	R20-HQ 5 ft	! 28	1	open	Ш	with thin beds of fine grained	1
I -	78%			132.85' - Fracture, rough, stepped, open	\mathbb{H}	laminations with voids - 131.9-133.9' - Same as 125.0-129.0'	
			2	133.05' - Fractures, 0-90 deg, rough,		except from 133.25-133.5 (<10%	1
-				stepped, open	\mathbb{H}	voids)	1
-				133.53' - Fractures, rough, planar, open	ш	No Recovery 133.9-135.0'	R20: 7 minutes
	40= 0		NR		+	_	1
135	135.0				\Box		
					1		

APPENDIX 2BB-293 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-23 SHEET 8 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

00111110	INLINODA	ND EC	JUIPIV	IENT : CME 550X S/N 340253, mud rotary, HQ tools, HV	casii	<u>ig</u>	ORIENTATION : Vertical
WATER	LEVELS: 0.5	ft bgs	s on 4		17/200		
₹ □ <i>₽</i>	<u>(%</u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-94.2 _			2	135.1' - Fractures, 50 deg, smooth, undulating, open		Limestone 135.0-136.4' - dusky yellow, (5Y 6/4), fine grained, very weak to extremely	-
_			>10	135.95' - Fractures, <5 deg, rough, undulating, open 136' - Fracture zone, gravels		weak (R1 to R0), trace fine grained laminations 136.4-139.4' - greenish gray, (5GY	-
_	R21-HQ 5 ft 88%	38	2	136.4' - Fracture zone, 40 deg, rough, stepped, open 136.9' - Fracture zone, 60-70 deg, rough,		6/1), very light gray mottled, very fine grained, strong HCl reaction, medium strong (R3), voids <3/16"	SC-7 collected at 137.25- 138.05'
_			4	undulating, open 137.1' - Fractures, 50 deg, rough, undulating, open		over 3-5% of surface becoming more common with depth, cavity 1-3/16"-1-9/16", ovate shape (>5)	-
140	140.0		>10 NR	137.3' - Fractures, 30 deg, rough, undulating to stepped, open 138.1' - Fractures, <5 deg, rough, undulating,		becomes numerous with depth, black carbonaceous material especially along fracture plane common below	R21: 9 minutes
-99. <u>2</u> -			10	open 138.45' - Fractures, 30 deg, rough, stepped, open, dark brown to black stain over 60-70%		138.5', HCl reaction becoming mild with depth No Recovery 139.4-140.0'	-
_			1	of surface 138.7' - Fractures, 80 deg, rough, stepped, open 138.95' - Fractures, rough, undulating, open		Limestone 140.0-143.1' - yellowish gray mottled with light olive gray, (5Y 7/2 with N8),	-
_	R22-HQ 5 ft 100%	76	1	139.1-140.3' - Fracture zone 140.7' - Fractures, <5 deg, rough, undulating, open		 very fine grained, moderate to strong HCl reaction, weak to very weak (R2 to R1), interbedded/laminae of fine grained limestone, laminations from 	_
_			1	141.7' - Fracture, horizontal, rough, undulating, open 142.4' - Fracture, <5 deg, rough, stepped,	崮	grained limestone, farinflations from 140.0-140.8' and 141.0-141.4', voids (<1/16") concentrated in fine grained material over 25% of surface,	-
145_	145.0		5	open 143.6' - Fracture, <5 deg, smooth, undulating, tight		cavities less than <3/8", material is medium strong to strong rock (R3 to R4)	R22: 9 minutes
-104.2 - -			2	144.1-144.85' - Fractures, <5 deg, rough, undulating, open 144.9' - Fractures, vertical, rough, stepped,		143.1-145.0' - moderate olive brown, (5Y 4/4), mild HCl reaction, extremely weak (R0), friable, coarse	_
_ _	Boo Lie		4	open 145.75-145.85' - Fractures, <5 deg, rough, undulating, open		grained from 143.1-143.6 becoming fine grained with depth, voids, cavities over 70-80% from 143.6,	-
_ _	R23-HQ 5 ft 100%	62	2	146.0-146.5' - Fractures, <5 deg, rough, undulating, open 146.9' - Fractures, rough, planar, open	H	diminishing to 10-15% with depth 145.0-145.75' - light olive gray, (5Y - 5/2), very fine to fine grained, mild	-
_ _			0	147.3' - Fractures, <5 deg, rough, undulating, open 147.5-148.0' - Fractures, 75 deg, rough,		HCl reaction, very weak (R1), voids over 10-15% of surface, <5 cavities - 3/16"x3/16"	R23: 5 minutes
- 150_ -109.2	150.0		1	undulating, tight 149.3' - Fracture, 20 deg, rough, planar, open 149.9' - Fracture, vertical, rough, stepped,	Ħ	145.75-147.3' - moderate olive brown, (5Y 4/4), mild HCl reaction, — extremely weak (R0), voids are	
-			3	open 150.3-150.7' - Fractures, smooth, planar to undulating, light tan to dark staining over		70-80% of surface 147.3-150.0' - light olive gray, (5Y 5/2), very fine to fine grained, mild HCl reaction, very weak (R1), fossils	SC-8 collected at 150.7- 151.8'
- -	R24-HQ		0	20-50% surface		(casts/molds), becoming fragmented at base, friable, weak (R2) 150.0-150.3' - light olive gray, (5Y	-
_	5 ft 72%	42	3	152.2' - Fractures, horizontal, rough, undulating, open 152.3' - Fractures, <5 deg, rough, undulating, open		5/2), fine grained, mild HCl reaction, very weak (R1), voids over 10-15% of surface	-
_			NR	152.4' - Fractures, 60 deg, rough, undulating, tight 153.3' - Fracture, 0-90 deg, rough, stepped,		-	R24: 5 minutes
155	155.0			open	囯		

APPENDIX 2BB-294 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-23

SHEET 9 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 0.5	ft bgs	on 4/	/10/07 START : 4/9/2007 END : 4/	17/200	DOT LOGGER: R. McComb, C. Doug	herty
≥∩≘	(9)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH,	(%) Q	750	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	OIK	ď	╙Δ	THICKNESS, SON ACE STAINING, AND HOTTINESS	S		
-114.2			2	155.15' - Fractures, rough, undulating, open	Ш	150.3-150.7' - moderate olive brown, - (5Y 4/4), fine grained, mild HCl	_
				155.7' - Fractures, 10 deg, smooth, planar,	ш	reaction, extremely weak (R0), very	
			2	open	ш	thick laminations (wavy), voids up to 1/16" over 20-25% of surface,	
			_	155.8' - Fractures, rough, undulating 156.03' - Fractures, rough, stepped, open	Н	linear-shaped cavities up to	
	R25-HQ		- 10	156.7' - Fractures, <5 deg, rough, undulating,		1-3/16"x3/16" - Limestone	
1 7	5 ft 60%	32	>10	tight 157.0-160.0' - Fracture zone, 90-0 deg,		150.7-152.2' - yellowish gray, (5Y	1
1 1				rough, open, gravel sized fragments	Н	7/2), mottled, fine to medium grained,	1
1 1					ш	 mild HCl reaction, very weak to weak (R1 to R2), voids over 35% of 	1
			NR			surface	R25: 5 minutes
100	400.0				╁┼	 152.2-153.6' - light olive brown, (5Y 7/2), very weak (R1), voids over 	1
160 -119.2	160.0			_		25-30% of surface, cavities	-
1 -			0			 (3/16"x3/16"), some black organic material throughout 	-
-					+	No Recovery 153.6-155.0'	-
-			0		ш	Limestone	-
-	D00 110			162 Ol. Frantisco Tana reugh productionally	\vdash	155.0-155.4' - Same as 152.2-153.6' 155.4-156.0' - yellowish gray, (5Y	-
4	R26-HQ 5 ft	50	>10	162.0' - Fracture zone, rough, predominantly horizontal undulating to stepped, open		_ 7/2), very fine grained, strong HCI	_
	80%					reaction, weak to medium strong (R2 to R3), voids/cavities absent,	_
			10	163.3' - Fracture, rough, stepped, open,	Ш	laminated, weak/unbroken fracture	
			10	horizontal, fracture connecting 163.3-163.4'	ш	separated by overlying limestone	
			NR	163.4-163.65' - Fractures, <5 deg, undulating, smooth to rough		156.0-158.0' - light olive brown, (5Y 7/2), very weak (R1), voids over	R26: 7 minutes
165	165.0		INIX	163.7-163.85' - Fractures	\vdash	25-30% of surface, cavities	
-124.2			40	163.85' - Fractures, horizontal, rough, undulating, open		— (3/16"x3/16"), some black organic material throughout	
1 7			10	165.1-165.75' - Fracture zone, 0-90 deg,		No Recovery 158.0-160.0'	SC-9 collected at 165.7-
1 7				rough, undulating, open	\vdash	 Limestone 160.0-160.2' - light olive brown, (5Y 	167.0'
1 1			0		ш	7/2), very weak (R1), voids over	1
1 1	R27-HQ			167.0-168.3' - Fracture zone, 90-0 deg,	Ш	- 25-30% or surface, cavities (3/16"x3/16"), some black organic	1
1 1	5 ft 100%	26	>10	rough, undulating to stepped, open	Н	material throughout	1
	100 /0					 160.2-162.15' - yellowish gray, (5Y 7/2), mild HCl reaction, weak to 	
			>10	168.3' - Fracture zone, horizontal, smooth, undulating		medium strong (R2 to R3), voids	-
				168.7' - Fracture zone, vertical, stepped,	Ш	 <1/16" over <1% of surface, < 5 cavities (3/16"x3/16") 	R27: 9 minutes
170	470.0		4	open	口	162.15-164.0' - yellowish gray to	-
170 -129.2	1/0.0			168.85' - Fracture zone, horizontal, rough, undulating, open	丗	— dusky yellow, (5Y 7/2 to 5Y 6/4), fine	-
			3	169.1-169.65' - Fractures, horizontal, rough,	+	to very fine grained, extremely weak to medium strong (R0 to R3),	-
-				undulating, open 170.1' - Fractures, <5 deg, rough, undulating,		 laminated, void percentage from 	-
-			10	open		<1% up to 30-40%, cavities (3/8"x3/16"), primarily in upper 1.0' of	-
	Dog to			170.35' - Fractures, 10 deg, smooth, planar 170.9' - Fractures, rough, undulating, open	$oxed{\square}$	section	-
	R28-HQ 5 ft	30	10	171.3' - Fractures, rough, stepped, open	Ш	No Recovery 164.0-165.0' Limestone	
	92%			171.45' - Fractures, smooth, planar, open 172.0-172.2' - Fractures, <5-90 deg, rough,	+	_ 165.0-168.0' - yellowish gray, (5Y]
			5	undulating to stepped, open	F	7/2), fine to very fine grained, mild]
				172.25-173.0' - Fractures, horizontal,		HCl reaction, weak to very weak (R2 to R1), voids <1/16" over 10-15% of	
]			1	intersecting angles 173.2-173.8' - Fractures, rough, undulating,	$\vdash \vdash$	surface, >5 cavities 3/8"x 1/16",	R28: 7 minutes
175	175.0		NR	vertical fracture along face of core, open		fossils (mold/cast)	1



338884.FL A-23

SHEET 10 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS : 0.5	ft bgs	s on 4/	/10/07 START : 4/9/2007 END : 4/	17/20	D7 LOGGER : R. McComb, C. Doug	herty
≥∩≘	(9)			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	: RU ITH, OVEF	D (%)	TO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
URF	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ചഗ⊔ -134.2	0 1 &	Ω.	ΨФ	173.8' - Fractures, horizontal, rough,	S	168.0-170.0' - yellowish gray, (5Y	
- 104.2			1	undulating, open	F	- 7/2), very fine grained, weak (R2)	4
_				173.9' - Fractures, smooth, planar, open 174.3' - Fracture, <10 deg, smooth, planar,	世	170.0-174.0' - yellowish gray, (5Y 7/2), light olive gray mottled, fine to	-
_			>10	tight, slightly inclined	$oldsymbol{\perp}$	very fine grained, mild HCl reaction,	
_	D00 110			175.2' - Fracture, smooth, undulating, open, sand-sized grains		weak (R2), voids up to 1/16" over 10-15%, cavities (>5) 3/16"x3/16",	-
_	R29-HQ 5 ft	60	0	176.0-177.0' - Fracture zone, 0-90 deg,	世	- fossil (casts/mold) concentrated at	1
_	91%			undulating, smooth to rough, open	┢	171.6-172.0' Limestone	_
_			3	<u>-</u>		- 174.0-174.6' - yellowish gray, (5Y	_
_				178.6-178.75' - Fractures, 10 deg, smooth,	片	7/2), moderate to strong HCl	l
_			3	planar, tight 178.85' - Fractures, <5 deg, rough,	╨	reaction, weak (R2), laminated, voids (<1/16") <1% of surface becoming	R29: 9 minutes
180	180.0		NR	undulating to stepped, open	尸	more numerous, 5-10% is brown]
-139.2			2	179.25-179.35' - Fractures, horizontal, smooth, planar, open	Д	laminae becoming thicker with depth. No Recovery 174.6-175.0']
				179.45' - Fractures, rough, stepped, open 180.8' - Fractures, rough, undulating, open	厅	Limestone]
			0	180.9' - Fractures, rough, undulating, open 180.9' - Fractures, <5 deg, rough, stepped,	┢	175.0-175.3' - dusky yellow, (5Y 6/4), mild HCl reaction, extremely weak	
			Ľ	open	F	(R0), friable	
	R30-HQ 5 ft	54	1	_		175.3-176.9' - yellowish gray, (5Y 7/2), very fine grained, strong HCl	<u> </u>
	100%	01	·			reaction, medium strong (R3), voids	
			>10	182.95' - Fracture, <5 deg, rough, undulating, open	$oxed{\square}$	confined to cavity infilling 176.9-179.55' - yellowish brown to	<u> </u>
			- 10	183.0-184.0' - Fracture zone, 0-<5 deg,	皿	dusky yellow, (5Y 7/2 to 5Y 6/4),	
			>10	smooth to rough, undulating stepped, open		strong HCl reaction, weak to medium strong (R2 to R3), voids 1/16" over	R30: 9 minutes
185_	185.0		- 10		Н	5-10% of surface, cavities abundant in upper 0.5'	
-144.2			>10	185.0-186.0' - Fracture zone, gravels, vertical orientation	F	_ (1-3/16"-1-9/16'x3/8-3/4") less	
			- 10	_	Ë	frequent with depth No Recovery 179.55-180.0'	<u> </u>
			>10	186.0' - Fracture zone, 0-90 deg, rough, stepped, open		Limestone	<u> </u>
			- 10	186.1' - Fracture zone, vertical, rough,	Н	180.0-181.7' - yellowish brown to - dusky yellow, (5Y 7/2 to 5Y 6/4),	<u> </u>
	R31-HQ 5 ft	26	>10	generally stepped to undulating 186.4' - Fracture zone, horizontal, rough,		strong HCl reaction, weak to medium	<u> </u>
	100%			planar, open	口	strong (R2 to R3), voids 1/16" over 5-10% of surface, cavities (1-3/16" to	
			10	187.5' - Fracture zone, 60 deg, rough, undulating, open	ഥ	1-9/16"x3/8" to 3/4") abundant in]
				188.0-188.7' - Fracture zone, 60 deg and 70	\vdash	upper 0.5' less frequent with depth – 181.7-183.4' - yellowish gray mottled	
			3	deg, rough, undulating to stepped, open	F	with pale greenish yellow, (5Y 7/2	R31: 8 minutes
	190.0				片	with 10Y 8/2), strong HCl reaction, weak to medium strong (R2 to R3),	Stopped drilling for the day 4/11/07
-149.2			2	190.1' - Fractures, rough to smooth,	片	voids up to 1/16", ovate cavities up to	Resume drilling 4/12/07
				undulating, open 190.75' - Fractures, 10 deg, smooth, planar,	dash	3/4"-1-3/16", fossil (cast), voids 183.4-185.0' - yellowish brown to	Water level 0.5' below ground surface -
			10	open	Д	dusky yellow, (5Y 7/2 to 5Y 6/4),	ground surface
			١٥	190.85' - Fractures, <5 deg, rough, stepped, open .	口	strong HCl reaction, weak to medium strong (R2 to R3), interbeds of]
	R32-HQ 5 ft	15	>10	191.0-191.2' - Fracture zone, 60 deg, rough,	\vdash	limestone similar to 181.7-183.4']
	100%	.5	- 10	stepped, open 191.4' - Fractures, 10 deg, smooth, planar,	\vdash	185.0-186.0' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction,]
			>10	tight	片	extremely weak (R0), voids, cavities]
			- 10	191.7' - Fractures, 10 deg, smooth, undulating, open	片	(up to 3/8"-3/4"x3/8") over 50-60% of surface, fossils (mold/casts)]
			>10	192.0' - Fracture zone, 90-<5 deg, rough, stepped, open	H	·	R32: 6 minutes
195	195.0		- 10	экорреи, орен	$oxed{\mathbb{H}}$		
					1		



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-23

SHEET 11 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 0.5	ft bgs	on 4/	10/07 START : 4/9/2007 END : 4/	17/20	07 LOGGER : R. McComb, C. Doug	herty
>00	(6)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	OTH.	D (%)	FOOF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30[MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	SOR	RQI	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-154.2		_		192.25-192.4' - Fracture zone, 60 deg, rough,		186.0-188.0' - yellowish gray, (5Y	
			>10	stepped, open, horizontal 192.6' - Fracture zone, 60 deg, rough,	╁	 7/2), very fine grained, strong HCI reaction, medium strong (R3), voids 	1
				stepped, open	H	<1/16" over <1% of surface	1
			>10	192.6-195.0' - Fracture zone, various orientation from subhorizontal to very vertical,	F	 188.0-190.0' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, 	1
	R33-HQ	•	- 10	stepped to undulating, rough to smooth, open 195.0-199.5' - Fracture zone, smooth,	Ħ	extremely weak (R0), voids, cavities (up to 3/8"-3/4"x 3/8") over 50-60% of	1
	5 ft 86%	0	>10	undulating		surface, fossils (mold/casts)]
			>10		H	Limestone - 190.0-190.85' - light olive brown, (5Y	
					片	4/4), fine grained, mild HCl reaction,	
			>10 NR		L	extremely weak to very weak (R0 to R1), laminated, voids and cavities up	R33: 12 minutes
200 -159.2	200.0		INIX	200 0 201 0' Fracture 7000	╀	to 2"x3/8" (coating) >5 at 190.3-190.4' becoming smaller with	Stopped drilling HQ on
-109.2			>10	200.0-201.0' - Fracture zone	H	- depth 190.85-191.4' - light olive brown, (5Y	4/12/07 _ Resume drilling on 4/17/07
-				201.0-202.0' - Fracture zone	H	190.85-191.4" - light olive brown, (5Y 4/4), fine grained, no to mild HCl	C. Dougherty begins
-			>10	20110 20210 1 1001010 20110	拝	reaction, extremely weak (R0), voids 1/16" or less over 3-5% of surface	logging _
	R34-HQ			202.0-203.0' - Fracture zone	扛	[–] 191.4-195.0' - grayish yellow, (5Y	-
	5 ft 64%	0	>10			_ 7/2), very fine to fine grained, very weak to extremely weak (R1 to R0),	-
	0.70		0	203.0-203.2' - Fracture zone		laminated from 191.4-191.9, becoming massive-bedded with	1
						depth (gravelly) with fossil mold/casts	1
			NR			195.0-199.3' - yellowish gray, (5Y 7/2), very fine grained, moderate to	R34: 9 minutes
	205.0			_	\vdash	strong HCl reaction, very weak (R1), easily breaks along fracture plane,	
-164 <u>.2</u>			5	205.1' - Fractures, rough, undulating,	F	voids over 1-3% to absent, cavities	
				horizontal, open 205.5' - Fractures, horizontal, rough,	F	rare <5 (3/16"x3/16"), trace laminations, trace calcareous stain	_
-			7	undulating, open 205.8' - Fractures, horizontal, smooth,	Ħ	No Recovery 199.3-200.0' Limestone	-
-	R35-HQ			stepped 205.9' - Fractures, horizontal, smooth,	Ħ	 200.0-201.0' - pale olive, (10Y 6/2), 	-
-	5 ft	8	>10	stepped, black staining	Ħ	fine grained, moderate HCl reaction, medium strong (R3), 1/4" thick zones	-
-	72%		>10	206.0' - Fractures, horizontal, smooth, stepped, slight black staining	#	 with voids up to 1/16" 201.0-203.2' - light olive gray, (5Y 	-
-			- 10	206.2' - Fractures, 45 deg, rough, undulating, black staining	#	6/1), fine to medium grained,	
			NR	206.4-206.5' - Fractures, horizontal, smooth,		 moderate HCl reaction, weak (R2), 20% voids up to 1/16", collapse 	R35: 8 minutes
210	210.0			undulating, <1/16" coating of silt size particles on surface	\vdash	breccia zone from 202.0-203.2' — No Recovery 203.2-205.0'	1
-169.2			>10	206.8' - Fractures, horizontal, rough, undulating	H	Limestone]
			- 10	207.0-208.6' - Fracture zone	F	205.0-207.0' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction,]
			5	211.0' - Fractures, 20 deg, smooth, undulating	H	weak (R2), voids to 1/16"x1/16" over 25% of surface, few cavities 1"x1/4",	4
	Doc 115			211.2' - Fractures, horizontal, rough,		 poorly fossiliferous (molds/casts), 	
	R36-HQ 5 ft	40	3	undulating, brown staining, on 50% of surface	扛	voids over 3-5% of surface 207.0-208.6' - light olive gray, (5Y	4
-	90%			211.5-211.9' - Mechanical break, 35 deg, rough, undulating	仜	5/2), fine grained, mild HCl reaction, weak (R2), moderately fossiliferous	-
-			3	212.5' - Fractures, horizontal, rough,	士	molds/casts, voids over 35% of	-
-			2	undulating, fine to medium grain particles on surface	\perp	_ surface No Recovery 208.6-210.0'	R36: 8 minutes
215	215.0		NR	213.2' - Fractures, horizontal, smooth, stepped	\perp		
210	210.0						



338884.FL A-23

SHEET 12 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 0.5	ft bgs	s on 4/	10/07 START : 4/9/2007 END : 4.	17/20	D7 LOGGER: R. McComb, C. Doug	herty
≩Q⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-174.2 - - - - - -	R37-HQ 5 ft 70%	17	>10	213.6' - Fractures, horizontal, smooth, planar, thin, (1/16" silt infill) 213.8' - Fractures, horizontal, rough, undulating, silt to fine grained particles 214.1' - Mechanical break, horizontal, rough, undulating 215.0-216.0' - Fracture zone 216.9' - Fracture zone, iron staining on some surfaces 217.8' - Fracture, 45 deg, rough, undulating, brown iron staining 218.2' - Fracture, horizontal, rough,		Limestone 210.0-211.2' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, weak (R2), some iron staining on fracture planes 211.2-213.2' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, weak (R2), highly fossiliferous (molds/casts) Limestone 213.2-214.5' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction,	SC-10 collected at 217.0- 217.8'
	220.0		NR	undulating		weak (R2), some iron staining on fracture planes No Recovery 214.5-215.0'	R37: 9 minutes
-179 <u>.2</u> - -			>10	220.0-221.8' - Fracture zone, fracture zone, brown iron, staining on some partings, fractures appear to be mainly along bedding planes		 Limestone 215.0-215.7' - light olive gray, (5Y 5/2), fine to medium grained, moderate HCl reaction, weak (R2), 	-
-	R38-HQ		>10			 15% voids up to 1/16", moderately fossiliferous 215.7-216.9' - yellowish gray, (5Y 	-
_	5 ft 86%	35	2	223.3-223.0' - Mechanical break, rough, uneven		 7/2), fine grained, moderate HCI reaction, weak (R2), carbonate derived silt zone from 216.0-216.6' is laminated 	
-			>10	223.5' - Fractures, horizontal, smooth, undulating, iron staining	Ħ	216.9-217.8' - yellowish gray, (5Y 7/2), weak (R2), uneven bedding plane, laminated, black staining	R38: 6 minutes
22 <u>5</u> -184.2 -	225.0		NR >10	225.0-227.5' - Fracture zone, no fragments larger than 3" on the longest direction, about 50% of volume is fragments 1" or less		along bedding planes, <5% voids — 217.8-218.5' - yellowish gray, (5Y 7/2), weak (R2), 10% voids, fractured, poorly fossiliferous	-
-			>10	30 % Of Volume is magnificated in the issues		 No Recovery 218.5-220.0' Limestone 220.0-221.3' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak 	
-	R39-HQ 5 ft 50%	0	>10			(R2), laminated bedding some are uneven, voids over 20% of surface, iron staining on bedding plane, poorly	
-			NR			fossiliferous, fractures are along bedding plane 221.3-223.5' - light olive gray, (5Y 5/2), fine grained, mild to moderate	R39: 13 minutes
230 <u> </u>	230.0		>10	230.0-232.0' - Fracture zone, rock fragments, with some 1-3" long sections of core		HCl reaction, weak (R2), voids 1/16" — over 20% of surface, cavities 3/8"x3/4" over 5% highly fossiliferous (molds/casts)	_
-			>10			 223.5-224.3' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, weak (R2), laminated, no voids, non fossiliferous 	
- -	R40-HQ 5 ft 68%	0	>10	232.0-233.4' - Fracture zone, carbonate derived fine to medium grain particles with some rock fragments		No Recovery 224.3-225.0' Limestone 225.0-225.7' - light olive gray, (5Y	Sample pulverized below
-			NR			5/2), fine grained, moderate HCI reaction, weak (R2), fragments have voids 15% below 225.4'	232.9'
235	235.0				Ħ	-	recorded -



PROJECT NUMBER:	BORING NUMBER:				
338884 FI	Δ-23	QUEET	12	ΩE	12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

	s on 4/	<u>/10/07 </u>	/17/20	07 LOGGER : R. McComb, C. Doug	nerty
		DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LO	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
0	>10 (>10) NR	235.0-236.1' - Fracture zone, rock fragments, irregular shape, generally 2" length or less		225.7-227.5' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), voids, casts/molds, iron staining on partings, voids <5% of surface, poorly fossiliferous No Recovery 227.5-230.0' Limestone 230.0-231.9' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, weak (R2), zone of voids over 40% of surface from 230.7-231.1' Limestone	R41: 5 minutes
0	>10 >10 >10 2 NR	240.0-243.0' - Fracture zone, mostly rock fragments 240.0-243.0', with 2 pieces of core about 3" long 242.7-245.9' - Fracture zone, top and bottom are 10 to 20 degrees from horizontal, respectively 243.0-243.1' - Fractures, horizontal, smooth, undulating, carbonate derived fine grain particle on faces of fracture, bedding plane		231.9-233.4' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak (R1) No Recovery 233.4-235.0' Limestone 235.0-236.1' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, weak (R2), fragments have 10% voids, poorly fossiliferous No Recovery 236.1-240.0' Limestone 240.0-241.3' - Same as 235.0-236.1' 241.3-242.0' - yellowish gray, (5Y 7/2), fine grained, very weak (R1), poorly fossiliferous	
0	>10 >10 >0 NR	245.0-248.0' - Fracture zone, rock fragments		242.0-242.5 - Iight olive gray, (ST 5/2), fine grained, medium strong (R3), poorly fossiliferous, iron staining along bedding planes, bedding planes are uneven and undulating 242.5-243.4' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCI reaction, weak (R2), voids over 50% of surface, moderately fossiliferous (casts/molds) No Recovery 243.4-245.0' Limestone 245.0-248.0' - yellowish grey, (5Y 7/2), fine to medium grained, mild to moderate HCI reaction, very weak (R1), fractures, massive, poorly fossiliferous (casts) No Recovery 248.0-250.0' Bottom of Boring at 250.0 ft bgs on 4/17/2007	R43: 4 minutes
		Variable Variable	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS >10	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 235.0-236.1' - Fracture zone, rock fragments, irregular shape, generally 2" length or less >10 NR >10 NR 240.0-243.0' - Fracture zone, mostly rock fragments 240.0-243.0', with 2 pieces of core about 3" long >10 242.7-245.9' - Fracture zone, top and bottom are 10 to 20 degrees from horizontal, respectively 243.0-243.1' - Fractures, horizontal, smooth, undulating, carbonate derived fine grain particle on faces of fracture, bedding plane 245.0-248.0' - Fracture zone, rock fragments	DESCRIPTION Page P



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	Δ-24	SHEET	1	OF	۵	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATE	R LEVELS	: 4.0 ft b	gs on 04/2	20/07	START : 4/18/2007 END : 4/20/2007	LOGGER	: C.	Dougherty
				STANDARD	SOIL DESCRIPTION		ā	COMMENTS
ANG	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLO	ND.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BE	2	RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY	OR	BOLI	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND FI EVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERAL	OGY	SYM	INSTRUMENTATION
40.6	0.0				Poorly Graded Sand With Silt (SP-SM)	C	H	
	1	1.1	SS-1	2-2-3 (5)	0.0-1.1' - medium light gray, (N6), moist, loose, grained, no HCl reaction, 5% nonplastic fines,			_
	1.5			(0)	organics roots decreasing with depth, sand is s	ilica	111	
						_		_
						_		_
	4					_		-
	4					-		-
	4					-		-
_	-					_		-
5 35.6	5.0				Silty Sand (SM)		TIT	
	-	1.1	SS-2	2-2-2	5.0-6.1' - yellowish gray, (5Y 7/2), wet, very loog grained, no HCl reaction, 25% low to nonplastic	se, fine -		-
	6.5	1	002	(4)	trace iron nodules, trace roots, sand is silica	inles,	<u>.H.</u>	-
	0.5							-
	1					-		-
	1					_		_
]							
						_		_
	_					_		_
10 30.6	10.0				Silty Sand And Limestone (SM)		7-17-	
30.0	'- 	1.0	00.0	3-5-4	10.0-10.95' - light gray, (N7), wet, loose, very fir	ne to -		-
	+	1.0	SS-3	(9)	fine grained, moderate to strong HCl reaction, r with yellowish gray (5Y 8/1) fine to medium san	nixed d sized ∫	11:1	-
	11.5				carbonate grains, 24% fines, 30% fine to coarse gravel-sized carbonate grains, limestone fragm	e /-		-
	1				bottom of sample, sand is silica	eriis ai _		-
	1					-		-
	1					_		_
]							
						_		_
15	15.0				C:1. (11)			
25.6	'-		00.4	40-49-17	Silt (ML) 15.0-16.5' - very pale orange, (10YR 8/2), wet,	hard, -		-
	4	1.5	SS-4	(66)	rapid dilatancy, moderate HCl reaction, 5% gra- trace fine grained sand, fine grained lamination	vel,		-
	16.5				nonplastic, all carbonate	, 	Ш	-
	-					_		-
	1					-		-
	1					-		-
]					_		_
]							
20								



PROJECT NUMBER:	BORING NUMBER:	
338884 FI	Δ-24	SHEET 2 OF 0

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

		: 4.0 ft bo			START: 4/18/2007 END: 4/20/2007			Dougherty
	LLVLLO	. -1 .0 II DÇ	10 UII U4/2		SOIL DESCRIPTION	LOGGER		COMMENTS
NG€	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION			LOG	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, CO		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
PTH SFAC			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSI' CONSISTENCY, SOIL STRUCTURE, MINEF		MBO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUF			#1111	(N)	, , , , , , , , , , , , , , , , , , , ,		SYI	
20.6	20.0			00 00 10	Limestone Fragments And Silt (ML) 20.0-20.5' - dusky yellow, (5Y 6/4), fine to co	nareo —	Н	Casing set at 20' below ground surface
_		1.5	SS-5	39-20-13 (33)	grained, moderate to strong HCl reaction, ar	ngular,		
l _	21.5				\limestone fragments \tau \text{Silt (ML)}		Ш	
l _					20.5-21.5' - Same as 15.0-16.5' except mod	erate to		_
_					strong HCl reaction, 1/2" fragments of coars fine limestone gravel at 20.6' and 21.0', all c	se sand to		_
_					into inflosiono graver al 20.0 and 21.0, an o	-		_
_						=		_
_						_		_
_						-		-
25 15.6	25.0				Sandy Silt (ML)		Ш	-
			00.0	10-10-4	25.0-26.1' - yellowish gray, (5Y 7/2), wet, stit	ff, rapid -	$\ \ $	-
-		1.1	SS-6	(14)	dilatancy, moderate HCI reaction, 31% fine to grained sand, nonplastic	to medium	Ш	-
-	26.5				(9. 4			-
-						=		-
-						-		-
-						-		-
-						-		1
-						-		1
30	30.0					_		1
10.6					Silt With Sand (ML) 30.0-31.1' - Same as 25.0-26.1' except 20-2	E9/ fine to -	Ш	Drilling ends 4/18/07 Drilling resumes 4/19/07 at 07:35 hrs
		1.1	SS-7	5-6-25 (31)	coarse grained sand	.5 % IIIIe 10 -		Drilling resumes 4/13/07 at 07.55 fils
_	31.5			. ,		_		_
_						-		_
-						-		_
_						-		-
-						-		-
-						-		-
-						-		-
35 5.6	35.0	0.0	00.0	22-72/7	Silty Gravelly Sand (SM)			-
-	35.6	0.6	SS-8	(72/7")	_ 35.0-35.6' - pale yellowish brown, (10YR 6/2			
-					very dense, mild to moderate HCl reaction, to coarse grained gravel, 30% low plastic fin	nes, all	1	
-					carbonate			-
-						-	1	Driller's Remark: Organic material in cuttings
-						-	1	at about 37' below ground surface -
-						-	1	
-						-	1	1
						_		
40								_



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-24 SHEET 3 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 4.0 ft bo	gs on 04/2	20/07	START : 4/18/2007 END : 4/20/2007	LOGGER	: C.	Dougherty
				STANDARD	SOIL DESCRIPTION		G	COMMENTS
AND (#)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME LISCS CROLIB SYMBOL COLO	ND.	ССО	DEPTH OF CASING, DRILLING RATE,
H BE ATIC		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLO MOISTURE CONTENT, RELATIVE DENSITY	OR	BOLI	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERAL	LOGY	SYMBOLIC LOG	INSTRUMENTATION
0.6	40.0				Sandy Silt (ML)		Ш	
-		1.5	SS-9	20-35-34 (69)	40.0-41.5' - pale yellowish brown, (10YR 6/2), whard, rapid dilatancy, moderate HCl reaction, 2	25-30%		_
	41.5			(00)	fine to medium grained sand, low plastic, trace organics, all carbonate			
-					organico, an ourbonate			_
-						_		-
-	-					_		-
-						_		-
-	_					-		-
45	45.0					-		-
-4.4	45.0				Silty Sand (SM)		П	
-		1.5	SS-10	3-9-27 (36)	45.0-46.5 - palé yellowish brown, (10YR 6/2), v dense, moderate HCl reaction, 40% low plastic	wet, - c fines.		· -
-	46.5			(50)	fine to coarse grained sand, trace fine gravel, a carbonate	all _		-
					Carbonate			
_						_		_
-						-		_
-						_		-
-						-		-
-						-		-
50 <u> </u>	50.0				Sandy Silt (ML)		Ш	
-		1.4	SS-11	47-32-49	50.0-51.4' - light olive gray, (5Y 5/2), trace blac mottling, moist, hard, rapid dilatancy, moderate	kiron – HCI		-
-	51.5			(81)	reaction, 30% fine to medium grained sand, 50)% _		_
					coarse grained sand in last 3.6" of sample, all carbonate			
-								_
-						_		-
-						_		-
-						-		-
						-		-
55 <u> </u>	55.0 55.4	0.4	SS-12	50/5	Sandy Silt (ML)		Ш	-
-				(50/5")	55.0-55.4' - pale to moderate yellowish brown, 6/2 to 5/4), wet, hard, moderate HCl reaction, 3	(10YR /=		<u>-</u>
-	1				fine to medium grained sand, nonplastic, trace			-
-					organics in lenses <1/16", all carbonate			<u> </u>
						_		_
-						_		_
-	-					-		-
-	-					-		-
-	-					-		-
60_								



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-24	SHEET	4	OF	9	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 4.0 ft bo	gs on 04/2	20/07	START : 4/18/2007
>				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
FH BI FACE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR ON STORY OF THE CONTENT OF
DEP' SURI ELE			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
-19.4	60.0 60.7	0.4	SS-13	34-50/2 (50/2")	Silt (ML) ☐ 60.0-60.4' - moderate yellowish brown, (10YR 5/4),
l _	00.7			(30/2)	1 \ wet. hard, rapid dilatancy, moderate HCl reaction.
_					10-15% fine to medium grained sand, 1/16" layers of organic material at top 3.6" of samples, trace iron
-					nodules, has a bedded appearance, irregularly laminated, all carbonate Driller's Remark: Organics in cuttings at
-					about 62' below ground surface
-					
-					
_					1 1
65	65.0				
-24.4				10 15 10	Silty Sand (SM) 65.0-65.7' - yellowish gray, (5Y 7/2), wet, medium
-		1.1	SS-14	13-15-13 (28)	□ dense, fine to medium grained, moderate HCl
_	66.5				reaction, 40% low plastic fines, trace coarse grained sand at 65.4', all carbonate
-					Silt With Sand (ML) 65.7-66.1' - yellowish gray, (5Y 7/2), wet, hard, rapid
-					\dilatancy, moderate HCl reaction, 26% fine to medium / -
-					grained sand, low plastic fines, all carbonate
_					1 1
-					1
70	70.0	0.1	SS-15,	50/2	Limestone Fragments
-29. 4 -	70.2			(50/2")	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
_					Begin Rock Coring at 70.0 ft bgs
_					See the next sheet for the rock core log
-					
_					1 1
_					1
]
_]]
75 <u> </u>					
-34.4					
_					
-					
-					
1 -					1 1
1 -]
]]
-]]
80					
L					



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-24

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 4.0	ft bgs	s on 04	4/20/07 START : 4/18/2007 END : 4/2	20/20	D7 LOGGER : C. Dougherty					
> O :=	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,				
H BE	E RU STH, OVEF	(%) Q	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD				
SURF	COR	RQI	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.				
	70.0	_			u,	Limestone	Driller's Remark: Tools				
-			0	-	Н	 70.0-73.0' - light olive gray, (5Y 5/2), moderate HCl reaction, very weak 	were bouncing when – hammering, also chatter				
-				- 74 O 74 Cl. Fractium name reals fractions	Ħ	(R1), voids over 70% of surface from	when drilling to 70' below				
-			3	71.2-71.6' - Fracture zone, rock fragments	Ħ	- 70.5' to 73.0', organics at 72.0'	ground surface. Driller switches to rock coring at				
-	R1-HQ			71.9' - Fracture, 20 deg, rough, undulating, open, coating of carbonate derived silt		=	11:25 hrs				
-	5 ft 60%	35	1	72.6' - Fracture zone	H	-	Begin rock coring at 13:18 - hours				
-				_	Ш	No Recovery 73.0-75.0'	Split Spoon sample SS-15 actually advanced 70.0-				
			NR		Н	_	70.2'				
_			IVIX	_	\vdash	_	R1: 6 minutes				
75	75.0			_	Щ	_					
-34.4			0	-	Ш	Limestone - 75.0-76.6' - Same as 70.0-73.0'	SC-1 collected at 75.0- 75.9'				
-				75.9-76.6' - Fracture zone	ш	except cavities (2) up to 1/2" wide and 1/2" deep	-				
-			2	-	団	<u>'</u>	-				
-	R2-HQ			-	\Box	No Recovery 76.6-80.0'	-				
-	5 ft	18		-	Н	-	-				
-	32%		ND	-	\Box	<u>-</u>	-				
-			NR	-	Ħ	-	=				
-				-	Ħ	_	R2: 6 minutes				
80	80.0			-	Ħ	-	-				
-39.4	00.0			_	H	Limestone					
-			0	80.7, 80.8, 80.9, 81.4, 81.5, 81.6, 82.0, 82.3' -	H	 80.0-85.0' - light olive gray, (5Y 5/2), very fine grained, moderate HCl 	-				
			0	Mechanical break (8)	Ш	reaction, very weak (R1), voids 1/16" or less over 20-30% of surface, cavities 3/8" in diameter over 5%,					
_			U	_	Н						
_	R3-HQ 5 ft	65	0	_	\vdash	moderately fossiliferous, 1/8" organic layers at 83.2' and 84.1'					
_	100%			20.0.00.01.5	Ш	=	_				
-			>10	83.0-83.3' - Fracture zone -	П	-	-				
-				84.0-84.3' - Fracture zone	Щ	_	R3: 5 minutes				
			>10	-	団	_	-				
85 -44.4	85.0			_	\Box	Limestone	-				
-			0	-	Ш	 85.0-91.0' - Same as 80.0-85.0' except weak to medium strong (R2 to 	-				
-				-	${\mathbb H}$	R3)	-				
-			0	-	H	-					
_	R4-HQ		. , ,	-	Ħ	-					
_	5 ft 100%	83	>10	- 87.6-88.2' - Fracture zone	H		1				
		0			Щ	_	1				
					Ш	_]				
_			0		H	_	R4: 9 minutes				
90	90.0				\square						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-24	SHEET	6	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 4.0	ft bgs	s on 04	4/20/07 START : 4/18/2007 END : 4/2	20/20	07 LOGGER : C. Dougherty	
≥0.0	(9)			DISCONTINUITIES	Ö	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	(%) Q	TUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	COR	ROI	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-49.4		_					SC-2 collected at 90.0-
_			0	-	\perp	-	90.9'
-			40	90.9-91.8' - Fracture zone, rock fragments, some fragmens have partial (10%) coating of	\vdash	Limestone	-
_			>10	grayish brown (5YR 3/2) clay	H	 91.0-93.0' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, 	1
	R5-HQ 5 ft	35	1	92.1' - Joint, smooth, undulating, possible	H	medium strong to strong (R3 to R4), voids <1/16" over 20% of surface,	Driller's Remark: Lost circulation at 92'
	60%	33	'	cavity, open	F	solution cavity 1/2"x1.5"x3/4" deep at	Circulation at 92
_				_	Ħ	92.5', 1/16" wide weathered area around edges of cavity	
_			NR	-	Ħ	No Recovery 93.0-95.0'	P5: 0
-				<u>-</u>	H	-	R5: 9 minutes
95 <u> </u>	95.0			_	t	Limestone	_
-			>10	-	世	95.0-99.2' - Same as 80.0-85.0'	-
-				-	H	except trace organics at 97.6'	-
-			1	-	H	-	-
-	R6-HQ			96.8' - Joint, 60 deg, smooth, undulating, coating of carbonate derived silt, tight	H	-	-
-	5 ft 100%	57	1	97.2-98.0' - Fracture, vertical, rough,	Ш	=	-
_			0	undulating -		-	-
			U]
_			>10	_	上	_ 99.2-99.6' - medium light gray, (N6),	R6: 10 minutes
100_	100.0		. 10		上	very fine grained, moderate HCl reaction, medium strong to strong	_
-59. 4 -			>10	100.4-100.8' - Fracture zone		_ (R3 to R4)	-
-				-	\vdash	99.6-104.0' - Same as 95.0-99.2' -	-
-			>10	- 101.5-101.9' - Fracture zone	\vdash	-	-
-	R7-HQ			-	H	-	-
-	5 ft 80%	48	1	102.3' - Joint, 35 deg, rough, undulating, - black iron staining, open	Ħ	-	-
-	0070			-	Ħ	-	-
-			1	- 103.8' - Joint, horizontal, rough, undulating, -	Ħ	-	1
			NR	open]#	No Recovery 104.0-105.0'	R7: 8 minutes
	105.0		INIX		片		
-64. 4 _			2	_	H	Limestone - 105.0-108.7' - light olive gray, (5Y]
_			_	105.6, 105.9' - Fractures (2), horizontal, rough, undulating, open	片	5/2), very fine grained, weak to	- - - - - - -
-			0		H	medium strong (R2 to R3), <1/16" voids over 40% of surface,	-
-	₽8₋H∪			107.0' - Fracture or mechanical break,	H	moderately fossiliferous (cast and molds), color change to yellowish	-
-	R8-HQ - 5 ft - 74% -		>10	horizontal -	F	gray, (5Y 7/2), at 108.3' and very	-
-				107.0-107.4, 107.7-107.9' - Fracture zone (2), horizontal, coating of carbonate derived	\vdash	_ weak (R1)	
-			1	silt - 108.4' - Fracture or mechanical break,	仜	- No Recovery 108.7-110.0'	-
-			NR	horizontal, loose	口	NO_Recovery 108.7-110.0	R8: 5 minutes
110	110.0		INIX	·	仜	-	
					1		



PROJECT NUMBER:	BORING NUMBER:				
338884 FI	Δ-24	CHEET	7	ΩE	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

			<u> </u>	IENT . CIVIE 330X 3/N 340233, Hud Totally, Fig tools, Fiv		· 9	ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bg	s on 0	4/20/07 START : 4/18/2007 END : 4/	20/20	7 LOGGER : C. Dougherty	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE, OOL OP	
O P E	Z Z Z	<u></u>	FRACTURES PER FOOT	DEGORII NOIV	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH	IN TEN	(%) Q	ΞÖ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ĬĞ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무류	SCO	Ø	RAC	PLANARITY, INFILLING MATERIAL AND	ME	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
吕오리	SHR	æ	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	BROLO, TEOL REGGETO, ETC.
-69.4						Limestone	
-			0		╂—	- 110.0-114.0' - Same as 105.0-108.7'	-
l _					\vdash	_ except poorly fossiliferous	
			_		\Box		
_			0			-	SC-3 collected at 111.4-
-	D0 110				₽	=	112.4'
I _	R9-HQ 5 ft	78	0		┢	_	
	100%	70	0	112.6-112.9' - Mechanical break			
_	.0070				ш	-	-
-			2	113.3' - Joint, 20 deg, smooth, undulating,	╁	_	-
				dark staining, loose			
				113.7' - Joint, 60 deg, smooth, undulating,		114.0-115.0' - dusky yellow, (5Y	R9: 8 minutes
I			1	dark staining, loose	╂—	- 6/4), fine to very fine grained, strong	-
115	115.0			114.0, 114.9' - Mechanical break (2) 114.3' - Fracture zone or mechanical break	╂╫	HCl reaction, very weak (R1), 1/16"	_
-74.4			4	114.3 - Fracture zone or mechanical break 115.0-115.4' - Joint, 80 deg, rough,		voids over 15% of surface, poorly fossiliferous	
1 -			1	undulating, black iron staining on 25% of the	lacksquare	115.0-117.0' - Same as 110.0-114.0'	1
-				surface	₩	except <1/16" voids over 20% of	1
I -			0	115.5' - Mechanical break	+	- surface	
				116.3-116.5' - Mechanical break			
_	R10-HQ			117.0-118.1' - Fracture zone	ш	117.0-118.2' - moderate olive brown,	
-	5 ft	40	>10		+	 (5Y 4/4), moderate HCl reaction, very 	-
_	90%					weak (R1), zone of carbonate	
						derived silt at 117.0-117.4' and	
_			0		1	 117.8-118.0' 118.2-119.5' - light olive gray, (5Y 	
-				119.0-119.5' - Fracture zone	+-	5/2), moderate HCl reaction, weak	R10: 8 minutes
_			>10	119.0-119.5 - 11actule 2011e	\perp	- (R2), voids (1/16") over 20% of	10. 6 minutes
120	120.0		NR		Н	surface, larger voids (up to 3/8") over	
-79.4				_	1	5% of surface, moderately	
-			3	120.4-120.7' - Fracture zone	$-\Box$	fossiliferous (molds)	Fragments from 120.4-
_					\vdash	No Recovery 119.5-120.0'	120.4' appear to have been
				121 21 Franking 20 day amouth planer		Limestone 120.0-120.5' - Same as 118.2-119.5'	cored at two different
_			3	121.3' - Fracture, 20 deg, smooth, planar, coating of carbonate derived fine sand		120.5-123.6' - light olive gray, (5Y	angles indicating they were
-	R11-HQ			particles on face, along bedding plane	Ь.	5/2), moderate HCl reaction, weak to	loose in borehole
_	5 ft	20	1	121.5-121.8' - Fracture zone	₽	medium strong (R2 to R3), voids	
	72%	0	'	121.7' - Fracture, 20 deg, smooth, planar,		<1/16" over 30% of surface, few	
1 -			0	along bedding plane	\Box	large voids (3/8"x1"), moderately	1
-					+	fossiliferous, voids oriented parallel	-
I -						to bedding plane at about 20 degrees, large cavity (3/8"x1-3/16")]
			NR			present at 122.0', laminated bedding	R11: 6 minutes
105	105.0				1—	(1/16"-1/4") below 122.5'	1
125_ -84.4	125.0			_	+	- No Recovery 123.6-125.0'	
			1			Limestone	
			'	405 OL Frankling having the country	\vdash	125.0-127.8' - Same as 118.2-119.5'	
-				125.8' - Fracture, horizontal, rough, undulating, coating of carbonate derived silt	1 -	except zone of larger (3/4"x3/8")	1
-			1	on faces, loose		cavities from 125.8-126.3' over 30% of surface, voids (<1/16") over 25%	-
1 -				126.3' - Joint or mechanical break, horizontal,	igspace	of surface, voids (<1/16) over 25%	
	R12-HQ		0	rough, undulating	\vdash	or surface	
1 -	5 ft	38		- -	<u> </u>	-	1
1 -	56%				仜	- No Recovery 127.8-130.0'	-
Ι -					\vdash	_	l J
			NR		\vdash]
-			INIT	,		_	R12: 5 minutes
-					1	_	-
130	130.0				\vdash		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-24

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

00111110			2011 11	HENT . CIVIE 330X 3/N 340233, Mud Totally, HQ tools, HV		5	ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 0	4/20/07 START : 4/18/2007 END : 4/	20/200	7 LOGGER : C. Dougherty	
>0.7				DISCONTINUITIES	(¹)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	L'A ER'A	(%	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
±ĕ,¥	E TEN	(%) Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
PR.	S S S S	Ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	074	œ	шп		o		
-89.4			NA	130.0-130.7' - Fracture zone, mostly carbonate derived fine sand and silt size		Carbonate Derived Silty Sand (SM)	End drilling 4/19/07, 17:20
				fragments	\mathbf{H}	· 130.0-130.7' - light olive gray, (5Y	hrs - Resume drilling 4/20/07,
-				130.7-132.0' - Fracture zone, only rock	+	moderate to strong HCl reaction,	07:45 hrs
-			>10	fragments, 2"x3", breakage is mostly along	┯	staining, 25% silt	Driller's Remark: Water -
l _				bedding planes	Н	Limestone	level 4' below ground
	R13-HQ				\vdash	130.7-132.0' - light olive gray and	surface
-	5 ft	0			\Box	dusky yellow, (5Y 5/2 and 5Y 6/4),	1
-	40%				+	fine grained, mild to moderate HCl reaction, medium strong to strong	-
_			NR			(R3 to R4), gray and yellow areas	_
					ш	interbedded in 1-inch beds, grey	
					Н	areas are medium to strong (R3 to	R13: 7 minutes
105					\Box	R4) with few (1/16" or less) voids,	-
135 <u> </u>	135.0			_	╁┴╂	_ dusky yellow areas are weak (R2) with 30% voids, light olive gray	
-34.4			>10		Н	limestone increases with depth,	_
			"			bedding oriented from 0-10 degrees	
					14	No Recovery 132.0-135.0'	1
-			1	120 Cl. Inint havinantal records conductions	╆	Limestone	-
_	544416			136.6' - Joint, horizontal, rough, undulating, iron staining, open	+	135.0-137.7' - moderate olive brown, (5Y 4/4), fine grained, mild HCl	-
	R14-HQ 5 ft	57	1	non staining, open	Н	reaction, medium strong (R3),	_
	88%	31	' '	137.5' - Fracture zone or mechanical break,		moderately fossiliferous, (1/16")	
-				horizontal	╁	voids over 20% of surface, cavities	1
-			0		++	(>3/16") and fossil molds over 10%	-
_					\Box	of surface, <3/16" fragments of gray limestone included in matrix at about	 -
_			0		Н	2-3% from 136.3-137.5', 1"	R14: 11 minutes
140	140.0		NR			fragments 137.5'-137.7'.	
-99.4				_	ш	137.7-139.4' - medium gray mottled	_
-			0		+	yellowish gray, (N5, mottled 5Y 7/2), fine to very fine grained, mild HCl	-
-					\Box	reaction, medium strong (R3),	-
_			1		Н	coloration surroundings and within	_
			' '	141.5' - Joint, horizontal, rough, undulating,		cavities, highly fossiliferous (cavities	
-	R15-HQ			iron staining, coating of carbonate derived fine sands on 15% of surface	Н	and molds), few (<1/16") voids,	1
-	5 ft	70	0	line sands on 13 % of surface	╁┼┼	cavities (up to 1.5"x2.5") over 15% No Recovery 139.4-140.0'	-
-	92%				┲	Limestone	-
I _			0		╁┼┨	140.0-142.0' - Same as 137.7-139.4'	
						except yellowish gray (5Y 7/2) at	SC-4 collected at 143.5-
_			0		╨	· 140.7-142.0' 142.0-143.0' - yellowish gray, (5Y	144.6' - R15: 9 minutes
 			NR		\Box	7/2), fine grained, mild HCl reaction,	-
145 <u> </u>	145.0		INK	_	口	— medium strong to strong (R3 to R4),	
-104.4			0		┵┦	thinly laminated (crenelated in top	-
						2.4" of section), few (<1/16") voids	
_					\Box	above 142.5', 15% voids from 142.5-148.0', few voids to 3/16"	1
-			0		╁┼┼	143.0-144.6' - light olive gray to	-
-	D40110				┲	yellowish gray, (5Y 5/2 to 5Y 7/2),	-
I _	R16-HQ 5 ft	68	0		H	moderate HCl reaction, weak (R2),	
	76%	00				laminated bedding, areas of voids	
I -					147	(1/16") correspond to bedding No Recovery 144.6-145.0'] 1
-			0		╁┼┼		-
-					₽		R16: 5 minutes
-			NR		╨	-	K 10. 5 Hilliutes
150	150.0						
					17		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-24	SHEET	9	OF	9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS : 4.0) ft bas	s on 0	4/20/07 START : 4/18/2007 END : 4/2	20/20	007 LOGGER : C. Dougherty
				DISCONTINUITIES		LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS RIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-109.4 -			0	-		Limestone 145.0-145.4' - olive gray to yellowish gray, (5Y 3/2 to 5Y 7/2), fine grained,
_			0	-		mild to moderate HCl reaction, medium strong to strong (R3 to R4), very fossiliferous, voids (<1/16") over
-	R17-HQ 5 ft 100%	92	0	-		30% of surface, larger (up to SC-5 collected at 151.9-3/8"x3/8") cavities and fossil molds over 5%
-			>10	153.3-153.8' - Fracture zone, fragments 1/16" - to 1-9/16" -		145.4-145.7' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, strong (R4), few voids (<1/16") 145.7-148.8' - moderate olive brown,
155_ -114.4	155.0		0	- -		- (5Y 4/4), fine grained, mild HCl reaction, medium strong (R3), voids (<1/16") up to 50% of surface (few
-			1	- 155.7' - Fracture, rough, undulating, iron staining on <5%, open		from 146.0-146.4' and 146.8-147.5'), cavities (up to 1" in diameter) over 5% from 147.0-148.8'
-	R18-HQ		1			No Recovery 148.8'-150.0' Limestone 150.0-155.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction,
_	5 ft 90%	75	1 >10	157.6-158.2' - Fracture zone		medium strong to strong (R3 to R4), thinly laminated from 152.0-153.8', voids (<1/16") over 10% of surface
-			0	-		from 150.0-152.5', 30% voids from 152.5-154.0', trace voids (up to 3 /16") and fossil molds R18: 5 minutes
160 -119.4 - - - - - - - - - - - - - - - - - - -	160.0		NR			155.0-156.9' - Same as 145.7-148.8' 156.9-157.3' - yellowish gray, (5Y 7/2), fine to very fine grained, moderate HCI reaction, medium strong (R3), thin (1/4") bedding, few voids, abrupt change from light olive gray with voids to yellowish gray with few voids, changes back at 157.3' (bedding, <5 degree from horizontal), tight 157.3-159.5' - Same as 145.7-148.8' except weak (R2), thinly bedded (1/2"-1") friable zone from 157.6-158.2' No Recovery 159.5-160.0' Bottom of Boring at 160.0 ft bgs on 4/20/2007



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-24A	SHEET	1	OF	5	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723110.0 N, 458176.7 E (NAD83)

ELEVATION: 40.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	WATER LEVELS : 4.0 ft bgs on 04/20/07											
					SOIL DESCRIPTION		COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		STANDARD PENETRATION TEST RESULTS	COLL NAME LICCO OPOLID OVA POCI COL	SYMBOLIC LOG	DEDTILOF OACING DOULTS SATE					
H BE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	30 Lí	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION					
LEV.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	3YME	INSTRUMENTATION					
40.3				(14)		+"						
-						1	-					
-						1	Blind drill to 25'					
-						1	Install SW casing to 10'					
-						1	-					
-						1	-					
]	Water level obtained from boring A-24					
_							_					
5							_					
35.3						4	-					
-						4	-					
-						+	-					
-						+	-					
-						+	-					
-						1	-					
-						1	-					
-						1	-					
10						1	-					
30.3]	_					
]						
_						1	_					
-						1	_					
-						4	-					
-						+	-					
-						+	-					
-						+	-					
15						1	-					
25.3					·	1	_					
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						1	-					
1 -]						
1]												
1 -						1						
1 -						1	_					
-						1	-					
-						+	-					
20						+	-					
1												



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-24Δ	CHEET	2 OF 5

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723110.0 N, 458176.7 E (NAD83)

ELEVATION: 40.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	WATER LEVELS: 4.0 ft bgs on 04/20/07 START: 6/15/2007 END: 6/15/2007 LOGGER: J. Townes											
				STANDARD	SOIL DESCRIPTION		COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	INTERVAL (ft) PENETRATION TEST RESULTS		COLL NAME LICCO OPOLID OVARDOL COLLOD		DEDTILOF CACING DOULING DATE					
ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND					
EPT SURF SLEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		INSTRUMENTATION					
20.3				(14)		Ť	,					
-	1					1	-					
-						1	-					
-						1	1					
1 []						
_							_					
_						1	_					
-						4	-					
	-					+	-					
25 <u> </u>	25.0				Silt With Sand (ML)	╁	ml					
-	-	1.3	SS-1	3-5-8	25.0-26.3' - gravish orange. (10YB 7/4), moist, stiff.	1	-					
-	26.5			(13)	rapid dilatancy, mild to moderate HCl reaction, 15-20% fine to medium sand, 10% coarse sand to	#	<u> </u>					
-	20.0				fine gravel-sized limestone fragments, all carbonate		-					
						1						
]	_					
_						1	_					
-						1	-					
-						-	-					
30 <u> </u>	30.0				Silt With Sand (ML)	+						
-		0.9	SS-2	3-4-11	30.0-30.9' - Same as 25.0-26.3'	\parallel	-					
-	31.5	0.0	00 2	(15)		Ť	-					
-	01.0					1	-					
]						
_												
-						1	-					
-	-					1	-					
-	35.0					+	-					
35 5.3	35.0	0.0	SS-3	50/1	No Recovery 35.0-35.1'	丰	Install HW casing to 35'					
-	1			(50/1")	Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log	+						
-	1					1	-					
-	1					1	-					
1 -]					1						
]]												
-						1	-					
-	-					-	-					
-	-					+	-					
40						+	-					
1						1						



338884.FL A-24A

SHEET 3 OF 5

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723110.0 N, 458176.7 E (NAD83)

ELEVATION: 40.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 4.0	ft bgs	s on 0	4/20/07 START : 6/15/2007 END : 6/	15/20	07 LOGGER : J. Townes	
≥0≎	- (÷			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
ELO N (fi	N, AND 3Y (%	_	ZES T	DESCRIPTION	O'C	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BI FACE	E RU 3TH, OVEF	(%) O	FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQ	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
5.3	35.0				亡	Limestone	Begin NQ coring; first run
-	R1-NQ 1.5 ft	33	1	35.72' - Fracture, 52 deg, rough, undulating,	\vdash	 35.0-35.9' - pale reddish brown, (10R 5/4), very fine to fine grained, 	1.5 to set stroke -
_	60% 36.5		NR	minor recrystallization, 3/16" open, rock,		moderate HCl reaction, very weak	R1: Run time not recorded
	00.0		0	rubble at top of run 0.2" thick		(R1), voids up to 1/16" over 85% of surface, 10% irregular cavities (up to	SC-1 collected at 36.1 37.05'
			U		H	9/16"x3/4"), minor recrystallization, some with fossil casts/ fossil molds,	
_			1	37.85' - Fracture, 65 deg, rough, undulating,	F	moderately fossiliferous	
_			ı'	open 3/16"	Ħ	No Recovery 35.9-36.5' - 36.5-40.1' - Same as 35.0-36.5']
_	R2-NQ 5 ft	63	1	20.01 Fraction 75 day recent conducti	片	except fewer irregular cavities, 5%]
-	72%			39.0' - Fracture, 75 deg, rough, undulating, open 1/16", minor carbonate recrystallization	片	cavities, most with fossil cast/molds, cavities up to 3/16"x3/8", two larger	
40 0.3			1	39.75' - Fracture, 75 deg, rough, undulating,	H	cavities 1-3/16"x3/8", moderately fossiliferous	-
-			No	open 1/16"	Ł	- No Recovery 40.1-41.5'	R2: 2 minutes
-			NR		H	-	-
-	41.5			44.7.40.0L Frankurs (C) L	F	Limestone	
-			3	41.7-42.0' - Fracture (2), horizontal, smooth, undulating, open 3/16"	口	 41.5-43.0' - moderate yellowish brown, (10YR 5/4), fine to medium 	-
_			>10	42.45' - Fractures, horizontal, rough,		grained, mild to moderate HCl	1
-				undulating, open 3/8" 42.75-43.0' - Fracture zone	\perp	 reaction, extremely weak (R0), voids up to 1/16" over 40% of surface. a 	
-	R3-NQ				\vdash	few subangular rock (gray) clasts up	
-	5 ft 30%	8			\vdash	 to 3/16"x3/16", poorly to moderately fossiliferous casts/molds, few black 	1
45_			NR		F	organic inclusions, most 1/16"-1/8", — one inclusion 1"x3/8"	1
-4.7					F	No Recovery 43.0-46.5']
					Ħ	_	R3: 1 minute
_	46.5				H]
_			2	46.6' - Fracture, 45 deg, rough, undulating, open	片	Limestone - 46.5-48.0' - moderate yellowish	
-				46.95' - Fracture, 35 deg, rough, undulating,	世	brown, (10YR 5/4), fine to medium grained, moderate HCl reaction,	
-			3	open 3/4", minor carbonate recrystallization 47.7' - Fracture, horizontal, rough, undulating,	₽	 extremely weak (R0), some voids 	-
-	R4-NQ		2	open 1/16", tight 48.0' - Fracture, horizontal, rough, undulating,	$oldsymbol{\Box}$	with fossil mold/casts, voids up to 1/16"x1/16" covering 100% of	-
-	5 ft	15	-	open 3/8"	$oxed{\Box}$	 surface; 5% subangular, gray, rock 	
50	48%			48.35' - Fracture, horizontal, rough, undulating, open 1/16", slightly tight	圧	clasts up to 3/16"x3/16", poorly to moderately fossiliferous	
-9.7			NR	48.55' - Fracture, 50 deg, rough, undulating, —	口	— 48.0-48.9' - Same as 41.5-43.0' except very few organic inclusions	
-				open	口	No Recovery 48.9-51.5'	R4: 1 minute
	51.5				口	F	
			2		\perp	Limestone - 51.5-53.0' - moderate yellowish	1
				52.0' - Fracture, 30 deg, smooth, planar 52.35' - Fracture, horizontal, smooth, planar	上	brown, (10YR 5/4), fine to medium]
_			5	52.6' - Fracture or mechanical break,	\vdash	grained, mild to moderate HCl reaction, extremely weak (R0)]
-				horizontal, rough, undulating 52.7' - Mechanical break, horizontal, rough,	F	53.0-54.0' - Same as 51.5-53.0']
-	R5-NQ 5 ft	14	3	undulating	F	except 2% black staining	-
-	72%			52.95, 53.1' - Fractures (2), horizontal, rough, undulating	H	_	-
55			0		\vdash		
					1		
					•		•



338884.FL A-24A

SHEET 4 OF 5

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723110.0 N, 458176.7 E (NAD83)

ELEVATION: 40.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 4.0	ft bgs	s on 04	4/20/07 START : 6/15/2007 END : 6/	15/200)7 LOGGER : J. Townes	
≥o⊋	<u>(%</u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-14.7 -	56.5	ш.	NR	53.4' - Fractures, 50 deg, rough, undulating, minor carbonate recrystallization, open 1/16" 53.7' - Mechanical break 54.45' - horizontal, rough, undulating, tight		Limestone 54.0-55.1' - light brown, (5YR 6/4), fine to medium grained, mild HCl reaction, weak (R2), voids (<1/16")	R5: 3 minutes
-			3	54.95' - Fracture, <90 deg, rough, undulating 56.7' - Fractures, horizontal, rough, undulating, tight, open 1/16" 57.05' - Fractures, horizontal, rough, undulating, open 1/16" 57.4' - Fractures, horizontal, rough, undulating, open 2/2" priors block occasion.		 over 85% of surface, poorly to moderately fossiliferous, irregular voids up to 9/16" over 2% of surface No Recovery 55.1-56.5' Limestone 56.5-58.6' - moderate yellowish brown, (10Y 5/4), fine to medium 	
- 60_ -19.7	R6-NQ 5 ft 42%	27	NR	undulating, open 3/8", minor black organic laminae 57.6, 57.7, 57.8' - Fractures (3), horizontal, rough, undulating, abundant black organic laminae 58.0' - Fracture, horizontal, rough, undulating, open 3/4", small black laminae		grained, mild to moderate HCI reaction, very weak to weak (R1 to R2), voids <1/16" over 90% of surface, poorly fossiliferous. irregular cavities up to 3/16" over 10% of surface, black organic inclusions, angular, up to 3/8", black laminae	R6: 2 minutes
- - -	61.5		0			prominent from 57.8-58.7'. No Recovery 58.6-61.5' Limestone 61.5-62.0' - grayish pink, (5R 8/2), very fine to fine grained, moderate HCl reaction, weak to medium strong	
-	R7-NQ 5 ft 97%	63	2	62.8' - Fracture or bedding plane, 10 deg, rough, undulating, open 3/8" 63.15' - Fractures, horizontal, rough, undulating, open 2" 63.5' - Fractures, 5 deg, rough, undulating, open 3/8"		 (R2 to R3), voids <1/16" over 50% of surface. irregular cavities up to 2" over 10% of surface. poorly fossiliferous 62.0-64.3' - moderate reddish orange, (10R 6/6), very fine to fine 	
65 -24.7 - -	66.5		2 2 NR,	63.9' - Fractures, horizontal, rough, undulating, minor recrystallization 64.15' - Bedding plane, horizontal, rough, undulating 64.8' - Bedding plane, horizontal, rough,		grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 50% of surface, single black organic layer at 62.6', 1/16" thick; trace organics	R7: 4 minutes
- - -	R8-NQ		1 2	undulating, open 3/4" 65.1' - Fractures, rough, undulating, minor recrystallization 65.7' - Fractures, 5 deg, rough, undulating 66.1' - Fracture, horizontal, rough, undulating, open 1-3/16" 66.95' - Fracture, horizontal, rough,		above and below. 64.3-64.9' - Same as 61.5-62.0' except more cavities, up to 9/16"x9/16" over 20% of surface. 64.9-66.35' - Same as 62.0-64.3' except more voids <1/8" over 70% of surface	
70	5 ft 100%	80	1	undulating, open 3/8", minor recrystallization 67.7' - Fractures, 60 deg, rough, undulating, minor recrystallization 68.4' - Bedding plane, 5 deg, rough, undulating 69.05' - Fracture, 30 deg, rough, undulating,	- - - - - - -	No Recovery 66.35-66.5' Limestone 66.5-67.0' - moderate reddish orange, (10R 6/6), fine grained, moderate HCI reaction, very weak (R1), voids over 10% of surface,	SC-2 collected at 69.78 70.58' R8: 4 minutes
- -	71.5		2	minor recrystallization 69.3' - Fracture, horizontal, rough, undulating, open 2" 69.7' - Fracture, horizontal, rough, undulating, minor recrystallization 70.6, 71.3' - Mechanical break (2)		trace organic black material, 66.5-67.0' non fossiliferous layer 67.0-68.0' - Same as 66.5-67.0' except poorly to moderately fossiliferous. mottled and layered	
- - - -	R9-NQ 5 ft 86%	51	>10	72.2' - Fractures, horizontal, rough, undulating, minor recrystallization 72.5-72.9' - Fracture zone, rubble, minor recrystallization 73.35' - horizontal, rough, undulating, tight 73.5' - Fractures, 60 deg, rough, undulating,		areas with grayish pink limestone, weak (R2) over 5% of surface area. 68.0-68.4' - Same as 66.5-67.0' 68.4-69.3' - Same as 67.0-68.0' 69.3-70.85' - Same as 61.5-62.0' 70.85-71.5' - Same as 62.0-64.3'	
<u>75</u> _				minor recrystallization			



338884.FL A-24A

SHEET 5 OF 5

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723110.0 N, 458176.7 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ELEVATION: 40.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER LEVELS: 4.0 ft bgs on 04/20/07 START: 6/15/2007 END: 6/15/2007 LOGGER: J. Townes LITHOLOGY DISCONTINUITIES COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -34.7 Limestone 75.3-75.7' - Fracture zone, rough, irregular, 71.5-72.1' - grayish pink to moderate >10 R9: 2 minutes reddish orange, (5R 8/2 to 10R 6/6), moderate HCl reaction, weak (R2), minor recrystallization NR 76.5 poorly fossiliferous, voids over 5% of 76.5-77.0' - Fracture zone surface >10 72.1-75.8' - moderate reddish orange, (10R 6/6), moderate HCl 77.4' - Fracture zone, 20 deg, rough, reaction, amount of voids varies in undulating, minor recrystallization >10 alternating 1' thick layers, voids 78.2-78.4' - Fracture zone range from 10-90%, irregular cavities R10-NQ throughout, up to 9/16"x9/16" over 5 ft 75% 46 >10 78.9-79.1' - Fracture zone 40% of surface, poorly fossiliferous No Recovery 75.8-76.5' Limestone 80 2 76.5-80.25' - moderate reddish -39 7 80.1' - Fractures, 60 deg, rough, undulating, orange, (10R 6/6), moderate HCI two intersecting fractures R10: 2 minutes reaction, very weak (R1), voids over NR 80% of surface, irregular cavities up 81.5 to 9/16" over 20% of surface No Recovery 80.25-81.5' 1 Limestone 82.2' - Mechanical break, horizontal, rough. 81.5-86.45' - moderate reddish undulating orange, (10R 6/6), fine to medium 82.8' - Fractures, 30 deg, rough, undulating, open 3/8", organic material 2 grained, moderate HCI reaction, very weak (R1), voids <1/16" over 80% of 83.1' - Fractures, rough, undulating, surface R11-NQ surface, irregular cavities up to 3/8" 1 5 ft 44 open 1-9/16", minor recrystallization over 20% of surface, some voids and 99% 83.9-84.0' - Fracture zone, horizontal, cavities contain fossil casts/molds, undulating, organics 84.5-85.6' - Fracture zone, 3/8"-3-1/8" long trace, black organics throughout, 85 >10 fossil and organics especially 44 7 rock fragments prevalent from 83.0-84.0'. R11: 2 minutes >10 86.05' - Fracture zone, 60 deg, rough, 86.5 undulating, open 1-3/16", minor recrystallization No Recovery 86.45-86.5' NR Drilling ended at 13:00 Bottom of Boring at 86.5 ft bgs on hours; grouting completed 6/15/2007 at 17:00 hours Total depth is 86.5'



338884.FL AD-01

SHEET 1 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATED	LEVELS : 5.1	7 ft h/	ne on e	9/13/07 START : 8/23/2007 END : 9	2/7/20)7	LOGGER : R. Bitely, C. Sump, 1	Γ Rort	ton I Burkard I Townee
		r it D	45 OH (DISCONTINUITIES		Ť	LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	H		+	
HE NO	L'AN,	(9)	JRE	DESCRIPTION	┥ 흑		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,		IZE AND DEPTH OF CASING,
H H A	SE R GTF SOVE	(%) O	CT.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BOI		WEATHERING, HARDNESS,		UID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	COP	a	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	s I &		AND ROCK MASS CHARACTERISTICS	D	ROPS, TEST RESULTS, ETC.
	204.0			204.0-204.7' - Fracture zone, multiple	+	t	Limestone	Во	oring AD-1 blind drilled to
l			>10	intersecting fractures, gravel-sized fragments	+	╁	204.0-206.5' - yellowish gray, (5Y	ар	proximately 204 feet -
205_ -163.0	R1-HQ			<3" diameter 204.7, 204.9, 205.1, 205.3' - Fractures (4),		╊	7/2), very fine to medium grained, mild to moderate HCl reaction,		elow ground surface efore beginning
-103.0	2.5 ft 100%	24	4	<10, 80, <10, and <10 deg, rough,	\bot	╁	extremely weak (R0), with areas of 1"		impling/logging. –
_	10070			undulating, intersecting fractures		1	diameter weak (R2) rock, voids over		ater level is based on
l _	206.5		>10	205.9-206.5' - Fracture zone, rough, undulating, fragments <2" diameter	\perp	Ł	40% of surface, trace laminations, fossiliferous, medium strong to		round Water Monitoring LNP site (FSAR Table -
			>10	206.5-207.15' - Fracture zone, rough,		1	strong (R3 to R4) from 204.0-204.2',	2.4	4.12.08)" `
	DO LIO		4.0	undulating, multiple intersecting fractures,	1	ſ	HCl reaction 1-3 seconds	08	3/22/07 HW casing set to
_	R2-HQ 2.5 ft	0	>10	gravel-sized fragments <2" diameter 207.3, 207.4, 207.55, 207.6, 207.9, 208.15' -	\blacksquare	1	206.5-208.5' - yellowish gray, (5Y 7/2), very fine to medium grained,		04.25' below ground – orface
-	80%		>10	Fractures or mechanical break (6), <10 deg,	\perp	t	extremely weak to very weak (R0 to	08	3/23/07 Begin rock coring
1 -	0000		NR	undulating, smooth to rough, bedding planes 208.15-208.5' - Fracture zone, gravel-sized	+	ł	R1), 206.5-207.15': light olive gray (5Y 5/2), high organic content; slow,		QWL se thick mud mix with
1 -	209.0		1417	fragments <2" diameter	+	1	moderate HCl reaction, trace strong	25	50-350 rpm rotation
-			NA	209.0-209.4' - Fracture zone, rough,	-	ħ	organic odor, 207.15-208.5':	- R1	1: 4 minutes _
210_ -168.0				undulating, gravel-sized fragments <2" diameter		Н	laminated with trace organics in laminations, <10% voids over		04-204.2': Probable sluff llen to bottom of borehole
-100.0			NA	209.4-210.6' - Sandy silt interval, friable		F	surface	du	ıring sonic advancement _
l _						L	No Recovery 208.5-209.0'	R2	2: 3 minutes
	R3-HQ 5 ft	0					Limestone 209.0-209.4' - yellowish gray, (5Y		
	32%	U					7/2), very fine to fine grained,		
			NR			Γ	medium strong to strong (R3 to R4), voids <1/16" over <20% of surface,	R3	3: 6 minutes
_						r	poorly fossiliferous, trace		=
-					111	r	laminations, trace organics		3/26/07 Switch drill rigs
-	0440				-	F	Sandy Silt (ML) 209.4-210.6' - yellowish gray, (5Y		nd crew: Boart Longyear - L300T drill rig operated
-	214.0			214.0-214.7' - Fracture zone, angular	++	╁	7/2), moist to dry, hard, strong HCl		Minnesota crew.
			>10	limestone fragments 2-3"	+	╀╵	reaction, >60% low to moderate plasticity carbonate fines, <40% fine	Us	sing HW casing -
215 <u></u> -173.0				214.7-215.3' - Fracture zone, fragments <1" _ diameter	十二	₽	to medium grained carbonate sand,		eviously set. sing face discharge type
1 .7 0.0			>10	215.3-217.1' - Fracture zone, fragments	+	╁	trace H ₂ S odor	bit	t
1 -				range from 1/2" to >3" in zones	\perp	1	No Recovery 210.6-214.0' Limestone Fragments		Sump takes over
-	R4-HQ 5 ft	8	>10		\perp	1	214.0-215.3' - yellowish gray, (5Y	100	gging. -
1 _	76%	•			\Box	1	7/2), slow moderate HCl reaction,		
1			3	217.0, 217.5' - Mechanical break (2), rough,	片	1	weak (R2), 2-3" fragments from 214.0-214.7' decreasing to <1" from		
1				undulating	\vdash	ſ	214.7-215.3', voids 1/16-1/8" over		_
1 -			NR	217.8' - Fracture, horizontal, rough, undulating, possible bedding plane	\perp	1	15-25% of surface Limestone And Limestone	R4	4: 7 minutes
1 -	219.0		INIT		1	t	Fragments		=
1 -	210.0			219.0' - Fracture or mechanical break,	F	1	215.3-219' - yellowish gray, (5Y 7/2),		-
			3	horizontal, rough, undulating	#	†	fine grained, slow moderate HCl reaction, extremely weak to very		=
220 <u></u> -178.0				219.4' - Fracture, rough, stepped 219.7' - Bedding plane, horizontal, rough,	$\dashv \perp$	╁	weak (R0 to R1), finely laminated		-
1 -			2	bedding plane fracture	$-\Box$	1	(<1/16"), thin zone (217.0-217.1') of medium strong (R3) rock fragments,		=
-	DE UO			220.2, 220.5' - Fractures (2), rough, undulating, ends of single full core piece	+	╁	fine grained laminated material		=
1 -	R5-HQ 5 ft	13	>5	220.5-222.0' - Fracture zone	\Box	+	appears argillaceous		=
1 -	60%				\perp	1	No Recovery 217.8-219.0' Limestone		_
1 _					\perp	Ł	219.0-219.7' - Same as 215.3-217.8'		
1			NR		」口	1			
1			INK		\vdash	ſ		R5	5: 13 minutes
1 -	224.0				H	T			=
					1	t			
1			1 1		- 1	1		1	



PROJECT NUMBER: BORING NUMBER: 338884.FL

AD-01

SHEET 2 OF 17

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.17 ft bgs on 9/13/07 START: 8/23/2007 END: 9/7/2007 LOGGER: R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes LITHOLOGY DISCONTINUITIES COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>∪</u> MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone And Silty Sand 1 224.3' - Fracture, horizontal, rough, 219.7-222.0' - mild to moderate HCI undulating, contact with very soft sandy silt reaction, with gravel-sized limestone 225 -183.0 carbonate material fragments, very fine to fine grained 224.3-225.1' - carbonate silt with gravel sized fragments are fossiliferous (casts 0 fragments (1/4-1/2") and molds up to 1/2" diameter over 225.1-225.7' - Fracture zone, very weak 10-15% of surface), voids (1/16-1/8") R6-HQ 0 limestone fragments 1-4": full core piece over 15-20% of surface, larger 8 5 ft laminated, easily parted on bedding plane 56% fragments and full core diameter fractures zones medium strong to very strong 225.7-226.8' - Fracture zone, limestone (R3-R5), small fragments (<1") weak material with fragments (R2) NR No Recovery 222.0-224.0' R6: 10 minutes Limestone 224.0-226.8' - yellowish gray, (5Y 229.0 7/2), fine grained, mild to moderate 229.0-229.55' - Fracture zone, limestone HCl reaction, extremely weak to very NA fragments, 3/4-2", weak (R2), fine oxidation weak (R0 to R1), voids (1/16") over 230 staining on fracture surfaces <1-5% in zones, trace fossil 188.0 229.55-230.2' - Extremely weak rock casts/molds (<1%), larger fragments tend to be more competent, fractured into sand/gravel sized carbonate NA material 225.6-226.1' medium strong (R3), 229.8' - Mechanical break, horizontal, rough R7-HQ NA extremely weak (R0) zones, friable, 230.2-230.4' - Fracture zone, more 0 5 ft 48% trace bedding (laminae 1/16-1/8"), competent limestone fragments, angular, fine grained, 1/4-1" diameter recurring sequence of thin (6") more 230.4-231.4' - Extremely weak material, competent limestone beds separated NR by extremely weak very fine grained same as 229.55-230.2' silt-sized carbonate material R7: 13 minutes No Recovery 226.8-229.0' Limestone Fragments 234.0 229.0-229.2' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to 234.0-234.7' - Fracture zone, limestone NA fragments 1/2-2" in size, weak to medium moderate HCI reaction, weak (R2), 235 strong (R2-R3) 3/4"-2-1/2" fragments, fossiliferous -193.0 234.7' - Horizontal contact with silty, sandy NA with fossil molds/casts over 20% of fine gravel-sized limestone fragments surface, voids (1/16-1/8") over 15% of surface R8-HQ 229.2-229.5' - Same as 229.0-229.2' 5 ft 0 except strong (R4), thin, fine-grained bed, trace voids (1/16"), very fine NR (<1/32") black inclusions (possibly pyrite) Limestone R8: 13 minutes 229.5-229.9' - yellowish gray, (5Y 7/2), very fine to fine grained, weak 239.0 (R2), voids (1/16") over 40-50% of 239.0-239.7' - Fracture zone, limestone surface, larger cavities up to 1/2" fragments 1" to 2-1/2" diameter >10 over 5-10% 240 239.7' - Fracture, horizontal, rough, Silty Sand Sized Material (SM) 198.0 undulating, chipped fracture face 240.0, 240.4' - Mechanical break (2), 229.9-231.4' - with gravel-sized very 2 weak (R1) limestone fragments horizontal, smooth, planar similar to 224.0-226.5' R9-HQ No Recovery 231.4-234.0' 8 5 ft Limestone Fragments 36% 234.0-234.7' - yellowish gray, (5Y 7/2), fine grained, moderate to strong NR HCl reaction, weak to medium strong (R2 to R3), small voids (1/16-1/8") R9: 8 minutes over 10-15% of surface, trace small fossil molds (<3/8") 244.0



338884.FL AD-01

SHEET 3 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

00111110		10	2011 11	IENT . Diethch D-120 3/N 620, BL3001 3/N 1317, Illud II	otal y,	rig tools, rive caomig	ORIENTATION : Vertical
WATER	LEVELS: 5.1	7 ft b	gs on 9		7/2007		
200	(9)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱ႘ᅙ	Z X X	(%	J. D. C.		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T A A	RE FIGURE	(%) Q	CTI	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SOF	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ϋ́	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014			244.0-244.6' - Mechanical break, 1-2"	0,	Silt (ML)	244.0': Slightly improved
_			>10	Limestone core pieces and fragments, mostly		- 234.7-235.6' - yellowish gray and	recovery/RQD after mixing -
245				horizontal, rough, undulating fracture faces;	Ш	dark olive gray in alternating mottled	new batch of mud
-203.0				extremely weak rock	Н	bands, (5Y 7/2 and 5Y 3/2),	_
-			3	244.6, 245.1' - Bedding plane (2), horizontal, rough, undulating, fractures on intact core		moderate to strong HCl reaction, extremely weak (R0), finely	1
-	R10-HC		>10	pieces	\blacksquare	laminated, all carbonate material	-
-	5 ft	20	>10	245.2, 245.9' - Fractures or mechanical break -		- No Recovery 235.6-239.0'	-
_	50%			(2), rough, undulating, very weak rock	\vdash	Limestone	_
				245.9-246.2' - Fracture zone, 1/4-3/4"		239.0-240.8' - yellowish gray, (5Y	
-			NR	fragments (very weak) 246.2-246.5' - Fractures (2), rough,	Ш	 7/2), fine grained, strong HCl reaction, extremely weak (R0), finely 	-
-				undulating, on either end of single core piece	+	laminated (1/16-3/16"), <5% fine	R10: 8 minutes
-				of very weak (R1) limestone		black inclusions (<1/16"), 1/4" thick	-
_	249.0			_	Н	more competent bed at 239.9' (very	_
			ا م			weak -R1)	
250			3	249.4' - Fracture, 10 deg, rough, undulating 249.5' - Fracture or mechanical break, 60-70	\mathbb{H}	 No Recovery 240.8-244.0' Limestone 	1
-208.0				deg, rough, undulating	1	244.0-246.5' - yellowish gray, (5Y	
-			>10	249.6' - Fracture, horizontal, rough,	\Box	- 7/2), strong HCl reaction, very weak	250.0': Not re-circulating
-				undulating, contact with finer grained	\vdash	(R1), voids (1/16") over 10-20% of	mud -
_	R11-HQ 5 ft	24	4	limestone		surface, variable in zones, trace fossil molds (<1/2"), light olive gray	_
	58%	24	_	249.6-250.4' - Fracture zone, limestone fragments 1/2-3/4" thick up to 3" diameter	Ш	(5Y 5/2) thinly laminated zones up to	
-				250.4. 250.9' - Fractures or mechanical break	Ш	1/4" thick spaced 1-2" apart over	1
-				(2), horizontal, rough, undulating		- 244.6-245.1'	-
-			NR	251.1' - Disk-shaped discontinuity with finer	₽₩	No Recovery 246.5-249.0' Limestone	D44: 40 minutes
l _				grained limestone below, brown staining on surface		249.0-249.4' - yellowish gray, (5Y	R11: 10 minutes
	254.0			251.2, 251.35' - Bedding plane (2),	\vdash	7/2), fine grained, strong HCI	
-				horizontal, bedding plane fractures		reaction, very weak (R1), pitted	1
255			>10	251.4' - Fracture, 10 deg, rough, undulating,	╙	surface, <1/16" dark brown laminations, many with 1/2" relief	1
255 <u>-</u> 213.0				stepped, crosses bedding planes 254.0-254.7' - Fracture zone, 30% limestone	\Box	249.4-251.9' - yellowish gray, (5Y	_
			>10	fragments 1/2-3/4" in size, single 4" half core		_ 7/2), fine grained, strong HCI	_
				diameter with vertical rough undulating	\vdash	reaction, weak to medium strong (R2	
	R12-HC			fracture or mechanical break, remaining		to R3), voids (1/16") over surface variably <5-10% in thin zones, larger	
-	5 ft 96%	35	>10	fragments 1-2" diameter 255.1' - Fracture, horizontal, rough,	\vdash	cavities/fossil molds up to 1/2"	-
-	3070			undulating		variable from trace to 5%; thinly	-
-			2	255.4' - Fracture or mechanical break, -		_ bedded (1/2-3/4") at 249.6-250.4',	-
-				horizontal, rough, undulating, stepped, 1/2" 255.6-255.8' - Fracture zone, 1/2" thick		very fine grained thin beds (<2") with no voids/fossils 251.2-251.5', very	B40 0 1 1
			>10	bedding plane parting -	\vdash	fine black inclusions (<1/16") over	R12: 8 minutes
I -	259.0			255.8, 256.2' - Bedding plane (2), horizontal,	\vdash	1-2%	1
I -			NR)	smooth, bedding plane partings	Ш	No Recovery 251.9-254.0'	1
-			2	256.2-256.6' - Fracture zone, similar to -		Limestone 254.0-258.8' - yellowish gray, (5Y	-
260_				255.6-255.8' 256.9, 257.1' - Bedding plane (2), horizontal,		— 7/2), strong HCl reaction, very weak	-
-218.0			.40	rough, bedding plane partings	Н	(R1), medium density, alternating]
I			>10	257.8' - Fracture or mechanical break, 70-80		zones of very fine grained and fine grained, voids (1/16") occur in	
I -	R13-HQ			deg	$\vdash \vdash$	horizontal zones up to 25% of	1
I -	5 ft	0		in length	Ш	surface, fossil molds and casts up to	1
-	44%			259.0-259.4' - Coarse carbonate sand	Ш	- 1/2" in discrete zones 1/2-1" thick	-
-			NR	259.4-259.6' - Fractures (2), horizontal,	\vdash	No Recovery 258.8-259.0'	-
I -			' '	rough, undulating, single full-core diameter, limestone, fracture faces on both ends		_	1
				innestone, iracture races on both enus	$\vdash \vdash$		R13: 7 minutes
I -	264.0			_		_	1
I							



BORING NUMBER: PROJECT NUMBER: 338884.FL

AD-01

SHEET 4 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

0011110	, we in obju	10 2	2011 10	EINT . DIELIICH D-120 3/N 620, BL3001 3/N 1317, IIIuu	rotary,	The tools, The baoming	ORIENTATION : Vertical
WATER	LEVELS: 5.1	7 ft b	gs on 9	9/13/07 START: 8/23/2007 END: 9	<u>/7/200</u>	7 LOGGER: R. Bitely, C. Sump, T.	. Borton, J. Burkard, J. Townes
>00				DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BH	ER'A	(%	FRACTURES PER FOOT		┫ 일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YA'H VA'H	GTF GTO	(%) О	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BB	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
92,9	8.5	S O	ER.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ξ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БОШ	016	ш	шш		0)		
				259.6-261.2' - Fracture zone, limestone	\perp	Limestone - 259.0-261.2' - Same as 254.0-258.8'	264.0': Driller's Remark:
265				fragments 1/2" to 1-1/2" with 20% sand and fine gravel material	Т	except extremely weak (R0),	No loss of torque
-223.0				ine graver material	1	fractured during drilling process into	Tag bottom of hole at —
_					╀	 silty sand/gravel-sized material 	268.5'
					上	No Recovery 261.2-269.0'	Bit clear Mud pump on low (6 - 8
	R14-HQ						gallons per minute)
_	5 ft	0	NR		++	-	Sand-sized limestone
_	0%				-	-	material in previous run -
_					4	-	possible washout _
					\vdash		
						_	_
-					+-	-	-
_	269.0			000 0 000 01	+		-
			>10	269.0-269.6' - Fracture zone, limestone fragments; 1/2-2" diameter, <5% fines	\Box	Limestone Fragments - 269.0-269.8' - yellowish gray, (5Y	
270			10	(sand-sized)	\mathbf{H}		1
-228.0			>10	269.6-270.1' - Fracture zone, sandy gravel	T '''	medium gravel-sized fragments	
-			-10	sized material	+-	- range in size from 1/4-2", fragments	_
_				270.1' - Discontinuity with competent	┵	exhibit voids (1/16-1/8") over 10-25%	_
	R15-HQ			limestone, weak rock (R2)		of surface, cavities (up to 3/4") - variable from trace to 15%	
	5 ft 32%	0		270.3' - Fracture or mechanical break, horizontal, undulating, bedding plane fracture	1_	Clayey Silt (ML)	_
_	0270			270.6' - Mechanical break	++	269.8-270.0' - slow strong HCl	-
_			NR		\perp	reaction	=
					\bot	_ Limestone	
					-	270.0-270.6' - yellowish gray, (5Y	R15: 11 minutes
_	274.0				\blacksquare	7/2), fine grained, strong HCI	1
_	274.0			274.0-274.2' - Fracture zone, 3/4-1"	+	reaction, extremely weak (R0),	-
_			>10	limestone fragments		medium density, thinly bedded (1-2") with fine laminations (<1/16")	_
275				274.2, 274.5, 274.7' - Bedding plane (3),		between beds, voids (1/16") up to	
-233.0				horizontal, smooth, planar, bedding plane	Ъ	30% in discrete horizontal zones 1/2"	
_			>10	fractures	世	- thick	_
-	D46 HO			274.7-275.1' - Fracture zone, 3/4" to 1-1/2" fragments	+	No Recovery 270.6-274.0'	_
_	R16-HQ 5 ft	0	>10	275.2' - Fracture or mechanical break,	\bot	Limestone - 274.0-275.8' - yellowish gray, (5Y	_
	62%	9	10	vertical, rough, undulating		7/2), very fine grained, strong HCl	
				275.4' - Contact between fractured limestone	\perp	reaction, extremely weak to very	1
-				above and very weak limestone below	+	 weak (R0 to R1), voids (1/16") over 	
-			NR	275.6-276.2' - Fracture zone, 1/4" to 1-1/2" fragments	+	5% of surface concentrated in discrete horizontal zones (bedding	R16: 10 minutes
_			\	276.2-277.1' - Fracture zone, limestone	\bot	- plane fractures)	K 10: 10 minutes
	279.0			fragments 3-4" with sandy fine gravel sized		Limestone Fragments	1
]				pieces at end	1	275.8-276.1' - very fine grained, with	1
-			>10	279.0-280.7' - Fracture zone, 80% fragments	+	 1" thick bed of greenish gray (5G 6/1) 	-
280				3/4" to 1-1/2", few larger fragments up to 3",		limestone, very strong (R5),	_
-238.0			>10	undulating fracture surfaces	\perp	numerous cavities up to 7/8" on one side of bed (cannot determine bed	
					+	orientation)	1
-	R17-HQ				口	Limestone	
-	5 ft	0			+-	 276.1-277.1' - yellowish gray, (5Y 	-
_	34%				\perp	7/2), fine to medium grained, mild	_
			NR			HCI reaction, medium strong (R3), voids (1/16") over 15% of surface,	
_			\		1	larger cavities up to 1" over 10-15%	-
-					亡	of rock	R17: 13 minutes
-					+	_ No Recovery 277.1-279.0'	-
	284.0				\perp		
					\bot		



PROJECT NUMBER: BORING NUMBER: 338884.FL

AD-01

SHEET 5 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

break (2), horizontal, rough, undulating, soft

material; top of dark black (organic) silt clay

vertical and horizontal intersecting fractures,

301.7' - Fractures, vertical, rough, undulating, intersecting fracture set in 3-1/2" core piece

300.3' - Fracture, horizontal, with loose

301.1' - Fractures (2), rough, undulating,

301.1-301.4' - Fracture zone, gravel sized limestone fragments (1/4-3/4") with silty

material

seam (1" thick)

sandy fines

possible mechanical break

1

>10

NR

R21-HQ

5 ft

78%

304.0

29 >10

300 -258.0

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER LEVELS: 5.17 ft bgs on 9/13/07 START: 8/23/2007 END: 9/7/2007 LOGGER: R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD SYMBOLIC MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 284.0-285.65' - Fracture zone, 70% Limestone Fragments 284.0-286.5': Note core >10 fragments 1-3" in size, 30% 1/2-1" in size, 279.0-280.7' - yellowish gray, (5Y barrel plugged after coring thinly bedded (1/4" thick) smaller fragments; 7/2), fine grained, strong HCI 2.5 feet. Pulled barrel and 285 -243.0 fragments exhibit bedding plane partings reaction, very weak to weak (R1 to core, then cored second >10 R2), trace voids (1/16") over surface, 2.5 feet with clean barrel. Upper portion of second 285.65' - Fracture, 5 deg, smooth, with black fossil molds and casts over 10-15% surface of most fragments, 90% of staining 286.1' - Fracture or mechanical break, run indicates material fell R18-HQ fossil molds <3/8" in longest out of 1st run (cored twice). 22 >10 5 ft horizontal, rough, undulating 286.1-286.4' - Fracture zone, 1/2-2" dimension, few molds up to 3/4" 82% Combined cores for 5 foot fragments from 279.0-279.1' contain interval 3 fragments only trace fossils (casts and molds) 286.4' - Fractures, 45 deg, rough, undulating, and exhibit smooth bedding plane intersecting fracture set (end of full core fractures R18: combined run time: diameter limestone) No Recovery 280.7-284.0' 15 minutes NR Limestone 284.0-284.3' - yellowish gray, (5Y 286.85' - Fracture or mechanical break, 45 289.0 deg, rough, undulating 287.3' - Fracture, 45 deg, rough, undulating 7/2), fine grained, moderate HCI >10 reaction, medium strong (R3), HCI 287.7' - Fracture, 5 deg, rough, undulating, 290 soft material reaction on fresh (powdered) surface 248.0 287.9' - Fracture, horizontal, rough, Limestone Fragments >10 284.3-284.7' - yellowish gray, (5Y 7/2), fine grained, weak (R2), very undulating, stepped (1/4" relief) 289.0-289.15' - Fracture zone, fragments 3/4" R19-HQ mild HCI reaction, moderate where to 1-1/2" 7 5 ft 289.15' - Silty sand material on fracture pulverized, 5-10% voids (1/16") over 42% surface, fossil molds and casts surface of full core diameter limestone piece 289.6' - Fracture, 10 deg, undulating, very 1/4-3/4" over 25% of surface NR 284.7-285.7' - yellowish gray with light gray mottling, (5Y 7/2 and N7), fine grained, 50% fragments exhibit rough 289.7-290.1' - Fracture zone, fragments 1-3" R19: 11 minutes in size 290.15-290.4' - Fractures (2), horizontal, thin bedding plane partings (1/4-1/2" 294 0 thick), light gray clayey seam at 284.7-285.0' rough, undulating, fractures on both of ends SC-1 collected at 294.0of single core diameter limestone 1 294 91 290.4-290.7' - Fracture zone. 3/4-1" Limestone 295 285.7-288.1' - light gray, (N7), very fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), mostly weak (R2), with thin fragments with soft sandy material -253.0 290.7-291.1' - Fractures, undulating, partial >10 full core diameter limestone rock; vertical fracture surfaces intersected by 45 deg R20-HQ zones of weaker (R1) material, voids (1/16-3/16") over 10-15% of surface, fracture set >10 18 5 ft 294.95' - Fracture, 45 deg, rough, undulating 58% 294.95-296.9' - Fracture zone, 2-3" larger cavities/fossil molds up to 1/2" fragments to 296.0' then rock becomes diameter over 15-20% of surface No Recovery 288.1-289.0' extremely weak and fractures into silt, sand, NR and fine gravel sized pieces (<3/4") Limestone And Limestone R20: 8 minutes **Fragments** 289.0-291.1' - yellowish gray, (5Y 299.0 7/2), fine grained, strong HCI reaction on powdered surface, weak 299.25, 299.8' - Fractures or mechanical 2 to medium strong (R2 to R3), voids (1/16-1/8") over 15-25% of surface,

APPENDIX 2BB-318

R21: 11 minutes

Rev. 4

trace cavities/fossil molds (up to

soft material 290.4-290.7': silty,

sandy gravel-sized limestone

No Recovery 291.1-294.0'

material

1/2"), extremely weak (R0) fractured



338884.FL AD-01

SHEET 6 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

WATER	LEVELS : 5.1	7 ft b	gs on 9	9/13/07 START: 8/23/2007 END: 9/	7/200	7 LOGGER: R. Bitely, C. Sump,	Γ. Borton, J. Burkard, J. Townes
≥∩≎	(9)			DISCONTINUITIES	ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE	: RU :TH,	(%) _Q	F.O.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE ENG ECC	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΕ	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	074	ď	╙┺		S		
_			>10	301.9-302.9' - Fracture zone, silty sandy material with gravel sized (1/4-3/4")	L	Limestone And Limestone - Fragments	1
305_				limestone fragments (25%)	₽	294.0-295.2' - yellowish gray to	_
-263.0			>10	304.0-304.7' - Fracture zone, extremely weak silt-sized material	Д	grayish yellow, (5Y 7/2 to 5Y 8/4), strong HCl reaction, extremely weak	1
_				305.1, 305.2, 305.35, 305.7' - Fractures or		to very weak (R0 to R1), intact core	1
_	R22-HQ 5 ft	9	>10	mechanical break (4), horizontal, slightly rough to smooth, weak rock, possible		from 294.0-294.9': finely laminated with darker laminae (1/16" thick)	1
_	91%			bedding planes	\vdash	spaced 1/2-1" apart `	
_			2	305.7-305.9' - Fragments (1/2-1") 305.9-306.5' - Fracture zone, extremely	Ħ	Limestone Fragments 295.2-296.2' - Same as 294.0-295.2'	
				fractured zone slightly healed (intact core	H	except voids (1/16-1/8") over 5-10%	
			1	piece) 306.5-307.0' - Fracture zone, 1-3" fragments	$oxed{\bot}$	of surface, trace cavities up to 1/2"	R22: 12 minutes
	309.0		NR	307.3, 307.6, 307.9, 308.0' - Fractures (4),	口	296.2-296.9' - Same as 294.0-295.2'	
			>10	horizontal, rough, undulating, partially stepped (1/4" relief)	ഥ	except moderate HCl reaction, extremely weak (R0), fractured into]
310			/10	309.0-310.3' - Fracture zone, 3/4-3"	\vdash	silty sandy gravel-sized material 25%	1
-268.0			1	fragments	H	gravel / 75% coarse to fine-grained silt and sand-sized particles	
			'		ľ	No Recovery 296.9-299.0'	1
	R23-HQ		2	310.9, 311.2, 311.4, 312.1, 312.4, 312.6' - Fractures or mechanical break (6),	Ľ	Limestone 299.0-300.3' - yellowish gray to light	1
	5 ft 76%	22		horizontal, rough, undulating	Н	olive gray, (5Y 7/2 to 5Y 5/2),	1
			3		Ш	moderate HCl reaction, extremely weak (R0), fragments with preferred	1
			Ľ		ш	horizontal orientation (yellowish gray)	1
			NR		┰	with fine grained light olive gray matrix material, fragments up to 1" in	R23: 11 minutes
	314.0		' ' '		H	longest dimension, finely laminated	1
				314.0-316.5' - Fracture zone, 1-3" limestone	Ħ	Clay (CL) 300.3-300.5' - dark black, no HCl	1
315			>10	fragments	Ľ	reaction, finely laminated, organic	1
-273.0			40	_	₽	Limestone	1
			>10		ш	- 300.5-301.9' - yellowish gray, (5Y 7/2), fine grained, extremely weak	1
	R24-HQ		40		ፗ	(R0), dark gray/black blebs covering	1
_	5 ft 94%	20	>10	040.01 5 4 45 4 4 4 1 1 1 1 1	╁	5-10% of surface, dark brown staining on few fracture surfaces	1
-				316.8' - Fracture, 45 deg, rough, undulating 317.0' - Fracture, 50 deg, rough, undulating,	Ė	301.9-302.9' - Same as 300.5-301.9'	1
-			>10	tight	1	 except fractured into silt and gravel-sized limestone fragments 	1
-			2	317.5' - Fracture or mechanical break, horizontal, rough, undulating	世	No Recovery 302.9-304.0'	R24: 8 minutes
-	319.0		NR	317.5-317.8' - Fracture zone, silty material	╨	Limestone 304.0-307.8' - yellowish gray, (5Y	1
-	5 10.0			with gravel sized fragments (3/4") 318.1' - Fracture, 15 deg, rough, undulating	圧	7/2), fine grained, slow strong HCl reaction, extremely weak to weak	1
320			5	318.3' - Fracture or mechanical break,	仜	(R0 to R2), with dark gray blebs up to	
-278.0				horizontal, rough, undulating — 319.3, 319.4, 319.6, 319.7, 319.85' -	\vdash	1/2" in size	-
-			>10	Fractures (5), horizontal, rough, undulating,	\vdash	_ 307.8-308.55' - light olive gray, (5Y 5/2), strong HCl reaction, medium	1
-	R25-HQ			bedding plane partings 2-4" 320.2-321.8' - Fracture zone	Ħ	strong (R3), sharp contact with	
-	5 ft 82%	37	>10		Ħ	yellowish gray limestone above, finely laminated 307.8-307.9', voids	
-	02/0			321.8' - Contact with competent limestone 322.1' - Fracture, horizontal, stepped, (1/4"	╨	 1/16" over 30-40% of surface, few 	
-			2	relief)	圧	larger cavities up to 3/8" (<2%) No Recovery 308.55-309.0'	
-				322.7' - Fracture or mechanical break, horizontal, rough, undulating	仜	<u>-</u>	R25: 9 minutes
-	324 0		NR	nonzoniai, rough, anddiaing	\Box	-	
	324.0				1		†
					\perp		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

AD-01

ROCK CORE LOG

SHEET 7 OF 17

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

		ND LC	ZOIFIV	IENT : Dietrich D-120 S/N 820; BL3001 S/N 1517, mud	Olal y,	rig tools, rive casing	ORIENTATION : Vertical
WATER	LEVELS: 5.1	7 ft bo	gs on 9		7/2007	LOGGER: R. Bitely, C. Sump, T.	Borton, J. Burkard, J. Townes
≥∩≘	_			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
325 -283.0 - - - -	R26-HQ 5 ft 14%		>10 NR	324.0-324.7' - Fracture zone, 1" to 1-1/2" fragments; 324.0-324.2' thin very weak fractured silty material		Limestone 309.0-311.5' - yellowish gray, (5Y 7/2), weak (R2), very strong HCl reaction, voids (1/16-1/8") variable 10-30% of surface concentrated in zones preferentially oriented along horizontal bedding planes 311.5-312.1' - Same as 309.0-311.5' except pale yellowish brown, (10YR 6/2) 312.1-312.8' - Same as 309.0-311.5' No Recovery 312.8-314.0' Limestone 314.0-318.7' - Same as 309.0-311.5' except more fragmented, color	Driller's Remark: No loss of torque during drilling; wash out fine soft material possible
330_ -288.0	329.0		>10	329.0-329.4', 330.4-331.15', 331.7-331.95' - Silt intervals 329.6, 329.95, 330.4, 331.15, 331.5, 331.7, 331.95' - Bedding plane fractures, mechanical breaks, or silt contacts (7), <10 deg, smooth to rough		becoming pale yellowish brown (5YR 5/2) at 317.0' No Recovery 318.7-319.0' Limestone 319.0-321.8' - pale yellowish brown with zones of yellowish gray, (5Y 5/2	
- -	R27-HQ 5 ft 70%	19	>10	U		with 5Y 7/2), strong HCl reaction, very weak (R1), grading to fractured material 320.2-321.8', voids (1/16") over 25-30% of surface, trace	C. Sump and R. Bitely
- -			NR			cavities up to 3/8" 321.8-323.1' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), finely	R27: 7 minutes
]	334.0					laminated (1/16") 321.8-322.2' No Recovery 323.1-324.0'	_
335 -293.0 -			3	334.25, 334.6, 334.85, 335.15, 335.45, 335.65, 335.9, 336.25, 337.5, 338.3, 338.65' - Fractures (11), <10 deg, rough, undulating, bedding plane fractures or mechanical breaks, tight to <1/2" open		Limestone Fragments 324.0-324.2' - very light gray, (N8), fine grained, strong HCl reaction, strong to very strong (R4 to R5), voids/fossil molds (1/16-3/16") over 15-20% of surface	
- - - -	R28-HQ 5.5 ft 100%	55	1 1 2	336.5' - Mechanical break		Fractured Limestone 324.2-324.7' - yellowish gray, fine grained, very strong HCl reaction, extremely weak (R0), with fine gravel-sized limestone fragments (1/4-1/2"), dark brown organic material (<2%)	R28: 9 minutes
340 -298.0	339.5		0 >10 >5	339.9, 340.1' - Fractures (2), <10 deg, smooth, undulating, bedding plane fractures or mechanical breaks		No Recovery 324.7-329.0' Sandy Silt To Gravelly Silt (ML) 329.0-329.4' - yellowish gray, (5Y 7/2), moist, moderate to strong HCI reaction, >50% silt with <50% limestone fragments as sand to gravel-sized fraction	6" of R29 at end of R28 run; adjust R28 to 5.5' and R29 to 4.5' to accommodate
-	R29-HQ 4.5 ft l 100%		2 2	340.1-340.75' - Fracture zone, rough, undulating, gravel sized fragments <3" diameter 341.35, 341.5, 341.65, 343.65' - Fractures or mechanical break (4), <10 deg, rough, undulating, bedding plane fractures or mechanical breaks, tight to open <1/2" 342.25-342.3' and 343.15-343.45' - Clay		Limestone 329.4-330.4' - yellowish gray, (5Y 7/2), very fine to medium grained, moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), trace fossil fragments, strong organic odor	R29: 7 minutes
	344.0			seams and silt seams	\Box	.1	

APPENDIX 2BB-320 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

AD-01 SHEET 8 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud			ORIENTATION : Vertical
	LEVELS : 5.1	7 ft b	gs on 9	9/13/07 START : 8/23/2007 END : 9. DISCONTINUITIES	7/2007	7 LOGGER: R. Bitely, C. Sump, T LITHOLOGY	. Borton, J. Burkard, J. Townes COMMENTS
≷9€	(%) D				8		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
345			1	344.4, 345.25, 345.5, 345.75, 346.0, 346.5, 346.75, 348.3' - Fractures (8), 40 deg,		Sandy To Gravelly Silt (ML) - 330.4-331.15' - Same as 329.0-329.4'	Driller's Remark: 100% circulation J. Burkard and C. Sump
-303 <u>.0</u> -			4	bedding plane fractures or mechanical breaks, smooth to rough, undulating	H	Limestone 331.15-331.7' - Same as 329.4-330.4'	logging SC-3 collected at 344.4- 345.25'
-	R30-HQ 5 ft 100%	77	2		H	Sandy To Gravelly Silt (ML) 331.7-331.95' - Same as 329.0-329.4'	00/00/07 40:00
-			0			Limestone 331.95-332.5' - Same as 329.4-330.4'	08/29/07 16:30 Stop drilling AD-1 for shift. Remove core barrel for geophysical logging
-	349.0		1		Ħ	No Recovery 332.5-334.0' Limestone - 334.0-339.5' - yellowish gray, (5Y	R30: 7 minutes
350_ -308.0			2	349.6, 349.8' - Mechanical break (2), 10-30 deg, rough, undulating		7/2), very fine to medium grained, strong HCl reaction, very weak to — medium strong (R1 to R3), voids	Start drilling at the beginning of the shift
-	R31-HQ		>10	350.2-351.7' - Fracture zone, rough, undulating, multiple breaks with sharp angular fragments, no visible orientation	Ħ	 <1/16" over <30% of surface, highly variable, trace bedding plane of 30 deg, trace bedding plane 40 deg, 	
-	5 ft 94%	50	>10			trace inclusion clasts 339.5-340.05' - very light gray to yellowish gray, (N8 to 5Y 8/1), very	
_			1	352.7' - Fracture, 70-80 deg, rough, undulating, tight	Ħ	fine to medium grained, strong HCl reaction, extremely weak to weak (R0 to R2), highly variable, increasing organic laminations with	R31: 8 minutes
-	354.0		0 NR	andadang, agin	Ħ	depth to mildly to moderately competent organic lens, olive gray to	
355_ -313.0			1	354.6, 355.2, 356.0, 356.5, 357.5, 358.2, 358.7, 358.8' - Mechanical break (8),		dark gray (5Y 4/1 to N3), very fine to fine grained, extremely weak (R0), no apparent HCl reaction on organic material, mild reaction on limestone	_
-	R32-HQ		2	horizontal to 10 deg, rough to smooth, undulating	Ħ	in section, 10-20% limestone probably due to boxing, limestone same as 340.05-344.0'	
-	5 ft 100%	95	1		Ħ	340.05-344.0' - Same as 339.5-340.5' except strong HCl reaction, very weak to weak (R1 to	
-			1			 R2), trace voids <1/16" intermittent over surface, trace laminated organics, variable hardness, variable 	R32: 7 minutes
-	359.0		3			grain sizes, trace fossil structure, trace mottled coloration, silt seam at 342.25-342.3' and clay seam at	
360_ -318.0			>10	359.7, 359.8, 361.2, 361.9, 362.0, 362.5, 363.1' - Mechanical break (7), horizontal to 15 deg, rough to smooth, undulating		 343.15-343.45', carbonate derived, friable, nonplastic silts and moderately to highly plastic clays 344.0-349.0' - very light gray with 	-
-	R33-HQ 5 ft	60	2	360.3-360.7' - Horizontal bedding plane followed by a fracture zone composed of very weak (R1) rock fragments		yellowish gray mottling, (N8 and 5Y 8/1), very fine grained, moderate to strong HCl reaction, very weak to	
-	90%		4	,		medium strong (R1 to R3), trace voids <1/16" over surface, trace fossil casts, few cavities <1"x1/4"	
-			1	362.7-363.1' - Fracture, 70-80 deg, rough, undulating, trace stain		349.0-350.3' - yellowish gray, (5Y 8/1), fine grained, mild to moderate HCI reaction, weak to medium strong	R33: 7 minutes
	364.0		NR		Ħ	(R2 to R3), few cavities <1"x1/4"	

APPENDIX 2BB-321 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL

AD-01

SHEET 9 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.1	17 ft bg	gs on 9	9/13/07 START: 8/23/2007 END: 9/	7/200	DT LOGGER: R. Bitely, C. Sump, T	. Borton, J. Burkard, J. Townes
≥∩≎	(9)			DISCONTINUITIES	စ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE	TH.	(%) Q	TUR 100-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Z Č	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	¥₩	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	034	ď	E 6	THICKNESS, SURFACE STAINING, AND HIGHTINESS	Ś		
_			1		世	350.3-351.0' - yellowish gray, (5Y - 7/2), very fine grained, mild HCl	
365_				364.5, 365.0, 365.3, 365.6, 365.9, 366.3, 367.3, 367.6, 368.3' - Mechanical break (9), —	┵	reaction, very weak to weak (R1 to	
-323.0			5	horizontal to 10 deg, rough to smooth,	耳	R2), <1/16" thick laminar bedding planes	
			3	undulating 364.6-366.5' - Silt-size particle infill	Ш	351.0-351.7' - yellowish gray	
	R34-HQ		-10	304.0-300.5 - Sitt-size particle iriiii		transition to pale blue, (5Y 7/2 to 5B – 6/2), fine grained, mild to moderate	
	5 ft 98%	35	>10	366.5-367.0' - Fracture zone, angular		HCl reaction, very weak to weak (R1	Drillaria Damariu lasa af
				fragments up to 1/2"x1" in size	╁	to R2), visible casts and molds	Driller's Remark: loss of – circulation at 366.8'
_			2		\blacksquare	– 351.7-353.7' - yellow gray, (5Y 8/1), fine grained, mild HCl reaction, very	Ī
_					T	weak to weak (R1 to R2), no casts or	R34: 7 minutes
-	369.0		2		╁	_ molds No Recovery 353.7-354.0'	
-	JUB.U		NR)		厈	Limestone	
270			1	000 7 070 0 074 41 5 (2)	世	_ 354.0-358.4' - very pale orange to pale yellowish brown, (10YR 8/2 to	-
370 <u></u> -328.0				369.7, 370.3, 371.4' - Fractures (3), horizontal to 40 deg, rough to smooth,	₩	10YR 6/2), fine to medium grained,	-
-			>10	undulating, no stain, no infill	仜	_ mild to moderate delayed HCl reaction, very weak to weak (R1 to	-
_	R35-HQ			370.7-370.9' - Fracture zone, with clay size particle infill	士	R2), moderately fossiliferous (casts	-
_	5 ft	55	1	particle iriiii	+	and molds), <1/16" voids cover	-
_	96%				丰	20-50% of surface, solution cavities 1/8x1"	-
_			>10	372.4-373.4' - Fracture zone, top of zone	世	_ 358.4-359.0' - yellowish gray, (5Y	_
_				along a smooth bedding plane, bottom	oxdot	7/2), fine to very fine grained, moderate to strong delayed HCl	
_			>10	section is rough and undulating	口	reaction, weak to medium strong (R2	R35: 7 minutes
_	374.0		NR		╆	to R3), <1/16" voids covering <5% of surface	
_			>10	374.2-374.5' - Fracture zone, no visible	\vdash	359.0-361.3' - very pale orange,	T. Borton and J. Burkard logging -
375_			- 10	orientation, gravels 1/2", angular to subangular —		(10YR 8/2), very fine to fine grained, moderate HCl reaction, very weak to	
-333.0			3	375.3-376.1' - Fracture, 80 deg, rough,	Н	weak (R1 to R2), trace voids 1/16" on	
			3	undulating, 9-9/16" length visible	\vdash	surface, mildly fossiliferous (casts	
	R36-HQ			375.5, 375.7, 376.1, 377.6, 378.3' - Fractures or mechanical break (5), horizontal, rough,	Т	 and molds), 360.4' undulating bedding plane 1/4" thick, dark 	1
	5 ft 100%	67	2	undulating	\top	yellowish brown (10YR 4/2)	Ī
				376.8' - Fracture or mechanical break,	F	- 361.3-362.4' - yellowish gray, (5Y 7/2), very fine to fine grained,	1
-			1	horizontal, smooth		moderate to strong delayed HCl	1
-				,	世	 reaction, contains silt-sized particles between breaks 	R36: 5 minutes
-	379.0		1		屽	362.4-363.5' - grayish yellow, (5Y	
_	J1 J.U			270 2 270 4! Fracture Tone subangular	口	 8/4), fine to medium grained, strong HCl reaction, solution cavities 	
200			>10	379.2-379.4' - Fracture zone, subangular fragments, 1" length or less	╁	1/8"x1/2"	-
380 <u> </u>				379.9' - Fracture or mechanical break,	H	No Recovery 363.5-364.0' Limestone	-
-			>10	horizontal, smooth 380.1-380.6' - Fracture zone, subangular	廿	364.0-364.6' - very pale orange to	-
-	R37-HQ			fragments, 1" length or less, no visible	世	grayish orange, (10YR 8/2 to 10YR	-
-	5 ft	60	3	orientation between fractures	oxdot	7/4), fine to medium grained, delayed HCl reaction, very weak to weak (R1	-
-	82%			380.1' - Fracture, horizontal, rough, undulating	口	to R2), 1/16" voids cover 10-20% of	SC-4 collected at 381.7-
_			1	380.6' - Fracture, 35 deg, rough	╁	surface, few cavities 1/4"x1/2" 364.6-366.5' - dusky yellow, (5Y 6/4),	382.8' -
_				381.0' - Fracture, <5 deg, rough, undulating 381.2, 381.7' - Fractures (2), horizontal,	芹	very fine to fine grained, delayed mild	D07. 5 min::4
			NR	rough, undulating	Ľ	to strong HCl reaction, very weak to weak (R1 to R2), laminar bedding	R37: 5 minutes
	384.0			382.7' - Fracture, 50 deg, rough, undulating	上	1/8" planes throughout the section	
					1		

APPENDIX 2BB-322 Rev. 4



338884.FL AD-01

SHEET 10 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.1	7 ft b	gs on s	9/13/07 START: 8/23/2007 END: 9/	7/200	7 LOGGER : R. Bitely, C. Sump, T	. Borton, J. Burkard, J. Townes
				DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
불병은	P.H. VER	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF.	NG CO	σD	'AC'	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
S I	SC EE	Ř	RH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ς	CHARACTERISTICS	BROLO, FEOT REGUETO, ETC.
			. 40	384.0-385.0' - Fracture zone, rough,	\blacksquare	366.5-368.9' - yellowish gray, (5Y	
385			>10	undulating, no visible orientation, angular fragments up to 1" length	世	 7/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 	
-343.0					┺	to R2), highly fossiliferous (molds	
-			1	385.3' - Fracture or mechanical break, horizontal, rough, undulating, 20% of	仁	 and casts), two casts at 368.4' (bivalve crinoids, 1"), solution 	-
-	R38-HQ			fractured plane stained black	╁	cavities 1/4"x1"	-
-	5 ft	13	>10	385.8-387.7' - Fracture zone, no visible	╁┸	- No Recovery 368.9-369.0'	-
-	74%			orientation, angular fragments up to 2" in length	-Ш	Limestone 369.0-372.3' - yellowish gray to	_
-			>10	····g	+	 dusky yellow, (5Y 7/2 to 5Y 6/4), fine 	_
-					丰	to very fine grained, strong HCl	
-			NR		┸	reaction, very weak to weak (R1 to R2), moderately fossiliferous (casts	R38: 6 minutes
_	389.0				$oldsymbol{\square}$	and molds), 369.0-370.2': 1/16" voids	_
_			>10	000 41 Freshure	口	20-40% of surface, 370.2-372.3': 1/16" voids covering up to 0-10% of	_
390				389.4' - Fracture zone, no visible orientation, subangular fragments up to 1/2" length	\bot	surface	
-348.0				389.9' - Fracture or mechanical break,	T	372.3-373.8' - yellowish gray, (5Y 7/2), fine to medium grained,	
-			1	horizontal, rough, undulating 390.5' - Fracture, horizontal, smooth,	1-	moderate to strong HCl reaction,	-
-	R39-HQ			possible mechanical break	尸	very weak to weak (R1 to R2),	-
_	5 ft 90%	48	4	391.0, 391.1' - Fractures (2), horizontal,	世	 moderately fossiliferous (casts and molds), solution cavities 1/2"x1" in 	-
-	90 /0			smooth, bedding plane parting 391.5, 391.8, 392.0, 392.3, 392.4' - Fractures	╁┈	- size	-
-			3	(5), horizontal, smooth, undulating	上	No Recovery 373.8-374.0'	-
-					+	374.0-378.5' - transitions from	R39: 7 minutes
-			3	393.1, 393.2' - Fractures (2), horizontal, smooth, undulating, bedding plane parting	\bot	grayish yellow to dusky yellow, (5Y	109. 7 minutes
_	394.0		NR	393.3' - Fracture or mechanical break,	上	8/4 to 5Y 6/4), fine to medium grained, mild to moderate HCl	0.01 - f h - li d + - h
_			3	horizontal, rough, undulating 394.3, 394.4, 394.7' - Fractures (3),	╁┼	reaction, very weak to weak (R1 to	0.2' of core believed to be recovered from R39
395				horizontal, smooth, bedding plane parting _	上	R2), voids to <1/16" over 10-20% of surface, moderately fossiliferous	
-353.0			>10	395.0, 395.2' - Fractures (2), horizontal,		(casts and molds)	_
			10	rough, undulating 395.4-395.7' - Fracture zone, no visible	\vdash	378.5-379.0' - bluish white, (5B 9/1), fine grained, delayed strong HCl	_
	R40-HQ)	orientation, subangular fragments up to 1"	П	reaction, weak (R2), voids to <1/16"	
_	5 ft 100%	43	2	395.9' - Fracture, horizontal, rough 396.2' - Fracture, <5 deg, rough, undulating	\Box	over 30-50% of surface	-
-				396.6, 396.8, 397.8' - Fractures (3),	F	 379.0-380.6' - yellowish gray, (5Y 8/1), fine to medium grained, delayed 	_
-			2	horizontal, rough, undulating		moderate to strong HCl reaction,	-
-					1	 very weak to weak (R1 to R2), planar laminations, trace fossils 	R40: 7 minutes
-	200.0		3	398.4' - Fracture, horizontal to 10 deg,	ፗ	380.6-383.1' - Same as 378.5-379.0'	-
-	399.0			smooth, undulating	世	- except yellowish gray, (5Y 7/2)	-
			4	399.2, 399.4, 399.6' - Fractures (3), <10 deg, rough, undulating	+	No Recovery 383.1-384.0' Limestone	-
400 <u> </u>				399.9' - Fracture, horizontal, smooth,	+	— 384.0-385.0' - yellowish gray, (5Y	_
-			3	undulating	ᡛ	7/2), fine to medium grained, moderate HCl reaction, weak (R2),	_
_	D			400.1, 400.2' - Fractures (2), horizontal, rough, undulating, bedding parting	$oldsymbol{oldsymbol{arPsi}}$	voids to <1/16" over 20-30% of	_
-	R41-HQ 5 ft	37	2	400.6' - Fracture or mechanical break,	口	surface 385.0-386.0' - light bluish gray, (5B	_
_	74%			horizontal, rough, undulating 401.0' - Fracture or mechanical break,	_	7/1), fine grained, moderate to strong	_
_			1	horizontal, smooth, undulating		HCl reaction, weak to medium strong	_
				401.8, 402.1' - Fractures (2), horizontal,	\vdash	(R2 to R3), trace organics	
			NR	smooth, undulating	\mathbf{H}		R41: 5 minutes
_	404.0		` `		世		
_					1		

APPENDIX 2BB-323 Rev. 4



338884.FL AD-01

SHEET 11 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

00111110	NIL TITOL 7 II	10	2011 11	ILINT : DIELIICIT D-120 3/10 020, BE3001 3/10 1317, IIIuu I	otary,	The tools, The caomig	ORIENTATION : Vertical
WATER	LEVELS: 5.1	7 ft b	gs on	9/13/07 START : 8/23/2007 END : 9/	7/2007	7 LOGGER : R. Bitely, C. Sump, T	. Borton, J. Burkard, J. Townes
	_			DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOL OD	
H H H	N. A. Y.	(9	꼾는	DESCRIPTION	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A S E	H H H	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
말류렛	SUSSE	Ø	A H	PLANARITY, INFILLING MATERIAL AND	Ĭ.	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	225	ď	H 4	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	, , , , , , , , , , , , , , , , , , , ,
					\Box	386.0-387.7' - yellowish gray, (5Y	0.3' of core placed in box
-			2	404.3' - Fracture, <5 deg, rough, undulating	+	 7/2), fine to medium grained, delayed 	with R41
405_				404.9, 405.7' - Fractures or mechanical break —	╀	mild to moderate HCl reaction, weak	Mechanical break at
-363.0				(2), horizontal, smooth		(R2), layered organics, laminae - visible, voids to 1/16" over 20-30% of	bottom of 0.3' is horizontal and smooth
-			1	406.4' - Fracture, <10 deg, rough, undulating	1	surface, possible cross bedding	and smooth
-	R42-HQ			406.7' - Fracture, 20 deg, rough, undulating	+	No Recovery 387.8-389.0'	SC-5 collected at 404.75-
_	5 ft	60	2			- Limestone	405.55'
	100%			407.0' - Fracture, horizontal, smooth,		389.0-391.5' - very pale orange,	
				undulating -	Н	(10YR 8/2), fine to medium grained,	
-			3	407.2' - Fracture, horizontal, smooth	$+ \Box$	delayed mild to moderate HCI	1
_				407.7-407.9' - Fracture, horizontal, rough,		reaction, very weak (R1), voids to <1/16" over 0-10% of surface	1
			_	undulating, fine to very fine grained	\vdash	- 391.5-393.5' - yellowish gray, (5Y	R42: 10 minutes
1 -	400.0		5	408.0' - Fracture, <5 deg, rough, undulating	Н	8/1), fine to medium grained, delayed	1
-	409.0			408.3' - Fracture, 10 deg, rough, undulating 408.7' - Fracture, horizontal, rough,		mild to moderate HCl reaction, very	1
1 -			>10	undulating	₩	 weak (R1), trace surface voids 	1 4
410				408.9' - Fracture or mechanical break, <10	\Box	(<1/16"), 393.1': chert lens 0.05"	
-368.0				deg, rough, undulating, bedding plane parting		No Recovery 393.5-394.0'	
-			1	409.0' - Fracture or mechanical break, <10	ш	Limestone	1
-				deg, smooth, undulating	+	394.0-395.2' - pale greenish yellow, (10Y 8/2), fine grained, strong HCl	-
	R43-HQ	40	>10	409.3' - Fracture zone, horizontal orientation of fragments up to 1-3/16"		reaction, very weak (R1), <1/16"	
	5 ft 72%	40	- 10	409.6' - Fracture, horizontal, smooth, bedding	Ш	voids over 0-5% of surface	
-	1270			plane parting	╁┼	395.2-396.8' - Same as 394.0-395.2'	1
_			1	410.4' - Fracture or mechanical break,		 except fine to medium grained, 	-
l _				horizontal, rough, undulating		moderate to strong HCl reaction,	
			NR	411.1-411.5' - Fracture zone, no visible	\vdash	voids to <1/16" over 10-20% of surface	R43: 10 minutes
-				orientation, one fragment 2-3/8", most	1	396.8-399.8' - yellowish gray, (5Y	1
-	414.0			<1-3/16", subangular, silty clay size, fine to very fine fill	ш	- 8/1), strong HCl reaction, very weak	-
_			>10	411.9' - Fracture, horizontal, smooth,	┸	to weak (R1 to R2), voids to <1/16"	
415			10	undulating		over 20-30% of surface	
-373.0				412.5' - Fracture or mechanical break, 5 deg,	ш	— 399.8-402.7' - Same as 395.2-396.8'	
-			1	rough, undulating		except yellowish gray, (5Y 8/1), fine	-
_				414.3-414.6' - Fracture zone, no visible	144	grained, delayed strong HCl reaction No Recovery 402.7-404.0'	
	R44-HQ			orientation, fragments up to 2-3/8", subangular, silt/clay intermixed with	\vdash	Limestone	
-	5 ft 88%	18	>10	limestone fragments		404.0-407.4' - vellowish grav. (5Y	1
-	00%		\vdash	414.9-415.0' - Fracture zone, no visible	H	8/1), fine to medium grained, delayed	-
-			>10	orientation, fragments up to 5/8", subangular	╀┤	strong HCl reaction, very weak (R1),	
				415.4' - Fracture, horizontal, rough,		voids up to <1/16" over 0-5% of surface	
1 -				undulating, lithologic discontinuity	1 + 1	407.4-409.4' - yellowish gray to	R44: 8 minutes
-			NR	416.0, 416.05, 416.1, 416.2, 416.35' - Fractures (5), horizontal, rough, undulating,	╀┤	dusky yellow, (5Y 7/2 to 5Y 6/4), fine	-
-	419.0		INIC	bedding plane partings	\Box	 to medium grained, mild to moderate 	1 4
			-10	416.5' - Mechanical break	\vdash	HCl reaction, weak (R2), trace voids	
420			>10	416.8-416.9' - Fracture zone, no visible	\mathbb{H}	<1/6", fine scale laminar and planar	Driller did not note a
-378.0				orientation, fragments up to <5/8", —		bedding	change in drilling patterns —
_			>10	subangular to angular	+	409.4-410.45' - yellowish gray with undulating laminae of olive gray, (5Y	(no given reason for low
I _				417.4' - Fracture, <5 deg, rough, undulating,	H	8/1 and 5Y 4/1), fine to medium	recovery)
1	R45-HQ			trace fill 417.8-418.1' - Fracture zone, no visible		grained, mild HCl reaction, extremely	1
1 -	5 ft	17		orientation, fragments up to 1-7/8", trace fine	\Box	weak to very weak (R0 to R1), voids	1
-	42%			to very fine grained fill	₽₩	to <1/16" over 0-5% of surface,	-
I _			ND	419.0-419.9 - Fracture zone, no visible	Ш	delayed HCl reaction but strong	
I -			NR	orientation, fragments up to 2-3/8", subround,		reaction when pulverized, undulating laminations	1
I -				fine to very fine fill	111		R45: 10 minutes
-				419.9' - Fracture, 10-20 deg, smooth	団	-	-
	424.0				\Box		



338884.FL AD-01

SHEET 12 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER	LEVELS : 5.1	7 ft ha	as on 9	9/13/07 START : 8/23/2007 END : 9/	7/2007	LOGGER : R. Bitely, C. Sump, 7	. Borton, J. Burkard J. Townes
			,	DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SH.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
H H H	RUN TH., A VER.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
THE YEAR	ORE SNGT	Ω	ACT ER F	PLANARITY, INFILLING MATERIAL AND	/MB(AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	2,2,2	ď	F. F.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	,
_			>10	420.2-420.6' - Fracture zone, <10 deg at 420.2', no visible orientation elsewhere;	Н	410.45-412.6' - yellowish gray, (5Y 7/2), fine to medium grained, delayed	424.4': Man-made break
425_			- 10	fragments up to 2-3/8", mostly smaller		mild HCl reaction, very weak (R1),	
-383.0			>10	varying sizes, trace dark brown-black staining 424.7-424.9' - Fracture zone, no visible		trace voids <1/16"	_
_			- 10	orientation, subangular fragments up to	Ш	Limestone]
_	R46-HQ 5 ft	30	>10	<5/8", fine to very fine grained fill 425.3-425.5' - Fracture zone, no visible	777	414.0-414.5' - Same as 410.45-412.6'	_
_	88%	50	- 10	orientation, fragments up to 1-3/16", angular,	Ш	414.5-415.3' - yellowish gray to	
_			1	trace very fine fill 425.8-426.2' - Fracture zone, large fragments	Н	dusky yellow, (5Y 7/2 to 5Y 6/4), medium grained, mild to moderate	
_			'	up to 3", possible multiple mechanical breaks	Ш	HCI reaction, very weak (R1), voids	
_			>10	426.4-427.0' - Fracture zone, fragments up to 4", subangular to angular, multiple	Щ	to <1/16" over 10-20% of surface Silty Clay (CL-ML)	R46: 12 minutes
l _	429.0		NR	mechanical breaks during extraction	Ш	415.3-415.9' - dark greenish gray	_
I _			1	427.2' - Mechanical break 427.5' - Fracture, horizontal, smooth, bedding	Н	transition to greenish gray, (5GY 4/1 to 5GY 6/1), very fine to fine grained,	429.5' and 429.8': Man- made breaks -
430_			·	plane parting	\Box	no HCl reaction, extremely weak	
-388.0			>10	427.8-428.4 Fracture zone or mechanical break, fragments up to 3", trace dark	耳	(R0) Limestone	Only able to obtain 4.0' run due to core blockage -
_	R47-HQ 4 ft	46	- 10	gray/blue staining 429.5' - Fracture, horizontal, smooth,		415.9-418.4' - yellowish gray, (5Y	_ due to core blockage
_	100%	40	>10	undulating, bedding plane parting	Н	8/1), fine to medium grained, very weak (R1), moderate to strong HCl	_
_				430.1-430.2' - Fracture zone, no visible orientation, fragments up to 1-3/16", trace		reaction where pulverized	
_			>10	fine to very fine infill		No Recovery 418.4-419.0' Limestone	R47: 12 minutes
_	433.0			430.7' - Fracture, horizontal, smooth, undulating, bedding plane parting		419.0-419.9' - yellowish gray, (5Y	
l _			2	430.85' - Fracture, 80 deg, rough, undulating	Н	7/2), fine to medium grained, weak to medium strong (R2 to R3), strong	
l _				431.0' - Fracture, horizontal, smooth, bedding plane parting	Ш	HCl reaction when pulverized, clays	_
l _			2	431.5' - Fracture, 45 deg, rough, undulating,	Щ	are very fine to fine grained, extremely weak (R0), no HCl	_
435_				fragments of quartz up to 1/2", angular to subangular —	Ш	reaction, medium plasticity	
-393.0			1	431.9-433.0' - Fracture zone, no visible	H	Limestone 419.9-421.1' - yellowish gray to light	SC-6 collected at 435.3- 436.2' -
_	R48-HQ 6 ft	56		orientation, fragments up to 2", angular, trace fine to very fine fill	H	olive gray, (5Y 7/2 to 5Y 5/2), fine	_
_	100%		3	433.4, 433.6' - Fractures or mechanical break	Ħ	grained, slightly delayed strong HCl reaction, weak to medium strong (R2	_
_				(2), horizontal, bedding plane parting, trace black staining	H	to R3), <1/16" voids on 10-20% of	
_			>10	434.0' - Fracture, horizontal, smooth,	₽₩	surface No Recovery 421.1-424.0'	
_				undulating 434.5' - Fracture or mechanical break, <10	Ш	Limestone	
_			2	deg, smooth	Ш	424.0-424.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to	R48: 20 minutes
_	439.0			435.1-435.5' - Fracture or mechanical break, 45-50 deg, rough, stepped		medium grained, moderate HCl reaction, weak to medium strong (R2	
_			>10	436.3' - Fracture, horizontal, smooth, trace fill		Ito R3), voids <1/16" on surface III III III III III III III	
440_				rough, undulating, large solid fragment —	出	10-20% Clayey Gravel (limestone	
-398.0			. 40	1-3/16" in between 437.1-437.6' - Fracture zone, no visible	Н	- Fragments) (GC)	_
-			>10	orientation, fragments up to 2-3/8", angular to	口	424.7-425.55' - yellowish gray, (5Y 8/1), moderate to mild HCl reaction,	
-	R49-HQ 5 ft	0		subangular, trace amounts of very fine fill 437.6-438.1' - Fracture, 80 deg, rough,	Ш	extremely weak (R0), fine to medium	_
-	46%			undulating .	Ш	grained limestone gravels, <1/2"	_
_			ND	438.1' - Fracture, horizontal, smooth, bedding plane parting	H	Limestone 425.55-426.2' - yellowish gray, (5Y	_
l -			NR	438.4' - Fracture or mechanical break, 40	口	8/1), fine grained, very weak (R1),	D40: 40
_				deg, rough, undulating	H	strong HCl reaction where pulverized	R49: 10 minutes
	444.0				H	.11	



338884.FL AD-01

SHEET 13 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.1	17 ft bg	gs on 9	9/13/07 START: 8/23/2007 END: 9/	7/200	DO7 LOGGER: R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes
>00	(9)			DISCONTINUITIES	ß	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	038	х	>10	439.0-439.6' - Fracture zone, no visible orientation, weak fragments <1/2", angular to subangular 439.6' - Bedding plane, horizontal	S	Clayey Gravel (limestone Fragments) (GC) 426.2-426.4' - Same as 424.7-425.55' except slightly delayed
- - -	R50-HQ 5 ft 94%	53	2 2	439.8' - Fracture, <5 deg, clay and gravels <1/2" fill 440.0-441.3' - Fracture zone, no visible orientation, fragments up to 2", mostly <1", subangular, possibly fine grained fill 444.0-444.8' - Fracture zone, fragments up to 1-3/16"', subround, including quartz		strong HCl reaction, clay, low to medium plasticity Limestone 426.4-428.4' - Same as 425.55-426.2' except very fine to fine grained, slightly delayed moderate to strong HCl reaction, medium strong
- - -	449.0		1 NR 3	fragments 444.8' - Fracture, horizontal 445.6, 445.9' - Fractures or mechanical break (2), horizontal, rough, undulating 446.6, 446.8' - Fractures or mechanical break, 10-20 deg, rough, undulating,		to strong (R3 to R4), laminations No Recovery 428.4-429.0' Limestone 429.0-430.2' - alternating yellowish gray and very light gray, (5Y 8/1 and N8), fine grained, delayed mild HCI
450 <u>-</u> -408.0 - -	R51-HQ 5 ft	13	>10	fractures same direction 447.5, 447.7' - Fractures, 10-20 deg, fractures angled in opposite directions: 447.5' angled toward ground surface, 447.7' angled away from horizontal 448.3' - Fracture, horizontal, smooth,		reaction, very weak to weak (R1 to R2), laminar planar bedding with some variation 430.2-430.7' - yellowish gray, (5Y 8/1), very fine to fine grained, delayed mild HCl reaction, medium
- - -	44%	2	NR	undulating 449.3' - Fracture, horizontal, smooth, undulating, bedding plane parting 449.7' - Fracture, 30-40 deg, rough, undulating 449.7-450.0' - Fracture or mechanical break, >80 deg, rough, undulating		strong to strong (R3 to R4), trace voids <1/16" Clay (CL) 430.7-431.0' - dark greenish gray, (5G 4/1), very fine grained, low to medium plasticity, no HCl reaction,
- 455_ -413.0	454.0		>10	450.0-450.9' - Fracture zone, fragments up to 2-3/8", angular to subangular, trace black staining 454.0-454.3' - Fracture zone, no visible orientation, fragments up to 1-3/4".		extremely weak (R0) Limestone 431.0-431.5' - yellowish gray, (5Y 7/2), fine to medium grained, extremely weak (R0)
	R52-HQ 5 ft 86%	0	>10	subangular 454.3-454.9' - Fracture, rough, gradually undulating 454.6, 454.8' - Fractures or mechanical break (2), horizontal to <10 deg		431.5-431.9' - Same as 429.0-430.2' except yellowish gray, (5Y 7/2), weak to medium strong (R2 to R3), laminations Clayey Gravel (limestone
- -	450.0		>10 NR	454.9' - Fracture, 45 deg, rough, undulating 455.2, 455.3' - Fractures or mechanical break (2), horizontal to <10 deg, rough, undulating, large angular gravels, 1-3/4" 455.7-456.9' - Fracture zone, no visible		Fragments) (GC) 431.9-433.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), very fine to fine grained gravel, low to medium
-460_ -418.0	459.0 R53-HQ 2 ft 95%	0	>10	orientation, fragments up to 4", mostly <1-3/16", including quartz - no HCl reaction 457.0' - Fracture, 20-30 deg, rough, undulating 457.3-457.5' - Fracture zone, fragments <1-3/16", including quartz		plasticity clay Limestone 433.0-436.2' - light olive gray, (5Y 5/2), fine to medium grained, weak to medium strong (R2 to R3), strong HCI reaction when pulverized,
- - -	461.0 R54-HQ 3 ft	39	NR) 2 >10	457.9-458.3' - Fracture zone, angular fragments up to 2-3/8", horizontal bedding plane at 457.9' 459.1-460.4' - Fracture zone, no visible orientation, fragments up to 2-3/8", subangular, including quartz		undulating lamination 436.2-437.5' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), yoids <1/16" over 20% of surface
-	100%		2	460.7' - Fracture, <10 deg, rough, undulating, fragments of quartz infill 461.1' - Fracture or mechanical break, horizontal, rough, undulating		R54: 10 minutes



338884.FL AD-01

SHEET 14 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.17 ft bgs on 9/13/07 START: 8/23/2007 END: 9/7/2007 LOGGER: R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>∪</u> MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 461.9' - Mechanical break, horizontal, rough, 437.5-438.0' - dark greenish gray >10 undulating with dusky yellow, yellowish gray, very light gray, (N8 with 5Y 6/4, 5GY 8/1, 5Y 4/1), very fine to fine grained, 465 462.2' - Fracture, horizontal, smooth, bedding plane parting 462.7-463.15' - Fracture zone: at 462.7', -423<u>.0</u> very strong delayed HCl reaction, strong (R4), trace chert layers 438.0-439.0' - yellowish gray, (5Y 7/2), moderate to strong delayed HCl 1 20-30 deg; at 463.15', 20-30 deg (opposite directions), elsewhere no visible orientation. R55: 15 minutes R55-HQ fragments up to 1-3/4", angular to subangular 17 >10 5 ft 463.4' - Fracture, horizontal, rough, reaction, strong (R4), <1/16" voids over <5% of surface, trace organics 82% undulating, bedding plane parting Milky white quartz found on (peat or coal) >10 463.7' - Fracture, horizontal, rough, table after core was boxed; undulating possibly from fracture Coal 464.3-465.0' - Fracture zone, no visible 439.0-439.5' - black, (N1), very fine to fine grained, extremely weak (R0), zone, not found orientation, angular fragments up to 1-13/16" somewhere in run (after NR 465.3' - Fracture, horizontal, rough, 469.0 trace amounts of limestone boxed) fragments: dusky yellow (5Y 6/4), 465.7-466.8' - Fracture zone, (465.7-466.1': >10 fine to medium grained, mild HCl fine to medium infill with limestone reaction, trace calcite crystals to 1/8" 470 fragments); fragments up to 1-3/4", black 428.0 Limestone Fragments staining, mostly infill at 466.6-466.8' 467.4-467.9' - Fracture zone, rough, undulating, horizontal at 467.4', no visible 4 439.5-441.3' - moderate olive brown. (5Y 4/4), fine to medium grained, extremely weak (R0), fine grains SC-7 collected at 470.85 to R56-H0 orientation elsewhere, fragments up to 0 have strong HCI reaction, gravels 42 5 ft 90% 472 05 2-1/16", angular to subangular, similar infill to have moderate HCl reaction, 20-30% 465.7-466.8', fine to medium grained, <10% voids on gravel, some weak (R1) black staining gravel >10 469.0-470.0' - Fracture zone, rough, No Recovery 441.3-444.0' undulating, fragments to 2-3/8", horizontal plane at 470.0'; possible bedding plane Limestone R56: 10 minutes 444.0-447.4' - yellowish gray, (5Y NR 7/2), fine to medium grained, very 474.0 . 470.6, 470.7, 470.75, 470.85' - Fractures (4), weak to weak (R1 to R2), strong HCl horizontal, rough, undulating 1 reaction where pulverized, voids to 472.0, 472.3' - Fractures or mechanical break 475 <1/16" over <5% of surface (2), 20 deg, rough, undulating, opposite -433<u>.0</u> Limestone directions 3 447.4-448.7' - grayish orange, (10YR 472.6' - Fracture, horizontal, rough, 7/4), fine grained, medium strong undulating (R3), strong HCl reaction where R57-HQ 472.6-473.3' - Fracture zone, no visible 3 5 ft 65 pulverized orientation, fragments up to 4", mostly 100% No Recovery 448.7-449.0' <2-3/8" Limestone 474.3-474.5' - Fracture, horizontal to <10 449.0-450.0' - yellowish gray with 1 deg, open with fragment 2-3/8" light gray laminations, (5Y 8/1 and 475.0' - Fracture or mechanical break, N7), fine to medium grained, mild to R57: 13 minutes horizontal to <10 deg, rough, undulating 475.3' - Fracture, 20-30 deg, rough, with moderate HCI reaction, alternating 3 very weak (R1) and weak (R2) 479.0 fragment 1-3/16", subangular 475.9' - Fracture or mechanical break, Limestone Fragments 450.0-451.2' - transition from >10 horizontal, rough, undulating, bedding plane yellowish gray to moderate yellowish brown, (5Y 7/2 to 10YR 5/4), fine to medium grained, moderate to strong 480 -438.0 476.3, 476.4' - Fractures (2), horizontal to >10 <10 deg, rough, undulating 476.5' - Fracture, 40-50 deg, rough, HCl reaction, medium strong (R3) in yellowish gray fragments, strong (R4) R58-HQ undulating, with large fragments 22 >10 in moderate yellowish brown gravels 5 ft 477.4' - Fracture or mechanical break, 10-20 96% No Recovery 451.2-454.0' deg, rough, undulating 478.2, 478.5' - Fractures or mechanical break 1 (2), <10 deg, rough, undulating, black staining 478.8' - Mechanical break, horizontal, rough, R58: 10 minutes 2 undulating 484.0



BORING NUMBER: PROJECT NUMBER: 338884.FL

AD-01

SHEET 15 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.1	7 ft bo	gs on s	9/13/07 START: 8/23/2007 END: 9/	7/200	7	LOGGER: R. Bitely, C. Sump,	Т.	Borton, J. Burkard, J. Townes
300	·			DISCONTINUITIES	ני		LITHOLOGY		COMMENTS
AND Z	, N. Y. (%)		S	DESCRIPTION	- 69	Г	ROCK TYPE, COLOR,		
ᆲ핑	RH, A	D (%)	URE	DEDTH TYPE OPIENTATION POLICINISOS	SYMBOLIC		MINERALOGY, TEXTURE,		SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	Set) D (ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	ABC		WEATHERING, HARDNESS, AND ROCK MASS		SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQ	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI		CHARACTERISTICS		DROPS, TEST RESULTS, ETC.
			NR)	478.9' - Fracture or mechanical break, 40-50	T	T	Limestone		
485			>10	deg, rough, undulating 479.4-479.7' - Fracture zone, horizontal at	╁	t	454.0-456.8' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine		_
-443.0				479.4-479.7 - Fracture Zone, nonzontal at 479.7', no visible orientation elsewhere,	Ħ	Ͱ	to medium grained, strong HCl		
-	R59-HQ		2	fragments up to 1-3/4"	╁┼	⊦	reaction, medium strong to strong		-
_	4 ft	0		479.7-480.0' - Fracture or mechanical break,	\perp	1	(R3 to R4), <1/16" voids on 0-10% of		_
_	88%		>10	80-90 deg, rough, undulating 480.0' - Fracture, 30-40 deg, rough,	╁┰	L	surface 456.8-457.3' - moderate yellowish		_
			- 10	undulating		1	brown, (10YR 5/4), medium grained,		
			3	480.0-480.4' - Fracture zone, fragments up to	\mathbb{H}	ſ	moderate HCl reaction, very weak		R59: 13 minutes
_	488.0		NR	1-3/4", angular 480.4' - Fracture, horizontal, rough,	工	t	(R1), trace organics Limestone Fragments		=
-	400.0			undulating, bedding plane parting	+	t	457.3-458.3' - Same as 454.0-456.8'		-
-			3	480.9-481.3' - Fracture zone, no visible	仠	ŀ	except more fragmented		-
-				orientation, fragments up to 1-3/4", angular to subangular	╂╫	ŀ	No Recovery 458.3-459.0'		-
_			>10	481.7' - Fracture, 30 deg, slightly rough,	\perp	ļ.	Limestone 459.0-460.0' - white to very light gray,		_
490_				slightly undulating		L	(N9 to N8), fine to medium grained,		
-448.0			>10	481.9-482.2' - Fracture zone, no visible — orientation, fragments up to 1-3/16"		l	mild to moderate HCl reaction,		
	R60-HQ		>10	482.9' - Fracture, horizontal to <10 deg,		Γ	medium strong to strong (R3 to R4), voids to <1/16" over 10-20% surface		
_	6 ft 70%	38		rough, undulating	┰┸	F	area, laminations		SC-8 collected at 490.35-
_	7070		>10	483.3' - Fracture, <5 deg, rough, undulating 483.6-483.7' - Fracture, horizontal, rough,	\perp	t	460.0-460.4' - Same as 456.8-457.3'		491.25' -
-			>10	large fragment in between 1-3/16"	╁	Ł	except yellowish gray, (5Y 7/2), fine to medium grained		-
_				484.0-484.1' - Fracture zone, no visible	士	ŀ	460.4-460.9' - Same as 459.4-460.0'		-
_			NR	orientation, fragments up to 1-5/8", mostly <5/8", subangular	₽	Ł	except moderate HCl reaction		
_			INIX	484.3, 484.5' - Fractures (2), horizontal,	工	L	No Recovery 460.9-461.0' Limestone		R60: 20 minutes
	494.0			slightly rough, slightly undulating, bedding	\vdash	ł	461.0-462.2' - Same as 459.0-460.0'		
			,	plane partings 484.7, 484.8' - Fractures or mechanical break	Ė	Γ	except fine grained, strong HCI		
495			3	(2), horizontal, rough, undulating	╁	t	reaction 462.2-463.0' - Same as 460.0-460.4'		_
-453.0				484.9-485.2' - Fracture zone, fragments up to -	口	H	except yellowish gray with olive gray		
-			>10	2-3/8", rough, angular; horizontal fractures at 484.9' and 485.2': rough, undulating	+	t	laminations, (5Y 7/2 with 5Y 3/2)		-
_				485.4, 485.5' - Fractures or mechanical break	Ŧ	ŀ	463.0-464.0' - Same as 461.0-462.2' except very light gray with light bluish		-
_	D04 110		1	(2), <10 deg, rough, undulating, possible bedding partings	世	ŀ	gray, (N8 with 5B 7/1), fine to		_
_	R61-HQ 6 ft	22		485.8-486.3' - Fracture zone, fragments up to	\bot	L	medium grained, strong to very		_
	62%		>10	3", mostly <5/8", subangular to angular		L	strong HCl reaction, <10% voids on surface		
				486.6' - Fracture or mechanical break, horizontal, rough, undulating		1	Limestone		
]				486.8, 487.0, 487.2' - Fractures or	世	Γ	464.0-465.7' - pale greenish yellow, (10Y 8/2), fine to medium grained,		
			NR	mechanical break (3), horizontal, rough,	╨	t	strong HCl reaction, very weak to		
-			INIX	undulating 487.2-487.5' - Mechanical break, >80 deg,	仜	t	weak (R1 to R2), long voids to 1-1/2",		R61: 18 minutes
				rough, undulating	+	t	mostly <1/16", over 20-30% of surface, possible dissolution features		-
500 <u> </u>	500.0			488.0-488.3' - Fracture, 70 deg, rough,	+	1	Silty Limestone Fragments (GM)	Н	
-50.0				undulating 488.3' - Fracture or mechanical break,	4	$ \cdot $	465.7-466.8' - dusky yellow, (5Y 6/4),		
				horizontal, rough, undulating	-		medium grained, moderate to strong HCI reaction, extremely weak (R0)		_
				488.9' - Fracture or mechanical break,	_		Limestone	Ш	
				horizontal, rough, undulating, bedding plane parting			466.8-467.4' - yellowish gray, (5Y		
				489.3' - Fracture, horizontal, rough,	1	П	7/2), fine to medium grained,		
				undulating, open with large rock fragment	1		moderate to strong HCl reaction, weak (R2), <10% voids to <1/16" on		
-				1-3/4", angular 489.8-490.3' - Fracture zone, horizontal	1	\vdash	surface, undulating laminations		-
-				fragments, two large <4", mostly <1-3/16",	1	\vdash	transition to planar, trace organics		-
				trace silty infill	-	\vdash		Ц	
						1			
						_			



PROJECT NUMBER:

338884.FL BORING NUMBER:

AD-01 SHEET 16 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.1	17 ft bo	gs on 9	9/13/07 START: 8/23/2007 END: 9	/7/2	2007	LOGGER: R. Bitely, C. Sump, 1	. Borton, J. Burkard, J. Townes
>00	(9)			DISCONTINUITIES		₀	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
				491.2-492.2' - Fracture zone, or multiple mechanical breaks, fragments up to 2-1/2"-5", mostly <2-3/8", angular with variable orientation 494.2' - Fracture, horizontal, smooth, undulating 494.6' - Fracture or mechanical break, 20-30 deg, rough, undulating 494.7-495.7' - Fracture zone, horizontal at 494.7', elsewhere no visible orientation, fragments up to 3", angular 496.2' - Fracture, horizontal, rough, undulating, possible bedding plane parting 497.1' - Fracture or mechanical break, horizontal, rough, undulating 497.4-497.7' - Fracture zone, subangular fragments up to 1-3/4"			Limestone With Peat 467.4-468.1' - grayish black and dusky yellow, (N2 and 5Y 6/4), medium grained, dusky yellow has moderate to strong HCI reaction, extremely weak to very weak (R0 to R1), prevalent organics No Recovery 468.1-469.0' Limestone Fragments 469.0-469.5' - yellowish gray, (5Y 7/2), with milky white quartz fragments, fine with medium coarse gravels, weak to medium strong (R2 to R3) gravels, extremely weak (R0) fines, fragments up to 4", limestone gravels mild HCI reaction, quartz no HCI reaction Limestone 469.5-473.5' - transition from yellow gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to medium grained, moderate to strong HCI reaction, medium strong to strong (R3 to R4), variable voids, mostly <30% up to 1/4" diameter, 470.4-<470.85': calcite crystals in voids up to 1-1/2", mostly <1/4" for 50-60% voids, at 470.8' linear features - possible burrows or dissolution features 1-1/2" to 2" long, 1/4" wide No Recovery 473.5-474.0' Limestone 474.0-479.0' - from light olive gray to yellowish gray with depth, (5Y 5/2 to 5Y 7/2), fine to medium grained fining with depth, moderate to strong HCI reaction increasing with depth, weak (R2), at 478.2' <1-3/16" zone of extremely weak to very weak (R0 to R1) with strong HCI reaction, voids <1/16" on 10-20% of surface 479.0-483.8' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCI reaction, weak (R2), voids to <1/16" on 25% of surface, fossiliferous (casts and molds), 479.5-480.3': coarse pebble size fragments, very pale orange (10YR 8/2), hardness and reactivity same as surrounding lithology, 481.6-481.9': silty gravels, same as surrounding lithology, 482.4-483.1': quartz in voids, crystalline growth No Recovery 483.8-484.0'	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	AD-01	SHEET	17	OF	17	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS: 5.	17 ft b	gs on 9	9/13/07 START : 8/23/2007	END : 9/7	200	LOGGER : R. Bitely, C. Sump, T	. Borton, J. Burkard, J. Townes
≥0 <i>€</i>	- %			DISCONTINUITIES			LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B	E RI GTH 30VE	(%) 🛛	CTU	DEPTH, TYPE, ORIENTATION, ROPLANARITY, INFILLING MATER	UGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COA REC	a Q	FRA	THICKNESS, SURFACE STAINING, AN		SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
_							Limestone - 484.0-487.5' - yellowish gray, (5Y	
_							7/2), fine to medium grained, weak (R2), moderate to strong HCl	_
-					-		reaction where pulverized, voids to	-
-					-		<1/16" on 20-30% of surface, at 485.1': silty clay zone, <2-3/8" wide,	-
-					-		extremely weak (R0), strong HCl reaction, all other properties same as	-
_					-		surrounding lithology, very similar to	-
_					-		- 474.0-479.0' and 479.0-483.5' No Recovery 487.5-488.0'	-
]		Limestone 488.0-492.2' - yellowish gray, (5Y	_
							7/2), fine to medium grained, strong HCl reaction (slightly weaker with	-
-					-		depth), weak (R2), voids to <1/16"	-
-					_		cover 15-25% surface, voids to 1/2" with crystals that strongly react to	_
-					-		HCl, very similar to 474.0-479.0' and 484.0-487.5'	-
-					-		No Recovery 492.2-494.0'	-
					1		494.0-497.7' - yellowish gray, (5Y	-
							7/2), fine to medium grained decreasing with depth (fining down),	_
_					_		moderate to strong HCl reaction increasing with depth, very weak	_
_					-		(R1) to weak (R2) slightly increasing with depth, <1/16" voids on 0-10%	-
-					-		surface	-
-					-		No Recovery 497.7-500.0' Bottom of Boring at 500.0 ft bgs on	-
_							9/7/2007	_
]		_	_
_							_	_
-					-		-	-
-					-		-	-
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				l				<u> </u>



AD-02

SHEET 1 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS: 3.0	ft bgs	s on 9/	08/07 START: 9/8/2007 END: 9/	12/20	DOT LOGGER: J. Burkard, R. Bitely,	T. Borton, J. Townes
≥∩ <i>⊊</i>	(9)			DISCONTINUITIES	၂ ဥ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	D (%)	TUR 100-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
FRE	ORE ECC	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
_оош -157.7		α.	шФ	200.1, 200.3, 200.7, 201.7' - Mechanical	S	Limestone	Boring AD-2 blind drilled to
-137.7	200.0		>10	break (4), 0-30 deg, rough, undulating	Ħ	- 200.0-201.9' - yellowish gray, (5Y	approximately 200 feet -
-				200.9-201.6' - Fracture zone, angular	Н	7/2), fine grained, moderate HCI	below ground surface
_			>10	fragments up to 2" in diameter	щ	reaction, weak to medium strong (R2 to R3), sand to gravel-sized broken	before beginning sampling/logging.
_	R1-HQ 4 ft	0		-	ш	fragments, infill in section, trace	Start Drilling at 08:45
_	63%		>10	202.1-202.5' - Mechanical break	Ш	voids (<1/16") over surface 201.9-202.5' - yellowish gray, (5Y	09/08/07, Water level 3.0' below ground surface
_				_		7/2), fine to medium grained,	Logger is J. Burkard
_			NR	_	Ħ	moderate to strong HCl reaction, very weak (R1)	R1: 7 minutes
_	204.0			_		No Recovery 202.5-204.0'	
_			>10	204.0-204.7' - Fracture zone, broken fragments	Ю	Limestone - 204.0-204.7' - very pale orange, (10Y]
205			-10	•	Ш	8/2), fine to medium grained.	
-162.7			3	204.9, 205.4, 205,7, 206.0, 206.8, 207.2, — 207.6' - Mechanical break (7), 0-20 deg.	Ш	moderate to strong HCl reaction, very weak (R1), voids <1/16" over	7
			3	rough, undulating	Π	15-30% of surface	1
I -	R2-HQ	4-		_	Ш	204.7-205.6' - yellowish gray, (5Y] 1
-	5 ft 80%	15	>10	_	Н	moderate HCl reaction, very weak to	1
_			. 40	207.2-207.8' - Fracture, vertical, rough,	Ш	weak (R1 to R2), trace voids less	1
_			>10	undulating, split core in two halves	ш	than 1/16" of surface Silty Sand (SM)	1
_				207.5' - Mechanical break 207.8-208.0' - Mechanical break	Н	205.6-206.4' - silty sand sized	R2: 9 minutes
-	209.0		NR	207.0 200.0 Weditalibal break	Н	- particles with broken limestone fragments up to 1/2" in diameter	1
-	203.0			-	Ħ	Limestone	1
210			>10	209.3-210.3' - Fracture zone, angular - fragments up to 2" in diameter	Н	206.4-207.8' - pale greenish yellow,	1
-167.7			. 40		ш	(10Y 8/2), very fine to fine grained, moderate to strong HCl reaction,	_
-			>10	210.4-210.8' - Mechanical break	ш	weak to medium strong (R2 to R3),	1
-	R3-HQ			-		laminar bedding planes <1/16" 207.8-208.0' - yellowish gray, (5Y	1
-	5 ft 36%	7		-	Н	- 7/2), strong HCl reaction, very weak	1
-	3070			-	Ħ	to extremely weak (R1 to R0) No Recovery 208.0-209.0'	1
-			NR	-	Ħ	- Limestone	
-				-	버	209.0-209.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl	R3: 11 minutes
-	214.0			-	Н	 reaction, weak to medium strong (R2 to R3), voids (<1/16") over 10-20% of 	-
-	214.0			214.0-214.4' - Fracture zone, rough,	口	surface (<1/16") over 10-20% of	-
			8	undulating, broken fragments up to 2" in	団	 209.7-210.3' - pale greenish yellow, (10Y 8/2), very fine to fine grained, 	-
215_ -172.7				diameter 214.6, 214.7, 214.9, 215.2, 216.6, 216.8,	Н	strong HCl reaction, very weak (R1),	-
-			5	217.0, 217.4, 217.7, 218.8' - Mechanical -	F	 <1/16" horizontal bedding planes 210.3-210.8' - very pale orange, (10Y 	-
-	R4-HQ			break (10), 0-30 deg, rough to smooth, undulating, minor black organic staining	H	8/2), fine grained, strong HCl	-
-	5 ft	40	>10	215.7-216.4' - Fracture zone, rough, -	世	reaction, very weak (R1), silt infillNo Recovery 210.8-214.0'	-
-	100%			undulating, rock fragments up to 3" in diameter	oxdot	Limestone	-
-			3	217.5-217.7' - Mechanical break	囯	214.0-219.0' - yellowish gray to pale	-
-					団	greenish yellow, (5Y 7/2 to 10Y 8/2), fine to medium grained, moderate to	SC-1 collected at 217.8-
-			1	-	H	 strong HCl reaction, very weak to weak (R1 to R2), fossil casts and 	218.9' R4: 9 minutes
-	219.0			-	H	molds, voids (<1/16") throughout	-
-			4	-	H	from 214.0-214.4' and 215.0-216.5'	-
220					\vdash		_
					\perp		



AD-02

SHEET 2 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

				IENT - BESOUT S/N 1317, Hidd Totally, Fig tools, FW cast		27 LOOGED LD 44-D D'IVL 3	ORIENTATION . Vertical
WATER	LEVELS : 3.0	πbgs	s on 9		12/20		
≥ 9€	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	8	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ZAN YN YN	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ATIC	J.H.	(%) Q	Ţ.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무류짓	SRE	οD	RAC ER F	PLANARITY, INFILLING MATERIAL AND	J ₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	SHR	ď	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	2.10. 0, 120. 1.202.10, 2.10.
-177.7				219.3, 219.4, 219.9, 220.0, 200.2, 200.4,	Ш	Silty Limestone Fragments	
-			4	200.5, 200.9, 221.3, 222.5, 222.8, 223.0' - Mechanical break (12), 0-15 deg, rough,	ш	 219.0-219.3' - yellowish gray, (5Y 7/2), mild HCl reaction, with broken 	1
-	R5-HQ			undulating	П	limestone fragments up to 1/8" in	-
-	5 ft	22	>10	219.9, 223.0' - Fractures, 60-90 deg, rough, -	Н	– diameter	-
_	82%			undulating	Ш	Limestone	_
			4	221.5-221.8' - Fracture zone, fragments up to 1/2" in diameter	Н	219.3-220.0' - yellowish gray, (5Y – 7/2), fine grained, mild to moderate	
			4	772 III didifferen		HCl reaction, weak to medium strong	
_				-	ш	(R2 to R3), laminar bedding planes	R5: 9 minutes
-			NR	-	ш	- 220.0-223.1' - pale greenish yellow,	-
-	224.0				Н	(10Y 8/2), moderate to strong HCl reaction, weak (R2), fossil molds and	-
_			>10	224.1, 225.1, 225.5, 226.1, 226.7, 227.1,	버	- casts, surface cavities (trace	
225_				227.6, 228.3' - Mechanical break (8), rough to smooth, undulating —	Ш	amounts) up to 1/4" wide and 1/4" in	
-182.7				224.4-224.8' - Fracture zone, multiple breaks,	Н	height, pitting on surface No Recovery 223.1-224.0'	
I -			3	angular fragments up to 1" in diameter		Limestone	1
-	R6-HQ			-	Н	224.0-228.9' - pale greenish yellow,	-
-	5 ft	43	1	-	口	_ (10Y 8/2), very fine to fine grained,	-
_	98%			_	Н	moderate to strong HCl reaction, very weak to weak (R1 to R2), wavy	_
			>10			bedding plane up to 1/16" in	
			/10	227.7-228.0' - Fracture zone, smooth to	Ш	thickness throughout section - some	1
_				rough, along bedding planes, horizontal along	ÌП	black organic material, surface pitting	R6: 9 minutes
-			>10	bedding planes to 40 deg		is present throughout the section	-
-	229.0		NR	228.6' - Bedding plane, horizontal, smooth	Н	No Recovery 228.9-229.0'	-
_			6		П	_ Limestone	_
230			,	_	Ы	229.0-233.0' - yellowish gray, (5Y	
-187.7				230.0-230.3' - Fracture zone, rough, angular		7/2), fine to medium grained, moderate HCl reaction, very weak to	
-			1	rock fragments 230.5, 231.8, 232.6, 232.8' - Mechanical	Н	weak (R1 to R2), surface pitting	SC-2 collected at 230.5-
_	R7-HQ			break, 0-30 deg, rough, undulating	ш	throughout sample, 1/16" voids on	231.55' -
-	5 ft	60	1	231.5' - Mechanical break	Н	surface throughout section, fossil casts	-
_	80%			201.0 - McGharilear break		-	_
I -			2	_	Н	_	
			-	232.5' - Mechanical break	Ш		
I -				-	\square	No Recovery 233.0-234.0'	R7: 12 minutes
-	224.0		NR		Ш	-	1
-	234.0			234.0, 234.6, 235.5-235.8, 236.1-236.7,	ш	Limestone	
-			>10	237.1-237.5, 237.8-238.8' - Fracture zone (6)	Н	- 234.0-236.7' - yellowish gray, (5Y	-
235					口	7/2), fine to medium grained,	
-192.7			.40		Н	moderate HCl reaction, extremely	
			>10	_	Ш	 weak to very weak (R0 to R1), surface pitting throughout entire 	1
-	R8-HQ			-	H	section	1
-	5 ft	0	>10	-		-	-
-	96%			-	Щ	Silt (ML)	-
-			>10	-	Н	236.7-237.1' - yellowish gray, (5Y 7/2), mild HCl reaction, mottling	
					Ш	_ \present	
I -			>10		\vdash		R8: 8 minutes
-	220.0				ш	-	1
-	239.0		NR	-	Щ		1
-			1	-	Ш	_	-
240					\vdash		



338884.FL AD-02

ROCK CORE LOG

SHEET 3 OF 15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING	METHOD A	ND E	QUIPN	IENT : BL300T S/N 1517, mud rotary, HQ tools, HW casi	ng		ORIENTATION : Vertical
WATER	LEVELS : 3.0) ft bg	s on 9	/08/07 START: 9/8/2007 END: 9/	12/20	D7 LOGGER : J. Burkard, R. Bitely,	T. Borton, J. Townes
>00	6)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-197.7 - - - -	R9-HQ 5 ft 88%	53	2 >10	239.5, 240.1, 241.6, 241.8, 242.3, 242.7, 243.0, 243.3' - Mechanical break, 0-10 deg, rough, undulating 241.1-241.3' - Fracture zone		Limestone 237.1-238.8' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), with 1/4" sections of very fine grain limestone No Recovery 238.8-239.0'	- - -
- - -	244.0		1 NR >10	244.0-244.7' - Fracture zone		Limestone 239.0-243.4' - pale greenish yellow, - (10Y 8/2), fine to medium grained, moderate to strong HCI reaction, very weak (R1), surface pitting - throughout section, trace voids	R9: 7 minutes
245 -202.7 - - -	R10-HQ 5 ft 100%	22	3	245.0, 245.5, 245.9, 246.1, 246.5, 246.8, 246.9, 247.3, 247.5, 247.8, 247.9' - Mechanical break (11), 0-10 deg, rough, undulating		(1/16") throughout section No Recovery 243.6-244.0' Limestone 244.0-249.0' - pale greenish yellow, (10Y 8/2), fine to medium grained, moderate to strong HCl reaction, very weak (R1), surface pitting throughout section, very brittle rock	
-	249.0		>10	248.1-248.5, 248.7-250.0' - Fracture zone (2), rough, undulating		- - - 249.0-254.0' - yellowish gray to pale	R10: 6 minutes
250 -207.7 -	R11-HQ 5 ft	23	4	249.4, 249.6, 250.1, 250.5, 251.6, 252.7' - Mechanical break (6), 0-30 deg, rough, undulating 250.8-251.1' - Bedding plane, horizontal, smooth, undulating		- greenish yellow, (5Y 7/2 to 10Y 8/2), medium grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), with fine grained interbeds at 250.7-251.1' and at 253.0 to 254.0', wavy bedding planes throughout section	- - - -
- - -	100%		6	252.3-252.4, 253.1-253.2' - Fracture zone (2), rough, undulating 253.0' - Bedding plane, horizontal, smooth		- - -	
255_ -212.7	204.0		2	254.2, 254.3, 255.1, 255.2, 255.8, 256.3, 256.9, 257.2, 257.4, 257.7, 258.3, 258.8' - Mechanical break (12), smooth to rough, undulating to stepped		254.0-259.0' - yellowish gray, (5Y - 7/2), fine to medium grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), wavy bedding planes 1/16" thick	-
-	R12-HQ 5 ft 100%	73	2			throughout the section, densely concentrated section of fossil casts and molds from 255.4-255.5'	- - -
-	259.0		7	258.4-258.5' - Fracture zone, angular rock fragments		- - -	R12: 9 minutes
260			2			-	_
1							



FRACTURES PER FOOT

2

2 50 5 ft

>10

8

>10

5

4

5

1

NR

>10

>10

4

NR

>10

>10

>10

NR

NA

13

RQD(%)

WATER LEVELS: 3.0 ft bgs on 9/08/07

CORE RUN, LENGTH, AND RECOVERY (%)

R13-HQ

96%

R14-HQ

5 ft 40

94%

R15-HQ

5 ft

82%

R16-HQ

5 ft 46% 33 1

264 0

269.0

274.0

279.0

DEPTH BELOW SURFACE AND ELEVATION (ft)

-217.7

265

-2227

270

-2277

275

-232.7

280

PROJECT NUMBER: BORING NUMBER: 338884.FL **AD-02**

9

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ROCK CORE LOG

SHEET 4 OF 15

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

START: 9/8/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

259.1, 259.5, 260.1, 260.7, 261.3, 261.4,

0-10 deg, rough, undulating

2" in diameter

fragments

fragments

stepped

undulating, tight

to 1-3/16" in diameter

1-3/16" in diameter

rough, undulating

261.8, 263.2, 263.6' - Mechanical break (9),

262.1-262.2' - Fracture zone, angular rock

undulating, 10 angular rock fragments up to

undulating, up to 1" in length angular rock

265.5, 265.7, 266.0, 266.1, 266.3, 266.6,

267.4, 267.7, 268.4' - Mechanical break (9).

undulating, up to 1" in length angular rock

271.3, 272.3, 272.7, 273.0' - Mechanical

break (4), 0-30 deg, rough, undulating to

274.3' - Fracture, horizontal, rough,

275.4' - Fracture, horizontal, rough,

279.25' - Mechanical break, horizontal,

274.55-274.8' - Fracture zone, multiple

274.45' - Fracture, 85 deg, rough, undulating,

intersecting fractures with rock fragments up

undulating, open (3/8"), organic layering 275.7-276.3' - Fracture zone, fragments up to

275.0' - Bedding plane, horizontal, smooth,

fragments up to 1/2" 262.5-263.1' - Fracture zone, rough,

264.3-265.0' - Fracture zone, rough,

267.0-267.2' - Fracture zone, rough,

0-20 deg, rough, undulating

269.0-271.0' - Fracture zone

269.8-269.9' - Fracture zone

DISCONTINUITIES

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical END: 9/12/2007 LOGGER: J. Burkard, R. Bitely, T. Borton, J. Townes LITHOLOGY COMMENTS ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 259.0-263.8' - pale greenish yellow, (10Y 8/2), fine to medium grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), surface cavity at 259.7 up to 3/4" wide and up to 1/4" in height, wavy bedding planes less than 1/16" in thickness throughout intact sections. voids to 1/16" over 5-10% of surface R13: 8 minutes No Recovery 263.8-264.0' Limestone 264.0-266.9' - pale greenish yellow, (10Y 8/2), fine to medium grained, moderate to strong HCI reaction, very weak (R1), wavy bedding plane from 265.0-265.5' <1/16" in thickness, 1/16" voids over 0-5% of 266.9-267.5' - pale greenish yellow, (10Y 8/2), fine grained, moderate HCI reaction, very weak to weak (R1 to R2), wavy bedding planes 1/16" in R14: 8 minutes thickness 267.6-268.7' - pale greenish yellow, (10Y 8/2), fine to medium grained, moderate to strong HCI reaction, very weak to weak (R1 to R2) No Recovery 268.7-269.0' Limestone 269.0-271.9' - light olive gray, (5Y 5/2), fine to medium grained, SC-3 collected at 270.95moderate HCl reaction, very weak to 272 35' weak (R1 to R2), with angular gravel-sized rock fragments 271.9-272.3' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, very weak to weak (R1 R15: 7 minutes to R2), trace voids 272.3-273.1' - yellowish gray, (5Y 8/1), moderate to strong HCl End drilling for the day at 16:43, 09/08/07 reaction, very weak to weak (R1 to Continue drilling 09/09/07, R2), bedding planes transition from Water level 3' below wavy to laminar ground surface No Recovery 273.1-274.0' Limestone 274.0-276.3' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, very weak (R1), solution cavities up to 1-3/8" by 3/8" over 1-2% of rock surface. bedding laminations with trace organics from 275.2-275.7 R16: 11 minutes No Recovery 276.3-279.0' R. Bitely begins logging



AD-02

SHEET 5 OF 15

ORIENTATION : Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson ELEVATION: 42.3 ft (NAVD88)

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER	LEVELS : 3.0			08/07 START: 9/8/2007 END: 9/1		07 LOGGER : J. Burkard, R. Bitely,	T. Borton, J. Townes
₹ Ω ⊊	(%)			DISCONTINUITIES	ار ار	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-237.7 - -	R17-HQ		5	279.45' - Fracture, 60 deg, rough, undulating, tight - 279.65-280.0' - Fracture zone, multiple intersecting fractures with rock fragments up		Sandy Silt (ML) 279.0-280.0' - yellowish gray to light olive gray, (5Y 7/2, 5Y 5/2), fine to medium grained, mild to moderate	-
-	5 ft 82%	0	>10 7	to 1-3/16" in diameter 280.3' - Fractures (2), 60 deg, rough, undulating, tight 280.5' - Fracture, 30 deg, rough, undulating 280.7-280.8' - Fracture zone, slight brown		HCl reaction, trace laminated bedding Limestone 280.0-283.1' - yellowish gray, (5Y	- - -
-	284.0		NR	staining, fragments up to 3/4" in diameter 280.95' - Fracture, 60 deg, rough, undulating, tight		 7/2), very fine to fine grained, moderate HCl reaction, very weak (R1), voids up to 9/16" diameter over 3-4% of rock surface, poorly 	R17: 9 minutes
285_ -242.7			>10	281.3' - Fracture, horizontal, rough, undulating, slight brown-black staining, open - 1-3/16" calcite crystallization 281.55-281.8' - Fracture zone, fragments up		fossiliferous, bedding plane Iaminations from 282.0-283.1' No Recovery 283.1-284.0' Limestone	-
-	R18-HQ 5 ft	46	>10	to 3/4" in diameter 281.9, 282.05, 282.25, 282.45, 282.8, 282.85' - Bedding plane (6), horizontal, smooth 282.65' - Fracture, rough, undulating, open		 284.0-289.0' - yellowish gray, (5Y 7/2), very fine to coarse grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), voids 	-
-	100%		1	284.25-284.4' - Fracture zone, multiple intersecting fractures with rock fragments up to 3/4" in diameter		up to 3/8" diameter over 5% of rock surface, solution cavities up to - 1-3/16" in diameter over 5% of rock surface, poorly fossiliferous, trace	-
-	289.0		1	open to 3/8" 285.2' - Fracture, horizontal, rough, undulating, open from 1/2" to 1" 285.3' - Mechanical break		bedding plane laminations, trace organics	R18: 9 minutes
290 -247.7			>10	285.4' - Mechanical break or fracture, horizontal, rough, undulating 285.7-285.9' - Fracture zone, rock fragments		289.0-291.6' - yellowish gray, (5Y - 7/2), very fine to coarse grained, moderate HCI reaction, extremely weak to very weak (R0 to R1), voids	SC-4 collected at 289.75
-	R19-HQ		>10	up to 1-3/16" – 286.4, 286.45, 286.7' - Bedding plane (3), horizontal, smooth – 287.4' - Mechanical break, horizontal, rough,		 up to 3/32" over 10% of rock surface, poorly fossiliferous, trace organics 	
-	5 ft 52%	22	NR	undulating, open to 3/8" 288.1' - Fracture, horizontal, rough, undulating, tight 289.0-289.3' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-3/16" in diameter 289.8' - horizontal, rough, undulating, open to		No Recovery 291.6-294.0'	R19: 10 minutes
- 295_	294.0		>10	3/8" - 290.6-291.6' - Fracture zone, rock fragments up to 1-9/16" in diameter 294.0-294.9' - Fracture zone, rock fragments —		Limestone - 294.0-297.9' - yellowish gray, (5Y 7/2), very fine to fine grained,	_
-252.7 - -	R20-HQ		>10	up to 1-3/16" in diameter 295.6-297.0' - Fracture zone, rock fragments up to 1-3/16" in diameter		moderate HCl reaction, extremely weak to very weak (R0 to R1), 60% carbonate sandy silt	-
-	5 ft 78%	14	>10	- - 297.3' - Fracture, horizontal, rough, -		_	-
-			NR	undulating, tight		No Recovery 297.9-299.0'	R20: 19 minutes -
300	299.0		3	- 299.3' - Fracture, 45 deg, smooth, trace black - organic staining, tight		-	-



BORING NUMBER: PROJECT NUMBER: 338884.FL **AD-02**

ROCK CORE LOG

SHEET 6 OF 15

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

				IENT . BESOUT S/IN 1317, Hud Totally, HQ tools, HW cas		ORIENTATION: Vertical
WATER	LEVELS : 3.0	ft bg	s on 9/		12/20	
≥□.⊋	<u> </u>			DISCONTINUITIES	Ŋ	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING
표일은	돌 두	(%) _Q	58	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	7 ਹੋ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, WEATHERING, HARDNESS,
F.F.	NG-SO	Oρ	R F	PLANARITY, INFILLING MATERIAL AND	ΜB	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS DROPS, TEST RESULTS, ETC.
SE	SHR	ď	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS BROFS, FEST RESOLTS, ETC.
-257.7				299.5, 299.6, 300.2, 300.3' - Fractures (4),		Limestone
_			3	horizontal, rough, undulating, trace black organic staining, tight	╁	299.0-300.3' - yellowish gray, (5Y
-	R21-HQ			301.0' - Fracture zone, rock fragments up to	1	moderate HCl reaction, extremely
-	5 ft	11	NA	3/4" in diameter	$\ \ $	weak (R0), black organic mottling
-	74%			301.2' - Mechanical break, 20 deg 301.8-301.9, 302.2-302.7' - Fracture zone	4	over 20% of rock surface 300.3-300.7' - olive gray to yellowish
_			NA	(2), rock fragments up to 3/4" in diameter	4111	gray, (5Y 3/2, 5Y 7/2), very fine
_				(),	1	grained, extremely weak (R0),
			NR			organic content decreasing with R21: 12 minutes depth from 1-3/16" lens of organic silt
-	304.0				1111	at 300.3' below ground surface, faint
_	001.0				1	to mild organic odor, fossiliferous,
			>10	004.05.005.4.005.7.000.05.000.75!	₩	transition to a carbonate silt with
305 <u> </u>				304.65, 305.4, 305.7, 306.35, 306.75' - Bedding plane or mechanical break (5), <10	╁	
			10	deg, smooth to rough, planar to undulating	₩	300.7-302.7' - yellowish gray, (5Y
_				205 05 200 251 Franking Tong Tours		7/2), low to medium plasticity, >50%
_	R22-HQ 5 ft	40	>10	305.95-306.35' - Fracture zone, rough, undulating to planar, rock fragments <2" in	Н	silt, <50% limestone fragments as sand sized fraction
	90%	70	10	diameter		No Recovery 302.7-304.0'
				306.9-307.0' - Fracture zone, rough,		Silt (ML)
_			0	undulating, rock fragments <1" in diameter	1	304.0-304.6' - yellowish gray, (5Y // 7/2), low to medium plasticity, mild to
-			4			moderate HCl reaction, limestone R22: 12 minutes
-			NR	308.3-308.5' - Fracture zone, rough,	₩	
-	309.0		INIX	undulating, rock fragments <1-1/2" in diameter	╆	Limestone
-			>10	309.5-309.75' - Fracture zone, rough,	╁┯	- 304.6-305.1' - yellowish gray, (5Y
310_ -267.7				undulating, silt lenses, rock fragments <2" in —		7/2), very fine to fine grained, moderate to strong HCI reaction,
-201.1			3	diameter	Ľ	extremely weak to weak (R0 to R2),
l _				310.25, 310.9' - Fractures or mechanical break (2), rough, undulating	┵	light gray mottling over 40% of
	R23-HQ 5 ft	58	>10	310.5' - Fracture or mechanical break, 30		surface, moderately fossiliferous casts and molds (1/8-1/4"), laminated
	100%	36	/10	deg, rough, undulating	\vdash	organics
_				312.0, 312.05, 312.1, 312.2' - Fractures (4),		Silt (ML)
-			6	0-90 deg, rough, undulating 312.45, 313.05, 313.45, 313.95' - Fractures	╁	305.1-305.4' - Same as 304.0-304.6'
-				or mechanical break (4), <10 deg, rough,		Limestone 305.4-308.5' - Same as 304.6-305.1' R23: 7 minutes
-			3	undulating	士	No Recovery 308.5-309.0'
-	314.0				F	Limestone
-			2		片	309.0-314.0' - yellowish gray, (5Y 7/2), fine to medium grained,
315_				314.9. 315.2' - Fractures or mechanical break	╀	moderate to strong HCl reaction,
-272.7			2	(2), 10 deg and 40 deg, rough, undulating	口	extremely weak to medium strong (R0 to R3), highly variable trace
			-	315.7-316.75' - Fracture zone, rough,	Н	voids 1/16", poorly fossiliferous, trace
_	R24-HQ		4.0	undulating, silt lenses, rock fragments <3" in	Ė	organic lamination, laminated silty
-	5 ft 98%	30	>10	diameter	╁	intervals from 311.35-311.5 and 311.65-311.8'
-	55,3			317.1, 317.5' - Fractures or mechanical break	Œ]
-			>10	(2), 70 deg and 50 deg, rough, undulating	\Box	<u> </u>
-				317.5-317.9' - Fracture zone, rough,	+	R24: 9 minutes
-			>10	undulating, rock fragments <3" in diameter 318.2' - Fractures or mechanical break, <10	片	1124. 9 1111114165
_	319.0		NR)	deg, rough, undulating	dash	<u> </u>
I -			>10		口	<u> </u>
320					Ь	
I	1				1	1

APPENDIX 2BB-336 Rev. 4



338884.FL AD-02

SHEET 7 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bgs	on 9/	08/07 START: 9/8/2007 END: 9/	12/20	007 LOGGER : J. Burkard, R. Bitely,	T. Borton, J. Townes
200	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	Sal	R	RH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-277.7 - - - - -	R25-HQ 5 ft 100%	27	>10 >10 >10	318.65-318.9' - Fracture zone or mechanical break, rough, undulating, rock fragments <2" in diameter 319.3-319.8, 320.1-320.4, 320.6-320.8, 321.7-322.1, 322.35-322.65, 323.2-323.3' - Fracture zone (6), undulating, rock fragments <1" in diameter, friable 319.9, 321.1, 321.2, 321.3, 322.8, 323.8' - Fractures or mechanical break (6), 20 deg, rough, undulating		314.0-318.9' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, extremely weak to medium strong (R0 to R3), highly variable trace voids <1/16", poorly fossiliferous, trace organic laminations, interlaminated silt lenses and limestone rock fragments at 314.4-314.55' and 315.7-316.75' No Recovery 318.9-319.0' Limestone	- - - - R25: 9 minutes
325 -282.7 -	324.0 R26-HQ		2	324.45, 324.95, 325.4, 325.8, 326.3' - Fractures or mechanical break (5), <10-30 — deg, rough, undulating		allo.0-324.0' - yellowish gray, (5Y 7/2), very fine to medium grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), with friable carbonate silts with <50% sand-sized limestone fragments, poorly fossiliferous 324.0-326.7' - yellowish gray, (5Y	- - - -
- - -	5 ft 100%	42	NA NA	326.7-329.0' - Fractures or mechanical break, smooth to rough, undulating		7/2), very fine to fine grained, extremely weak to very weak (R0 to R1), trace laminated organics 325.1-325.7' - Same as 324.0-326.7' except mild to moderate HCl reaction, moderately fossiliferous,	R26: 13 minutes
-	329.0		>10	329.0-329.3' - Fracture zone, rough, undulating, rock fragments <1" in diameter	H	fossil shells to 1/2" Sandy Silt With Limestone (ML) 326.7-329.0' - very fine to fine	- -
330 <u>-</u> -287.7 -			2	329.4, 329.45' - Fractures or mechanical break (2), 40 deg and 20 deg, rough, undulating 329.7, 330.4, 330.85, 331.9' - Bedding plane	Ë	grained, low to medium plasticity, mild to moderate HCl reaction, sandy silt (carbonate), carbonate silt with <50% limestone fragments as sand	-
- -	R27-HQ 5 ft 92%	67	1	or mechanical break (4), <10 deg, rough, undulating		fraction; limestone interbeds, extremely weak to very weak (R0 to R1), strong to very strong odor (crude petroleum and hydrogen	SC-5 collected at 330.85- 331.9'
-			>10	332.15-332.35' - Fracture zone, rough, undulating, rock fragments <2" diameter		Limestone 329.0-333.6' - yellowish gray, (5Y	- R27: 8 minutes
-	334.0		NR		\Box	 7/2), very fine to fine grained, moderate to strong HCl reaction, 	-
335 -292.7 -			>10	334.4-334.5, 334.8-334.9, 335.1-335.25, 336.2-336.6, 336.6-337.0, 337.3-338.0, 338.25-338.4' - Fracture zone (7), rough, undulating, sandy silt lenses with rock fragments <2" in diameter		extremely weak to weak (R0 to R2), voids <1/16" over 10% of surface, one cavity or fossiliferous cast 1" in diameter, few cavities <1/4" in diameter, trace organic lenses, moderately fossiliferous, trace laminated organics	-
-	R28-HQ 5 ft 88%	8	>10	335.45, 335.7, 335.95' - Bedding plane or mechanical break (3), <10 deg, rough, undulating		No Recovery 333.6-334.0'	-
-					E]	R28: 12 minutes
-	220.0		>10		oxdot	<u> </u>	-
-	339.0		NR.		E	<u>}</u>	J. Townes begins logging
340			2	·		<u> </u>	_
5-10					T'''	1	
					1		



BORING NUMBER: PROJECT NUMBER: 338884.FL

AD-02

SHEET 8 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS: 3.0) ft bgs	s on 9	/08/07 START: 9/8/2007 END: 9/	12/20	007	LOGGER : J. Burkard, R. Bitely	/, Τ. Ε	Borton, J. Townes
300	<u> </u>			DISCONTINUITIES	U		LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SI	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,		OIZE AND DEDTH OF GAGING
품발은	P.E. A. F.E. A	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 5		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FI	SIZE AND DEPTH OF CASING, LUID LOSS, CORING RATE AND
FYF EVA	NG NG	αD	ACT R F	PLANARITY, INFILLING MATERIAL AND	MB(AND ROCK MASS	L	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SE	898	Ř	FR PE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Sγ		CHARACTERISTICS		BROFO, TEOT REGGETO, ETG.
-297.7			. 40	339.4' - Mechanical break, horizontal, silt	Ш	П	Limestone		
			>10	lens with angular rock fragments up to 3/4" in diameter	ш	11	334.0-338.4' - yellowish gray, (5Y 7/2), very fine to medium grained,		_
_	R29-HQ			339.6' - Mechanical break, horizontal, rough,	┰	朴	moderate to strong HCl reaction,		7
-	5 ft 94%	62	2	undulating, along bedding plane 340.25-340.4' - Fracture zone or mechanical	Ė	11	extremely weak (R0), silt lenses interbedded with extremely weak		=
-	3470			break, silt lens		ŧ١	rock, 80% of core is sandy silt		-
-			0	341.35, 341.7' - Bedding plane (2),	╨	╂╽	carbonate material of low to medium		=
-				horizontal, fractures along contact of silt lens	\perp	╊╽	plasticity, >50% limestone fragments as sand fraction, trace decomposing	$\ \ _{R}$	
-			1	343.25' - Fracture, horizontal, rough,	╁	╂╽	organic odor	Π'	(25. / Illillates –
_	344.0		NR	undulating, tight		11	No Recovery 338.4-339.0' Limestone		-
-			1		世	11	339.0-339.85' - yellowish gray, (5Y		=
345_				344.8, 345.55, 345.9, 346.4, 346.6, 346.9,	F	L	7/2), very fine to medium grained,		
-302.7			2	347.45, 348.9' - Bedding plane (8),	Д	1	moderate HCl reaction, extremely weak to very weak (R0 to R1),		
				horizontal, rough, undulating, tight	\vdash	ľ	limestone fragments up to 3/4" in		
	R30-HQ				Ė	T	diameter, calcite crystals, moderate vellow		_
_	5 ft 100%	71	3		╁	t	Organic Material (OH)		-
-	10070				ш	╁	339.85-340.0' - dark brown to black,		=
-			1			1	mild HCl reaction, organic layer, bedding laminations		-
-					╁	╁	Limestone		SC-6 collected at 347.8-
-			1		H	1	340.0-340.4' - Same as		48.8' R30: 7 minutes
-	349.0				\vdash	╁	339.0-339.85' 340.4-343.7' - light gray, (N7), very		Complete drilling at 17:00
-			0		\perp	1	fine to medium grained, moderate to		on 09/09/07, water level at -
350				_	上	┺	strong HCl reaction, very weak (R1),	s	urface
-307.7			2	350.35, 350.9, 351.85, 352.4' - Bedding plane	╁╌	╁	black organic mottling over 20% of rock surface		_
_				or mechanical break (4), horizontal, rough,	\Box	L	No Recovery 343.7-344.0'		_
	R31-HQ 5 ft	76	1	undulating, tight		1	Limestone 344.0-349.0' - light gray, (N7), very		
	97%	70	'		\vdash	-	fine to medium grained, moderate to		
					ш	T	strong HCl reaction, very weak to		_
-			2		\vdash	t	weak (R1 to R2), black and blue mottling over 20% or rock surface,		7
I -				352.9, 353.6' - Mechanical break (2), 0-90	F	1	trace laminations	F	R31: 10 minutes
-	354.0		1	deg, rough, undulating	Ľ	†	349.0-353.85' - yellowish gray, (5Y 7/2), very fine to fine grained,		=
-	354.0		NR_		╨	ł	moderate HCl reaction, weak to		-
			1	354.4, 357.0, 357.9' - Fractures (3),	仜	1	medium strong (R2 to R3), trace laminated bedding with organics,		=
355 <u> </u>				horizontal, rough, undulating, open up to 3/8" $_$	士	╁	cavities up to 3/8" in diameter are		-
-			0		+	ł	fossil burrows and over 10% of rock surface from 351.0-352.0' bgs.		=
-	B20 L10				Ë	1	No Recovery 353.85-354.0'		=
-	R32-HQ 5 ft	94	1	356.3, 356.5' - Mechanical break (2)	₽	╁	Limestone		-
-	100%				Ш	+	354.0-359.0' - yellowish gray, (5Y 7/2), very fine to fine grained,		=
_			1		上	1	moderate HCI reaction, weak to		
_					\vdash	Ł	medium strong (R2 to R3), voids up to 3/16" over 50% of rock surface		
			0		片	1	and are fossil molds, cavities up to 2"	F	R32: 11 minutes
I -	359.0		١٠		₽	ſ	in diameter over 1-2% of rock		
					\coprod	Ť	surface, fossiliferous		-
360			2		仜	†			=
- 500					1	t		T	
L					L	L		ᆚ	



AD-02

SHEET 9 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

WATER	LEVELS: 3.0	ft bgs	s on 9	/08/07 START: 9/8/2007 END: 9	/12/20	D7 LOGGER: J. Burkard, R. Bitely,	T. Borton, J. Townes
≷O⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B	E RU GTH, OVE	R Q D (%)	CTUI	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR	A Q	FRA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-317.7				359.6' - Mechanical break, horizontal, rough,		Limestone	
_			2	undulating, 3/4" relief 359.8' - Mechanical break, vertical, rough,	世	 359.0-363.9' - yellowish gray, (5Y 7/2), very fine to fine grained, 	1
_	R33-HQ		4	undulating	\perp	moderate to strong HCl reaction,	1
	5 ft 98%	62	1	360.2' - Bedding plane, horizontal, rough, undulating, bedding plane fracture along	\mathbf{H}	 weak to medium strong (R2 to R3), voids up to 3/16" over 10% of rock]
l _			2	organic layer 360.5, 361.3, 362.5, 362.9, 363.55' -	\bot	surface and are fossil molds, cavities up to 3/4" in diameter over 1-2% of	
_				Mechanical break, horizontal, rough,	F	rock surface, trace organics,	
_			1	undulating 361.5' - Mechanical break	#	moderately fossiliferous	R33: 8 minutes
-	364.0		NR/		#	─ No Recovery 363.9-364.0'	-
-			1	004.0 005.451. D. LII	#	Limestone	-
365_ -322.7				364.6, 365.45' - Bedding plane, horizontal, rough, undulating	+	364.0-366.55' - yellowish gray, (5Y 7/2), very fine to fine grained,	-
-			1		\perp	 moderate HCl reaction, weak to medium strong (R2 to R3), voids up 	-
-	R34-HQ				$+$ \square	to 3/16" over 10% of rock surface	-
-	5 ft 98%	82	>10	366.5-366.65' - Fracture zone, rock	+	and are fossil molds, trace organic laminations, fossiliferous	-
-	90%			fragments up to 3/4" in diameter	+	 366.55-368.55' - white to very light gray, (N9 to N8), very fine to fine 	1
-			1	367.3, 368.3' - Mechanical break (2), horizontal, rough, undulating	世	grained, strong HCl reaction,	SC-7 collected at 367.3 368.3'
_			1		\perp	 medium strong (R3), voids up to 3/8" over 20% of rock surface and are 	R34: 9 minutes
_	369.0		1			fossil molds, cavities up to 1-3/16"	1
			NR) 2			 over 5% or rock surface, fossiliferous 368.55-368.9' - Same as 	1
370				369.45, 369.85' - Fractures (2), horizontal, rough, undulating, tight	\mathbf{F}	364.0-366.55' — No Recovery 368.9-369.0'	
-327.7			1	G. G.	F	Limestone	
_			·	370.5' - Bedding plane, horizontal, smooth, tight, fracture along organic layering	#	369.0-373.55' - yellowish gray, (5Y – 7/2), very fine to fine grained,]
_	R35-HQ 5 ft	66	>10	371.4-371.5' - Fracture zone, rock fragments		moderate HCl reaction, medium strong (R3), voids up to 3/8" over	
_	91%			up to 3/4" in diameter	#	 20% of rock surface and are fossil 	
_			>10	372.1' - Fracture, horizontal, rough, undulating, tight	+	molds, trace organic layering, moderately fossiliferous	-
-				372.8-373.1' - Fracture zone, rock fragments	\perp		R35: 8 minutes
-	074.0		0 NR	up to 1-9/16" in diameter	+	_ No Recovery 373.55-374.0'	-
-	374.0		INE		+	Limestone	-
375			4	374.25, 374.4, 374.75, 374.95, 375.3, 375.5, 376.45, 377.7, 378.15' - Mechanical break or	丁	 374.0-378.5' - yellowish gray, (5Y 7/2), very fine to fine grained, 	-
-332.7				bedding plane (9), horizontal, rough,	世	moderate HCl reaction, medium	-
-			2	undulating, tight	世	 strong (R3), voids up to 3/8" over 10% of rock surface and are fossil 	1
-	R36-HQ		_		世	molds, trace organic layering, fossiliferous, cavities up to 9/16" over	1
	5 ft 90%	46	1		\perp	1-2% of rock surface and are	1
			3	377.1, 377.35' - Mechanical break or bedding	\perp	dissolution fossil molds]
_				plane (2), horizontal, rough, undulating, tight		_	<u> </u>
-			1			- N- D	R36: 8 minutes
-	379.0		NR	270.0.270.21 Fronture	#	No Recovery 378.5-379.0'	-
-			>10	379.0-379.3' - Fracture zone, rock fragments up to 1-9/16" in diameter	#	-	-
380					+		_



338884.FL AD-02

SHEET 10 OF 15

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER	LEVELS: 3.0	ft bgs	s on 9/	08/07 START: 9/8/2007 END: 9	/12/200	7 LOGGER: J. Burkard, R. Bitely,	T. Borton, J. Townes
≥∩ ∵	(9)			DISCONTINUITIES	ڻ ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-337.7 - - -	R37-HQ 5 ft	36	3	379.6, 379.8, 380.0' - Fractures (3), horizontal, smooth, tight 380.2-380.4' - Fracture zone, rock fragments up to 1-9/16" in diameter 380.8, 381.4' - Fractures (2), horizontal,		Limestone 379.0-383.1' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, medium strong (R3), voids up to 3/8" over	-
- -	82%	00	>10	rough, undulating, open to 3/4" 382.7-382.9' - Fracture zone, rock fragments		20% of rock surface and are fossil molds, fossiliferous	-
_	384.0		NR	up to 1-9/16" in diameter 384.0-384.5' - Fracture zone, rock fragments		No Recovery 383.1-384.0' 384.0-384.5' - yellowish gray, (5Y	R37: 8 minutes -
385_ -342.7 -			>10	up to 1-9/16" in diameter 384.7, 384.95' - Fractures (2), horizontal, rough, undulating, 3/4" relief 385.6-385.75' - Fracture zone, rock		7/2), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" over 20% of rock surface and are fossil molds, moderately	
-	R38-HQ 5 ft 88%	53	2	fragments up to 3/4" in diameter 386.2, 386.55, 387.15' - Fractures (3), horizontal, rough, undulating, 3/8" relief 386.4-386.8' - Mechanical break		fossiliferous 384.5-385.75' - light gray, (N7), very fine to coarse grained, strong HCl reaction, medium strong to strong (R3 to R4), voids up to 3/32" over	-
- - -	389.0		1 0 NR			10% of rock surface and are fossil molds, cavities up to 3/8" over 3-5% of rock surface 385.75-385.95' - Same as	R38: 8 minutes
390 -347.7			>10	389.0-389.9' - Fracture zone, rock fragments up to 1-9/16" in diameter 390.0' - Fracture, vertical, rough, undulating,		384.5-385.75' except organic laminated limestone 385.95-388.4' - Same as 384.0-384.5' No Recovery 388.4-389.0'	_
_ _ _	R39-HQ 5 ft 54%	9	>10	tight 390.1, 390.3' - Fractures (2), horizontal, rough, undulating, tight 390.5-390.6' - Fracture zone, rock fragments up to 3/4" in diameter		Limestone 389.0-391.7' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, very weak	-
_			NR	390.8, 391.95, 391.2' - Fractures (3), horizontal, rough, undulating, tight 391.5' - Mechanical break		(R1), voids up to 1/16" over 1-2% of rock surface, poorly fossiliferous, trace organic laminations No Recovery 391.7-394.0'	R39: 8 minutes
395	394.0		1			Limestone 394.0-399.0' - yellowish gray, (5Y 7/2), very fine to fine grained,	
-352.7 - - -	R40-HQ 5 ft	46	3 >10	395.0, 395.4, 395.75, 396.0, 396.4' - Fractures (5), horizontal, rough, undulating, tight to open		moderate HCl reaction, very weak to weak (R1 to R2), voids up to 3/16" over 10% of rock surface and are fossil molds, moderately fossiliferous, trace laminations	- - -
- -	100%		4	396.7-397.1' - Fracture zone, rock fragments up to 1-3/16" in diameter 397.45, 397.65, 397.9' - Fractures (3), horizontal, rough, undulating, tight			
-	399.0		>10	398.3-399.0' - Fracture zone, rock fragments up to 1-9/16" in diameter			R40: 6 minutes - - -
400_					$\dagger \dagger$		
							<u> </u>



338884.FL AD-02

SHEET 11 OF 15

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.0 ft bgs on 9/08/07 START: 9/8/2007 END: 9/12/2007 LOGGER: J. Burkard, R. Bitely, T. Borton, J. Townes DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -357.7 399.2, 399.6, 399.8, 400.0, 400.2, 400.4, Limestone 4 400.6, 400.9, 401.05, 401.45, 402.05' -399.0-402.45' - yellowish gray, (5Y Fractures (11), horizontal, rough, undulating, tight, to 3/8" relief 7/2), very fine to fine grained, moderate HCI reaction, weak (R2), R41-HO 2 voids up to 3/32" over 20% of rock 31 5 ft 69% surface and are fossil molds, moderately fossiliferous 1 No Recovery 402.45-404.0' NR R41: 6 minutes 404 0 Limestone 404.0-408.3' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, weak to 3 404.5, 404.75, 404.9, 405.15, 405.35, 405.95, 405 406.1, 406.2, 406.4, 406.7, 406.85, 407.1' --362.7 Fractures (12), horizontal, rough, undulating, 3 medium strong (R2 to R3), voids up tight open to 3/8" over 10% of rock surface and are fossil molds, secondary quartz R42-HQ 406.0' - Fracture zone, fragments up to >10 1-9/16" in diameter mineralization found in fractured 5 ft 25 86% material near bottom of run, trace organic laminations near top of run >10 407.4-408.3' - Fracture zone, fragments up to 1-9/16" in diameter, quartz grains up to 3/8 found as infill material R42: 8 minutes No Recovery 408.3-409.0' NR 409.0 409.1, 409.25, 409.45, 410.85, 411.35, 412.85, 413.2, 413.7, 413.9' - Bedding plane or mechanical break (9), <10 deg, rough, Complete drilling at 15:15 Limestone >10 409.0-414.0' - yellowish gray, (5Y on 09/10/07 due to 7/2), very fine to medium grained, strong HCl reaction, extremely weak 410 proximal lighting, water -367.7 level at surface undulating, tight to open 1/2" 409.7-410.05' - Fracture zone, rough, to very weak (R0 to R1), laminated 1 R. Bitely begins logging organics over 20% of rock surface, voids <1/16" over <10% of rock surface especially along bedding undulating, rock fragments with carbonate silt matrix, fragments <1" in diameter R43-HQ 58 1 5 ft 100% planes, trace cavities up to 1' diameter, carbonate silt and limestone fragments at 409.7-410.5', 1 carbonate clay/silt with limestone fragments at 412.8-413.0' R43: 8 minutes 3 414.0 414.0-416.6' - yellowish gray, (5Y 7/2), very fine to medium grained, >10 414.5-415.0' - Fracture zone, rough, 415 moderate to strong HCI reaction, undulating, rock fragments <2" in diameter -372.7 extremely weak to very weak (R0 to 415.2, 415.4, 416.35, 416.5, 418.35, 418.45, 10 R1), voids <1/16" over 30% of 418.55' - Bedding plane or mechanical break, surface, few cavities 1/2" in diameter, <10 deg, rough, undulating, tight to open 1/2" moderately fossiliferous R44-HC 415.6-415.85' - Fracture zone, rough, NA 26 5 ft undulating, rock fragments <2" in diameter 416.55-416.7, 417.1-417.15, 417.4-417.45, 94% Organic Elastic Silt To Organic Fat Clay (MH-CH) 417.65-418.05' - Fracture zone (4), rough, undulating, organic silt and rock fragments 416.6-417.4' - dark greenish gray, NA (5G 4/1), no HCl reaction, extremely <2" in diameter with carbonate silt lenses weak (R0), laminated, poorly R44: 10 minutes 3 interbedded fossiliferous, moderate hydrogen sulfide odor NR 419.0 >10 420



338884.FL AD-02

SHEET 12 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS : 3.0 ft bgs on 9/08/07

START : 9/8/2007

END : 9/12/2007

LOGGER : J. Burkard, R. Bitely, T. Borton, J. Townes

WATER	LEVELS: 3.0	ft bgs	s on 9/	08/07 START: 9/8/2007 END: 9/	/12/20	07 LOGGER: J. Burkard, R. Bitely,	T. Borton, J. Townes
>00	(9)			DISCONTINUITIES	ڻ ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	R. R.U.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	io Lic	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-377.7	OIR	œ	шФ	419.0-419.4, 419.6-419.7, 419.8-420.4,	S	Limestone	
-311.1			>10	419.0-419.4, 419.6-419.7, 419.8-420.4, 421.75-422.4, 422.65-423.4' - Fracture zone	士	- 417.4-418.7' - yellowish gray, (5Y	-
				(5), silt infilling, rock fragments <2" in	┵	7/2), very fine to medium grained,	
	R45-HQ 5 ft	13	>10	diameter 419.5, 420.6, 420.9, 421.65' - Bedding plane	╨	moderate to strong HCl reaction, extremely weak to very weak (R0 to	_
	88%			or mechanical break (4), <10 deg, rough,	\perp	R1), voids <1/16" over 30% of	
			>10	undulating, tight, open <1/2"	┰	surface, few cavities 1/2" in diameter, moderately fossiliferous	
			-10		J	No Recovery 418.7-419.0'	
			>10		H	Limestone	R45: 8 minutes
	424.0		NR		\mathbb{H}	419.0-423.4' - yellowish gray, (5Y 7/2), very fine to medium grained,	
]]	-				工	moderate HCl reaction, extremely	1
425			>10	424.5' - Bedding plane or mechanical break,	\perp	 weak to very weak (R0 to R1), interbedded carbonate silt lenses, 	1
-382.7				horizontal, rough, undulating – 424.8-424.9, 425.1-425.6, 426.2-426.3,	┰	voids <1/16" over 10% of surface,	
			>10	427.1-428.0' - Fracture zone (4), rough,	+	 cavity up to 0.5' long from 421.75-422.25' with crystalline quartz 	1
	R46-HQ			undulating, rock fragments <2" in diameter 425.9, 426.75' - Fractures or mechanical	世	growth, laminated bedding over 10%	
	5 ft 80%	16	>10	break (2), <10 deg, rough, undulating, tight,	屽	of surface No Recovery 423.4-424.0'	-
	60%			open <1/2"	仜	Limestone	1
-			>10		\pm	424.0-428.0' - yellowish gray, (5Y	-
					+	7/2), very fine to medium grained, moderate HCl reaction, extremely	R46: 12 minutes
			NR		片	weak to medium strong (R0 to R3),	-
	429.0				世	variable voids <1/16" over 30% of rock surface from 424.0-424.5', trace	-
			>10	429.3, 429.6' - Mechanical break (2), 50 deg	\perp	voids , <1/16" of remaining core,	-
430_ -387.7				and 60 deg 429.85-430.15, 430.6-431.0, 431.8-432.7,	丰	laminated organics from 424.5-424.8' over 20%, trace grayish blue (5PB	4
-307.7			>10	433.0-433.6' - Fracture zone (4), rough,	士	 5/2) mottling over core from 	-
4				undulating, rock fragments <2" in diameter	F	425.6-427.0', all poorly fossiliferous No Recovery 428.0-429.0'	
4	R47-HQ 5 ft	8	>10	431.2, 431.7' - Bedding plane or mechanical	片	_ Limestone _	
4	92%			break (2), horizontal and 30 deg, smooth to rough, undulating, intersection at 431.2'	上	429.0-433.6' - yellowish gray to grayish black, (5Y 7/2 to N2), strong	
			>10	. sag.i, and adding, into socion at 40 i.2	$oldsymbol{oldsymbol{eta}}$	HCl reaction, extremely weak to	
					口	medium strong (R0 to R3), organic	
			>10		上	lenses, organics as laminae and lenses up to 1" thick comprising 20%	R47: 15 minutes
 	434.0		NR		厂	of core especially 432.0-432.6',]
 			NIA			 mottled coloration along bedding planes, especially in stronger 	- 1
435			NA			limestone, poorly fossiliferous, trace	1
-392.7			NI A	_		voids <1/16" No Recovery 433.6-434.0'	
]]			NA			Limestone	1
]]	R48-HQ					- \434.0-434.3' - light gray, (N7), very fine grained, mild HCl reaction,	1
7	5 ft 100%	48	>10	436.35' - Bedding plane or mechanical break, horizontal, rough, stepped to undulating, tight	Ħ	strong (R4)	SC-8 collected at 436.35- 437.35'
	10070				世	Organic Carbonate To Coal Seam 434.3-434.6' - black to greenish	
			0	437.35' - Mechanical break	屽	black, (N1 to 5GY 2/1), no HCl	
					世	reaction, laminated, friable	R48: 13 minutes
	420.0		3	438.25' - Bedding plane or mechanical break, horizontal, rough, stepped to undulating, tight	\pm	 -	-
	439.0			438.75, 438.9' - Fractures or mechanical	F	 -	-
,			>10	break (2), 50 deg and 80 deg, rough, undulating	<u> </u>	<u> </u>	
440				undulating			
$\overline{}$							



338884.FL AD-02

SHEET 13 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bgs	s on 9/	/08/07 START: 9/8/2007 END: 9/	12/20	007 LOGGER : J. Burkard, R. Bitely, 1	Γ. Borton, J. Townes
≥∩≎	(9)			DISCONTINUITIES	ő	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
-397.7	COR	A Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-397.7			>10	439.0-439.3, 439.5-440.15, 440.7-441.1, 441.9-442.2' - Fracture zone (4), rough, undulating, rock fragments <2" in diameter		434.6-436.2' - dark greenish gray, (5GY 4/1), carbonate, varve-like	_
_	R49-HQ 5 ft 64%	11	>10	440.35, 440.6, 441.8' - Fractures or mechanical break (3), <10 deg, rough, undulating, open <1/2"	Ħ	laminated organics, few silica nodules to subhedral quartz up to 1/2" diameter at 435.2'	-
_			<u>>10</u>		Ħ	Limestone 436.2-439.0' - dark greenish gray, (5GY 4/1), very fine to fine grained,	-
_	444.0		NR	-	H	strong HCl reaction, medium strong to strong (R3 to R4), laminated, varve-like organic laminations, trace	R49: 14 minutes
445			>10	444.0-445.5' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-9/16" in diameter	Ħ	limestone casts or secondary carbonate mineralization up to 1" diameter, poorly fossiliferous	- -
-402.7 -			>10	445.1, 445.9' - Fractures (2), 45 deg, rough, undulating, tight	Ħ	439.0-439.7' - yellowish gray, (5Y 7/2), mild HCl reaction, weak to medium strong (R2 to R3), with	_
_	R50-HQ 5 ft 66%	7	3	446.4' - Fracture, 45 deg, rough, undulating,		interbedded carbonate silt lenses, voids <1/16" over 20% of surface, poorly fossiliferous, 1/4" organic peat	-
-	0070		0	tight 446.5' - Mechanical break 446.9, 447.0' - Fractures (2), horizontal,	Ħ	lens at 439.35'	- -
_			NR	rough, undulating, tight	Ħ	<50% limestone fragments as sand sized fraction, organic peat lens at	R50: 16 minutes
-	449.0			-	F	Limestone	J. Townes begins logging
450 -407.7			3	449.45' - Fracture, 45 deg, rough, undulating, tight	Ħ	- 440.2-441.25' - medium light gray to yellowish gray, (N6 to 5Y 7/2), mild HCl reaction, strong (R4), voids	
-	R51-HQ		>10	449.7, 449.95' - Fractures (2), horizontal, rough, undulating, tight 450.5' - Fracture, horizontal, rough,	E	- <1/16" over 30% of rock surface, cavities <1" diameter over 10% of surface, mottled coloration due to	-
-	5 ft 66%	24	>10	undulating, tight 450.9-451.2' - Fracture zone, rock fragments up to 1-9/16" in diameter	Ħ	secondary mineralization of cavities, organic associated with cavities, with	-
-				451.6-452.3' - Fracture zone, rock fragments up to 1-9/16" in diameter	Ħ	- calcite crystals at 440.2-441.25' and - 441.27-442.2' - 441.25-442.2' - moderate yellowish	-
-	454.0		NR		Ē	brown, (10YR 5/4), very weak to weak (R1 to R2), faintly laminated organics	R51: 9 minutes
455 <u></u>			>10	454.0-455.5' - Fracture zone, multiple, high angle, intersecting fractures, rock fragments up to 2-3/8" in diameter	Ħ	No Recovery 442.2-444.0' Limestone 444.0-447.3' - medium light gray,	_
-412.7 - -			>10	455.6, 456.0, 456.4, 456.9, 457.0, 457.1' -	E	(N6), very fine grained, strong HCl reaction, strong (R4), voids up to 3/32" over 20% of rock surface,	_
	R52-HQ 5 ft 82%	28	>10	456.6-456.7' - Fracture zone, rock fragments	Ħ	cavities up to 9/16" over 1-2% of rock surface and some are filled with quartz crystallization	_
_			>10	up to 3/4" in diameter 457.45-457.65' - Fracture zone, rock fragments up to 1-3/16" in diameter	Ħ	- No Recovery 447.3-449.0'	_
_	459.0		NR		E		R52: 15 minutes
460			>10	459.0-459.3' - Fracture zone, rough, undulating, rock fragments <2" in diameter	Ħ	- - -	-
					1		
					1		

Rev. 4



338884.FL

AD-02

SHEET 14 OF 15

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.0 ft bgs on 9/08/07 START: 9/8/2007 END: 9/12/2007 LOGGER: J. Burkard, R. Bitely, T. Borton, J. Townes DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -417.7 459.9-460.05' - Fracture zone, rough, Limestone >10 undulating, rock fragments <1" in diameter 449.0-452.3' - light brownish gray to 460.3-460.75' - Fracture zone, rough, light brown, (5YR 6/1 to 5YR 6/4), undulating, rock fragments <3" in diameter, 2 very fine to fine grained, strong HCI R53-HQ reaction, strong (R4), carbonate sandy silt lens from 451.6-451.8' is vertical fractures from 460.4-460.7 46 3 5 ft 460.85, 461.25, 461.95, 462.3' - Bedding plane or mechanical break (4), rough, 80% extremely weak rock, voids up to undulating, tight, open to <1/2 3/16" over 5% of rock surface and 1 are filled with crystallization, trace 461.5' - Mechanical break organic laminations at 451.5' R53: 14 minutes No Recovery 452.3-454.0' NR Limestone 464 0 454.0-458.1' - light brownish gray to light brown, (5YR 6/1 to 5YR 6/4), >10 464.3' - Fractures (3), horizontal and vertical, very fine to fine grained, strong HCI rough, undulating, tight, three intersecting 465 reaction, strong (R4), voids up to 3/16" over 5% of surface, trace -4227 fractures 464.6-465.4' - Fracture zone, rock fragments NA up to 1-3/16" in diameter organic laminations at 456.9 465.6-465.9' - Fracture zone, rock fragments No Recovery 458.1-459.0' R54-HQ up to 3/4" in diameter 466.2' - Bedding plane, horizontal, rough, Limestone 5 ft 0 NA 459.0-463.0' - light gray to yellowish gray, (N7 to 5Y 7/2), very fine to fine grained, weak to strong (R2 to R4), 78% undulating, tight 466.5-467.9' - Fracture zone, rock fragments up to 1-9/16" in diameter NA voids <1/16" over <10% of rock, cavities <3/4" from 462.0-463.0', R54: 10 minutes trace laminated organics, cavity NR infilling, crystalline growth of 469.0 calcite/aragonite, very weak to weak transition from 461.25-461.55' 469.0-469.6' - Fracture zone, multiple high >10 angle, intersecting fractures, rock fragments No Recovery 463.0-464.0' 470 up to 2-3/8" in diameter Limestone 469.9' - Fracture, horizontal, rough, 427 7 464.0-464.9' - light brownish gray to undulating 470.1' - Bedding plane, horizontal, smooth, 3 light brown, (5YR 6/1 to 5YR 6/4), very fine to fine grained, strong HCI stepped, intersecting fractures, rock R55-HQ reaction, medium strong to strong (R3 to R4), trace organic increasing with depth, voids up to 3/32" over fragments up to 2-3/8" in diameter 44 2 470.2' - Fracture, 30 deg, rough, undulating, 98% tight 1-2% of rock surface 2 470.5' - Fracture, 45 deg, rough, undulating, Silt With Limestone Fragments (ML) tight 464.9-465.9' - fine grained, strong 471.75, 472.0, 472.15, 472.75, 473.1' -R55: 12 minutes HCl reaction, extremely weak (R0), 1 Fractures (5), horizontal, rough, undulating, with limestone fragments, high except 45 deg at 472.75' 474.0 NR organic content, strong organic odor Complete drilling at 17:00 Limestone 474.3' - Fracture, horizontal, rough, 3 on 09/11/07, water level at undulating, tight 465.9-466.5' - Same as 464.0-464.9' 475 surface 474.7' - Fracture, 30 deg, rough, undulating, Silt With Limestone Fragments (ML) 432.7 466.5-467.9' - Same as 464.9-465.9' No Recovery 467.9-469.0' 4 474.9' - Fracture, horizontal, rough, undulating Limestone R56-HC 475.3' - Fracture, 30 deg, rough, undulating, 469.0-473.9' - light brownish gray to light brown, (5YR 6/1 to 5YR 6/4), >10 36 5 ft 100% 475.9' - Fracture, horizontal, rough, very fine to fine grained, strong HCI undulating, high relief at 3/4" 475.6, 475.9' - Fractures (2), horizontal, 3 reaction, medium strong to strong (R3 to R4), voids up to 3/16" over rough, undulating, tight 476.4, 475.9' - Fracture zone, horizontal, 20% of rock surface and are fossil R56: 15 minutes molds, moderately fossiliferous, trace >10 rough, undulating, tight, rock fragments to organics near top of run 479.0 No Recovery 473.9-474.0' 1 480



338884.FL AD-02

SHEET 15 OF 15

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

				, , , , , , , , , , , , , , , , , , ,	iig		
WATER	LEVELS: 3.0	ft bg:	s on 9	/08/07 START: 9/8/2007 END: 9/	12/20	D7 LOGGER: J. Burkard, R. Bitely,	T. Borton, J. Townes
>		L	_	DISCONTINUITIES	(J)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	LOG	ROCK TYPE, COLOR,	
照光후	N 4.8.	(S)	FRACTURES PER FOOT		SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ΞĂĚ	A TES	(%) О	도	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E # 4	S S S S S S S S S S S S S S S S S S S	Ø	ZZ ERZ	PLANARITY, INFILLING MATERIAL AND	₹	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	225	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	,, -
-437.7				476.75, 477.0, 477.65, 478.0, 478.35' -	Ш	Limestone	
-			4	Fractures (5), horizontal, rough, undulating,	╁	 474.0-479.0' - yellowish gray, (5Y 	1
l -				tight	+	_ 7/2), very fine to fine grained, mild to	1
	R57-HQ			478.6-478.8' - Fracture zone, rock fragments		strong HCl reaction, medium strong	
	5 ft 96%	37	>10	up to 1-3/16" in diameter 479.6, 480.15, 480.45, 480.6, 480.95, 481.25'	Ъ.	 to strong (R3 to R4), voids up to 3/16" over 10% of rock surface and 	1
-	90 /6			- Fractures (6), horizontal, rough, undulating,	+	are fossil molds, cavities up to 3/8"	1
l _			3	tight		- diameter over 1-2% of rock surface,	
				481.5-481.8' - Fracture zone, rock fragments		moderately fossiliferous, secondary	
-				to 3/4" diameter	ш	mineralization from 478.0-479.0'	R57: 12 minutes
_			>10	481.9, 482.1, 482.75, 482.95, 483.2, 483.4' -	+	 479.0-483.8' - yellowish gray to light 	-
_	484.0		NR.	Fractures (6), horizontal, rough, undulating,		gray, (5Y 7/2 to N7), very fine to fine	_
			igcup	open to 3/4"	Ш	grained, mild to strong HCl reaction,	
105			>10	482.85' - Fracture, vertical, rough, undulating,	╊	 medium strong to strong (R3 to R4), with and extremely weak carbonate 	
485 <u>-</u> -442.7				tight 483.55-483.7' - Fracture zone, rock —	+	sandy silt lens from 481.5-481.8',	-
-442./			4	fragments up to 1-3/16" in diameter	Ш	voids up to 3/8" over 10% of rock	
			4	484.0-484.5' - Fracture zone, rock fragments	\vdash	surface and are fossil molds, trace	1 7
-	R58-HQ	!)		up to 2" in diameter	\vdash	organics, moderately fossiliferous	SC-9 collected at 485.8-
-	5 ft	42	2	484.85, 485.0, 485.3, 485.4, 485.8, 486.9,	-	No Recovery 483.8-484.0¹	486.85'
	76%			487.0' - Fractures (7), horizontal, rough,	┸	Limestone	_
			4	undulating, tight		484.0-487.8' - light brownish gray,	1
-			1	487.2' - Fracture, horizontal, rough, undulating, open to 3/4"	\Box	L (5YR 6/1), very fine to fine grained, mild to strong HCl reaction, strong	1
_				- undulating, open to 0/4	-	(R4), voids up to 3/16" diameter over	D50: 44
			NR		\mathbf{L}	20% of rock surface are fossil molds,	R58: 11 minutes
	489.0					quartz crystallization at 487.2',	
-	409.0			•		 1-9/16" diameter and contains 	1
-			3	489.2' - Fracture, horizontal, rough,	₽	_ carbonate crystallization	-
490_				undulating, aragonite crystallization 489.45, 489.9' - Fractures (2), horizontal,	ЬT	No Recovery 487.8-489.0¹ ── Limestone	
-447.7				rough, undulating, tight		489.0-493.05' - light brownish gray,	
_			0		╙	(5YR 6/1), very fine to fine grained,	1
-	R59-HQ	ļ		-	+	 mild to strong HCl reaction, strong 	1
_	5 ft	l 64	>10			(R4), voids up to 3/16" over 10% of	
	81%		10	491.45-491.6' - Fracture zone, rock		rock surface and are fossil molds,	
_				fragments up to 1-3/16" in diameter	\vdash	- cavities up to 1-3/8" over 1% of rock	1
_			1	492.4' - Fracture, horizontal, rough,	亡	surface are filled with carbonate crystallization and found from	-
I _				undulating, tight	$oldsymbol{\sqcup}$	- 489.0-490.0', moderately	
					\vdash	fossiliferous	R59: 12 minutes
_	404.0		NR		Ľ	No Recovery 493.05-494.0'	1
-	494.0	-			╙	Limestone	1 -
I -			5	494.2, 494.3, 494.45, 494.75, 495.1, 495.55,	\vdash	- 494.0-498.4' - light brownish gray,]
495				495.9' - Fractures (7), horizontal, rough,		(5YR 6/1), very fine to fine grained,	
-452.7				undulating, trace brown staining, tight —	$oxed{\Box}$	mild to strong HCl reaction, medium	
-			4	-	+	strong to strong (R3 to R4),	1
_				495.65' - Fracture, vertical, rough, undulating,	广	carbonate sandy silt, extremely weak	
			,	tight, intersecting with horizontal fractures at	Ш	rock from 497.3-497.9', voids up to	
-	R60-HQ)	4	495.55 and 495.9'	1—	 3/16" over 10% of rock surface and are fossil molds, cavities up to 9/16" 	1
-	6 ft	19		496.2, 496.45, 496.65' - Fractures (3), horizontal, rough, undulating, tight	\vdash	diameter over 1% of rock surface	1 -
l -	73%		>10		\Box	- and are filled with aragonite]
			'	to stepped, tight		crystallization, trace organics	
I -			1	497.3-497.6' - Fracture zone, rock fragments	╀		R60: 10 minutes, 6' run to
-				up to 3/4", soft material	世	No Recovery 498.4-500.0'	500' below ground surface -
I -				498.15' - Fracture, horizontal, rough,	\mathbf{H}^{-}	- -	
			NR	undulating, tight	\vdash		9/12/07 at 10:30, total
500	500.0						depth at 500.0' below - ground surface
300	500.0					Bottom of Boring at 500.0 ft bgs on	ground surface
						9/12/2007	
	i e	ı			1		



AD-03

SHEET 1 OF 16

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -157.6 200.0-200.6' - Fracture, vertical, rough, Limestone Boring AD-3 blind drilled to 200.0 >10 undulating, open 200.0-203.6' - light olive gray to approximately 200 feet 200.6-201.4' - Fracture zone, angular fragments, 1-3" in size yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, moderate HCl reaction, below ground surface before beginning sampling/logging.
"Water level is based on >10 weak to medium strong (R2 to R3), trace voids (<1/16") 201.4-201.5' - horizontal black 201.7-202.2' - Fracture zone, angular Ground Water Monitoring R1-HQ fragments, 1" to 2-1/2" at LNP site (FSAR Table 0 >10 organic laminae 5 ft 202.4' - Fracture, horizontal, smooth, 2.4.12.08)"
Logger: C. Sump (limited 100% undulating, open 202.8-203.1' - horizontal black 202.5-202.7' - Fracture (3), 60 deg, rough, undulating, 1/8" relief organic laminae >10 space in header) 203.6-205.0' - pale yellowish brown, Approximately 1.8' of 202.9' - Fracture, horizontal, rough, (10YR 6/2), fine grained, moderate slough (from 0.0-200.0' undulating, open HCI reaction, weak to medium strong drilling) removed from top >10 203.1-204.7' - Fracture zone, fragments (R2 to R3), 30% voids (<1/16"), trace 205 205.0 1/4-3" casts/cavities (<1/16") R1: 12 minutes -162<u>6</u> 204.7-205.0' - Fracture zone, fragments 2-3" 205.0-207.1' - light olive gray to >10 205.0-205.5' - Fracture zone, fragments 1/2' medium gray, (5Y 5/2 to N5), fine to 2" in size grained, moderate HCI reaction, 205.5-206.5' - Fracture zone, fragments medium strong (R3), trace medium >10 1/4-1" in size 15:25: Segment of R2 R2-HQ to coarse subrounded fragments 205.8, 206.0, 207.1, 207.3, 207.4, 207.5, 0 207.5, 207.6, 207.7, 207.8, 207.9 - Fractures or bedding plane (11), horizontal, rough, 206.5-207.1' - 5 to 10% voids to clogged, removed for 4 ft logging and resumed R2 -100% 1/16", trace cavities up to 3/4 x 9 HQ at 206.5' 1-3/16" planar to undulating, 1/8" open 207.1-209.0' - pale yellowish brown to yellowish gray, (10Y 5/4 to 5Y 7/2), Driller's Remark: R2 - HQ 208.1, 208.15, 208.2' - Fractures or bedding was a 4.0' run due to >10 plane (3), smooth to rough, planar to fine grained, weak HCI reaction, blockage in core barrel 209.0 undulating, 1/8-1/4" open 208.3-208.6' - Fracture zone, smooth to trace voids to 1/16", strong HCI R2: 14 minutes reaction in pulverized material >10 rough, planar to undulating, 1/4-2" open 209.0-209.85' - grayish orange pink, 210 208.6-209.0' - Fracture zone, fragments 2-3" (5YR 7/2), fine grained, moderate 167.6 209.0-209.85' - Fracture zone, multiple high 4 HCl reaction, medium strong to angle intersecting fractures, rock fragments strong (R3 to R4), voids (<3/16") R3-HQ up to 1/8" 8 over 70% of surface, moderately 4 ft 210.25' - Bedding plane, horizontal, smooth 43% fossiliferous 210.3' - Fracture, vertical, rough, undulating, 209.85-210.7' - moderate orange NR <1/16" open pink, (5YR 8/4), very fine grained, mild to moderate HCl reaction, weak 210.4' - Fracture, horizontal, rough, undulating, 3/8" open to medium strong (R2 to R3), voids 213.0 210.6' - Fracture, vertical, rough, undulating, over 10% of surface, cavities up to <1/16" open R3:15 minutes 3/8" over 1% of surface, laminated, >10 213.0-213.4' - Fracture zone, multiple high very poorly fossiliferous angle intersecting fractures, rock fragments No Recovery 210.7-213.0' up to 1/8" Limestone >10 213.6' - Fracture, horizontal, rough, 213.0-217.0' - grayish orange pink, 215 undulating, 3/8" open (5YR 7/2), very fine grained, mild to 172.6 214.05' - Fracture, rough, undulating, 3/16" moderate HCI reaction, medium >10 open strong (R3), voids <1/16" over 50% R4-HQ 214.25-216.15' - Fracture zone, multiple high of surface, few cavities up to 3/4", 6 6 ft angle intersecting fractures, rock fragments poorly fossiliferous 67% up to 1-9/16" >10 216.3, 216.55, 216.65' - Fracture (3), horizontal, smooth, bedding plane, very low No Recovery 217.0-219.0' R4:16 minutes 216.65-217.0' - Fracture zone, multiple high NR angle intersecting fractures, rock fragments up to 1-3/16" 219.0 219.0-220.8' - Fracture zone, multiple high J. Townes continues >10 angle intersecting fractures, rock fragments logging 220 up to 1-3/16"



PROJECT NUMBER:

338884.FL

BORING NUMBER:

AD-03 SHEET 2 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

VALTER LEVELS: 5,88 flags on 941307 START 8160007 FND: 8222007 LOGGER. P.D. 98 Streep. J. Townes, R. Blaey, M. Paucks, C. Sum DISCONTINUTIES DISCORDINUTIES UITHOLOGY COMMENTS	COMINC	INCTITOD A	ND L	ZUIFIV	IENT: BL3001 S/N 1517, mud rotary, HQ tools, HW casi	ng		ORIENTATION : Vertical
DEPTH TYPE CRICAL DR. MICRAPORT FERTURE. RESHO 5	WATER	LEVELS: 5.8	8 ft b	gs on 9	9/13/07 START : 8/16/2007 END : 8/3	24/20	D7 LOGGER : P. De Sa'rego, J. Tow	nes, R. Bitely, M. Faurote, C. Sump
177.6	> 0 @	(°)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
177.6	N AN E	747 200 200		ES	DESCRIPTION	13	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASING
177.6	불병은	P.F.R	(%)	150 100	DEPTH TYPE ORIENTATION ROLIGHNESS	1 5	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
177.6	FF FF FF	NG NG	O C	'AC'	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	
Section Sect		SHR	æ	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λS	CHARACTERISTICS	BROI 3, 1231 RE30213, 210.
RS-HQ 5 ft 0 NR	-177.6			>10				
RS-HQ Self D Sel				- 10	-			_
medium strong (R2 to R3), voids <a 5%="" href="https://doi.org/10.108/j.com/richard-resource-resour</td><td>_</td><td></td><td></td><td></td><td>-</td><td>╁</td><td>7/2), very fine to fine grained,</td><td></td></tr><tr><td>24.0 224.0 225 -182.6 -182.</td><td>_</td><td></td><td>0</td><td></td><td>-</td><td>Ė</td><td></td><td>-</td></tr><tr><td> NR NR NR NR NR NR NR NR</td><td> -</td><td>30 /0</td><td></td><td></td><td>-</td><td>+-</td><td><1/16" of="" over="" poorly<="" surface,="" td=""><td>-</td>	-							
224.0 225 2 2 224.7-224.9' - Fracture, 10 deg, rough, undulating, high relief (34") due to fossil molds (34") due to fossil molds (35") - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16' 229.4' - Fracture, 10 deg, rough, undulating, 58% NR 229.0 NR 229.0 NR 229.0 NR 229.4' - Fracture, 10 deg, rough, undulating, 58% NR 229.4' - Fracture, 10 deg, rough, undulating, -3/32" open, thin black material over 25% of fracture surface undulating, -3/32" open, thin black material over 25% of fracture surface undulating, -3/15" open, thin black material over 25% of fracture surface undulating, -3/15" open, thin black material over 25% of fracture surface undulating, -3/15" open, thin black material over 25% of fracture surface undulating, -3/15" open, thin black material over 25% of fracture surface undulating, -3/15" open, thin black material over 25% of fracture surface undulating, -3/15" open, thin black material over 25% of fracture surface undulating, -3/15" open, thin black material over 25% of fracture surface undulating, -3/15" open, thin black material over 25% of fracture undulating, -3/15" open, thin black material over 25% of fracture undulating, -3/15" open, thin black material over 25% of surface, fossil molds, poorly dos up to 1/15" over 20% of surface, cavilies up to 1/3/16" over 25% of surface	-			NR	-	\perp	– fossiliferous	-
224.0 225.2-226.9 - Fracture, 10 deg, rough, undulating, high relief (34") due to fosal molds angle intersecting fractures, rock fragments up to 1-3/16" NR 6+MO 5ft 0 12 29.4 - Fracture, 10 deg, rough, undulating, -3/32 open, this black material over 25% of fracture surface 229.5°. Fracture 20ne, multiple high angle intersecting fractures, rock fragments up to 1-3/16" over 50% of surface, cavelies up to 38" over 10% of surface, cavelies up to 1-3/16" over 20% of surface, cavelies up to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to 10 to 1-3/16" over 50% of surface, cavelies up to	-				-		No Recovery 220.8-224.0	P5:13 minutes
2 225 226 2 226 2 226 2 226 2 2	_				-	╁	=	No. 13 minutes
225 - 182.6 -	_	224.0			-		,	_
225. 1-82.6 1-82	_			2	_	╨	Limestone - 224 0-226 9' - vellowish grav (5Y	_
Section Sect					224.7-224.9' - Fracture, 10 deg, rough,		7/2), very fine grained, moderate HCl	
R6HQ 5 ft 12 > 10	-182.6			\ \\10				
R8-HQ 5 ft 5 ft 5 ft 5 ft 5 ft 5 ft 5 ft 5 f				/10		\vdash		
No Recovery 226.9-229.0' No Recovery 226.9-229.0' No Recovery 226.9-229.0' R6:5 minutes Second				>10				1
NR 229.0 NR 229.1 - Fracture, 10 deg, rough, undulating, -3/32" open, thin black material over 25% of fracture surface 229.5 - Fracture, 10 deg, rough, undulating, -3/32" open, thin black material over 25% of fracture surface 229.5 - Fracture, 10 deg, rough, undulating, -3/16" open 229.7 - Fracture, 10 deg, rough, undulating, -3/16" open 229.7 - Fracture, 10 deg, rough, undulating, -3/16" open 229.7 - Standard, voer 1-2% of surface, cavifies up to 3/4" over 1-2% of surface, fossil molds, trace laminations No Recovery 231.3-234.0" R7-HQ 5 th 46% 234.0 - 234.5" - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0 - 234.5" - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0 - 235.5" - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" > 10 R8-HQ 5 th 5 th 30% NR R8-HQ 5 th 10 234.0 - 234.5" - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" > 10 R8-HQ 5 th 7 th 7 th 7 th 8 th 7 th 8 th 7 th 8 th 8 th 8 th 8 th 8 th 8 th 8 th 8			12	/10	up to 1-3/16"	L	- iossilierous	_
230 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -192.	-				-	\vdash	No Recovery 226.9-229.0'	
230 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -192.	-				-		-	-
230	-			NR	-	╁	-	R6:5 minutes
230 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -187.6 -192.	-				-	H	-	-
230 - 187.6 >10 229.4' - Fracture, 10 deg, rough, undulating, ~3/32" open, thin black material over 25% of fracture surface 229.55' - Fracture, 10 deg, rough, undulating, ~3/32" open, thin black material over 25% of fracture surface 229.55' - Fracture, 10 deg, rough, undulating, ~1/16" open 229.55' - Fracture, 10 deg, rough, undulating, ~1/16" open 229.55' - Fracture, 10 deg, rough, undulating, ~1/16" open 229.55' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0 - 234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-235.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-235.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1 - 3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1 - 3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1 - 3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1 - 3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1 - 3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1 - 3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1 - 3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1 - 3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1 - 3/16" 239.0-240.0' - Fracture zone, multiple hig	-	229.0			-	L	_ Limestone	-
-3/32" open, thin black material over 25% of fracture surface surface surface surface 29.55' - Fracture, 10 deg, rough, undulating, -3/32" open, thin black material over 25% of fracture surface surface 29.55' - Fracture, 10 deg, rough, undulating, -3/20, fine grained, moderate HCI reaction, weak (R2), voids up to 1.3/16" open 29.7-231.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" angle intersecting fractures, rock fragments up to 3/4" over 1-2% of surface, (R2), voids of surface, (R2), voids of surface, (R2), voids of surface, (R2), voids of surface, (R2), voids of surface, (R2), voids of surface	-			>10	229.4' - Fracture, 10 deg. rough, undulating.	₩		-
Signature 10 deg, rough, undulating, 1/16" over 20% of surface, cavities up to 3/4" over 1-2% of surface, cavities up to 1-3/16" 1/16" over 20% of surface, cavities up to 3/4" over 1-2% of surface, fossil molds, poorly fossiliferous, trace laminations 1/16" over 20% of surface, cavities up to 3/4" over 1-2% of surface, cavities up to 1-3/16" 1/16" over 20% of surface, cavities up to 3/4" over 1-2% of surface, cavities up to 1-3/4" over 1-2% of su					~3/32" open, thin black material over 25% of	ш		
R7-HQ 5 ft 46% 0 229.7-231.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 231.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-235.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.9-235.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.9-235.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0-240.0' - Fracture zone, multiple	-107.0			>10		h		_
angle intersecting fractures, rock fragments up to 1-3/16" 234.0 234.0 234.0 234.0 234.0 234.0 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0 234.0 234.0 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.9-235.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0 235. -192.6 R8-HQ 5 ft 8 30% NR R8:7 minutes R7:7 minutes	_				<1/16" open	F	up to 3/4" over 1-2% of surface,	_
234.0 234.0 234.0 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" R8-HQ - 5 ft 30% No Recovery 231.3-234.0' R7:7 minutes R7:7 minutes R7:7 minutes R7:7 minutes R7:7 minutes R7:7 minutes	_		Ω	>1				_
234.0 234.0 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 235 -192.6 R8-HQ 5 ft 30% NR NR 239.0 239.0 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 239.0 R8-HQ 5 ft 30% NR 239.0 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" R8-T minutes R7:7 minutes R7:7 minutes R7:7 minutes R7:7 minutes R7:7 minutes R7:7 minutes R7:7 minutes			Ü		up to 1-3/16"	$oldsymbol{oldsymbol{eta}}$		_
234.0 234.0 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-235.5' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, weak (R2), voids <1/16" over 5% of surface, cavities up to 1" over 1-2% of surface, fossil molds, trace laminations, poorly fossiliferous No Recovery 235.5-239.0' R8:7 minutes R7:7 minutes								
234.0 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.0-235.5' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, weak (R2), voids <1/16" over 1-2% of surface, cavities up to 1" over 1-2% of surface, fossil molds, trace laminations, poorly fossiliferous No Recovery 235.5-239.0' R8:7 minutes				NR	~3/8" open		_	_
235 - 192.6	-				-	—	=	R7:7 minutes
235 - 192.6	1 -	234.0			·	Ľ	-	
235 -192.6 -1	1 -	204.0				╙	Limestone	
-192.6 -192.6	225			>10		仜		-
angle intersecting fractures, rock fragments up to 1" over 1-2% of surface, cavities up to 1" over 1-2% of surface, fossil molds, trace laminations, poorly fossiliferous No Recovery 235.5-239.0' NR 239.0 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments					234.9-235.5' - Fracture zone, multiple high	仜		-
R8-HQ 5 ft 8 30% NR NR NR Recovery 235.5-239.0' 239.0	-			>10	angle intersecting fractures, rock fragments	╁	 over 5% of surface, cavities up to 1" 	-
No Recovery 235.5-239.0' No Recovery 235.5-239.0' R8:7 minutes 239.0 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments	-	P8_H∩			up to 1-3/16"	F		-
R8:7 minutes 239.0 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments	-	5 ft	8		-	Ľ		-
R8:7 minutes 239.0 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments	-	30%			-	\vdash	_	-
239.0 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments	-			NR	-	仜	-	_
239.0 239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments	-				-	\vdash	<u>-</u>	
239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments	1 -				_	F	_	Ro:/ minutes
- >10 angle intersecting fractures, rock fragments	I _	239.0			_	片	_	
	1					\vdash]
	240			10		Ш		



338884.FL AD-03

ROCK CORE LOG

SHEET 3 OF 16

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump LITHOLOGY DISCONTINUITIES COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -197.6 Limestone 240.1' - Fracture, 60 deg, rough, undulating 239.0-240.2' - yellowish gray, (5Y 7/2), very fine grained, mild HCI reaction, weak (R2), voids up to R9-HO 3/32" over 30% of surface, fossil 5 ft 24% 0 molds, poorly fossiliferous, trace NR laminations No Recovery 240.2-244.0' R9:7 minutes 244 0 244.0-244.5' - Fracture zone, multiple high Driller's Remark: Smooth Limestone >10 244.0-244.5' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong HCl reaction, angle intersecting fractures, rock fragments drilling, no loss of 245 resistance or rod drops; up to 1-3/16" -202 6 incompetent material being very weak to weak (R1 to R2), voids ground up and washed out <1/16" over 50% of surface, trace laminations, area of oxidized pyrite R10-HQ 3/4", poorly fossiliferous No Recovery 244.5-249.0' 5 ft 0 NR 10% R10:7 minutes 249.0 249.0-249.6' - Fracture zone, multiple high Limestone >10 angle intersecting fractures, rock fragments 249.0-249.6' - yellowish gray, (5Y 250 to 1-3/16" 7/2), very fine to fine grained. -207<u>.6</u> moderate HCI reaction, extremely weak to very weak (R0 to R1), trace laminations, nonfossiliferous No Recovery 249.6-254.0' R11-HQ 0 5 ft NR 12% R11: 7 minutes 254.0 254.0-255.0' - Fracture zone, rough, Limestone 254.0-256.5' - yellowish gray, (5Y 7/2), very fine to fine grained, >10 undulating, multiple high angle intersecting 255 fractures, rock fragments up to 1.5" -212.6 moderate HCl reaction, very weak to 2 255.2' - Fractures (2), 60 deg and horizontal, weak (R1 to R2), trace laminations, rough, undulating, 3/16" open cavities up to 3/8" over 5% of surface, fossil molds, poorly R12-HQ fossiliferous 5 ft 28% 0 No Recovery 256.5-259.0' NR R12: 7 minutes 259.0 >10 260



PROJECT NUMBER:

338884.FL

BORING NUMBER:

AD-03 SHEET 4 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IENT: BL3001 S/N 1517, mud rotary, HQ tools, HW cas			ORIENTATION : Vertical
WATER	LEVELS : 5.8	88 ft b	gs on 9		24/200		vnes, R. Bitely, M. Faurote, C. Sump
≥ 5€	(%) _		1	DISCONTINUITIES	8	LITHOLOGY	COMMENTS
SELC ON	N _A N N _A N		RES	DESCRIPTION	임	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAC	IE RI GTH OVE	Q D (%)	CTU	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	S O	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-217.6			(>10)	259.0-259.3' - Fracture zone, rough,		Limestone	+
-				undulating, multiple intersecting fractures,	Н	- 259.0-260.1' - yellowish gray, (5Y	1
-	R13-HQ			fragments up to 0.5" with one larger piece 1.5"	Ħ	_ 7/2), very fine to fine grained, moderate to strong HCl reaction,	1
-	5 ft	0		259.4' - Fracture, <10 deg, rough, undulating,	ш	 weak (R2), voids <1/16" over 60% of 	1
-	22%		NR	9/16" open 259.7' - Bedding plane, <10 deg, rough,	₽	surface, cavities up to 3/4" over 10% surface, fossil molds, moderately	1
-				undulating, 3/8" open	Ш	 fossiliferous 	1
-				259.7' - Mechanical break, vertical 259.9-259.95' - Fracture, 45 deg and	ш	No Recovery 260.1-264.0'	R13: 7 minutes
-				horizontal, rough, undulating, intersecting	Н	-	-
-	264.0			fractures, ~3/8" open, due to fossil molds 259.95-260.1' - Fracture zone, fragments up	\Box	Limestone	-
			>10	to 1"	Ħ	 264.0-264.5' - yellowish gray, (5Y 	-
265_ -222.6			\>10 <i>i</i>	264.0-264.35' - Fracture zone, rough, undulating, fragments up to 2"	Ш	7/2), very fine to medium grained, strong HCl reaction, weak to strong	-
				264.45, 265.8, 265.95' - Bedding plane or	$oldsymbol{arphi}$	- (R2 to R4), voids <1/16" over 10%	-
_	 R14-HQ			mechanical break (3), <10 deg, smooth to rough, planar to undulating	ш	surface, few small dissolution cavities (<1x1/2"), trace shell laminae	-
_	5 ft	0			ш	 (<1/2"), poorly to moderately 	-
_	22%		NR		Н	fossiliferous Interbedded Silt And Limestone	
_					H	 264.5-264.7' - yellowish gray, (5Y 	-
_						7/2), dry to moist, nonplastic to low plasticity, moderate to strong HCl	B44. Constructor
_					Н	- reaction, coarse angular fragments,	R14: 6 minutes
_	269.0		40		ш	<50% limestone fragments, all carbonate	_
_			_10_	269.0-269.3' - Bedding plane, <10 deg and 80 deg, smooth to rough, undulating to	ш	Limestone	_
270_				planar, intersecting fractures	ш	264.7-264.95' - Same as 	_
-227.6					Н	Interbedded Silt And Limestone	_
_					H	264.95-265.1' - Same as - 264.5-264.7'	_
_	R15-HQ 5 ft	0				No Recovery 265.1-269.0'	_
_	6%	-	NR		Н	Limestone - 269.0-269.3' - yellowish gray, (5Y	_
_					ш	_ 7/2), very fine to fine grained, strong	<u> </u>
_					ш	HCl reaction, medium strong to strong (R3 to R4)	
_					Ш	No Recovery 269.3-274.0'	R15: 6 minutes
	274.0				Н]
			>10	274.0-274.4' - Fracture zone, rough, undulating, coarse fragments <1.5"	\square	Limestone - 274.0-275.0' - yellowish gray, (5Y]
275				274.6' - Bedding plane or mechanical break,	H	7/2), very fine to medium grained,	
-232.6				or fracture, <10 deg, rough to smooth, undulating	Н	mild HCl reaction, weak to strong - (R2 to R4), voids <1/16" over 10% of]
					Н	surface, moderately fossiliferous with]
	R16-HQ 5 ft	0			Д	fossil cast lenses No Recovery 275.0-279.0']
	20%	5	NR		Щ	-]
			' '		Н	_]
					\square	_]
					Ħ	_	R16: 6 minutes
	279.0				Ш	_]
			>10	279.0-280.7' - Fracture, <10 deg, rough, fragments <2", intersecting horizontal and	Н	_]
280			- 10	vertical fragments	\square		
					Ш		



PROJECT NUMBER: BORING NUMBER: 338884.FL **AD-03** SHEET 5 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING	METHOD A	ND E	QUIPN	ENT : BL300T S/N 1517, mud rotary, HQ tools, HW cas	ing		ORIENTATION : Vertical
WATER	LEVELS : 5.8	88 ft b	gs on 9	9/13/07 START : 8/16/2007 END : 8/	24/20	07 LOGGER : P. De Sa'rego, J. Tow	nes, R. Bitely, M. Faurote, C. Sump
≥∩ ≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-237.6 -			>10			Limestone - 279.0-280.7' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl	-
-	R17-HQ 5 ft 34%	0	NR			reaction, medium strong to strong (R3 to R4) No Recovery 280.7-284.0'	- - - R17: 10 minutes
_	284.0					_	
285 <u>-</u> -242.6			>10	284.0-284.55' - Fracture zone, rough, undulating, multiple intersecting fractures 284.8' - Bedding plane, 10 deg, rough, undulating		Limestone - 284.0-284.9' - yellowish gray, (5Y - 7/2), very fine to fine grained, medium strong to strong (R3 to R4),	-
-	R18-HQ		>10	285.12 - Fracture, <10 deg, rough, undulating, intersecting fractures 285.2' - Fracture, 55 deg, rough, undulating,	Ħ	 <1/16" voids over 10% of surface, fossiliferous 284.9-285.4' - grayish orange pink to 	-
-	5 ft 62%	12	>10	intersecting fractures 285.25' - Fracture, <10 deg, rough,		yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, moderate HCl reaction, extremely	-
-			NR	undulating, intersecting fractures 285.75' - Fracture or mechanical break, <10 deg, rough, undulating 286.4' - Fracture or mechanical break, <10 deg, rough, undulating		 weak to weak (R0 to R2) 285.4-285.5' - fine to medium grained, moderate HCl reaction 285.5-287.1' - yellowish gray, (5Y 7/2), fine to medium grained, mild 	R18: 6 minutes
290	289.0		>10	286.6-287.1' - Fracture or mechanical break, 40 deg, rough, undulating, multiple intersecting fractures 286.61' - Fracture or mechanical break, <10		HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 20% of surface, trace fossil casts	-
-247.6			>10	dea. rough, undulating	E	No Recovery 287.1-289.0' Limestone	
- - -	R19-HQ 5 ft 30%	0	NR	289.0-290.5' - Fracture zone, rough, undulating, multiple intersecting fractures, rock fragments <4"x1" 290.4' - Fracture, rough, undulating, potential healed fractures, intersecting		289.0-290.5' - yellowish gray, (5Y 7/2), very fine to medium grained, mild HCl reaction, extremely weak to medium strong (R0 to R3), voids over 15 to 30% of surface (<1/16"), poorly to moderately fossiliferous No Recovery 290.5-294.0'	- - - -
_					\vdash	-	R19: 5 minutes
-	294.0		>10	294.3' - Fracture, 70 deg, rough, undulating		Limestone - 294.0-295.9' - yellowish gray, (5Y	Driller's Remark: Slow rotation to approx. 400 rpm
29 <u>5</u> -252.6	-			294.6' - Fracture, 70 deg, rough, undulating 294.6-295.0' - Fractures, multiple intersecting fractures, fragments <2"	Ħ	8/1), very fine to fine grained, extremely weak to weak (R0 to R2),	to achieve better recovery in softer material
-	R20-HQ		10	295.2' - Bedding plane or mechanical break, <10 deg, smooth to rough, undulating	H	 laminated bedding, <5% voids (1/16") over surface, trace secondary infill on clast inclusion 	M. Faurote continues – logging _
- - -	5 ft 38%	10	NR	295.3' - Fracture or mechanical break, 60 deg, rough, undulating 295.8-295.9' - Fracture zone, rough, undulating, >3 fractures intersect		- No Recovery 295.9-299.0' - - -	- - - R20: 5 minutes
	299.0				Ľ		
300			3	299.35' - Mechanical break or bedding plane, <10 deg, smooth to rough		-	-

Rev. 4



PROJECT NUMBER:

33884.FL

BORING NUMBER:

AD-03 SHEET 6 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.8	8 ft b	gs on 9	9/13/07 START : 8/16/2007 END : 8/	24/200	DOT LOGGER : P. De Sa'rego, J. Tow	nes, R. Bitely, M. Faurote, C. Sump
≥∩⊋	. (%			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-257.6 	R21-HQ 5 ft 82% 304.0 R22-HQ 5 ft 38%	51	>10 >10 1 0 NR >10 >10	299.45' - Mechanical break or bedding plane, <10 deg, smooth to rough, slickensided 299.7' - Mechanical break or bedding plane, <10 deg, smooth to rough, slickensided 300.4-300.65' - Fracture zone, rough, undulating, gravel sized fragments <2" 301.0-301.1' - Fracture zone, rough, undulating, sand sized fragments 301.5' - Fracture or mechanical break, <10 deg, smooth to rough, undulating 301.9-302.1' - Fracture, <10 deg, smooth to rough, undulating, gravel sized fragments <1" 302.85' - Fracture or mechanical break, <10 deg, rough, undulating 304.0-305.9' - Fracture zone, rough, undulating, gravel sized fragments <2"		Limestone 299.0-299.3' - grayish orange, (10YR 7/4), very fine grained, mild HCl reaction, extremely weak (R0), trace laminations 299.3-299.35' - olive gray, (5Y 4/1), very fine grained, no HCl reaction, extremely weak (R0) 299.35-301.0' - yellowish gray to light olive gray, (5Y 8/1 to 5Y 6/1), very fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), laminated bedding 301.0-303.1' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to moderate HCl reaction, laminated bedding, voids <1/16" over 10% of surface No Recovery 303.1-304.0' Limestone 304.0-305.9' - yellowish gray, (5Y 8/1), mottled colorations with trace organics, very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), trace voids <1/16", poorly fossiliferous	SC-1 collected at 302.0-302.8' - R21: 7 minutes - R22: 7 minutes -
310 -267.6 - - - - - - 315 -272.6	R24-HQ		>10 >10 3 >10 NR >10 >10	309.0-309.7' - Fracture zone, rough, undulating, gravel sized fragments <2" 310.25-310.35' - Fracture zone, rough, undulating, gravel sized fragments <1" 310.8, 311.15, 311.55, 311.95, 312.1' - Bedding plane (5), <10 deg, rough, undulating 312.3-312.8' - Fracture zone, rough, undulating, gravel sized fragments <1" 314.0-315.6' - Fracture zone, rough, undulating, gravel sized fragments <3"		No Recovery 305.9-309.0' Limestone 309.0-312.8' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, extremely weak to weak (R0 to R2) 309.0-310.8' - very fine grained, mottled laminations 310.8-312.8' - very fine to fine grained, laminated bedding, with voids (<1/16") over 30% of surface No Recovery 312.8-314.0' Limestone 314.0-315.6' - yellowish gray, (5Y 8/1), very fine to medium grained, moderate HCl reaction, extremely weak to weak (R0 to R2), voids <1/16" over 10% of surface No Recovery 315.6-319.0'	R23: 5 minutes
- - - - 320	5 ft 32%	0	NR >10	318.0-320.0' - Fracture zone, rough, undulating, gravel sized fragments <2"		- - - - -	R24: 5 minutes



PROJECT NUMBER:

33884.FL

BORING NUMBER:

AD-03 SHEET 7 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

CORING	I WE I HOD AI	ND EC	JUIPIV	IENT: BL3001 S/N 1517, mud rotary, HQ tools, HW cas	irig		ORIENTATION : Vertical
WATER	LEVELS: 5.8	8 ft b	gs on 9	9/13/07 START: 8/16/2007 END: 8.	24/20	D7 LOGGER : P. De Sa'rego, J. Tov	vnes, R. Bitely, M. Faurote, C. Sump
≥∩ ∵	(9)			DISCONTINUITIES	ပ္	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B B B B B B B B B B B B B B B B B B	B.F.A	(%) O	TUR 00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ ا	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FFF	SNE	σD	SAC ER F	PLANARITY, INFILLING MATERIAL AND	/MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	0 H E	œ	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	,, -
-277.6 _			4	320.1' - Fracture, 30 deg, rough, undulating,	₽	Limestone - 319.0-320.5' - yellowish gray, (5Y	_
				4 intersecting fractures 320.3' - Fracture, 70 deg, rough, undulating,	\perp	8/1), very fine to medium grained,	_
l _	R25-HQ 5 ft	0		4 intersecting fractures	工	mild to moderate HCl reaction, very weak to weak (R1 to R2)	_
	30%	U			\vdash	No Recovery 320.5-324.0'	
			NR		H		I -
-						-	1
-					╁	-	R25: 6 minutes
-	324.0				仜	-	
-	324.0			324.0-326.1' - soil interval	111	Silty Sand (SM)	Begin drilling at 8:00 on – 8/22/07; water level at 3'
205			NA		1111	- 324.0-326.1' - yellowish gray, (5Y	below ground surface
325_ -282.6				_	1	7/2), moist, dense, fine to coarse grained, mild HCl reaction, 40 to 60%	Driller's Remark: No — slough in boring, clean to
-			NA		-	 carbonate sands, 40 to 60% low 	324' below ground surface
_	R26-HQ				-	plasticity carbonate silts	Driller's Remark: Moderate –
-	5 ft	0			-	No Recovery 326.1-329.0'	to slow advancement rate; very consistent
_	42%				4)	_	advancement _
-			NR		4	_	Driller's Remark: Slow rotation rate to approx. 300
_					1111	-	rpm to achieve better
_						_	recovery in softer material R26: 7 minutes
1 -	329.0						1020. 7 minutes
l _			NA		4	Sandy Silt (ML) - 329.0-331.3' - yellowish gray, (5Y	_
330_			1471	_	1111	7/2), dry to moist, very dense, fine to	
-287.6			NA			coarse grained, >50% low plasticity - carbonate silts, carbonate sands	
			INA			carbonate sins, carbonate sands	
	R27-HQ 5 ft	40	NA		Ш	- Limestone	-
	88%	40	2	331.5' - Mechanical break, boxing core		331.3-333.4' - yellowish gray, (5Y	
-				331.7' - Bedding plane or mechanical break, <10 deg, rough, undulating	╁	7/2), very fine to fine grained,	1
_			2	331.85' - Bedding plane or mechanical break,	\vdash	 moderate HCl reaction, extremely weak to very weak (R0 to R1), trace 	
-			0	<10 deg, rough, undulating 332.5' - Fracture or mechanical break, 60	仜	organic laminations	R27: 6 minutes
-	334.0		NR	deg, rough, undulating	╁	No Recovery 333.4-334.0'	
-	JUT.U			332.9' - Bedding plane or mechanical break, <10 deg, rough, undulating	F	No Recovery 334.0339.0'	Driller's Remark: Possible
335				10 dog, rodgii, diiddidiiig	Ħ	-	void space; low torque on - drill indicating very soft
-292.6				_	╁	 	material or no material; no
-					H	-	fluid return; fluid return at
-	R28-HQ				口	-	higher flow rate of approx. 25 gpm and not drilling
-	5 ft	0	NR		+	-	(approx. 25% circulation) -
-	0%				[_	-
-					Ë	_	-
-					╀	-	R28: 7 minutes
-						-	rzo. / Illinutes
-	339.0				上	- N. B	_
_					\vdash	No Recovery 339.0-342.0'	
340							
							L



AD-03

SHEET 8 OF 16

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>∪</u> MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -297.6 Driller's Remark: Clogging NR in core barrel; tag total depth at 341' below ground surface with cutting bit R29-HQ pulled; core barrel is open, 0 5 ft but rock fragments may be 34% rolling under the bit 342.0-343.7' - Fracture zone, rough, Sandy Silt (ML) 342.0-343.4' - yellowish gray, (5Y 7/2), moist to wet, soft to stiff, fine to causing no recovery or NA undulating, trace staining, silt material, possible void; felt rock fractures in rock fragments fragment break loose or coarse grained, moderate HCI NA reaction move out of the way; 2' of NR 343.4-343.7' - bluish gray, yellowish recovery from 342 to 344' 344 0 gray, (5B 7/1, 5Y 7/2), moderate HCI R29: 6 minutes reaction, weak (R2) 7 344.3-344.4' - Fracture zone, vertical and No Recovery 343.7-344.0 horizontal, multiple fractures on and through 345 **Silt (ML)** 344.0-344.3' - brown to orange gray, -302 6 the zone, broken fragments >10 345.5-345.75' - Fracture zone, fragments 1/4" carbonate grains to 3/4", in transition between lithologic units 346.1' - Mechanical break Limestone R30-HQ 344.3-345.7' - very fine to coarse 5 ft 32 3 346.4' - Mechanical break grained, strong HCI reaction, very weak (R1), bedded at 345.7 346.95' - Mechanical break or bedding plane 2 weak (K1), bedded at 93.7 345.7-347.4' - light gray, (N8), very fine grained, strong HCl reaction, medium strong (R3), pyrite mottling 347.3' - Bedding plane, horizontal, smooth, planar, organic, trace iron oxide 347.4' - Bedding plane, horizontal, smooth, NR R30: 7 minutes planar, organic, trace iron oxide 347.4-347.7' - compact, carbonate 349.0 No Recovery 347.7-349.0' >10 Limestone 349.5' - Fracture, 65 deg, planar to 350 349.0-350.5' - light gray to white, (N8 undulating 349.6-350.4' - Fracture zone, heavily -307.6 to N9), very fine grained, strong HCI >10 reaction, medium strong (R3) fractured, fragmented 350.5-352.0' - yellowish gray, (5Y 8/1), very fine grained, strong HCl 350.7-351.1' - Bedding plane, horizontal, R31-HQ planar, silt to sand horizon between weak 56 3 reaction, very weak (R1), laminated rock bedding, trace organics, trace pyrite 98% 351.7' - Mechanical break, 0-10 deg, rough, 352.0-354.0' - white, light gray, yellowish gray, (N9, N8, 5Y 8/1), very undulating to planar 2 352.0' - Mechanical break, 0-10 deg, rough, fine grained, strong HCl reaction, undulating to planar 352.6' - Mechanical break, 0-10 deg, rough, weak (R2), trace iron, pyrite R31: 6 minutes 2 undulating to planar 354.0 353.05' - Mechanical break, 0-10 deg, rough, Sandy Silt (ML) undulating to planar 354.0-354.4' - pinkish gray, (5YR 8/1), carbonate derived, friable 0 353.55' - Mechanical break, 0-10 deg, rough, 355 undulating to planar -312.6 Limestone 354.4' - Bedding plane, horizontal, smooth, NA 354.4-354.8' - pale orange, (10YR undulating, light to moderate organic 8/2), strong HCl reaction, weak (R2), 354.6' - Bedding plane, horizontal, smooth, R32-HC undulating, light to moderate organic staining <10% voids <1/16" >10 24 354.8-356.4' - Fracture zone, 0-80 deg, 5 ft Silt (ML) 100% organic staining, fragments 1/4" x 1/2" 357.0-357.5' - Fracture zone, 0-75 deg, \354.8-356.0' Limestone multiple fragments 1/2" x 1/2" 357.5-358.3' - Fracture zone or bedding >10 356.0-358.2' - pale orange, (10YR 8/2), very fine grained, strong HCI R32: 8 minutes plane, 0-60 deg, random fractures, multiple reaction, weak to medium strong (R2 >10 sizes to R3), 15-18% voids <1/8' 359.0 358.4' - Fractures, 75 deg and 60 deg, smooth, intersecting 2 359.4' - Bedding plane, rough, undulating 360



AD-03

SHEET 9 OF 16

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump LITHOLOGY DISCONTINUITIES COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -317.6 359.95' - Bedding plane, rough, undulating Limestone 360.2-360.4' - interbedded, generally >10 358.2-361.1' - pale orange, (10YR 8/2), very fine grained, weak to horizontal medium strong (R2 to R3), 20% voids (<1/16"), fossiliferous 361.1-361.3' - very fine grained, 360.95' - Mechanical break R33-HQ 50 3 5 ft 361.5' - Fracture or bedding plane, horizontal 82% SC-2 collected at 361.75and vertical, rough, undulating 361.6' - Fracture or bedding plane, horizontal transition zone, irregular, convoluted surface, laminar, horizontal bedding, 362 65' >10 and vertical, rough, undulating 361.7' - Fracture or bedding plane, horizontal and vertical, rough, undulating organic interbedding, rip-up clasts 361.3-363.1' - yellowish gray, (5Y 8/1), trace mottling, very fine to R33: 6 minutes NR 362.7-363.1' - Fracture zone, smooth to rough, undulating, multiple fragments, no medium grained, moderate to strong 364 0 HCI reaction, weak (R2), fossil casts visible orientations (1/16 to 3/8") over 10 to 15% of the 7 364.25-364.45' - Bedding plane, smooth, surface, faint bedding 365 undulating No Recovery 363.1-364.0' -322 6 364.7' - Fracture, 85 deg and vertical, rough, Limestone 0 undulating 364.0-364.25' - pale orange, (10YR 364.9' - Bedding plane, horizontal, smooth, 8/2), trace mottling, very fine grained, moderate to strong HCI reaction, R34-HQ contact, with 45 deg fracture 2 5 ft 52 366.2' - Bedding plane, rough, contact very weak (R2), fossil casts (1/16 to 3/8") over 10 to 15% of the surface, faint 100% irregular 366.9-368.0' - Fracture zone, smooth, bedding >10 undulating, irregular contact with uneven 364.25-364.9' - pale orange, (10YR surfaces 8/2), very fine grained, strong HCI R34: 6 minutes reaction, medium strong (R3), 1 granular, voids (<1/16") over 15% of 369.0 368.7' - Bedding plane, horizontal surface, cavities (up to 1/2 to 1/4") over 10% of surface (fossil molds) >10 369.35-369.8' - Fracture zone or bedding 364.9-366.15' - grayish orange, 370 plane, 0-90 deg, smooth to rough, planar to (10YR 7/4), very fine grained, strong undulating, iron oxides and trace organics 327.6 to very strong HCI reaction, medium >10 370.1' - Fractures, horizontal and 8 deg, strong (R3), trace organics as laminae at top of interval rough, undulating R35-HQ 370.6-370.7' - Fracture zone 366.15-368.2' - white, pale orange, (N9, 10YR 8/2), very fine grained, medium strong to strong (R3 to R4), 44 1 5 ft 371.5' - Mechanical break 74% 371.9' - Mechanical break 20% burrows, molds, and 5% voids 1 (<1/16"), trace organics 372.6' - Mechanical break 368.2-368.6' - pale orange, (10YR R35: 5 minutes 8/2), very fine grained, very weak to weak (R1 to R2), granular, 1/8" NR 374.0 organic layer at 368.3', few voids, few 374.0-374.3' - Fracture zone, fragments 1/4" cavities >10 to 3/4" Limestone 375 374.3' - Bedding plane, horizontal and 5 deg, 369.4-370.5' - white to pale orange, -332.6smooth, undulating (N9 to 10YR 8/2), very fine grained, 374.4' - Bedding plane, horizontal and 5 deg, >10 strong HCl reaction, medium strong smooth, undulating (R3), trace organics, burrows and 374.6' - Bedding plane, horizontal and 5 deg, R36-HC molds create cavities to 1/2", 10% smooth, undulating 374.85' - Fracture, 20 deg, rough, undulating 374.9-375.3' - Fracture zone, multiple orientations, fragments are 1/2"x1" to 2"x1" voids (<1/16") 370.5-372.7' - yellowish gray, (5Y 5 ft 12 >10 66% 7/2), very fine grained, strong HCI reaction, medium strong to strong 375.55' - Mechanical break 375.7-375.95' - Fracture zone (R3 to R4), 20 to 25 % voids (<1/16") NR R36: 7 minutes and fossil molds and casts 376.55' - Fracture zone, horizontal and 25 No Recovery 372.7-374.0' deg, rough, undulating 379.0 376.6-376.8' - Fracture zone, trace iron oxide 2 380

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PROJECT NUMBER: BORING NUMBER: 338884.FL

AD-03

SHEET 10 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump LITHOLOGY DISCONTINUITIES COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -337.6 Limestone 380.1, 380.2, 380.45' - Bedding plane (3), 5 374.0-374.45' - grayish orange, horizontal (10YR 7/4), fine to medium grained, 380.8, 380.9' - Mechanical break (2) moderate HCl reaction, very weak R37-HQ 381.05' - stepped fracture over 3/4", angular (R1), laminated bedding, organic 18 4 381.4' - Bedding plane, smooth, undulating, 5 ft interbedding 374.45-377.3' - yellowish gray, (5Y 82% stepped 381.7, 381.9, 382.15, 382.6' - Bedding plane 8/2), very fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), 25 to 35 % burrows, cavities (molds), 5 to 10% voids (<1/16"), leastly because the strength of the strength 4 (4), smooth, undulating 382.7, 382.9' - Bedding plane (2), rough, R37: 6 minutes undulating NR locally heavily fractured 384 0 No Recovery 377.3-379.0' 384.2, 384.4, 384.5, 384.7' - Bedding plane Limestone 8 or mechanical break (4) 379.0-381.75' - grayish orange, 385 (10YR 7/4), very fine to fine grained, strong HCl reaction, very weak to 384.9' - mid point of vertical fracture along -342 6 center of core 6 385.05, 385.2, 385.7, 385.9' - rough, multiple weak (R1 to R2), nonreactive granular material, localized laminated fragments, angular to spike random angles R38-HQ 386.0' - Fracture, 20 deg bedding with trace organics 5 ft 39 >10 386.6-387.5' - Fracture zone, multiple 381.0-381.3' - extremely weak (R0), 96% friable, dissembles in water fragments up to 2", crosses lithology change 381.75-383.1' - yellowish gray, (5Y >10 8/1), very fine grained, strong HCI 387.8' - Bedding plane, 10 deg, smooth, SC-3 collected at 387.8reaction, medium strong (R3), 10% undulating 388.8' voids (<1/8") 382.7-383.1' - very weak to weak (R1 0 R38: 7 minutes 389.0 NR to R2) 389.05' - Mechanical break No Recovery 383.1-384.0' 4 389.4-389.5' - Bedding plane, horizontal and Limestone 390 5 deg, smooth, undulating, silt/clay infill 384.0-384.5' - yellowish gray, (5Y 347.6 7/2), very fine grained, very strong 2 HCI reaction, extremely weak (R0) 390.5-391.5' - Fracture zone, fragments to 2", 384.5-387.0' - grayish orange, (10YR subangular to angular, 40-60% infill <1" R39-HQ 7/4), very fine grained, strong HCl reaction, medium strong (R3), 20% 27 2 391.5-391.8' - Bedding plane, horizontal, 94% smooth, undulating, rock partings on both <1/16" voids, trace organics, cavities to 3/4" ends 1 387.0-388.8' - light gray, light blue gray, (N7, 5B 7/1), very fine to fine 391.8-392.6' - Fracture zone, fragments to 1-1/2", subangular to angular R39: 8 minutes grained, strong HCl reaction, weak to 392.9' - Bedding plane, smooth, undulating, >10 contact rock with silt/sand medium strong (R2 to R3), 25% NR 394.0 393.4-393.7' - Fracture zone, fine infill, fossil casts (1/16 to 9/16" max.) of angular fragments to 1" forams, pelecypods, and >10 394.0-394.55' - Fracture zone, fractures from echinoderms 395 horizontal to vertical, immediately below 3/8" No Recovery 388.8-389.0' -352.6 gravel sized fragments, clay/silt rock Limestone >10 389.0-393.7' - grayish orange, very pale orange (392.0'), (10YR 7/4, 10YR 8/2), strong HCl reaction, fragments to end of run R40-HQ 5 ft 36% 0 extremely weak to very weak (R0 to R1), fracture zone, breccia begins at 390.5', 15-18% voids (<1/16") in rock NR fragments No Recovery 393.7-394.0' R40: 6 minutes Limestone 394.0-395.8' - Same as 389.0-393.7' 399.0 395.6' - becomes tacky, heavy silt

399.65' - Bedding plane, smooth, horizontal

No Recovery 395.8-399.0'



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SHEET 11 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -357.6 400.0' - Fracture, horizontal, rough, Limestone 2 undulating 399.0-399.25' - very pale orange, (10YR 8/2), moderate HCl reaction, 400.1' - Fracture, vertical, rough, undulating 401.0' - Mechanical break very weak (R1), 30% voids (<1/8") R41-HQ (fossil molds), sand-sized grains, 67 1 5 ft SC-4 collected at 401.5fossil fragments 399.25-403.4' - yellowish gray, (5Y 8/1), mild to strong HCl reaction, 88% 402.65 1 weak (R2), trace iron oxides on shell 402.7' - Fracture, 45 deg, planar casts, 15% <1/16" voids with 1 R41: 6 minutes sporadic fossil casts to 1/4" NR No Recovery 403.4-404.0' 404 0 Limestone 404.1' - Bedding plane, 5 deg, undulating 404.0-408.95' - grayish orange pink, (5YR 7/2), fine to medium grained, 2 405 404.85' - Fracture, 15 deg, smooth, planar 405.05' - Bedding plane or mechanical break, moderate HCI reaction, very weak -362.6 1 (R1). HCl reaction delayed core contacts spun against each other brecciated at 410.2-410.35 R42-HQ 5 ft 86 1 99% 406.65' - Bedding plane, horizontal and 5 deg, smooth, undulating 2 407.05' - Bedding plane, 10 deg, smooth, planar 407.75' - Mechanical break R42: 6 minutes 1 409.0 408.85' - Mechanical break, probably when NR No Recovery 408.95-409.0' breaking core run off bottom Limestone >10 409.0-411.3' - Same as 410 409.7-410.0' - Mechanical break, undulating, -367.6 404.0-408.95' heavily fractured near vertical planes, >10 probably mechanically induced 410.3' - Fracture, 40 deg and 45 deg, zone R43-HQ infilled with 1/8" or less rock fragments in silt 14 >10 Limestone 5 ft matrix 411.3-412.0' - mild HCl reaction, very 60% 410.6-412.0' - Fracture zone, horizontal and vertical, multiple fragments of varying size weak (R1), dark organic laminae, ranging to 3"x1-1/2"x1", organic (coatings) on trace iron oxides on bedding plane planar surfaces and lining casts from NR 411.3-412 No Recovery 412.0-414.0' R43: 7 minutes 414.0 Limestone 414.15' - Bedding plane, horizontal, smooth, 414.0-414.6' - very pale orange, 5 planar (10YR 5/2), very fine grained, very 415 414.4' - Fracture, vertical and 60 deg -372.6 strong HCl reaction, weak (R2), 5% 414.6' - Bedding plane, rough, undulating (<1/16") voids on surface, trace 3 414.95, 415.2, 415.5, 415.8' - Mechanical òrganics break (4) Conglomerate R44-HC 2 57 414.6-414.8' - strong HCl reaction, 5 ft 416.4' - Mechanical break, horizontal 89% variegated, silica gravel up to 3/8", 416.8' - Fracture, 65 deg, planar to limestone grains undulating, 1/16" separation 2 Limestone 417.15, 417.25' - Fracture (2), horizontal and 414.8-418.45' - very pale orange, 80 deg, 1/16" to 1/16" separation R44: 8 minutes 1 (10YR 8/2), very fine grained, strong 418.4' - Bedding plane, smooth, undulating HCl reaction, weak to medium strong NR 419.0 (R2 to R3), 5 to 20% (<1/16") voids, fossil molds, some including cavities 419.2' - Bedding plane, probable organic 1 up to 1/2", trace organic material stain and/or infill 420 No Recovery 418.45-419.0'



338884.FL AD-03

SHEET 12 OF 16

ORIENTATION : Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER	LEVELS: 5.8	88 ft b	gs on 9		/24/20		ownes, R. Bitely, M. Faurote, C. Sump	
≩D⊋	(%			DISCONTINUITIES	ပ္က	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
A A CE	I.R.U TH,	(%) Q	150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND	
EPT URF EV	ORE	Ø	ZAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
	022	ď	# 4		S	CHARACTERISTICS		
-377.6 _			1	419.75' - Mechanical break	\perp	Peat - √419.0-419.2' - brownish black, (5YR	_	
			ı i		\Box	2/1), malleable	_	
	R45-HQ			404.01 Frontiers ventical amonath undulation	Т	Limestone		
_	5 ft 96%	65	2	421.3' - Fracture, vertical, smooth, undulating 421.7-422.5' - Bedding plane or fracture	\perp	419.2-421.8' - very pale orange, (10YR 8/2), very fine grained, strong	_	
-	30,0			zone, rough, undulating, irregular contact with		HCl reaction, medium strong (R3),	-	
-			>10	uneven surfaces	1	fossil mold rich, 25% (<1/16") voids,	-	
_				400 41 M 1 : 11	-	trace organics 421.8-423.8' - very pale orange to	R45: 9 minutes	
_			>10	423.1' - Mechanical break 423.4-423.8' - Fracture zone, horizontal and	+H	pale yellowish brown, (10YR 8/2 to	-	
_	424.0		NR.	vertical, rough, undulating, may be	\perp	10YR 6/2), very fine grained,	_	
_			1	extensively broken from/by breaking core for	\perp	moderate to strong HCl reaction, – medium strong to weak (R3 to R2),	_	
425			L'	retrieval	Ш	voids (<1/16") over 10-15% of		
-382.6				424.9' - Mechanical break	\mathbb{H}	surface, 3-8% cavities (1" x 1/4"),		
_			2	425.4' - Fracture, rough, undulating, angular		 weak (R2) rock (last 1' of interval), trace organics, laminar interbeds with 	-	
_	R46-HQ			425.65' - Bedding plane, 5 deg and 15 deg, undulating, organic infilling	+	fossil coatings	-	
_	5 ft	86	4	426.45' - Bedding plane or mechanical break		No Recovery 423.8-424.0'	-	
_	100%			426.5' - Mechanical break, 10 deg and	$+$ \Box	Limestone 424.0-428.3' - Same as 421.8-423.8'	_	
_			2	vertical, undulating, short 426.7' - Bedding plane, trace organic	\perp	- 424.0 420.0 Gaine as 421.0 420.0	_	
_				staining, open to 1"	\perp	_	_	
			3	427.3' - Bedding plane, rough, undulating,		 428.3-433.3' - very pale orange, 	R46: 8 minutes	
	429.0		١	open channel interface 427.6' - Fracture, rough, undulating, 1/16"		(10YR 8/2), very fine grained,	Driller's Remark: Lost	
_				opening	Ъ	moderate to strong HCl reaction,	circulation at 428.2-429.3'	
430			3	428.05, 428.2, 428.7' - Bedding plane (3),	世	 very weak (R1), voids (1/16"-1/8") over <10% of surface , 1/16"-3/16" 	-	
-387.6				organic infill, stains _ 429.2, 429.45, 429.8, 430.1' - Bedding plane	╁┼	fossil casts, at 428.3-429.0' vertical	_	
-			3	(4), smooth, planar to undulating		channel-like voids (1/2"-1-1/2" wide)	SC-5 collected at 430.5-	
_	R47-HQ			430.2' - Fracture, organic or iron oxide	+	_	431.55'	
_	5 ft	50	1	healed, 1/16" 430.35, 430.5, 431.55, 434.55, 434.7' -	\perp	-	-	
_	98%			Bedding plane (5), smooth, planar to	\pm	_	_	
			1	undulating	\perp			
			'	432.3' - Mechanical break	Ш			
_							R47: 9 minutes	
-	434 O		2			 Peat 433.3-433.9' - black to dark brown 	_	
-	434.0		NR/			black, (N1 to 5YR 2/1), laminated to	SC-7S collected at 434.0-	
			2	434.55, 434.7' - Bedding plane, between rock	127	thin bedding, organic and silt	434.25' -	
435 <u> </u>				and clay or organic detritus	╨	No Recovery 433.9-434.0'		
-552.0			1		П	434.0-434.65' - Same as 433.3-433.9	-	
] _				435.65' - Bedding plane, rough, undulating	H	Limestone	_	
	R48-HQ	22	3	436.2' - Bedding plane, horizontal and 7 deg,		434.65-435.7' - limestone fragments,		
]	5 ft 88%	22		rough, undulating, fossil cast openings	0.0	variegated, random size and type in variable matrix, trace to some	<u> </u>	
_	,			436.4' - Bedding plane, smooth, undulating, rock with silica rich gravel	Ш	organics] -	
-			>10	436.75' - Fracture, 35 deg and vertical,	Ш	435.7-436.5' - yellowish gray, (5Y 7/2), very fine grained, moderate to	-	
-			1	smooth, filled with carbonate fragments and	H	strong HCl reaction, very strong (R5),	R48: 12 minutes	
-			NR	silty clay 436.9-437.7' - Fracture zone, multiple	+	voids (<1/16") over 5-10% of surface,	-	
_	439.0		INK	fragments up to 1-1/2" some organic infill and	\mathbf{H}	angular cavities (1/2 to 3/4") and	-	
_			1	stain	Ш	open	_	
440				438.0' - Mechanical break	Ы			



338884.FL AD-03

SHEET 13 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump LITHOLOGY DISCONTINUITIES COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -397.6 439.9, 440.5, 441.0' - Mechanical break (3) Peat 3 436.5-436.6' - brownish black, (5YR 2/1), platy, malleable, parting tendencies, HCl reaction on parting R49-H0 441.25, 441.4' - Bedding plane (2), rough, surfaces 42 4 5 ft planar, 1/16" open 94% Conglomerate 441.6' - Bedding plane, 60 deg, rough, 436.6-436.95' - strong HCl reaction, planar, 1/16" open, planar fracture with extremely weak (R0), variegated, limestone fragments (1/2"x3/8") and >10 organic material as sporadic blebs 442.2-444.0' - Fracture zone, very strongly silica grains (up to 5/16"), trace R49: 10 minutes >10 broken rock fragments in silty sand or sandy organics, angular silica NR 444 0 Limestone 436.95-437.5' - grayish orange, 2 (10YR 7/4), very fine grained, 444.6, 444.95' - Bedding plane (2), rough, 445 moderate HCI reaction, medium stepped to undulating, fragmented -402.6 strong (R3), thin bedding, 5 to 10% separations 2 discontinuous organic stringers and 445.3' - Fracture, 75 deg, rough, irregular, blebs trace organics 437.5-437.7' - very pale orange, (10YR 8/2), very fine grained, strong HCl reaction, extremely weak (R0), R50-HQ 446.1-446.3' - Fracture, vertical, multiple 5 ft 8 >10 small fractures throughout 92% laminated bedding, organic partings, undulant to scour like bedding 437.7-438.4' - moderate orange pink >10 (5YR 8/4), very fine grained, mild HCI R50: 8 minutes >10 reaction, weak (R2), voids (1/16") NR over <5% of surface, trace organics, 449.0 fossil molds infilled, recrystallized 449.0-450.1' - Fracture zone, random >10 carbonate minerals orientations, fragments to 2-1/2" x 2" No Recovery 438.4-439.0' 450 407.6 Limestone 439.0-441.25' - vellowish grav. (5Y >10 7/2), very fine grained, very strong 450.6' - Fracture, 70 deg, rough, planar 450.7-454.0' - Bedding plane or fracture HCl reaction, very strong (R5), R51-HQ >10 zone, smooth, undulating 5-10% blebs and stringers of organic 8 5 ft material, voids (<1/8") over 5% of surface, 1-1/2 x 1/2" cavities, lined or 52% partially lined with calcite NR Peat 441.25-441.5' - black. (N1). above R51: 13 minutes carbonate derived silt 454.0 Limestone 441.5-443.7' - pale brown to pale 454.0-454.6' - Fracture zone >10 vellowish brown, (5Y 5/2 to 10YR 455 6/2), moderate HCl reaction, 454.8, 454.95' - Fracture (2), 15 deg and 30 -412<u>.6</u> extremely weak to very weak (R0 to deg, rough, undulating, recrystallized R1), limestone fragments, trace 2 455.15, 455.6' - Bedding plane (2), smooth, organics planar No Recovery 443.7-444.0' R52-HC . 455.7' - Fracture, 75 deg, undulating to >10 20 5 ft Peat planar 58% 444.0-444.1' - black, (N1), amorphous 457.2-459.0' - Bedding plane or fracture Limestone zone, horizontal, smooth, undulating NR 444.1-448.6' - light brown, (5YR 5/6), R52: 12 minutes very fine to fine grained, mild to moderate HCl reaction, very weak to 459.0 strong (R1 to R4), voids (<1/8") over 459.0-460.0' - Fracture zone, fragments to 15% of surface >10 3"x2"x1' No Recovery 448.6-449.0' 460



338884.FL | AD-03

SHEET 14 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -417.6 Limestone 5 460.3, 460.4, 460.6, 460.65, 460.95' -449.0-451.5' - yellowish gray, (5Y Mechanical break or bedding plane (5), 60 7/2), very fine grained, mild to very strong HCl reaction, strong to very deg, trace organic staining R53-HQ >10 461.3' - Fracture, 60 deg, rough, undulating, strong (R4 to R5), voids (<1/8") over 0 5 ft intersecting 461.7-462.0' - Fracture zone, 60 deg, rough, 84% 10% of surface No Recovery 451.5-454.0' undulating, angular 462.1' - Bedding plane, smooth 462.4, 462.6' - Fracture (2), 45 deg, >10 Peat 454.0-454.1' - brown black, (5YR 2/1) 2 R53: 14 minutes Limestone undulating, one healed is parallel to these, 454.1-456.9' - light brown to pale NR 464 0 yellowish brown, (5YR 6/4 to 10YR 462.8' - Fracture, 85 deg, rough, undulating 463.2' - Fracture, 30 deg and vertical, 6/2), very fine grained, mild to very 2 strong HCI reaction, very strong (R5), smooth, undulating 465 voids (<1/16") over 5-8% of surface, trace cavities (1/2" x 1/4"), trace 463.3' - Fracture, vertical, smooth, undulating 464.1' - Fracture, 45 deg, rough, undulating -422.6 >10 organics 464.6' - Mechanical break, 10 deg, core No Recovery 456.9-459.0' pieces spun against each other R54-HQ Silt (ML) 465.1' - Fracture zone, 70 deg, rough, planar, 459.0-459.2' - with subrounded 5 ft 17 >10 may extend to 496' with multiple fragments 86% gravel to 1/2" between Limestone 466.0-467.0' - Fracture zone, fragments to 2", >10 459.2-461.8' - moderate yellow brown, (10YR 5/4), very fine to fine sporadic organic staining 467.8' - Fracture, 15 deg, rough, undulating, >10 R54: 13 minutes grained, mild to strong HCl reaction, angular NR very weak to weak (R1 to R2), thin 468.0' - Fracture, 20 deg, rough, undulating, 469.0 bedding, voids (<1/16") over 10-15% angular of surface 469.3' - Bedding plane, rough, stepped to 2 Fine Sand (SP) 461.8-462.0' - dusky yellow, (5Y 6/4), planar, organic staining locally 470 427.6 469.6' - Bedding plane, rough, stepped to carbonate planar, organic staining 470.05' - Bedding plane, smooth, undulating, 5 Limestone 462.0-462.75' - moderate yellow contact R55-HQ brown, (10YR 5/4), very fine to fine 470.4' - Fracture, 45 deg, smooth, planar, intersecting, fractures at a bedding plane parting with veneer to laminar bedded black 31 >10 grained, mild to strong HCl reaction, 90% very weak to weak (R1 to R2), thin bedding, voids (<1/8") over 10-15% (organic) material 2 471.05' - Fracture, rough, irregular, trace of surface Silty Sand (SM) organics 2 462.75-463.0' - very fine grained, 471.1-471.5' - Fracture zone, stepped, NR irregular, fracture along suture type material carbonate 474.0 471.9' - Bedding plane, stepped to undulating Limestone 472.55' - Fracture, horizontal, rough, 463.0-463.2' - yellowish gray, (5Y 4 undulating 7/2), very fine grained, moderate HCI 475 472.8' - Fracture, 60 deg, smooth, undulating, reaction, very weak (R1), small blebs 432.6 of black organics throughout trace organics >10 473.3' - Fracture, 15 deg, rough, undulating 474.6' - Fracture, vertical, rough, planar 474.95' - Fracture, vertical, rough, undulating, No Recovery 463.2-464.0' Limestone R56-HC 464.0-464.65' - pale reddish brown, 3 24 5 ft angular 94% (10R 5/4), very fine grained, 475.2-476.1' - Fracture zone 476.5' - Fracture, 15 deg, rough, undulating, \pm moderate HCl reaction, strong (R4), voids (<1/16") over 5% of surface 464.65-466.1' - grayish orange, 3 Δ angular Δ 476.7' - Fracture, 75 deg, rough, undulating 477.2' - Fracture, 60 deg, rough, undulating, (10YR 7/4), very fine grained, R56: 9 minutes Δ delayed mild HCI reaction, medium 2 infilled, limestone fragments and fines Δ strong (R3), thin bedding, irregular 479.0 NR 477.6' - Fracture, 5 deg and 30 deg, bottom bedding of previous fracture area >10 477.9' - Fracture, 85 deg, rough, undulating 480



AD-03

SHEET 15 OF 16

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -437.6 478.15' - Fracture, 60 deg, smooth, planar 478.35' - Mechanical break Limestone 466.1-468.3' - dusky yellow, (5Y 6/4), >10 479.0-481.0' - Fracture zone, 60 deg, random very fine to medium grained, mild to fragments 1/2 to 2", 480.7-481.6' is single moderate HCI reaction, extremely Driller's Remark: Lost R57-HQ >10 fragment with fracture weak to strong (R0 to R4), granular, 26 circulation on this run 5 ft 481.0-481.3' - Fracture zone, random angles, sizes from 1/4" to 2", average about 3/8" 74% voids (<1/16") over 18-20% of water column dropped to surface 50' below top of casing 482.2' - Bedding plane, 0-5 deg, smooth, No Recovery 468.3-469.0' 0 undulating Limestone 469.0-470.15' - Same as R57: 6 minutes 1 466.1-468.3 470.15-471.5' - light brown, (5YR NR 484 0 6/4), very fine grained, moderate to strong HCl reaction, weak (R2), 484.3' - Mechanical break, 15 deg, smooth, 3 undulating 484.55' - Mechanical break, 15 deg, smooth, laminated to very thin bedding, black 485 beds, lenticels and lenses, at 470.45 -442.6 undulating and 471.0' beds to 1/4" 1 471.5-482.25' - light brown, (5YR 5/6), very fine to fine grained, weak 484.75' - Bedding plane, 30 deg, smooth, undulating to very strong HCl reaction, very weak to medium strong (R1 to R3)

No Recovery 473.7-474.0' R58-HQ 485.8' - Mechanical break 486.2' - Fracture, edges do not match, could Driller's Remark: Lost 3 5 ft 43 circulation in large cavity 95% where the two opposing be up to 0.3' separation fragments do not match Limestone >10 486.7' - Mechanical break or bedding plane, indicating the cavity exceeds the apparent 475.2-475.8' - limestone fragments in smooth, undulating 487.6-488.3' - Fracture zone, fragments from carbonate silt, fracture or cavity infill, >10 volume fragments subangular to R58: 10 minutes 488.4' - Fracture, 65 deg, rough, planar, flat subrounded, 15% voids (<1/8") and 489.0 NR fossil molds (up to 3/8") 489.05, 489.35, 489.5, 489.6' - Bedding plane Breccia 9 (4), smooth, flat 477.0-477.6' - sand and silt matrix **No Recovery 478.7-479.0'** 490 489.75, 489.85' - Bedding plane (2), 65 deg, 447.6 rough, planar 6 489.9, 490.0, 490.15, 490.3, 490.6, 490.85, 491.05, 491.3, 491.5, 491.68, 491.9' -Limestone 482.85-487.7' - grayish orange, dark gray, (10YR 8/2, N3), very fine grained, moderate HCl reaction, R59-HQ Bedding plane (11), smooth, flat 19 5 5 ft weak to medium strong (R2 to R3), voids (<1/8") over 5-15% of surface, fossil molds filled or partially infilled 82% 492.15' - Fracture, 20 deg, rough/smooth, SC-6 collected at 492.2-1 undulating 493.15' with aragonite/calcite, cavities range to greater than width of core and over R59: 10 minutes 2" high, trace organics (shells or NR shell fragments) 494.0 No Recovery 482.7-484.0' Limestone 2 494.6' - Fracture, 15 deg, smooth, undulating 494.9, 495.0, 495.15, 495.3, 495.9' - Fracture 487.7-491.7' - dusky yellow to light 495 brown with 1 to 2" grayish orange, (5YR 6/4 to 10YR 7/4), very fine to 452.6 (5), horizontal and 10 deg, smooth, 4 fine grained, mild to strong HCI undulating reaction, very weak to medium strong (R1 to R3), voids (<1/16") 496.1' - Bedding plane, horizontal, smooth, 2 planar, lithology change 496.5' - Mechanical break over 15-30% of surface, solution cavities (1/2" to 2-1/2"x2") R60-HQ 6 ft 62 No Recovery 488.75-489.0' 2 497.5' - Fracture, rough, planar, angular, Limestone 490.1-492.0' - numerous thin stepped 497.95' - Fracture, 55 deg, rough, planar, dissolution cavities subparallel to 2 gently arcuate 498.4' - Fracture, horizontal and 20 deg, 491.5-497.0' - extremely weak to very 1 rough, irregular weak (R0 to R1), 1/4" black organic 498.75' - Fracture, 45 deg, rough, planar bed at/near contact NR 500 500.0



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	AD-03	SHEET	16	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

00111110	METHODA	10 20	ZOII IV	IENT . BESOUT S/N 1517, Mud Totally, Fig. to	7013, 11VV Ca311	ig			ORIENTATION : Vertical
WATER	LEVELS: 5.8	88 ft bo	gs on 9	9/13/07 START : 8/16/2007	END : 8/2	4/20	07	LOGGER : P. De Sa'rego, J. To	ownes, R. Bitely, M. Faurote, C. Sump
				DISCONTINUITIES		ניו	1	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION		SYMBOLIC LOG	Г	ROCK TYPE, COLOR,	
BH ION	L'A FR'A	(%	되			S I		MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
₽₽. ATA	GTER	D (%)	FS	DEPTH, TYPE, ORIENTATION, ROUG PLANARITY, INFILLING MATERIAL	HNESS,	BO		WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P. C. F.	SOR	RO	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND T		ΥM		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БОШ	016	ш	шш			0)	┞		
				\ 499.0' - Mechanical break \ 499.2-499.5' - Fracture zone	/_		L	Limestone 491.7-500.0' - very pale orange to	_
				(400.2 400.0 Tradiare 2011e				grayish orange, (10YR 8/2 to 10YR	
1 -					-			7/4), very fine to fine grained, mild	11
-					-		H	HCl reaction, very weak to medium	
_					_		H	strong (R1 to R3), voids (<1/16")	
					_		L	over 10% of surface, voids (<3/8") over 5% of surface, trace larger	_
							П	cavities	
1 -					_			No Recovery 493.1-494.0'	-
-					-		H	Limestone	-
-					-		F	495.35' - very weak to medium strong (R1 to R3), wavy to undulant	-
					_		L	silt sized laminae with organic	
							L	interbeds, <1/2" total thickness	
							Γ	496.2' - very weak to medium strong	
1 -					-		r	(R1 to R3), wavy to undulant silt sized laminae with organic interbeds,	1
-					-		ŀ	<1/2" total thickness	1
_					_		F	498.45' - very weak to medium	-
					_		L	strong (R1 to R3), wavy to undulant	_
								silt sized laminae with organic interbeds, <1/2" total thickness	
1 -					_			No Recovery 499.5-500.0'	1 1
-					-		F	Bottom of Boring at 500.0 ft bgs on	1 -
-					-		F	8/24/2007	1 -
_					_		L		_
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1 -								-	-
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

AD-04

SHEET 1 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IEM1 : Dietiicii D-120 3/N 620, BE3001 3/N 1317, Iliud 1		<u> </u>	ORIENTATION: Vertical
WATER	LEVELS : 5.8	38 ft b	gs on 9		27/20		
≥□≎	<u> </u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
불병은	J. H.	Q D (%)	R C	DEDTIL TYPE OPIENTATION POLICINESS	1 🗒	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	564	0	Z F	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	√BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCE		A Q	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-157.4					\vdash	No Recovery 200.0-212.0'	Boring AD-4 blind drilled to
-						-	approximately 200 feet -
I _					\vdash	_	below ground surface
					П		before beginning
_	1				\Box	=	sampling/logging. – "Water level is based on
-	-				₽	-	Ground Water Monitoring
-					Ш	-	at LNP site (FSAR Table -
					Ь		2.4.12.08)" `
					Н		8/26-8/29/07: Sonic casing
1 -					仜	-	at 200.0' below ground – surface, attempt
1 -	-				\vdash	-	advancement of HQWL
-						-	with only 2.5' of
205_				_	ш		advancement, no recovery
-162.4							of material and two rock coring bits (#636)
1 -]					=	destroyed
-	1				₩	-	9/5/07: Sonic rig setup on
-	-				ш	-	AD-4, advances sonic
_					┢	-	4"core barrel from 202.5- 207.5' below ground
							surface, no recovery of
					Ш		material due to broken
-	1			•	H	-	HQWL bit plugging Sonic -
-	-					-	core barrel; no voids noted; _ HQWL bit removed,
-					₽	=	advance 207.5-213' below
l _						_	ground surface _
210					Н		
-167.4	1			_			Advance Sonic 4" casing to
-	1				ш	-	213' below ground surface; -
-	-				Н	-	retrieve 5.0 of crushed limestone fragments and
_						=	limestone core segments,
	212.0				Н		4" long each; no void
				212.0-213.0' - Fracture zone, rough, angular	ш	Limestone	space; set Sonic 6" casing
1 -	R1-HQ		>10	to undulating, limestone fragments, <2" diameter fracture zone	\vdash	 212.0-213.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong 	to 210.0' below ground - surface;
1 -	2 ft	0		ulameter fracture zone	匚	HCl reaction, weak to strong (R2 to	R1: 13 minutes
1 -	50%		NR		₽	 R4), voids <1/16" over 30% of 	4
1 -	214.0				\Box	surface, poorly fossiliferous with few	
1			ر ا		Н	fossils <1/4" diameter, no organics, no cavities	9/6/07: Begin rock coring
215	R2-HQ		2	044.0.045.01. D. 1.11	Ľ	No Recovery 213.0-214.0'	after advancing HWT - casing to 2.38' below
-172.4	2 ft 100%	33		214.8, 215.0' - Bedding plane (2), <10 deg, — rough, undulating	ш	213.0-214.0'	ground surface, 1.0'
1 -			>10	215.25-215.85' - Fracture zone, rough,	Н	 Limestone 	material inside casing to -
1 -	216.0			undulating, limestone fragments <2" diameter	\Box	214.0-216.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong	212.0', core blockage at
1 -			>10	<u>.</u>	\vdash	HCl reaction, weak to medium strong	214.0' bgs due to fragment locking in sample barrel;
1			10	216.8-216.95' - Fracture zone, <10 deg and	ш	(R2 to R3), voids <1/16" over	no further advancement for
1 -	1			216.8-216.95 - Fracture zone, <10 deg and <20 deg, rough, undulating, limestone	\vdash	10-40% of surface decreasing with	R1, limestone inside casing
1 -			1	fragments <3" diameter, bedding plane	世	 depth, few cavities, poorly to moderately fossiliferous with fossil 	to 212.0', – SC-1 collected at 214.0-
1 -	D2 110			fractures with high angle intersecting	ш	casts <1/4" diameter, trace laminated	214.8'
1 -	R3-HQ 5 ft	56	3	fractures	Н	bedding	R2: 5 minutes
	90%	-		217.25, 218.15, 218.25, 219.15, 219.4' - Bedding plane or mechanical break (5), <10	厈	_]
1				deg, rough, undulating	\vdash]
220]		>10	-	Ш	-	1
220					1		
1							
	1				1		



PROJECT NUMBER: BORING NUMBER: 338884.FL

AD-04

SHEET 2 OF 16

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 9/6/2007 END: 9/27/2007 LOGGER: R. Bitely, J. Townes, S. Roberti, K. Waikins DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD SYMBOLIC MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 219.4-219.85' - Fracture zone, rough, Consistent slow to Limestone >10 undulating, limestone fragments <2" diameter 216.0-221.0' - yellowish gray, (5Y moderate drilling rate with NR 219.85, 220.3' - Bedding plane (2), 30 deg 7/2), very fine to medium grained, approx. 50% circulation 221.0 and 70-90 deg, rough, undulating strong HCI reaction, medium strong return; circulated mud is to strong (R3 to R4), voids <1/16" over 10-30% of surface, variable, 220.3' - Fracture zone, rough, undulating, losing to formation through 3 limestone fragments <2" diameter 4" HWT's, 6" sonic casing 221.75-221.9' - Fracture or mechanical break moderately fossiliferous with several (2), <30 deg, rough, undulating, 3 fractures fossil casts/molds <1/2" diameter. SC-2 collected at 218.3-3 222.15' - Fracture or mechanical break, <10 219 15 few cavities <1", trace organic deg, rough, undulating, 3 fractures R4-HQ laminations R3: 9 minutes >10 No Recovery 220.5-221.0' 5 ft 25 222.25' - Fracture or mechanical break, 40 **Limestone** 221.0-223.6' - yellowish gray to light 52% deg, rough, undulating 222.5' - Bedding plane or mechanical break, rough, undulating gray, (5Y 7/2 to N7), very fine to 223.2-223.35' - Fracture zone, rough, medium grained, strong HCI NR 225 undulating, silt lens, limestone fragments <1" reaction, very weak to strong (R1 to -182 4 R4: 5 minutes diameter with silt lens R4), strength decreasing with depth, voids <1/16" over <10-25% of 226.0 surface, few cavities up to 2"x1" poorly to moderately fossiliferous >10 226.3-226.9' - Fracture zone, multiple with few fossil molds and casts <1/2" intersecting fractures with rock fragments up diameter, secondary infill present to 1-9/16" diameter over <30% of surface; 223.2- 223.35' >10 226.95, 227.0, 227.1' - Fractures (3), 60 deg, rough, undulating, three intersecting fractures silt lens with limestone fragments <1" Y shaped, moderate relief (~3/8") diameter, rough, calcareous silt R5-HQ No Recovery 223.6-226.0' 227.25' - Fracture, 30 deg, rough, undulating, 5 ft 78% 24 4 ~3/8" relief, fossil molds Limestone 226.0-229.9' - yellowish gray, (5Y 227.7-227.9' - Fracture zone, multiple 7/2), very fine to fine grained, weak 4 intersecting fractures with rock fragments up HCl reaction, very weak to weak (R1 to 1-3/16" diameter 230 228.3' - Fracture, 30 deg, rough, undulating, to R2), voids <1/16" over 20% of 187.4 R5: 10 minutes rock surface mostly along bedding relief ~3/8" NR surfaces; cavities up to 3" diameter 228.5' - Fracture, 80 deg, rough, undulating, 231.0 cover 5% of rock surface and are low relief dissolution fossil molds; trace 228.65, 229.0, 229.35' - Bedding plane (3), >10 laminations, fossiliferous 80 deg, rough, undulating, stepped, low relief No Recovery 229.9-231.0' 229.8-229.9' - Fracture zone or mechanical Driller's Remark: Rapid Limestone break >10 advancement at 232.0-231.0-233.0' - yellowish gray, (5Y 7/2), very fine to fine grained, weak 231.0-231.9' - Fracture zone, multiple 233.0' and 234.0-235' due intersecting fractures with rock fragments up to possible void space or R6-HQ to moderate HCl reaction, weak to to 1-3/16" diameter unconsolidated material 5 ft 40% 0 232.15' - Fracture, 50 deg, rough, undulating, medium strong (R2 to R3), voids up to 3/16" cover 10% of rock surface, 3/8" relief poorly fossiliferous 232.3-232.4' - Fracture zone NR No Recovery 233.0-236.0' 232.55' - Fracture, 60 deg, rough, undulating, 235 3/8" relief 192.4 R6: 3 minutes 232.9-233.0' - Fracture zone 236.0 236.0-237.2' - Fracture zone, multiple Limestone 236.0-239.2' - yellowish gray, (5Y intersecting fractures with rock fragments up >10 7/2), very fine to fine grained, moderate HCl reaction, weak to to 1-9/16" diameter SC-3 collected at 237.2-237.2' - Fracture, 30 deg, smooth, stepped, >5 medium strong (R2 to R3), voids up low relief 238.0' to 3/8" 20% of rock surface, poorly fossiliferous, trace organics 238.0' - Mechanical break, 30 deg, rough, R7-HQ 5 ft undulating, tight, hardness test 32 >10 238.85-239.2' - Fracture zone No Recovery 239.2-241.0' 240



338884.FL AD-04

SHEET 3 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 9/6/2007 END: 9/27/2007 LOGGER: R. Bitely, J. Townes, S. Roberti, K. Waikins LITHOLOGY DISCONTINUITIES COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD SYMBOLIC RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -197.4 R7: 3 minutes 241.0 241.0-242.2' - Fracture zone, multiple Limestone 241.0-242.2' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, weak to intersecting fractures with rock fragments up >10 to 1-3/16" diameter >10 Driller's Remark: Rapid, medium strong (R2 to R3), voids up consistent drilling; potential to 3/32" cover 5% of rock surface, cavity or silt infill washed R8-HQ trace organics out during drilling 5 ft 0 No Recovery 242.2-246.0' 24% NR 245 -2024 R8: 2 minutes 246.0 246.0-247.0' - Fracture zone, multiple Driller's Remark: Potential Limestone intersecting fractures with rock fragments up >10 cavity at 246.0-250.0' or silt 246.0-247.0' - yellowish gray, (5Y 7/2), very fine to fine grained, weak to 2" diameter zone washed out-to moderate HCl reaction, weak to consistent 50% circulation medium strong (R2 to R3), voids up to 3/32" cover 1-2% of surface, poorly fossiliferous R9-HQ No Recovery 247.0-251.0' 5 ft 20% 0 NR 250 207.4 9/6/07: Complete drilling at 17:00, water level at surface 251.0 9/7/07: Re-spool 650.0' Limestone 251.2' - Mechanical break or fracture, rough, 251.0-251.2' - yellowish gray, (5Y 7/2), very fine to medium grained, >10 wireline, transmission undulating, angular rock fragment potentially down time for repair, start fallen from above onto top of run, no strong (R4), no voids, cavities or drilling at 12:15 discernible rock contact/fracture angle >10 fossil, light organic stain on <30% of 251.85-252.05' - Fracture zone, rough, undulating, multiple intersecting fractures 251.2-252.6' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 20-30% of surface, poorly Driller's Remark: at 253.0-R10-HQ >10 252.5' - Fracture or mechanical break, 60-70 5 ft 50% 18 254.0' light chatter; core deg, rough, undulating, variable blockage at 254.25' 252.6-253.5' - Fracture zone, rough, undulating, interbedding with silt seams fossiliferous, trace laminated bedding NR 252.6-253.5' - yellowish gray, (5Y 7/2), extremely weak (R0), silt lenses 255 -212.4 R10: 5 minutes interhedded No Recovery 253.5-256.0' 256.0 256.0-257.5' - Fracture zone, rough, undulating, intersecting fractures and gravel Limestone Limestone 256.0-259.75' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCI reaction, extremely weak >10 sized fragments 3" diameter Driller's Remark: at 257.0to weak (R0 to R2), voids <1/16" >10 259.0' light to moderate over <10% of surface, poorly chatter, consistent drilling fossiliferous, trace organic R11-HQ 258.3-258.5' - Fracture zone, rough, staining/laminar from 256.0 to 257.0'; 15 >10 5 ft undulating, gravel sized fragments <2" laminated bedding predominant from diameter 258.8 to 259.75' >10 258.5' - Mechanical break or fracture, 50 deg, rough, undulating 260



PROJECT NUMBER:

338884.FL

BORING NUMBER:

AD-04

SHEET 4 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.8	38 ft bo	gs on 9	9/13/07 START: 9/6/2007 END: 9/	27/200	17 LOGGER: R. Bitely, J. Townes,	S. Roberti, K. Waikins
200	(9)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES r	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A H B H A H H H H H H H H H H H H H H H	ID TH	D (%)	TUR :00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLIC OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE ECC	Ø	FRACTURES PER FOOT	PLANARITÝ, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	¥₩B	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	028	α.	E 6		Ś		
-217.4			NR	258.8-259.75' - Fracture zone, rough to smooth, undulating to planar, intersecting	凵	No Recovery 259.75-261.0'	R11: 4 minutes
_	261.0			fractures and gravel sized fragments up to	₽₩		-
_				<2" diameter, rough to smooth transitioning with depth, bedding plane fractures with	Ш	No Recovery 261.0-266.0'	-
_				intersecting vertical fractures prevalent from	Ш	-	
l -				259.0-259.75'	廾┨	_	Driller's Remark: Rapid advancement 262.0-265.0' -
_					H	_	below ground surface,
_	R12-HQ 5 ft	0	NR		茸	_	possible voids or silt lens; continuous circulation –
_	0%				Ш	_	(approximately 50% return)
_					Н	_	through run; minimum of pump pressure increasing –
265				_	Щ		intermittently through run
-222.4					Ш	_	indicating core/fluid blockage due to formation -
1 -	266.0				Ы	_	back pressure on
					П	No Recovery 266.0-271.0'	equipment, likely silt/soil
_					耳	_	formation
							R12: 5 minutes Driller's Remark: Rapid –
					Ш		advancement 266.0-271.0'
	R13-HQ	0	NR		Ш		below ground surface, as above, no recovery due to
	5 ft 0%	U	INIX			_	unconsolidated silt/soil
					Н	-	concentration; pressure on flow increasing during
270					Н	-	drilling indicating back
-227.4				_	Ħ		pressure from formation; — HQ core barrel set on
-	271.0				Ш	-	formation at 271.0' below
			>10	271.0' - Fracture, rock limestone fragments	Н	Limestone	ground surface with no free rod drop: material is
_				up to 12" in size 271.0-271.1'	Ш	271.1-271.25' - yellowish gray, (5Y 8/1), very fine to fine grained,	present but not retrievable
_	R14-HQ				Ш	moderate HCl reaction, very weak	due to unconsolidated – nature
_	3 ft 8%	0	NR		Ш	(R1), 5% small voids up to 1/16" No Recovery 271.25-274.0'	R13: 4 minutes
-					H	No Recovery 27 1.25-274.0	K. Watkins and Robert – logging
1 -	274.0				H	-	Coring Equipment: BL
1 -					世	No Recovery 274.0-279.0'	300T – R14: No Time Recorded
275					╫	-	_
-232.4				_	Ħ	_	_
1 -					ш	-	
_	R15-HQ				Ш	-	Driller's Remark: Slow
1 -	5 ft 0%	0	NR		+	-	drilling; used 300 gallons of muck with no recovery,
1 -					Ħ	=	decision to trip out rod and
-					Ħ	-	barrel to check bit, bit – inspected and appears
1 -					╆╫	-	intact, hole tagged at
1 -	279.0				冏	-	279.0', tripped back in to try another run
-	210.0				団	-	R15: 20 minutes
280	R16-HQ		4		団	=	-
200					1 1		



338884.FL AD-04

SHEET 5 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS: 5.88 ft bgs on 9/13/07

START: 9/6/2007

END: 9/27/2007

LOGGER: R. Bitely, J. Townes, S. Roberti, K. Waikins

WATER	LEVELS : 5.8	88 ft b	gs on 9	9/13/07 START : 9/6/2007 E	END : 9/27/2	200	7 LOGGER: R. Bitely, J. Townes,	S. Roberti, K. Waikins
≳D⊋	(%)			DISCONTINUITIES	ي	ي ا	LITHOLOGY	COMMENTS
ELO NO ANI	JN, AND RY (9	_	ZES	DESCRIPTION		כו	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H B H	E RU STH, OVEI	%) (JUS	DEPTH, TYPE, ORIENTATION, ROUGHNE	ss,	RCL	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGH	TNESS	SYMBOLIC LOG	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-237.4	2 ft	21		279.4, 279.6, 279.85, 279.9, 280.3, 280.	4,		Limestone	Driller's Remark: More
-	95%		>10	280.5, 280.65, 280.75' - Fractures, horizo smooth, planar to undulating, horizontal,		H	279.0-279.85' - yellowish gray, (5Y 7/2), medium grained, moderate HCl	pieces of bit recovered – R16: 6 minutes
-	281.0		NR)	clayey white infilling, open (1/5" pore)	一日	7	reaction, very weak (R1), <1% voids	K 10. 6 minutes
-	R17-HQ		8	280.0-280.15' - clay infilling 281.4, 281.5, 281.6' - Fractures (3),		#	on surface, <1/32" 279.85-280.0' - Same as	1
-	2 ft 80%	0	>2	horizontal, rough, planar to undulating, 9/	/16"		279.0-279.85' except yellowish gray,	R17: 6 minutes
-	283.0		NR	relief 281.6-281.75' - soft infill, clayey	1	╁	(5Y 8/1), with clayey striation 280.0-280.3' - clay - white, soft,	Driller's Remark: Slow - drilling
-	203.0			281.9, 281.95, 282.0, 282.1, 282.3, 282.5	5, 🗇	Ц	moderate HCl reaction	_
-			2	282.6' - Fractures (7), horizontal, rough, stepped	1	Ц	280.3-280.9' - yellowish gray, (5Y 8/1), very fine grained, moderate HCl	-
-				283.0-238.5' - Fracture zone, broken/crus		╚	reaction, medium hard, 25% surface	1
285			1	283.9' - Fracture, 85 deg, rough, stepped 9/16" relief	1, -	т	area voids 3/16" No Recovery 280.9-281.0'	1
-242.4				284.4, 285.0' - Fractures (2), horizontal, rough, 11-4/5" relief, infill, limestone	-F	╌	Limestone	-
-	R18-HQ		2	285.1-285.4' - Fracture zone		7	281.0-282.6' - light gray, (N7), fine to medium grained, mild to moderate	1
-	6 ft 100%	50		285.5-287.3' - Fracture zone, infill of loos	se 📙	⇉	HCI reaction, weak to medium strong	1
-			1	medium-grained limestone	-	Ⅎ	(R2 to R3), abundantly fossiliferous, voids to 3/16" (molds)	1
-						Ц	No Recovery 282.6-283.0' Limestone	
-			0		P	Ц	283.0-283.5' - light gray to pale	SC-4 Collected at 287.3 288.5'
_						Ц	yellow brown, (N7 to 10YR 6/2), mild HCl reaction	R18: 16 minutes
_	289.0		1	288.5' - Mechanical break, horizontal, rou		₫	283.5-285.0' - light gray, (N7), fine to	1
-				stepped, 9/16" relief, across large 1" void 289.25, 289.5, 289.85' - Fractures (3),	' h	+	medium grained, abundant fossils, voids to 9/16" over 100% (molds)	1
290			3	horizontal, rough, stepped, medium	F	H	285.0-287.3' - loose fragments as in	1
-247.4			3	limestone, 9/16" relief		7	- 283.0 to 283.5' 287.3-288.4' - light gray to very light	
			3			Ⅎ	gray, (N7 to N8), medium grained,	
	R19-HQ 5 ft	57	2	290.9, 291.4, 291.85, 292.25, 292.8, 293. 294.5, 294.7' - Fractures (8), horizontal,	.0,	Н	mild to moderate HCl reaction, very weak to weak (R1 to R2), irregularly	
	94%	31		rough, stepped, infill, loose, broken	\perp	Ц	spaced voids to 9/16"; highly fossiliferous	
_			3		Ъ	Ц	289.0-293.7' - very light gray to very	_
l _						Ц	light bluish gray, (N8 to 5B 8/1), very fine grained, mild to moderate HCl	_
_			2		上	ҵ	reaction, very weak to weak (R1 to	R19: 13 minutes
_	294.0		NR	004.0.005.01. D. L."	_	╛	R2), some portions clayey, <5% voids (molds)]
_			>10	294.0-295.2' - Bedding plane, smooth, undulating, slight (mt) metal oxide stainin	ng, 📙	\dashv	No Recovery 293.7-294.0'] _
295				parting on bedding planes	~ _L	7	Limestone – 294.0-295.5' - yellowish gray, (5Y	_
-252.4			3		上	$ \downarrow$	8/1), fine grained, weak (R2), poorly to moderately fossiliferous, <5%] _
_	Baa . : :			295.8, 298.7' - Fractures (2), horizontal,	上	┧	voids (molds) to 1/16" near 294.0'] _
_	R20-HQ 5 ft	55	>10	rough, 9/16-1" relief	₽	4	295.5-298.9' - very light gray to very light bluish gray, (N8 to 5B 8/1), mild]
_	98%				口口	4	to moderate HCl reaction, very weak	-
-			1		中	⇉	to weak (R1 to R2), poorly to abundantly fossiliferous, voids to 3/4"	-
-					占	⇉	(molds)	P20: 11 minutes
-			2		-	╁		R20: 11 minutes
-	299.0		NR)	299.0-304.0. 304.0-309.0' - Mechanical b	reak \Box	\dashv	No Recovery 298.9-299.0'	-
-			>10	(2) 299.0-304.0, 304.0-309.0 - Mechanical b	neak □ -	1	· · · · · · · · · · · · · · · · · · ·	-
300						+		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

AD-04

SHEET 6 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.8	88 ft bo	gs on 9	9/13/07 START: 9/6/2007 END: 9	/27/20	07 LOGGER : R. Bitely, J. Townes,	S. Roberti, K. Waikins
>00	6)			DISCONTINUITIES	o O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A BE	TH, /	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	S E	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
	ORE ENG ECO	Ø	RAC:	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	035	ď	# 5	THICKNESS, SURFACE STAINING, AND HIGHTNESS	Ś	CHARACTERISTICS	· ·
-257.4			>10		Ł	Limestone 299.0-301.0' - very light gray to very	_
_					₽	light bluish gray, (N8 to 5B 8/1), fine	_
_	R21-HQ 5 ft	0	>10		┸	grained, mild to moderate HCl reaction, very weak to weak (R1 to	_
l _	62%	ŭ	- 10		\perp	R2), fossil molds, voids to 3/4" (less	
l _					\perp	than 5%) Clayey Limestone	
_			NR		F	301.0-302.1' - light yellowish gray to	
_			INIX			light bluish gray, (5Y 7/2 to 5B 8/1), very fine grained, moderate HCl	R21: 16 minutes
_	304.0				世	reaction, with layers of very weak	
_			>10		\vdash	R1) dark olive silty clay No Recovery 302.1-304.0'	
305_			- 10	_		Clayey Limestone	
-262.4			>10		\perp	304.0-308.5' - light yellowish gray with bluish gray mottling, (5Y 7/2 with	
l _			- 10		\bot	5B 8/1), very fine grained, moderate	
_	R22-HQ 5 ft	28	>10		J	HCl reaction, extremely weak (R0), very poorly unconsolidated,	
_	90%	20	-10		上	bioturbation filled with bluish gray	
			>10		片	infill; <5% voids	
_			- 10		\bot	L	
_			>10				R22: 15 minutes
l _	309.0		NR		\perp	No Recovery 308.5-309.0'	
l _			>10	309.0-310.8, 311.5-311.8, 312.6-312.8' - Mechanical break (3)	上	Limestone - 309.0-310.0' - very light bluish gray	
310			- 10	-		with medium bluish gray mottling,	
-267.4			>10		\perp	(5B 8/1 with 5B 5/1), very fine grained, very weak (R1)	
_					F	310.0-313.5' - yellowish gray with	_
_	R23-HQ 5 ft	43	>10	311.0, 312.2' - Fractures (2), <5 deg, smooth, planar to undulating, tight		bluish gray streaking, (5Ÿ 7/2 with 5B 8/1), very fine grained, strong HCl	_
_	90%			France to annual g, ag. a	H	reaction, very weak to weak (R1 to	_
_			>10		₽	R2), scarce voids (bioturbation)	_
_				312.6-312.8' - Mechanical break	\perp] -	
-			>10		上	 	R23: 15 minutes
_	314.0		NR		廿	No Recovery 313.5-314.0']
-			>10		+	314.0-318.6' - Same as 310.0-314.0'	
315				_	片	<u></u>	
-272.4			>10		片	1	
-					上	1	
-	R24-HQ 5 ft	17	>10		\perp	<u> </u>	_
-	92%				耳] -	
-			>10		上	1	_
-					上	1	D04: 45 min.uts -
-			>10		一	<u> </u>	R24: 15 minutes
-	319.0		NR	240 0 240 0 220 0 200 0 200 4 200 0	井	No Recovery 318.6-319.0'	
-			>10	319.0-319.9, 320.8-322.9, 323.4-323.8' - Mechanical break (3)	片	1	-
320				.,	\vdash		
						<u> </u>	



PROJECT NUMBER: BORING NUMBER: 338884.FL

AD-04

SHEET 7 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.8	8 ft bo	gs on 9	9/13/07 START: 9/6/2007 END: 9/	27/20	D7 LOGGER : R. Bitely, J. Townes,	S. Roberti, K. Waikins
≥∩≘	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SL	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	S.E.A.	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	S L	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FR EV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_оош -277.4	074	ď	╙Δ		S		
-211.4			>10	320.05, 320.3' - Mechanical break (2), <5 deg, smooth, undulating, tight to 1/4" open	Ш	Limestone - 319.0-323.4' - yellowish gray, (5Y	_
				deg, smooth, and dating, agin to 1/4 open	Н	7/2), medium grained, moderate HCl	_
	R25-HQ 5 ft	30	>10	_	Д	reaction, extremely weak to very - weak (R0 to R1), friable, <5% voids	_
	96%			_		(molds) at 322.0-323.0', otherwise	_
			>10	_	Н	<1% -	_
			- 10	220 5 220 0 222 0 222 d. Machanical break	П	_	_
			>10	320.5-320.8, 322.9-323.4' - Mechanical break or fracture zone (2), smooth, undulating		- No Barrage 200 4 204 0	R25: 15 minutes
	324.0		NR.		Н	No Recovery 323.4-324.0'	
	T]	>10	204.4.204.7L Markari III II III III	Д	Limestone - 324.0-324.5' - light gray with bluish	
325			- 10	324.4-324.7' - Mechanical break, multiple breaks	Д	gray mottling, (N7 to 5B 8/1),	
-282.4			>10	_	Ш	moderate HCl reaction, weak (R2), brown organic peat staining	
			-10		Н	324.5-328.8' - yellowish gray, (5Y	
	R26-HQ	32	3		H	7/2), medium grained, strong HCI reaction, very weak (R1), to	
	5 ft 95%	32	3		H	unconsolidated	
			>10		Ш		
			-10		Ш		
			>10		Ш		R26: 15 minutes
	329.0		NR.	-		- - No Recovery 328.8-329.0'	
			>10 >10	329.0-330.0' - Fracture zone, loose	Н	Limestone	
330			-10		\vdash	329.0-330.0' - light yellowish gray, — (5Y 7/2), medium grained, strong HCl	
-287.4			. 40	330.0-330.4' - Mechanical break,	Ш	reaction, extremely weak (R0), loose	Driller's Remark: 15:26 -
			>10	fracture/breakage zone across friable rocks 330.4-331.5' - Mechanical break	Ш	 330.0-330.2' - medium dark gray, (N4), medium strong (R3), very hard 	pulling core -
	R27-HQ	4.	_	-	Н	with calcite filled bioturbation voids	
	5 ft 74%	15	1	-	Ш	Clayey Limestone 330.2-332.0' - yellowish gray, (5Y	
			0	331.95' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open	ш	8/1), medium grained, strong HCl	
				undulating, tight to 1/4 open		reaction, extremely weak (R0), loose _ 332.0-332.7' - Same as 330.0-332.0'	1
1 7			NR		\mathbb{H}	except very weak (R1)	R27: No Time Recorded
1 7	334.0				H	No Recovery 332.7-334.0'	1
1 7					\Box	Limestone	1
335			3	334.6' - Mechanical break, 40 deg, rough,	Ш	 334.0-337.6' - yellowish gray, (5Y 7/2), medium grained, moderate HCl 	1
-292.4			_	undulating, 3/8" relief (mechanical) 334.75' - Fracture, horizontal, rough, planar,	Н	reaction, very weak to weak (R1 to	
1 7			2	1/16" relief	Ш	 R2), abundantly fossiliferous, <5% voids (molds) at 334.0-336.8', voids]
	R28-HQ	_		335.1' - Fracture, horizontal, rough, 9/16" relief	\blacksquare	to 3/8"	SC-5 Collected at 335.9- 336.6'
	5 ft 100%	62	1	335.8, 336.7, 337.2' - Fractures (3), 30 deg,	Н	-	
1				rough, undulating, 15 deg, and horizontal, 9/16" relief	\sqcap	-	5.6' of recovery in R28 on
1			3	337.6' - Fracture, horizontal, rough, planar,	H	-	5' run; upper break point of core matches lower break
1 7			- 10	loose infill 337.8-339.2' - abundant breaks in very loose	Ш		point of R27 R28: 13 minutes
1	339.0		>10	limestone	Н	-	rzo: 13 minutes -
				-	П		1
340			>10	-	Ш	-	1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

AD-04

ROCK CORE LOG

SHEET 8 OF 16

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.8	8 ft bo	gs on 9	9/13/07 START: 9/6/2007 END: 9/	27/200	D7 LOGGER : R. Bitely, J. Townes,	S. Roberti, K. Waikins
≥∩≘	. (9)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
ANI (file)	ÄAND ≪γND		S L	DESCRIPTION	O C	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-297.4	O¬K	2	шФ	Triorateo, cora not on anti-	S	Limestone	
-257.4			>10	-	H	- 339.0-343.8' - yellowish gray, (5Y	-
_	D20 LIO			-	Н	7/2), medium grained, mild to moderate HCl reaction, extremely	-
_	R29-HQ 5 ft	0	>10	-	Н	 weak to very weak (R0 to R1), voids 	-
_	96%			-	Ш	1/32-1/16" throughout; friable	-
_			>10	342.4' - Fracture, smooth, undulating, brown	ш	_	-
_				organic staining, tight, ~1/8" thick	ш	_	R29: 15 minutes
_			>10	-	Н	_	R29. 15 minutes
_	344.0		NR.	-	H	- No Recovery 343.8-344.0'	-
_			1	-	H	Limestone 344.0-348.8' - light bluish gray with	-
345 <u> </u>				344.7' - Mechanical break or bedding plane,	Ш	— medium bluish gray mottling, (5B 7/1	_
-			>10	10 deg, smooth, undulating, 1/16" relief 345.0-345.7' - Fracture zone, large angular,	${\mathbb H}$	with 5B 5/1), very fine grained, strong HCl reaction, very weak (R1), clayey,	
-	R30-HQ			brittle limestone	Н	voids (bioturbation); otherwise <1%	-
_	5 ft	75	1		ш	voids	-
_	96%			346.6' - Mechanical break, rough, planar, along bedding plane	Н	-	SC-6 Collected at 347.0-
_			1	347.0' - Fracture, horizontal, rough,	Н	-	347.9'
-				undulating, 3/16" relief 348.0, 348.8' - Fractures or bedding plane		-	R30: 10 minutes
_			1	(2), horizontal, rough		_	-
-	349.0		NR.	240.4.250.0.254.5.254.7.252.0.252.2	H	- No Recovery 348.8-349.0	-
-			1	349.1, 350.0, 351.5, 351.7, 352.0, 352.2, 352.3, 352.8' - Bedding plane (8), horizontal,	Н	Limestone 349.0-353.5' - bluish white with light	-
350 -307.4				smooth, undulating, tight to 1/4" open, — bedding planes	H	— bluish gray mottling, (5B 9/1 with 5 B 7/1), very fine grained, strong HCl	_
-			1	349.8, 349.9' - Fractures (2), 60 deg, smooth,	ш	reaction, very weak to weak (R1 to	-
-	R31-HQ			undulating, tight 350.35' - Mechanical break, <5 deg, rough,	ш	R2), friable, <1% visible voids	-
-	5 ft 96%	42	>10	stepped, tight	ш	-	-
-	9070			351.0-351.5' - Fracture zone	Н	-	-
-			5	352.2' - Fracture, vertical, smooth, undulating, 1.1' long fracture, tight	H	-	-
-			1	-	Ħ	-	R31: 8 minutes
-	354.0		NR	353.5' - Mechanical break, <5 deg, rough,	H	No Recovery 353.5-354.0	
-	JJ4.U			undulating, tight 353.6' - Fracture, vertical, smooth,	Н	-	
355			1	undulating, 4" long fracture, tight	H	-	
-312.4				354.8' - Fractures (2), 40 deg, smooth, — undulating, two intersecting fractures, tight	囯	_	
-			3	354.9' - Fractures (2), vertical, smooth,	Ш	Limestone	
	R32-HQ			undulating, two 2-7/16" fractures, tight 355.05, 355.55, 355.8, 355.91, 356.05, 356.2,	Ш	355.7-356.5' - yellowish gray, (5Y	1
-	5 ft 100%	48	>10	357.85' - Bedding plane (7), horizontal,	\square	 8/1), medium grained, moderate to strong HCl reaction, weak (R2), 	
				smooth, planar to undulating, tight to 1/4" - open	Ħ	abundantly fossiliferous, primarily	1
			2	356.2-357.2' - Fracture zone, fragments, 3"	H	 foraminiferous <1/32" molded voids (forams) throughout; brown organic 	1
1				358.2' - Fractures (2), 10 deg and 40 deg,	Ш	silt partings	R32: 10 minutes
1	359.0		1	rough, undulating, broken up there, force not	\mathbb{H}	 356.5-359.0' - Same as 349.0-355.7' except bluish white to yellowish gray, 	1
]				tight, broken at 1" fossil cast 359.2' - Fracture, 60 deg, smooth, undulating,	Ш	(5B 9/1 to 5Y 8/1), scarce	1
360			2	tight to 1/4" open, 4-3/16" long	Ш	bioturbation	1

APPENDIX 2BB-369

Rev. 4



2

4

3

NR

2

>10

>10

NR

1

2

10

369.0

374.0

378.0

R35-HQ

88%

R36-HQ

4 ft

70%

35 3

370

327.4

375

-332.4

380

WATER LEVELS: 5.88 ft bgs on 9/13/07

PROJECT NUMBER: BORING NUMBER:

338884.FL **AD-04** SHEET 9 OF 16

ORIENTATION: Vertical

COMMENTS

LOGGER: R. Bitely, J. Townes, S. Roberti, K. Waikins

ROCK CORE LOG

LITHOLOGY

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

DISCONTINUITIES

START: 9/6/2007

ELEVATION: 42.6 ft (NAVD88) ${\tt DRILLING\ CONTRACTOR: Boart\ Longyear, Huntsville, AL;\ Driller:\ K.\ Heinrich,\ A.\ Anderson}$

CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -317.4 359.9, 360.2, 360.45, 360.6, 362.15, 362.35, Limestone 359.0-365.5' - yellowish gray, (5Y >10 362.55, 362.65, 363.45' - Bedding plane (9), 7/2), medium grained, mild to moderate HCl reaction, very weak to horizontal, smooth, undulating, tight to 1/4" R33-HQ 360.6-360.95, 361.25-362.15, 362.55-362.65' weak (R1 to R2), moderately to 50 >10 5 ft abundantly fossiliferous, forams, 100% - Fracture zone (3), fragments 3" diameter pelecypods, bryozoa; <1/32" voids and foraminiferous molds ~ 50% >10 bioturbated and finer grained, 359.0 to 360.2' and 363.0 to 365.5' R33: 12 minutes 2 364 0 363.75' - Fracture, vertical, smooth, undulating, 6" long, tight 2 364.6, 365.6, 364.9, 366.0' - Bedding plane 365 (4), horizontal, smooth, undulating, tight to $-322\overline{4}$ 2 Limestone 365.0' - Fracture or mechanical break, 20 365.5-366.8' - yellowish gray, (5Y deg, rough, undulating, open, fragment R34-HQ 8/1), fine grained, mild to moderate missing 5 ft 60 1 365.4' - Fracture or mechanical break, 30 HCl reaction, weak (R2), friable, silty, 100% voids over <5% 366.8-367.7' - pale yellow gray to very light gray, (5Y 7/2 to N8), weak SC-7 Collected at 366.8deg, rough, undulating to stepped, missing fragments, tight to 1" open 367.7 1 366.5-366.8' - Fracture zone, fragments to to medium strong (R2 to R3), >50%

END: 9/27/2007

relief, break across void 371.5, 371.8, 371.9, 373.0' - Bedding plane (4), 0-10 deg, rough, undulating, 3/16-3/4" 374.3, 374.6, 375.1' - Fractures (3) horizontal, rough, undulating, 3/16-9/16" open 375.5-376.8' - fragments, silty limestone

R34: 12 minutes bioturbated with voids over 60% of 368.05-368.6' - Fracture zone, fragments to sample, abundantly fossiliferous 2-3" rock weakened by fossiliferous zone 367.7-369.0' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to 369.2' - Bedding plane, horizontal, moderate HCl reaction, abundantly moderately smooth, planar, 1/16-3/16" open fossiliferous (pelecypods, forams) voids, molds up to 1/16" >50% 369.4, 369.6, 369.8, 370.1, 370.3' - Bedding plane (5), horizontal, moderately smooth, planar, 1/16-3/16" open (typ) bioturbated 369.0-370.3' - yellowish gray, (5Y 370.3-370.7' - Fracture zone, lithology 7/2), fine to medium fine grained, mild HCl reaction, very weak to weak (R1 to R2), <1/32" voids (primarily change 371.1' - Fracture, rough, undulating, 9/16" foraminifera molds), friable, silty 370.3-373.7' - very light gray, (N8), with <5% light bluish gray mottling, moderate to strong HCI reaction, abundantly fossiliferous (primarily foraminifera), molds <1/32-3/16", >50% bioturbated R35: 12 minutes No Recovery 373.7-374.0' Limestone 374.0-374.9' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak Driller's Remark: Hard rocks lodged in inner core, to weak (R1 to R2), voids to 3/16"; only advanced 4' friable and very weak rock (R1)rock at 374.0-374.3 374.9-376.8' - yellowish gray, (5Y 8/1), strong HCl reaction, weak (R2), R36: 15 minutes friable, as at 374-374.3' above, but with occasional olive gray organic No Recovery 376.8-378.0' 378.6, 379.3' - Fractures (2), horizontal, rough, undulating, poorly fit 3/16-9/16" open



PROJECT NUMBER: BORING NUMBER:

338884.FL **AD-04**

SHEET 10 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

				ILIVI . DIELICI D-120 3/N 620, BE3001 3/N 1317, Iliuu I			ORIENTATION: Vertical
WATER	LEVELS : 5.8	88 ft b	gs on s		27/20		
>00	(9)			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-337.4 - -	R37-HQ 6 ft	39	3	379.6, 380.0, 380.1, 380.2, 380.7' - Bedding plane (5), horizontal, tightly fill 1/16-3/16" relief		Limestone 378.0-379.5' - very light gray, (N8), very fine grained, moderate HCI	-
-	78%		>10	380.9-382.7' - Fracture zone	H	reaction, weak (R2), >50% voids - <1/32" wide and bioturbated 379.5-382.6' - yellowish gray, (5Y 7/2), fine grained, moderate HCl	-
-			>10			reaction, very weak to weak (R1 to R2), friable, silty, voids <1/32", well distributed but <5%	- R37: 16 minutes
-	384.0		NR	384.0-384.3' - Fracture zone, fragments to		 382.6-382.9' - pale yellowish gray, (5Y 8/1), strong HCl reaction, weak to medium strong (R2 to R3), 	-
385 -342.4			>10	4"x2" 384.3, 384.5, 384.8, 385.3, 387.85' - Bedding plane (5), 0-5 deg, smooth, undulating, tight		bioturbated, voids 1/8" wide No Recovery 382.9-384.0' Limestone	_
-	R38-HQ		3	to 1/2" open 385.5' - Fracture, rough, undulating, 4-3/16" void	Ė	 384.0-385.7' - Same as 379.5-382.6' except 3/8" single very extensive void across sample 385.2-385.7' 385.7-388.5' - Same as 384.0-385.7' 	-
_	5 ft 100%	55	1	385.65' - Mechanical break, <5 deg, rough, undulating, tight	Ħ		-
_			>10	387.5' - Mechanical break, 20 deg, rough, undulating, tight		-	R38: 10 minutes
-	389.0		2	388.4-388.8' - Fracture zone, fragments to 2"x2"		388.5-390.0' - light gray, (N7), fine to medium grained, moderate HCl reaction, weak to medium strong (R2	-
390_ -347.4			0	389.4' - Fracture, 80 deg, rough, undulating, open, missing face 389.6' - Mechanical break, <5 deg, rough, undulating, tight		to R3), hard, abundant voids <1/32-1/8" throughout, primarily foraminiferous	_
_	R39-HQ 5 ft	0	>10	389.8' - Bedding plane, horizontal, smooth, planar to undulating 389.9-394.0' - Fracture zone, some brown		Clay (CL) 390.0-390.3' - soft, calcareous with dark brown orange silt	-
- -	100%		>10	organic staining on fractures, various fragments of all orientation within limestone; mechanical	Ė	Limestone 390.3-394.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, very	- -
-	204.0		>10		Ë	weak to weak (R1 to R2), friable, organic staining within many fractures <1/32-3/16" voids	R39: 10 minutes -
- - 395	394.0		3	394.2, 394.3, 394.5, 394.9' - Mechanical break or bedding plane (4), horizontal and 10	Ė		-
-352.4 -			>10	395.3-395.8' - Fracture zone, 3/4 to 1-1/2"		to R2), voids, <1/32-3/16" (molds and casts) 394.0-395.0' bioturbated	-
- -	R40-HQ 5 ft 90%	53	2	blocky fragments 396.4, 396.9' - Mechanical break (2), horizontal, rough, undulating, 1-3/16" relief		-	-
-			0		Ħ	-	P40: 0 minutes
- -	399.0		0 NR		E	No Recovery 398.5-399.0'	R40: 9 minutes -
400			3	399.3, 399.7, 400.1' - Bedding plane (3), horizontal, smooth		-	-



338884.FL AD-04

SHEET 11 OF 16

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 9/6/2007 END: 9/27/2007 LOGGER: R. Bitely, J. Townes, S. Roberti, K. Waikins DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD SYMBOLIC MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -357.4 Limestone 400.1-400.3' - Fracture zone 2 399.0-404.0' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, very weak to weak (R1 R41-HO 401.1' - Fracture, 30 deg, rough, 3/16-9/16" 2 to R2), mold and casts over 20% of 53 5 ft relief, mechanical 96% rock, foraminifera, gastropods, 401.7, 402.1, 402.4, 402.6, 403.2' - Fractures pelycypods, bioturbated 400.0-401.0' (5), 0-20 deg, planar, tight 2 R41: 9 minutes 3 Finished at 15:15 on 404 0 NR No Recovery 403.8-404.0' 9/20/07 404.1, 404.3, 404.5, 404.6, 404.8, 405.3, Limestone 5 405.7' - Mechanical break (7), horizontal and 404.0-409.0' - Same as 399.0-404.0' Started at 07:30 on 9/21/07 405 30 deg, rough, planar to undulating, poorly fit, except molds and casts 1/16-3/16' -362.4 >9/16" open between 405.0-407.0' 3 406.0, 406.5, 406.8' - Mechanical break (3), R42-HQ 2 0-20 deg, rough, undulating, tightly fit to 3/8" 5 ft 40 99% 1 407.5, 408.2' - Mechanical break (2), 30 deg, very rough, planar, tightly fit R42: 11 minutes 3 408.5-408.8' - Mechanical break, vertical 409.0 NR 408.9' - Mechanical break, horizontal, planar No Recovery 408.95-409.0' to undulating 409.1, 409.2' - Mechanical break (2), 409.0-411.3' - light yellowish gray, 2 (5Y 9/1), fine grained, moderate HCI 410 horizontal, smooth, undulating, poorly fit 367.4 reaction, very weak (R1), voids to 410.3' - Mechanical break, horizontal, very 1/4", fine black needle form mineral 2 rough, stepped, tightly fit, 3/4" relief throughout 5% (possibly phosphate 410.7' - Fracture, 30 deg, smooth, planar, or organic) R43-HQ 1/16" open Clay (CL) 27 0 5 ft 411.1, 411.3' - Mechanical break (2), 411.3-411.7' - light gray calcareous 80% horizontal, very poorly fill, 1-3/16" open silty clay 3 411.6-411.9' - Fracture zone, through Limestone consolidated limestone 411.7-413.0' - Same as 409.0-411.3' 412.2' - Mechanical break, 30 deg, break except medium strong (R3) R43: 14 minutes through unconsolidated limestone NR No Recovery 413.0-414.0' 412.7, 412.8' - Mechanical break (2), 414.0 Limestone 414.25, 414.4' - Mechanical break (2), planar 5 414.0-416.5' - yellowish gray, (5Y to undulating, poorly fit 414.6' - Fracture, horizontal, undulating, 415 8/1), moderate HCl reaction, medium -372.4 strong (R3), finely crystalline; poorly fit with (Mt) oxide staining evident 415.0-416.5' medium strong (R3); 415.0' - Fracture, 40 deg, discontinuity 414.0-415.0' very weak; 414.7-414.9' between hard fossiliferous limestone and very weak (R1), dark brown organics R44-HQ dark organic silt clay 1 50 5 ft 415.7, 416.5, 417.2, 417.7, 418.0, 418.3' -416.5-418.7' - yellowish gray, (5Y 96% 8/1), fine grained, very weak to weak Mechanical break (6), horizontal, planar (R1 to R2), >5% fossiliferous casts 3 and molds (foraminifera, echinoderma, pelycypods, R44: 13 minutes 2 gastropods), occasional black mineral growth in voids, very soft, NR 419.0 418.7' - Fracture, horizontal, rough, planar, voids <1/32-3/16" 0 contact: hard fossiliferous limestone over Clayey Silt (ML) dark brown silty clay. mt oxide staining on 2 418.7-418.8 - greenish black 420 limestone surface



338884.FL AD-04

SHEET 12 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER	LEVELS : 5.8	88 ft b	gs on 9	9/13/07 START : 9/6/2007 END : 9/	<u> 27/20</u>	07 LOGGER : R. Bitely, J. Townes	S. Roberti, K. Waikins
200	(9)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, SVEF	(%) _Q	FOOT FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EN SERVI	SORE	ROL	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3Y.ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-377.4	016	ш	ш.ш	419.3' - Bedding plane, 10 deg, contact:	1	No Recovery 418.8-419.0'	
-			0	black orange clayey silt over limestone,	H	- ∖Clayey Silt (ML)	-
-	R45-HQ			unbroken 419.9' - Mechanical break, horizontal, rough,	Ħ	419.0-419.2' - greenish black, organic	-
-	5 ft	61	3	planar, 3/8" relief, 1/16" open, tight	世	Limestone	-
-	100%			421.5' - Bedding plane, horizontal, undulating, horizontal undulating break along		419.2-421.5' - yellowish gray, (5Y 8/1), weak (R2), >5% casts and	-
-			4	bedding, <1/16" infill (organic) - 421.8-422.3' - Mechanical break, vertical	H	 molds (foraminiferons, tortella, 	-
_				422.8' - Bedding plane, smooth, undulating,		pelycypods), voids of various size throughout	R45: No Time Recorded
_	404.0		1	break along bedding, tight fit, organic staining		 421.5-423.0' - pale yellowish brown, 	-
_	424.0		1	-	H	(10YR 6/2), very fine grained, strong HCl reaction, weak (R2)	-
405				-	////	√ 423.0-424.5' - pale yellowish brown,	□ Bit drops at 424.5' □
425_ -382.4			NA	_	1 ///	(10YR 6/2), very dense, mild to moderate HCl reaction, very strong	_ -
-			>10	-	Ľ	-\\(R5), crystalline, <1/32" voids \\throughout	1
-	R46-HQ			-	₩	Clav (CL)	1
-	5 ft 58%	12	>10	-	F	424.5-425.2' - brownish gray, soft,	1
-	30 /0			-	仜	_ \carbonate Limestone	Various bit drops between
-				-		425.2-427.0' - light olive gray, (5Y	427-429' (void depths – unknown)
-			NR	-	T	6/1), strong HCl reaction, very weak to weak (R1 to R2), limestone	R46: 15 minutes
-	420.0			-	F	fragments	-
-	429.0			429.2, 429.5, 429.8, 429.9, 430.0' - Fractures	Ħ	No Recovery 427.0-429.0' Limestone	-
430			4	(5), 10-30 deg, planar, tight, 1/16-1/16" relief,	Ħ	429.0-433.0' - light yellowish gray, (5Y 9/1), dense, strong HCl reaction,	-
-387.4				thin organic silty infill <1/32"	L	medium strong (R3),	_
_			1	430.0-432.5' - Mechanical break, horizontal, - smooth, planar, tight to 1/8" open	╙	microcrystalline, no visible voids, medium strong (can be carved with a	1
-	R47-HQ					knife) organic, silty bedding planes,	1
_	5 ft 78%	27	1	-	ш	- last 4" very soft and clayey	1
_			_	-	Т	-	1
_			3	432.7' - Fracture, rough, undulating break,	\vdash	-	1
_			NR	disconformity, limestone over friable organic		No Recovery 433.0-434.0'	R47: 15 minutes
-	434.0		INK	silt -	Ħ	-	1
				-	Ш	Clayey Silt/ Silt (ML)	SC-8S Collected at 434.0-
435			NA	-	1	 434.0-435.4' - greenish black, (5GY 2/1), organic soft 	435.4' – (soft soil sample)
-392.4			NA	_	Щ		
	R48-HQ		0	435.4-438.0' - Fracture zone, hard limestone with angular fragments	E	Peat/organics 1 435.4-435.9' - greenish black, (5GY	
	4 ft 100%	0	\10	singular maginorità	H	\ 2/1), moderate HCl reaction,	1
			>10	_	\Box	extremely weak to very weak (R0 to R1), >50% organic material	1
			-10		Ш	Limestone	R48: 16 minutes
	438.0		>10		口	435.9-438.0' - grayish orange, (10YR 7/4), fine grained, strong HCl]
			1		Ь	reaction, very weak to weak (R1 to]
			1	438.5' - Mechanical break, horizontal, rough, undulating, 3/16" open	-	R2)	SC-9 Collected at 438.5- 439.4' -
			>10	undulating, 5/10 open	厈	_	700.4
440			-10		Ľ		
1			1 1		1		



338884.FL AD-04

SHEET 13 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

00111110	7 WIE 1110 D 7 W	10	2011 11	IENT . DIELICI D-120 3/N 620, BL3001 3/N 1317, Illud I	otal y,	The today, The bearing	ORIENTATION : Vertical
WATER	LEVELS : 5.8	88 ft b	gs on	9/13/07 START: 9/6/2007 END: 9/	27/20	D7 LOGGER : R. Bitely, J. Townes,	S. Roberti, K. Waikins
>	<u> </u>			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	N 4.8	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
±ĕ,¥		(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
925		A Q	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0716	IĽ.	шп		S		
-397.4			>10	439.4-440.6' - Fracture zone, through soft material	┢┷	438.0-439.4' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl	_
	R49-HQ			material		reaction, medium strong (R3),	
I -	6 ft 43%	14		•	╁	abundant voids to 1/8" with some	1 7
-	45%				╂╵	 voids filled with organic silt, <5% 	-
_					Ш	fossils, primarily molds	1 -
l _			NR			439.4-440.6' - dusky yellow, (5Y 6/4), - strong HCl reaction, very weak (R1),	_
						friable silt	
-				•	Ш	No Recovery 440.6-444.0'	R49: 18 minutes
-				-	$+ \Box$	-	-
_	444.0					- ,. ,	-
_			2		╟	Limestone - 444.0-446.0' - moderate yellowish	
445				444.5' - Fracture, 15 deg, very rough	Ш	brown, (10YR 5/4), fine to very fine	1
-402.4				445.0' - Fracture, possible void	1	grained, mild HCl reaction, very weak	
-			1	445 CL Machanical brook notabed modium		to weak (R1 to R2), dolomite,	1 -
-	D50.110			445.6' - Mechanical break, notched medium fit 1/16" open	Ш	crystalline friables, >5% voids up to 1/16"	Deillerie Demonis Dit dren
l _	R50-HQ 5 ft	20		446.0' - Fracture, bit dropped, assumed void	Н	- 446.0-447.8' - missing	Driller's Remark: Bit drop 2.0 ft into run. interpreted
	56%	20	NR	location		110.0 117.0 Milesing	as void
_			1411	-	╙	=	1
-				447 CL Franking CO day break agrees vaid	fT	=	1 -
_				447.6' - Fracture, 60 deg, break across void		 447.8-448.6' - dusky yellowish brown 	DEO: O minutos
_			1	_	┵	to pale yellow brown, (10YR 2/2 to	R50: 9 minutes
	449.0		NR			10YR 4/2), fine grained, strong HCl reaction, crystalline, calcite, large	
				449.0' - Fracture, void	1—	voids to 1-1/4" with calcite rhombic	Driller's Remark: Void at
				•	+-	crystals and clean hexagonal quartz	top of run, 1.0' of drilling in
450 <u>-</u> 407.4			NR	-	╨	crystals other voids filled with silty	middle of void near bottom, (based on bit drop)
					┢	friable dolomite	(based on bit drop)
						No Recovery 448.6-449.0' No Recovery 449.0-451.0'	
	R51-HQ			451.0-452.0' - Fracture zone, limestone	Ш	Limestone	1
-	5 ft 32%	0	>10	(dolomite)	ш	451.0-452.0' - pale yellowish brown,	1 1
-	32 /6			452.0' - Fracture, void	╁	(10YR 6/2), medium strong to strong	1 -
_				402.0 - Fracture, Volu	╀	(R3 to R4), crystalline >5%, of voids (molds) voids up to 1/8", dolomite	1 4
l _			NR			No Recovery 452.0-454.0'	l
			''''		\vdash	•	R51: No Time Recorded
I -	154.0					<u> </u>	1
-	454.0			454.0-456.0' - Mechanical break, large	Ш	Limestone	-
-			>10	angular fractures at all angles	世	 454.0-455.9' - pale yellowish brown,]
455_					厈	(10YR 6/2), fine grained, <5% voids	
-412.4					\vdash	to 3/16", poorly fossiliferous	Ι Π
-			>10	-			1
-	R52-HQ			-	┨	455.9-457.0' - light olive gray to pale	1 1
-	5 ft	7	4	456.2, 456.3, 456.6, 456.7' - Fractures (4),		olive, (5Y 5/2 to 10Y 6/2), fine]
-	76%			horizontal, smooth, planar to undulating, tight	$oldsymbol{oldsymbol{\square}}$	grained, mild HCl reaction, very weak to weak (R1 to R2), friable, silty]
			5	457.3-457.7' - shattered dolomite, large	\vdash	457.0-457.8' - Same as 454.0-455.9'	
I -			ـــّـــا	angular fragment		except first 3" are amber brown,	1
-			l	3	╙	dolomite	R52: No Time Recorded
-			NR		世	No Recovery 457.8-459.0'	Finished drilling on 9/21/07
-	459.0			450 0 450 51 5 4 4 4 5 0 1		_	at 459.0'
			>10	459.0-459.5' - Fracture zone, 1"-3" rock fragments of hard dolomite	┢	_	
460			10	nagnienio di nara adidiffile			Start drilling on 9/22/07
1.00					1	_	
					1		
					_		



338884.FL AD-04

SHEET 14 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS: 5.8	8 ft b	gs on 9	9/13/07 START: 9/6/2007 END:	9/27/20	07 LOGGER: R. Bitely, J. Townes,	S. Roberti, K. Waikins
≥∩≘	_ (9			DISCONTINUITIES	ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE ATIC	L H	(%) _Q	F.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLIC OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
JRF.	ORE ING	ο	SAC ER F	PLANARITY, INFILLING MATERIAL AND	. I BB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	SHR	ď	FB	THICKNESS, SURFACE STAINING, AND TIGHTNES	S S	CHARACTERISTICS	5.10. 6, 120. 1.200216, 2.10.
-417.4			3	460.0, 462.7' - Fracture (2), 75 deg, planar,		Limestone	
			3	fracture through hard dolomite, 3/16" relief 460.4' - Fracture or mechanical break, 30		 459.0-460.2' - moderate brown to grayish brown, (5YR 3/4 to 5YR 3/2), 	_
_	R53-HQ			deg, rough, planar	1	dense, fine to medium grained, mild	-
_	5 ft 100%	25	>10	460.6, 460.8, 461.2, 461.3' - Bedding plane or mechanical break (4), horizontal, planar,		 HCl reaction, medium strong to strong (R3 to R4), crystalline, 	-
-	10070			3/16" relief		dolomite; <1/32" voids over 70% of	-
-			5	461.7-462.3' - Fracture zone, horizontal,	╁	- surface	-
_				undulating, dolomite, poorly fit	+	460.2-462.2' - fine to medium grained, mild HCl reaction, very weak	R53: 13 minutes
-			>10	463.4-463.8' - Fracture zone	+	 (R1), friable breaks on bedding 	-
_	464.0					planes 462.2-464.0' - Same as 459.0-460.2'	_
_			>10	464.0-466.3' - Fracture zone, large fragments of blocky to angular dolomite	+	except moderate brown to grayish	_
465_				or according to an game account	\bot	brown, (5YR 3/4 to 5YR 3/2),	
-422.4			>10			dolomite Limestone	_
			10		\vdash	464.0-466.5' - Same as 462.2-464.0'	
	R54-HQ		4.0		I		_
_	5 ft 60%	0	>10	466.5' - Fracture or mechanical break, 45		466.5-467.0' - yellowish brown,	_
_	3373			deg, across hard dolomite over friable dolomite below, tightly fit	1	 (10YR 5/4), moderate HCl reaction, friable, silty, streaks of organic 	-
-				466.7' - Fracture, horizontal, planar, 3/16-3/8"	\pm	staining on bedding	-
_			NR	relief, contact between hard dolomite and	+	- No Recovery 467.0-469.0'	R54: 12 minutes
-				friable dolomite below	+	-	-
_	469.0			469.0-470.2, 471.0-471.4' - Fracture zone	+	Limestone	_
-			>10	(2), hard, dolomite	\perp	 469.0-472.0' - moderate yellowish 	-
470					- I	brown, (10YR 5/4), mild HCl reaction,	_
-427.4 -			1		\perp	very weak to weak (R1 to R2), finely crystalline, dolomite, voids	_
_				470.6' - Fracture, horizontal, rough, planar,	F	throughout variable 1/16-3/4"	_
_	R55-HQ 5 ft	13	>10	break tensely fit, 9/16" relief			_
	60%	10	- 10	471.8-472.0' - Fracture zone	┵		_
				47 1.0-47 2.0 - 1 Tacture 2011c		No Recovery 472.0-474.0'	
_					\perp	_	_
_			NR		1	-	R55: 12 minutes
_	474.0				1	<u> </u>	-
-	474.0			474.0-475.1' - Fracture zone	1	Limestone	
475			>10		$+$ \square	- 474.0-478.0' - moderate yellowish	-
475 <u> </u>					\pm	brown, (10YR 5/4), mild HCl reaction, very weak to weak (R1 to R2),	-
-			1	475.5' - Fracture or mechanical break, 50	+	 extensive voids throughout 1/16-3/4", 	-
_	DECLIC			deg, very rough, undulating, tight	#	finely crystalline dolomite, few of the voids with clean hexagonal quartz	-
_	R56-HQ 5 ft	27	3		\perp	- crystals (1/8")	-
	80%	•		476.5' - Mechanical break, 45 deg, tightly fit 476.7' - Mechanical break, 10 deg, planar,	\perp	_ ` ` ′	-
			>10	tight		_	_
				477.3' - Mechanical break, horizontal, undulating, tight			
			NE	undulating, tigrit		No Recovery 478.0-479.0'	R56: 14 minutes
_	479.0		NR		1		
_				479.0-479.3' - Fracture zone, hard dolomite	口	†	
400			2	479.3' - Fracture, 45 deg, rough, irregular break across voids	廿	-	-
480				DI CAN ACIOSS VOIUS	-		
					_		•

Rev. 4



338884.FL AD-04

SHEET 15 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING	METHOD A	ND E	QUIPN	MENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud n	otary,	HQ tools, HW casing	ORIENTATION : Vertical
	LEVELS : 5.8						
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-437.4 - - - - -	R57-HQ 5 ft 88%	48	2 6 0	480.0-480.3' - Fracture zone, through dolomite 480.8' - Fracture, horizontal, rough, undulating, horizontal break through voids 481.0-481.4' - Fracture zone, through friable dolomite 481.4-481.7' - Fracture, 60 deg, through hard dolomite 481.7' - Fracture, horizontal, very rough, undulating. Mt. evide exteriors		Limestone 479.0-481.7' - yellowish orange, (10YR 7/4), very weak to weak (R1 to R2), finely crystalline, dolomite, voids throughout to 3/4" 481.7-483.4' - grayish orange, (10YR 7/4), dolomite with calcareous infill voids; 482.6': portion of gray infilled limestone 3" thick	SC-10 Collected at 481.7- 483.3'
-			NR	undulating, Mt oxide staining	+	No Recovery 483.4-484.0'	-
- 485_ -442.4 - -	R58-HQ 5 ft 90%	38	4 1 2	484.2-484.5' - Mechanical break, 45 deg and horizontal, undulating, poorly fit 485.7' - Mechanical break, horizontal, undulating, across void, tightly fit 486.4' - Fracture zone, irregular		Limestone - 484.0-487.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), finely crystalline dolomite, voids to <1/16-3/16"; many filled with amber calcite	- - - - - -
- - - -	489.0		>10 >10 NR	487.0, 487.3' - Mechanical break (2), horizontal, planar, very poorly fit across friable dolomite 487.0-488.5' - dusky yellow, (5Y 6/4), very weak (R1), very friable, finely crystalline dolomite No Recovery 488.5-489.0'		R58: 12 minutes	
490 -447.4 - - - - -	R59-HQ 5 ft 92%	50	>10 6 2 2	489.0-489.8' - Fracture zone, large angular block, limestone fragments 490.0-490.1' - Fracture, horizontal, smooth, undulating, discontinuity with 1" white clay infill 490.1, 490.3' - Mechanical break (2), horizontal, planar, poorly fit 490.6' - Mechanical break, 15 deg, rough, planar, tightly fit 490.8-491.0' - Mechanical break, 85 deg, fracture between 2 horizontal bedding plane breaks		Limestone 489.0-489.3' - yellowish gray, (5Y 8/1), very fine grained, very strong HCI reaction, weak to medium strong (R2 to R3), <1/32" void over 10%, 1" thick layer of soft calcareous clay 489.3-493.6' - pale grayish orange to dusky yellow, (10YR 7/4 to 5Y 6/4), fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), >8% voids throughout <1/32-1/16", many voids with amber calcite fill, finely crystalline	
-	494 N		NR	491.7' - Mechanical break, undulating, 1/16-3/16" open		No Recovery 493.6-494.0'	-
495 -452.4 -452.4 - - - - - -	R60-HQ 6 ft 95%	47	3 >10 2 4 3	492.4-492.5' - Mechanical break (2), planar, 3/16-5/16" open 494.4, 494.7, 494.9, 495.0' - Mechanical break (4), 0-15 deg, rough, poorly fit 495.8' - Fractures (2), horizontal, light brown clay infill (1"), poorly fit 495.9' - Fracture (2), horizontal, light brown clay infill (1"), poorly fit 497.7-498.3' - Mechanical break or bedding plane (4), horizontal, planar, through friable dolomite 498.8, 498.9, 499.0, 499.3, 499.5, 499.6' - Bedding plane (6), horizontal, poorly fit, friable dolomite		Limestone 494.0-499.7' - grayish orange, (10YR 7/4), moderate HCl reaction, medium strong (R3), dolomite, weak to medium strong (R1-R2) through areas of bedding plane discontinuities; voids <1/32-1/8", uniformly distributed, some voids filled with amber calcite, numerous open voids to 1.5" with amber, calcite crystal growth, finely crystalline 496.0-496.9' - moderate yellowish brown to grayish brown, (10YR 5/4 to 10YR 7/4), mild HCl reaction, finely crystalline dolomite, well-distributed 1/32-1/16" voids, some filled with crystals, black organics, white	SC-11 Collected at 496.0-496.9'
500	500.0		NR	as.o doloilito	H	calcareous clay	
I					1		1

APPENDIX 2BB-376 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	AD-04	SHEET	16	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.8	38 ft bo	gs on 9	9/13/07 START : 9/6/2007	END : 9/2	7/200	D7 LOGGER : R. Bitely, J. Townes, S	S. Roberti, K. Waikins
≥0 ::	(9			DISCONTINUITIES		Ō	LITHOLOGY	COMMENTS
ANE (AAN ⊘⊗		ES	DESCRIPTION		SLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A CE	E.F.	(%)	T.05	DEPTH, TYPE, ORIENTATION, ROL	JGHNESS,	OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	PLANARITY, INFILLING MATERI THICKNESS, SURFACE STAINING, AN	AL AND	SYMBOLIC LOG	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	034	α.	E 6	THICKNESS, SURFACE STAINING, AN	D HGHINE33	Ś		
-					_		No Recovery 499.7-500.0' Bottom of Boring at 500.0 ft bgs on	-
-					_		9/27/2007	-
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PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-01	SHEET 1 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

						ry, auto nammer, invio rous,			ONIENTATION : Vertical
WATER	LEVELS	: 1.0 ft b	gs on 5/2:	3/07	START : 5/23/2007	END: 5/30/2007	LOGGEF	} : R.	
>				STANDARD		SOIL DESCRIPTION		U	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
표원한		RECOVE	RY (ft)	12011120210		IE, USCS GROUP SYMBOL,		吕	DEPTH OF CASING, DRILLING RATE,
T ¥ ¥ ¥ ¥			<u> </u>	6"-6"-6"		E CONTENT, RELATIVE DEN ICY, SOIL STRUCTURE, MIN		JBC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	(N)	CONSIGNEN	101, 0012 011100 10112, Will	VET U LEGGT	SYI	ING THOMESTATION
40.8	0.0			(**)	Topsoil			V1 1/2	Additional equipment note: 3-7/8" tricone bit,
-	0.0			1-3-5		nish black, (5YR 2/1), mois	st, 15% roots /-		split spoon Start drilling 5/23/07 at 08:15;
l -		0.9	SS-1	(8)					water level = 1' ft below ground surface
I _	1.5				Poorly Graded	d Sand (SP)	amara (10VD		_
					8/2 to 10VR 7/2	 pale orange to grayish ora moist, loose, very fine t 	ange, (10 fR		
-					grained, trace r	roots, trace nonplastic fine	s, silica sand		-
-								1	=
-							-	ł	-
-							-		_
l _							_		_
					l				
5	5.0						-	1	_
35.8	0.0				Poorly Graded	d Sand With Silt (SP-SM)		177	
-		, ,	86.0	1-4-6	5.0-6.1' - pale y	yellowish brown to modera	te yellowish -	団	-
-		1.1	SS-2	(10)	brown, (10YR 6	6/2 to 10YR 5/4), moist to grained, no HCl reaction,	wet, loose,		-
I -	6.5				nonplastic fines	e grained, no no reaction, s, trace roots, silica sand	, 12%		_
					(non-placed miles	<u> </u>			
							_		
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l -							-		_
I _							_		
10	10.0								
30.8					Poorly Graded				
-		1.1	SS-3	4-9-10		le yellowish brown to mode n, (10YR 6/2 to 10YR 5/4)			-
-		'''		(19)	wet, medium d	lense to dense, fine to med	, moist to dium grained. /		-
-	11.5					n, trace black minerals, sili			-
_									_
							_		
-							-	1	_
-					l		-	1	-
-							-		-
-							-		_
15	15.0				<u> </u>			ļ.,	
25.8					Poorly Graded	Sand With Silt (SP-SM)	rata	間	
		0.8	SS-4	6-9-9	vellowish brow	le yellowish brown to mode rn, (10YR 6/2 to 10YR 5/4)	erale - wet -	نانا]
-	16.5			(18)	\ medium dense	e, no HCl reaction, 5% non	plastic fines, /-	1	-
-	16.5				silica sand	. '			-
-					l		-		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-01	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 1.0 ft bo	s on 5/23	3/07 S	START : 5/23/2007 END : 5/30/2007 LOGGE	R : R.	Bitely
<u> </u>				STANDARD	SOIL DESCRIPTION	g	COMMENTS
AND N (#)	SAMPLE			PENETRATION TEST RESULTS	COIL NAME LICCS COOLID SYMBOL COLOD	O LO	DEDTH OF CASING DOWNING DATE
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION
20.8	20.0				Silty Sand (SM)		
		1.5	SS-5	2-2-2 (4)	20.0-21.5' - palé yellowish brown, (10YR 6/2), wet, very loose, no HCl reaction, 35% nonplastic fines,		
	21.5			(' '	silica sand		
-						1	_
_						-	-
-						-	-
-						1	-
-						1	-
25	25.0						
25_ 15.8					Silty Sand (SM) 25.0-26.5' - Same as above except 35-40% nonplastic		
-		1.5	SS-6	1-1-1 (2)	fines		_
-	26.5						_
-						-	-
-						1	-
-						ł	-
-						1	-
						1	1
30	30.0					<u> </u>	_
10.8				0-1-1	Silty Sand (SM) 30.0-31.5' - Same as above except 35-40% non to low		_
-		1.5	SS-7	(2)	plastic fines	-	-
-	31.5						-
-						ł	-
-						1	-
] -						1	
-						-	_
35 5.8	35.0				Silt (ML)	+	
-		0.5	SS-8	1-2-4	35.0-35.5' - pale yellowish brown, (10YR 6/2), moist to wet, low plasticity, rapid dilatancy, mild to moderate	₩	-
-	36.5			(6)	HCI reaction, very thinly bedded, 5-10% fine to	1	-
-	30.0				medium grained silica sand, lens of coarse sand-sized material from 35.4-35.5', all carbonate	1]
					materials, trace organics throughout, one 1/4" thick organic lense]	
_					[3	1	
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- 40						1	-
40						I	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FI	B-01	SHEET	3	OF	q	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 1.0 ft bo	gs on 5/20	3/07	START : 5/23/2007 END : 5/30/2007 LOGGER : R. Bitely
				STANDARD	SOIL DESCRIPTION COMMENTS
O (#) 7	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	Ŏ
JEEL JOEL		RECOVE	RY (ft)	12011120210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
<u> </u>	40.0			(N)	
0.8	40.0			2-2-2	Clayey Sand With Organics (SC) 40.0-41.5' - olive gray, (5Y 4/1), moist to wet, very
_		1.5	SS-9	(4)	loose, very fine to fine grained, no HCI reaction,
_	41.5				organic lenses, 16% medium plastic fines, fines appear to be organic, silica sand
_					
_					-
_					-
_					-
_					-
_					-
45 <u> </u> -4.2	45.0	0.4	CC 10	50/5	Organic Soil (OL) HW casing down to 45.0'
-4.4	45.4	0.4	SS-10	50/5 (50/5")	
-					hard, very fine to fine grained, medium plasticity, slow / _ dilatancy, no HCl reaction, 5-10% silica sand
-					Clayey Sand (SC)
-					\\45.2-45.4' - light olive gray, (5Y 6/1), moist to wet, \\35\% medium to plastic fines, silica sand
-					
-					-
-					-
-					
-					-
50 -9.2	50.0			07.50/5	Silty Sand (SM)
-	50.9	0.9	SS-11	27-50/5 (77/11")	50.0-50.85' - moderate yellowish brown to pale
_	30.3			, ,	yellowish brown, (10YR 5/4 to 10YR 6/2), moist to wet, very dense, very fine to medium grained, strong
_					│ \HCl reaction, 45-50% nonplastic fines, all carbonate │ - │
-					\material \documents - \documen
-					
-					-
-					
-					
	EE 0				
55 <u> </u>	55.0 55.3	0.3	SS-12	50/4	Sandy Silt (ML)
-				(50/4")	\ 55.0-55.3' - light olive gray, (5Y 5/2), wet, nonplastic \ to low plasticity, rapid dilatancy, moderate to strong
-					\HCI reaction, 30% very fine to medium sand, 10%
-					coarse sand, all carbonate materials
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-01	SHEET	4	OF 9)

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 1.0 ft bo	gs on 5/20	3/07	START : 5/23/2007 END : 5/30/2007 LOGG	ER	: R.	Bitely
				STANDARD	SOIL DESCRIPTION			COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	NTERVAL (ft) PENETRATION TEST RESULTS SOIL NAME LISCS CROUB SYMBOL COLOR				SYMBOLIC LOG	
		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		SLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		MBC	INSTRUMENTATION
				(N)		_	်	
-19.2	60.0			32-15-10	Sandy Silt (ML) 60.0-60.8' - light olive gray, (5Y 5/2), wet, nonplastic,			There is no distinct boundary between the subunits; boundary is gradational
l _		1.5	SS-13	(25)	rapid dilatancy, mild to moderate HCI reaction,		++	-
l _	61.5			. ,	\30-40% fine to coarse sand, all carbonate \(\silty \) Silty Sand (SM)	/	\coprod	_
_					60.8-61.5' - light olive gray, (5Y 5/2), wet, medium dense, mild to moderate HCl reaction, 40% nonplastic			_
l _					\dense, mild to moderate HCl reaction, 40% nonplastic fines, limestone lenses up to 1/4"-1/2" thick, all	$/ \rfloor$		
_					carbonate			
_								
_								
65	<u>65</u> .9							
-24.2		0.0	SS-14	50/0.25 (50/0.25")	Limestone Fragments 65.0-65.1' - light olive gray, (5Y 5/2), mild to moderate			Driller's Remark: Hit rock at 65.0'
l _				(30/0.23)	HCI reaction, fine gravel-size fragments	$/ \rfloor$		
l _								
_								_
_								_
_								_
_								_
l _								_
l _								_
70	70.0	0.0	SS-15	50/1	No Recovery 70.0-70.1'			10:00 Began rock coring; water level at 2.3'
-29.2	70.1	/	(33-13)	(50/1")	Begin Rock Coring at 70.0 ft bgs	/]		below ground surface
_					See the next sheet for the rock core log	4		_
_								_
_								_
_						4		_
_						4		_
_						4		_
_						4		_
_						4		_
75 <u> </u>						_		_
-34.2						4		_
_						4		_
-						4		_
-						4		-
-						4		_
-						4		-
-						4		-
-						4		-
-						4		-
80						\dashv		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-01	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NE I HOD AI	ND EC	JUIPIV	MENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bgs	s on 5	/23/07 START : 5/23/2007 END : 5/	30/200	7 LOGGER : R. Bitely	
300	<u> </u>			DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
-29.2	70.0	A Q	FRA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS Limestone	DROPS, TEST RESULTS, ETC.
-			>10	70.3' - Fracture, 65 deg, rough, undulating, tight, open <1/8" 70.35-70.6' - Fracture zone, very fine to		70.0-71.95' - moderate olive brown, (5Y 4/4), fine grained, moderate to strong HCl reaction, weak (R2),]
-	R1-NQ		1	coarse gravel sized fragments 70.65-70.85' - Bedding plane, <10 deg, smooth, undulating, tight to 1/4" open	H	 voids (1/16") over 25% of surface, trace fossil molds, largest 1/4"x1/2", trace secondary recrystallization in 	SC-1 collected at 71.15- 71.95' Driller's Remark: Soft from
-	5 ft 39%	17		71.1' - Fracture or mechanical break, rough, undulating, tight		voids No Recovery 71.95-75.0'	72.0-74.0' -
-			NR			- -	R1: 3 minutes
75 <u> </u>	75.0			75.0-75.2' - Fracture zone		Limestone	-
-			>10	75.5-75.9' - Fracture zone	Ħ	75.0-75.9' - moderate olive brown to light olive gray, (5Y 4/4 to 5Y 2/2), fine grained, moderate HCl reaction,	-
-	R2-NQ		6	76.4, 76.55, 76.7, 76.9, 76.95' - Bedding plane (3), <10 deg, rough, undulating to stepped, open <1/2"		- weak (R2), voids (<1/16") over 15-20% of surface, secondary recrystallization in voids trace casts	Driller's Remark: Soft from 76.5-77.0'
-	5 ft 64%	10	4	76.8-76.9' - Fracture zone 77.25, 77.1, 77.6, 77.9' - Bedding plane or mechanical break (4), <10 deg, rough,		- 75.9-78.2' - moderate olive brown to light olive gray, (5Y 4/4 to 5Y 2/2), fine to coarse grained, strong HCI	-
-			NR	undulating to stepped, open <1/2" 78.1-78.2' - Fracture zone	目	 reaction, weak (R2), voids (<1/16") over 40% of surface, trace secondary recrystallization, trace fossil casts up 	- R2: 5 minutes
80 -39.2	80.0				Ħ	to 1/2" diameter No Recovery 78.2-80.0' Limestone	
-			5	80.15, 80.3, 80.4, 80.55, 80.75, 81.05, 81.35' - Bedding plane or mechanical break (7), <10 deg, smooth, undulating, open <1/2"		- 80.0-84.2 - moderate olive brown, (5Y 4/4), fine to medium grained, strong HCl reaction, very weak (R1),	circulation at 80'
-	R3-NQ		2	81.05' - Bedding plane or mechanical break, 30 deg, smooth, undulating, open <1/8"	Ħ	 except from 82.5-82.8' where secondary calcite crystals in voids (<1/16") exists, medium strong (R3), 	SC-2 collected at 81.35- 82.35'
-	5 ft 84%	38	2	82.35-82.4' - Mechanical break 82.4' - Bedding plane or mechanical break, 10 deg, rough, undulating, tight		 voids (<1/16") over 50% of surface, many cavities, highly fossiliferous (fossils/molds) 	-
-			>10	82.4-82.7' - Mechanical break 82.7-84.2' - Fracture zone		- - No Recovery 84.2-85.0'	R3: 6 minutes
85_ -44.2	85.0		NR	85.1' - Bedding plane or mechanical break,		Limestone	
_			>10	10 deg, rough, fine gravel with clayey silt infill, open (large) 85.35, 86.0, 86.85, 86.95' - Bedding plane or		 85.0-87.2' - moderate olive brown, (5Y 4/4), except two zones: 85.0-85.1' and 86.1-86.3' of clayey silt, pale greenish yellow, (10Y 8/2), 	Driller's Remark: 86-87'
-	R4-NQ 5 ft	18	1	undulating, no infill, open <1/2" 85.9' - Bedding plane or mechanical break,		moist, strong HCl reaction, extremely weak (R0) No Recovery 87.2-90.0'	Driller's Remark: Still no circulation
-	44%	.0	NR	50 deg, smooth, undulating, tight 86.0-86.4' - Fracture zone, clayey silt infill 87.1' - Bedding plane or mechanical break, 50 deg, smooth, undulating, open <1/8"		-	-
-			INEX	oo acg, smooth, undulating, open < 170		- -	R4: 4 minutes
90	90.0				H		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-01	SHEET	6	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

COKING	INLITIODA	ND LC	אורוע	IENT: CME 55 S/N 299205, mud rotary, NQ tools, HW o	asing			ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bgs	s on 5	/23/07 START: 5/23/2007 END: 5/	30/20	007	LOGGER : R. Bitely	
				DISCONTINUITIES	/ D	Γ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	r	DOCK TYPE COLOR	
SH NO	N. A.Y.		FRACTURES PER FOOT	BEOOKII HOW	<u></u>		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AHE	E E E	(%) O		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ		WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F 문문년	N N N N N N N N N N N N N N N N N N N	Ø	₩ K	PLANARITY, INFILLING MATERIAL AND	Ĭ		AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	S E	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś		CHARACTERISTICS	,, -
-49.2				90.2' - Bedding plane or mechanical break,	П	Т	Limestone	
-			>10	<10 deg, smooth, undulating, open <1/2"	1	╁	90.0-90.4' - yellowish gray, (5Y 8/1),	1
-				90.4-90.8, 91.3-91.45' - Fracture zone (2),	亡	1	moderate HCl reaction, weak (R2), voids (<1/16") over 5% of surface,	-
-			1	fine to coarse gravel sized fragments	╨	╁	trace fossil molds/cavities	_
					Н	1	Limestone	
1 7	R5-NQ		0		Ľ	1	90.4-92.3' - moderate olive brown,	Driller's Remark: 92.0-93.0'
-	5 ft	29			╨	╁	(5Y 4/4), strong HCl reaction, weak	silty clay
-	46%				╂┰	╊	(R2), voids (1/16") over 40% of surface, fossil molds	-
						1	No Recovery 92.3-95.0'	
			NR		Н	1	110 110001019 0210 0010	
					T	t		Driller's Remark: 94-94.5'
-					┰	╁		possible voids -
95	95.0			05.0.054.054.0571.5	╁┼	╄		R5: 5 minutes
-54.2			>10	95.0-95.1, 95.4-95.7' - Fracture zone (2), fine to coarse gravel sized fragments	ഥ	1	Limestone 95.0-96.5' - yellowish gray, (5Y 7/2),	
1 7			- 10	95.7-96.0' - Fracture, vertical, smooth,	\vdash	ſ	strong HCl reaction, extremely weak	1
-				undulating, fragmented rock on one side of	╁	t	(R0), voids (1/16") over 40% of	Driller's Remark: 96.0-99.0'
-			5	fracture	+	+	surface from 95.0-96.1' and 25% of	very soft clay
_			-	96.0, 96.1, 96.4, 96.55' - Bedding plane or	4111	Ľ	surface from 96.1-96.5', few cavities,	
	R6-NQ	•		mechanical break (4), <10 deg, smooth,			few small (<1/4") fossils	
1 7	5 ft 38%	0		planar to undulating, open <1/2"	1111	Г	Silt (ML) 96.5-96.9' - carbonate material	
-	0070				1	F	No Recovery 96.9-100.0'	
-			NR		4	F	no necestary colo recio	_
					_	L		
								R6: 3 minutes
100	100.0				1111			1
-59.2	100.0			-	1 '''	╁	Limestone	-
-			2		匚	1	100.0-104.35' - grayish yellow to	-
				100.6, 100.7, 100.8' - Mechanical break (3),	╨	Ł	yellowish gray, (5Y 8/4 to 5Y 7/2),	<u>_</u>
			_ ا	<10- 50 deg, smooth, undulating, tight			fine to medium grained, strong HCI	
			5	101.3, 101.4,101.5, 101.55, 101.6' - Mechanical break (5), <10 deg, smooth,	1_	1	reaction, very weak (R1), trace coarse grained material, voids (<	1
-	R7-NQ			planar to undulating, tight to open <1/8"	╁	t	1/16") over 40% of surface, abundant	-
-	5 ft	32	6	102.2-102.3' - Fracture zone, very fine to fine	- -	1	cavities/fossil molds, few fossils,	4
	87%			gravel sized fragments	ᅪ	Ł	trace black organics material	
			_ ا	102.5, 102.75, 103.0, 103.1, 103.35, 103.55,		1]
1 7			5	103.6, 103.85' - Mechanical break (8), <10 deg, smooth, planar to undulating, tight to	ш	1		1
-			1	open <1/8"	╁	+		R7: 5 minutes
-				104.1-104.35' - Fracture zone, coarse gravel	Ľ	1	No Recovery 104.35-105.0'	-
105_	105.0		NR	_	ш	L	_	
-64.2				105.15-106.8' - Bedding plane or mechanical	\mathbf{H}	ſ	Limestone	
-			3	break, <10 deg, rough, undulating, open	亡	t	105.0-106.5' - light olive gray, (5Y	-
-				<1/2"	╨	╁	6/1), fine to medium grained, strong HCl reaction, very weak (R1), trace	Driller's Remark: 106.0-
			>10	106.6' - Fracture zone, fine to coarse gravel	一	┢	coarse-sized material, voids (< 1/16")	107.5' soft, probably sand
			L		广	1	over 40% of surface, abundant	
1 1	R8-NQ		0		\vdash	Ŧ	cavities/fossil molds, few fossils,	1
-	5 ft	20	_ —		\bot	t	trace black organics material	-
1 -	51%				匚	1	106.5-107.55' - Same as 105.0-106.5' except grayish yellow,	4
					╨	Ł	(5Y 8/4)	
			NR		口	1	No Recovery 107.55-110.0']
1 7					F	1	•	R8: 4 minutes
-					╁	+		-
110	110.0		<u> </u>		ፗ	1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-01	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMINC	INCTITIOD A	ND L	ZUIFIV	IENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bg	s on 5	/23/07 START : 5/23/2007 END : 5/3	30/20	D7 LOGGER : R. Bitely	
	_			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	- FOG	ROCK TYPE, COLOR,	
표원한	L'A ER'A	(%	FRACTURES PER FOOT		SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
±Ä,¥	GTF	(%) Q	FG	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E S E	SOR	ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	Olk	ľ	шп		S		
-69.2			>10			Limestone - 110.0-114.2' - yellowish gray, (5Y	_
			10	110.5' - Mechanical break, 60 deg, smooth,		8/1), fine to medium grained, strong	
-				undulating, tight	┰	HCl reaction, very weak (R1), voids	
-			7	110.7, 110.9-111.1, 111.3, 111.35, 111.55' - Bedding plane or mechanical break (5), <10	╁	 (<1/16") over 40% of surface, few 	-
_				deg, smooth, planar to undulating, open <1/8"		_ cavities, fossil molds	_
	R9-NQ	20	_	111.1-111.35' - Fracture (2), 80 deg, smooth,	\vdash		
	5 ft 84%	20	5	undulating, tight		_	_
-	0.70			112.4, 112.45' - Mechanical break (2), <15	ш	-	-
-			6	deg, undulating, smooth to rough, open <1/2" 112.75-112.85' - Fracture zone	+	-	-
_				113.3, 113.45, 113.7, 113.8' - Bedding plane -		-	
			1	or mechanical break (4), <15 deg, undulating,	Ш	No Recovery 114.2-115.0'	R9: 4 minutes
115	115.0		NR	smooth to rough, open <1/2", gray/black	Ш		1
-74.2	110.0			staining on rock core and fracture surface — from 112.8-113.6',	厂	 Limestone	_
-			2	113.8-114.2' - Fracture zone	╀	 115.0-117.8' - yellowish gray, (5Y 	-
1 -				115.2-115.4' - Fracture zone, sand- to		8/1), fine to medium grained, strong	_
l _			3	gravel-size fragments	Ь	HCI reaction, very weak (R1), - gray/black staining from 117.5-117.9'	
			3	115.75, 116.3, 117.0' - Bedding plane or		gray/black stairing from 117.5-117.9	
-	R10-NQ			mechanical break (3), <10 deg, rough, undulating to stepped, tight to open <1/2"	ш	-	
-	5 ft	13	>10	116.0-116.1, 117.2-117.8' - Fracture zone	+	-	-
_	56%			(2), fine to coarse gravel-sized fragments		- No Recovery 117.8-120.0'	_
l _						_	
			NR				
_			INIX	-	Ъ.	=	R10: 3 minutes
				-	+-	-	-
120_ -79.2	120.0			_	\perp	Limestone	
- 10.2			3	120.15' - Fracture, 30- 50 deg, rough,	╁	- 120.0-124.85' - yellowish gray, (5Y	_
				undulating, open <1/4" 120.55' - Fractures, 10 - 50 deg, undulating,		8/1), fine to medium grained, strong	
				smooth to rough, open <1/2"	Ш	HCl reaction, extremely weak (R0),	
-			>10	121.0, 121.1, 121.25, 121.4, 121.6, 121.65,		trace secondary recrystallization	-
-	R11-NQ			121.8, 122.05, 122.1, 122.2, 122.75, 122.8,	\vdash	voids	-
_	5 ft	16	>10	122.95' - Bedding plane (13), <10 deg,	╨	-	_
	97%	. •		smooth, undulating, open <1/4"			
1				123.2, 123.4, 123.45, 123.75, 124.2, 124.35' -	\vdash		1
-			6	Fractures (6), 10 - 50 deg, undulating,	Ľ	-	1
1 -				smooth to rough, <1/2" open	ш	-	R11: 3 minutes
1 -			3	-	\vdash	-	-
~ . ~	125.0		NR	124.7' - Bedding plane, <10 deg, smooth,	厂	─ No Recovery 124.85-125.0'	
-84.2				undulating, open <1/4"	\vdash	Limestone	
_			3	125.2, 125.4, 125.9' - Bedding plane (3), <10 deg, smooth, undulating, open <1/2"	ш	125.0-129.45' - yellowish gray, (5Y	1
-				125.9' - Fractures, 30 deg, smooth,	╁	- 8/1), fine to medium grained, strong	16:00 Stopped drilling and
-			3	undulating, tight to open <1/4"	Ľ	HCl reaction, extremely weak (R0)	left core barrel in overnight -
1 -	_			126.1, 126.2, 126.3, - Bedding plane (3), <10	oxdot	<u>-</u>	due to possibility of hole
	R12-NQ		5	deg, smooth, undulating, open <1/2"	\vdash		caving
1 -	5 ft 89%	38	°	127.1' - Fractures, 30 deg, smooth, undulating, tight to open <1/4"	广		1
-	3070			127.8, 127.9, 128.2, 128.5, 128.7, 128.85' -	╙	-	1
1 -			3	Bedding plane (6), <10 deg, smooth,	仜	_	-
1 -				undulating, open <1/2"	\vdash	 -	-
1			2	129.25' - Fractures, 30 deg, smooth,	┢		R12: 5 minutes
130	130.0		NR	undulating, tight to open <1/4"		No Recovery 129.45-130.0'	
1					1		
1							

APPENDIX 2BB-384 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-01	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

				IENT: CME 55 S/N 299205, mud rotary, NQ tools, HW o			ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bg	s on 5	/23/07 START : 5/23/2007 END : 5/	30/2007	LOGGER: R. Bitely	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
SEL ON ON	N. A. Y.		FRACTURES PER FOOT	BECOMI HOW	힏	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A HE	A E E	(%) Q	F.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	ORI	Ø	ER A	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Į₹	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	OIK	œ	ша	THICKNESS, SORI ACE STAINING, AND HOTTINESS	S		
-89.2			. 40	130.2, 130.4, 130.7, 131.0, 131.1, 131.2,	Н	Limestone	
			>10	131.25' - Bedding plane or mechanical break	TT	130.0-134.9' - yellowish gray, (5Y 8/1), fine to medium grained, strong	1
-				(7), <10 deg, undulating, smooth to rough,	ㅁ	HCl reaction, extremely weak (R0),	-
-			5	open <1/2"	₽₽	very fine grained from 130.7-131.3'	-
_				131.3' - Fractures, 15 -20 deg, smooth, undulating, open <1/2"	Ш	•	_
	R13-NQ			132.0, 132.25, 132.5, 132.6, 132.75, 132.95,	Н		
	5 ft 98%	73	7	133.9' - Bedding plane or mechanical break	H		1 7
-	90 /6			(7), <10 deg, undulating, smooth to rough,	毌		-
_			0	open <1/2"	₩		SC-3 collected at 133.1- 134.1'
							104.1
			2	133.95' - Fractures, 15- 20 deg, smooth,	Щ		R13: 5 minutes
135	125.0		3	undulating, open <1/2" 134.65, 134.75, 134.8' - Bedding plane or	H		1
-94.2	135.0		NR	mechanical break (3), <10 deg, undulating,	口	No Recovery 134.9-135.0'	-
			5	smooth to rough	₩	Limestone	-
				135.1, 135.25, 135.3, 135.4, 135.6, 135.75,	Ш	135.0-138.9' - yellowish gray, (5Y	
				136.1, 136.2, 136.3' - Bedding plane or		8/1), fine to medium grained, strong HCl reaction, extremely weak (R0),	
-			9	mechanical break (9), <10 deg, smooth, planar to undulating, open <1/4"	H	except 135.1-135.3' and	1 7
_	R14-NQ			136.4' - Fracture or mechanical break, 15	団	136.7-137.1', very fine grained	-
_	5 ft	7	6	deg, rough, undulating, tight	₩	material with lineations (1/8" thick) of	-
	78%			136.5, 136.6, 136.7, 136.75, 136.95, 137.05,	旪	yellowish gray (5Y 8/1) and light olive gray (5Y 5/2), gray material in few	_
			3	137.3, 137.55, 137.7, 137.8, 138.05, 138.2, 138.3' - Bedding plane or mechanical break		voids	
_			3	(13), <10 deg, smooth, planar to undulating,	H	75.00	1
-				open <1/4"	廿	No Recovery 138.9-140.0'	R14: 5 minutes
_			NR	·	₩		-
140_	140.0			_	┰	_	
-99.2				140.2, 140.3' - Bedding plane or mechanical		Limestone	
					\mathbf{H}		
_			>10	break (2), <10 deg, smooth, undulating, tight	掛	140.0-140.8' - yellowish gray, (5Y	-
_			>10	break (2), <10 deg, smooth, undulating, tight to open <1/2"		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to	-
-			>10 3	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating,		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCl reaction, strong (R4), voids (<1/16") over 15% of surface,	- - -
_				break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4"		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCl reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds	- - -
- - -	R15-NQ		3	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCl reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2")	Driller's Remark: 142-143'
- - - -	5 ft	12		break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCl reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y	- - Driller's Remark: 142-143' void -
- - - -			3	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg,		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCl reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2")	
-	5 ft		3	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2"		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained	void -
- - - - -	5 ft		3	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg,		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCl reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCl reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of	
- - - - -	5 ft		3 4 >10	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2"		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil	void - Driller's Remark: 143.5-
- - - - - - 145	5 ft 80%		3	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2"		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCl reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCl reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of	void - Driller's Remark: 143.5- 144' soft -
 145 -104.2	5 ft 80%		3 4 >10	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCl reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCl reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts	void - Driller's Remark: 143.5- 144' soft -
	5 ft 80%		3 4 >10	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y	void - Driller's Remark: 143.5- 144' soft -
	5 ft 80%		3 4 >10 NR	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCl reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCl reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl	void - Driller's Remark: 143.5- 144' soft -
	5 ft 80%		3 4 >10 NR >10	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), voids (1/16")	void - Driller's Remark: 143.5- 144' soft -
	5 ft 80%		3 4 >10 NR	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or mechanical break (3), <10 deg, smooth to		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), voids (1/16") over 15% of surface, few cavities	void - Driller's Remark: 143.5- 144' soft -
	5 ft 80%	12	3 4 >10 NR >10	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), voids (1/16") over 15% of surface, few cavities (1/8"x3/4"-elongated) 146.7-149.5' - yellowish gray, (5Y	void - Driller's Remark: 143.5- 144' soft -
	5 ft 80% 145.0 R16-NQ 5 ft	12	3 4 >10 NR >10	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, planar to undulating 146.0-146.35' - Fracture zone 146.65' - Mechanical break		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), voids (1/16") over 15% of surface, few cavities (1/8"x3/4"-elongated) 146.7-149.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong	void - Driller's Remark: 143.5- 144' soft -
	5 ft 80% 145.0 R16-NQ	12	3 4 >10 NR >10 >10	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, planar to undulating 146.0-146.35' - Fracture zone 146.65' - Mechanical break 146.83, 146.86' - Bedding plane or		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), voids (1/16") over 15% of surface , few cavities (1/8"x3/4"-elongated) 146.7-149.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, very weak (R1), trace	void - Driller's Remark: 143.5- 144' soft -
	5 ft 80% 145.0 R16-NQ 5 ft	12	3 4 >10 NR >10 3	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, planar to undulating 146.0-146.35' - Fracture zone 146.65' - Mechanical break (14.83, 146.86' - Bedding plane or mechanical break (2), <10 deg, smooth to rough, planar to undulating 146.0-146.35' - Bedding plane or mechanical break (2), <10 deg, smooth to		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), voids (1/16") over 15% of surface, few cavities (1/8"x3/4"-elongated) 146.7-149.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, very weak (R1), trace coarse grained material, voids	void - Driller's Remark: 143.5- 144' soft -
	5 ft 80% 145.0 R16-NQ 5 ft	12	3 4 >10 NR >10 >10	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, planar to undulating 146.0-146.35' - Fracture zone 146.65' - Mechanical break (4), <10 deg, smooth to rough, planar to undulating plane or mechanical break (2), <10 deg, smooth to rough, planar to undulating		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), voids (1/16") over 15% of surface , few cavities (1/8"x3/4"-elongated) 146.7-149.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, very weak (R1), trace	void - Driller's Remark: 143.5- 144' soft -
	5 ft 80% 145.0 R16-NQ 5 ft	12	3 4 >10 NR >10 3 3 3	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, planar to undulating 146.0-146.35' - Fracture zone 146.65' - Mechanical break (14.83, 146.86' - Bedding plane or mechanical break (2), <10 deg, smooth to rough, planar to undulating 146.0-146.35' - Bedding plane or mechanical break (2), <10 deg, smooth to		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), voids (1/16") over 15% of surface , few cavities (1/8"x3/4"-elongated) 146.7-149.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, very weak (R1), trace coarse grained material, voids (<1/16") over 40-50% of surface,	void - Driller's Remark: 143.5- 144' soft -
-104.2 - - - - - - -	5 ft 80% 145.0 R16-NQ 5 ft 90%	12	3 4 >10 NR >10 3 3 3 2	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, planar to undulating 146.0-146.35' - Fracture zone 146.65' - Mechanical break 146.83, 146.86' - Bedding plane or mechanical break (2), <10 deg, smooth to rough, planar to undulating 147.3' - Bedding plane		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), voids (1/16") over 15% of surface, few cavities (1/8"x3/4"-elongated) 146.7-149.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, very weak (R1), trace coarse grained material, voids (<1/16") over 40-50% of surface, abundant fossil casts and molds	void
	5 ft 80% 145.0 R16-NQ 5 ft 90%	12	3 4 >10 NR >10 3 3 3	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, planar to undulating 146.0-146.35' - Fracture zone 146.65' - Mechanical break 146.83, 146.86' - Bedding plane or mechanical break (2), <10 deg, smooth to rough, planar to undulating 147.3' - Bedding plane		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), voids (1/16") over 15% of surface, few cavities (1/8"x3/4"-elongated) 146.7-149.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, very weak (R1), trace coarse grained material, voids (<1/16") over 40-50% of surface, abundant fossil casts and molds	void
-104.2 - - - - - - -	5 ft 80% 145.0 R16-NQ 5 ft 90%	12	3 4 >10 NR >10 3 3 3 2	break (2), <10 deg, smooth, undulating, tight to open <1/2" 140.5' - Fracture, vertical, rough, undulating, open <1/4" 140.7-140.9' - Fracture zone 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2" 143.65-143.85' - Fracture zone 145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, planar to undulating 146.0-146.35' - Fracture zone 146.65' - Mechanical break 146.83, 146.86' - Bedding plane or mechanical break (2), <10 deg, smooth to rough, planar to undulating 147.3' - Bedding plane		140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, strong (R4), voids (1/16") over 15% of surface, few cavities (1/8"x3/4"-elongated) 146.7-149.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, very weak (R1), trace coarse grained material, voids (<1/16") over 40-50% of surface, abundant fossil casts and molds	void



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-01	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

Minimeration (Tartore,	WATER	LEVELS : 1.0) ft bgs	s on 5/	23/07 START : 5/23/2007	END : 5/3	0/20	007	LOGGER : R. Bitely	
Total depth = 150.0' 147.65' - Bedding plane or mechanical break,	≥0≎	- (%			DISCONTINUITIES		၅		LITHOLOGY	COMMENTS
Total depth = 150.0' 147.65' - Bedding plane or mechanical break,	ELO N (fi	Ñ, AND 3Y (3		ZES T	DESCRIPTION		CLC		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
Total depth = 150.0' 147.65' - Bedding plane or mechanical break,	TH BI	E RU 3TH, OVEF	(%) C	STUF	DEPTH, TYPE, ORIENTATION, ROUG	SHNESS,	BOLI		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
Total depth = 150.0' 147.65' - Bedding plane or mechanical break,	SURF FLEV	COR	3 Q L	-RAC	PLANARITY, INFILLING MATERIAL THICKNESS, SURFACE STAINING, AND	. AND TIGHTNESS	SYME		AND ROCK MASS	DROPS, TEST RESULTS, ETC.
<10 deg, smooth to rough, planar to undulating 148.35' - Mechanical break, smooth, undulating, open <1/8" - 148.55, 148.75, 148.9, 149.0, 149.15' - Bedding plane (5), <10 deg, undulating,	Волш	014	ш.				0)	1		Total depth = 150.0'
148.35' - Mechanical break, smooth, undulating, open <1/8" 148.55, 148.75, 148.9, 149.0, 149.15' - Bedding plane (5), <10 deg. undulating,	-				<10 deg, smooth to rough, planar to	-		F		-
undulating, open <1/8" 148.55, 148.75, 148.9, 149.0, 149.15' - Bedding plane (5), <10 deg. undulating,	-				148.35' - Mechanical break, smooth	. -		F		-
Bedding plane (5), <10 deg, undulating,	-				undulating open <1/8"	-		F		-
smooth to rough, tight	-				Bedding plane (5), <10 deg, undulat	ing,		F		-
	-				smooth to rough, tight			F		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	1	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION · Vertical

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	<u>ENT : CME 550 S</u>	186073, mud rotary, cathead, NW rods, 3-7/8" tri-co	ne bit		ORIENTATION : Vertical			
WATER LEVELS : 4.0 ft bgs on 4/18/07											
				STANDARD	SOIL DESCRIPTION		(D	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG				
BEL ON		RECOVE	RY (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLO		CIC	DEPTH OF CASING, DRILLING RATE,			
YFA(#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY CONSISTENCY, SOIL STRUCTURE, MINERAL		MBC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
SCH			#11171	(N)	, , , , , , , , , , , , , , , , , , , ,		SY				
41.8	0.0				Poorly Graded Sand With Silt (SP-SM)		H				
_		1.0	SS-1	2-2-2 (4)	0.0-1.0' - mottled dark gray, yellowish gray and yellowish brown, (N3, 5Y 8/1 and 10YR 6/2), m	pale - noist	開	_			
-	1.5			(4)	very loose, very fine to fine grained silica sand,	, 5-10% <i>[</i>	1.1.	NW-Rod (5.0' sections)			
-	1.0				nonplastic fines, 10% rootlets <1/16" up to 2-1/ long, trace dark yellowish orange (10YR 6/6) m		1	QuikGel brand bentonite (50 lb bags)			
-					near top	lottiling / -	ı	24" split spoon (SS)			
-							ł	8:56 Driller's Remark: 3-7/8" tricone roller			
-						-	ł	drill bit in use, 2.0' adaptor length (to help set -			
-						=	ł	5.0' stroke) when drilling Add 1/2 bag bentonite to mud vat			
-						-	ł	Water level assumed at 4.0' below ground			
-						-	l	surface due to moisture content of ŠS-1 and -			
5 36.8	5.0				Clavey Sand (SC)		1777	SS-2			
30.0				2-3-2	Clayey Sand (SC) 5.0-5.5' - moderate yellowish brown and pale g	reen, –		_			
-		0.5	SS-2	2-3-2 (5)	(10Y 5/4 and 10G 6/2), mottled, moist to wet, lo	oose,					
l -	6.5				30-35% medium plastic, fine grained silica san cohesive, trace rounded concretions up to 1/4"	a, duskv -					
_					brown (5YR 2/2), trace roots up to 1/16" and 2'			9:32 Driller's Remark: a rock ledge at 6.5'			
_						-	1	_			
_						-	1	_			
-						-	l	-			
-						-	ı	-			
- 40	40.0					-	ł	-			
10 31.8	10.0				Silt With Sand (ML)		Ш	-			
-		1.2	SS-3	1-5-42	10.0-11.2' - grayish yellow to moderate yellow,		$\ \ $	-			
-		1.2	33-3	(47)	to 5Y 7/6), wet, hard, nonplastic, very rapid dila mild to moderate HCl reaction, 5-10% fine to m	itancy, nedium –	$\ \ $	10:17 Driller's Remark: switched to 4-3/4"			
-	11.5				grained silica sand, 20% medium to coarse gra		-	tricone roller bit to straighten out the hole,			
-					pockets, all carbonate			will add 10' of 4" HW casing to ensure a 90°			
_						-		borehole through confirmed drilling Original B-2 hole has been offset 1.5' NW			
l _						_		and re-drilled. This redrilled hole will be			
_						_		called B-2R ("R" for redrill). Original B-2 borehole could not be straightened to 90°.			
]	Add 1/4 bag bentonite			
1								11:26 Driller's Remark: 12.5-14.5' soft drilling, hard slow drilling at 14.5', 2' adaptor			
15	1 <u>5</u> .0 15.2					-		and 1-3/8" tricone roller drill			
26.8	15.2	0.1	SS-4	50/2	Limestone Fragments	(E) (C : .	Г				
				(50/2")	15.0-15.1' - grayish yellow to moderate yellow, to 5Y 7/6), moderate to strong HCl reaction, po	(5Y 8/4 / - orly	1	1			
-					fossiliferous		1	-			
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION											
WATER	LEVELS	: 4.0 ft bo	s on 4/18	3/07 S	TART : 4/18/2007 END : 4/19/2007 LOGGER : T. Stewart						
				STANDARD	SOIL DESCRIPTION COMMENTS						
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
CE,CE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND						
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY						
				(N)							
21.8	20.0			10-10-24	Silty Sand (SM) 20.0-21.1' - grayish yellow, (5Y 8/4), wet, dense, fine Driller's Remark: softened drilling at 16.5- 20.0'						
_		1.1	SS-5	(34)	to medium grained, moderate to strong HCl reaction,						
	21.5			, ,	→ 30-40% nonplastic fines, 5-10% fine gravel, trace fine grained silica sand moderate gray (5G 5/6) particles,						
					trace fine grained silica sand white particles, all						
					carbonate 13:27 Driller's Remark: 21.5' hard drilling, soft again at 23.0'						
]					Soft again at 25.0						
					11						
					11						
					11						
25	25.0				11						
16.8		0.8	SS-6	47-50/4	Silt (ML)						
	25.8	0.0	33-0	(100")	25.0-25.8' - grayish yellow, (5Y 8/4), wet, nonplastic,						
-					\ 10-15% very fine to fine grained, 5-10% fine grained -						
-					silica sand white particles, homogeneous, all 13:50 Driller's Remark: 26.5' hard drilling						
-											
-					1						
-					1						
-					13:55 Driller's Remark: 28.5-29.5' soft drilling						
-					- · · · · · · · · · · · · · · · · ·						
-											
30 11.8	30.0				Silt With Sand (ML)						
-		1.3	SS-7	48-39-37	30.0-31.3' - Same as 25.0-25.8' except yellowish gray - -						
-		1.5	33-1	(76)	to moderate yellow, (5Y 8/4 to 5Y 7/6), wet, nonplastic, very rapid dilatancy, 20-25% very fine to						
-	31.5				\medium grained silica sand						
-											
-											
-											
-											
_					- 44:00 Dillada Davadu handasad dillaa ah						
_					14:08 Driller's Remark: hardened drilling at 34.0'						
35	35.0	0.0	00.0	50.40							
6.8	35.3	0.3	SS-8	50/3 \ (50/3") /	Silty Gravel With Sands (GM) 35.0-35.3' - moderate yellowish brown, (10YR 5/4),						
				(00/0)	wet, dense, mild to moderate HCl reaction, fine						
					gravel-sized angular to subangular limestone 14:23 Remove silt/sand cuttings from mud ragments, 30% fine to coarse grained silica 14:23 Remove silt/sand cuttings from mud vat, add 1/4 bag bentonite before continuing						
					sand-sized, 25% low plastic fines						
] [
]]						
]					14:34 Driller's Remark: Observe light to moderate drill chatter and bouncing						
]					Thoderate drill charter and bounding						
1 7					11						
40					11						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	3	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION: Vertical

						, cathead, NW rods, 3-7/8"			ORIENTATION : Vertical
WATER	LEVELS	: 4.0 ft b	gs on 4/18		START : 4/18/2007	END: 4/19/2007 SOIL DESCRIPTION	LOGGER	₹ : T. :	Stewart COMMENTS
≥0€				STANDARD PENETRATION		SOIL DESCRIPTION		90	COIVIIVIENTS
BELO SE AN TION (SAMPLE	RECOVE	, ,	TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL, (COLOR,	J DITC	DEPTH OF CASING, DRILLING RATE,
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)		ONTENT, RELATIVE DEN: ', SOIL STRUCTURE, MINE		SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
1.8	40.0	1.5	SS-9	50-46-37 (83)	40.0-41.5' - mode nonplastic to low moderate HCl rea sand, 15-25% ver medium dark gray	pre Fragments (ML) erate olive brown, (5Y 4/4) plasticity, rapid dilatancy, action, 5-10% very fine gr y fine to fine grained silic y (N4) fragments, 40.0-4(lestone disks, all carbona	, mild to rained silica ca sand, 0.4' lens of		- - - -
- - - - 45 -3.2	45.0	4.4	SS-10	16-34-50/3	Silty Sand (SM) 45.0-46.1' - mode	erate olive brown to light o	- - - - -		15:24 45-50' with very light chatter intermittently
- - - -	46.3	1.1	55-10	(84/9")	(5Y 4/4 to 5Y 5/2) grained, mild to m gravel-sized, 36% black fragments, of), wet, very dense, fine to noderate HCI reaction, 10 6 nonplastic fines, trace v one 1/2"x1/4" brittle blacl r black fragment, all carb	coarse 0% fine very fine k fragment,		
- - 50	50.0						-		drilling (very soft) -
-8.2 - -	50.5	0.5	SS-11	40-50/0.5 (90/6.5")	50.0-50.5' - dusky 6/4 to 5Y 4/4), we mild to moderate	imestone Fragments (S) yellow to moderate olive et, very dense, fine to coa HCl reaction, 25% nonpl limestone fragments 1/4	e brown, (5Y rse grained, astic fines,		15:45 Driller's Remark: 50% circulation loss
- - -					disks, 1/2" to 1" fr	ragments, trace brownish ing on limestone, all carb	black (5YR		15:54 Driller's Remark: 52.0-53.0' soft drilling - - -
- 55 -13.2	55.0 55.3	0.3	SS-12	50/4 (50/4")	Limestone Fragn ├── 55.0-55.3' - yellov	vish gray to light olive gra	- - ay, (5Y 7/2 /-		16:22 Driller's Remark: last SS/SPT for B- 2R, will switch to NQ coring assembly, will install 55' of 3" NW 8:07 Water level on 4/19/07 is 1.2'
-				(55. :)	to 5Y 5/2), wet, m Begin Rock Corin	nild to moderate HCI read			- - - - - - -
60									-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-02	SHEET	4	OF	8

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 4.0	ft bgs	s on 4	18/07 START : 4/18/2007 END : 4/	19/200	D7 LOGGER : T. Stewart	
≥∩≘	(%)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	55.5		NR	-		No Recovery 55.5-56.7'	3" NW casing is set to 55.5', 50 lb bags of – QuikGel brand bentonite
-			3	56.75, 56.85' - Fractures (2), rough,		Limestone 56.7-57.0' - dusky yellow, (5Y 6/4),	- 8:57 Total depth tape measured at 55.5' below ground surface
-	R1-NQ 5 ft	62	1	57.0' - Fracture, horizontal, rough, undulating, open <1/2"-1/16" 58.1' - Fracture, 60 deg, rough, undulating,	崫	mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), friable, 30-35% spheroidal voids	9:12 Added 1/8 bag to mud vat – SC-1 collected at 57.0-
-	76%		0	tight	H	 <1/16" 57.0-60.5' - olive gray with yellow gray mottling, (5Y 3/2 with 5Y 7/2), 	58.15'
60_			2	- -	Ħ	 moderate HCl reaction, highly laminated in black discontinuous 	R1: 13 minutes
-18. 2 -	60.5		0	60.55' - Mechanical break, rough, undulating, tight, fragments in rock matrix to 1/4"	H	ribbons (<1/16" thick), voids <1/16" - up to 20% of surface, 60.0-60.5' is yellowish gray (5Y 7/2) with 10-15%]
-				61.5' - Mechanical break, horizontal		fine to medium grained organic black fragments horizontally aligned, laminations are horizontal then grade	-
_	R2-NQ		0	62.15' - Mechanical break, horizontal, rough, undulating, tight		to wavy downward 60.5-61.5' - light olive gray, (5Y 5/2), moderate HCl reaction, medium	-
-	5 ft 90%	75	0	62.4, 62.9' - Mechanical break (2), horizontal, rough, undulating, tight 63.0' - Mechanical break, 3-7 deg, rough,	Ħ	strong (R3), voids <1/16" over 20-25% of surface, poorly fossiliferous (casts up to 3/8"), 10%	
-			1	undulating, tight 64.5' - Mechanical break or bedding plane,	Ħ	short black discontinuous laminae <1/16" thick	- R2: 3 minutes
65 -23.2	65.5		1 NR	horizontal, rough, undulating, open 1/4"-1" — 64.8' - Fracture or mechanical break, 75-85		61.5-65.0' - dusky yellow, (5Y 6/4), mild HCl reaction, very weak (R1), 35-40% voids up to 1/16", trace 3/16"	
-			1	deg, rough, undulating, tight 65.6' - Mechanical break or bedding plane, horizontal, rough, planar, open 1/4"		elongated cavities, poorly fossiliferous (casts 3/16"), trace voids infilled with medium gray	_
-			0	66.15' - Mechanical break, horizontal to 5 deg	\exists	mineralization, medium gray staining over interval No Recovery 65.0-65.5'	-
_	R3-NQ 5 ft 100%	98	0	67.3, 67.5' - Mechanical break (2) -		Limestone 65.5-70.5' - dusky yellow, (5Y 6/4), very fine grained, mild to moderate	-
-	10070		2	68.55' - Fracture or bedding plane, rough, undulating, tight	Ħ	HCl reaction, very weak to medium strong (R1 to R3), voids up to 1/16"	-
70 -28.2			1	69.4' - Fracture or mechanical break, horizontal, rough, undulating, open up to 5/8" 69.8' - Fracture or mechanical break,		over 25-35% of surface, medium gray staining over 20% of surface, powdery feel in sections of core run	R3: 8 minutes
-	70.5		0	horizontal, rough, undulating, tight to open 1/4", vertical stress joints from 69.8-70.35'		70.5-73.55' - moderate brown to grayish brown, (5Y 4/4 to 5Y 3/2),]
-			1	- 	Ħ	moderate HCl reaction, medium strong to strong (R3 to R4), voids up to 3/16" spheroidal over 30-40% of	-
-	R4-NQ 5 ft	77	0	72.1' - Bedding plane, horizontal, rough, undulating, carbonate fine infill up to 1/4" thick -		surface, trace 1/4"x3/16" elongated cavities, poorly fossiliferous (casts up to 1/4") 1" thick extremely weak (R0)	11:10 Additional 0.35' recovered during R5-NQ core run which belongs in
-	91%		1	72.8, 72.95, 73.1' - Mechanical break (3) 73.55' - Bedding plane, 20-30 deg, rough, undulating, contact with extremely weak rock	Ħ	rock layer at 72.1'	the R4-NQ data. Driller's Remark: Able to - identify redrill marks on
			2	(R0) below and medium strong to strong (R3 to R4) rock above	H	-	core pieces R4: 10 minutes
75 -33.2	75.5		∠ NR		H		_
	7 0.0			-	f		

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	5	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

				TENT . CIVIE 930 3/N 1860/3, Mud Totally, NQ tools, NVV			
WATER	LEVELS: 4.0	ft bgs	s on 4	/18/07 START : 4/18/2007 END : 4/	19/20	D7 LOGGER : T. Stewart	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
SP €	⊒%)		m	DESCRIPTION	SYMBOLIC LOG		
O A E	Z, A, Z	~	Ä,	DESCRIPTION	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A S E	SET N	(%) _Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무유장	8880 880	οD	AC RF	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	8	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
				74.65' - Bedding plane or mechanical break,	T	Limestone	1
-			3	horizontal, rough, undulating, tight to open		- 73.55-75.05' - pale greenish yellow to	-
				1/8"	Щ	yellowish gray, (10Y 8/2 to 5Y 7/2),	_
				74.75' - Bedding plane or mechanical break,	Н	very fine grained, strong HCl	
_			3	horizontal, smooth, planar, tight		reaction, very weak (R1), voids /16"	-
_				75.6' - Fracture, 40 deg, smooth, planar,	\perp	over 10-15% of surface, poorly	1
	R5-NQ			tight, through very weak rock (R1)	\vdash	fossiliferous (casts up to 3/8"x1/8",	
	5 ft 98%	80	0	75.75' - Fracture, 30 deg, smooth, planar, tight, through very weak rock (R1)	1	 powdery feel, trace black staining in casts) 	1
-	90 /6			75.8' - Fracture, 20 deg, smooth, planar,	$-\Box$	No Recovery 75.05-75.5'	1
_			0	tight, through very weak rock (R1)	\perp	- Limestone	
				76.5' - Fracture or bedding plane, horizontal,	Ш	75.5-76.5' - yellowish gray, (5Y 7/2),	
				rough, undulating, open 5/8"	$\dagger \exists $	very fine to medium grained, strong	R5: 11 minutes
-38.2			0	76.8' - Fracture, 20-30 deg, rough, planar, –	口	 HCl reaction, extremely weak to very 	
-38.Z	80.5		ND	open 1/8"	Щ	weak (R0 to R1), 35-40% of this	1
1 7			NR.	77.05' - Fracture or mechanical break,	H	interval is medium gray (N5),	1
-			1	horizontal-5 deg, rough, undulating, tight	╁┤	medium grained, granular	1 +
_				77.95' - Mechanical break, horizontal, rough,	ш	appearance 76.5-78.75' - light olive gray to	1
				undulating, tight 80.9' - Bedding plane or mechanical break,	\vdash	_ moderate brown, (5Y 5/2 to 5Y 4/4),	
_			1	horizontal, rough, undulating, tight	+	medium strong (R3), voids to 1/16"	1
-	DC NO			81.95' - Fracture, 30 deg, rough, undulating,	$+ \Box$	over 40% of surface, dark gray (N3)	-
	R6-NQ 5 ft	82	0	open 1/8"-5/8"		infill, trace casts up to 3/8", trace of]
	88%	02	0	'	Ш	1/2" organic fragments	Driller's Remark: 5-10%
_					T	78.75-80.4' - yellowish gray, (5Y 7/2),	circulation loss during run -
-			0			very fine grained, strong HCl	-
					Щ	reaction, medium strong to strong	_
85			1	84.61' - Fracture or mechanical break,	\vdash	(R3 to R4), trace 1"-1-1/2" cavities infilled with secondary mineralization	R6: 3 minutes
-43.2			NR	horizontal, rough, undulating, open 1/8"-1/2"	+	No Recovery 80.4-80.5'	
_	85.5				ш	Limestone	-
			0		\vdash	80.5-84.9' - dusky yellow to moderate	
			U		\top	olive brown, (5Y 6/4 to 5Y 4/4),	1
-						moderate to strong HCl reaction,	1
-			0		\perp	medium strong (R3), voids up to	1 4
					Н	1/16" over 20-25% of surface,	
	R7-NQ			87.6, 88.0, 89.7' - Mechanical break (3),	т	 moderately fossiliferous (casts up to 5/8"), trace medium grain black 	1
-	5 ft	100	0	horizontal, rough, undulating, tight		organic fragments throughout,	1 -
_	100%			, <u>3</u> , <u>3</u> , 	$oldsymbol{+}$	- laminations of 3/16" thick over upper	1
					H	most 0.2'	1
]			0		Ľ	No Recovery 84.9-85.5'	1
-					Ш	- Limestone	R7: 7 minutes
90			0	_	\vdash	85.5-90.5' - light olive brown mottled	IV. / Illillutes
-48.2	90.5				Н	olive gray, (5Y 5/6 mottled 5Y 3/2),	1
1 -					ш	 fine to medium grained, strong HCl reaction, very weak to weak (R1 to 	1
-			0		╂┼┤	R2), highly fossiliferous (casts,	1 -
					\mathbb{H}	molds, microforams), yellowish gray	
						(5Y 8/1) material as replacement infill	1
-			2	91.9-92.0' - Fracture, horizontal,	П	of echinoderms, 5-10% olive gray	1 +
-				slickensided, undulating, clay infill, dry, soft	₽	(5Y 4/1) wavy laminations throughout	1
	R8-NQ			clay 0.1' thick	H	interval, up to 20% bioturbated zones	1
1 7	5 ft 100%	98	0	92.4, 93.0' - Mechanical break (2), horizontal,		filled with both yellowish gray (5Y	SC-2 collected at 93.0-
-	100 /0			rough, undulating, tight	Ш	_ 8/1) infill around edges and medium	94.1'
_			1		H	dark gray (N4) infill inside/center, very light gray (N7) carbonate silt]
			'	94.0' - Fracture, 40-50 deg, rough,	\vdash	_ mottling (hard) over the last 1.0' of	1
95				undulating, tight to open 1/8" (fossil mold 1-1/4" x 1/2" on fracture surface), fossils are	Ш	run, 5-10% organics (black medium	R8: 10 minutes
-53 2			0	whole spiral shaped casts	╂┼┤	grain sized fragments) as short	
50.2	95.5			misio opiidi oliaped odoto	Н	laminations	
							1
			L		L		<u> </u>
		_	_		_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	6	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

LEVELS: 4.0	ft bgs	s on 4/	18/07 START : 4/18/2007 END : 4/	19/200	7 LOGGER : T. Stewart	
(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
CORE RUN, LENGTH, ANE RECOVERY (R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LC	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
R9-NQ 5 ft 96%	93	0 0 1 0 0	96.2' - Mechanical break, horizontal-5 deg, rough, undulating, tight 97.7' - Fracture, horizontal, rough, undulating, tight to open 1/4", breakage in area with 3/4" size fossil casts and 3/8" spiral shaped casts 98.0, 99.0, 99.2' - Mechanical break (3)		Limestone 90.5-95.5' - white to yellowish gray, (N9 to 5Y 8/1), very fine grained, strong HCl reaction, weak (R2), voids up to 15% increasing percentage with depth, moderate to highly fossiliferous (microforams, casts up to 3/16", mostly a few larger fossil casts), organic soil bed 1" thick at 91.95', trace cavities up to 3/8" rimmed with white, hard mineral (maybe replacement of echinoderms) 95.5-100.3' - Same as 95.5-100.3' except yellowish gray to light olive gray (SY 7/2 to 5Y 5/2) strong HCl	R9: 4 minutes
	97	0 0 0	100.7' - Fracture or mechanical break, horizontal, rough, undulating, open 1/16" 103.0' - Mechanical break		reaction, very weak (R1), very fossiliferous (microforams, casts and molds), voids or spaces between microforam casts and molds, trace cavities up to 5/8"x1/8" (possible echinoderms with white secondary mineralization as replacement), trace voids 1/8"x1/8", trace medium dark gray (N4), fine grained fragments in matrix, trace black short 3/8" discontiuous organic laminations, "powdery" chalk-like feel over entire run	R10: 5 minutes
105.5 R11-NQ 5 ft 100%	83	0 2 1 2 0	106.3-109.0' - Fracture, vertical, large >2" sized fossil molds and casts along surface 106.65' - Fracture or mechanical break, horizontal, rough, undulating, tight 106.95' - Fracture or mechanical break, horizontal, rough, undulating, tight 107.65' - Fracture, vertical, rough, undulating, >2" size fossil casts or molds along surface 108.5' - Fracture or mechanical break, horizontal, rough, undulating, tight 108.7' - Fracture or mechanical break, horizontal, rough, undulating, tight		Limestone 100.5-105.5' - Same as 105.5-110.5' except 10% echinoderm molds up to 5/8"x1/8" with white calcite replacement, olive gray mottling (5Y 3/2) as wavy horizontal beds, from 103.0-104.0' trace organic black fragments as medium grained fragments throughout run, spheroidal to subrounded voids <1/16" over 20-25% of surface, 130.5-131.2 is without olive mottling 105.5-110.5' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak (R1), voids up to 1/16" over 35-40% of surface, from 105.5-107.5' grading to 15%, from 107.5-110.5' chalk-like	R11: 7 minutes
5 ft 99%	99	1 0 0 0	111.45' - Fracture or mechanical break, horizontal, rough, undulating, tight 113.0' - Mechanical break 114.3' - Fracture, 20 deg, rough, undulating, open 1/8"-1/4"		feel, very fossiliferous (casts from 1/8" to greater than 2"), spiral shaped casts and shell patterns 110.5-115.45' - no visible coral shaped casts, casts of echinoderms/ostracods 1/4"x1/16" with white calcite mineral replacement	R12: 5 minutes
	CORERUN. R9-NQ 5 ft 100.5 R11-NQ 5 ft 100% 110.5	(%) CORE RUN, (%) O S H S H S H S H S H S H S H S H S H S	COKE RUN' (%) COKE RUN' (%	DISCONTINUITIES DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 1 O O O O O O O O O O O O O O O O O O	DISCONTINUITIES DESCRIPTION DESCRIPTIO	DISCONTINUITIES DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION ROCK TYPE: COLOR, MINERALORY, TEXTURE, WEARLINGY, TOUGH, TOUGH, TEXTURE, WEARLINGY, TEXTURE,



WATER LEVELS: 4.0 ft bgs on 4/18/07

PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	7	OF	8	

ROCK CORE LOG

LOGGER : T. Stewart

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis ELEVATION: 41.8 ft (NAVD88)

END: 4/19/2007

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing START: 4/18/2007

WYXILLIX	LLVLLS . 4.0	it bg	3 011 7		10/20	LOGGEN . T. Slewart	1
> 0 0	. 6			DISCONTINUITIES	ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SII	DESCRIPTION	507	ROCK TYPE, COLOR,	OIZE AND DEDTH OF CASH C
ᆱ끯흔	Z H A Y	(%			1 9	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
Ĭ, Ĭ, Š, Š	E S	(%) Q	P. C.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BG	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
H K K	SEN SEN SEN SEN SEN SEN SEN SEN SEN SEN	Q Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	014	4	1 " "	, , , , , , , , , , , , , , , , , , , ,	1 0,		SC 2 collected at 111 F
			1	115.7' - Bedding plane or mechanical break,	Ľ	No Recovery 115.45-115.5' Limestone	SC-3 collected at 114.5- 115.5'
			'	horizontal, rough, undulating, open 1/8",		115.5-120.5' - yellowish gray, (5Y	1.10.0
1 1				surfaces of fracture have molds or voids filled	⊣	7/2), strong HCl reaction, very weak	1
-			0	with secondary mineralization 116.9' - Mechanical break, 50-60 deg, rough,	ᡛ	 (R1), very fossiliferous, microforams, 	1
1 4				undulating, tight		casts of echinoderms/ ostracods with	1
	R13-NC			anddidding, tight	\vdash	yellowish gray (5Y 7/2) replacement	
1 1	5 ft 100%	97	0	-		 mineralization, olive gray (5Y 3/2) thin beds and laminations at 116.0'. 	1
-	100 /0			-		medium light gray staining from	1
1 4			1		├ ─	- 118.0-119.0', rock sample contains]
					\vdash	25-35% medium grain, medium dark	
120				-	Ш	gray (N4) fragments in rock matrix,	R13: 8 minutes
-78.2			0	_	\vdash	— overall the sample has a "gritty" feel	-
	120.5			-	╀	L 400 5 405 41 11 11 11 15 15 15 15 15 15 15 15 15 15	1
			4			120.5-125.4' - yellowish gray, (5Y	
1 7			1		lacksquare	 7/2), strong HCl reaction, weak (R2), voids <1/16" over 30-40% of surface, 	1
1 -				121.35, 121.5, 121.75, 122.05' - Fracture or	₩	olive gray (5Y 3/2) staining over 20%	1
1 4			3	mechanical break (4), horizontal, rough,	\vdash	of rock (122.0-122.7) and	
				undulating, open 1/16"-1/8"		124.0-124.45'), extremely weak (R0)	
1 1	R14-NC			122.7! Machanical break beginned were	\vdash	rock at 124.35, very fine grained	1
1 -	5 ft	80	2	122.7' - Mechanical break, horizontal, rough,	f_T	 limestone bed from 121.35-121.75', 	-
1 4	98%			undulating, tight 123.0' - Mechanical break	亡	medium strong, highly fossiliferous]
			_	123.35, 124.45' - Bedding plane (2),	Ш	(microforams, casts), trace molds with white mineral replacement]
1 7			2	horizontal, rough, undulating, open 1/16"	\vdash	- with white mineral replacement	1
				123.5' - Bedding plane or mechanical break,	亡	<u>}</u>	R14: 7 minutes
125			0	rough, undulating, open up to 1/2"	Ш	L	
-83.2	125.5	L	Ľ	123.75' - Mechanical break, horizontal,	\vdash	L ,, , , , , , , , , , , , , , , , , ,]
1 7				rough, undulating, tight	Ľ	No Recovery 125.4-125.5'	1
			0	-	ш	Limestone 125.5-130.5' - yellowish gray and	1
1 -				-	\vdash	olive gray, (5Y 7/2 and 5Y 5/2), wavy	-
			0	_		bedded, strong HCl reaction, very]
			"		Ш	weak (R1), voids <1/16" over 5-10%	1
	R15-NC	l)		127.5, 127.65, 128.0' - Mechanical break (3),	\vdash	of surface, trace molds with white	
-	5 ft	97	0	horizontal, rough, undulating	亡	_ calcite mineral replacement at sizes	1 -
	100%				$oldsymbol{\Box}$	of 5/8"x1/8" and 3/16"x1/16", medium dark gray (N4), medium grain]
					\vdash	particles over 30-40% of rock matrix]
			1	129.0, 129.5' - Bedding plane (2), horizontal,	Ľ	participe ever do 4070 of fook matrix	1
-				rough, planar, tight	$oxed{\Box}$	ŀ	R15: 8 minutes
130			2	129.75' - Fracture or mechanical break,	\vdash	<u>L</u>	17.13. O Hilliutes
-88.2	130.5		-	horizontal, rough, undulating, open 1/4"	Ľ]]
1 1				-	\Box	130.5-135.3' - Same as 125.5-130.5'	1
-			0	-	╆	 except no molds with replacement 	1
1 4						mineralization, casts up to 5/8"]
			4			(spiral shapes without infilling), more]
			1	- 132.15' - Fracture, 20 deg, rough, planar,	1—	thinly bedded than 125.5-130.5'	1
	R16-NC			tight	Ľ	<u> </u>	-
1 4	5 ft	! 78	3	132.75' - Bedding plane or mechanical break,	\Box	<u> </u>	1
	96%	•		horizontal, rough, undulating, tight	\vdash	1	
1 1				132.95, 133.1' - Bedding plane or mechanical	1-	ſ	1
-			4	break (2), horizontal, smooth, planar, tight	仜	}	1
				133.7' - Bedding plane or mechanical break,		 -	SC-4 collected at 134.35-
135			0	horizontal, rough, undulating, open 1/2" 133.95, 134.0' - Bedding plane or fracture, —	\vdash	1	135.3'
-03 2	135.5		Ľ	horizontal, smooth, undulating, tight	\Box	Γ	R16: 10 minutes
	133.3				H		+



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	8	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

	EVELS : 4.0	ft bgs	on 4/	118/07 START : 4/18/2007 END : 4/	19/200	7 LOGGER : T. Stewart	
			, 011 17				
>	<u></u>			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원인	N Y Y	9	FRACTURES PER FOOT		- 일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HAAK	문 의	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	l B	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
- - - - - - - - - - - - - - - - - - -	S N N	ō	RA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Оωш	OIR	ď			S		
		1	NR/	134.35' - Bedding plane, horizontal, smooth,	Ш	No Recovery 135.3-135.5'	
			0	planar, tight	TTI	 Limestone 135.5-136.8' - Same as 125.5-130.5' 	1
-		ŀ			口	135.5-130.6 - Same as 125.5-130.5	-
			1	136.65' - Bedding plane, horizontal, rough,	₽₩	- 136.8' - intact discontinuity	_
			.	undulating, tight	Н	136.8-138.6' - yellowish gray, (5Y	
	R17-NQ	ĺ				7/2), medium to coarse grained,	1
-	5 ft	100	0		₩	strong HCl reaction, very weak (R1),	-
	100%	- 1			╂┼┤	chalk-like feel, medium dark gray (N4) particles over 25-30% of matrix,	-
			4	138.55' - Bedding plane or mechanical break,		- 5-7% medium dark gray (N4)	
			1	rough, undulating, open 5/8", exposed filled cavities on surfaces	ш	subrounded cavities up to 5/8"	1
		ŀ		cavilles on surfaces	+	138.6-142.8' - variegated yellowish	R17: 9 minutes
140 -98.2			0	_		_ gray to grayish yellow, (5Y 7/2 to 5Y	——————————————————————————————————————
-98.2	40.5			140 251 Machanical break barinental	Щ	8/4), very fine grained, strong HCI	_
				140.35' - Mechanical break, horizontal, rough, undulating, tight	Н	reaction, weak to medium strong (R2	
-			2	140.85' - Bedding plane or mechanical break,		to R3), voids increasing with depth (1/16") ranging from 1-2% to	-
-		}		horizontal, rough, undulating, tight	₩	15-20%, fossil molds/casts common	-
			2	141.55' - Fracture or mechanical break,	Н	with cavities 1-3/16"- 1-9/16" x 3/4"-	_
			_	horizontal, rough, undulating, open up to 3/4"		1-3/16" penetrating deep into core,	
	R18-NQ	ı		141.7' - Bedding plane, horizontal, rough,	14	few cavities filled with very weak (R0)	
_	5 ft	82	1	undulating, <1/32" brownish black organic material infill over 100% surface, tight	+	limestone with voids more than	-
	98%			142.8' - Bedding plane, horizontal, rough,		40-50% decreasing with depth 142.8-145.4' - variegated yellowish	_
				undulating, tight, horizontal mottling surface	ш	gray to dusky yellow to light olive	
1 7			2	444 OL Frankura 20 dan mandalakiran	Н	gray, (5Y 7/2 to 5Y 6/4 to 5Y 5/2),	Driller's Remark: 144.0-
-		H		144.2' - Fracture, 30 deg, rough, undulating 144.4' - Fracture or mechanical break,		strong HCl reaction, medium strong	144.5' 50-75% loss of -
145			0	horizontal, rough, undulating, open 1/2"	₽₽	_ (R3), voids over less than 1-2% of	circulation in a void (space
-103.2	45.5			g, open <u>.</u>	Н	surface becoming more common	approximately 80%) R18: 9 minutes -
				145.7' - Bedding plane or mechanical break,		 with depth, thin black organic laminae from subhorizontal to 	SC-5 collected at 144.4-
-			1	horizontal, rough, undulating, open 1/2"	╁┼┼	vertical throughout interval, thin	145.4'
_		}		g, open <u>.</u>	$+ \Box$	subvertical to vertical fractures	-
			0			(tight), unbroken, permeate nearly	_
			Ĭ		Н	full length of interval, trace fossil	
	R19-NQ	Ī		447.7.447.01.14.1.1.1.1.00	Ħ	 casts/molds predominantly in last 0.3' of interval 	1
-	5 ft	92	0	147.7, 147.9' - Mechanical break (2), horizontal, rough, undulating, tight		No Recovery 145.4-145.5'	-
_	100%			nonzontal, rough, undulating, tight	₽₽	Limestone	_
				148.55, 148.6' - Bedding plane (2),	Н	145.5-148.7' - vellowish gray mottled	
1 7			2	horizontal, rough, undulating, crumbled rock	П	with light gray, (5Y 7/2 mottled with	1
<u>, </u>		ŀ		fragment between surfaces	╂┴╂	N7), fine to medium grained, strong	R19: 5 minutes
150 -108.2			0	_		HCl reaction, very weak (R1), sharp contact at 146.4' with rocks above	-
1100.2	50.5				口	containing abundant lithoclasts up to	
		I			1 I	1/2" (well rounded to rounded	Total depth is 150.5' on
					1 I	nodules), possibly bioclastic,	4/19/07 -
-					┨╴╏	lithoclasts less apparent below	-
					4 l	contact, appears to be very thinly laminated, voids and trace cavities	-
					j l	>3/8"x1/16" over 1-3% of surface	1
1 7					1	148.7-150.5' - yellowish gray, (5Y	1
					1 I	7/2), very fine grained, mild HCl	-
					4 I	reaction, medium strong to weak (R3	-
J]	to R2), very faintly mottled, voids up]
1 7						to 1/16" over 3-5% of surface, cavities rare (<1/16"x3/16")	1
					1 I	Bottom of Boring at 150.5 ft bgs on	
-				_	-{ }	4/19/2007	-
1					lacksquare		
H +							



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-03	SHEET 1 OF 8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit ORIENTATION : Vertical

DRILLIN	GMETH	OD AND	<u>EQUIPMI</u>	ENT: CME 550 S	/N 186073, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 3.0 ft bo	gs on 3/26	6/07	START : 3/26/2007 END : 3/26/2007 LOGGER : T. Stewart
STANDARD					SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft) RECOVERY (ft)			PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
BEL SEA				120111200113	SOIL NAME, USCS GROUP SYMBOL, COLOR, SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING RATE,
TH YAT			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR ONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION
E S E			#ITPE	(N)	Solition 2 10 10 10 10 10 10 10
43.9	0.0				Poorly Graded Sand With Organics (SP) 24" split spoon, 5' AWJ rod
-		0.5	SS-1	1-1-1	0.0-0.5' - medium gray to dusky brown, (N5 to 5YR
-		0.5	00-1	(2)	\\2/2), moist, very loose, very fine to fine silica sand, _\organics are fines and roots
-	1.5				Driller switch to N-rod, 4.75" tricone roller
-					drill bit add 12.5lb quick gel bentonite
_]]
]
					Water level reached at ~3.0' below ground - surface based upon SS-1 and SS-2 on
					3/26/07 at 12:00
5	5.0				
38.9	5.0				Poorly Graded Sand With Silt (SP-SM)
-		0.0	SS-2	6-7-9	5.0-5.9' - very pale orange to grayish orange, (10YR - 🗐 💮
-		0.9	SS-2	(16)	8/2 to 10YR 7/4), wet, medium dense, very fine to fine rounded silica sand, 5% nonplastic fines as black
-	6.5				│ \ particles and pale yellowish orange (10YR 8/6) │
-					particles, trace fine gravel-sized concretions with
_					moderate yellowish brown (10YR 5/4) centers and grayish brown (5YR 3/2) rims, trace roots up to 3"
					<u> </u>
1 7]
					1 1
-					
10 -	10.0				
10 33.9	10.0				Poorly Graded Sand (SP)
-		0.0	00.0	5-6-7	10.0-10.8' - very light gray to light gray, (N8 to N7),
-		0.8	SS-3	(13)	wet, medium dense, no HCl reaction, very fine to fine rounded silica sand, trace nonplastic fines that are
-	11.5				\rounded silica sand, trace nonplastic lines that are
_					
]]
]					Driller's Remark: Hitting hard rock at 13'
					drilling slow
-					
15	15.0				
28.9	15.0				Fat Clay With Sand (CH)
-		1.1	SS-4	6-4-5	↑ 15.0-15.4' - medium light gray, (N6), wet, stiff,
-		'.'	33-4	(9)	medium to high plasticity, no to low dilatancy, mottled
-	16.5				│ \\6/6), 20-25% very fine to fine rounded silica sand, │ │ │
_					trace very fine sand-sized black particles
_					Fat Clay (CH) 15.4-16.1' - bluish white, (5B 9/1), moist, stiff, medium -
_					to high plasticity, no to low dilatancy, no HCl reaction,
]					mottled with grayish blue (5PB 5/2) streaks, 10% fine
]					to medium sand-sized white particles
					11
20					
					



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-03	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit

ORIENTATION: Vertical

					S/N 1860/3, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 3.0 ft b	gs on 3/2		START: 3/26/2007 END: 3/26/2007 LOGGER: T. Stewart
≯Q£	041451-	INITEDIC	.1 (6)	STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE INTERVAL (ft)			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
ATI B		RECOVE	<u> </u>		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
E SUR			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
23.9	20.0			(* 1)	Lean Clay With Sand (CL)
-		1.2	SS-5	6-5-5	20.0-21.2° - light gray, (N7), wet, stiff, 30% very fine to fine grained, low plasticity, slow to no dilatancy, no
-	01.5			(10)	HCI reaction, pale green (10GB 8/2) mottling, mottled
-	21.5				\at bottom (21.2'), trace of black particles, 50% very \fine to fine silica sand, trace fine gravel-sized grains \frac{1}{2}
-					(inte to fine sinca sand, trace fine graver-sized grains)
-					1 1
-					1 1
-					1 1
-					-
	05.0				-
25 <u> </u>	25.0				Silty Sand (SM)
-		1.3	SS-6	2-1-2	25.0-26.25' - yellowish gray, (5Y 7/2), wet, very loose, medium grained, no HCl reaction, very fine to fine
-	26.5			(3)	rounded silica sand, 20-30% nonplastic fines, trace of
-	26.5				very fine sand-sized black particles
-					1 1
-					
-					-
-					-
-					
-					
30 13.9	30.0				Clayey Sand (SC)
-		1.2	SS-7	2-2-3	30.0-31.2' - light olive gray mottled with greenish gray
-	21.5	'	00 /	(5)	and purple streaks, (5Ŷ 6/1 with 5GY 6/1), wet, loose, no HCl reaction, very fine to fine rounded silica sand,
-	31.5				\\20% medium plastic fines, trace very fine sand-sized \/-\\black particles
-					- Luiduk particles
-					1 1
-					1 1
-					1 1
-					
35	25.0				
8.9	35.0				Silt (ML)
-		1.0	SS-8	14-28-7	35.0-36.0' - light olive gray with olive black and dark yellowish brown, (5Y 5/2 with 5Y 2/1 and 10YR 4/2),
-	26 5	,		(35)	wet, hard, low plasticity, rapid dilatancy, 5-10% fine
-	36.5				sand-sized black particles, mild HCl reaction from 35.5-40.0', carbonate material, organic seam at 35.0',
-					\0.35' thick black and brown mottling , strong organic
-					odor
-					
-					
-					
40					
40_					+ + + + + + + + + + + + + + + + + + + +
			<u> </u>		
					1 1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-03	SHEET	3	OF	8	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit

					·	ary, cameau, Avvo rous, 4-5/4			Official Vertical
WATER	LEVELS	: 3.0 ft bo	gs on 3/26	5/07 S	START : 3/26/2007	END : 3/26/2007	LOGGEF	{ : T.	
>				STANDARD		SOIL DESCRIPTION		ō	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
BH		RECOVE	ERY (ft)			IE, USCS GROUP SYMBOL, C		일	DEPTH OF CASING, DRILLING RATE,
H H H				011 011 011		E CONTENT, RELATIVE DENS ICY, SOIL STRUCTURE, MINE		ABC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	6"-6"-6" (N)	OONOIOTEN	OT, COLL OTTIOG FORLE, MINVE	ITTICOGT	S⊀	INOTHOMENTATION
3.9	40.0			()	Silt (ML)			111	
-	10.0			30-41-46	40.0-41.3' - lial	ht olive gray, (5Y 5/2), wet, v	ery dense, -	!	-
I _		1.3	SS-9	(87)	fine to medium	n grained, mild to moderate I	HCI	!	_
	41.5			` ′		nonplastic fines, trace fine g		ш	
I -					broken into silt	many sand-sized particles ca	an be	1	1
-					broken into siit	1 SIZEG BY HANG		l	-
-							-		-
_							_		_
-							-	1	1
l							-	1	-
45	45.0				C:Ih. C1 /C*	A\		191111	_
-1.1				00.40.40	Silty Sand (SN 45.0-46.4' - ligh	//) ht olive gray, (5Y 5/2), wet, v	verv dense -		_
		1.4	SS-10	29-40-46 (86)	fine to medium	n grained, mild to moderate I	HCI		
I -	46.5			(00)	reaction, sand,	, 10% coarse sand-sized, 35	5-40%		1
-	40.5				nonplastic fine	s, all carbonate			1
-							-	•	-
I -							=		_
							_		
-							-	1	1
-							-	1	-
-							-		-
50	50.0							I	
-6.1	50.5	0.5	SS-11	50/6	Sandy Silt Wit	th Limestone Fragments (M	IL)		Start of sampling on 3/27/07
				(50/6")	nonplastic rap	llowish gray, (5Y 7/2), wet, hold dilatancy, mild to modera	ard, te HCl	l	Driller's Remark: Soft drilling -
-					reaction, 40%	fine to coarse sand-sized, 1/	4"-1/2"	i	-
-					limestone lens	es at top and bottom of sam		•	-
I -					carbonate				_
							_		
1 -							-	1	1
-							-	l	-
-							-		-
							_		_
55_	55.0							L	
-11.1	55.4	0.3	SS-12	50/4.5	Silt With Sand	d (ML)		Ш	Light to moderate bit chatter over 1st foot
-				(50/4.5")	\ 55.0-55.3' - yel	llowish gray, (5Y 7/2), wet, h	ard, /-	1	(drilling from 51.5-55.0')
-						oid dilatancy, mild to moderation to medium sand-sized,		l	-
_					carbonate	to modiam band bized,	~··· / _		
1 _									
									Driller's Remark: Hard at 57', soft at 57.5',
	60.0						-	1	hard again at 58.3'
-		0.2	SS-13	50/2.5		agments		ш	
-	60.2			(50/2.5")	\ 60.0-60.2' - ligl	ht olive gray to olive gray, (5			-
-						to strong HCI reaction, foss			
1						medium grain sized black fra ") spheroidal particles are th			
60					very lifte (1/32) sprieroluai particles are tri	c maunx		1
					Begin Rock Co	oring at 60.0 ft bgs			
					See the next sl	heet for the rock core log			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-03	SHEET	4	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CONINC	INLITIODA	ND LC	אורוע	IENT: CME 550 S/N 186073, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS: 3.0	ft bgs	s on 3	/26/07 START : 3/26/2007 END : 3/	26/200	7 LOGGER : T. Stewart	
				DISCONTINUITIES	۲۵.	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(n	DESCRIPTION	SYMBOLIC LOG		
E A O N	Ž,Ą,Ž	<u></u>	FRACTURES PER FOOT	DESCRI HOR	$\overline{\circ}$	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H H H		(%) O	Τ̈́	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
민류년		Ø	ZAC ER	PLANARITY, INFILLING MATERIAL AND	Į ₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		ď	F F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	· · · · · · · · · · · · · · · · · · ·
-16.1	60.0 R1-NQ				Ш	Limestone	R1: 1 minute
-	1 ft	85	0	CO CEL Machanian I brands	+	60.16-61.0' - dusky yellow, (5Y 6/4),	_
-	61.0 85%			60.65' - Mechanical break		fine grained, mild to moderate HCl reaction, very weak to weak (R1 to	Start at drilling 3/28/07,
l _			2		Ш	- R2), voids up to 1/16" on 15-20% of	water level at surface -
			_		Ш	surface, no fossils	(mud) at 7:55 =3/28/07
-						61.0-65.9' - dusky yellow, (5Y 6/4),	` ′
-			2		ш	mild to moderate HCl reaction, weak	-
-					\vdash	to medium strong (R2 to R3), voids	_
	R2-NQ 5 ft	65	0	63.05', 63.4' - Mechanical break		up to 3/16"x3/16" (some infilled with very fine to medium grain	
	98%	05	"		Ш	mineralization) voids up to 25% of	
I -				-	H	surface, extremely weak carbonate	-
-			3		口	silt interval from 64.3-64.6' mottled	-
65				_	Ш	gray from 63.5-64.5', very poorly	
-21.1			4		Н	fossiliferous (trace molds)	R2: 12 minutes
_	66.0		1	•		•	
-	66.0		NR)		₩	No Recovery 65.9-66.0'	
-			0		H	Limestone	_
						66.0-71.0' - Same as 61.0-65.9'	
_					Ш	except very weak rock (peels with	
-			0	-	\Box	knife over first foot) grades to medium strong over last 3.0' of run,	-
_	50.110					extremely weak rock (compressed by	_
	R3-NQ 5 ft	78	2		Щ	thumb) from 68.95' to 69.15', 10%	
	100%	70	-	68.5', 68.6' - Fractures, 50-60 deg, rough,		unfilled spheroidal cavities up to	
-				undulating, tight, black particles on surface	Ш	1/2"x1/2", stratified with black	_
-			3	68.95' - Bedding plane, <10 deg, top of extremely weak rock	₩	laminations from 69.4-70.8', 5-10% medium grain black particles, some	-
70				69.15' - Bedding plane, 40 deg, base of —		— voids (<1/16") in lower half infilled	
-26.1				extremely weak rock	Н	with gray mineral moderately	R3: 13 minutes
I -	71.0		1	69.5' - Bedding plane or mechanical break,	Н	fossiliferous (casts, molds), up to	Driller's Remark: – Maintaining circulation
-	71.0			horizontal, rough, undulating, tight	ш	3/8" fragment molds	- Ividintalining on ediction
-			>10	70.0' - Fracture, 60-70 deg, rough, undulating, medium black particles	\vdash	71.0-71.5' - yellowish gray, (5Y 7/2),	_
_				71.15'-71.7' - Fracture zone, fractured rock	$\vdash \vdash$	moderate to strong HCl reaction, voids (mostly <1/16") up to 45%	
				core black stains on fractures		surface, gray staining, moderately	
1 -			2	72.15' - Bedding plane, 0-5 deg, rough,	H	fossiliferous (mold, casts),	1
-	R4-NQ			undulating, open 5/8"	ᡛᡃᡰ	71.0-72.75' and 74.7-75.7' very weak	-
I -	5 ft	72	2	72.75' - Bedding plane or mechanical break,	Ш	rock (R1) peels with knife,	_
	94%	-		horizontal, rough, planar 73.35'-74.35' - Fracture, rough, planar, no	\mathbb{H}	72.75-74.7' medium strong rock (R3) cannot be scraped with knife	
				stains, curved fracture	ᆸ	72.5-75.7' - Same as 71.0-71.5'	1
l			1	73.95' - Fracture, 40 deg, rough, planar, tight,	Ш	except moderate to strong HCI	
75				(bisecting curved fracture)	╁┼┤	— reaction	P4: 22 minutes
-31.1			0	74.7' - Bedding plane or mechanical break,	口	_	R4: 23 minutes
	76.0		NR	horizontal, rough, undulating, open up to 1/2" discontinuity between rock	Щ	No Recovery 75.7-76.0'	
-			<u> </u>	discontinuity between fuck	H	1.10 1.000 voly 10.11-10.0	1
-			2		口	-	-
-				76.7' - Fracture, 80-90 deg, rough,	ш	-	_
			4	undulating, tight	Н	_	
			1	76.95' - Fracture, horizontal, rough, undulating, open up to 1"	口	-	1
-	R5-NQ			77.25' - Fracture or mechanical break,	₩	-	
-	5 ft	90	1	horizontal, rough, undulating, open 1/4"	\vdash		_
I _	98%			78.35' - Bedding plane or mechanical break,	口	_	
			[,]	horizontal, rough, undulating, open 1/2"	Ш		
- 00			1	79.3' - Bedding plane or mechanical break,	H	-	1
80				horizontal, rough, undulating, open 1/2"	ဓ		
					1		



PROJECT NUMBER:	BORING NUMBER:							
338884.FL	B-03	SHEET	5	OF	8			

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bgs	s on 3/	26/07 START : 3/26/2007 END : 3/2	26/200	7 LOGGER : T. Stewart	
> 0 0	(9)			DISCONTINUITIES	ي [LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	E RU STH, OVEF	(%) Q	T.00-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EPT URF	SORE	ROD	RAC ER I	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΕ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-36.1	Olk	Ľ	шп		S I	Limestone	R5: 7 minutes
-			2	80.5' - Fracture, 30-40 deg, rough,	Ħ	76.0-80.9' - dusky yellow to moderate	No. 7 minutes
-	81.0		NR.	undulating, tight -	H	olive brown, (5Y 6/4 to 5Y 4/4), moderate to strong HCl reaction,	-
-			2	80.6' - Fracture, 10-15 deg, rough, undulating, tight	H	- spherical voids up to 1/16"x1/16"	-
_				81.0'-81.2' - Fracture zone	Ш	covering up to 30% of core surface, 5-10% irregularly shaped cavities up	-
_			0	-	ш	to 1-1/4", no infill, predominantly	-
_	DC NO			-	╁╁	weak rock (R2), gray mottling of stains at 80.5', zone of brown	-
_	R6-NQ 5 ft	90	0	-	\vdash	- lamination (very weak rock R1 at	_
_	96%			-	H	78.35'), moderate olive brown interval from 76.0-76.6'	SC-1 collected at 84.2-
_			0	<u>-</u>	口	No Recovery 80.9-81.0'	85.15' -
85 <u> </u>				_	₽	Limestone 81.0-85.8' - dusky yellow, (5Y 6/4),	Driller's Remark: 100% loss of circulation at 84.5'
-41.1			0	85.15' - Mechanical break _	Н	mottled, mottled, irregular shaped	R6: 8 minutes –
-	86.0		NR	-	ш	cavities infilled with medium gray (N5) mineral and extremely weak	-
-			2	86.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/4"	団	rock (R0) yellowish gray in color,	-
-				86.3' - Mechanical break or bedding plane,	Ш	voids up to 3/16"x3/16", spheroidal cavities covering 15% of the surface	-
_			0	horizontal, rough, undulating, open 1/8"-1/4"	\Box	of first 2.5' of run, infilled cavities up	-
-	R7-NQ 5 ft			90 05! Fracture 45 20 dec rough	H	to 2"x1/2" over bottom 2.5' of run, entire run moderately fossiliferous	-
-		88	2	88.05' - Fracture, 15-20 deg, rough, undulating, tight	H	_ (molds and casts), yellowish gray (5Y 8/1) clay seam at 83.2'	-
-	100%			88.35' - Mechanical break, 5-10 deg, rough, planar, black stain, tight	Ш	No Recovery 85.8-86.0'	-
-			3	88.5' - Mechanical break	Н	Limestone 86.0-88.0' - yellowish gray to dusky	-
90 <u> </u>				88.95' - Fracture, 70-80 deg, rough,	田	— yellow, (5Y 7/2 to 5Y 6/4), strong HCl	R7: 12 minutes
-			0	89.5', 89.6' - Bedding plane or mechanical break 5.10 deg rough planer black stains bedded (1/16" thick) containing dark	-		
-	91.0			brown and white fossil, voids	-		
=			1	90.65' - Mechanical break	Ш	covering 40-50% of surface, 1"x1/2" cavity infilled with soft gray clay,	-
-				91.6' - Fracture, 60-70 deg, rough, undulating, tight	╁┼	trace medium grain black particles,	-
-			0	-	Ħ	medium to highly fossiliferous (casts, molds, mostly whole fossil), weak	-
-	R8-NQ			-	甘甘	rock (R2) 88.0-91.0' - Same as 86.0-88.0'	-
-	5 ft 100%	100	0	-	Ш	except dusky yellow, (5Y 6/4), very	-
-	100 /0			-	╁┼	 fine grained, weak (R2), poorly fossiliferous (molds, casts, whole 	
95			0	-	田	fossil), 5-10% black particles, organic	
-51.1				-	口	— bedding/lamination at 89.5-98.0' 91.0-96.0' - Same as 88.0-91.0'	R8: 6 minutes
1 -	96.0		0	-	団	except discontinuous wavy black	-
1 -	55.0			 	╁	 lamination at 92.0', highly fossiliferous 	
1 -			2	96.3', 96.85', 96.55' - Fractures (3),	日	96.0-100.9' - Same as 88.0-91.0'	
1 -					Ħ	except highly fossiliferous at 98.5-99.7'	SC-2 collected at 96.85-
1 -			0	-	H	-	97.8'
1 -	R9-NQ			-	H	-	
1 -	5 ft 98%	88	1	-	曰	-	
1 -	55,3			98.95' - Fracture, horizontal, rough,	口	-	
100			1	undulating, 1/8" relief	団	-	
,,,,					1 1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-03	SHEET	6	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				TENT . CIVIE 330 3/N 1800/3, ITIUU TOLATY, INQ 1001S, FIV			ORIENTATION: Vertical
WATER	LEVELS : 3.0	ft bgs	s on 3	/26/07 START : 3/26/2007 END : 3/	26/200	D7 LOGGER : T. Stewart	
300	<u></u>			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	2 4 K	(9)	품드		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
I ∓X €	STER OVE	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P. R. F.	RNG	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	078	ď	ΗΔ		S	CHARACTERISTICS	
-56.1			2	99.7' - Fracture, 10 deg, rough, undulating,			R9: 8 minutes
_	101.0			open	\top	=	1
-	101.0		NR/	100.65', 100.75' - Bedding plane, rough, planar, 1/16" relief (bedding plane fracture)		No Recovery 100.9-101.0'	1
-			1	101.2' - Mechanical break	₽	Limestone	1 -
				101.25' - Bedding plane or mechanical break,		101.0-106.0' - Same as 88.0-91.0'	
I -				horizontal, rough, undulating, open 1/4"		except highly fossiliferous at 101.3-102.1' and 103.5-104.2'	
-			0		ш	_ 101.5-102.1 and 105.5-104.2	1
-					$+$ \Box	_	
l _	R10-NQ 5 ft	96	0			_	
	100%	30	0	103.5', 104.2' - Mechanical break (2)	Ш		
-				•	\top	=	1
-			0	104.25', 104.7', 105.25', 105.65' - Mechanical	\blacksquare	_	-
105				break (4), horizontal, rough, undulating, tight	H		l
-61.1							R10: 8 minutes
-	106.0		0			_	1
-	100.0				+	106.0-109.0' - yellowish gray, (5Y	1
l -			0		-	- 7/2), strong HCl reaction, very weak	-
l _					\perp	to weak (R1 to R2), gray mottling,	
					H	staining over 106.0-109.0', 10-15%	
-			0	•		- spherical voids (<1/16"), poorly	1
-	R11-NQ				+	fossiliferous (molds mostly casts up to 1/8" in size), 25-30% very fine	-
l _	5 ft	92	1		_	grain white and dark gray particles	
	100%	-		108.6' - Fracture, 60-70 deg, rough,		3	
-				undulating, tight	\vdash	109.0-111.0' - Same as 106.0-109.0'	1
l			2	109.0' - Bedding plane or mechanical break,	++	 except yellowish gray, (5Y 8/1) 	1
110_ -66.1				horizontal, smooth, planar 109.8' - Bedding plane or mechanical break,	-		
-00.1			2	horizontal, rough, undulating, open 1/4"	\perp	_	R11: 7 minutes
	111.0		_	110.2' - Bedding plane or mechanical break,			
_				horizontal, smooth, planar, open 1/8"		111.0-113.0' - yellowish gray, (5Y	1
-			1	110.35' - Bedding plane or mechanical break,	+	 8/1), strong HCl reaction, very weak 	-
-				horizontal, rough, undulating, open up to 5/8" 111.3' - Bedding plane or mechanical break,		to weak (R1 to R2), up to 10%	1
			2	horizontal, rough, undulating, 1/8" open	ш	elongated cavities up to 1/4"x1/2" - rimmed with secondary	
			_	111.6' - Mechanical break, <10 deg, rough,	Н	mineralization, trace fossil casts up	
-	R12-NQ			undulating, tight		to 1/2"	1
-	5 ft	80	2	112.0' - Mechanical break, <10 deg, rough,	\sqcup	- 113.0-116.0' - white, (N9), strong HCl	-
I -	100%			undulating, tight 112.9' - Mechanical break or bedding plane,	\Box	reaction, very weak to weak (R1 to	
			ارا	112.9 - Mechanical break of bedding plane, <10 deg, rough, undulating, tight		R2), mottled with soft white clay,	
115			1	113.7-113.95' - Fracture zone, rough,	\mathbb{H}	 poorly fossiliferous (casts and molds up to 1/4") more larger voids, voids 	1 1
-71.1				undulating, gray stains, also brown stains —	Ш	are spheroidal and up to 1/16", no	R12: 5 minutes
-			1	114.4' - Bedding plane or mechanical break,		– infill	
I _	116.0			horizontal, rough, undulating, tight 115.35' - Bedding plane or mechanical break,	Н	_	l J
				rough, undulating, tight to 1/8" gap		116.0-119.5' - yellowish gray, (5Y	SC-3 collected at 115.1-
I -			1	116.45' - Bedding plane or mechanical break,	\square	- 7/2), strong HCl reaction, very weak	116.0'
-				horizontal, rough, undulating, open up to 1/4"	+	to weak (R1 to R2), grades from moderate to highly fossiliferous from	1
I -			5	117.2' - Bedding plane or mechanical break,	ш	- 116.0-119.0' (casts, molds) up to	
1				horizontal, rough, undulating, tight	\vdash	1/2"x1/2" micro fossils, gray staining	
1 -	R13-NQ			117.4' - Fracture, 60-70 deg, rough, undulating, open 1/8"	\vdash	predominantly over 117.0-119.0'	1
-	5 ft	72	1	117.55' - Bedding plane or mechanical break,	ш	-	-
I -	100%			horizontal, rough, undulating, open 1/8"	╂┯┨	_	-
I _			2	117.65' - Mechanical break, horizontal,	H	_	l J
120			_	smooth, planar, open 1/8"			1
				-			
1							
					1		



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-03	SHEET 7 OF 8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bgs	on 3/	26/07 START: 3/26/2007 END: 3/	26/200	D7 LOGGER : T. Stewart	
≳∩a:	. (9)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	~	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B	SE RU GTH SOVE	(%) Q	CTU	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	CON REC	A Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-76.1				117.9' - Mechanical break or bedding plane,	Ш	Limestone	R13: 7 minutes
	121.0		1	rough, undulating, tight 118.25' - Mechanical break or bedding plane,	ш	 119.5-120.5' - Same as 116.0'-119.5' except grayish yellow, (5Y 8/4), up to 	-
			2	<10 deg, rough, undulating, tight 119.45' - Mechanical break or bedding plane,	Щ	25% spheroidal voids (<1/16") - 120.5-121.0' - Same as 116.0'-119.5'	Chalk like or powder like rock, this run contains rock
_				<10 deg, rough, undulating, dark gray stains,	Ш	except yellowish gray, (5Y 8/1), very	with vertical fractures-
_			0	open up to 1/2" 119.65' - Bedding plane, horizontal	Ш	fine grained, trace voids, 15% elongated cavities up to 1/8"x1/2",	possible stress related to over burden –
_	544316			120.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8" gap	╁┼	poorly fossiliferous 121.0-125.0' - yellowish gray, (5Y	-
_	R14-NQ 5 ft	75	2	121.75' - Bedding plane or mechanical break,	H	 8/1), strong HCl reaction, very weak 	_
-	80%			horizontal, rough, undulating, tight 121.85' - Bedding plane or mechanical break,	H	to weak (R1 to R2), 10% voids up to 1/16", wavy bedded discontinuity 1/2"	-
			1	horizontal, rough, undulating, tight	Ħ	thick at 122.0', gray staining over	SC-4 collected at 124.5-
125 -81.1				123.05' - Bedding plane or mechanical break, — horizontal, rough, planar, tight	H	entire interval, poorly fossiliferous (casts), trace dark gray very fine	125.0' — R14: 5 minutes
-	126.0		NR	123.35, 123.55' - Mechanical break 123.9' - Mechanical break, rough, planar,	H	particles, upper most 1' is the same as the bottom of R13	Driller's Remark: Soft
-	126.0			tight	Ш	No Recovery 125.0-126.0' Limestone	drilling at 124.5-125.0' -
-			1	124.05' - Mechanical break or bedding plane, smooth, planar, tight	Ш	126.0-129.6' - vellowish gray with	-
			2	126.5' - Mechanical break or bedding plane, horizontal, rough, planar, open 1/16"	Н	moderate gray staining, (5Y 8/1), strong HCl reaction, 126-128.5' is	1
			2	127.0' - Mechanical break, horizontal, rough,		very fine chalk-like feel, poorly	
	R15-NC 5 ft 72%	52	2	undulating, tight 127.3-127.45' - Fracture zone	Щ	fossiliferous (trace casts), 25% spheroidal voids (mostly	
_		٥_		128.3' - Mechanical break or bedding plane, horizontal, rough, undulating, open 1/16"	Щ	1/16"x1/16"), trace cavities up to 1/2"x1/4"	
_			2	128.8' - Mechanical break, horizontal, rough,	Щ	_ 128.5-129.6' highly fossiliferous	_
130 <u> </u>				undulating, tight 129.02-129.05' - Fracture zone —	Ш	(casts, molds, micro fossil), 20-25% — cavities partially filled (rimmed with	R15: 7 minutes
-			NR	129.4' - Bedding plane or mechanical break, horizontal, rough, undulating, tight, assume	Ш	_ calcite) No Recovery 129.6-131.0'	Driller's Remark: Soft lense -
-	131.0			core loss from bottom of run - - - 132.0' - Mechanical break, horizontal, rough,	団	Limestone	from 127.0-128.0' Appears similar to 90-115',
-			>10		ш	 131.0-135.0' - Same as 126.0-128.5' except bottom most 0.5' returns to 	a vertical fracture in this interval is over 1.5' long
_					Ш	"clean" un-stained yellowish gray (5Y	Intervaris over 1.5 long
_			>10	planar, for horizontals, vertical stained set of fractures at 132', 80-100% surface covered.	Н	- 8/1)	-
	R16-NQ	10	>10	,	Н	_	-
	5 ft 80%	10	-10		H		
_			2		Ħ	_	
135_ -91.1				_	Ħ	No Bossess 405 0 400 0	D40: 7 minutes
-91.1			NR		Ħ	No Recovery 135.0-136.0'	R16: 7 minutes
-	136.0				H	_ Limestone	-
-			0		丗	 136.0-137.45' - light olive gray, (5Y 	-
-					Ш	6/1), strong HCl reaction, strong (R4), wavy black mineralization	-
-			>10	137.45' - Bedding plane, 15-20 deg, brownish	Ш	 laminae, trace cavities up to 1-1/2" long 	-
-	R17-NQ - 5 ft 96%			black stains, tight 137.8-138.15' - Fracture zone, up to 2"	Н	_ iong	
-		64	>10	subrounded pieces	囯	-	-
_			138.35' - Fracture or mechanica		囯	-	
140	0		2	· · · · · · · · · · · · · · · · · · ·	\blacksquare		<u> </u>



PROJECT NUMBER:

33884.FL

B-03 SHEET 8 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 3.0) ft bg:	s on 3	/26/07 START : 3/26/2007 END : 3/2	26/20	07 LOGGER : T. Stewart	
≥ ∩ ⊕	6)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-96.1 - - -	141.0		1 NR 1	138.5-138.75' - Fracture zone, brownish black stains 139.35' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1/2" 139.55' - Fracture or mechanical break, 40-50 deg. rough, undulating, open up to 1/2"		Limestone 137.45-140.8' - white to yellowish gray, (N9 to 5Y 8/1), strong (R4), voids up to 1/16"x1/16" over 25% of surface, cavities up to 2"x1-1/2" irregularly shaped filled with a weak	R17: 8 minutes Stopped drilling at 141.0' on 3/28/07 Starts drilling from 141.0' on 3/29/07, 08:01 water
-	R18-NQ 5 ft 100%	88	0	40-50 deg, rough, undulating, open up to 1/2" 140.25' - Mechanical break or bedding plane, horizontal, rough, undulating 141.35' - Bedding plane, horizontal, rough, undulating, 1/16" clay infilling, open1/8" 142.8' - Bedding plane or mechanical break, -10 deg, rough, undulating, tight to 1/4" open		secondary mineral, poorly to moderately fossiliferous (casts, molds), fossils up to 3/4" No Recovery 140.8-141.0' Limestone 141.0-146.0' - light olive gray, strong	level to 3'10" below ground surface in NQ barrel
145 -101.1 -	146.0		0	143.4', 143.5', 143.85', 144.15', 144.55' - Mechanical break (5), horizontal, rough, undulating, tight 144.55' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 145.8' - Bedding plane or mechanical break,		HCI reaction, weak (R2), 5-10% spherical voids up to 1/8"x1/8" laminated rim <1/16" thick over entire interval, trace cavities up to 3/8"x1/16" elongated with secondary white mineral rimmed (60% infill), bottom most 0.15' is a very light gray	R18: 9 minutes
-	R19-NC 5.2 ft 100%		(0	horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below - 147.55' - Bedding plane or mechanical break, horizontal, rough, undulating, tight		medium strong (R3) limestone 146.0-148.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine grained, strong HCl reaction, medium strong to strong (R3 to R4), voids up to 3/16"x1/8" covering
- - 150 -106.1			1	148.05', 148.5', 149.4' - Bedding plane or mechanical break (3), horizontal, rough, planar, 148.5' has organic black infill <1/16" thick		20-30% of surface, trace cavities elongated horizontally 1"x1/4" in size, trace fossil (casts/molds) 148.5-149.45' - very weak (R1), stratified section of yellowish gray and brownish black lamination, rock	SC-5 collected at 148.5- 149.45' -
-106.1 - - - -			0	- - - - -		has powdery feel to touch 149.45-151.2' - fine grained, very thinly bedded, voids up to 1/8"x1/8", some infilled with white mineralization, rock has powdery feel to touch Bottom of Boring at 151.2 ft bgs on 4/3/2007	R19: 10 minutes Driller's Remark: Circulation loss has been continuing (60-100%) during core runs, total depth tape measured at 151.0', borehole open to total depth
- - -				- - -		- - - -	- - - -
- - -				- - -		-	- - - -
-				-		-	- - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04	SHEET	1 0	F	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

					orientation : venical	_
WATER	LEVELS	: 3.0 ft b	gs on 4/10		START : 4/10/2007	٦
≥Q₽				STANDARD PENETRATION	SOIL DESORIF HON 9	4
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
H BI		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND	
무유			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
<u> 42.8</u>	0.0			(N)	Topsoil Samples taken using 5' sections of N-rod, 3-	┨
-	0.0			1-2-2	\\\\ 0.0-0.15' - brownish black, (5YR 2/1), moist, 30-35% \\\/\-\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	+
-		1.1	SS-1	(4)	roots brand bentonite 08:40 Water level at 3.0' below ground	4
_	1.5				Poorly Graded Sand With Organics (SP) 0.15-1.1' - grayish black to very light gray, (N2 to N8), surface based on SS-1 moist, SS-2 wet	4
_					moist, very loose, very fine to fine grained, silica sand,	4
l _					trace nonplastic fines, 10% organics decreasing with depth	
_						
]	1
_					11	
5	5.0				11	1
37.8	0.0				Poorly Graded Sand (SP)	1
-		1.0	SS-2	2-2-2	5.0-6.0' - grayish orange to pale yellowish brown mottled with trace dusky brown. (10YR 7/4 to 10YR	1
-	6.5			(4)	6/2 with 5YR 2/2), wet, very fine to fine grained, trace	1
-	6.5				to 3% nonplastic fines, trace very fine sand-sized	\exists
-					\black particles, silica sand	\exists
-					-	+
_					-	+
-					-	+
_						+
_					_	4
10	10.0				-	4
32.8				4-6-7	Poorly Graded Sand To Clayey Sand (SP-SC) 10.0-10.9' - yellowish gray, (5Y 7/2), wet, very fine to	4
_		0.9	SS-3	(13)	│ fine grained, grading from sand (SP) to clayey silt │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │	
_	11.5				\(SC) with depth, trace nonplastic fines in SP, 25-30% \ low to medium plastic fines in SC, trace of angular \ \	
_					shaped black particles	
]	1
_					1	٦
_					11	1
-					1 1	1
15	15.0					1
27.8	10.0				Silty Sand (SM)	\dashv
-		1.2	SS-4	7-10-12	│ 15.0-16.2' - yellowish gray, (5Y 7/2), wet, medium	1
-	46-	'.2	00-4	(22)	dense, very fine to fine grained, 25-30% nonplastic fines, very fine black particles, 3/8" thick vertically	+
-	16.5				oriented seam of SP as above (10.0-10.9'), trace /-	+
-					moderate yellow (5Y 7/6) staining over last 1/3 of sample, silica sand	4
-						4
_						4
-]]	4
-]]	4
-]]	1
20						╝



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-04	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION: Vertical

				S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical	
WATER	LEVELS	: 3.0 ft b	gs on 4/1	0/07	START : 4/10/2007
≩Qæ1	041451	. INITED: (NI (64)	STANDARD PENETRATION	SOIL DESCRIFTION 0
ON (SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
ATI(RECOVI	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
22.8	20.0			(1.1)	Silty Sand (SM)
-		1.2	SS-5	9-10-9	20.0-21.2' - yellowish gray, (5Y 7/2), wet, very fine to fine grained, 14% nonplastic fines, trace very fine
-	21.5			(19)	angular black particles, silica sand
-	21.5				
-					†
-					†
_					1 1
_					-
_					-
25	25.0				-
17.8	23.0				Clayey Sand (SC)
_		1.3	SS-6	5-6-5	25.0-25.1' - dark yellowish orange, (10YR 6/6), moist, very fine to fine grained, 30-35% medium plastic
-	26.5			(11)	fines, silica sand
_	20.5				Sandy Fat Clay (CH) 25.1-25.4' - greenish gray, (5GY 6/1), moist, stiff,
_					medium to high plasticity, no to slow dilatancy, 30%
_					fine silica sands laminated with very light gray (N8), very fine to fine silica sands about 1/6" thick, light
_					brown (5YR 5/6) laminations <1/16" thick
-					Fat Clay (CH)
-					25.4-25.7' - grayish black, (N2), moist, high plasticity, no dilatancy
30	30.0				Silty Sand (SM)
12.8	30.0				25.7-26.0' - light brown, (5YR 5/6), wet, fine to medium grained, strong HCl reaction, 25-30% low 09:36 Driller's Remark: Will change to 3-
_		1.4	SS-7	7-11-41	
_	31.5			(52)	Silty Sand (SM) 26.0-26.3' - grayish yellow, (5Y 8/4), wet, fine to
-	01.0				│
_					fines, pockets of yellowish gray (5Y 8/1) material Silty Sand With Gravel (SM)
_					30.0-31.4' - yellowish gray with moderate yellow and
_					yellowish gray staining, (5Y 8/1 with 5Y 7/6 and 5Y 7/2), wet, fine to coarse grained, strong HCl reaction,
_					angular to subrounded sand-sized, 23% low plastic
-					fines, 20% fine to coarse gravel, all carbonate
35	35.0				1
7.8	-			_	Interbedded Silt With Sand (ML)
		1.5	SS-8	3-4-14 (18)	35.0-36.5' - medium light gray mottled with medium dark gray interbedded with very pale orange mottled
	36.5			(10)	with yellowish gray, (N6 mottled with N4 interbedded 1
	-				with 10YR 8/2 mottled with 5Y 8/1), moist, low plasticity, strong to very strong HCl reaction, 20-25%
					very fine to fine grained sand, 1" angular limestone The sample very fine to fine grained sand, 1" angular limestone The sample very fine to fine grained sand, 1" angular limestone The sample very fine to fine grained sand, 1" angular limestone The sample very fine to fine grained sand, 1" angular limestone The sample very fine to fine grained sand, 1" angular limestone very fine to fine grained sand, 1" angular limestone very fine to fine grained sand, 1" angular limestone very fine to fine grained sand, 1" angular limestone very fine to fine grained sand, 1" angular limestone very fine to fine grained sand, 1" angular limestone very fine to fine grained sand, 1" angular limestone very fine to fine grained sand, 1" angular limestone very fine to fine grained sand, 1" angular limestone very fine grained sand, 1" angular
					nagments at pollom of sample
					1
					1
					1
40					1



PROJECT NUMBER:	BORING NUMBER:				
338884 FI	R-04	CHEET	3 OE	Ω	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION : Vertical

						y, catheau, NVV 1005, 3-7/6		. D	MacComb
WATER	LEVELS	. J.U IL D	gs on 4/10		START : 4/10/2007	END: 4/17/2007 SOIL DESCRIPTION	LUGGER		McComb COMMENTS
≷ 9€	SAMDIE	INTERVA	J (ft)	STANDARD PENETRATION		COL DECOM HON		90-	COMMENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	OPNIVIFLE	RECOVE		TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL,	COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
THE		RECOVE		011 011 011		CONTENT, RELATIVE DEN Y, SOIL STRUCTURE, MIN		/BOI	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEP SUR ELE			#TYPE	6"-6"-6" (N)	CONSISTENC	1, SOIL STRUCTURE, WIII	NET VALOUT	SYN	INSTROMENTATION
2.8	40.0				Silt With Sand (I			Ш	
_		1.4	SS-9	5-5-9 (14)	40.0-41.4' - light mottled with 5Y 7	gray mottled with yellowi 7/2), wet, nonplastic, rapi	sh gray, (N <i>7</i> – d dilatancv		-
-	41.5			(14)	very strong HCl r	reaction, 20% very fine to	o fine sand,		_
_					all carbonate				-
-							_		-
-							_		-
-							_		-
-							_		-
-							_		-
45	45.0						_		-
-2.2	10.0					Sand And Limestone F	ragments	П	_
_		1.5	SS-10	6-10-14 (24)	(MH) 45 0-46 5' - medi	ium light gray, (N7), wet,	low to		-
_	46.5			(24)	medium plasticity	y, rapid dilatancy, very st	rong HCl		-
_	10.0					ne to medium grained sar ained gravel limestone fr			<u> </u>
_					carbonate				-
_							_		-
_							_		-
_							_		-
_							_		-
50	50.0						_		
-7.2					Silty Sand (SM)			Ш	_
-		1.0	SS-11	17-17-18 (35)	coarse grained, v	ium gray, (N5), wet, dens very strong HCl reaction,	se, fine to –		_
	51.5			(00)	nredominantly fo	ssils including shell fragr	ments, 20%		⁻
					\low plastic fines				_
l _							_		
							_		
							_		
55	55.0							<u> </u>	_
-12.2				45.04.00	Sandy Silt (ML)	light gray, (N8), wet, low	nlasticity -		
1 -		1.5	SS-12	15-24-33 (57)	rapid dilatancy, v	ery strong HCl reaction,	30% fine to		_
1 -	56.5			, ,		sand, fossils and fossil fra lowish gray to medium da		Ш	_
1 -					5/1 to 5Y 8/1)				_
1 -							_		_
1 -							_		
-							_		
-							_		-
-							_		-
60									
1									
			l		l .				



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-04	SHEET	4	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION : Vertical

DRILLIN	G METH	OD AND	EQUIPM	<u>ENT : CME 550 S</u>	S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical				
WATER LEVELS: 3.0 ft bgs on 4/10/07 START: 4/10/2007 END: 4/17/2007 LOGGER: R. McComb									
				STANDARD	SOIL DESCRIPTION COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
BEL SE A		RECOVERY (ft)		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE,				
YFA(#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
SE			#1117	(N)	\[\langle \la				
-17.2 - -	60.0	1.5	SS-13	28-27-24 (51)	Silty Sand With Gravel (SM) 60.0-61.5' - medium light gray, (N6), wet, very dense, fine to coarse grained, very strong HCI reaction, predominantly fossil fragments, 25-30% low to				
- - - -	61.5				medium plastic fines, 15% fine gravel-sized fragments composed of shale fragments				
65 -22.2	65.0	0.8	SS-14	37-50/4.0	Silty Sand (SM) 65.0-65.8' - very light gray to light gray mottled with				
- - -	65.8	0.0		(87/10")	medium gray, (N8 to N2 mottled with N5), wet, very dense, fine to coarse grained, very strong HCl reaction, fossil fragments and carbonate material, 43% low to medium plastic fines, 10-15% fine gravel-sized fragments				
- - -									
70	70.0				1				
-27. <u>2</u> - -	71.5	1.5	SS-15	24-26-30 (56)	Silty Sand (SM) 70.0-71.5' - Same as 65.0-65.9'				
-									
-									
75	75.0								
-32.2 _ _ _	76.5	1.5	SS-16	11-12-15 (27)	Clay With Sand (CL) 75.0-75.8' - grayish green mottled with grayish green and brownish black, (10GY 5/2 mottled with 10G 4/2 and 5Y 2/1), moist, very stiff, high plasticity, no dilatancy, mild HCl reaction, 25% very fine to fine				
- - - -					silica sand; irregular shaped, laminated bedding; brownish black material may be organics Elastic Silt With Sand (MH) 75.8-76.5' - yellowish gray, (5Y 8/1), moist to wet, low to medium plasticity, rapid dilatancy, mild HCI reaction, 25% fine silica and carbonate sands, 1-1/2" lens of sandy fat clay at bottom of sample, same as 75.7-75.8'				
80					++				
					1 1				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04	SHEET	5	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical										
WATER	LEVELS	: 3.0 ft b	gs on 4/10	0/07	START : 4/10/2007					
				STANDARD	SOIL DESCRIPTION COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION					
BEI CE,		RECOVERY (ft)		120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND					
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY					
밀Տ크				(N)						
-37.2 - -	80.0 80.9	0.9	SS-17	18-50/4.5 (68/10.5")	Clayey Sand (SC) 80.0-80.9' - light olive gray mottled with dusky yellow green, (5Y 5/2 mottled with 5BG 3/2), wet, very dense,					
- - - -					fine grained, predominantly clayey sand (SC) with pockets of clay (CH) and silt (ML), 35% medium plastic fines, mild HCl reaction, silica sand CH- dusky blue green, (5BG 3/2), with very shiny appearance, no HCl reaction ML- yellowish gray (5Y 8/1), same as 45.0-46.5', mild HCl reaction, olive gray (5Y 2/1) organic pockets at bottom of sample, high plastic, no HCl reaction					
85	85.0 85.2		00.40							
-42. 2		0.1	SS-18	50/2 (50/2")	Limestone Fragments 14:49 Driller's Remark: Light rig bouncing over entire 5-foot run to 90'					
-					\strong HCl reaction, organic fragments					
_					<u> </u>					
_					<u> </u>					
					<u> </u>					
					<u> </u>					
					1					
-					1					
90	90.0				† 					
-47.2	90.3	0.3	SS-19	50/4	Silt (ML)					
-				(50/4")	90.0-90.3' - yellowish gray mottled with medium dark gray, (5Y 7/2 mottled with N4), moist, low plasticity,					
-					\rapid dilatancy, strong HCl reaction, brownish black					
_					irregular laminations, organics at bottom of sample,					
-					\carbonate derived \					
_					-					
-					-					
_					4					
]]					
_					<u> </u>					
95	95.0									
-52.2		0.7	SS-20	40-50/4.5 (90/10.5")	Sandy Silt (ML) 95.0-95.7' - yellowish gray, (5Y 8/1), wet, low					
_	95.9			(90/10.5)	∏ plasticity, rapid dilatancy, strong HCl reaction, 25-30% / □					
_					\fine to medium grained sand, 5% coarse grained					
]]					
1 7					1					
					1					
					1					
100					1					
100					+					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04	SHEET	6	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION: Vertical

DRILLIN	G METH	DD AND	EQUIPM	ENT : CME 550 S	/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit			ORIENTATION : Vertical				
WATER	LEVELS	: 3.0 ft bo	gs on 4/10	0/07	START : 4/10/2007 END : 4/17/2007 LOGO	GER	: R.	McComb				
					SOIL DESCRIPTION	П		COMMENTS				
종무 <u>을</u>	SAMDI E	INTERVA	I (ft)	STANDARD PENETRATION		\dashv	90-					
DEPTH BELOW SURFACE AND ELEVATION (#)	SAWIFLE			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		101	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
A CE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR		OL	DRILLING FLUID LOSS, TESTS, AND				
FF.F.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		ΛME	INSTRUMENTATION				
BS I				(N)			S					
-57.2	100.6	0.3	SS-21	50/4	Sandy Silt (ML)	\Box		16:10 Driller's Remark: Last sample of				
_				(50/4")	100.0-100.3' - Same as 95.0-95.7' except limestone lens 0.1' thick at bottom of sample	/1		4/10/07, end of drilling - 08:15 Water level at 2.5' below ground				
-					lens o. i thick at bottom of sample	⁄ ┨		surface on 4/11/07				
-						- 4		4/11/07 Adding 5' sections of AWJ to reach				
I _						J		depth				
_						- 1		1				
-						Ⅎ		-				
-						-4		-				
						J						
]				
105	105.0					- 1		1				
-62.2	100.0			44 50/5 5	Silt With Sand (ML)	\dashv	ш	09:44 Starting drilling to 105' added 1/2 bag				
-		8.0	SS-22	41-50/5.5 (91/11.5")	105.0-105.8' - yellowish gray mottled with gray, (5Y	4		bentonite -				
_	106.0			(6.11118)	¬ 8/1 mottled with N5), moist, low plasticity, rapid	巾	ш					
					dilatancy, strong HCl reaction, 20% fine to medium grained sand, trace wafer shaped limestone lenses							
1 -					\<1/8" thick, one 1/2" dark yellowish orange coarse	/1		1				
-					fragment, all carbonate	/ 1		1				
-						′ -{		-				
-						-4		4				
						J						
1 -						- 1		1				
						Ⅎ		-				
110 <u></u> -67.2	110.0				Silty Sand (SM)	\dashv	717	10:26 Drillor's Domark: 22 E0/E" (92/11")				
-07.2		0.8	SS-23	33-50/5	110.0-110.8' - yellowish gray, (5Y 8/1), wet, fine to			10:36 Driller's Remark: 33-50/5" (83/11") Add 1/2 bag bentonite to mud vat				
	110.9			(83/11")	coarse grained, strong HCl reaction, 10-15% fine	\mathcal{A}	Ш	riad 1/2 bag boritorine to mad vat				
1 7					\ gravel-sized, 25-30% low to medium plastic fines, all	/1		1				
-					\carbonate	/ ┨		1				
-						- 1		-				
I -						4		4				
						J]				
						7		1				
-						- 1		1				
-						\dashv		-				
-						4						
115_	115.0					_	741					
-72.2					Sandy Clay With Silt (CL-ML)	ŀ						
		1.5	SS-24	1-1-3	115.0-116.5' - olive gray mottled with greenish black, (5Y 4/1 mottled with 5GY 2/1), low plasticity, slow	7		1				
-	440 -			(4)	dilatancy, moderate to strong HCl reaction, 15-20% of							
-	116.5				clay is fine to coarse grained sand; fossils and fossil	 	ИЦ					
-					fragments; the clay is irregularly interbedded with 30%	· / 🗐						
					\light olive gray (5Y 6/1) fine grained, poorly graded silica sand (SP)							
1 7					Silica satiu (Si)	[,]]		1				
-						- 1		1				
-						\dashv		-				
-						4						
]				
120]				
						\dashv						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04	SHEET	7	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

WATER	LEVELS	: 3.0 ft bo	s on 4/10)/07 S	START : 4/10/2007 END : 4/17/2007	LOGGEF	≀ : R.	McComb
				STANDARD	SOIL DESCRIPTION		_O	COMMENTS
NA PION	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SLO	
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLO MOISTURE CONTENT, RELATIVE DENSITY		3OLIG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERAL	.OGY	SYMBOLIC LOG	INSTRUMENTATION
-77.2	120.0	0.3	SS-25	50/5	Silt With Sand And Limestone Fragments (MI	L) _	Ш	
-				(50/5")	120.0-120.3' - yellowish gray, (5Y 8/1), moist, s HCl reaction, 50% limestone fragments, 20% fil	trong /-		-
-					medium sand-sized material, all carbonate			-
-						_		_
						_		
_						_		_
_						_		_
_						_		_
-						-		_
125 <u> </u>	125.0 125.3	0.2	SS-26	50/3	¬ Silt (ML)			_
-	.20.0	<u> </u>	00 20	(50/3")	\ 125.0-125.2' - yellowish gray, (5Y 8/1), moist, lo	ow /-		-
-					plasticity, rapid dilatancy, strong HCl reaction, 5 fine to medium sand-sized, all carbonate	o-10% / _		-
-							1	-
-						_		-
-						_		-
_						_		_
						_		
						_		
130	130.0		00.0=	5 0.10			.	
-87.2	130.3	0.3	SS-27	50/3 \ (50/3") /	Silt With Sand (ML) \(\) 130.0-130.3' - Same as 125.0-125.2' except 20-	-25% /=	Ш	14:20 Driller's Remark: Light rig chatter at 133.5', 131.5'
-					fine to coarse sand-sized material	/ _		· -
-						-		-
-						-	-	-
-						-	1	-
-						-	1	-
-						-	1	-
-						-	1	-
135	135.9					_		-
-92.2	133:1	0.1	SS-28	50/1 (50/1")	Limestone Fragment 135.0-135.1' - yellowish gray, (5Y 7/2), moderat	to to		15:02 Driller's Remark: Will switch to NQ
				(30/1)	strong HCl reaction, trace olive gray (5Y 3/2) st	taining,		coring, last soil sample for B-4 boring
] -					fossil casts, fragment is a 1" disc shaped Begin Rock Coring at 136.0 ft bgs	/		
_					See the next sheet for the rock core log	_		_
_						_		_
-						-		-
-						-		-
-						-		-
440						-		-
140								-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04	SHEET	8	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bgs	s on 4/	/10/07 START : 4/10/2007 END : 4/	17/20	07 LOGGER : R. McComb	
200	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTI SURF. ELEV		RQD	FRAC PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	136.0		2	136.5, 136.9' - Fractures (2), horizontal, rough, undulating	Ħ	Limestone 136.0-137.35' - light olive gray, (5Y 5/2), fine to medium grained, strong	4/12/07 Start coring at 09:40:15 from 136-141' – The interval from 135.0-
-			2	137.3' - Fracture or bedding plane, horizontal, smooth	F	HCl reaction, medium strong (R3), voids (<1/16") on 20% of surface, cavities (3/16" - 1-3/4"), secondary	136.0' was drilled down to set a 5' stroke; no data for 135.0-136.0' is available
	R1-NQ 5 ft 92%	74	1	137.35' - Fracture, horizontal, smooth 137.8, 138.5' - Fractures (2), horizontal, rough, undulating		crystallization in 35-40% of surface, fossiliferous 137.35-137.39' - light olive gray, (5Y	07:45 Water level at 7' 10" -
140			2	- 139.8' - Fracture, <10 deg, rough, undulating —	Ė	5/2), very fine grained, moderate to mild HCl reaction, extremely weak (R0), fine wavy laminations	<u>-</u>
-97. <u>2</u>	141.0		NR	140.4' - Fracture, 20-30 deg, rough, undulating	Ė	137.39-140.6' - yellowish gray, (5Y – 7/2), fine to medium grained, strong to extremely strong HCl reaction,	R1: 25 minutes
-			>10	- 141.6-142.6' - Fracture zone, 70-80 deg,	Ħ	weak to medium strong (R2 to R3), weaker with depth, voids (<1/16") on <5% of surface, irregular	R2-NQ is the first run on 4/17/07 – 08:45 Water level at 6.5'
-			>10	rough, <20 deg at 142.6' and 146.6', rough, undulating	Ē	laminations, powder feel increases with depth, shell fragments, fossiliferous (casts, molds)	below ground surface
-	R2-NQ 5 ft 98%	78	0	143.1, 143.5' - Mechanical break (2)	H	No Recovery 140.6-141.0' Limestone 141.0-145.9' - transition from	-
145			1	144.0' - Mechanical break or bedding plane, horizontal, open 3/8", clay infill, very soft		yellowish gray to light olive gray, (5Y 8/1 to 5Y 5/2), fine to medium grained, extremely strong HCI	-
-102.2	146.0		2	145.45' - Fracture or mechanical break, 50-60 deg, rough, undulating, black staining	Ħ	reaction, very weak to weak (R1 to R2), fines increase with depth, voids (<1/16") over 40-50% of surface,	R2: 8 minutes
-			NR / >10	on 70% surface 145.75' - Bedding plane or fracture, vertical, rough, undulating, black stains on 60-70% of	Ė	fossiliferous casts and molds mainly in weaker rock 144.0-145.9', dark gray stains at 144.5'	Driller's Remark: Loss of
-			2	surface, tight 146.1, 146.2, 146.45, 146.55' - Mechanical break or bedding plane (4), rough,		No Recovery 145.9-146.0' Limestone 146.0-149.6' - yellowish gray, (5Y	circulation 100% at 146.5' – SC-1 collected at 147.35- – 148.4'
-	R3-NQ 5 ft 72%	19	5	undulating, tight, broken along wavy bedded laminations, organic beds (<1/16") 147.05' - Fracture or bedding plane,	H	 7/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids to <1/16" over 20% of rock, black organic staining. 	-
150			4	horizontal, rough, undulating, open 1/8", black stains over 25% of surface 147.4' - Fracture, 20-30 deg, rough,	F	secondary crystallization in voids, poorly fossiliferous (casts/molds)	-
-107 <u>.2</u>	151.0		NR	undulating, black staining over 100% of surface, open 1/32"	Ė	No Recovery 149.6-151.0' 	R3: 4 minutes End of B-4 boring at 151.0' - below ground surface on
-	151.0			148.5' - Fracture, 40 deg, rough, undulating, 100% black staining, tight 148.55' - Fracture or mechanical break, rough, undulating, black staining over 100% of surface, tight 148.7, 148.8, 149.0' - Mechanical break or bedding plane (3), rough, undulating, tight to open 1/16" 149.15' - Fracture or mechanical break, horizontal, black stains on 80% surface, open 1/4"-1/2" 149.45' - Fracture or mechanical break, 40-50 deg, rough, undulating, tight 149.55' - Mechanical break or bedding plane, horizontal, rough, undulating, open 1/2"- 5/8"		Bottom of Boring at 151.0 ft bgs on 4/14/2007	below ground surface on 4/17/07



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04A	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLIN	IG METH	OD AND	EQUIPM	ENT : CME 550 S	/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 25.0 ft l	ogs on 6/	14/07	START : 6/12/2007 END : 6/13/2007 LOGGER : A. Teal
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H H H		RECOVE	=RY (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, 으 DEPTH OF CASING, DRILLING RATE,
F AC			<u> </u>	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	(N)	Solidate Prof., Solie Office Prof. Minitely 12501
42.0	0.0				Poorly Graded Sand Grading To Poorly Graded "Water level is based on Ground Water
-	1	1.3	SS-1	1-2-3	Sand With Silt (SP) 0.0-1.3' - light gray grading to dark yellowish orange, Monitoring at LNP site (FSAR Table 2.4.12.08)"
-	1, _			(5)	(N7 to 10YR 6/6), moist, no HCl reaction, trace to
-	1.5				\\\ 10-15% nonplastic fines, very fine to fine silica sand, \\ \/ -
-	-				\trace roots / _
-	1				
-	-				
_	-				
_	1				.
-	1				
5	5.0				
37.0				2.07	Silty Sand (SM) Sand in 5.0-5.3' may be pyrite 5.0-5.3' - black with orange staining, matrix is dark
		0.9	SS-2	3-6-7 (13)	从 yellowish orange, (10YR 6/6), wet, loose, no HCl
	6.5			,	reaction, predominantly coarse sand to 3/16", 20%
_					Clayey Sand (SC)
_	1				5.3-5.6' - dusky yellow green, (5GY 5/2), moist, no
-	1				HCI reaction, very fine to fine silica sand, 35% stiff clay with medium to high plasticity
-	1				Silt With Sand (ML)
-	1				5.6-5.9' - yellowish gray, (5Y 8/1), wet, nonplastic,
-	-				mild HCl reaction, 15-20% very fine sand-sized, carbonate material, trace fine to medium black Driller's Remark: change at 9.0'
	1				sand-like 5.0-5.3' (possibly pyrite)
10 32.0	10.0				Silt With Sand (ml) To Silty Sand (SM)
-	-		000	9-8-7	↑ 10.0-10.4' - grayish orange, (10YR 7/4), wet, medium / ₹ 1111
-	-	0.4	SS-3	(15)	\dense, very fine to fine grained, mild to moderate HCI / reaction, nonplastic fines, carbonate material, sample /
_	11.5				is 50% ML and 50% SM, trace black sand
-					
_					_
l _					
l _					
] [
Ι -] [
15	15.0				11
27.0					Silty Sand (SM)
-	1	1.0	SS-4	2-3-11	15.0-16.0' - yellowish gray, (5Y 8/1), with mottling and streaking, wet, nonplastic, mild to moderate HCl
-	16.5			(14)	reaction, 51% fine sand, trace fine gravel-sized
-	10.0				\(\text{(limestone) fragments, carbonate material}\) / - Driller's Remark: 10-15% circulation loss at
-	1				- 16.5'
-	1				
-	-				-
-	-				
-	-				
-	-				
20					
l					



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	B-04A	SHEET	2	OF	a	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 25.0 ft b	ogs on 6/	14/07 S	START : 6/12/2007 END : 6/13/2007 LOGGEI	R:	A. Teal
				STANDARD	SOIL DESCRIPTION	Т	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		7	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
A BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		의 DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FPT FNA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ı	INSTRUMENTATION
22.0	20.0			(N)	Silty Sand (SM)	╁	Blind drill to 20.0' after moving drill rig due to
-	20.0	0.7	SS-5	22-22-12	20.0-20.7' - pale yellowish gray, (5Y 8/1), wet, dense,	4	split spoon shoe lost in previous hole -
-	04.5	0.7	00-3	(34)	medium to coarse grained, mild HCl reaction, 45% / nonplastic fines, carbonate material	┨	Begin SPTs at 20.0'. Each of the following samples belong to the redrilled hole B-04A.
-	21.5					1	1
-						1	1
-						1	1
-						1	1
_						1	1
25	25.0					1	
17.0	25.5	0.4	SS-6	50/5.5 (50/5.5")	Silt (ML)	₽	Щ _
-					nonplastic, mild to moderate HCl reaction, trace to 10% fine to medium sand-sized material, streaks of	1	-
-					white in matrix and trace fine sand-sized green	┨	-
-					material, carbonate material	┨	-
-						┨	-
-						1	-
-						1	-
-						1	1
30	30.0					1	1
12.0				10.00	Silt With Sand (ML) _ 30.0-30.6' - grayish orange, (10YR 7/4), wet,		
_		0.6	SS-7	13-8-3 (11)	nonplastic, mild HCl reaction, up to 25% fine to	T	<u> </u>
_	31.5				coarse sand-sized material decreasing with depth,	4	-
-						4	-
-						4	-
-						┨	-
-						┨	-
-						\dagger	-
35	35.P					1	-
7.0	_ ਤਤ:₹	0.0	SS-8	50/1.5	No Recovery 35.0-35.1'	ŧ	Driller's Remark: some chatter at 35.0-36.0'
_				(50/1.5")		1	1
]	
_]	
_						1	
-						-	Driller's Remarks amouth at 29 0
-						-	Driller's Remark: smooth at 38.0'
-						+	-
						+	-
40						+	+



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04A	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

					·	ry, cameau, NVV 10us, 3-7/6			CAIENTATION : Vertical
WAIER	LEVELS	: 25.0 ft k	ogs on 6/1		START : 6/12/2007	END : 6/13/2007	LOGGE	⊀∶A. 【	
3021				STANDARD PENETRATION		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	COIL NAME		COLOR	SYMBOLIC LOG	DEDTH OF CACING DOWNING DATE
HU		RECOVE	RY (ft)		MOISTURE	E, USCS GROUP SYMBOL CONTENT, RELATIVE DE	I, COLOR, INSITY OR	ا ا	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FF/F			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MI		₩B	INSTRUMENTATION
SU				(N)					
2.0	40.4	0.4	SS-9	50/5	Silt With Sand	(ML)		Ш	Driller's Remark: 35.0-40.0' fairly hard
				(50/5")	plasticity mild to	e gray, (5Y 4/1), wet, nor moderate HCl reaction	20-25% very		1
-					fine sand, carbo	onate material	, _0 _0 /0 .0.,	1	1
-					•			1	1
-								1	
-								1	-
I -							-		
I _									_
							_		
45	45.0 45.2						•		1
-3.0	45.2	0.1	SS-10	50/2.5	Limestone Frag	gments	Γ		7
-				(50/2.5")	45.0-45.1' - oliv	e gray, (5Y 4/1), mild HC ragments and silt as in 40	I reaction, a	1	1
-					lew limestone ii	raginents and silt as in 40	5.0-40.4	1	1
-								1	-
-								1	-
-							-		-
I -							-		-
_									_
50	50.0								
-8.0				48-50-50/1	Silty Sand (SM)			Driller's Remark: drilling remains fairly hard
1 -		1.0	SS-11	(100/7")	50.0-51.0' - oliv	re gray mottled with light of 6/1), wet, very dense, fir	gray, (5Y 4/1	1111	1
-	51.1				grained, modera	ate HCI reaction, 30-40%	low plastic /		1
-					\fines, carbonate	e material		1	
-							-	ł	-
-							-		-
_									-
_									_
								1	
55	55.P								1
-13.0	55.1	0.1	SS-12)	50/1	Limestone Frag	gments	Ι	T	A few limestone fragments and silt
1 1				(50/1")	\ 55.0-55.1' - oliv	e gray, (5Y 4/1), mild to rone fragments	noderate HCI	1	1
-					roadion, iiiioda	one nagmente		1	1
-							-	1	1
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04A	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 25.0 ft b	ogs on 6/	14/07	TART : 6/12/2007 END :	6/13/2007	LOGGER	: A.	Teal
>				STANDARD PENETRATION TEST RESULTS	SOIL DESC	CRIPTION		93	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GRO	UP SYMBOL. COLOR	₹.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH B		RECOVE		011 011 011	MOISTURE CONTENT, F CONSISTENCY, SOIL STR	RELATIVE DENSITY O	R	/BOL	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEP SUR ELE			#TYPE	6"-6"-6" (N)		OCTORE, MINERALO	G1	SYN	
-18.0	60.0	0.1	SS-13	50/1 (50/1")	Limestone Fragments 60.0-60.1' - olive gray, (5Y 4	/1) moderate HCI			Driller's Remark: 60.0-65.0' drilling slows and becomes much harder
				(50/1)	reaction, limestone fragmen	ts			and becomes mader narder
-	-						_		_
-	-						-		-
-	1						-		-
-	1						-		Driller's Remark: very hard at 63.0'
-	1						-		_
									_
65_	65.0	0.1	SS-14	50/1	□ Limestone Fragments				switch to rock coring, see rock core log
-23.0	65.1	0.1	(00 14)	(50/1")	Limestone Fragments 65.0-65.1' - Same as 60.0-6	0.1'	/ -		Switch to rock coming, see rock core log
-	-				Begin Rock Coring at 65.0 ft See the next sheet for the ro	t bgs ock core log	-		-
-	1					· ·	-		-
-	1						-		-
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70 <u> </u>	1						-		
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PROJECT NUMBER:

338884.FL

B-04A

SHEET 5 OF 9

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER LEVELS: 25.0 ft bgs on 6/14/07 START: 6/12/2007 END: 6/13/2007 LOGGER: A.	Tool
	l Edi
DISCONTINUITIES (n LITHOLOG	GY COMMENTS
DISCONTINUITIES LITHOLOGY ON A CHARACTERIS ON	OLOD.
DESCRIPTION ON A CHARACTERIS	SIZE AND DEPTH OF CASING,
MINERALOGY, TE SECOND DEPTH, TYPE, ORIENTATION, ROUGHNESS, DEPTH, TYPE, ORIENTATION,	ARDNESS, PLUID LOSS, CORING RATE AND SMOOTHNESS CAVING BOD
도본교 포인정 그 우교 PLANARITY, INFILLING MATERIAL AND 볼 AND ROCK M	IASS DDODE TEST DESILITS ETC
-23.0 65.0 Limestone - 65.0-65.4' - pale yellow	Installed HW casing to 4/15h brown, 65.0'
65.7, 65.85, 66.2' - Fractures (3), <10 deg, (10 YR 6/2), medium gr	
rough, undulating, open 3/16" moderate HCl reaction.	
3 66.25-66.7' - Fracture, vertical, rough, (R1), voids (up to 1/8")	
undulating, changing to 30 deg over last 1" surface, trace casts/ca	
R1-NQ from 66.6-66.7', open 1/8" 3/8"x1/4"), poorly fossil	
- 5 ft 19 66.9' - Fracture zone 65.4-66.9' - light olive g	
HCI reaction, very wea	
NR - to R2), voids (up to 3/1	6") over 30% very soft (silt lense) -
of surface, trace linear	
(1/16"x1/16"), poorly fo	R1: 10 minutes
70 70.0 No Recovery 66.9-70.0	' 1
70 70.0 -28.0 Limestone	Driller's Remark:
- 70 0-70 6' - light olive o	
strong HCl reaction, mo	edium strong NQ lodged in core barrel,
(R3), voids (1/16") over	
- surface, trace spherica	
casts/cavities (3/8"), pa	artial infill with (14:38) -66.9', trace Driller's Remark: unable to
R2-NQ material similar to 65.4	
12% 12%	barrel
NR NR No Recovery 70.6-75.0	י
1 1 1 1	
│	
	R2: 6 minutes
75 75.0	
-33.0 75.0-75.4' - Fracture zone Limestone	
- >10 - 75.0-79.2' - moderate y	
75.8-76.0, 76.0-76.2' - Fractures (2), 60 deg, - brown, (10YR 5/4), mile	
very weak to weak (R1 77.95-78.05' is extreme	
76.6-76.7' - Fracture, 45 deg, smooth, very weak (R0 to R1),	
R3-NQ undulating, tight 1/8") over 20% of surfa	
5 ft 51 >10	l '
77.5° - Mechanical break 77.7' - Fracture, horizontal, rough, undulating, soft (R0) carbonate at	a I
open soit (No) carbonate at 1	17.00 chat down for day
/1.85-78.05 - Fracture Zone	6/14/07 water level at 25.0'
78.05-78.8' - Fracture, vertical, smooth,	R3: 6 minutes
undulating, open 1/8" NR 78.8' - Fracture, <5 deg, rough, undulating,	· -
80_80.0 onen 3/8"	
-38.0 80.1' - Fracture no discerning orientation Limestone	Driller's Remark: "stiff" run
80.0-84.7' - Same as 7 except moderate HCl ru	
extremely weak to wea	
2 81.25' - Fracture, 30 deg, rough, undulating, 4 at 82.9-83.5', trace cas	
open 81.5' - Mechanical break to 3/4"x9/16")	· ·
R4-NQ 04 F 92 4! Freeture or machanical break	
5 ft 67 1 81.5-82.4 - Fracture or mechanical break, 94% vertical and terminating at 60 deg, rough,	1 1
undulating, tight	
00 El Machaniael breek	1
82.9-83.1' - Fracture zone	
82.9-83.1' - Fracture zone 83.35-83.5' - Fracture zone	R4: 5 minutes
82.9-83.1' - Fracture zone 83.35-83.5' - Fracture zone 0 83.8-84.0' - Fracture zone	1
82.9-83.1' - Fracture zone 83.35-83.5' - Fracture zone	-



PROJECT NUMBER: BORING NUMBER: 338884.FL **B-04A** SHEET 6 OF 9

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) $DRILLING\ CONTRACTOR: Universal\ Engineering\ Sciences,\ Gainesville,\ FL;\ Driller:\ G.\ Davis;\ Cathead\ Operator:\ A.\ Turner\ Contractor:\

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION: Vertical WATER LEVELS: 25.0 ft bgs on 6/14/07 START: 6/12/2007 END: 6/13/2007 LOGGER: A. Teal LITHOLOGY DISCONTINUITIES COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -43.0 Limestone >10 85.0-86.35' - Same as 75.0-79.2' 85.0-85.5' - Fracture zone except cavities (1-3/16"x3/8") at 86.3' 85.7' - Fracture, horizontal, rough, undulating, over 50% of surface 86.35-87.65' - yellowish gray, (5Y 1 SC-1 collected at 86.35-86.2-86.3' - Fracture, 30 deg, rough, 7/2), fine grained, moderate HCI 87 4' undulating, open R5-NQ reaction, medium strong (R3), trace Driller's Remark: 87.0-87.5' 41 2 87.35-87.55' - Fracture, 60 deg, smooth, voids (up to 1/16"), trace cavities soft 5 ft 78% (5/16"x1/16") stepped, tight Fat Clay (CH) 88.25-88.35' - Fracture, 30 deg, rough, 3 87.65-87.8 undulating, open Limestone 88.35-88.9' - Fracture, vertical, smooth, R5: 6 minutes 87.8-88.9' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, undulating, tight NR 88.7' - Fracture, horizontal, rough, undulating, 90 90.0 very weak to weak (R1 to R2), trace -48 0 Driller's Remark: 89.0-90.0' voids (up to 1/16"), <2% casts (up to 90.0-90.2' - Fracture zone >10 soft 1/4"x1/4") 90.5-90.95' - Fracture zone No Recovery 88.9-90.0' SC-2 collected at 90.9-90.0-91.9' - yellowish gray, (5Y 7/2), 91.8' 1 fine to medium grained, very strong HCl reaction, very weak (R1), voids 91.8' - Fracture, horizontal, rough, undulating, R6-NO (up to 3/16") over 15-20% of surface, open 25 5 ft 38% trace spherical casts and cavities (up to 3/8") No Recovery 91.9-95.0' NR R6: 3 minutes 95 95.0 -53.0 Limestone 95.0-100.0' - very pale orange to yellowish brown, (10YR 8/2 to 10YR 3 95.4' - Bedding plane, horizontal, smooth, planar, tight 95.65-95.8' - Fracture, 30 deg, smooth, 6/2), fine to medium grained, strong undulating, open 4 HCl reaction, very weak to weak (R1 96.05' - Fractures (2), <30 deg, smooth, to R2), voids (up to 3/16") over undulating, open 15-20% of surface, no visible cavities R7-NQ >10 except 98.0-98.6' 10% casts/cavities 5 ft 61 96.4' - Fracture, 25 deg, smooth, stepped, (up to 1"x3/8"), poorly fossiliferous, black (organic) laminae at 97.9' 100% tight 96.6-96.7' - Fractures (2), horizontal, smooth, undulating, open 97.0-97.7' - Fracture zone (8), 0-30 deg, 1 rough, undulating, open R7: 5 minutes 1 98.35, 98.45' - Fractures (2), <10 deg, rough, 100 100.0 undulating, tight -58.0 99.55' - Bedding plane, horizontal, rough, 100.0-100.55' - Same as 95.0-100.0' undulating, tight 100.2, 100.4' - Fractures (2), horizontal, >10 100.55-103.4' - very pale orange, (10YR 8/2), fine to medium grained, strong HCl reaction, very weak to smooth, undulating, open 100.55, 100.9' 2 weak (R1 to R2), trace voids (up to 101.4, 101.85, 102.35, 102.55, 102.7, 102.9' -1/16"), no visible casts/cavities Fractures (6), horizontal, smooth, undulating, R8-NC 26 5 open 5 ft 68% 102.95-103.15' - Fracture zone, black 2 staining over 75% of surface No Recovery 103.4-105.0' R8: 4 minutes NR 105 105.0



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-04A

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

				TENT . CIVIE 350 3/N 160073, HILL TOTALLY, NO TOOLS, NV			ORIENTATION : Vertical
WATER	LEVELS: 25.	0 ft bo	gs on (6/14/07 START : 6/12/2007 END : 6	3/13/200	7 LOGGER : A. Teal	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
BELOW CE AND TION (ft)	CUN, 1, AND ERY (%	(%)	JRES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBO	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-63.0 - -			>10	105.2-106.15' - Fracture zone or bedding plane, horizontal, smooth, undulating, open	井	Limestone 105.0-107.5' - very pale orange, (10YR 8/2), fine to medium grained,	-
-	DO NO		>10	106.15-106.4' - Fracture zone 106.5, 106.7, 106.95, 107.0, 107.05, 107.3, 107.4' - Bedding plane (7), horizontal,	Ħ	strong HCl reaction, very weak to weak (R1 to R2), trace voids (up to 1/16"), no visible casts/cavities	-
-	R9-NQ 5 ft 50%	0	5	smooth, planar to undulating, open		No Recovery 107.5-110.0'	_ _
- -			NR		Ħ	- -	R9: 3 minutes
	110.0				崮	_	-
-68. 0 -			NA			Carbonate Silts And Sands (SP-SM) 110.0-111.4' - yellowish gray to light	Unclear if material is cuttings or very poorly indurated rock that was
-	D.O.V.		NA	111.65, 111.95' - Fractures (2), <10 deg,		olive gray, (5Y 7/2 to 5Y 5/2), very strong HCI reaction, grades from 60% silt-sized particles to 40%	destroyed by drilling action
- -	R10-NQ 5 ft 74%	12		rough, undulating, open (small rock fragments associated with fracture) 112.5' - Mechanical break 112.8-113.3' - Fracture zone, possibly due to		sand-sized particles to 80% medium sand-sized particles and 20% silt-sized	-
-			>10	casts/cavities	井	Limestone 111.4-113.7' - very pale orange, (10YR 8/2), fine to medium grained, extremely weak to weak (R0 to R2),	R10: 3 minutes
- 115 -73.0	115.0		NR	115.0-115.2' - Fracture zone	日	- 111.4-112.0' no visible voids or cavities, at 112.0-113.7' voids (up to 3/16") over 15-20% of surface, 10%	-
-			>10	115.2-115.4' - Bedding plane (3), horizontal, smooth, planar, open 115.55, 115.75, 115.95' - Fractures (3),		- casts/cavities (up to 9/16"x3/4") No Recovery 113.7-115.0' Limestone	-
-	R11-NQ		1	horizontal, rough, undulating, open 116.55' - Fracture, <10 deg, rough, undulating, open	H	 115.0-116.8' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), medium to coarse grained, strong 	Driller's Remark: 116.5- 120.0' very soft
_	5 ft 36%	11			Ħ	HCl reaction, very weak (R1), voids over 30-60% of surface (as spaces between fossil fragments; almost	- -
			NR			 "coquina" appearance), trace cavities (up to 3/8"x5-7/8"), highly fossiliferous No Recovery 116.8-120.0' 	R11: 3 minutes
120 -78.0	120.0				\parallel	No Recovery 120.0-125.0'	Driller's Remark: no
-					H	- -	recovery 6/14/07 -
-	R12-NQ					-	
-	5 ft 0%	0	NR			-	-
-						-	R12: 2 minutes
125	125.0				挕	-	-



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	B-04A	CHEET	8 OF 9

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 25	.0 ft bo	gs on (6/14/07 START : 6/12/2007 END : 6	/13/20	07 LOGGER : A. Teal							
				DISCONTINUITIES		LITHOLOGY	COMMENTS						
AND AND (f)	74N 74ND 74ND		ES	DESCRIPTION	J S	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,						
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.						
-83.0				125.0-125.9' - Fracture zone	Т	Limestone							
-			>10		ፗ	- 125.0-125.35' - Same as 115.0-116.8'	-						
1]					」	125.35-125.6' - yellowish gray, (5Y 7/2), fine grained, strong HCl							
					\perp	reaction, very weak (R1), trace voids							
-	R13-NQ 5 ft	0				(up to 1/16"), no visible cavities - 125.6-125.9' - Same as 115.0-116.8'							
_	18%	ŭ	NR		+	No Recovery 125.9-130.0'	_						
_					F	-							
-					Ħ	-	to 128.5'						
					Ħ	-	R13: 4 minutes						
130 <u> </u>	130.0			-	+	Carbonate Silts And Sands (SM)	possible alluvial/fluvial						
-			NA		-	 130.0-131.6' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), loose, 	deposit -						
-					1	strong HCl reaction, fine to medium	-						
_			NA		-111	grained sands Limestone	-						
_	R14-NQ		>10	131.85-132.25' - Mechanical break 132.0-132.9' - Fracture, vertical, rough,	+	131.6-132.8' - yellowish gray, (5Y							
_	5 ft 56%	0	710	undulating, open	F	 7/2), strong HCl reaction, extremely weak to weak (R0 to R2), voids (up 							
										132.25-132.5' - Fracture zone 133.2, 133.3, 133.4' - Fractures (3), <10 deg,		to 1/16") over 5-10% of surface and increasing with depth, no visible	
_			NR	rough, undulating, healed	F	casts except 133.55-133.8' 20-30%							
-						casts (up to 1-3/4"x1") No Recovery 132.8-135.0'	R14: 5 minutes						
135	135.0			_	1111		Dibli-60						
-93. 0 -			NA			Carbonate Silts And Sands (SM) - 135.0-136.35' - Same as	Possible cuttings or infill						
_					4	130.0-131.6'	_						
_			>10	136.35-136.7' - Fracture zone	-	- Limestone	-						
-	R15-NQ			136.95' - Fracture or mechanical break,	士	136.35-137.6' - yellowish gray, (5Y 7/2), fine grained, strong HCl	-						
_	5 ft 52%	10	1	horizontal, smooth, planar 137.05' - Fracture, horizontal, rough,	\pm	reaction, medium strong (R3), no visible voids or cavities except 10%	-						
-	32/0			undulating	+	voids at 137.4' and 137.6'	-						
_			NR		+	- No Recovery 137.6-140.0'							
_					F	-	R15: 26 minutes						
	140.0				F								
-98.0			NA			Carbonate Silts And Sands (SM) - 140.0-141.5' - Same as 130.0-131.6'	Possible cuttings or infill						
-			11/7			except grades from 60% fines to fine							
-			NA	444 F 444 OL Freehurs	111	sand at top to 80% medium sand and 20% fines at bottom	<u> </u>						
-	D46 NO		>10	141.5-141.9' - Fracture zone 141.9-142.6' - Fracture, vertical, rough,	井	Limestone	_						
-	R16-NQ 5 ft	0	>10	undulating, open 142.35' - Fracture, horizontal, rough,	廿	141.5-142.9' - yellowish gray, (5Y 7/2), fine to medium grained, strong	-						
-	58%			undulating, open	世	HCl reaction, very weak (R1), trace voids (up to 1/16"), no visible cavities	-						
-				142.45' - Fracture, horizontal, rough, undulating, open	\bot	No Recovery 142.9-145.0'	-						
-			NR	142.6-142.9' - Fracture zone	$+$ \square	-	R16: 4 minutes						
145	145.0				F	-	-						
175	1 70.0				T								
1					1								



PROJECT NUMBER:

33884.FL

B-04A

SHEET 9 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

DISCONTINUITIES DESCRIPTION DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, PITILING MATERIAL AND POLYMENS, PITILING PITILING MATERIAL AND POLYMENS, PITILING P
145.95' - Mechanical break 145.95' - Mechanical break 146.5, 146.75, 147.2, 147.85, 147.95' - Fractures (5), horizontal, rough, undulating, open 147.6-147.8' - Mechanical break, extremely weak section 148.15, 148.15' - Fracture, vertical, rough, undulating, open 149.05' - Bedding plane, smooth, planar to undulating, open 149.45' - Bedding plane, smooth, planar to undulating, open 149.8' - Be
-103.0 -104.5.9 i- Mechanical break
and the state of t



PROJECT NUMBER:

338884.FL

B-05

SHEET 1 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ary, auto nammer, AVVJ rous,			ORIENTATION : Vertical
WATER	LEVELS	: 4.0 ft b	us on 5/8/		START : 5/7/2007	END : 5/9/2007	LUGGE	<u>:K : N.</u>	Jarzyniecki COMMENTS
≥¤≎				STANDARD PENETRATION		SOIL DESCRIPTION		- 8	COIVIIVIEN 15
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOII NAN	ME, USCS GROUP SYMBOL	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
A B B B B B B B B B B B B B B B B B B B		RECOVE	ERY (ft)			E CONTENT, RELATIVE DE		Ω	DRILLING FLUID LOSS, TESTS, AND
F 문유명			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, MI	NERALOGY	Ĭ,	INSTRUMENTATION
<u> 古</u>				(N)	Doorly Credo	d Cand (CD)		S	
42.9	0.0			1-2-1	Poorly Grade 0.0-1.0' - light	t gray, (N7), dry to moist, v	erv loose.		_
l _		1.5	SS-1	(3)	very fine silica	a sand, trace nonplastic fine	es, trace very		_
	1.5					lack particles, roots	/		
-					Silty Sand Wi	ith Organics (SM) ky yellowish brown grading	to dark	T]
-					\ vellowish brow	vn, (10YR 2/2 to 10YR 4/2)), moist, very	1	1
-					loose, very find nonplastic org	ne to fine grained, silica sar	nd, 15-20%	1	1
-					monplastic org	gariic iiries		1	-
-								1	-
-								-	-
-								4	-
5 37.9	5.0				Doorly Crade	d Cand With Cilt (CD CM)		16.17	_
37.9				5-6-4		ed Sand With Silt (SP-SM) e with dark yellowish orang		411	
_		1.1	SS-2	(10)	yellowish brow	vn staining, (N9, with 10YR	8 6/6 and	111	_
_	6.5				10YR 6/2), we	et, loose, very fine to fine graph and the g	rained, silica black coarse	T^{-}]
_						aterial (pyrite), trace roots	pidon oddioo /	_	
_								1	1
_								1	1
-								1	-
-								1	-
								1	-
10 32.9	10.0				Silty Sand (SI	M\		111	-
-		1	00.0	3-3-3	10.0-11.3' - pa	alé yellowish brown, (10YR		-111	-
-		1.3	SS-3	(6)		ne to fine grained, silica sar es, trace very fine sand-siz		4111	-
-	11.5				particles	es, trace very fille saffu-sizi	eu black		-
_					ų			1	_
_								_	_
_								_	
-								1	
-								1]
-								1]
15	15.0							1	<u>-</u>
27.9	13.0				Silty Sand (SI	M)	_	111	-
-		1.1	SS-4	3-2-2	15.0-16.1' - Sa	ame as 10.0-11.3' except v	ery loose	1	
-		'.'	33-4	(4)				411	-
-	16.5	-						-	-
_								4	
-								4]
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PROJECT NUMBER:

33884.FL

B-05

SHEET 2 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ary, auto nammer, AVVJ 100) . NI	ORIENTATION : Vertical
WATER	LEVELS	: 4.0 ft b	us on 5/8/		START : 5/7/2007	END: 5/9/2007 SOIL DESCRIPTION	LUGGER	C: IN.	Jarzyniecki COMMENTS
ŞQ⊋	044.5.		1 (6)	STANDARD PENETRATION		SOIL DESCRIPTION		90	CONTINIEN 19
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBO	OL COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B ATIC		RECOVE	ERY (ft)		MOISTURE	E CONTENT, RELATIVE [DENSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
LEV LEV			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE,	MINERALOGY	3YM	INSTRUMENTATION
22.9	20.0			(14)	Sandy Fat Cla	av (CH)		77	
-	20.0	1 1 1	SS-5	2-3-4	20.0-21.4' - lig	iht greénish gray, (5GY 8	8/1), wet, stiff, -		-
-		1.4	33-3	(7)		, no dilatancy, no HCl rea ark yellowish orange (10			-
-	21.5				\[\] white very fine	e silica sand, 5-10% very	fine sand-sized [-	///	-
_						s, scattered pockets of maite particles throughout,			-
_					size	inc particles throughout,	up to 1/0 iii		_
_							-		_
_							-		_
_							-		_
_							-]
25	25.0								_
17.9				F 0.5	Silty Sand (SN 25.0-25.7' - ve	M) ellowish gray, (5Y 7/2), w	et loose verv -		
		0.7	SS-6	5-6-5 (11)	\rightarrow fine fine gra	ained, silica sand, 15-20°	% nonplastic /		
	26.5			(,	\fines, trace ve	ry fine sand-sized black	particles /		
							_		1
							_	1	1
-							-	1	1
-							-	1	1
-							-	1	1
30	30.0						-	1	1
12.9	00.0					Vith Sand (GM)		٠Ţ	1
-		1.0	SS-7	1-3-3	30.0-30.95' - y medium plastic	ellowish gray, (5Y 8/1), city, rapid dilatancy, no l	wet, stiff, low to - HCl reaction		1
-	31.5			(6)	gray staining a	and laminated appearant	ce, 50% of	Ī	1
-	01.0					to coarse gravel-sized r stone appearance, also		1	1
-						d conglomerate	nas appearance	l	1
-									-
-							-		-
-							-		-
-							-		-
							-		-
35 7.9	35.0				Sand With Sil	It (SP-SM)		1110	
		1,		4-6-5	35.0-36.15' - y	ellowish gray, (5Y 7/2),	wet, medium -		-
-		1.2	SS-8	(11)	dense, very fir	ne to fine grained, no HC ce medium dark gray (N	I reaction, silica	甜	-
-	36.5				nonplastic fine		+, mouning, 1070 /-		-
-									-
-							-		-
_							-		-
_							-		-
-							-		_
_							-		_
40								Ш	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-05

SHEET 3 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 4.0 ft bo	gs on 5/8/	07 5	START : 5/7/2007 END : 5/9/2007 LOGGER : N. Jarzyniecki
				STANDARD	SOIL DESCRIPTION COMMENTS
A PICON	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	O DEPTH OF CACING PRIMING PATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
2.9	40.0			(1.1)	Elastic Silt And Fat Clay (CH) Driller's Remark: Loss of circulation after
-		1.5	SS-9	1-2-2 (4)	40.0-41.5' - grayish olive green, (5GY 3/2), wet, soft, high plasticity, no dilatancy, materials are layered in
-	41.5			(4)	an irregular way giving a mottled appearance,
-					predominantly clay, mottled with another clay and silt, clay is olive gray (5Y 3/2), high plastic, no dilatancy,
					no HCl reaction, silt is yellowish gray (5Y 8/1), low to
_					reaction
_					
_					. .
-					
45 -2.1	45.0				Poorly Graded Sand With Silt (SP-SM)
		1.3	SS-10	3-5-5	45.0-46.3' - pale yellowish brown with medium dark - [부분]
-	40.5	1.3	33-10	(10)	gray staining, (10YR 6/2 with N4 staining), wet, loose, very fine to fine grained, no HCl reaction, silica sand,
-	46.5				10-15% nonplastic fines, 1/2" lens of grayish olive green (5G 3/2) fat clay (CH), trace very fine to coarse
-					sand-sized pyrite fragments
-	-				†
-					1
-]				1
]
50	50.0				
-7.1				1-2-3	Sandy Lean Clay (CL) 50.0-51.5' - greenish gray and grayish olive green,
-	-	1.5	SS-11	(5)	(5GY 6/1 and 5GY 3/Ž), wet, stiff, high plasticity, no dilatancy, no HCl reaction, 40% very fine to fine silica
-	51.5				¬ sand, seams and pockets of other materials scattered ┌────
-	_				\throughout less than 10% of sample, yellowish gray \((5Y 7/2) \) sandy seam, pocket of medium sand-sized \(\)
-					white particles, pockets of silty material
-					† †
-	-				1 1
-	1				11
55	55.0				11
-12.1				4.4.0	Poorly Graded Sand With Clay (SP-SC) 55.0-56.5' - greenish gray and grayish olive green,
_		1.5	SS-12	1-1-2 (3)	(5GY 6/1 and 5GY 3/2), wet, stiff, no to mild HCI
-	56.5				reaction, no white particles, lenses of grayish green (5G 5/2) fat clay (CH) similar to 40.0-41.5' materials,
-					\begin{pmatrix} \text{possible organic lens, lenses of other materials are} \ / \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-	-				1078 of sumple, sumple has motified appearance
-	-				
-	-				-
-	1				
60	-				



PROJECT NUMBER:

33884.FL

B-05

SHEET 4 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						END : 5/0/200			. NI	ORIENTATION : Vertical
WATER	LEVELS	. 4.U IL DO	gs on 5/8/		START : 5/7/2007	END : 5/9/200 SOIL DESCRIPTIO		JOEK :		Jarzyniecki COMMENTS
≥ 9€	CAMPIT	INTERVA	I /#\	STANDARD PENETRATION		JOIL DECORAL TIO	• •	\dashv	90.	COMMENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE		` ,	TEST RESULTS	SOIL NAM	ME, USCS GROUP SYN	MBOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE	<u> </u>		MOISTURI	E CONTENT, RELATIV	'E DENSITY OR		BOL	DRILLING FLUID LOSS, TESTS, AND
SUR!			#TYPE	6"-6"-6" (N)	CONSISTEN	ICY, SOIL STRUCTUR	E, MINERALOGY		SYM	INSTRUMENTATION
<u>-17.1</u>	60.0			(14)	Silty Sand (SI	VI)		+	Π	
-	00.0	1.5	SS-13	0-1-2	60.0-61.5' - ve	llowish gray, (5Y 7/2)	, wet, very loose,	- 1	Ш	-
-		1.5	33-13	(3)	no HCl reactio	n, silica sands, 30% sand-sized black par	nonplastic fines, rticles		\mathbb{H}	-
-	61.5				udoc very mic	Saria Sizea biack pai			Ш	-
_								4		_
_								4		_
_										_
								1		
65	65.0							1		_
-22.1	00.0				Clayey Sand ((SC)				-
-		1.5	SS-14	2-1-3	65.0-66.5' - ye	llowish gray, (5Y 7/2) n, with trace gray sta	, wet, very loose,	1		1
-	00 F		00	(4)	fine silica sand	ds, 35% medium plas	tic fines	1		-
-	66.5					·		-f	ZZZ	-
-										-
-										-
-								4		-
_								4		_
_										_
70	7 8.9									
-27.1		0.0	SS-15	50/1	No Recovery	70.0-70.1'		$\neg \top$		18:42 Water level 5.0' below ground surface,
				(50/1")				- 1		last SPT on 5/7/07
-								1		1
_								- 1		Driller's Remark: 70-71.5' hard material,
-								- 1		maybe rock layer, soft easy Driller's Remark: - Drilling with intermittent light chatter, switch
-								-		to newer tricone roller Driller's Remark: Drill
-								-		bit 2-7/8" in diameter -
-								-		-
-								4		-
_								4		
75	75.0		00.45	50/6 05	<u> </u>				\perp	
-32.1	75.3	0.3	SS-16	50/3.25 (50/3.25")	Limestone Fra	agments llowish gray, light oliv	e grav and	計	\dashv	5/8/07, 07:45 Water level 4.0' below ground surface, 4" HW casing installed to 70' below -
_				(00/0.20)	\ moderate gray	/, (5Y 7/2, 5Y 8/8, and	d N5), mild HCl			ground surface
						lar and subangular 1/	/4" to 3/4" sized			Driller's Remark: rock fragments are caving into bottom of borehole, advanced 4" HW
-					\fragments			J 1		casing to 75' below ground surface
-								- 1		_
-								- 1		
-								- 1		
-								\dashv		-
-								- 1		-
-								4		-
80								\dashv		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-05	SHEET	5	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ary, auto nammer, Avvj rous				ORIENTATION : Vertical
WATER	LEVELS	: 4.U ft b	gs on 5/8/		START : 5/7/2007	END: 5/9/2007	LOGG	EK:	N.	Jarzyniecki COMMENTS
30₽				STANDARD PENETRATION		SOIL DESCRIPTION		\dashv	ဗ္ဗ	COIVIIVIEIV15
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOI	COLOR		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H H H H H		RECOVE	ERY (ft)		MOISTURI	E CONTENT, RELATIVE DE	ENSITY OR		SOL	DRILLING FLUID LOSS, TESTS, AND
FF.F.			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, M	INERALOGY		YMB.	INSTRUMENTATION
				(N)				4	Ś	
-37.1 - - -	80.0		(SS-17)	50/2 (50/2")	reaction, 15% recovery Begin Rock Co	eenish gray, (5GY 6/1), m voids/casts on surface, vo oring at 81.0 ft bgs	ery poor			Driller's Remark: Advanced 4" HW casing to 78.6' below ground surface, switch to NQ wireline coring assembly
-					See the next s	sheet for the rock core log		-		- - -
- 85										
-42.1 - -										- -
-								-		- -
-								1		- - -
90 -47.1								4		- -
-								1		-
-								-		- -
-								1		
95 -52.1								4		- -
-								1		
-								-		_
-								-		- -
100								1		
100								十		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-05	SHEET	6	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	INE I HOD AI	ND EC	JUIPIV	MENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5	/8/07 START : 5/7/2007 END : 5/	9/200	7 LOGGER : N. Jarzyniecki	
	_			DISCONTINUITIES	T	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		·	DESCRIPTION	SYMBOLIC LOG		
D'IIEL O'N'E	₹ _A ₹	_	FRACTURES PER FOOT	DESCRIPTION	_ C	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A S S	ΣĘ∄	Q D (%)	28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OL I	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FR	NG NG NG NG NG NG NG NG NG NG NG NG NG N	Ωζ	R P	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SCI	잉필盟	R	유민	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	81.0				t	Limestone	First core run on 5/8/07
I -			1		┲	81.0-85.3' - light olive gray, (5Y 5/2),	-
				81.7' - Bedding plane, rough, undulating,	╨	moderate HCl reaction, weak to	_
				organic material (brownish black) covering	\top	medium strong (R2 to R3),	
_			2	80% surface, open 5/8"		 spheroidal voids up to 25% surface 	-
_				82.3' - Bedding plane or mechanical break,	┵	(<1/16") in size, moderately	-
	R1-NQ		4	horizontal, rough, undulating, open up to 1"	\vdash	fossiliferous (casts, molds, up to 3/8"), trace irregularity shaped	
	5 ft 100%	90	1	82.6' - Fracture, 80 deg, rough, undulating, tight	┰┷	cavities 25% infilled with very fine	1
-	100 /0			83.6' - Bedding plane, horizontal, rough,	┨	grain yellowish gray (5Y 7/2)	-
_			3	undulating, tight	╆	material, trace to 7% organics,	_
85			-	84.3' - Fracture, 25 deg, rough, undulating,	H	brownish black (5YR 2/1) lamination	
-42.1				fossil casts/molds on fracture surface	oxdot	at 81.7', 83.6' and 84.2' and short (1"	R1: 9 minutes
-			0	84.8' - Bedding plane, horizontal, rough,	╁┈	long), discontinuous lamination	-
-	86.0			undulating, 1" thick, tight	┵	85.3-86.0' - Same as 81.0-85.3'	1
			_	84.9' - Fracture, vertical, rough, undulating, grayish, staining 10% surface, tight		except yellowish gray, (5Y 8/1), strong HCl reaction, medium strong	Driller's Remark: 86.5' <5%
1 7			2	85.3' - Mechanical break	\perp	to strong (R3 to R4), 5-10% voids	circulation loss, regained at - 87'
-				86.1' - Mechanical break	₩	(<1/16"), very fine grain interval	"
-			2	86.3' - Fracture, 80-90 deg, rough,	╁┼	_ 86.0-87.1' - yellowish gray, (5Y 8/1),	
			-	undulating, gray staining over 15-20%		very fine to fine grained, strong HCl	
-	R2-NQ		0	surface, tight	┺	reaction, medium strong (R3), trace	1
-	5 ft	30		86.85' - Bedding plane, horizontal, smooth,	+ -	voids (1/16"), organics rich carbonate	-
I _	42%			planar, 1/4" carbonate silt infill, tight		silt bed (1/4" thick) - 87.1-88.1' - Same as 86.0-87.1'	<u>_</u>
				87.1' - Bedding plane, horizontal, rough, undulating, open 1"		except very weak (R1), moderately	
00			NR	87.75' - Fracture, 10-15 deg, rough,	1	fossiliferous (casts, shells, molds),	1
90 <u> </u>				undulating, tight	+-	10-15% fine to medium grained sized	R2: 8 minutes
-47.1				aa		_ medium dark gray (N4) particles in	R2. 6 Illillutes
	91.0				\vdash	rock matrix, 20-25% elongated and	
_					1	spherical shaped void/casts (<1/16),	1
-			0		╨	yellowish gray discoloration on 30-40% of material	-
I _					┢	- No Recovery 88.1-91.0'	<u>_</u>
						Limestone	
_			0	•	oxdot	91.0-95.9' - yellowish gray, (5Y 8/1),	1
-	D2 NO				╁	 medium grained, strong HCl 	-
_	R3-NQ 5 ft	98	1	93.1' - Fracture or mechanical break, 20 deg,	┵	reaction, very weak to weak (R1 to	
	98%			rough, undulating, tight		R2), highly fossiliferous (casts,	
]				93.5' - Mechanical break	П	 molds) fossils up to 1/2" in size, voids (<1/16") up to 25% surface, 	1
-			0		₩	trace micro (<1/16" thick) lamination	-
95				_	╁ा	— - brownish black in color - from	1_, , , , _
-52.1			0			91.0-92.0' and 93.5-99.0', trace	R3: 4 minutes
1 7	06.0		ا ا		╨	spherical cavities up to 3/8" partially	1
-	96.0		NR/		+	 filled with black very soft fine material 	-
			0	96.2' - Mechanical break, horizontal, rough,		(organics), medium gray (N5) fine]
				undulating, open 1/2"	Ш	grain particles in rock matrix, powder/chalk like texture to rock	
1 7					+	No Recovery 95.9-96.0'	1
-			2		亡	Limestone	-
				97.65' - Bedding plane or mechanical break,	Щ	96.0-104.0' - Same as 91.0- 95.9'	_
	R4-NQ			horizontal, rough, undulating, tight	\vdash	except large 1-1/4" cavity at 96.6',	
]	5 ft 100%	90	1	97.8' - Bedding plane or mechanical break, horizontal, rough, undulating, brownish black		80% filled with carbonate silt, light	SC1-collected at 98.5-99.6'
-	100%		\vdash	(organic) covering <50-60% surface, open	仜	olive gray (5Y 6/1) from 96.2-96.8'	-
			1	1/16"	\vdash	and 97.3-98.7', organics also appears up to 1" long <1/32" thick	
100				98.0' - Fracture or mechanical break,	\vdash	appears up to 1" long <1/32" thick Laminations at 96.3' and 97.3'	
-57.1				horizontal, rough, undulating, tight	\Box	L Idiffiliations at 50.5 and 51.5	R4: 6 minutes
-			1	98.5' - Mechanical break	+	-	-
	101.0				世		
1							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-05	SHEET	7	OF	10	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

		10 -	<u> </u>	TEINT: CIVIE 33 3/14 3 10023, Midd Totally, MQ tools, MVV C	uog		ONLINIATION: Vertical
WATER	LEVELS: 4.0	ft bgs	on 5		9/200		,
≥∩ ⊙	. (6			DISCONTINUITIES	ي ا	LITHOLOGY	COMMENTS
N AN E	- ZN SD SD		ES.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
불병은	RUH H. H.	(%) Q	JUR JOT	DEDTH TYPE OPIENTATION POLICINISCO	1 월 [MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	RE J	0	4CT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	a Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				99.6' - Fracture, 10-15 deg, rough,	ш	Limestone	
-			0	undulating, tight	\vdash	 101.0-105.0' - yellowish gray, (5Y 	1 -
_				101.2' - Mechanical break, horizontal, rough,	Н	8/1), strong HCl reaction, very weak	
l _			2	planar, <1/16 gap 102.2' - Fracture, 45 deg, rough, undulating,	ш	to weak (R1 to R2), over all powder/chalk-like feel, 15-20%	_
			_	tight	Н	voids/casts, highly fossiliferous	
	R5-NQ			102.6' - Mechanical break or bedding plane,		(forams and foram casts), 10% fine	1
-	5 ft 80%	36	>10	rough, undulating, open up to 1/2" 103.05, 103.15, 103.25, 103.3, 103.35,	Н	 grain medium dark gray, (N4) particles (probably pyrite), yellowish 	1 1
-	00 /6			103.45, 103.5, 103.6, 103.7, 103.8, 104.0,	ш	gray (5Y 7/8) staining from	1
-			8	104.1, 104.2, 104.25, 104.35, 104.5, 104.6,	Н	 101.0-103.0', voids tend to be 	-
105				104.7' - Bedding plane or mechanical break		concentrated in a horizontal	l —
-62.1			NR	(18), smooth and planar to smooth and undulating, open 1/16"	Н	orientation No Recovery 105.0-106.0'	R5: 8 minutes
	106.0		INEX	and and any open in to	Ш	1.0 1.000 1019 100.0-100.0	1
I -				106.1' - Mechanical break, horizontal, rough,	\mathbb{H}	Limestone	1 1
-			>10	undulating, open 1/8"	Ш	- 106.0-107.0' - yellowish gray, (5Y	1 1
-				106.3-106.45' - Fracture zone, 1"-1-3/8" sized	ш	8/1), very fine grained, strong HCl reaction, very weak to weak (R1 to] -
-			2	rock fragments 106.5' - Fracture, 80 deg, smooth, planar,	ш	- R2), stained light gray (N7) over 40%	1 4
l _				<1/22" organics on surface, tight	Н	of entire sample, highly fossiliferous	<u> </u>
	R6-NQ		2	106.9' - Fracture, 50 deg, rough, undulating,	Н	(forams and foram casts,	
_	5 ft 90%	56	2	tight	Ш	 echinoderms), 20-25% fine grained pyrite in rock matrix, gradational with 	1
_	55,3			107.4' - Fracture or mechanical break, horizontal, rough, undulating, tight	\Box	107.0-110.5'	1 1
			2	107.8' - Fracture, 50-60 deg, rough,	口	- 107.0-110.5' - Same as 106.0-107.0'	-
110_ -67.1				undulating, tight	++	except fine grained, molds and casts up to 1/32"-3/8"	R6: 5 minutes
-07.1			1	108.3' - Fracture or bedding plane, 15-20 deg, rough, undulating, open 1/8"	ш	· =	No. 5 minutes
I _	111.0		NR	108.65-108.8' - Fracture zone	H	No Recovery 110.5-111.0']
I			.40	109.1' - Fracture, 10-15 deg, rough,	ဓ	Limestone	1
			>10	undulating, tight 109.4' - Fracture, 80-90 deg, rough,	$\vdash \vdash$	 111.0-115.4' - yellowish gray, (5Y 7/2), medium to coarse grained, 	1
-				undulating, open 1/2"	Ш	strong HCl reaction, weak (R2),	1 1
-			1	110.1' - Fracture, 60-65 deg, rough,	\Box	- becoming mottled moderate yellow	SC-2 collected at 112.5-
-	D7 NO			undulating, tight	口	(5Y 7/6) with depth, voids rare to absent except from 115.0-115.4'	113.6'
_	R7-NQ 5 ft	79	1	110.0-111.25' - Fracture zone 111.35' - Mechanical break, 50 deg, rough,	Н	- where voids <1/16" cover 1-3% of]
	88%	. 0		undulating, tight	Ш	rock surface, cavities rare (3/16" in	
I -				111.75' - Fracture, 50 deg, rough, undulating,	Н	diameter), rare echinoderms, fossil	1
115			2	tight 112.5' - Fracture or mechanical break, 5-10		 voids/casts rare to absent, thick bedded except from 115.3-115.4' 	1 1
-72.1			0	deg, rough, undulating, tight	Н	which is laminated, fine grained	R7: 4 minutes
-			NR	113.6' - Fracture, 50 deg, rough, undulating,	口	- (sharp contact with overlying	1 -
-	116.0		1417	tight 114.4' - Fracture, 0-5 deg, rough, undulating,	$\vdash\vdash$	massive bedded limestone No Recovery 115.4-116.0'] -
_			3	tight	Ш	Limestone]
				114.8, 114.9' - Mechanical break or fractures	Ш	116.0-120.5' - yellowish gray, (5Y	
				(2), horizontal, rough, planar	Ш	7/2), medium to coarse grained, very	1
-			2	115.0' - Mechanical break, 30 deg, rough, undulating	\square	weak to weak (R1 to R2), except from 116.1-116.15' which is very fine	1 1
-	R8-NQ			116.1' - Bedding plane, 0-5 deg, rough,	Ш	grained and medium strong rock	1
-	5 ft	76	2	undulating, open 1/8", fine infilling	łП	(R3), voids (<1/16") over 5% or less	-
-	90%			116.25-116.35' - Fracture zone 116.7' - Fracture or mechanical break,	旪	of rock surface, some cavities up to 3/16" over 1-2% of rock surface to]
			2	horizontal, rough, planar, 1/8" open	口	120.4', fossils (molds/casts) rare to	
120			4	117.2' - Fracture, 20-25 deg, rough.	Н	absent, rare echinoderms, some	1
-77.1			0	undulating, open up to 1/8"	囯	lithoclast (1"-1-1/2" long) from	R8: 7 minutes
-	404.0		NR		H	_ 120.0-120.5', cavities common from 120.4-120.5'	-
	121.0		1417		Ħ		-

APPENDIX 2BB-426 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-05	SHEET	8	OF	10	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 4.0	ft bgs	on 5/	/8/07 START : 5/7/2007 END : 5/9	9/200 ⁻	7 LOGGER : N. Jarzyniecki	
≥∩≘	(%)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_	0.32		3	117.5' - Fracture or mechanical break, horizontal, rough, undulating, tight to 1/2" - open		No Recovery 120.5-121.0' - Limestone 121.0-123.4' - yellowish gray, (5Y	Water level 10.8' below ground surface in outer (4"HW) casing, 3.8' below
-	50.110		1	118.65' - Fracture or mechanical break, horizontal, rough, undulating, tight - 118.85' - Fracture, 20-25 deg, rough, undulating, tight		8/1), medium to coarse grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over 5-10% of rock surface, cavities	ground surface in borehole (uncased) –
-	R9-NQ 5 ft 100%	77	4	undulating, tight 119.45' - Fracture, 35-40 deg, rough, undulating, tight 119.95' - Fracture, 20 deg, rough, undulating,		common (up to 3/8"-3/4"), fossiliferous (echinoderms) and casts/molds, some areas where rock	- -
- 125_ -82.1			2	tight		is fine-grained and stronger (R2-R3), some rip-up clasts/intraclasts especially at 121.3-121.5'	R9: Runtime not recorded
-	126.0		0 >10	or mechanical break (4), horizontal, rough, undulating, open 1/8" 122.5' - Fracture, 40 deg, rough, undulating, tight		 123.4-126.0' - yellowish gray, (5Y 8/1), very fine to fine grained, alternating beds several inches thick, voids (<1/16") over 1-3% of rock 	- -
-			2	123.4' - Fracture, 5-10 deg, rough, undulating, open <1/16" 123.55, 123.75, 123.95' - Bedding plane or mechanical break (3), horizontal, rough,		surface, some cavities up to 3/4" (especially at 124.7-124.9'), fossils (molds/casts) rare to absent 126.0-127.8' - Same as 123.4-126.0'	- -
-	R10-NQ 5 ft 92%	52	1	planar, tight 124.3' - Bedding plane or mechanical break, horizontal, rough, undulating, tight		except rare fossil echinoids 127.8-128.5' - yellowish gray, (5Y 8/1), medium grained, strong HCl	- -
130_			2	124.95' - Bedding plane or mechanical break, horizontal, smooth, planar, tight 125.9' - Mechanical break, 50 deg, rough, undulating —		reaction, very weak (R1), voids (<1/16") over 5% or less of rock surface, cavities rare to absent (<3/16" in diameter), fossil	
-87. 1 -	131.0		1 NR	126.0-127.0' - Mechanical break, horizontal, smooth, planar, multiple breaks along bedding planes, tight		molds/casts rare, some laminations 128.5-130.6' - yellowish gray, (5Y 8/1), fine to medium grained, strong	R10: Runtime not recorded
-			3	127.55 - Fracture or mechanical break, 0-5 deg, rough, planar, tight 128.5' - Bedding plane, horizontal, rough,		HCl reaction, voids (<1/16") over 3-5% of rock surface, some cavities up to 3/8"-3/4" in diameter (typically	First core run on 5/9/07, water level at 4.1' below ground surface Driller's Remark: NQ core
-	R11-NQ		>10	undulating, tight 129.2' - Fracture or mechanical break, horizontal, open up to 1" 129.7' - Bedding plane or mechanical break,		elongated), fossiliferous (molds/casts and rare echinoids), very rare (<1/16") dark gray argillaceous grains	barrel has snapped in two pieces SC-3 collected at 131.85-
-	5 ft 50%	23		horizontal, rough, planar, tight to 1/4" gap 130.15' - Fracture, 70-75 deg, rough, undulating, tight 131.15, 131.4' - Bedding plane or mechanical		No Recovery 130.6-131.0' Limestone 131.0-132.6' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak	132.6'
135_ -92.1 -	136.0		NR	break (2), horizontal, smooth, planar, tight to — open 1/16" 131.85' - Bedding plane, horizontal, rough,		to weak (R1 to R2), powder/chalk-like feel, highly fossiliferous (forams), voids/casts (<1/6") over 10-15% of surface.	R11: 23 minutes
_			3	undulating, tight, 3/4" sized exposed medium light gray (N6) filled voids on surface 132.6' - Fracture zone, angular fragments of rock		(\$\frac{1716}{}\) over \$10-15\% of surface, 15-20\% cavities infilled with medium light gray (\$\frac{1}{100}\) fine grained mineral with stong HCl reaction, cavities are	
- -			3	136.1, 136.05' - Bedding plane or mechanical break (2), horizontal, rough, undulating, 1/8" open		irregularly shaped to spherical and range in size from 3/16"- 1-3/8", horizontal aligned fossil (casts/shells)	
-	R12-NQ 5 ft 84%	66	0	136.3' - Fracture, 60 deg, rough, undulating, tight 137.1' - Fracture, 45 deg, rough, undulating,		and gray cavities, bedding/discontinuity at 131.65'	-
140 <u>-</u> -97.1			1	centimeter spaced parallel fracture 137.3' - Bedding plane, horizontal, rough, undulating, light olive gray hard mineralization over 38% surface, 1/32" thick,		-	- R12: 15 minutes
-	141.0		NR	tight -			-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-05	SHEET	9	OF	10	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 4.0) ft has	s on 5	/8/07 START : 5/7/2007 END : 5/9	9/20	07	LOGGER : N. Jarzyniecki	
				DISCONTINUITIES		Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	99	r	ROCK TYPE, COLOR,	
표원인	A'A'N	(%	NE		SYMBOLIC		MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA -	RE F	(%) □ i	ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	ABC A		WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCIE	SHE	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI		CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				137.35' - Mechanical break, 40-50 deg,	П	T	Limestone	
_			3	rough, planar, tight 137.65' - Bedding plane or mechanical break,	╁	十	132.6-133.5' - medium light gray to medium gray, (N6 to N5), very fine	1
-				horizontal, rough, undulating, exposed molds	F	7	grained, strong HCl reaction,	1
-			1	on surface, open 5/8"	Ľ		medium strong to strong (R3 to R4),	-
-	R13-NQ			138.5' - Mechanical break 139.25' - Fracture, 40 deg, rough, undulating,	₽	+	trace voids/casts (<1/16"), poorly fossiliferous (1" molds), very fine	-
_	5 ft	50	3	tight -	ш	1	grain pyrite grains in rock matrix	-
_	94%			140.1' - Mechanical break, horizontal, rough,	╁	╁	(5-7%), 10-15% cavities from 1/8" to	1
_			3	undulating, tight 141.25' - Mechanical break or bedding plane, -	F	1	1" in size, oval in shape unfilled to partially filled with a yellowish gray	
145_				horizontal, rough, planar, tight	H	L	(5Y 7/2) very fine grained material	
-102.1			2	141.65' - Fracture, vertical, rough, undulating, brown staining over surface (100%), <1/32" -	Н	Ł	that is 40-45% voids <1/16" No Recovery 133.5-136.0'	R13: 11 minutes
	146.0		NR	infill over 98% surface	П	1	Limestone	1
				141.75' - Fracture or mechanical break, horizontal, rough, undulating, tight	Н	╁	136.0-137.5' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2),]
_			3	142.5' - Fracture or mechanical break,	F	7	strong HCl reaction, medium strong	1
-				horizontal, rough, undulating, tight	Ľ	士	to strong (R3 to R4), thin bedded	1
-			4	143.3, 143.5' - Fractures or mechanical break (2), 5-10 deg, rough, undulating, tight	₽	╁	alternating with very fine grained rock with medium grain-sized particles in	1
-	R14-NQ			143.85' - Fracture or mechanical break, 0-5	╆	⇟	the laminated (<1/16") beds	SC-4 collected at 147.8-
_	5 ft	60	1	deg, rough, undulating, tight 144.45' - Fracture or mechanical break,	H	╁	137.5-140.2' - yellowish gray, (5Y 7/2), fine to medium grained, strong	148.7'
-	96%			horizontal, rough, undulating, tight	F	₽	HCl reaction, very weak (R1), 7-10%	-
_			2	144.6' - Bedding plane or mechanical break,		╁	coarse grain-sized flat angular fossil	-
150_				horizontal, rough, undulating, 1/8" open 144.8' - Bedding plane or mechanical break, —	₽	╄	fragments horizontally aligned, - 15-25% medium to coarse	
-107.1			2	horizontal, rough, undulating, 1/16" open	П	1	grain-sized medium dark gray (N4),	R14: 8 minutes
_	151.0		NR	144.9, 144.95' - Mechanical break (2), rough, ☐ undulating, open <1/16" ☐	Ь	┸	subrounded particles also horizontally aligned, highly	
_				145.1, 145.35' - Bedding plane (2), 0-5 deg,			fossiliferous, trace voids (<3/16"),	
				rough, undulating, wavy bed of organics,		П	sharp discontinuity at 139.5'	
				100% surface coverage with brownish black organics -		Г	No Recovery 140.2-141.0' Limestone	1
_				146.5' - Bedding plane, 15-20 deg, rough,		Г	141.0-142.6' - yellowish gray, (5Y	1
-				undulating	1	Г	8/1), very fine to medium grained, strong HCl reaction, very weak (R1),	1
_				tight	1	r	texture coarsening with depth to	1
-				146.8' - Fracture, 70 deg, rough, undulating, - black stains over 100% surface , tight	1	ŀ	sharp contact at 142.6', interval of	1
-				147.0' - Bedding plane or mechanical break,	1	F	moderate yellow brown and light brown (5Y 7/6 and 5Y 5/6) fine to	
-				horizontal, rough, undulating, tight	1	\vdash	medium grained rounded grains,	-
-				147.3' - Bedding plane or mechanical break,	-	F	powder to chalk-like texture 142.6-145.0' - Same as 141.0-142.6'	-
_				147.5' - Fracture, 60 deg, rough, undulating,	-	F	except light olive gray, (5Y 5/2),	-
_				black staining 80-90% surface, tight	1	F	moderate to strong HCl reaction,	1
_				147.8' - Fracture, 15-20 deg, rough, undulating, tight -	1	L	medium strong (R3), voids 10-15% (<1/16") spheroidal trace elongated]
I _				148.7' - Fracture or mechanical break,		L	cavities 3/16"x1/16"	
				horizontal, rough, undulating, tight 149.25' - Fracture, 40 deg, rough, undulating,		L	145.0-145.7' - Same as 141.0-142.6' except yellowish gray, (5Y 8/1), very	
I -				tight to 1/8" open		ľ	weak to weak (R1 to R2), 25-30%]
				149.45' - Fracture, 10-15 deg, rough, planar, tight		T	olive black (5Y 2/1) laminations No Recovery 145.7-146.0']
				150.3' - Fracture or mechanical break,	1	T	Limestone	1
_				horizontal, rough, undulating, hard mineral	1	t	146.0-146.5' - Same as 145.0-145.7'	1
-				infill covering 30-40% surface 1/16' thick, open 1/8"	1	H	-	-
-				150.6' - Fracture or mechanical break,	1	F		
-				horizontal, smooth, planar, open 1/16"	┨	+		-

APPENDIX 2BB-428 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-05	SHEET	10	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATERI	LEVELS: 4.0) ft bgs	on 5/	8/07 START : 5/7/2007	END : 5/9	/200	7 LOGGER : N. Jarzyniecki	
>000	(9			DISCONTINUITIES		G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASINO
ᆱᇬ은	RUF H. A	(%) Q	IUR 1	DEPTH, TYPE, ORIENTATION, ROUG	HNESS)LIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
TAY A	NGT COO:	οD	ACT R F	PLANARITY, INFILLING MATERIAL	AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
BS급	잉크핆	8	띪	THICKNESS, SURFACE STAINING, AND	TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
							Limestone	
-					-		- 146.5-150.8' - yellowish gray, (5Y 8/1), very fine to medium grained,	<u> </u>
-					-		strong HCl reaction, very weak (R1),	-
-					-		 highly fossiliferous (molds, forams, 	-
-					_		fragments), sharp contact between medium grained limestone above	_
					_		 and fine grained limestone below at 	_
							150.0', from 149.0-150.0' casts/ fossil	_
							fragments give the rock interval gritty/friable texture, very fine grained	
							weak rock (R2) from 150.0-150.8'	
1 7							No Recovery 150.8-151.0'	
					=		- Bottom of Boring at 151.0 ft bgs on 5/9/2007	
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PROJECT NUMBER:	BORING NUMBER:					
338884 FI	B-06	SHEET	1	OF	a	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						y, auto riammer, AVVJ 10			. D. I	ORIENTATION : Vertical
WAIER	LEVELS	: 4.4 ft bo	is on 4/26		START : 4/24/2007	END: 4/26/2007 SOIL DESCRIPTION	LOGO	∍EK :	. B. l	COMMENTS
≷Q∉	CANADIT	INTERVA	1 (6)	STANDARD PENETRATION		JOIL DESCRIPTION		\dashv	8	GOIVIIVILINIG
ELC ON (SAMPLE			TEST RESULTS	SOIL NAME	E, USCS GROUP SYMB	OL. COLOR.		일	DEPTH OF CASING, DRILLING RATE,
ATI B		RECOVE	_ ` `		MOISTURE	CONTENT, RELATIVE	DENSITY OR		BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE,	MINERALOGY		SYMBOLIC LOG	INSTRUMENTATION
42.5	0.0			(14)	- Topsoil			_	11,	16:51 Begin drilling, sample SS-1 taken; first
-	0.0	1.0	SS-1	0-1-2	\0.0-0.2'			/ ╂		6"=weight of hammer -
-		1.0	33-1	(3)	Poorly Graded	Sand (SP) rownish gray, (5YR 6/	1) maint van	7		-
_	1.5				l loose, very fine	to fine grained, silica	sand with	/-		-
_					\medium dark gr	ray (N4) mottling, trace	of nonplastic	/ 4		4
_					tines, roots and	organics decreasing v	vitn deptn	[∫] .		_
_								4		
_										
								1		
5	5.0							1		
37.5					Clayey Sand (S	SC)	-4.41. !			4/25/07, 07:38 Begin drilling to 5' using
-		1.1	SS-2	4-4-4	5.0-6.1' - greeni	isń gray, (5G 6/1), moi grained, no HCl react	st to wet, loose,	1		tricone bit – 07:40: SS-2 taken
-	6.5			(8)	□ 20% low plastic	city fines, trace very fin	e sand-sized	/ *	<i>ZZ</i> 4	- 17.40. GG 2 taken
-	0.5				black particles			/ ┨		1
-								1		-
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_								4		4
10	10.0				0:11 0 1 (011)			_	LTT.	-7.40.00.01.1
32.5				3-3-4	Silty Sand (SM) 10.0-11.25' - lig) ht olive gray to greenis	sh grav. (5Y 6/1	4		07:48: SS-3 taken
_		1.3	SS-3	(7)	to 5GY 6/1), we	et, loose, very fine to fir	ne grained, no	1		
l _	11.5					lica sand, 15% low pla black particles, trace o		/-		
_					(uddo vory mio s	sidor particios, traco o	igainoo	′		
_								J		
								1		1
								1	J	1
1 -								1		1
15	15.0							1		1
27.5	13.0				Silty Sand (SM))		+	Ш	SS-4 is less plastic than SS-3
-		1.5	SS-4	4-4-4	15.0-16.5' - ligh	t olive gray to light gra	y, (5Y 6/1 to	1		-
-	40.5		55 4	(8)		, very fine to fine grain sand, 30% low plasticit		+		
1 -	16.5					sized black particles		\mathcal{A}	ш	-
-								\dashv		
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-06	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

					·	ry, auto nammer, Avvo rous, s			ORIENTATION: Vertical
WATER	LEVELS	: 4.4 ft b	gs on 4/2	6/07 S	START : 4/24/2007	END : 4/26/2007	LOGGE	R : B. ■	
≥∩≎				STANDARD		SOIL DESCRIPTION		၂ ဗွ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOII NAM	IE, USCS GROUP SYMBOL,	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BE ACE		RECOVE	ERY (ft)		MOISTURE	E CONTENT, RELATIVE DEN	ISITY OR	30LI	DRILLING FLUID LOSS, TESTS, AND
THE THE			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE, MIN	IERALOGY	YMB	INSTRUMENTATION
30 E				(N)	01 0 1"	00)		Ś	
22.5	20.0			2-5-4	Clayey Sand (\$ 20.0-21.0' - vel	ຣິ ເ) llowish gray to light gray, (5	5Y 8/1 to N7)		_
l _		1.2	SS-5	(9)	moist, loose, h	igh plasticity, no dilatancy,	no HCl		
	21.5			(-,	reaction, 28%				
-					Fat Clay (CH)	ht bluish gray, (5G 7/1), mo	niet etiff high	1	
-	1				plasticity, no di	ilatancy, no HCl reaction), ott, ottii, riigii	1	_
-	1							1	-
-							-	1	-
-							-	1	-
-							-	┨	-
-							-		-
25 <u> </u>	25.0				Oleveri C. 1."	60)		////	_
17.5				1-2-2	Clayey Sand (9 25.0-26.4' - yel	SC) llowish gray, (5Y 8/1), wet,	very loose.		_
l _		1.4	SS-6	(4)	very fine to fine	e grained, no HCl reaction,	25%		_
_	26.5			. ,	medium plastio	city fines, increasing to 40%	% by 26.2',		
					Silica Sariu				
_							- -	1	
-	1						-	1	_
-	1						-	1	-
-							-	1	-
-	1						-	┨	-
-	-						-	1	-
30 <u> </u>	30.0				Silty Sand (SN	A \		717	_
12.5 -				2-2-2		ayish orange, (10YR 7/4), v	vet, very		=
-		1.5	SS-7	(4)		e to fine grained, no HCl re	action, 20%	7777	_
_	31.5				Organic Soil (icity fines, silica sand		2222	_
_						ve black, (5Y 2/1), wet, sof	t, high		
					\ plasticity, no to	slow dilatancy, no HCl rea	action,		
					gravel-sized fra	ne grained silica sand, whi agment at 30.9', medium g	rained		
-					(J. 2. 2. 3.233 H	- J		1	1
-							-	1	
-							-	1	-
	25.0						-	1	-
35 7.5	35.0				Clayey Sand (SC)		1//	\vdash
-		1.5	SS-8	2-3-1	35.0-36.5' - oliv	ve black with grayish orang	je mottling,		-
-		1.5	აა-8	(4)	(5Y 2/1 with 10	OYR 7/4), wet, very loose, vo o HCl reaction, 12% low to	rery fine to	V ///	-
_	36.5				plasticity fines.	, silica sand, some organic	fines /		_
-					,			1	_
-							-	1	_
I -									
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<u></u>									



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-06

SHEET 3 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER LEVELS: 4.4 ft bgs on 4/26/07 START: 4/24/2007 END: 4/26/2007 LOGGER: B. Ellis									
WATER	LEVELS	: 4.4 ft b	gs on 4/26	5/07	START : 4/24/2007	END : 4/26/2007	LOGGEF	(∶B.	
≥∩≎				STANDARD PENETRATION		SOIL DESCRIPTION ME, USCS GROUP SYMBOL, COLO		စ္က	COMMENTS
ANI (SAMPLE INTERVAL (ft)			TEST RESULTS	COU NAM		COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
A B B B B B B B B B B B B B B B B B B B	RECOVERY (ft)		ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR		ISITY OR		
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MIN	ERALOGY	YME	INSTRUMENTATION
<u> </u>				(N)	01 0 1/6	20)		Ś	
2.5	40.0			2-1-2	Clayey Sand (\$ 40.0-41.5' - Sa	me as 35.0-36.0' except no	HCI -		_
l _		1.5	SS-9	(3)	reaction, 16% f	fines, silica sand, varies in	irregular		_
l _	41.5			` ,	beds throughou	ut			
-							_	1	_
_							-	1	_
-							-		-
-							-		-
,	45.0						-		-
45 -2.5	45.0				Silt (ML)				-
		1 4	00 40	1-2-1	45.0-46.1' - bla	ack mottled with moderate y		$\ \ $	-
-		1.1	SS-10	(3)	brown (5Y 2/1 i	mottled with 10YR 5/4), we dilatancy, no HCl reaction,	t, soft, trace to 10% /=	Ш	-
-	46.5				very fine to fine	e grained, silica sand	-		-
-									_
_							-		_
_							_		_
_							_		_
l _							_		
50	50.0								
-7.5					Fat Clay (CH)				_
-		1.5	SS-11	0-1-1 (2)		ame as 45.0-46.1' except p tht olive gray and moderate		\prod	_
_	51.5			(2)	_ \brown, (10Y 6/2	2 mottled with 5Y 5/2 and 1	0YR 5/4), _	Щ	_
-	01.0				├─ \wet, soft, high p Silty Sand (SM	plasticity, no dilatancy, no l	HCI reaction		-
-					50.45-51.3' - m	יוי) noderate yellowish brown, (י	10YR 5/4),	1	-
-					\\wet. verv loose	e, very fine to fine grained, r	no HCI		-
-					Fat Clay (CH)	sand, 20-25% low plasticity	y fines		=
-					51.3-51.5 - Sa	me as 50.0-50.45' except in	nterbedded -		-
-						rith silty sand (SM)			-
-							-		-
55 <u> </u>	55.0				Cilé (BAL)				_
-12.5		, _		34-44-50/4.5	Silt (ML) 55.0-56.3' - mo	oderate yellowish brown, (10	0YR 5/4)		_
_		1.3	SS-12	(94/10.5")	moist, hard, lov	w plasticity, rapid dilatancy,	moderate		_
_	56.4				HCl reaction, 5 trace organics,	5-10% fine to medium sand	grained,	Ш	
					\adda digarilda,	a Jan Donato			
							_		
-							-		_
-							_		7
-							-		09:28: Setting casing to 59' (1" stick up 60'
60							-		casing) -
- 00_									



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-06	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ry, auto nammer, Avvj rous			ORIENTATION : Vertical
WATER	LEVELS	: 4.4 ft b	gs on 4/26		START : 4/24/2007	END: 4/26/2007 SOIL DESCRIPTION	LOGGE	<u>Κ∶Β.</u>	Ellis COMMENTS
≥ 0€				STANDARD PENETRATION		SOIL DESCRIPTION		8	COIVIIVIENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOII NAM	IE, USCS GROUP SYMBOI	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BI ACE		RECOVE	ERY (ft)		MOISTURE	E CONTENT, RELATIVE DE	ENSITY OR	30	DRILLING FLUID LOSS, TESTS, AND
EPT URF LEV			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE, M	INERALOGY	₹	INSTRUMENTATION
	60.8	0.2	SS-13	(N) 50/4	→ Silt (ML)			JIII	10:48 Slight chatter while drilling
-17.5	60.6	<u> </u>	00-10	(50/4")	∖ 60.0-60.2' - Sa	me as 55.0-56.3' except	light olive	-	10.40 Slight Chatter while drilling
_					\brown, (5Y 5/6), moderate to strong HC	I reaction /	4	_
_								1	
_								1	11:03 Bringing up SS-13
								╛	
								1	
-								1]
-								1	1
65	65.0							1	-
-22.5	65.4	0.2	SS-14	50/4.5	_ Limestone Fra	agments		士	 11:22 Bringing up SS-14
-	- 55.1			(50/4.5")	├-\ 65.0-65.2' - du	sky yellow, (5Y 6/4), mild	HCI reaction,	┨	11:41 Switching to core barrel
-					√friable	oring at 65.5 ft bgs	/	-	-
-					See the next s	heet for the rock core log		-	-
-								-	-
_								4	_
_								4	_
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_								⅃	
70 <u> </u>							_	J	
-27.5									
								1	
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-								┨	-
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75 <u> </u>							_	4	-
-52.5								4	_
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1 7								1]
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80								1]
50_								1	



WATER LEVELS: 4.4 ft bgs on 4/26/07

PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-06	SHEET	5	OF	9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

START: 4/24/2007

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

LOGGER : B. Ellis COMMENTS

ORIENTATION: Vertical

>00	(9			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
ANC (#	74N 0% 78D		ES	DESCRIPTION	SLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	65.5 R1-NQ	^		65.5-65.7' - Bedding plane, horizontal,	H	Silt (ML)	Water level at 0.0 below
	1 ft 66.5 100%	0	2	bedding change 65.8' - Fracture, 60 deg, rough, undulating	H	-\65.5-65.7' - very fine grained, some \organics	ground surface (at - surface); tooling in hole
			0	66.2' - Mechanical break	F	Limestone	13:30 Coring R1-NQ
_			Ľ		F	65.7-66.5' - yellowish gray, (5Y 7/2), very fine grained, no to moderate	13:45 Coring R2-NQ
_			4	67.5' - Mechanical break 67.9, 68.0, 68.2' - Bedding plane (3), <5 deg,	片	HCl reaction, weak (R2), voids up to 1/16" over 20% of surface, poorly	
_	50.110		-	rough, undulating, open up to 1/8"	世	fossiliferous, infill of yellowish gray	_
_	R2-NQ 5 ft	77	1	68.1' - Fracture, 85 deg, rough, undulating, open, no matching end	L	(5Y 8/1) over < 5%, infill has voids/fossils	_
-	84%			68.8' - Mechanical break	₽	Limestone 66.5-67.9 and 68.5-69.8' - Same as	_
70 <u> </u>			0	69.3' - Fracture, 60 deg, smooth, undulating 69.8' - Mechanical break —		- 65.7-66.5' except no silt, light olive	_
-			0	-	Ͳ	gray (5Y 5/2) from 67.9-68.5' voids up to 1/16" over 30% of surface,	-
-	71 5		NR	-	口	 fossiliferous (fossil casts up to 1"), 	-
-	71.5			-	仜	dissolution features up to 1/8", bedding feature of grayish orange	13:59 Coring R3-NQ
-			1	-	」	 (10YR 7/4) from 67.6-67.7' is fine grained, none to trace voids, fossils 	SC-1 collected at 71.5-
-				72.4' - Bedding plane, <5 deg, rough, undulating, with 0.4' of silt infill, very fine	┢	infill with light olive gray material	72.2'
_			0	72.2-72.6, has laminar organic layers within,	├	 69.8-70.7' - yellowish gray, (5Y 7/2), very fine grained, weak to medium 	
_	R3-NQ	00	4	up to 0.05' width 73.0' - Mechanical break	F	strong (R2 to R3), trace voids up to 1/16", poorly fossiliferous, no	
	5 ft 99%	63	1	73.6' - Bedding plane, <5 deg, rough,	Ħ	dissolution on surface	
75			1	undulating 73.9-74.0' - Mechanical break	H	No Recovery 70.7-71.5' Limestone	
-32.5			Ľ.	74.7' - Bedding plane, <5 deg, smooth to rough, undulating	片	71.5-72.2' - Same as 65.7-66.5'	
_			0	75.3, 75.8, 76.8' - Mechanical break (3)	Ľ	except discontinuous organic laminations over < 5% of surface up	
_	76.5		NR)	70.55 70.7 70.01 D 11' 1 (0) 15	世	to 1/8"x1/4", infill occurs over 20% of surface	14:20 Caring D4 NO
-			3	76.55, 76.7, 76.8' - Bedding plane (3), <5 deg, rough to smooth, undulating, <5%	L	_ 72.2-72.6' - very fine grained, has	14:20 Coring R4-NQ
-				organics on fracture surface 77.3' - Mechanical break	\vdash	laminar organic layers within, up to 1/2" width, dusky yellow (5Y 6/4) silt	-
-			4	77.85, 77.75' - Fractures (2), 10 deg, rough,	F	infill 72.6-74.9' - light olive gray to very	-
-	R4-NQ			undulating, fracturing associated with dissolution, open up to 1/2"	口	pale orange, (5Y 5/2 to 10YR 8/2),	-
-	5 ft 76%	31	>10	78.2' - Fracture, 85 deg, smooth, undulating,	世	very fine grained, trace voids up to 1/16", 73.4-73.9' silt infill yellowish	-
80	, 0,0		1	a fragment at 79.6' is missing 78.25' - Bedding plane, smooth to rough,	ш	gray to very pale orange mottled with very light gray (5Y 7/2 to 10YR 8/2	
-37.5			1	undulating, intersects 78.2' — 79.0' - Bedding plane, <5 deg, smooth to	世	mottled with N8), 73.9-74.9',	
			NR	rough, undulating, change in lithology, open	\perp	 73.9-74.9' has infill of very pale orange with 20% tiny voids, matrix 	1
	81.5			up to 1/4" - 79.05' - Fracture, 85 deg, rough, undulating,	Ь	has trace voids up to 1/16", poorly fossiliferous	
			1	open up to 1/8" 79.1-79.25' - Fracture zone, intersecting	厂	74.8-74.9' - moderate olive brown,	14:35 Begin R5-NQ
-				fractures	F	(5Y 4/4), bedding layer with organics of olive gray (5Y 3/2) <1/16" thick	
-			0	79.8' - Fractures, 65-70 deg, rough, undulating, intersecting fractures	F	-	_
-	DE NO			80.2' - Mechanical break 81.5-81.7' - Fracture zone	Ħ	-	_
-	R5-NQ 5 ft	80	1	82.7' - Mechanical break	Ħ	-	SC-2 collected at 82.7- 83.7'
	92%			83.6' - Fracture, 10 deg, rough, undulating, fracturing associated with dissolution, open	世	-	-
-42.5			0	up to 1/2" — 84.0' - Mechanical break	片	-	-
-				07.0 - IVICUIALIICAI DICAN	\vdash		_

END: 4/26/2007

APPENDIX 2BB-434 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-06	SHEET	6	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS: 4.4	ft bgs	s on 4/	26/07 START : 4/24/2007 END : 4/	26/20	07 LOGGER : B. Ellis	
≷ D ≎	(%)			DISCONTINUITIES	ပ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
AACE	E. R.U.	(%)	T.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Į,	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE	ΩD	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	೧⊒ಜ	œ	∐۵		S		
_			1	84.2, 85.7' - Mechanical break (2)		74.9-76.45' - yellowish gray, (5Y 7/2), - organic laminations (discontinuous)	_
-	86.5		NR		₽	through <5% of surface up to	
l -			0	00.051 B 11' 1 1 1 1 1	ш	1/2"x1/4" and infill occurs over 20% of surface, tiny voids up to 1/16" over	15:10 Begin R6-NQ
_				86.95' - Bedding plane or mechanical break, <5 deg, smooth, undulating		20% surface, highly fossiliferous,	_
_			1	87.3' - Mechanical break	Н	casts and molds up to 1/2"x1", tiny voids decrease to 10% of surface at	_
_			'			75.7'.	
	R6-NQ 5 ft	100	1			No Recovery 76.45-76.5' Limestone	
	100%	100	'	89.0' - Mechanical break	\vdash	76.5-81.5' - weak to extremely strong	
90			4	89.15' - Bedding plane or mechanical break, <5 deg, rough, undulating	Ш	(R2 to R6), 76.5-76.7' and 77.5-79.95' same as in R3-NQ from	
-47.5			1	89.7' - Mechanical break	Т	72.6-74.9 except from 77.5- 78.65	
_]			90.4' - Bedding plane, <5 deg, rough, undulating, open up to 1/8"	Н	has tiny voids on 5-10% of surface, 2"x1" cavities over <5% of surface.	1
_	91.5		0	undulating, open up to 170	H	76.7-77.5' same as 77.5-77.95'	_
-	1			91.0, 91.7, 95.8' - Mechanical break (3)	Ħ	except no cavities/fossil molds, moderate yellowish brown (10YR	15:28 Drill R7-NQ
_			10	92.2' - Fracture, 60 deg, rough, undulating	Ľ	5/4);	1
-				92.4' - Mechanical break	╨	79.0-80.3' same as 76.7-77.0' except from 79.1-80.0' has up to 1/16" voids	-
-			3	92.7' - Fracture, 60 deg, rough, undulating, multiple missing pieces, intersecting fractures	П	over 10% of surface, extremely	-
-	R7-NQ			93.0' - Fracture, 80 deg, rough, undulating		strong at 78.9' No Recovery 80.3-81.5'	
-	5 ft 95%	42	1	93.8' - Bedding plane, <5 deg, silt infill of yellowish gray color (5Y 7/2), milimeters thick	╁	Limestone	-
95	- 00%			organic layers (discontinuous), thickness of	\vdash	81.5-86.1' - Same as 65.7-66.5'	
-52. 5			1	infill is 93.5'-94.3' —	Ħ	except weak to medium strong (R2 to R3), voids over 30% of surface,	_
-				95.3' - Fracture, 60 deg, rough, undulating	╁	fossils up to 1/2"x1/4" (casts), infill of light gray (N7) over 5%, infill is very	-
-	96.5		0		\vdash	fine grained, trace voids up to 1/16",	-
-	90.5		NR	96.65, 96.7' - Bedding plane (2), <5 deg,	ш	 trace cavities features up to 1/8", infill is approximately medium strong rock 	16:09 Drill R8-NQ
-			2	smooth, stepped, open up to 1/8"	\perp	(R3), except 81.5'-81.8' is extremely	-
-	1				╁	- weak to very weak rock (R0-R1)	-
-	1		0	98.05' - Mechanical break	F	No Recovery 86.1-86.5' Limestone	-
-	R8-NQ			23.23	岸	86.5-91.5' - 86.5-90.0' dusky yellow,	-
-	5 ft	95	1	98.9, 100.5' - Bedding plane or mechanical	\vdash	(5Y 6/4), 86.5-88.0' light gray (N7) to very pale orange (10YR 8/2), very	SC-3 collected at 98.05-
100	100%			break (2), <5 deg, rough, undulating 99.0' - Mechanical break	╀	- fine grained, 30% tiny voids up to 1/16", fossiliferous, fossil casts up to	98.9'
100_ -57.5	1		0	99.9' - Mechanical break	仜	1/16 , lossillerous, lossil casts up to 1/4", trace very fine grained organics,	
-	1			100 6' Machanical brook	士	infill is up to 10% light gray (N7)	-
-	 		1	100.6' - Mechanical break	+	material voids, no visible fossils 89.4-89.6' bedding features up to	-
-	101.5			101 6' Padding plane of day amouth	厈	1/4", and olive gray (5Y 3/2), thin wavy laminations,	16:10 Begin R9-NQ
-	-		1	101.6' - Bedding plane, <5 deg, smooth, undulating	片	90.0-91.5' yellowish gray (5Y 7/2),	-
-	1			102.5' - Fracture, 70 deg, smooth, undulating	世	mottled with light olive gray (5Y 5/2),	-
-	-		2	102.55' - Mechanical break	F	very fine grained, voids from 0-10% (decreasing with depth) up to 1/16",	-
-	R9-NQ			103.35' - Bedding plane, 15 deg, smooth,	仜	trace fossil casts up to 1/4", weak to	-
-	5 ft	95	0	undulating 104.0' - Mechanical break	士	medium strong (R2 to R3) 91.5-91.7' - silt infill of yellowish gray	-
-	100%			107.0 - IVICUI AI IIICAI DI CAN	+	color (5Y 7/2), discontinuous thin	-
105 <u> </u>			1	-	+	organic layers	-
- 52.5					⊭		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-06

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				HENT : CIVIE 33 3/N 3 10023, Mud Totally, NQ tools, HW C			
WATER	LEVELS: 4.4	ft bgs	s on 4	/26/07 START : 4/24/2007 END : 4/	26/20	D7 LOGGER : B. Ellis	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		l	<u> </u>	SYMBOLIC LOG		
∐.ă∠	zZZ	_	FRACTURES PER FOOT	DESCRIPTION	ᄓ	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표일은	8 1	(%) O	158	DEDTH TYPE ODIENTATION POLICHNESS] =	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
Ė₽≸	# <u>2</u> 6	Ω	2.5	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽ĕ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		a Q	장파	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ž	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ВОШ	0716	ш	шш	, , , , , , , , , , , , , , , , , , ,	0)		
			١.	104.9' - Bedding plane, <20 deg, rough,	ш	91.7-93.5' - very fine grained, trace	
_			1	undulating, open up to 1/4"	Н	- voids to 1/16", trace fossils up to	1
-	106.5			105.6' - Fracture, 70 deg, smooth, undulating,	\vdash	_ 1/4", voids increasing with depth to	1,000 - 540,00
			_	intersecting high angle fractures		20% of surface	16:30 Begin R10-NQ
_			0		Ш	94.3-96.25' - yellowish gray, (5Y 7/2),	1
-					ш	fine to medium grained, strong HCl reaction, very weak to weak (R1 to	-
			0	107.8' - Mechanical break	Н	- R2), voids to 1/4" over 30-40% of	
I -			0	107.0 - Wedianical break	\vdash	surface, voids to 1/4" over 30-40 % or surface, voids to 1/2" at 94.55',	1
-	D40 NO				ш	fossiliferous	-
	R10-NQ 5 ft	85	2	108.6' - Bedding plane, <20 deg, rough,		- No Recovery 96.25-96.5'	
	96%	65	-	undulating, open up to 1/8"	ш	Limestone	
-	3070			109.0' - Mechanical break	Н	96.5-101.5' - yellowish gray, (5Y 7/2),	-
110			1	109.2' - Fracture, 75 deg, rough, undulating,	H	— medium to fine grained, moderate to	
-67.5			'	open up to 1/8"	Ш	strong HCl reaction, very weak to	I 7
I -				110.0' - Bedding plane, <5 deg, rough to		weak (R1 to R2), voids up to 1/16"	1
l _			0	smooth, undulating, open up to 1/8"	ш	over 20-30% of surface, fossiliferous	
	111.5				Н	(casts/molds)	
-	111.0		NR/		Н	⁻ 104.0-105.2' - yellowish gray, (5Y	16:45 Begin R11-NQ
_			1	111.7' - Bedding plane, <5 deg, smooth,	Н	_ 8/1), fine to medium grained, strong	10.40 Begiii 1411 14Q
			·	planar, open up to 1/8"		HCl reaction, very weak to weak (R1	
_				112 6 112 7 112 9' Bodding plans (2) <5	ш	to R2)	1
_			3	112.6, 112.7, 112.8' - Bedding plane (3), <5	\vdash	_ 105.2-106.5' - yellowish gray, (5Y	-
			-	deg, rough to smooth, undulating, open up to 1/8"	Н	8/1), fine to medium grained, strong	
_	R11-NQ			113.6' - Mechanical break	т	HCI reaction, very weak to weak (R1	1
_	5 ft	72	0			to R2), trace tiny voids up to 1/16",	-
	80%			114.0' - Mechanical break		poorly fossiliferous, slight increase in	
115				114.6' - Mechanical break	Ъ	fossil casts (approximately 10%)	1
115_ -72.5			0	- Indianion break	Н	106.5-111.5' - yellowish gray, (5Y	_
-12.5					Ш	8/1), fine to medium grained, strong	
						 HCl reaction, very weak to weak (R1 to R2), fewer voids about 5% of rock 	
-			NR		ш	No Recovery 111.3-111.5'	1
_	116.5				\vdash	- Limestone	_
					Н	111.5-115.5' - from 111.5-112.7'	17:00 Begin R12-NQ
_			1	117.0' - Fracture, 50 deg and 60 deg, rough,	П	same as R10-NQ	1
_				undulating		- At 112.7' color goes from yellowish	-
			ا ا	117.5' - Fracture, 50 deg and 60 deg,	ш	gray (5Y 7/2) to light olive gray (5Y	
_			1	smooth, undulating	Н	5/2) with depth, fine grained, voids	1
-	B40 1:0		<u> </u>	,	╀┤	 begin to increase with depth to 15%, 	1 -
	R12-NQ	78	1	118.7' - Bedding plane, smooth, undulating,	Ш	fossil casts and molds increase to	
I -	5 ft 100%	10	'	open up to 1/8"		20% up to 1/4"x1/8", has <5% infill	1
-	100 /6			119.0' - Mechanical break	ш	- dusky yellow (5Y 6/4), with voids in	1 -
120_			2	119.4' - Mechanical break	Н	infill up to 30%-40% and size of infill	ı
-77.5			_	120.0' - Bedding plane, <10 deg, rough,	Н	is up to 1/8"x1/8"	
I -				undulating, open up to 1/4"	団	- No Recovery 115.5-116.5'	1 -
I -			1	120.3' - Fracture, 85 deg, rough, undulating		Limestone]
	121.5		'	120.6' - Mechanical break	ш	116.5-121.5' - Same as 106.5-111.5'	
I -				121.6. 121.7! Redding plans (2) <5 doc	H	 except light olive gray (5Y 5/2) with <5% very pale orange mottling, very 	07:24 Water level at 4.4'
-			4	121.6, 121.7' - Bedding plane (2), <5 deg, smooth, undulating, open up to 1/8"	H	fine to fine grained, trace fossils up	below ground surface
				121.9' - Fracture, 75 deg, rough, undulating,		to 1/4", casts and molds, trace tiny	
I -				open up to 1/8"	\Box	voids up to 1/16"	07:31 Drilling R13-NQ
I -			0	122.25' - Bedding plane, 20 deg, rough,	ш	119.4-120.6' medium grained,]
			L	undulating	Н	extremely weak (R0) to weak (R2)	
I -	R13-NQ			123.0' - Mechanical break	Ш	rock, up to 30% fossil casts up to	1
-	5 ft	79	1	123.6' - Fracture, 75 deg, rough, undulating,	ш	1/4", trace dissolution cavities up to	1 -
	100%		L	open up to 1/8"	口	_ 1/4", 10% voids up to 1/16"	
125				124.0' - Mechanical break	ш	,	1
-82.5			1	124.8' - Mechanical break	Н		SC-4 collected at 124.0-
					ш		124.8'
							ı l
-							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-06	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	NETHOD A	ND EC	JUIPIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.4	ft bgs	on 4	26/07 START : 4/24/2007 END : 4/	26/20	D7 LOGGER : B. Ellis	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPT SURF ELEV	CORE	RQD	FRAC PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB	AND ROCK MASS CHARACTERISTICS Limestone	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	126.5		1	125.1' - Bedding plane, <5 deg, smooth, undulating, associated with lithology change 125.5' - Mechanical break 126.3' - Bedding plane, 80 deg, rough,	Ħ	- 121.5-126.5' - Same as 111.5-115.5' except fine grained, very weak to weak (R1 to R2), various layers	- 07:42 Drilling R14-NQ
-			1	undulating, open up to 1/4" 126.6' - Bedding plane, <5 deg, rough to smooth, undulating, open up to 1/4"	H	 between dusky yellow (5Y 6/4) and yellowish gray (5Y 5/2) and light olive gray (5Y 5/2), fossils increasing from 	
-	R14-NQ		2	127.8' - Bedding plane, <5 deg, smooth, stepped 128.25' - Bedding plane or mechanical break,		 125.4-126.5' up to 15%, casts and molds up to 1/2"x1/4" and trace organic features, <5% infill dusky 	-
130	5 ft 100%	87	1	<5 deg, rough, undulating 128.8-129.0' - Mechanical break 129.3' - Bedding plane, <5 deg, rough to		yellow (5Y 6/4), with voids in infill up to 30-40% and size of infill is up to 1/8"x1/8"	-
-87.5 -			0	smooth, undulating, open up to 1/4" — 129.8' - Mechanical break		Limestone 126.5-131.5' - Same as 121.5-126.5' except fine grained, extremely weak to weak (R0 to R2), fossiliferous	-
-	131.5		1 4	130.9' - Bedding plane or mechanical break, <5 deg, rough, undulating 131.65, 131.7, 131.95, 132.5' - Bedding plane	H	layers have color change from light olive gray (5Y 5/2) to yellowish gray (5Y 7/2)	07:55 Begin R15-NQ
-			1	(4), <5 deg, smooth to rough, undulating, open <1/8"		131.5-134.3' - Same as 126.5-131.5' except only one bedding feature is highly fossiliferous from	-
-	R15-NQ 5 ft 56%	33	0	133.3' - Fracture, 50 deg, rough, undulating, open up to 1/8" 133.8-134.3' - Mechanical break, multiple		133.1-133.25', rock is extremely weak (R0) to very weak (R1)	-
- 135_ -92.5 -	30%		NR	fragments —		- No Recovery 134.3-136.5' 	- - -
-	136.5					- Limestone	- 08:13 Begin R16-NQ
-			>10	136.7-137.1' - Fracture zone, intersecting fractures 137.35' - Bedding plane, <5 deg, rough, undulating		 136.5-137.1' - yellowish gray, (5Y 7/2), fine grained, extremely weak to very weak (R0 to R1), fragments are 	-
-	R16-NQ 5 ft	28	0 >10	138.3' - Mechanical break 138.75-139.0' - Fracture zone, intersecting		 very light gray (N7) to gray (N5), clasts are very weak (R1) to weak (R2), poorly fossiliferous 137.1-139.0' - light olive gray, (5Y 	
- 140 -97.5	50%		NR	fractures		5/2), fine grained, very weak to medium strong (R1 to R3), dusky — yellow (5Y 6/4) infill, 15-20% fossil casts up to 1/2"x1/4", trace voids up	-
-	141.5			· ·		to 1/16" up to 30% of surface No Recovery 139.0-141.5' Limestone	- 08:38 Begin R17-NQ
-			1	142.2, 143.0, 144.0, 145.7, 145.9' - Bedding plane (5), <5 deg, smooth, undulating, open	Ħ	 141.5-144.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine grained, medium strong to strong 	
-	R17-NQ 5 ft	90	1 1	up to 1/8" 143.4' - Mechanical break		 (R3 to R4), very fine wavy bedding features ranging in color from yellowish gray (5Y 7/2), light olive gray (5Y 5/2) and olive gray (5Y 4/1), 	SC-5 collected at 142.2- 143.0'
145 <u>-</u> -102.5	98%		2	 		<5% voids up to 1/16", trace fossils, casts, trace cavities up to 1/8"	-
					Ħ		
					•		1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-06	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				IENT . CIVIE 33 3/14 3 10023, Mud Totally, INQ 1001S, HVV C	aonig	9	ORIENTATION : Vertical
<u>WATE</u> R	LEVELS: 4.4	ft bg	s on 4/	/26/07 START : 4/24/2007 END : 4/	<u> 26/20</u>	007 LOGGER : B. Ellis	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		<i>(</i> 0	DESCRIPTION	SYMBOLIC LOG		-
N E E	₹ _A ₹	_	삤	DESCRIPTION	_ □	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A A CI B	贤듀씨	(%) Q	⊉8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	g	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F F 및	S S S S S S S S S S S S S S S S S S S	ØΒ	AC R	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
밀양급	822	æ	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROFS, TEST RESOLTS, ETC.
				145.5' - Mechanical break	ш	Limestone	
-			1		╁	144.0-146.4' - Same as 141.5-144.0'	_
l -	146.5		NR.		₽	except dusky yellow, (5Y 6/4), fine to	
				146.65, 146.8' - Bedding plane (2), <5 deg,		medium grained, extremely weak	09:42 Begin R18-NQ
_			4	smooth, undulating, open up to 1/4"	1_	(R0) at 146.0-146.4', zone at 144.5' and 145.3 are same as 136.5-137.1',	_
-				146.7' - Fracture, 75 deg, smooth, undulating	₽	extremely weak material (R0), rock at	_
-			0	147.35' - Bedding plane, <5 deg, smooth,	┸	- 141.5-144.0' is medium strong (R3)	_
			•	undulating 148.15' - Mechanical break		to strong rock (R4)	SC-6 collected at 147.35-
	R18-NQ			140.13 - Wechanical break	Н	No Recovery 146.4-146.5'	148.15'
-	5 ft	77	3	148.9' - Bedding plane, <5 deg, smooth,	┰	Limestone 146.5-151.1' - Same as 141.5-144.0'	_
_	92%			undulating, open up to 1/8"	╁	except interbedded with dusky yellow	-
150_			>10	149.4, 149.6, 149.9' - Bedding plane (3), <5	╨	(5Y 6/4) up to 1' thick, most beds are	
-107.5				deg, smooth, undulating, open up to 1/8" 149.75' - Mechanical break		thick with zones of thin wavy bedding	
1 -			1	150.05-150.15' - Fracture zone, intersecting	┰	from 150.75-151.1' is same as	_
1 -				fractures	₽	R10-NQ rock, 146.5-150.75' is	_
I -	151.5		NR	_ 150.8' - Bedding plane (<5), smooth,	口	medium strong (R3) to strong rock	
				\undulating, open up to 1/4"	1	(R4) No Recovery 151.1-151.5'	
_				\150.95' - Mechanical break	1	Bottom of Boring at 151.5 ft bgs on	_
-					1	4/26/2007	_
_					4	-	_
							_
-					1	-	_
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PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-07	SHEET 1 OF 8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER LEVELS : 2.0 ft bgs on 5/4/07								
				STANDARD	SOIL DESCRIPTION	g	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICOS OPOLID CVARDOL COLOD	SYMBOLIC LOG	DEDTIL OF CACING PRILLING PATE	
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	30LI(DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
DEPT SURF SLEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYME	INSTRUMENTATION	
43.1	0.0			(,	Poorly Graded Sand With Organics (SP)			
_		1.0	SS-1	0-2-1 (3)	0.0-1.0' - dark gray grading to very light gray, (N3 to N8), moist, very loose, very fine to fine grained silica	1	1	
-	1.5			(5)	sands, trace nonplastic fines, 10% organics and roots decreasing with depth, last 2.4' is dark yellowish		Using 2' x 2" split spoon for SPT	
					brown (10YR 6/6) with 5% nonplastic fines, trace]]	
_					concretions to 1/2"	1	_	
_						4		
-						-	-	
-						-	-	
	50					1	-	
5 38.1	5.0				Poorly Graded Sand (SP)		SS-2 taken 09:47	
-		0.9	SS-2	3-3-2 (5)	5.0-5.9' - very pale orange, (10YR 8/2), wet, loose, very fine to fine grained silica sands, trace nonplastic		Assumed water level at 2.0' due to moisture - content in SS-2 and water level	
-	6.5			(5)	fines, trace sand-sized black particles	1	measurements at B-9	
]]	
_						1	_	
_						4		
-						-	-	
-						┨	-	
10	10.0					┨	-	
33.1	10.0				Poorly Graded Sand With Silt (SP-SM)	10	SS-3 taken 09:53	
-		1.0	SS-3	3-3-5 (8)	10.0-11.0' - white to very light gray, (N9 to N8), very fine to fine grained silica sands, 10% nonplastic fines,		Similar to SS-2	
	11.5			(0)	sand-sized black particles	Ī]	
_								
_						1		
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-						┨	-	
15	15.0					1	-	
28.1	10.0				Poorly Graded Sand With Silt (SP-SM)	133	SS-4 taken 09:57	
		0.9	SS-4	3-3-4 (7)] 1	
	16.5			(*)	7% nonplastic fines, trace very fine sand-sized black particles]	
_					(particios	1]	
-						-		
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-						-	-	
-						1	-	
20						1	-	
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-07	SHEET	2	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 2.0 ft bo	gs on 5/4/	′07 S	START : 5/4/2007 END : 5/6/2007 LOGGEF	R : P.	. De Sa'rego, R. Bitely
				STANDARD	SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 111115 11000 000: 12 011115: 10010	SYMBOLIC LOG	DEDTILOS CACINOS SERVICIOS
H H H		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	J	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
HEVA EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	YMB	INSTRUMENTATION
<u> 23.1</u>	00.0			(N)	Cilty Cond (CM)	Ś	SS-5 taken 10:07
23.1	20.0			4-5-5	Silty Sand (SM) 20.0-21.1' - pale yellowish brown, (10YR 6/2), wet,	4111	55-5 taken 10.07
-		1.1	SS-5	(10)	loose, no HCl reaction, very fine to fine grained silica sands, 20% nonplastic fines	Ш	_
-	21.5				Sarius, 20 % Horipiastic lines	1	
-					-	1	_
_					-	1	
_					-	-	-
_					-	1	
_					-	1	
_					-	1	
25 <u> </u>	25.0				Cille O and (OM)	1610	00.04-140.40
18.1				2-2-2	Silty Sand (SM) 25.0-26.5' - pale brown, (5YR 5/2), wet, very loose, no	4	SS-6 taken 10:13
-		1.5	SS-6	(4)	HCI reaction, very fine to fine grained silica sands,	1111	4
-	26.5				20-25% nonplastic fines		4
-					-	1	_
_					-	-	-
_					-		-
_					-	1	_
-					-	1	
-					-		_
30	30.0				Decade Over ded Octob With Oils (OD OM)	10.15	00.7451 10:00
13.1				2-2-1	Poorly Graded Sand With Silt (SP-SM) 30.0-31.5' - yellowish gray, (5Y 7/2), wet, very loose,		SS-7 taken 10:20
-		1.5	SS-7	(3)	no HCl reaction, very fine to fine grained silica sand, 6% nonplastic fines, trace very fine sand-sized black		4
-	31.5				particles	111	4
_					-		_
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-					-	1	_
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-					-	1	
35	35.0				Doorly Craded Cond With Cits (CD CSS)	 	
8.1				1-1-1	Poorly Graded Sand With Silt (SP-SM) 35.0-36.5' - Same as 30.0-31.5' except yellowish gray,	166	SS-8 taken 10:25
-		1.5	SS-8	(2)	trace medium bluish gray mottling, (5Y 8/1 trace 5B		-
-	36.5				7/1)	1,1	4
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PROJECT NUMBER:	BORING NUMBER:		
338884.FL	B-07	SHEET	3 OF 8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 2.0 ft b	gs on 5/4/	07 S	START : 5/4/2007 END : 5/6/2007 LOGGEF	R : P.	De Sa'rego, R. Bitely
				STANDARD	SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
		RECOVE	RY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR) CIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	,WBC	INSTRUMENTATION
SS				(N)		ŝ	
3.1	40.0			0.00	Poorly Graded Sand With Silt (SP-SM) 40.0-41.5' - yellowish gray, (5Y 8/1), wet, loose, no	Hili	SS-9 taken 10:45
l _		1.5	SS-9	2-2-3 (5)	HCl reaction, very fine to fine grained silica sand, 11%	H	_
_	41.5			()	nonplastic fines, trace pyrite fragments		Driller's Remark: Switched to 2-7/8" tricone drag bit
							diag bit
						1	
-					_	1	1
-					_	1	1
_					-	1	1
-					-		1
45	45.0				-	1	1
-1.9	43.0				Poorly Graded Sand With Silt (SP-SM)	TH	SS-10 taken 10:50 —
-		1.5	SS-10	2-2-3	45.0-46.5' - Same as 40.0-41.5' -	誾	-
-	40.5	1.0	00 10	(5)	-	li li	-
-	46.5					4,14	-
-					-	ł	-
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50 -6.9	50.0				Docube Creaded Cond Mitale Cité (CD CM)	11.15	CC 11 token 10:57
-6.9				0-1-1	Poorly Graded Sand With Silt (SP-SM) 50.0-51.5' - moderate yellowish brown to pale	臣	SS-11 taken 10:57
-		1.5	SS-11	(2)	yellowish brown, trace medium dark gray mottling,	H	-
_	51.5				(10YR 5/4 to 10YR 6/2 with N4), wet, very loose, no — HCl reaction, very fine to fine grained silica sand, 6%	i¦i	Weight of hammer over 4", then 2 blows recorded as 0-1-1 (2)
_					\nonplastic fines \	1	_
_					_		_
l _					_		_
l _					_		
]
					_		
55	55.0				_		1
-11.9					Poorly Graded Sand With Silt (SP-SM)	帯	SS-12 taken 11:06
		1.5	SS-12	0-1-1 (2)	55.0-56.5' - Same as 50.0-51.5' except medium dark gray to dark gray (N4 to N3) mottling	[]]	1
_	56.5			(2)			1 blow for first 12"
-	- 3.0					1	1
-					-	1	1
-					-	1	1
I -					-	1	-
-					-	1	
-					-	1	-
					-	1	-
60						\vdash	-



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-07	SHEET	4	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						iry, auto naminer, Avvo rous,			Onientation : vertical
WATER	LEVELS	: 2.0 ft b	gs on 5/4/	/07 S	START : 5/4/2007	END : 5/6/2007	LOGGEF	} : P.	De Sa'rego, R. Bitely
300				STANDARD PENETRATION		SOIL DESCRIPTION		g 	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	TEST RESULTS	COUL NAMA	AE LICOC ODOLID CVAADOL	001.00	SYMBOLIC LOG	DEDTIL OF CACINO DRILLING DATE
		RECOVE	ERY (ft)			ME, USCS GROUP SYMBOL E CONTENT. RELATIVE DE		OLI O	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FF FF			#TYPE	6"-6"-6"		NCY, SOIL STRUCTURE, MI		MB	INSTRUMENTATION
ESE ESE				(N)				Ś	
-16.9	60.0					d Sand With Silt (SP-SM) ame as 50.0-51.5' except o	lucky bluo -		SS-13 taken 11:11
		1.4	SS-13	0-1-2 (3)	(5PB 3/2), trace		lusky blue,	Цij	
-	61.5			(0)	, , , , ,		_		_
-	01.0						_		
-							-	1	-
-							-	1	-
-							=		-
_							-		=
_							-		-
_							_		SS-14 has a jumbled appearance
65	65.0								
-21.9					Clay With Grav				SS-14 taken 13:10
-		1.5	SS-14	5-6-12		ottled grayish blue green a G 5/2 and N4), moist to we		V ///	
-	66.5			(18)	high plasticity,	no dilatancy, 20% fine to	coarse gravel,		-
-	66.5					ived, rounded to subround			-
-					gray (5Y 8/1), f	6.0', 3.0' thick, white (N9) the to coarse sand-sized	carbonate	1	-
-					material, grave	el and silty sand have very			-
-					reaction, clay h	has no HĆI reaction			_
_							_		_
l _							_		_
70	70.0						_	1	
-26.9					Silty Sand (SM			Ш	SS-15 taken 13:26
-		1.4	SS-15	2-2-3		ellowish gray, (5Y 8/1), wet on, very fine to fine grained			-
-	71.5			(5)		icity fines, scattered irregu			-
-	/1.5				∫ fat clay (CH), g	grayish blue green (5BG 5			-
-					\plasticity, 15-20	20% is fat clay			-
_							-		=
-							-		_
I -							_		
-							-		_
75	75.0						-		
-31.9	, 5.0				→ Fat Clay (CH)			77	SS-16 taken 13:43
-		1.5	SS-16	4-2-1	\75.0-75.2' - mc	oderate yellowish brown, (10YR 5/4), /-	辯	-
-	.		55 .5	(3)		plasticity, no dilatancy, said Sand With Silt (SP-SM)	iuy seaiii _	捐捐	-
-	76.5		-		¬ 75.2-76.5' - vei	ery pale orange heavily mo		4.E.	-
-						/2 with N4), wet, very loose			-
-						lica sand, 10% nonplastic -sized black particles	iiries, trace		_
_						to the leading			_
I _							_		
							_		_
80							_		7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07	SHEET	5	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 55 S/	N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 2.0 ft b	gs on 5/4/	07	START: 5/4/2007 END: 5/6/2007 LOGGER: P. De Sa'rego, R. Bitely
I				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
표성인		RECOVI	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING RATE,
F & S			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR OF DRILLING FLUID LOSS, TESTS, AND SONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION
SCI			,,,,,	(N)	
-36.9	80.0				Silty Sand (SM)
_		1.5	SS-17	1-1-2 (3)	80.0-81.5' - pale yellowish brown, (10YR 6/2), wet, - left object on the very loose, trace medium gray laminated mottling, - left object on the very loose, trace medium gray laminated mottling,
-	81.5			(3)	very fine to fine grained silica sand, 25% nonplastic
_	01.0				fines, trace very fine sand-sized black particles
-					Driller's Remark: Light to medium chatter
-					observed while drilling to 85'
-					
-					
-					
-					
85 <u> </u>	85.0	00	00.10	F0/0	0101(00)
-41.9 -	85.3	0.3	SS-18	50/3 (50/3")	Clayey Sand (SC) 85.0-85.4' - mixed silty sands, fat clays (SM, CH), fat
-				(==,-,)	clav is mottled olive black (5Y 2/1) and gravish black
l _					(N2), silty sand is dark yellowish brown (10YR 4/2) Driller's Remark: Switch to 2-7/8" tricone with black streaks, wet, very loose/soft, trace medium Priller's Remark: Switch to 2-7/8" tricone roller bit at 15:07
					to coarse sand-sized carbonate material with SS-18 may be slough
 					moderate HCl reaction, no HCl reaction in silty sands
_					or fat clays
_					1 1
-					<u> </u>
-					
-					
90 <u> </u>	90.0				Silt (ML) SS-19 taken 15:36
-		١.,	00.40	4-19-26	↑ 90.0-90.4' - yellowish gray, (5Y 8/1), nonplastic, rapid /=
-		1.4	SS-19	(45)	\ dilatancy, moderate to strong HCl reaction, very thinly \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-	91.5				(organics), all carbonate
_					Silty Sand With Gravel (SM)
_					\ \ 90.4-91.4' - yellowish gray, (5Y 8/1), wet, dense, strong HCl reaction, fine to coarse sand-sized, 20%
l _					fine to coarse gravel-sized, 30% nonplastic fines, all
_					carbonate
l] [
l -]
95	95.0				1
-51.9					Sandy Clay With Silt (CL-ML) SS-20 taken 15:51
_		1.5	SS-20	0-7-47	95.0-96.5' - yellowish gray, (5Y 8/1), moist, hard, low - plasticity, rapid dilatancy, strong HCl reaction,
-	96.5			(54)	greenish black (5GY 2/1) mottling at 95.8', 10-15% Weight of hammer for first 6"
-	30.0				fine to medium sand-sized, trace organics in pockets
-					
-					-
-					
-					
-]] .
_]
100					
I		<u> </u>			



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-07	SHEET	6	OF 8	3	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 2.0 ft b	gs on 5/4/	/07 5	START : 5/4/2007 END : 5/6/2007 LOGGE	R : P.	De Sa'rego, R. Bitely
				STANDARD	SOIL DESCRIPTION	(T	COMMENTS
AND N (#)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	COLL NAME TIDOS OBSTILIS STATES AND SE	Ĭ	DEDTIL OF CACING PRIVATE
ACE ATIOI		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
-56.9	100.0	0.5	SS-21	38-50/2	Silty Sand (SM)	T	SS-21 taken 17:03
_	100.7	0.0	00 2	(88/8")	100.0-100.5' - yellowish gray to very light gray, (5Y 7/2 to N8), wet, very dense, strong HCl reaction, fine to	1	1
					coarse sand-sized, 25% low plasticity fines, 10% fine gravel-sized, all carbonate		11:50 100% circulation loss at 101.0' Switch to 2-3/8" tricone roller drill bit
_					graves essees, and essees	4	_
-						-	5/5/07 water level taken 08:38, 4.4' below ground surface
_						-	09:30 65.0' 4" HW casing installed Driller's Remark: Will use 2-7/8" tricone drag
-						1	bit to advance boring, AWJ rods
-						-	-
105	105.0					1	1
-61.9	100.0				Silty Sand (SM)	111	Light chatter while drilling with drag bit
-		0.9	SS-22	10-6-23 (29)	105.0-105.9 - yellowish gray, (5Y 7/2), wet, medium dense, strong HCl reaction, fine to coarse sand-sized,		1
	106.5			(20)	\\35% low plasticity fines, 10% fine to coarse \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\]	10:40 Driller's Remark: Reached 90.0-91.0' and lost complete circulation
_					graver-sized, an carbonate		Installed 4" HW casing to 105.0' below
_						4	ground surface
_						4	-
_						-	-
-						-	-
						1	-
110_ -66.9	110.0				Silty Sand With Limestone Fragments (SM)		SS-23 taken 14:55
-		1.5	SS-23	13-22-11	110.0-111.5' - very light gray to light gray, (N5 to N7), wet, dense, strong HCl reaction, fine to coarse	1	1
-	111.5			(33)	sand-sized, 35% fine to coarse gravel-sized limestone	1	1
_					fragments, 20% low plasticity fines, material is carbonate and highly fossiliferous		1 1
]
_						1	
_						4	-
_						-	-
115 <u></u> -71.9	115.0				Silty Sand With Limestone Fragments (SM)	1	SS-24 taken 15:13
-		0.9	SS-24	7-2-29	115.0-115.85' - Same as 110-111.5'	-	Last SPT on 5/5/07 -
-	116.5	0.5	00-24	(31)		1	1 -
_	110.5					1	1
-						1	1
-						1	1
]]
]
-						1	
120						1	
		l .	1			_	



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-07	SHEET	7	OF 8	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ary, auto nammer, Avvo rou			ONIENTATION: Vertical
WATER	LEVELS	: 2.0 ft b	gs on 5/4/	U/ S	START : 5/4/2007	END : 5/6/2007	LOGGE	<u>н : Р.</u>	De Sa'rego, R. Bitely
3000				STANDARD PENETRATION		SOIL DESCRIPTION		ď	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	TEST RESULTS SOIL NAME LISCS GROUP SYMBOL COLOR				SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,	
A S S S S S S S S S S S S S S S S S S S		RECOVE	ERY (ft)				ONTENT, RELATIVE DENSITY OR		DRILLING FLUID LOSS, TESTS, AND
EVAT.			#TYPE	6"-6"-6"		NCY, SOIL STRUCTURE, N		J₩	INSTRUMENTATION
				(N)			(2.5)	က်	
-76.9	120.0			10 10 10		th Limestone Fragments yellowish gray, (5Y 8/1),		1	Start drilling on 5/6/07 at 8:05 Water level at 6.4' below ground surface at
		1.5	SS-25	13-18-19 (37)	strong HCl rea	action, fine to coarse san	d-sized, 42%]	beginning of day
	121.5			(-)	low plasticity fi	ines, 15-20% fine fragme	nts-sized		
					carbonate den	ived, highly fossiliferous	with moids and	111	_
_					(50000			1	
-								1	=
-								┨	-
-								┨	-
-								-	<u>-</u>
-								4	_
125_	125.0							1	
-81.9		0.9	SS-26	37-50/5	Silty Sand Wi	th Limestone Fragments Same as 120-121.8' exc	s (SM) ent 25-30%		Driller's Remark: Continued circulation loss from 120-125' - gained a little back at 125.0' -
	125.9	0.0	00 20	(87/11")	¬ gravel-sized m	naterial in wafer-like lense			110111 120-120 - gamed a little back at 125.0
					\1/4"-1/2" thick			1	
								1	_
_								1	1
-								1	-
-								┨	-
-								┨	-
-								-	-
_								4	_
130	130.0						(222)	1	
-86.9	130.5	0.4	SS-27	50/5.5 (50/5.5")	Silty Sand Wi	th Limestone Fragments Same as 125.0-125.9' ex	S (SM)	1111	Driller's Remark: 130-135' drilled fairly hard and consistent
				((30/3.3_))	organic fragme		(cept trace		and consistent
								1	
								1	
_								1	
-								1	-
-								┨	-
-								┨	-
-								-	-
-								-	_
135	135.0		00	F0/4 F					
-91.9 _	135.4	0.1	SS-28	50/4.5 (50/4.5")	Limestone Fra	agments strong HCl reaction	_	_	_
				(25, 110)	\	55g	/	_	
									Chatter at 136-136.5' Driller's Remark: Harder
									Dillier 3 Remark. Hardel
	137.5							1	End soil sampling at 10:35 on 5/6/07
	137.6	0.0	\SS-29	50/2 (50/2")	No Recovery				Switch to rock coring, see rock core log
				(30/2)	See the next s	oring at 137.5 ft bgs sheet for the rock core loo	1	1	1
-					COC IIIO HOAL S		,	1	-
-								1	-
								┨	-
140								+	
		l							



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-07	SHEET	8	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

00.1	J WILLING D 74	10	ZOII IV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bg	s on 5	/4/07 START : 5/4/2007 END : 5/6	3/200	7 LOGGER: P. De Sa'rego, R. Bite	ly
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	REC	R Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-	137.5 R1-NQ 4 ft	35	7	137.6-137.8' - Fractures (3), horizontal, smooth to rough, undulating to stepped, heavy drill action marks, open 137.9' - Fracture, horizontal, rough, stepped, possible black staining over 50% of surface, with 1/4" relief, lower side smooth and planar with wear from drilling, black staining with		Limestone - 137.5-138.7' - yellowish gray, (5Y 8/1), strong HCl reaction, medium strong (R3), banded with silt lenses between 1/4" and 2", small voids to 1/16" over 25% of surface in a few lenses, trace fossil molds, casts,	Driller starts with new bit: Boart Longyear Alpha bit 4050089 NQ 06 R8 at 155 Limestone from 137.5- 151.5' appears to be detrital limestone
140_ -96.9 -	75%		1 NR	embedded particles over 60% of surface 138' - Bedding plane, <5 deg, rough, undulating, 1/16" relief, open		cross-bedding from 138.5-138.7', strongly cemented 138.7-139.2' - Same as 137.5-138.7' 139.2-140.5' - very weak (R1),	R1: 8 minutes
-	141.5		3	138.35' - Bedding plane, 15 deg, rough, planar, tight 138.4' - Bedding plane, horizontal, bottom surface is rough, undulating, heavy wear on upper side from drilling, <1/16" relief, open		becomes more massive, highly fossiliferous with molds, casts, clasts of different limestone, subrounded, moderately cemented	SC-1 collected at 142.1-
-	R2-NQ		2	138.7' - Mechanical break 138.9' - Fracture, 60 deg, rough, undulating, 3/16" relief, tight 139.3' - Bedding plane, horizontal, rough,		No Recovery 140.5-141.5' Limestone 141.5-143.5' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak	143.1' - - -
- 145_ -101.9	5 ft 100%	76	4	undulating, rock weak from drilling in upper surface, open 139.45' - Fracture, 5 deg, rough, undulating, 1/16' relief, tight		to weak (R1 to R2), very few voids of any size, massive appearance, scattered black grains (pyrite), trace fossils 143.5-144.4' - strong HCI reaction,	
-	146.5		0	139.6' - Fracture, 60 deg, rough, undulating, 1/16' relief, tight 140.1' - Mechanical break 141.6' - Mechanical break, 0-90 deg, rough,		becomes banded with gray particles throughout, 50% of surface covered with voids to 1/16" 144.4-146.5' - moderate HCl	R2: 17 minutes
-			4	undulating, <1/16" relief, open 141.8, 142.1' - Fractures, 70 deg, rough, undulating, 1/16" relief, tight 143.3' - Fracture, 80 deg, rough, undulating, 1/16" relief, accretions of iridescent pyrite		reaction, medium strong (R3), trace voids to 1/16", trace fossil molds, casts 145.3-146.5' - mild to moderate HCl	- - -
-	R3-NQ 5 ft 76%	60	1	covering 30% of surface, tight 143.6' - Fracture, 70 deg, rough, undulating, up to 1/16" relief, tight 143.85' - Mechanical break		reaction, infilling in two 1.2" thick bands 146.5-150.3' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), highly	-
150 -106.9 -			1 NR	144.1-144.4' - Bedding plane, 0-5 deg, rough, undulating, open 144.6-145.5' - Fracture, vertical, undulating 145.9' - Mechanical break 146.6' - Bedding plane, horizontal, rough,		fossiliferous (molds, casts), echinoderms, brownish black laminations over 146.5-146.8', voids <1/1/16" over 30-35% surface over	R3: 8 minutes
-	151.5			undulating, open 5/8" 146.7' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8" 147.8' - Fracture, 30 deg, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, tight 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of break, open up to 3/8"		149.4-150.3', particles in rock matrix (medium dark gray particle, fossil mold fragments, fossils) give the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007	Assume core loss from bottom of run. Finish drilling at 13:00. Abandoned on 5/7/07 with 61 bags of Bonsal or Quikrete brand Portland Type I/II or Type I cement (47-lb bags) grouted to surface



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07A	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

						y, catheau, NW 1005, 3-7/6) . NI	ONIENTATION : Vertical
WATER	LEVELS	: 4.5 ft bo	ıs on 6/10		START : 6/15/2007	END: 6/17/2007 SOIL DESCRIPTION	LUGGEF	1 : N.	Jarzyniecki COMMENTS
30₽	041:5:		1 (0)	PENETRATION					COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,				DEPTH OF CASING, DRILLING RATE,
A ACE		RECOVE	RY (ft)		MOISTURE C	CONTENT, RELATIVE DEN	SITY OR	30LI	DRILLING FLUID LOSS, TESTS, AND
L HEV			#TYPE	6"-6"-6"	CONSISTENC	Y, SOIL STRUCTURE, MINI	ERALOGY	SYMBOLIC LOG	INSTRUMENTATION
□ あ iii 43.2	0.0			(N)	Doorly Craded C	Cond With Organias (CD)		S	
43.2	0.0			2-2-3	0.0-1.2' - mediun	Sand With Organics (SP) n dark gray grading to ver	rv light grav		_
I _		1.2	SS-1	(5)	(N4 to N8), mois	t, loose, fine grained, no l	HCI		_
	1.5			, ,	reaction, trace no	onplastic fines, 20% organ with depth, silica sand	nics and		
					\100t3 decreasing	y with depth, silica sand			
							_	1	
-							_	1	-
-							_	1	-
-							-		-
-							-		-
							-	1	-
5 38.2	5.0				Poorly Graded S	Sand (SD)			_
- 50.2				7-7-6	5.0-6.0' - white to	o vellowish grav. (N9 to 5)	Y 8/1), wet, -		-
_		1.0	SS-2	(13)	medium dense, f	fine grained, no HCI react	ion, trace		_
_	6.5				nonplastic fines,	silica sano			_
							_		_
							_		
-							_		_
-							-	1	=
-							-	1	-
10	10.0						-	1	-
33.2	10.0				 	Sand (SP)		1111	_
-		1.0	SS-3	7-9-8	\10.0-10.1' - Sam	ne as 5.0-6.0'	/ -		-
-		1.0	33-3	(17)	Silty Sand (SM)	aked light gray to medium	gray (NIZ to [-
-	11.5				N5), moist to wet	t, medium dense, very fine	e to fine / -	1	-
_					grained, no HCI i	reaction, 15% low to med	ium plastic _	1	-
-					fines, silica sand	1			_
_							_	.	_
							_		
							_]	
15	15.0						_		
28.2					Poorly Graded S	Sand With Silt (SP-SM)		Ţij.	_
		0.9	SS-4	5-8-11	15.0-15.9' - yello	wish gray, (5Y 8/1), wet, r to fine grained, no HCl re	medium - action 10%		-
-	16.5			(19)	nonplastic fines,	silica sand	400001, 1070	П	-
-	10.0								-
-							-		-
-							-		-
-							-		-
-							-		-
_							-		_
							=		_
20								Ш	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-07A	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

					START : 6/15/2007	END : 6/17/2007		· NI	Jarzyniecki
VVALER	LLVLLO	: 4.5 ft bo	JJ ()11 () 10			END: 6/17/2007 SOIL DESCRIPTION	LOGGER		COMMENTS
동무(E)	SAMPI F	INTERVA	L (ft)	STANDARD PENETRATION				SYMBOLIC LOG	332.110
DEPTH BELOW SURFACE AND ELEVATION (ft)	0/11111	RECOVE		TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL,	COLOR,	LICI	DEPTH OF CASING, DRILLING RATE,
TH E		TILOGVL	#TYPE	6"-6"-6"		ONTENT, RELATIVE DEN ', SOIL STRUCTURE, MIN		ИВО	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUF			#ITPE	(N)	00.10.012.101	, 00.2 01.100101.2, 1		SYI	
23.2	20.0				Poorly Graded S	and With Silt (SP-SM)	modium		1.65' recovery noted on log
		1.5	SS-5	6-6-7 (13)	dense, very fine to	vish gray, (5Y 8/1), wet, ı o fine grained, no HCl re	nedium – action,		1
	21.5			(10)	5-10% nonplastic	fines, silica sand			1
							_		1
							_		1
							_		1
							_		1
							_		
25	25.0						_		1
18.2					Poorly Graded St 25.0-26.5' - Same	and With Silt (SP-SM)			2.0' recovery noted on log
		1.5	SS-6	7-3-2 (5)	25.0-26.5 - Same	e as 20.0-21.5	_		
	26.5			(0)			_		
30_	30.0								
13.2				4.0.0	Silty Sand (SM)	vish gray, (5Y 7/2), wet, I	looso fino –		1.7' recovery noted on log
		1.5	SS-7	1-2-2 (4)	grained, no HCl re	eaction, 15-20% nonplas	stic fines,		
	31.5			. ,	silica sand				
_							_		_
_							_		_
							_		
							_		
35	35.0								, <u></u>
8.2				2-1-2	Poorly Graded S 35.0-36.5' - vellov	and With Silt (SP-SM) vish gray, (5Y 7/2), wet, v	verv loose -	帯	1.75' recovery noted on log
		1.5	SS-8	(3)	very fine to fine g	rained, no HCI reaction,	8%	拼拍	_
	36.5			. ,	nonplastic fines, s	silica sand	_	\mathbf{i}_{i}	_
							_		
							=		
							=		
							_		
_							-		
-							-		
40									



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-07A	SHEET	3	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

						y, cathead, NW rods, 3-//8			ORIENTATION : Vertical					
WATER	LEVELS	: 4.5 11 00	gs on 6/16		START : 6/15/2007	END: 6/17/2007 SOIL DESCRIPTION	LOGGER	(: N.	Jarzyniecki COMMENTS					
≥ ⊇⊋	CAMPIE	INTERVA	1 (#)	STANDARD PENETRATION		SOIL DESORIF HON		SYMBOLIC LOG	OCIVIIVILINIO					
ELO ON (SAMPLE		, ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				DEPTH OF CASING, DRILLING RATE,					
H B		RECOVE	RY (ft)						DRILLING FLUID LOSS, TESTS, AND					
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)					INSTRUMENTATION					
3.2	40.0	1.5	SS-9	1-1-2	Silty Sand (SM) 40.0-41.5' - Sam	e as 35.0-36.5' except p 0% nonplastic fines, blac	pale yellowish -		Driller's Remark: Weight of hammer causes 2' rod drop from 37-55' 2.0' recovery noted on log					
-	41.5			(3)	staining from 40.	5-40.6'	ok (organio) _		-					
-							-		- -					
_							-		-					
-	45.0						-		-					
45 <u> </u> -1.8	45.0				Silty Sand (SM)				1.8' recovery noted on log					
_	46.5	1.5	SS-10	1-1-2 (3)	45.0-46.5' - Sam nonplastic fines, staining from 45.	e as 40.0-41.5' except 2 trace black (possibly or 25-45.35'	25% - ganic) _		-					
-							_		- -					
-							-		- -					
_							-		-					
50	50.0						-		-					
-6.8 - -	51.5	1.5	SS-11	0-1-1 (2)	fragments in top fossiliferous, no	e as 45.0-46.5' except li 1" of sample, rock fragr HCL reaction, trace coa	ments are		1.75' recovery noted on log					
-	31.3				sand-sized conc	retions		1.1.1	-					
-							-		- -					
_							-		-					
55_	55.0													
-11. 8 -		1.3	SS-12	0-1-5 (6)	Silty Sand (SM) 55.0-56.3' - mode wet, loose, very f	erate yellowish brown, (fine to fine grained, no h	10YR 5/4), HCI reaction,		-					
_	56.5			(0)	40% low plasticit	by fines, trace moderate wn (10YR 3/4) concretic 4" of sample, black (or,	gray (N5) to	<u> </u>]					
-					staining over bot	tom 6" of sample	gaillo)		Driller's Remark: "Drastic" change of material at 57.5', harder and different in color ("gray to green") Driller switch to tri-cone roller bit (from drag					
-							-		bit) at 57.5' Driller removes large (6" spherical) piece of silty clay with trace rock fragments from drill					
60									bit from 57-60' -					
					•			•						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07A	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

DRILLIN	G METH	DD AND	EQUIPM	ENT : CME 550 S	/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit		ORIENTATION : Vertical
WATER	LEVELS	: 4.5 ft bo	s on 6/16	5/07 S	TART : 6/15/2007 END : 6/17/2007 LOGGER	R : N.	Jarzyniecki
				STANDARD	SOIL DESCRIPTION	g	COMMENTS
WO (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		ο̈́	
BEL JONE		RECOVE	RY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR)LIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
SU				(N)		S	
-16.8	60.0 60.6	0.6	SS-13	25-50/1 (75/7")	Elastic Silt (MH) _ 60.0-60.6' - very light gray, (N8), mottled with	Ш	_
_				(1.6/1.)	yellowish gray (5y 8/1), wet, hard, high plasticity, slow		
_					dilatancy, 10-15% fine sand (both silica and carbonate), pyrite nodules in top 1.5" of sample to		HW casing advanced to 61'
_					3/4", mild HCI reaction in carbonate materials, most of		
_					sample is non-reactive		
					_		
					_		
					_		
65	65.0						
-21.8	65.4	0.4	SS-14	50/5 (FO/F")	Clayey Sand (SC)		1.0' recovery noted on log
]				(50/5")	65.0-65.4' - light gray to yellowish gray, (N7 to 5Y 8/1), wet, very dense, medium to coarse grained, moderate		
					HCI reaction in carbonate materials, subangular grains (carbonate material with trace pyrite), 5-10%	1	
					fine grained silica sand, 25% medium to high plasticity		
					fines		
					_	1	_
					_	1	_
					_	1	
70	70.0						
-26.8					Interbedded Poorly Graded Sand With Clay To Clayey Sand And Fat Clay (SP-SC, CH)	///	
		1.2	SS-15	16-17-12 (29)	71.0-71.2' - 60% sand: yellowish gray (5Y 8/1), wet,		
	71.5			(==)	medium dense, fine silica sand, 5-10% medium sand-sized carbonate grains in upper half of sample,	1//	
					variable fine (10-30%) content, medium plasticity, mild		
					HCl reaction in carbonate grains, 40% of sample fat clay (CH): greenish gray (5G 6/1), moist, high		
					plasticity, at 70.0-70.5' clay in 3/4" irregular beds, at		
					70.5-71.2' clay occurs in 1-3/16" to 2" lenses interbedded in sand		
1 7					into boddod iii dand		
]					_		
75	75.0				_]
-31.8					Poorly Graded Sand With Silt (SP-SM)	帯	6/16/07: Water level at 4.5'
1 7		1.5	SS-16	4-2-4 (6)	75.0-76.4' - yellowish gray, (5Y 7/2), wet, loose, very fine to fine grained, no HCl reaction, 5% nonplastic		8:15: HW casing to 70'
1 7	76.5			(5)	fines, trace black mottling at 75.2-75.3', silica sand		8:30: At 75.0' switch to 2-7/8" rock bit
1 7					_		8:57 Driller's Remark: Casing slid approx. 2-
]					_	1	1/2' down borehole, added 5 HW casing (to - 75')
					-	1] ^ _
-					-	1	7
-					-	1]
-					-	1	1
80					-	1	7



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-07A	SHEET	5 OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

DNILLIN	WATER LEVELS: 4.5 ft bgs on 6/16/07 START: 6/15/2007 END: 6/17/2007 LOGGER: N. Jarzyniecki												
WATER	LEVELS	: 4.5 ft bo	gs on 6/16	6/07	START : 6/15/2007	END : 6/17/2007	LOGGEF	? : N.					
200				STANDARD		SOIL DESCRIPTION		g	COMMENTS				
ANE (ft	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COUL NIAME	LICOC ODOLID OVIMBOL OC	N OD	OT C	DEDTIL OF CACING DOLLING DATE				
HSE		RECOVE	ERY (ft)		MOISTURE C	, USCS GROUP SYMBOL, CC CONTENT, RELATIVE DENSI	TY OR	ÖĽ	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY	Y, SOIL STRUCTURE, MINEF	RALOGY	SYMBOLIC LOG	INSTRUMENTATION				
-36.8	80.0			(N)	Silty Sand (SM)			S					
-50.0	00.0	1 1 1	SS-17	1-0-50/5	80.0-80.9' - yello	wish gray, (5Y 7/2), wet, ver	ry loose, -		-				
-		1.4	33-17	(50/11")	very fine to fine g	grained, no HCI reaction, 20	-25% /=		-				
_	81.4				Organic Lens (O		/ ₋	ш	_				
_					80.9-81.1' - brow	nish black, (5YR 2/1), shiny	′		_				
_					Elastic Silt (MH)	earance, may be compress	ed leaves -		_				
_					81.1-81.4' - medi	ium gray, (N5), moist, hard,	medium _		_				
_					mottled	rapid dilatancy, strong HCl	reaction,		_				
_					ļo.aou				_				
_							_		_				
85	85.P												
-41. 8		0.1_/	\SS-18	50/1.5 (50/1.5")	Silt With Sand (I	ML) xy yellow, (5Y 6/4), moist, ha	ırd		0.3' recovery noted on log				
_				(00,110)	\nonplastic, rapid	dilatancy, strong HCl reacti	on,		_				
_					\15-20% fine to m	nedium sand, all carbonate			_				
_							_		_				
							_		_				
							_		Driller's Remark: Clay lens at 87.5-88.0'				
							_		_				
							_		Driller's Remark: Very soft at 88.5'				
							_						
90	90.0												
-46.8				0.0.00	Silt (ML)	olive gray, (5Y 5/2), wet, ha	rd -		1.6' recovery noted on log				
		1.5	SS-19	6-9-29 (38)	nonplastic, slow t	to rapid dilatancy, strong HO	Cl		_				
	91.5			` ′	reaction, 10-15% (carbonate), carb	fine to medium sand-sized	particles	Ш	_				
					(carbonate), care	Soriate Sitt			_				
							_						
							_						
1 7							_		_				
95	95.0						-]				
-51.8	95.5	0.3	SS-20	50/5.5		Limestone Fragments (SM)		1.11	Driller's Remark: Losing circulation at 95.0'				
1 7				(50/5.5")	strong HCl reacti	wish gray, (5Y 8/1), wet, ver ion, fine sand-sized carbona	ry dense, - ate		_				
-					particles, 25% no	on to low plasticity fines, lim	estone		_				
-					fragments to 1/2" sand/50% limesto	" in "wafer" like pieces, 50% one	silty	1	-				
								1	-				
							-	1	-				
-							-	1	7				
-							-	1	-				
-							_	1	-				
100							=	1	-				
100													



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-07A	SHEET	6 OF	- 9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit ORIENTATION: Vertical WATER LEVELS: 4.5 ft bgs on 6/16/07 START: 6/15/2007 END: 6/17/2007 LOGGER: N. Jarzyniecki													
WATER	LEVELS	: 4.5 ft bo	gs on 6/16	6/07	START : 6/15/2007 END : 6/17/2007 LOGGEF	R : N	. Jarzyniecki						
				STANDARD	SOIL DESCRIPTION	g	COMMENTS						
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG							
BRA		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT. RELATIVE DENSITY OR	13	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND						
PTH IRFA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MB	INSTRUMENTATION						
				(N)	0.11 0 1/040	Ś							
-56.8	100.0			22-33-45	Silty Sand (SM) 100.0-101.5' - yellowish gray, (5Y 7/2), light gray		1.6' recovery noted on log						
_		1.5	SS-21	(78)	mottling, wet, very dense, medium to coarse grained,								
l _	101.5				strong HCl reaction, 25% low plasticity fines increasing to 35-40%, all carbonate		_						
_					indicating to do 1070, all carbonato]	_						
_]	_						
_]							
_													
105	105.0					L]						
-61.8		0.9	SS-22	37-50/5	Poorly Graded Sand With Silt (SP-SM) 105.0-105.1' - pale yellowish brown, (10YR 6/2), wet,		1.35' recovery noted on log						
-	105.9	0.9	33-22	(87/11")	very dense, strong HCI reaction in carbonates, 5-10%								
					\\nonplastic fines, fine silica sand, medium carbonate	1	1						
-					sand, trace black medium sand-sized minerals Silty Sand (SM)	1							
_					\105.1-105.9' - Same as 100.0-101.5' except very	1							
-					strong HCl reaction, 40% low-plasticity fines	1	1						
_					-	1	1						
_						1	1						
-						1	1						
110	110.0					1							
-66.8	110.0			00 50 50/0	Poorly Graded Sand With Silt (SP-SM)	T	Driller's Remark: Likely to have no recovery						
_		1.3	SS-23	30-50-50/3 (100/9")	110.0-110.95' - Same as 105.0-105.1' except yellowish gray to pale yellowish brown, (5Y 7/2 to	11:	if coring begins at 105.0' - 2.0' recovery noted on log						
_	111.3			, ,	10YR 6/2), predominately fine to medium silica sand,	T							
_					5% white medium carbonate sand, 5-10% nonplastic fines increasing with depth; strong HCl reaction in	1	1						
_					fines and carbonate grains	1	1						
-					Limestone Fragments 110.95-111.25' - yellowish gray, (5Y 7/2), fine to	1	1						
-					coarse grained, very strong HCl reaction, highly	1	15:12: Instruct driller to take one more spoon						
-					fossiliferous	1	115.0'-120.0' and if limestone present, begin coring with NQ						
-						1							
115	115.0					1	1						
-71.8	110.0				Silty Sand With Limestone Fragments (SM)	11	Driller extends casing (HW) to 110.0'						
-		1.2	SS-24	25-31-32	115.0-116.2' - yellowish gray, (5Y 8/1), wet, very dense, 15% coarse sand to fine gravel-size limestone	111	1						
-	116.5			(63)	fragments, 30% low plasticity fines, all carbonate	111	կ						
-	110.0					1	-						
-						1	1						
-						1	1						
-						1	06/17/07: Water level at 8.0'						
-						1	1						
-						1	8:45: Driller clear hole with tri-cone roller bit						
100						1	-						
120						+	 						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07A	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

DHILLING ME I HOD AND EQUIPMENT: CME 550 S/N 1860/3, mud rotary, cathead, NW rods, 3-7/8" drag bit WATER LEVELS: 4.5 ft bgs on 6/16/07 START: 6/15/2007 END: 6/17/2007 LOGGER: N. Jarzyniecki												
WATER	LEVELS	: 4.5 ft b	gs on 6/16	5/07	START : 6/15/2007	END: 6/17/2007	LOGGER	: N.	Jarzyniecki			
1				STANDARD		SOIL DESCRIPTION		(n	COMMENTS			
\$ 9€	SAMPLE	INTERVA	L (ft)	PENETRATION			ĭ					
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVERY (ft)		TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL, C	OLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND			
FINE		NECOVE	<u> </u>		MOISTURE C	ONTENT, RELATIVE DENS	ITY OR	B	DRILLING FLUID LOSS, TESTS, AND			
교육교			#TYPE	6"-6"-6" (N)	CONSISTENCY	, SOIL STRUCTURE, MINE	RALOGY	λV	INSTRUMENTATION			
-76.8	120.0	0.2	SS-25	50/3.5	Cilty Cand With	Limestone Fragments (SI	\ / /\		Resume drilling 6/16/07 at 8:57			
-70.0	120.6		00-20	(50/3.5")	120.0-120.2' - Sa	me as 115.0-116.2'	v") /_		Driller setting rod for SPT at 120.0'			
l _				()								
_							_	1	_			
-							_	1	1			
-							-		-			
_							_		-			
_							_					
									Split spoon SS-26 driven from 125.0-125.15'			
1 -	124.5						_		1			
125		0.2	SS-26	50/2	Limestone Fragr	nents		Ш	Driller's Remark: 5% return of mud from 125-			
-81.8				(50/2")	-\ 125.0-125.15' - y	ellowish gray, (5Y 8/1), str	ong HCl \mathcal{T}		130' —			
-					reaction, friable	og at 125 0 ft bac	/ -		Switched to NQ WL to begin rock core at 125.0'			
1 -					Begin Rock Corir See the next she	ng at 125.0 ft bgs et for the rock core log	_					
1 -					222 2.0 3110		_		_			
1												
							_					
_							_	1	1			
-							_		-			
-							_		-			
-							_		_			
I _							_		_			
130												
-86.8								1	_			
-							_	i	1			
-							_		-			
_							_		-			
_							_		_			
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1												
-							_		1			
1 -							-		1			
-							-					
-							-		-			
135									-			
-91.8							_		_			
1												
1 -							_		1			
1 -							_		1			
-							-		-			
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1 -							_					
-							_					
140							-					
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1												



PROJECT NUMBER:

338884.FL

B-07A

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

SHEET 8 OF 9

CORING M	/IETHOD AN	ND EC	UIPN	ENT : CME 550 S/N 186073, mud rotary, NQ tools, HW	casıng		ORIENTATION : Vertical
WATER LE	EVELS : 4.5	ft bgs	on 6/	16/07 START : 6/15/2007 END : 6/	17/200	77 LOGGER : N. Jarzyniecki	
	(DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	S.A.	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±Ã¥ L¥ŽT	R TOO	D (%)	FF	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
		R	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λ×	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	25.0	ш.		125.0, 125.1' - Bedding plane (2), horizontal,	1 "	Limestone	Start rock coring at 125'
1 01.0	20.0		6	smooth, planar, fractures, open	ш	- 125.0-129.4' - yellowish gray, (5Y	with NQ WL casing -
				125.35, 125.5' - Fractures (2), horizontal,	Ш	7/2), fine to medium grained, strong	_
		rough, planar, open, some rock fragments (3) HCl reaction, very weak (R1), 10%					
1 7			>10	125.85, 125.9' - Fractures (2), horizontal, rough, undulating, open	Н	 voids up to 1/16", 5% casts/cavities up to 3/4"x3/8", poorly fossiliferous, 	
1 1	R1-NQ			126.0-127.9' - Fracture zone, smooth to		slightly harder (R1-R2) from	
-	5 ft	13	>10	rough, planar, bedding plane fractures, thin	Ш	– 127.9'-129.9'	-
-	88%			(1/2") beds, open to tight	Ш	_	-
			3		\vdash	_	_
				128.6, 128.9, 129.0' - Fractures (3),		_	_
			2	horizontal, rough, undulating, open 129.1, 129.2' - Fractures (2), horizontal,	Ш		R1: 3 minutes
130 13	30.0		NR	rough, undulating to stepped, open	Ш	No Recovery 129.4-130.0'	1
-86.8	55.0			130.1' - Fracture, horizontal, rough,	\Box	Limestone	
			3	undulating, open		- 130.0-130.1' - Same as 125.0-129.4'	-
-				130.4' - Fracture, horizontal, rough,	Ш	_ 130.1-131.55' - yellowish gray mottled with light gray, (5Y 7/2 and	-
-			>10	undulating, open, associated with large infilled cavity	ш	- N7), moderate HCl reaction, weak to	_
				130.9, 131.0, 131.45' - Fractures (3),	Н	_ medium strong (R2 to R3), mottling	_
	R2-NQ 5 ft	19	>10	horizontal, rough, undulating, open, sandy		associated with large cavities over 40% of surface, carbonate, fine to	
	75%	19	-10	organic soil infilling at 131.45' 131.26-131.4' - Fracture zone, sandy black	Ш	medium grained, 5-10% voids up to	
1 7			4	(possibly organic) soil infilling	ш	1/8", 25% cavities (up to	Ī
1 1			_	131.6-131.85' - Fracture zone	Н	 2-3/8"x1-9/16" at 130.4-130.55', 130.75-130.8'), cavities infilled with 	1
-				131.9, 132.1, 132.2' - Bedding plane (3), <10 deg, rough, undulating	世	carbonate material (pale yellowish	R2: 6 minutes
-			NR	132.0-132.05' - Clay seam, (CH), reacts with	Н	brown, medium grained, weak (R2),	-
135 <u>13</u> -91.8	35.0			HCl	ш	25% voids, mild HCl reaction, poorly fossiliferous)	Difficult to distinguish voids
-91.0			>10	132.3-132.45' - Fracture zone 132.45-133.0' - Fracture, vertical, smooth,	Н	131.55-132.45' - very pale orange,	Difficult to distinguish voids due to average worn -
				undulating, open, 70% light gray staining	Я	(10YR 8/2), fine grained, moderate	appearance of unit from
			. 40	133.0-133.1' - Fractures (3), horizontal,	Н	HCl reaction, very weak (R1), thinly bedded (1/4"-1/2"), trace voids to	drilling action
			>10	vertical, and 30 deg, rough, undulating, open 135.0-136.4', 136.6-136.8' - Bedding plane,	ш	3/16", no visible casts, 25%	
	R3-NQ			horizontal, smooth, planar, fractures every	+	extremely weak (R0), irregular gray	-
I -	5 ft	18	7	1/2" over interval, open	П	_ lenses 132.45-133.75' - yellowish gray,	-
	88%			137.05, 137.15, 137.2, 137.6, 137.8, 138.05, 138.15, 138.25, 138.35, 138.5' - Fractures	世	mottled light gray, and very pale	-
			6	(10), horizontal, smooth to rough, planar	Ш	orange, (5Y 7/2, N7, and 10YR 8/2),	-
				138.95' - Fracture, horizontal, rough,	団	fine grained, strong HCl reaction, medium strong (R3), 5-10% voids up	
			0	undulating, pale yellowish brown (10YR 6/2)	H	to 1/16" increasing with depth, trace	R3: 4 minutes
140 14	40.0		NR	clay infill up to 1/4" thick, open		cavities up to 9/16"x3/8"	
-96.8				_	\vdash	The No Recovery 133.75-135.0' Limestone	
1 1			0	•	Ш	135.0-138.95' - yellowish gray, (5Y	1
					+	- 7/2), medium grained, strong HCI	-
-			1		口	reaction, very weak to weak (R1 to R2), trace voids to 1/6", trace	-
-	R4-NQ			141.7' - Mechanical break 141.9' - Fracture, horizontal, smooth, planar,	++	 casts/cavities to 1/4", poorly 	-
	5 ft	48	>10	open	П	fossiliferous (with small 3/16" shell	-
	83%			142.05-142.1' - Carbonate silt seam (possible	H	fragments)	_
			3	infill of fracture with cuttings from drilling)			
]			٥	142.15, 142.2, 142.3, 142.4, 142.5, 142.65, 142.7, 142.8, 142.9, 143.05' - Fractures (10),	H		1
1 1			0	horizontal, smooth to rough, undulating, open	Ш	_	R4: 5 minutes
145 14	450		NR	143.3' - Fracture, horizontal, smooth, undulating, open	Ш	_	-
145 14	45.0			undulating, open	\Box		-
							1

APPENDIX 2BB-454



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-07A

SHEET 9 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 4.5	ft bg	s on 6	/16/07 START : 6/15/2007 END : 6/	/17/20	07 LOGGER : N. Jarzyniecki	_		
200	6)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
-101.8	R5-NQ 5 ft 77%	42	8 2 >10 1 NR	143.55' - Fracture, horizontal, smooth, planar to undulating, open 145.1, 145.2, 145.35' - Fractures (3), horizontal, smooth, undulating, open 145.15-145.35' - Fracture, vertical, smooth, undulating, open 145.85' - Fracture, horizontal, smooth to rough, undulating 146.35' - Fracture, <10 deg, rough, undulating, open 146.95, 147.0, 147.2, 147.4' - Fractures (4), horizontal, rough, undulating, open 147.0-147.4' - Fracture, vertical, rough,	\s \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	CHARACTERISTICS 138.95-139.4' - yellowish gray to light gray, (5Y 7/2 to 5Y 5/2), fine to medium grained, mild HCI reaction, weak to medium strong (R2 to R3), 10% voids to 1/16" in size, trace voids to 3/8" in size, no visible cavities/casts No Recovery 139.4-140.0' Limestone 140.0-142.05' - Same as 138.45-139.4' except trace cavities up to 9/16"x3/8", and 20% voids up to 1/16" from 141.3-141.7' 142.05-144.15' - yellowish gray, (5Y 7/2 to 5Y 8/1), fine to medium grained, strong HCI reaction, very weak (R1), 10% voids up to 1/16", trace casts/cavities up to 5/16"x3/16" at 143.5-144.4', irregular gray laminatons and thread-like mottling in 1/16" to 3/16" thick bands at 142.0-142.4' No Recovery 144.15-145.0' Limestone 145.0-145.85' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, very weak (R1), trace voids to 1/8", trace casts/shell fragments up to 3/8"x3/16" 145.85-147.05' - pale yellowish brown to dusky yellow, (10Y 2/2 to 5Y 6/4), medium grained, moderate HCI reaction, very weak to weak (R1 to R2), 15-20% voids to 1/16", moderately fossiliferous 147.05-147.65' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, weak to medium strong (R2 to R3) 147.65-148.35' - Same as 145.0-145.85' No Recovery 148.5-150.0' Bottom of Boring at 150.0 ft bgs on 6/17/2007	R5: 5 minutes 6/17/07 15:30: 15' HW casing removed to ensure no lock up in boring 6/18/07 8:02 Driller's Remark: Bottom of hole tagged to 138.5' over newer cave-in after casing removal		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-08	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLIN	G METH	<u>OD AND</u>	<u>EQUIPM</u>	ENT : CME 55 S/I	N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 4.0 ft b	gs on 5/2	0/07	START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faurote, N. Jarzyniecki
				STANDARD	SOIL DESCRIPTION COMMENTS
충밀운	SAMPLE	INTERVA	J (ft)	PENETRATION	0007
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVI		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
AAGE		RECOVE	ΕΚΥ (π)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
42.4				(N)	
42.4	0.0			1-1-1	Poorly Graded Sand With Organics (SP) 0.0-0.9' - dark gray, (N2), dry to moist, very loose,
_		0.9	SS-1	(2)	∟ angular to sub angular, fine silica sand, 25-30%
	1.5			` '	organics, 10-15% roots and rootlets that are 1"-1.5"
_					\long and up to 3/16"x3/16" with organics / - 08:10 Driller's Remark: 50 lb bags of
-	1				- Halliburton Quik gel bentonite mud mixture
-	-				- I
_					
_					
_					Water level assumed at approximately 4.0'
5	5.0				below ground surface
37.4	3.0				Silty Sand (SM)
-	-		00.0	4-3-4	5.0-6.0' - yellowish gray, (5YR 7/2), wet, loose, fine
_		1.0	SS-2	(7)	subangular, silica sands, 12% nonplastic fines,
_	6.5				brownish black (5YR 2/1), a few very large roots (>5"), / with rootlets (<1/8" x 1/8")
					(with footicis (* no x no)
_	1				1
-	1				†
-					-
_					
_					
10	10.0] [
32.4	10.0				Silt (ML)
-	1	1.0	SS-3	20-34-50/5	10.0-11.0' - moderate yellow, (5YR 7/6), wet, hard,
-				(84/11")	nonplastic, rapid dilatancy, moderate HCl reaction, \[\sqrt{5-10\%} \] fine to medium sand-sized carbonate particles, / \[\]
-	11.4				\friable, trace black fine sand-sized, trace white \ - \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
_					Carbonate grains, all carbonate Driller's Remark: 100% circulation loss after pulling out spoon
					09:30: Install 10' 6" casing, additional 5' of 6"
I -					casing installed
-	1				11:00: 15' 6" casing installed to 14.0' below
I -	1				ground surface (1 foot stick up height),
-	-				drilling and doing SPTs with a NW casing sized stabilizer installed on AWJ rods just
-					above drill bit
15	15.0				
27.4					Silty Sand With Limestone Fragments (SM) 15.0-16.25' - grayish yellow, (5Y 8/4), wet, dense, fine 13:53: Switched to 5 1/2" tricone bit, 100% circulation loss after pulling out spoon, add
		1.2	SS-4	31-24-17 (41)	to coarse grained, moderate HCl reaction, sand-sized 1/2 bag bentonite
-	16.5			(31)	carbonate material, 25% nonplastic fines, 1/8"-1/4"
-	10.0				fossiliferous limestone casts (<1/16") limestone, 20-25% gravel-sized fragments, limestone also
-	1				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					(5G 6/6) material, all carbonate
-					
_]
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I -	1				11
20	1				
<u> </u>					



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-08	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						Ty, auto nammer, Avvi rous			ORIENTATION : VEItical
WATER	LEVELS	: 4.0 ft bo	ıs on 5/20		START : 5/20/2007	END: 5/22/2007 SOIL DESCRIPTION	LOGGE	K: IV	. Faurote, N. Jarzyniecki COMMENTS
≷Q⊋			1 (0)	STANDARD PENETRATION		JOIL DESCRIPTION		9	COIVIIVILIVIO
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	. ,	TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMBOL	., COLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH B		RECOVE			MOISTURE	E CONTENT, RELATIVE DE	DRILLING FLUID LOSS, TESTS, AND		
			#TYPE	6"-6"-6" (N)	CONSISTEN	ICY, SOIL STRUCTURE, MI	NERALOGY	SYM	INSTRUMENTATION
22.4	20.6	0.1	SS-5	50/3	_ Limestone Fra	agments			14:12: Full circulation loss, Driller's Remark:
-				(50/3")		me as 15.0-16.25' except	poor	′┨	add another 5' 6" casing section, adding 1/2
-					\recovery		/	1	bag bentonite to mud vat
-								+	-
_								-	-
-								-	-
-								4	-
_								-	-
_								4	Drillarda Damandu Drill hit alimmana fram 22 0
_								4	Driller's Remark: Drill bit slippage from 23.0'- 24.0' -
25	25.0				Limactore			\bot	14.47. Add 1/2 has bents to to seed out
17.4		0.6	SS-6	13-50/4.5 (63/10.5")	Limestone Fra 25.0-25.2' - Sa	agments ame as 15.0-16.25'	/	\blacksquare	14:47: Add 1/2 bag bentonite to mud vat
-	25.9			(03/10.5)	Silt With Limes	stone Fragments (ML)	/	\Box] _
l -					25.2-25.6' - gra	ayish yellow, (5Y 8/4), wet olastic, 10-15% medium to	t, hard, rapid		_
_					sand-sized, 25	5% fine to coarse gravel-si	ized limestone		
_					fragments, 5-10	0% molds 3/8"		_	
								1	
_								1	
-								1	_
30	30.0							1	-
12.4	00.0					th Limestone Fragments			15:10 Driller's Remark: No circulation, add 4"
-		1.3	SS-7	20-11-13		oderate yellow, (5Ý 7/6), v coarse grained, moderate		1	HW casing, 30' HW casing (4") installed
-	31.5			(24)	22% nonplastic	c fines, 30-35% fine to co	arse		1
-	01.0					mestone fragments, highly shells), white-grayish yello		1	-
-						yellow (5Y 7/6), all carbor		1	-
-								1	-
-								1	-
-								1	-
-								+	-
								+	-
35 7.4	35.0 35.3	0.3	SS-8	50/4	_ Limestone Fra	arments		+	-
		\		(50/4")	\ 35.0-35.3' - mo	oderate yellowish brown, (10YR 5/4),	十	1 -
-						grained, mild HCl reactior ngular fragments, 10-15%		4	-
_					fines	ngulai iraginicitis, 10-1370	Horipiastic	4	-
_								-	-
-								4	-
-								1	_
-								1	-
-								1	_
_								1	_
40								\perp	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-08	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 4.0 ft b	gs on 5/20	0/07 8	TART : 5/20/2007	END : 5/22/2007	LOGGER	: M.	Faurote, N. Jarzyniecki
						SOIL DESCRIPTION		G	COMMENTS
N (#)	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION TEST RESULTS	SOIL NAIVIE, USUS GROUP STIVIBUL, CULUR,				DEDTH OF CACING POWERS SATE
H BE ACE ATIO	RECOVERY (ft)			MOISTURE C	CONTENT, RELATIVE DENSITY	/ OR	3OLI(DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
EN H			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MINERA	LOGY	SYMBOLIC LOG	INSTRUMENTATION
2.4	40.0	0.2	SS-9	50/5	Limestone Fragr	ments		J	Driller's Remark: Install 4" HW casing to 40'
_				(50/5")	40.0-40.15' - light	t olive gray, (5Y 5/2), wet, mo edium to coarse sand-sized,	oderate -	П	below ground surface -
-					moderately fossil	liferous (casts/molds), trace v	ery fine		
-					black organics Begin Rock Corir	ng at 41.0 ft bgs	/ -		1
					See the next she	ng at 41.0 ft bgs eet for the rock core log			
_							_		_
-							_		-
-							-		-
- 45							-		-
45 <u> </u> -2.6							_		
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-08	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	METHOD A	ND EC	QUIPM	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW of	asing		ORIENTATION : Vertical
WATER	LEVELS : 4.0	ft bg:	s on 5/	20/07 START: 5/20/2007 END: 5/	22/200	D7 LOGGER : M. Faurote, N. Jarzyr	niecki
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	41.0					No Recovery 41.0-43.7'	
- - - -	R1-NQ 5 ft 54%	33	NR >10	43.3-43.9' - Fracture zone, 1"-2" fragments		- - - - - Limestone	Start R1-NQ at 09:00 on 5/21/07, water level 6" SW casing at 4.9" below ground surface, 4" HW casing to 41.0', will advance 4" HW casing after pulling out R1-NQ
-	. 5470		-10		\top	43.7-46.0' - moderate olive brown,	Driller's Remark: First 1.5' – of run very fast drilling-
45_ -2.6			0	-	\mathbb{H}	 (5Y 4/4), wet, moderate HCl reaction, very weak (R1), highly fossiliferous (casts/molds), 15-20% voids on 	slippage; will assume core loss occurs at top of run 4" HW casing installed to
-	40.0		2	45.6, 45.8' - Bedding plane or mechanical	+	surface up to 1/16", 5-7% cavities	47.0' below ground surface
-	46.0			break (2), horizontal, rough, undulating, tight	口	_ infilled with medium gray (N5) up to 3/8", trace black sand-sized coarse	R1: 4 minutes –
-					廿	 grained and short 3/4" discontinuous laminations (<1/16" thick) 	-
-			NR		\perp	No Recovery 46.0-48.3'	-
-						-	_
-	R2-NQ				1	- Lime-sterre	_
-	5 ft 46%	24	1		\blacksquare	 Limestone 48.3-51.0' - Same as 43.7-46.0' 	
-			5	48.95' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/2" 49.1, 49.4' - Bedding plane or mechanical	Ħ	- -	-
50 -7.6	-			break (2), 25 deg, rough, undulating, tight	廿		R2: 2 minutes
-	51.0		2	49.5, 49.6' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open	\perp	-	-
-	51.0		2	1/16" 49.9, 50.1' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/8" for 49.9', tight for 50.1'		51.0-55.3' - medium olive brown, (5Y - 4/4), moderate HCl reaction, weak to medium strong (R2 to R3), poorly to moderately fossiliferous (casts),	- - -
_			1	50.4, 50.5' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/16"	囯	 15-20% spheroidal voids mostly <1/16", trace coarse sized black 	
-	R3-NQ 5 ft 86%	72	2	51.4' - Bedding plane or mechanical break, horizontal, rough, undulating, tight	\pm	grains, carbonate fines/silts from 54.6-54.85', fossil casts from 1/8"-1/2"	-
_				51.75' - Fracture, 50 deg, rough, undulating, tight	\vdash	_	
55_			2	52.8' - Bedding plane or mechanical break,		-]
-12.6			0	horizontal, rough, undulating, tight 53.1' - Bedding plane or mechanical break,	片	 - No Recovery 55.3-56.0'	R3: 5 minutes
	56.0		NR	horizontal, rough, undulating, open 1",very	片	_	
_			0	weak rock, friable 53.3' - Mechanical break or bedding plane,	出	Limestone 56.0-60.3' - moderate olive brown,	
_			$oxed{oxed}$	horizontal, rough, undulating, tight 54.6-54.85' - Fracture zone, extremely weak,	Н	_ (5Y 4/4), moderate HCl reaction,	
-			0	carbonate silt 56.85-58.5' - Fracture, extremely to very	\blacksquare	medium strong rock (R3) from 56.0-56.85', 56.8-58.5' black fine	-
-	R4-NQ		\vdash	weak rock	₽	carbonate laminations, medium strong rock (R3), grading to very	-
-	5 ft	45	1		円	weak rock (R1) 58.5-60.3',	-
-	86%		\vdash	58.75' - Fracture, 50 deg, rough, undulating, tight	囯	56.0-58.5', 5-10% voids/casts <1/16", 58.5-60.3', 30-35% voids <1/16",	-
			2	ugnt	ΙП	 3-7% medium sized black grains in 	-
60 <u> </u>			0	60.0, 60.2' - Mechanical break or bedding	\pm	rock matrix (carbonaceous)	R4: 3 minutes
-	61.0		NR	plane (2), horizontal, rough, undulating, tight	Н	- No Recovery 60.3-61.0'	SC-1 collected at 58.75- 60.0'
-	61.0						00.0



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-08	SHEET	5	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				VOCAST CONTROL OF A DE STOCK O		OZ LOGOFD M.F. ot M. I.	ORIENTATION . Vertical
WATER	LEVELS : 4.0	πbg	s on 5	<u>/20/07 START : 5/20/2007 END : 5.</u> DISCONTINUITIES	22/20	07 LOGGER : M. Faurote, N. Jarzyn LITHOLOGY	COMMENTS
ĕ₽£	CORE RUN, LENGTH, AND RECOVERY (%)			<u> </u>	8		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	Z, Z, Z	<u></u>	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AHE	E E E	(%) Q	F. S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	B B	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F.E.E.	SENCE	RQI	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ПОП	0.716	IL.	шп		0)	Limestone	
_			0	61.2, 61.7, 63.1, 64.2, 65.4' - Fractures (5),	 	- 61.0-66.0' - light olive brown, (5Y	-
_				horizontal, rough, undulating, tight	╀	5/6), moderate to strong HCl	_
			1		╨	reaction, weak (R2), 63.0-64.0' - medium strong rock (R3), 20-25%	
			'	62.75' - Bedding plane or mechanical break,	Н	voids/casts decreasing to 10-15%	
	R5-NQ			horizontal, rough, undulating, open 1/4"	\vdash	below 64.0', moderately fossiliferous	
	5 ft 100%	90	0	63.5' - Mechanical break	世	 (casts, few molds), trace black fine to medium grain sized, 3-7% medium to 	1
_					╁	coarse sized, medium dark gray (N4)	1
65			1		仜	 intraclasts from 65.5-66.0', subrounded bedding interval from 	1
-22.6				64.8' - Fracture, 50 deg, rough, undulating, –	+	64.0-66.0', short discontinuous (3/8")	R5: 5 minutes
-			1	tight	仠	black laminations and fine grain black grained, 20% staining in alive	-
-	66.0			65.75' - Bedding plane or mechanical break,	廿	black grained, 20% staining in olive gray (5Y 3/2)	-
-			3	horizontal, rough, undulating, tight	₩	 66.0-71.0' - light olive brown, (5Y 	-
_				66.55' - Fracture, 35 deg, rough, undulating, open 5/8"	ፗ	5/6), moderate HCl reaction, similar to 61.0-66.0', medium strong rock	-
_			0	66.8, 66.95' - Bedding plane or mechanical	╁┰	_ (R3), 66.0-66.8' weak rock (R2),	_
			Ľ	break (2), horizontal, rough, undulating, tight 67.9, 68.3, 68.55, 68.7, 68.75' - Mechanical	F	68.7-69.7' extremely weak rock (R0),	
	R6-NQ 5 ft	88	0	break (5)	片	10-15% voids <1/16", 5-10% medium dark gray (N4), medium to coarse	
	100%	00	"	(1)		grained intraclasts, discontinuous,	
					$oxed{\Box}$	68.7-69.7' short horizontal black laminations, trace olive gray (5Y 4/1)	1
70			2	69.6' - Bedding plane, 20 deg, rough,	╁┌	staining	1
-27. 6				undulating, tight, very weak rock (R1)	Ħ	_	R6: 7 minutes
-	71.0		0	69.9' - Fracture, 60 deg, rough, undulating, tight	世	-	1
-	71.0			ugiit	╁	_ Limestone	1
-			0		\perp	- 71.0-75.7' - light olive brown to	-
-				72.0' - Fracture, 35 deg, rough, undulating,	\pm	moderate olive brown, (5Y 5/6 to 5Y 4/4), moderate to strong HCl	SC-2 collected at 71.0-
-			0	tight	+	 reaction, poorly fossiliferous (casts), 	72.0' -
_	D7.NO			72.6' - Bedding plane, horizontal, rough,	+	medium strong rock, R3, from 71.0-72.5', very weak rock, R1, to	-
_	R7-NQ 5 ft	77	0	undulating, tight	╁ᆣ	- extremely weak rock, R0, from	_
_	94%			70.05.75.41.5	oxdot	72.5-74.2', medium strong, R3, from	_
			0	73.95, 75.1' - Fractures (2), horizontal, rough, undulating, tight	Ш	74.2 to 75.7', 10-15% voids <1/16" - over 71.0-72.5', 35-40% voids <1/16"	
75			"	and and any agent	\vdash	over 74.2-75.7', poorly fossiliferous	
-32.6			1	_	岸	(casts), bottom 2" has gritty feel, medium dark gray (N4) intraclast as	R7: 7 minutes
	76.0		NR			seen in 66.0-71.0' interval	1
	,		<u> </u>		oxdappi	No Recovery 75.7-76.0'	1
					\perp	No Recovery 76.0-78.0'	
-			NR		╁	-	
-					广	-	-
-	R8-NQ			78.0-78.4' - Fracture zone	世	-	-
-	5 ft	28	>10		╀	-	-
-	60%			horizontal, rough, undulating, open 1/16"	世	-	-
-			>10	78.8' - Fracture, 15-20 deg, rough,	十	-	
80				undulating, open 1/6" 78.95' - Fracture or mechanical break, –	片		
-37.6			0	horizontal, open 1-1/4"	Ľ	_	R8: 10 minutes
	81.0				\coprod		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-08	SHEET	6	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

				IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c			ORIENTATION : Vertical
WATER	LEVELS : 4.0) ft bg:	s on 5		22/20		
≥∩≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 85_ -42.6 - - - - - -	R9-NQ 5 ft 88% 86.0 R10-NQ 5 ft 88%	74	3 2 1 1 0 NR 1 0 >10 2	79.15' - Fracture, horizontal, rough, undulating, open 1/8" 79.25' - Fracture, horizontal, rough, undulating, tight 79.65-79.95' - Fracture zone 81.3' - Bedding plane, horizontal, rough, undulating, open 1/2" 81.45' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8" 81.9' - Bedding plane, horizontal, rough, planar 82.2' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 82.9' - Fracture, 20 deg, rough, undulating, tight 83.45' - Fracture, 60-70 deg, rough, undulating, tight 84.4' - Fracture, 60 deg 86.7' - Bedding plane, horizontal, rough, undulating, tight 88.0' - Bedding plane, 5-10 deg, rough, undulating, tight 88.0' - Fracture zone 88.5' - Fracture, 15-20 deg, rough to undulating, black staining over 15% of surface		Limestone 78.0-81.0' - light olive brown, (5Y 5/6), strong to moderate HCI reaction, medium strong to strong (R3 to R4), 78.0-78.5' dissolution cavity zone, 10-25% voids mostly <1/16", poorly fossiliferous (casts <3/16") trace cavities 3/16"x1/8", trace black fragment 3/4"x1/8", bedding discontinuity up to 5/8" at 80.7' Limestone 81.0-85.4' - light olive brown to dusky yellow, (5Y 5/6 to 5Y 6/4), moderate to strong HCI reaction, poorly to moderately fossiliferous (casts), 81.0-81.8' strong rock (R4), trace voids <1/16", trace medium dark gray (N4) staining, 81.5-85.4' weak rock (R2), 30% voids/casts <1/16", trace cavities, 10-15% medium gray (N5) staining at 84.5' No Recovery 85.4-86.0' Limestone 86.0-90.4' - light olive brown to dusky yellow, (5Y 5/6 to 5Y 6/4), moderate to strong HCI reaction, weak (R2), moderate to strong HCI reaction weak (R2), moderate to strong HCI reaction weak (R2), moderate to strong HCI reaction weak (R2), moderate to strong HCI reaction weak (R2), moderate to strong HCI reaction weak (R2), moderate to strong HCI reaction weak (R2), moderate to strong HCI reaction weak (R	R9: 8 minutes
-47.6 - - - - -	91.0 R11-NQ 5 ft	60	0 NR 1 1	89.4' - Bedding plane, 5-10 deg, rough, stepped, 1/8" black layer organics 89.7' - Bedding plane, 30 deg, rough, undulating, tight 91.85' - Bedding plane, 0-5 deg, smooth, undulating, tight, <1/16" fine infill 92.95' - Fracture, 40 deg, rough, undulating, tight, fracture surface parallels friable zone 1"		moderate to strongly fossiliferous (molds, casts), 3-7% medium coarse grain-sized black laminations <1/16" thick, casts/molds up to 5/8", voids/casts <1/16" over 25-30% of surface, 3-7% medium to coarse sized, medium dark gray (N4) subrounded sand-sized in rock matrix, 89.9' black intraclast also at 1/8" No Recovery 90.4-91.0'	R10: 9 minutes
- 95_ -52.6 -	92%		4 2 NR	1 34.2 - I lacture, nonzontal, rough, undulating,		Limestone 91.0-92.5' - Same as 86.0-90.4' 91.0-95.6' - light olive brown (5Y 5/6) grading to white (N9) at 92.5', light olive gray (5Y 6/1) mottling, strong HCI reaction 92.5-95.0' - yellowish gray (5Y 8/1), medium strong rock (R3), cavities fine grained infill at 92.9', very weak	SC-4 collected at 92.95- 93.65' - R11: 16 minutes -
- - - - - 100 -57.6	R12-NQ 5 ft 76% 101.0	69	0 2 0 2 NR	open 5/8", friable zone 94.6' - Fracture, 60 deg, rough, undulating, tight 94.7' - Fracture, horizontal, rough, undulating, open 1/8" 95.1' - Bedding plane, horizontal, very weak rock (white) below 95.4' - Bedding plane, horizontal, 1/2" thick organic layer 97.8-97.9' - Fracture zone 97.9' - Bedding plane, horizontal, rough, undulating 99.0' - Fracture, 10-20 deg, rough, undulating, open 1/2"		zones at 93.7' with a chalk-like feel, 5-10% voids to <1/16" over surface 95.0-95.25' - very weak (R1), 20-25% voids to <1/16" over surface 95.25-95.6' - very weak (R1), with 25% (<1/16") black laminations No Recovery 95.6-96.0'	

APPENDIX 2BB-461 Rev. 4



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-08

SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	I WE I HOD AI	ND EC	ZUILIA	MENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5	/20/07 START : 5/20/2007 END : 5/	22/200	D7 LOGGER : M. Faurote, N. Jarzyr	niecki
≥∩≘	. (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B C C C C C C C C C C C C C C C C C	E FE	Q D (%)	8.5	DEPTH, TYPE, ORIENTATION, ROUGHNESS,] 	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
PT.	ORE NG	ΩØ	RAC.	PLANARITY, INFILLING MATERIAL AND	ΜB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
S I	CC LE RE	R	FB	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	2. Kor 6, 1261 (A266216, 216.
				99.4' - Bedding plane or mechanical break,	Ш	Limestone	
			1	horizontal, rough, undulating, open 1" 101.55, 102.0' - Fractures (2), 70 deg, rough,	ш	 96.0-99.8' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak (R1), 	1
_				undulating, tight	Н	grading to weak rock (R2), highly	1
_			4	102.2' - Bedding plane, horizontal, rough,	ш	 fossiliferous (casts, molds), 1/2" fossils decreases with depth. trace 	-
-	R13-NQ			undulating, tight 102.7' - Fracture, 70 deg, rough, undulating,	Н	brownish black (5YR 2/6) infill,	-
_	5 ft	65	2	tight -	ш	 diverse fossil types over upper 2.0' 	-
_	90%			102.95' - Fracture, 40 deg, rough, undulating, tight	Н	and lower 0.5', 10-15% medium gray (N5) fine to medium sized	-
_			1	103.1' - Fracture, 60 deg, rough, undulating,	Ħ	No Recovery 99.8-101.0'	
105_				dark gray stains over 80%, tight	ш	Limestone	
-62.6			0	103.5' - Fracture, 30 deg, rough, undulating, tight	Щ	101.0-105.5' - Same as 96.0-99.8' - except yellowish gray, (5Y 7/2),	R13: 5 minutes
	106.0		NR	104.7' - Fault, 40 deg, rough, undulating,	団	strong HCl reaction, 20-25% medium	1
				tight, 50% dark gray staining	\mathbb{H}	dark gray (N4), fine medium sized] 1
-			0		Ħ	grains No Recovery 105.5-106.0'	1
-				•	Н	Limestone	1
-			0	-	ш	_ 106.0-111.0' - Same as 96.0-99.8'	-
_	R14-NQ				Н	except yellowish gray, (5Y 8/1), with gradational change to smaller	-
_	5 ft	98	2	108.4' - Fracture, 60 deg, rough, undulating,	+	_ (mostly microforams) fossils starting	-
_	100%			black staining over 100% surface, tight	ш	at 107.5' -	
_			1	108.75' - Fracture, 30 deg, black staining	ш	_	_
110			'	over 100% of surface 109.3' - Fracture, 70 deg, rough, undulating,	ш		
-67.6				trace dark gray (N3) staining, tight	Н		R14: 5 minutes
	111.0		3	110.25' - Fracture, 70 deg, rough, undulating, dark gray stains over 100% over surface,	Н	_	1
_				tight	ш	Limestone	1 7
-			1	110.5' - Fracture, 70 deg, rough, undulating,	ш	 111.0-115.9' - yellowish gray, (5Y 8/1), fine to medium grained, strong 	-
-				tight, dark gray stains over 100% of surface 110.75' - Fracture, 70 deg, rough, undulating,	ш	HCl reaction, very weak (R1),	-
-			2	dark gray stains over 100% of surface, tight	Н	- gritty/powder-like feel, highly	SC-5 collected at 112.5-
_	D45 NO			111.1' - Bedding plane or mechanical break,	H	fossiliferous (microforams, shells, casts, molds), grain size increases	113.3'
_	R15-NQ 5 ft	80	1	horizontal, rough, planar, tight, open 1/16" 112.0' - Fracture or mechanical break, 40	Н	- with depth, 15-20% fine sized,	-
_	98%			deg, rough, undulating, tight	Щ	medium dark gray (N4) grains in]
			0	112.5' - Fracture, 60 deg, rough, undulating, open 1/16"	Н	matrix	
115			"	113.3' - Fracture or mechanical break,	H]
-72.6			2	horizontal, rough, undulating, tight	Ш		R15: 5 minutes
	116.0		2	115.2' - Fracture, 75-80 deg, rough, undulating, open 1/16"	14	-] 1
-	. 10.0		NR.	115.8' - Bedding plane or mechanical break,	Ш	No Recovery 115.9-116.0'	1
-			0	horizontal, rough, undulating, open 1/16"	Н	Limestone 116.0-118.5' - yellowish gray, (5Y	1
-				-	仠	8/1), medium grained, strong HCI	-
-			1	117.2' - Fracture, 70 deg, rough, undulating,	丗	_ reaction, highly fossiliferous	-
_	D40 NO			tight, large casts	ш	(microforams, casts, molds), 15-25% moderate dark gray (N4) intraclasts,	-
-	R16-NQ 5 ft	100	0		Ш	_ 160.4' bedding contact, fossil casts]
_	100%				H	>3/4" (corals) - 118.5-121.0' - yellowish gray, (5Y]
			2	119.25' - Bedding plane or mechanical break,	П	_ 7/2), 5/8" through coring cavities]
120			_	horizontal, rough, undulating, tight, fracture	Ш	infilled at 118.7', fossil casts >1/2"]
-77.6			_	through bioturbated zone 119.6' - Bedding plane or mechanical break,	Ш	 fragments (yellowish gray, medium dark gray, light olive brown) medium 	R16: 6 minutes
	121.0		0	horizontal, rough, planar, tight	Ш	sized grains] 1
				- · · · · · · · · · · · · · · · · · · ·	\Box		
					\perp		
					_		-



PROJECT NUMBER:

33884.FL B-08 SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bg:	s on 5/		22/200		
≩Q₽				DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 125 -82.6	R17-NQ 5 ft 54%	37	NR >10	123.3-123.7' - Fracture zone, subangular to subrounded 3/4"-1 5/8" limestone fragments, very weak (friable texture) rock (R1) 123.85, 124.0' - Bedding plane (2), horizontal, rough, planar, open 1/16"		No Recovery 121.0-123.3' Limestone 123.3-123.85' - yellowish gray, (5Y 8/1), highly fossiliferous (fragments, shells, molds, casts), friable 123.85-126.0' - strong HCl reaction, very weak (R1), highly fossiliferous	07:40: Water level on 5/22/07 at 4.9' below ground surface in 6" SW casing -
-02.0	126.0		2	125.3' - Bedding plane, horizontal, rough, undulating, open 1/16" 125.4' - Bedding plane, rough, undulating,		- (casts, shells), 1/2"x1/2" shells, 10-15% voids <1/16", very fine to medium grain rock texture, 7-10%	Add 7.0' of 4" HW casing, now set at 53.0' below ground surface
-			4	tight, fracture through/across bedding plane 126.05, 126.15, 127.45, 127.55, 127.65, 129.75' - Bedding plane or mechanical break (6), horizontal, rough, planar, open <1/16"		yellowish gray (5Y 7/2) mottling 126.0-128.0' - Same as 123.85-126.0'	- - -
- -	R18-NQ 5 ft 78%	56	2	127.9-128.0' - Fracture zone, horizontal, rough, undulating 128.4, 129.55, 129.55' - Bedding plane or mechanical break (3), horizontal, rough,		Limestone 128.0-129.9' - medium grained, strong HCl reaction, very weak (R1), friable, 20-25% medium grained	- - -
130_ -87.6	121.0		3 NR	undulating, tight		 sized, medium dark gray (N4) grains, rounded to subrounded, grain size coarsens with depth, 128.0-128.4' very fine grain with >1/2" casts, crystalline carbonate material in rock 	R18: 5 minutes
- - -	131.0		3	131.1' - Bedding plane, horizontal, rough, undulating, open 1/8" 131.25, 131.30' - Bedding plane (2), horizontal, rough, undulating, open 1/4"		matrix as cavity infilling and matrix grains No Recovery 129.9-131.0' Limestone	All material is carbonate; larger (1/2"x1/8") shells appear to be bedded at approximate 20°-30° dip
-	R19-NQ 5 ft 76%	47	3 5	132.55' - Fracture or mechanical break, horizontal, rough, undulating, tight 133.3' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 133.5, 133.6, 133.7' - Bedding plane (3), horizontal, rough, planar, open <1/16" 134.05' - Bedding plane, horizontal, rough,		- 131.0-133.4' - yellowish gray, (5Y 8/1), very weak (R1), 30-40% voids/casts <1/16", trace cavities 3/16"x1/16", friable, highly fossiliferous (casts, molds, shells), very fine grain sized limestone, all carbonate 133.4-134.8' - yellowish gray, (5Y	over 132.0-133.4' interval SC-6 collected at 131.3- 132.55'
135_ -92.6 -	136.0		NR	undulating, tight undulating, rough, undulating, open 1/8" 134.2, 134.4, 134.5' - Bedding plane (3),		8/1), very fine to medium grained, (grain size coarsening with depth), thin bedded, medium-sized rounded particles of different colors bedded	R19: 6 minutes
- -			3	horizontal, rough, undulating, open 1/8" 136.1, 137.1' - Bedding plane or mechanical break (2), 5-10 deg, rough, undulating, tight 136.3' - Bedding plane or mechanical break,		from 133.5-134.8, carbonate materials No Recovery 134.8-136.0'	SC-7 collected at 136.3-
-	R20-NQ 5 ft 80%	58	2	horizontal, rough, planar, tight 137.85, 137.95' - Bedding plane or mechanical break (2), horizontal, rough, undulating, tight		-	137.1'
- 140 -97.6			>10	138.1' - Fracture, 70 deg 138.9' - Fracture, 15-20 deg 139.3' - Bedding plane, 5 deg, rough, undulating 139.3-140.0' - Fracture, angular stained black		- - -	R20: 8 minutes
	141.0		NR	along fracture surfaces		-	
					_		•



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-08

SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IEINT: CIVIE 33 3/N 3 10023, ITIUU TOLAIY, NQ LOOIS, FIVE				ORIENTATION : Vertical
WATER	LEVELS : 4.0) ft bgs	s on 5		22/2	<u>2007</u>		
≥□≎	(%			DISCONTINUITIES	ی ا	Ł	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLICLOG		ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
ᆱ끯은	RUI H, / ÆR	(%) Q	R C	DEDTIL TYPE OPIENTATION POLICINESS	7 🚆	(MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T A A	ZE I) O	Z F	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l E		WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SEN SE	S S	75.7	THICKNESS, SURFACE STAINING, AND TIGHTNESS	1		CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		_			+ï	+	Limestone	
_			3	141.2' - Bedding plane or mechanical break,	上	⇉	136.0-139.3' - yellowish gray, (5Y	4
				15-20 deg, rough, undulating, open fractured	Щ	Ł	8/1), very fine grained, strong HCI	
				through cavity 141.6, 141.9, 142.25' - Mechanical break or	Ъ	┰	reaction, very weak (R1), very fine	
-			2	fracture (3), horizontal, rough, undulating,	匚	⇉	grain rock with medium grained beds	1
_	DO4 NO	ļ		tight, fractured through irregularly shaped	₽	+	at 136.0', 138.0-138.3', very weak (R1), highly fossiliferous	-
I _	R21-NQ 5 ft	60	3	dissolution cavities, 15% brown or black	╁┱	╁	(microforams, shells, casts, molds),	
	92%	00	ľ	staining on fracture surface			5-7% medium sized, medium dark	
				142.8' - Bedding plane, 10 deg, rough, undulating, black stains over 10% of surface,	H	╌	gray (N4) medium sized grain,	1
			1	open 1/16"	十	╁	subrounded, 5-10% voids <1/16",	1
145_				143.1' - Bedding plane, 15-20 deg, brownish —	4	_	_ 10% mottling in yellowish gray (5Y _ 7/2) powder-like texture	I BOA 40
-102.6			3	black stains over 85% of surface, tight	尸	1	Limestone	R21: 10 minutes
	146.0		NR	143.25' - Bedding plane, horizontal, rough,		1	139.3-140.0' - yellowish gray, (5Y	1
-				undulating, open 1/8" 143.9' - Bedding plane, horizontal, rough,	1	_Ի	8/1), very fine grained, medium	1
-			1	stepped	廿	+	strong to strong (R3 to R4), 3-5%	1 -
-				144.25' - Fracture, 25 deg, rough, undulating,	\Box	4	voids <1/16", poorly fossiliferous (casts, molds), interval has broken	-
			2	tight	Ь	Ł	fragments of core with irregular	
			_	145.05' - Bedding plane, horizontal, rough,	Ľ	ⅎ	shaped infilled cavities (bioturbated	
-	R22-NQ)		undulating, tight 145.35' - Bedding plane, horizontal, rough,	口	_	zones), infilling with grayish yellow	1
_	5 ft	77	1	undulating, open 1/16"	+	╁	(5Y 8/4), hard, brittle minerals with	-
_	92%			145.5' - Fracture, 80 deg, rough, undulating,	E	1	30-40% voids <1/16" No Recovery 140.0-141.0'	1
			2	tight	上	Ł	Limestone	
150				146.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1"	Ъ	1	141.0-145.05' - very fine grained,	
-107.6			1	147.35, 147.75' - Bedding plane or	Г	_	strong HCl reaction, medium strong	R22: 9 minutes
-				mechanical break (2), horizontal, rough,	╀	+	to strong (R3 to R4), 5-15% voids <1/16", 15-20% horizontally aligned,	1
_	151.0		NR	_ undulating	中	1	irregularly shaped to elongated	
				148.2, 148.5' - Mechanical break (2), tight		Ш	cavities 3/16" x 1/16", few bedding	
				148.9' - Bedding plane, horizontal, rough, undulating, tight	1	П	contacts with brownish black (5YR	Abandonment:
_				149.15' - Fracture, vertical, rough, undulating,	1	H	2/1) laminations on surface, trace	approximately 250 gallons
_				tight	-	H	dissolution cavities 3/4", poorly fossiliferous (casts/molds), dense	of grout mix (28-47 lb bags of Bonsal brand Portland
_				149.8' - Fracture, 40-50 deg, rough,	4	L	heft	Type 1 cement), 7 dry 47 lb -
				undulating, tight			145.05-145.6' - light olive brown, (5Y	bags added to top of
				150.3' - Fracture or mechanical break, horizontal, rough, undulating, tight, fractured	1	Г	5/6), strong HCl reaction, weak (R2),	grouting surface (35-47 lb
_				through partially infilled cavity	1	F	3-5% moderate dark gray (N4)	bags of grout mix used)
-					1	F	rounded grains, fine to medium grained, trace voids <1/8"	1 -
-				_	4	L	No Recovery 145.6-146.0'	-
					⅃	L	Limestone	
					1	Γ	146.0-148.9' - yellowish gray grading	1
1 -				•	1	F	to light olive brown, (5Y 8/1 grading to 5Y 5/6), medium grained, strong	1
-					1	F	HCl reaction, very weak (R1), with	-
1 -					1	L	gritty feel, bedded medium sized	
							carbonate grains (yellowish gray,	
					1	Γ	light olive brown, moderate yellow),	1
-					1	F	particle sizes decreasing with depth, angular to subrounded, medium light	1 1
-					-	F	gray (N6) coarse sand to fine	-
-					1	L	gravel-sized grains over top 0.7'	
]		interval	
					1	Γ		1
1 -				_	1	上	1	
-					+	F		-
					4	╀		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-08	SHEET	10	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

00.1				IENT . CIVIE 55 3/N 3 10025, ITIUU TOLATY, NG	2 10010, 1111 00	zonig	9	SRIENTATION : Vertical
WATER	LEVELS: 4.0) ft bgs	on 5/	/20/07 START : 5/20/2007	END : 5/2	2/20	007 LOGGER : M. Faurote, N. Jarzyniecki	i
	_			DISCONTINUITIES			LITHOLOGY	COMMENTS
중무율	(%) ي <u>0</u>					8		-
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	S F, Ä	(%) Q	28	DEPTH, TYPE, ORIENTATION, ROUG	HNESS	딍	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	UID LOSS. CORING RATE AND
FF.	RE CO	۵	AC.	PLANARITY, INFILLING MATERIAL	. AND	ΨĞ	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUB	응힐띭	RQ	F.F.	THICKNESS, SURFACE STAINING, AND	TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
F		_				۲		
					_]	148.9-151.6' - fine to very fine grained, strong HCl reaction,	
					_	1	medium strong to strong (R3 to R4),	
-					-	l	fine to very fine grain texture	-
					_		(decreasing with depth), 3-7% voids	_
							<1/16", poorly fossiliferous (casts),	
I -					-	i	dense heft, moderate olive brown (5Y	=
I -					-		 4/4) grading to yellowish gray (5Y) 	-
							7/2) at 149.5'	
1 7					_	1	No Recovery 150.6-151.0'	7
-					-	l	Bottom of Boring at 151.0 ft bgs on	-
						1	5/22/2007	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER LEVELS: 4.0 ft bgs on 5/3/07									ORIENTATION . VERICAL
WATER	LEVELS	: 4.0 π ο	gs on 5/3/	07 S	START : 5/1/2007	END : 5/3/2007	LOGGEI	₹∶R. T	Bitely, K. Coke, A. Erickson, W. Elliott
30₽				STANDARD PENETRATION		SOIL DESCRIPTION		9	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	. ,	TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBO	OL COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BE ATIO		RECOVE	RY (ft)		MOISTURE	E CONTENT, RELATIVE D	ENSITY OR	30 E	DRILLING FLUID LOSS, TESTS, AND
FP.			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, N	MINERALOGY	Ϋ́	INSTRUMENTATION
42.9	0.0			(N)	Poorly Grade	d Sand With Organics (2D\	S	
42.5	0.0			1-1-2	0.0-1.1' - dark	gray to very light gray, (I	N3 to N8),	_	_
_		1.1	SS-1	(3)	moist, very loo	ose, fine grained sands, t	race nonplastic		_
l _	1.5				tines that are p	primarily organic, trace ro th depth, silica sand	oots,		_
					decreasing with	ur acpur, omca oaria			
								1	
-								1	Wet at 3.0' below ground surface (SS-1 dry
_								1	but SS-2 wet)
-								1	-
	. .							1	-
5 37.9	5.0				Clayey Sand ((SC)		1//	-
-				3-1-2	5.0-6.0' - dark	yellowish brown, (10YR			-
-		1.0	SS-2	(3)	black mottling,	, moist to wet, very loose edium plastic fines, 5% co	, fine grained		-
_	6.5				1/2" in size, sil			4	_
_								4	_
_								1	_
-							•	1	
-								1	
10	10.0						,	1	-
32.9	10.0				Silt (ML)			Ш	_
-		0.9	SS-3	5-4-6	10.0-10.9' - gra	ayish yellow, (5Y 8/4), we	et, stiff,	1	-
-		0.0		(10)	reaction, trace	oid dilatancy, mild to mod fine grained sand, trace	concretions.	╂	-
-	11.5				∖carbonate deri			┨	-
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l _								1	_
]							•		
15	15.0							1	-
27.9					Silt (ML)			1	Driller's Remark: Some loss circulation after
-		0.9	SS-4	11-2-2		ame as 10.0-10.9' except nottling, soft, trace fine w		1	pulling split spoon -
-	16 5			(4)	sand, fine to co	oarse grained sand, carb	onate derived	1	-
-	16.5					<u>.</u>		1	-
-								$ \cdot $	-
-								$\mid \cdot \mid$	-
-								1	-
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-09	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLIN	DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8" tri-cone bit ORIENTATION: Vertical								
WATER	LEVELS	: 4.0 ft b	gs on 5/3/	/07 5	START: 5/1/2007 END: 5/3/2007 LOGGER: R. Bitely, K. Coke, A. Erickson, W. Elliott				
	STANDARD				SOIL DESCRIPTION COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
BE A NO.		RECOVE		IESI KESULIS	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE,				
TH VAT			<u> </u>	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION				
			#TYPE	(N)					
22.9	20.0	0.1	SS-5	50/3	Well Graded Gravel (GW) Driller's Remark: 4" HW casing advanced to				
-				(50/3")	20.0-20.1' - dusky yellowish brown, (10YR 2/2), fine to coarse grained gravel-sized concretions, dark				
-					yellowish orange staining, fine grained sands, also a This is Remark: Circulation loss				
-					single limestone fragment, silica sand				
-					- Last SPT of 5/1/07				
-					- I				
-					-				
_									
_					_				
_]]				
25	25.0								
17.9				05.07.40	Silty Sand With Limestone Fragments (SM) 25.0-26.2' - grayish yellow, (5Y 8/4), wet, very dense, +0.8' SS-6 is first run of 5/2/07, 08:03 water level = +0.8'				
		1.2	SS-6	25-37-42 (79)	moderate HCI reaction, fine to coarse grained				
-	26.5			(10)	sand-sized, 41% nonplastic fines, 15% fine grained				
-					gravel-sized limestone fragments, trace white carbonate streaks, trace black with green very fine				
-					grained sand, all carbonate derived				
-					1				
-									
-					-				
-					- 1				
_									
30	30.0				016.0				
12.9				27-31-29	Silty Sand (SM) 30.0-31.3' - Same as 25.0-26.2' except 30-35%				
_		1.3	SS-7	(60)	nonplastic fines and 10-15% fine sized limestone				
_	31.5				fragments				
_									
_					1				
-					1 1				
-					1 1				
-									
	05.0								
35 7.9	35.0				Silty Sand With Limestone Fragments (SM)				
I -		1.5	SS-8	29-40-19	】 35.0-36.5' - Same as 25.0-26.2' except 20% sized - ┃ │ │ │ │				
-		1.5	J 33-8	(59)	limestone fragments				
-	36.5								
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 4.0 ft bo	s on 5/3/	07 S	START : 5/1/2007 END : 5/3/2007 LOGGE	ER :	R. Bitely	y, K. Coke, A. Erickson, W. Elliott
>00				STANDARD	SOIL DESCRIPTION	ot	g 🗀	COMMENTS
ANE SANE	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH BE		RECOVE			MOISTURE CONTENT. RELATIVE DENSITY OR		BOLI	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYM	INSTRUMENTATION
2.9	40.0				Sandy Silt (ML)	T	П	
		1.5	SS-9	20-40-46 (86)	40.0-41.5' - grayish yellow, (5Y 8/4), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl]		
-	41.5			. ,	reaction, 33% fine to medium grained sand, all carbonate	\perp	Щ	_
-								-
-						+		-
-						+		-
-						+		-
-						1		-
45	45.0					1		-
-2.1				40.00.00	Sandy Silt (ML) 45.0-46.5' - Same as 40.0-41.5'			
-		1.5	SS-10	16-22-36 (58)	45.0-46.5 - Gaine as 46.0-41.5	4		_
-	46.5					4	Щ	-
-						+		-
-						+		-
-						+		-
-						1		-
-						1		-
50	50.0					1		
-7.1	50.3	0.0	SS-11	50/4 (50/4") /	No Recovery 50.0-50.3'	4	-	-
-						+		-
-						+		-
-						+		-
-						1		-
-						1		-
]		
_						1		_
55 -12.1	55.0	0.4	00.40	EO/E	Limentone Everyments	4		
-12.1	55.4	0.1	SS-12	50/5 (50/5")	Limestone Fragments 55.0-55.1' - grayish yellow, (5Y 8/4), moderate HCl reaction, fine to coarse grained sand and fine sized	/-		-
-					\reaction, fine to coarse grained sand and fine sized limestone fragments	1		-
-						+		-
-						+		-
-						1		-
						1		-
]		_
_						1		ller's Remark: Last 2.0' were harder ling, light chatter -
60						4	-	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 4.0 ft bo	gs on 5/3/	07 5	START: 5/1/2007 END: 5/3/2007 LOGGER: R. Bitely, K. Coke, A. Erickson, W. Elliott
300				STANDARD	SOIL DESCRIPTION g COMMENTS
AND (f	SAMPLE	INTERVA		STANDARD PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
H BE		RECOVE			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-17.1	60.8	0.1	SS-13	50/4	Last SPT sample, switching to NQ coring
-				(50/4")	\(\begin{align*} \left(60.0-60.1' - grayish yellow, (5Y 8/4), mild to moderate \(-\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
					Begin Rock Coring at 61.0 ft bgs See the next sheet for the rock core log
_					See the next sheet for the rock core log
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-22.1					- 1
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	5	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	METHOD A	ND E	QUIPN	MENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bg	s on 5	/3/07 START : 5/1/2007 END : 5/3	3/2007	LOGGER : R. Bitely, K. Coke, A.	Erickson, W. Elliott
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	61.0 R1-NQ 5 ft 66% 66.0 R2-NQ 5 ft 100%	8	4 6 3 1 NR 2 2 2	61.25, 61.55' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/16", shell casts on fracture surface 61.7' - Fracture, 50 deg, rough, undulating, tight 61.95' - Fracture, 80 deg, rough, undulating, black staining in microfractures on surface 62.1, 62.25' - Bedding plane or mechanical break (2), horizontal, rough, undulating, 1/8" open 62.5' - Fracture, 50 to 60 deg, rough, undulating, tight 62.6' - Mechanical break of fracture, horizontal, rough, undulating, tight 62.7' - Fracture, 50 to 60 deg, rough, undulating, tight 62.9' - Fracture, horizontal, rough, undulating, tight 63.1' - Fracture or mechanical break, horizontal, rough, undulating, open to 3/4" 63.5, 63.75' - Fractures or mechanical break (2), horizontal, rough, undulating, dark grayish staining, open 1/16" 64.0' - Fracture or mechanical break, 30 deg,		Limestone 61.0-64.4' - grayish yellow, (5Y 8/4), mild to strong HCl reaction, very weak (R1) (top most) to medium strong (R3) (lower 2/3 sample), voids (<1/16") over 25-30% of surface, moderately fossiliferous (casts, molds), medium gray (N5) staining over lower 2/3 sample, fossils up to 3/8" in size No Recovery 64.4-66.0' Limestone 66.0-71.0' - grayish yellow, (5Y 8/4), strong HCl reaction, voids (<1/16") over 25-30% of surface, moderate to highly fossiliferous (casts, molds), extremely weak (R0) from 66.0-66.3', rest of sample medium strong rock (R3), grayish stains on rock surface	NQ coring assembly, 60.0' 4" HW casing installed, tape measured total depth to 61.0' 14:00 Start coring, using 10.0' sections of NQ barrel R1: 3 minutes SC-1 collected at 68.75-
70 -27.1 -			0	rough, undulating, dark grayish staining on surface, tight 66.1, 66.3' - Mechanical break or fractures — (2), horizontal, rough, undulating, open up to 1/2"		- -	69.65'
- - - - - 75 -32.1	R3-NQ 5 ft 84%	75	2 0 0 1 NR	67.15' - Fracture, 50 deg, rough, planar, dark staining over 80% of surface, tight 67.95' - Fracture, 10 to 20 deg, smooth, stepped, tight 68.5' - Mechanical break, 10 to 20 deg, rough, undulating, mechanical break to get into box, tight 68.75, 68.85' - Mechanical break or bedding plane (2), 10 to 20 deg, rough, undulating, open 1/16" 69.65' - Mechanical break or bedding plane, horizontal, rough, undulating 71.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1/4" 71.65' - Bedding plane, horizontal, rough, undulating, open to 1/2" contact between 2		71.0-75.2' - stained medium gray, (N5), strong HCl reaction, very weak to weak (R1 to R2) 71.0-71.65' - voids (<5/8") over 5-10% of surface, hard medium dark gray (N4) mineralization and olive gray (5Y 4/1) soft plastic very fine grained infilling 71.65-75.2' - yellowish gray, (5Y 8/1), chalk-like texture, highly fossiliferous (shell fragments, casts, molds), most fossils <1/16" in size up to 3/8" casts 73.0-73.8' - moderate yellowish brown staining, (10YR 5/4), horizontally oriented medium dark gray (N4) 3/8" long fossils	Driller's Remark: Slight (20%) loss of circulation over first foot of run R3: 7 minutes
- - - - - 80 -37.1	R4-NQ 5 ft 62% 81.0	43	2 NR 1 3	colors, infilled voids and soft plastic fines on surface above 74.85' - Mechanical break or bedding plane, horizontal, rough, undulating, tight 76.2' - Mechanical break or fracture, horizontal, rough, planar, open 1/16" 76.4' - Fracture or mechanical break, 30 deg, rough, undulating 76.65' - Fracture, horizontal, rough, undulating 78.5' - Fracture, horizontal, rough, undulating 79.0. 79.25' - Fractures (2), horizontal, rough, undulating, top and base of crumbled rock fragments, tight		gray (N4) 3/8" long fossils - 74.3-75.2' - moderate yellowish brown (10yr 5/4) staining, horizontally oriented medium dark gray (N4) 3/8" long fossils No Recovery 75.2-76.0' Limestone 76.0-76.65' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, very weak (R1), voids (<1/16") over 5-10% of surface No Recovery 76.65-78.55'	Driller's Remark: Loss of core interval from 76.65-78.5' Driller's Remark: Loss of circulation at approximately 78' (100%) SC-2 collected at 79.8-81.0' R4: 25 minutes
	1						<u> </u>



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-09	SHEET	6	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	METHOD A	ND EC	QUIPN	MENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bg	s on 5	/3/07 START : 5/1/2007 END : 5/3	3/200	LOGGER : R. Bitely, K. Coke, A.	Erickson, W. Elliott
300	<u></u>			DISCONTINUITIES	_O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 85 -42.1	R5-NQ 5 ft 100% 86.0 R6-NQ 5 ft 100%	86	1 2 3 0 1 2 1 0 1 1	79.8' - Bedding plane or mechanical break, horizontal, rough, planar, open <1/16" 81.5' - Mechanical break, 50 to 60 deg, rough, undulating, tight 81.8' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 82.8, 82.9, 83.05' - Bedding plane or mechanical break (3), 30 deg, rough, undulating, tight, fossil casts (up to 1 1/2" size) and molds (of tubular fossils) on surfaces 83.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1" 83.5' - Mechanical break, mechanical break to get into box 83.7' - Bedding plane or mechanical break, horizontal, rough, undulating, slight darker discoloration/staining 84.2' - Mechanical break, 10 deg, rough, undulating, tight 85.4' - Bedding plane, 0 to 5 deg, rough, undulating, soft fine material infill 1/16" thick 86.2, 86.7' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/8"		Limestone 78.55-81.0' - medium yellow, (5Y 7/6), very fine grained, strong HCI reaction, weak to strong (R2 to R4), voids (<1/16") over 25-30% of surface, trace unfilled cavities, irregularly shaped, poorly fossiliferous (casts) 81.0-85.4' - yellowish gray, (5Y 8/1), white mottled, strong HCI reaction, very weak to weak (R1 to R2), highly fossiliferous (molds, casts) 1" long tubular molds 1/16" diameter, voids (<1/1/6") over 30-35% of surface, 83.3-84.0' very fine grained "chalk-like" textured layer, below 84.0' highly mottled in bioturbated pockets 85.4-86.0' - olive gray, (5Y 4/1), laminations 1/4" thick of a very fine grained soft fine material 86.0-91.0' - yellowish gray, (5Y 8/1), very fine grained, strong to moderate HCI reaction, weak (R2) 86.0-86.4' - light olive brown (5Y 5/6) bioturbated pockets with voids	R5: 14 minutes
90 -47.1 -	91.0		2	horizontal, smooth, planar 87.4' - Fracture, vertical, rough, undulating, black stains over 10-15% of surface 89.25' - Bedding plane, 70 deg, 3/4" thick soft fine infill (olive gray 5Y 3/2)		(<1/16") 86.4-86.7' - very fine grained "chalk-like" textured limestone bed 86.7-90.0' - very fine grained weak (R2) rock, voids or casts (<1/16")	R6: 21 minutes
- - - -	R7-NQ		0	90.0' - Fracture, 70 deg, rough, undulating, light gray staining over 100% of surface, tight 90.45' - Fracture, 30 deg, rough, undulating, tight 91.1, 91.5' - Mechanical break or bedding plane (2), horizontal, rough, undulating, open		over 10-15% of surface, grades to highly fossiliferous medium grained textured limestone, 20-25% white fossil allochems in rock matrix with 30-35% medium gray grains 89.5' - organic clay lens, light olive	Driller's Remark: Depth to water 4.0' below ground - surface -
- - 95_ -52.1	5 ft 98%	82	0 1 3	1/16" 91.9' - Mechanical break or bedding plane, horizontal, rough, undulating, open up to 1/2", fossils on surface of break 92.6, 93.65' - Mechanical break (2), horizontal, rough, undulating, tight 94.4' - Mechanical break or bedding plane, horizontal, rough, undulating, tight 95.25' - Mechanical break or bedding plane,		brown (5Y 5/6) 90.0-91.0' - 30-40% yellowish gray (5Y 7/2) grains in matrix, organic (black) laminations with 3/8" sized grains (black in color) 91.0-95.9' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2) 91.0-93.2' - stained yellowish gray	Last run on 5/2/07 R7: 20 minutes
	R8-NQ 5 ft 100%	86	0 1 0	horizontal, rough, planar, shell casts on fracture surface, open 1/16" 95.55' - Mechanical break or bedding plane, horizontal, rough, undulating, tight, fossil cast on surface 95.65' - Mechanical break or fracture, 30 deg, rough, undulating, open 3/8"-1/4" 96.3' - Fracture or mechanical break, 30 deg, rough, undulating, tight to open 3/4" 98.2' - Fracture or mechanical break, horizontal, rough, undulating, gray staining		(5Y 7/2), highly fossiliferous (casts, molds up to 3/4"), voids/casts (<1/8) over 20-25% of surface, 10-15% fine to medium grained sized medium dark gray (N4) grains in rock matrix No Recovery 95.9-96.0 Limestone 96.0-101.0' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak (R1), chalk-like texture, highly fossiliferous (casts, spiral-shaped up to 5/8" and molds), voids or casts (<1/16") over 25-30%	First core run on 5/3/07 Water level 4.0' below ground surface at 07:49 SC-3 collected at 97.35-98.5'
	101.0		2	rough, undulating, light gray staining, tight		of surface, trace black grains (organics)	
			1				<u> </u>



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	7	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	IVIE I HOD AI	ND EC	ĮUIPIV	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW c	asıng		ORIENTATION : Vertical
WATER L	EVELS : 4.0	ft bgs	on 5/		3/200		
≥⊕£	<u>(%</u>			DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			1	100.55' - Fracture, 50 deg, rough, undulating, tight 101.3' - Mechanical break or fracture,		Limestone Continuing - as 3/4" long x 1/8" wide grains, rock has a medium grained appearance	Driller's Remark: Continued 90-95% loss of circulation
			2	horizontal, rough, undulating, gray staining over 100% of surface, tight 101.65' - Fracture, 80 to 90 deg, rough,	Ħ	due to medium dark gray (N4) and yellowish gray (5Y 7/2) grains in rock matrix, microforams throughout,	
	R9-NQ 5 ft 96%	42	>10	undulating, gray staining, tight 102.0' - Fracture, 10 to 15 deg, rough, undulating, 40% gray staining, tight		trace elongated cavities 9/16"x1/16" rimmed with white (N9) mineral 98.1-101.0' - stained fine to medium	-
105_			3	102.5' - Fracture, 80 deg, rough, undulating, >1' length, tight, casts/molds on surface 104.15' - Fracture, 5 to 10 deg, rough,		grained yellowish gray (5Y 7/2) 101.0-105.8' - yellowish gray, (5Y 8/1), strong HCI reaction, very weak	
-62. 1	106.0		0 NR	undulating, tight, casts/molds on surface 104.3' - Fracture, 80 deg, rough, undulating, light gray staining on 70-80% of surface, tight 104.7' - Fracture or mechanical break, 30		(R1), very fine to medium grained, mixture of visible white (N9), yellowish gray (5Y 7/2) and medium gray (N5) grains, voids or casts	R9: 4 minutes
			0	deg, rough, undulating, open up to 1"		gray (N3) grains, voids or casts (1/16") over 25-30% of surface, spheroidal to elongated in shape, rock has chalk-like feel, casts and]
-	R10-NQ		0			molds up to 3/4" visible over upper 2.5' of sample, voids (<1/32"), white spheroidal grains predominant lower	-
	5 ft 100%	100	1	108.45' - Mechanical break or fracture, horizontal, rough, undulating, brown staining over 80% of surface, tight		2.5' of sample No Recovery 105.8-106.0' Limestone	-
110 -67.1			0	109.2' - Mechanical break, horizontal, rough, stepped, tight —		_ 106.0-111.0' - same as lower 2.5' of 101.0-105.8' except with areas of bioturbation horizontally oriented,	R10: 4 minutes
- - 1	111.0		0	110.85' - Mechanical break, 70 deg, rough, undulating, tight	Ė	 bioturbated areas are yellowish gray (5V 8/1) with voids (<1/16") over 40-45% of surface, trace cavities up to 3/4", elongate in shape and 	-
-			1	111.1' - Mechanical break or fracture, horizontal, rough, planar, open 1/16"	H	partially infilled like bioturbated areas, sample grades with depth to a yellowish gray (5Y 8/1) below 109.25'	-
	R11-NQ		1	112.4' - Fracture or mechanical break, 15 to 20 deg, rough, undulating, open 1/8"		111.0-116.0' - yellowish gray grading to light gray at 114.5', (5Y 8/1 to N7), very fine grained, strong HCl	-
	5 ft 100%	98	0	113.55' - Mechanical break, 20 deg, rough, undulating, tight		reaction, very weak (R1), medium to highly fossiliferous	
11 <u>5</u> -72.1			0	145 45' Mochanical hazzla	H	114.5-116.0' - percentage of voids, fossil casts, and cavities increases with depth, voids (1/16" to 3/16") over	R11: 2 minutes
<u> </u> 1	116.0		1	115.45' - Mechanical break 116.1' - Fracture or mechanical break, horizontal, rough, planar		15-30% of surface, 5-10% cavities up to 9/16th rimmed with white (N4) mineral (possible mineral replacement in fossil casts), tubular]
-			1	117.45' - Fracture or mechanical break, 20		- and shell fossil casts up to 3/8" in size, color change also indicative of change from "chalk/powder" like feel	SC-4 collected at 117.45-
	R12-NQ 5 ft	68	1	deg, rough, undulating, tight 118.55' - Fracture, 30 deg, rough, planar,	Ħ	to friable/gritty feel with depth, moderately to highly fossiliferous	118.55' -
120	70%	,	1	open 1/16" 119.1' - Fracture or mechanical break, horizontal, rough, undulating, tight, fossil			-
-77.1	121.0		NR	casts on surface —	H	- -	R12: 2 minutes
	121.0				\Box		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	8	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c			ORIENTATION : Vertical
WATER	LEVELS : 4.0	ft bg:	s on 5		3/200		
ĕ₽€	(%			DISCONTINUITIES	ဗ္ဗ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H B	E.R.L STH, SVE	(%) Q	ĬΞĞ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30L	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV LEV	ORE	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	072	ď	ഥ	THIORNESO, OOK AGE STAINING, AND HOTTINESO	S		
_			1	121.35' - Fracture, 70 deg, rough, undulating,	Н	Limestone - 116.0-119.5' - fine grained, strong	
			·	tight	ш	HCl reaction, very weak to weak (R1	
				122.05, 122.1' - Bedding plane or mechanical		to R2), highly fossiliferous	
			2	break (2), 5 to 10 deg, rough, undulating, black speckling as stains on 25% of surface,	Н	 (microforams, molds/casts), grades in color from light gray (N7) from 	
_	R13-NQ			tight		116.0-118.0' to medium gray (N5)	1
-	5 ft	98	1	123.15, 123.4' - Mechanical break (2),	ш	- from 118.0-119.5', similar sequence	1
-	98%			mechanical break to get in to box 123.55' - Fracture, 60 to 70 deg, rough,	ш	to 111.0-116.0', becoming friable, voids and fossils increase in	1
-			1	undulating, tight	H	 percentage with depth, 5-10% 	-
125				124.4, 124.65' - Mechanical break, horizontal,		cavities with white (N9) and	I _{540.0}
-82.1			0	rough, undulating, broken by driller, tight 124.9' - Fracture, 80 deg, rough, undulating,	Н	translucent mineral replacement, cavities are elongated 5/8"x3/8",	R13: 2 minutes
	126.0		_	black speckled staining over 60% of surface,	Ш	translucent to clear crystal grains	
]			NR NR	tight	Ш	(calcite) (1/32"-1/16"), voids (<1/16") over 35-45% of surface	1
			>10	125.05' - Mechanical break, <5 deg, rough, undulating, black stains, tight	Н	No Recovery 119.5-121.0'	
-				126.15-126.45' - Fracture zone, subangular	Ш	Limestone	1
-			1	and subrounded limestone fragments - 3/4"-1-1/8" in size	ш	_ 121.0-125.9' - yellowish gray to light gray, then to medium light gray at	1
-	R14-NQ			127.85' - Fracture or mechanical break, 60 to	団	125.0', (5Y 8/1 to N7 to N6), fine	1
-	5 ft	22	3	70 deg, rough, undulating, tight to open 7/8"	+	grained, strong HCl reaction, very	-
_	52%			128.0 - Fracture or mechanical break, horizontal, rough, planar, tight		weak (R1), voids/microforams casts (<1/16") over 30-35%of surface,	1
_				128.5' - Fracture or mechanical break,	Н	highly fossiliferous (casts, molds,	
130			NR	horizontal, smooth, planar, tight	Ш	microforams), fossil casts of shells	
-87.1					Н	and spiral tubes up to 9/16", echinoderms with white (N9) mineral	R14: 3 minutes
	131.0			-	\Box	replacement 9/16" x 3/16" in size,	
				·	Ш	similar to 101.0-105.8' 124.9-125.9' - possible calcite	1
-			3	131.3, 131.4' - Mechanical break or fracture (2), horizontal, rough, undulating, open <1/8"	ш	crystals	1
-				131.75' - Mechanical break or fault,	ш	No Recovery 125.9-126.0'	1
-			1	horizontal, rough, planar, tight	Н	Limestone 126.0-128.6' - medium gray to	CS-5 collected at 132.3-
_	D45 NO			132.3' - Fracture, 25 deg, rough, undulating, tight		yellowish gray, (N5 to 5Y 7/2), strong	133.5'
-	R15-NQ 5 ft	80	0		Н	HCl reaction, very weak to weak (R1]
	90%			133.5-133.75' - Mechanical break, 0 to 10 deg, rough, planar, mechanical break to get	Ш	to R2), inverse sequence of - 106.0-111.0', grades from	
			2	in to box, tight	Н	friable/gritty to powder-like at 127.5',	
135				134.55' - Fracture or mechanical break, 5 to	H	highly fossiliferous (casts up to 7/8",	1
-92.1			0	10 deg, rough, undulating, tight to open 1/16" — 134.6' - Fracture or mechanical break, 0 to 5	Ш	 molds, microforams), 3-7% 3/4" echinoderms (rimmed cavities with 	R15: 3 minutes
-	136.0		NR	deg, rough, planar, tight to open 1/16"	Ш	white (N9) to translucent	1
-	130.0				団	 mineralization), bottom-most 1' has 3/8" thick horizontal bioturbated 	1 1
-			1	- 136.6' - Fracture or mechanical break,	H	lenses	-
-			<u> </u>	136.6 - Fracture or mechanical break, horizontal, rough, undulating, open up to 1"	H	No Recovery 128.6-131.0'	-
-			2	137.3' - Bedding plane, horizontal, rough,	Н	<u>-</u>	1 4
				undulating, open to 5/8"	Ш]
	R16-NQ 5 ft	36	2	137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight	Н	_	
]	50%	50		138.1, 138.2' - Fractures (2), rough,	\Box		1
]				undulating, fracture intersecting 70° fractures	Ш		1
140			NR	with 6" lengths, tight	Щ	-	1
-97.1				_	団	_	R16: 6 minutes
-	444.0			-	Н	_	1 -
-	141.0				H		+

APPENDIX 2BB-473

Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-09	SHEET	9	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c			ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bg	s on 5		3/200		
≥O₽	(%			DISCONTINUITIES	ő	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A CE	R.H.	(%) Q	15°	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	S	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT LEV	ORE	Ø	ZAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	¥.	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	038	œ	ᇤᆸ	THICKNESS, SURFACE STAINING, AND HIGHTINESS	Ś		
_			2		┢	Limestone - 131.0-135.5' - yellowish gray, (5Y	_
			_	141.55' - Fracture or mechanical break,	Щ	8/1), medium to coarse grained,	_
				horizontal, rough, undulating, 1/2" open 141.85' - Bedding plane or mechanical break,		strong HCl reaction, very weak to - weak (R1 to R2), voids (<1/16") over	
			1	85 deg, smooth, undulating, open 1/16"	Н	10-15% of surface,	l -
	R17-NQ		_	142.25, 143.1, 143.45, 143.8' - Fractures (4), 20 to 60 deg, rough, undulating, tight		chalk-like/powdery feel to sample,	<u> </u>
_	5 ft 86%	60	3	20 to 00 deg, rough, undulating, tight	H	 5-10% coverage of 3/4"x3/16" cavities rimmed with white (N9) 	-
_				144.2' - Fracture or mechanical break, 10	╙	mineralization, 134.75' contact	-
145			5	deg, rough, undulating, tight	仜	 (sharp) very fine grained whitish limestone below, medium gray (N6) 	Driller's Remark: Probable
-102.1			0	144.55, 144.65, 144.8, 144.95' - Mechanical —	+	discoloration as horizontal bands at	jostling of rock fragments —
-			NR	break or fractures (4), 0 to 10 deg, smooth, undulating, open <1/16"	F	- 132.0', moderately to highly	during coring _ R17: 16 minutes
-	146.0			and alating, open in to	t	fossiliferous (casts, molds) No Recovery 135.5-136.0'	-
_			1		₽	_ Limestone	-
-				146.8' - Fracture, 50 deg, rough, undulating,	ш	136.0-138.5' - very light gray to medium light gray, (N8 to N6), strong	-
_			1	tight 147.1' - Bedding plane or mechanical break,	世	HCl reaction, weak to medium strong	-
_				horizontal, rough, planar, tight	╁╌	(R2 to R3) 136.0-137.25' - cavities up to 1-3/4"	_
	R18-NQ 5 ft	78	1	147.6' - Mechanical break, horizontal, rough,		infilled partially and entirely with very	_
	84%		·	undulating, tight 148.25' - Mechanical break, horizontal,	H	fine grained yellowish gray (5Y 8/1) material, cavities have tubular casts	_
			2	rough, undulating, tight		_ 1/8" diameter, trace elongate shaped	_
150			-	148.5' - Fracture or mechanical break, rough, undulating, 15% black speckled staining, tight —		cavities 3/4"x3/16" rimmed with white	
-107.1			0	149.35-149.6' - Mechanical break or bedding	h	(N9) mineralization (possibly echinoderms with calcite	R18: 8 minutes
	151.0		NR	plane, 5 to 10 deg, rough, undulating, open <1/16"	H	replacement)	l -
				71110	1	137.25-138.5' - yellowish gray (5Y 8/1), very fine grained, moderate to	
-					1	strong HCl reaction, medium strong	
_					1	(R3), bioturbated areas with voids <1/16" over 30-40% of infill, poorly to	-
_				•	1	moderately fossiliferous (casts,	-
-					1		-
-					1	Limestone	-
-					1	- 141.0-145.3' - yellowish gray, (5Y	-
_					-	8/1), medium grained, strong HCl reaction, weak to very weak (R2 to	-
-				_	4	R1), possible wavy-load structures,	I —
_					1	grades from medium grained to fine grained to medium grained with	-
-					1	- depth	-
					1	141.7' - with 3-5% medium to coarse	_
_					1	grained medium gray (N5) grains, I horizontally to subhorizontally	_
					1	aligned, poorly fossiliferous (shells,	_
					1	molds, echinoderms) No Recovery 145.3-146.0'	
]							
1 7					1		·
1 7					1		_
					1		
-				_	1		_
-					1	<u> </u>	-
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-09	SHEET	10	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				1ENT . CIVIE 33 3/N 310023, ITIUU TOLAIY, N	<u>u 100.0, 1.111 00</u>	ionig	
WATER	LEVELS: 4.0	ft bgs	s on 5	/3/07 START : 5/1/2007	END : 5/3	/200	07 LOGGER: R. Bitely, K. Coke, A. Erickson, W. Elliott
	_			DISCONTINUITIES		(D	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION		SYMBOLIC LOG	DOCK TYPE COLOR
E HO	N. A. Y.	(9	FRACTURES PER FOOT	BEGORII HOR		2	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, SIZE AND DEPTH OF CASING, FILLIPLOSS, CORING PATE AND
A HE	ETE S	(%) Q	Τ̈́	DEPTH, TYPE, ORIENTATION, ROUG	GHNESS,	30L	WEATHERING, HARDNESS, AND DOCK MASS, AND DOCK MASS, AND DOCK MASS
무유의	SING	οD	SAC ER I	PLANARITY, INFILLING MATERIAL	L AND	WE	AND ROCK MASS CHARACTERISTICS DROPS, TEST RESULTS, ETC.
12 S II	225	22	H H	THICKNESS, SURFACE STAINING, AND	HIGHTNESS	S	CHARACTERISTICS BROFS, TEST RESULTS, ETC.
							Limestone
-					-		- 146.0-150.2' - yellowish gray, (5Y -
-					-		7/2), strong HCl reaction, weak (R2)
							to medium strong (R3) rock, voids - (<1/16") over 10-15% of surface,
							poorly fossiliferous (casts, molds,
1 7					_		some echinoderms), medium grained
-					-		 intervals have barely visible distinct
					_		grain colors, yellowish gray (5Y 7/2)
							and light gray (N6), fine grained intervals are yellowish gray (5Y 8/1)
1 7					_		in color and have voids (<1/16") over
-					_		20% of surface, trace infilled cavities
-					-		up to 1/4" diameter
							149.6-150.2' - horizontal bedding
							No Recovery 150.2-151.0'
1 1					-		- Bottom of Boring at 151.0 ft bgs on
-					-		_ 5/3/2007
					_		<u> </u>
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-10	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						END : 4/0/2007		-D		ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft bo	JS 011 4///		START : 4/6/2007	END: 4/9/2007 SOIL DESCRIPTION	LOGGE	T		COMMENTS
중무운	SAMPLE	INTERVA	I (ft)	STANDARD PENETRATION		0012 22001111 11011		┪	90-	
DEPTH BELOW SURFACE AND ELEVATION (ft)	0, 1111 22	RECOVE	` ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,				SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH YEAC			#TYPE	6"-6"-6"		CONTENT, RELATIVE DEN CY, SOIL STRUCTURE, MIN			MBC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUI			#***** <u></u>	(N)				╛		
42.0	0.0			2-3-5	Topsoil	nish black to light brown,	(5YR 2/1 to	1	717	Cathead Operator: F. Cani
_		0.8	SS-1	(8)	- \5YR 5/6), moist	t, root matter, wood fragm		d		Driller's Remark: Rapid, smooth drilling Water level between 1.5-3.0' below ground
_	1.5				organics, with fi	Sand With Silt (SP)		4		surface
_					0.25-0.8' - brow	nish gray, (5YR 4/1), mois	st, loose,	4		Driller's Remark: Light chatter
-					trace organics	d, silica sand, 5% nonpla	stic fines,	+		-
-								4		-
-								4		-
-								+		-
	5 0							+		-
5 37.0	5.0				Sandy Lean Cla	ay (CL)		-	///	-
-		1.2	SS-2	4-4-3	5.0-6.2' - light g	ray, (N7), moist, medium dilatancy, no HCl reaction		1		-
-	6.5		002	(7)	fine silica sand	uliataricy, no norreaction	, 30 % very	4		7
-	0.0				-			1		1
_								1		1
								1		1
								1		1
]		
10	10.0									_
32.0				4-22-22	Clayey Sand (S	SC) nsitions from black to yello	wish grav	_		_
_		1.2	SS-3	(44)	\ (N1 to 5Y 8/1), ı	moist to wet, soft, high pla	asticity, no to	4		-
_	11.5				medium grained	strong HCl reaction, <5% d carbonate sand	fine to	Ħ		_
_					Silt (ML)		d	4		-
_					hard, nonplastic	yish orange, (10YR 7/4), c c, rapid dilatancy, modera	te to strong	4		-
-					HCl reaction, 10	0% medium sand-sized, to nestone fragments, all carl	race fine	+		-
-					material	lestone fragments, all carr	bonate	+		-
-								+		
	45.0							+		-
15 <u> </u>	15.0				Silt (ML)			+	Ш	\dashv
-		1.0	SS-4	5-15-19	15.0-16.0' - San	me as 10.5-11.2' except conestone fragments (1") at t	oarse top of	+		- -
-	16.5			(34)	interval, no sand	d-sized material		1	쌕	Driller's Remark: Light chatter, variable at
-	10.0							1		15-20', drill rate slowing
-								1		1
								1		1
								1		1
]]
]]
20								\perp		



PROJECT NUMBER:

338884.FL

B-10

SHEET 2 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

						ary, carneau, NVVJ 10us, 5-			ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft bo	us on 4///		START : 4/6/2007	END: 4/9/2007 SOIL DESCRIPTION	LOGGE	:ĸ∶(. Sump COMMENTS
≥⊕€	044.5:		1 (0)	STANDARD PENETRATION		JUIL DEJURIT HUN		– 8	CONNINIENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMBO	_, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ATI B		RECOVERY (ft)			MOISTURE	E CONTENT, RELATIVE DE	ENSITY OR	BOIL	DRILLING FLUID LOSS, TESTS, AND
SURI			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY			SYN	INSTRUMENTATION
22.0	20:8	0.3	SS-5	50\5.5	_ Silt (ML)			Ш	
-	20.5			(50\5.5")	\ 20.0-20.3' - Sa \sand-sized ma	ame as 15.0-16.0' except	<5% fine	1	1
-					Saria-Sizea ma	itoriai	/	1	1
-								1	1
-								1	Driller's Remark: Slow advancement rate at
-								1	22-30', intermittent to constant heavy chatter, - strong H2S odor from mud at 22-24'
_								1	311011g 1120 0001 110111 111100 at 22-24
-								1	1
-								1	1
25	25.0							1	1
17.0	23.0				Sandy Silt Wit	th Limestone Fragments	(ML)	ΤП	Driller's Remark: 100% loss of circulation at
-		1.0	SS-6	23-30-30		ayish orange, (10ŸR 7/4), ic, rapid dilatancy, moder		111	24'
-	26.5			(60)	☐ HCI reaction, 2	25-30% fine to coarse sar	d-sized, weak	∕╬	1
-	20.5				(R2) limestone	e lenses (<1/2" thick) thro	ughout, all	1	Driller's Remark: Partial to full circulation
-					carbonate mate	criai		1	return with use of thicker mud
-								1	1
-								1	1
-								1	1
-								1	1
30	30.0							1	1
12.0	30.0				Sandy Silt (ML	L)		┪	Driller's Remark: Moderate drilling rate at 30-
-		1.2	SS-7	11-24-30	30.0-31.2' - gra	ayish orange, (10YR 7/4), ic, rapid dilatancy, moder	moist to wet, ate HCl	111	45', intermittent light to moderate chatter -
_	31.5			(54)	$_{\neg}$ reaction, 30% $^{\circ}$	very fine to fine sand-size	ed material,	ДШ,	4 1
_	01.0) limestone lens (1/2" thic , all carbonate material	ek) at 30.0',	1	1
-					(a.dee e.ga.nee,	, an earsernate material		1	1
-								1	1
-								1	1
-								1	1
-								1	1
35	35.0							1	1
7.0					Silty Sand (SN	M)	(40)(D.5(1)	T	1
_		1.5	SS-8	9-12-5 (17)	35.0-36.5' - mo moist to wet vo	oderate yellowish brown, very stiff, fine to medium of	(10YR 5/4), rained.		1
_	36.5			(17)	moderate HCI	reaction, 40% nonplastic	fines,	1]
_					Interpedded (> lenses (<1" thic	5) extremely weak (R0) li ck), all carbonate materia	mestone I /	1	1
_					(= === (= u	,,	/	1	1
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PROJECT NUMBER:	BORING NUMBER:				
338884 FI	R-10	CHEET	2	OE	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

DRILLIN	G METH	OD AND	EQUIPM	ENT : Dietrich D-5	50 S/N 232, mud rotary, cathead, NWJ rods, 3-7/8" tri-	cone bit		ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft bo	gs on 4/7/	/07	START : 4/6/2007 END : 4/9/2007	LOGGER	R : C.	Sump
				STANDARD	SOIL DESCRIPTION		<u></u>	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION			SYMBOLIC LOG	
PH PH PH PH PH PH PH PH PH PH PH PH PH P		RECOVE	, ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLO		LIC.	DEPTH OF CASING, DRILLING RATE,
HAE A		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY CONSISTENCY, SOIL STRUCTURE, MINERAL		IBO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
925			#TYPE	6"-6"-6" (N)	CONSISTENCT, SOIL STRUCTURE, WIINERAL	LOGI	S.Y.	INSTRUMENTATION
2.0	40.8	0.1	SS-9	50/4		Г	"	Driller's Remark: Light to heavy chatter at
-				(50/4")	\daggerapsysheright 40.0-40.1' - moderate yellowish brown, (10YR mild to moderate HCl reaction, medium to coa	5/4), -		40-45', very dense, slow drilling rate
-					sand-sized and fine gravel-sized fragments			-
-						-		-
-						-		-
-						-		_
- 45	45.0					-		18:30 on 4/6/07 End drilling for the day at 49', water at ground surface
-3.0	70.0	1.4	00 40	17-29-31	Sandy Silt With Limestone Fragments (ML) 45.0-46.4' - moderate yellowish brown, (10YR			08:00 on 4/7/07 Resume drilling from 49' Water level at 2' below ground surface
-	46.5	1.4	SS-10	(60)	moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 35-40% fine to coarse sand-sized, extremely weak (R0) limestone ler		Ш	Driller's Remark: Moderately slow drilling rate at 45-60', intermittent light chatter -
-					(<1/2" thick) interbedded throughout sample, a			-
_								- -
-						-		-
-						-		_
50 <u> </u>	50.0				Sandy Silt With Limestone Fragments (ML)		Ш	
-		1.3	SS-11	37-29-15 (44)	50.0-51.3' - Same as 45.0-46.4'	-	Ш	
-	51.5						Ш	-
-						-		-
-						-		-
_						-		- -
- 55	55.0					-		-
-13.0	55.4	0.4	SS-12	50/5 (50/5")	Limestone Fragments ↑ 55.0-55.4' - moderate yellowish brown, (10YR	5/4) <i>[</i> =	F	_
-				(33,0)	mild HCl reaction, extremely weak (R0) limest lenses (<1/2" thick) interbedded with silt-sized	one /		-
-					material, all carbonate material			-
-						-		-
-						-		- -
-						=	-	-
60								-



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-10	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.0 ft bo	gs on 4/7/	07 5	START : 4/6/2007 END : 4/9/2007 LOGGER	R : C	C. Sump
				STANDARD	SOIL DESCRIPTION	₀	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR	BOLI	DRILLING FAILUD LOSS, TESTS, AND
DEPT SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION
-18.0	60.0 60.6	0.6	SS-13	22-50/0.75 (77/6.75")	Sandy Silt (ML) 60.0-60.6' - moderate yellowish brown, (10YR 5/4),	П	11:00 on 4/7/07 Set HW casing to 60.5' to begin NQ rock coring
				(1110.13)	moist, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 25% medium to coarse sand-sized and 5% fine to coarse gravel-sized material, all carbonate	ľ	begin No rock coming
_						l	-
-					\text{material, trace organic laminations} \text{ Begin Rock Coring at 61.0 ft bgs}	ł	-
-					See the next sheet for the rock core log	ł	-
-					-	ł	-
-					-	1	-
65 <u> </u>							
-23.0					-	ł	-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-10	SHEET	5	OF	9	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.0) ft bg:	s on 4	7/07 START : 4/6/2007 END : 4/9	9/200	7 LOGGER : C. Sump	
ŞQ⊋	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
BELO CE AN TION (f	RUN, H, AND	(%	URES	DESCRIPTION		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	61.0 R1-NQ 61.5 0.5 ft	0	2 NR	CA OF CA AL Frankrica an area having lands	\mathbb{H}	Limestone	Begin rock coring at 61.0'
			2	61.35, 61.4' - Fractures or mechanical break (2), <10 deg, smooth, undulating, tight		- 61.0-61.3' - dark yellowish brown, (10YR 4/2), fine grained, strong HCl	R1: 1 minute
				61.7, 62.15 - Fractures or mechanical break (2), <10 deg, smooth, undulating, open 1/4"	Т	reaction, weak (R2), 15% laminated organics decreasing with depth, trace	SC-1 collected from 62.2-
			0	(2), <10 deg, \$1100th, undulating, open 1/4	\vdash	voids (<3/16") over surface, poorly	63.25'
			U	63.25' - Mechanical break	\vdash	fossiliferous - No Recovery 61.3-61.5'	
	R2-NQ 5 ft	68	3	63.75' - Fracture, 30 deg, rough, undulating,		62.5-64.3' - Šame as 61.0-62.5'	
	100%	00	3	open 1/4"		except extremely weak to very weak (R0 to R1), 10% laminated organics,	
65_			3	64.0' - Mechanical break 64.3' - Fracture, 20 deg, rough, undulating,	╟	poorly fossiliferous, trace voids	
-23.0				open 1/4"	$oldsymbol{oldsymbol{eta}}$	(3/16"), few cavities (<1/2") 64.3-66.3' - Same as 61.0-62.5'	
			4	64.45' - Fracture, vertical, rough, undulating, tight	厂		R2: 10 minutes
	66.5			64.55, 64.85, 65.4' - Bedding plane (3),	\mathbf{H}	Silt And Limestone Fragments (ML)	Driller's Remark: 50%
			1	horizontal, smooth, planar, tight 65.25' - Fracture or mechanical break, 80	\vdash	66.3-66.5' - dark yellowish brown,	water loss at 66.5'
				deg, rough, undulating, tight 65.6-66.3' - Fracture zone or mechanical	\Box	(10YR 4/2), moderate to strong HCI reaction, with extremely weak (R0)]
_			1	break, 80 deg and 85 deg, rough, undulating,	厂	limestone and trace organics	
_			'	some horizontal fractures, tight 66.3' - Bedding plane, horizontal, rough,		Limestone 66.5-66.7' - moderate yellowish]
_	R3-NQ 5 ft	66	1	undulating, soil contact, open <1/2"	\vdash	brown to dark yellowish brown,]
l _	78%	00	· ·	66.7' - Bedding plane, horizontal, rough, undulating, open 1/2"	F	(10YR 5/4 to 10YR 4/2), very fine to fine grained, extremely weak (R0),	
70			4	67.6' - Fracture or mechanical break,	Ë	with silt, trace cavities (<1/2"), poorly	
-28.0			·	horizontal, rough, undulating, open 1/4" 68.85' - Fracture or mechanical break,	Н	fossiliferous - 66.7-68.85' - Same as 66.5-66.7'	
_			NR	horizontal, rough, undulating, open 1/4"	oxdot	except medium strong (R3), voids	R3: 3 minutes
_	71.5			69.5' - Fracture or mechanical break, vertical, rough, undulating, open 1/4"	$oxed{\Box}$	(<1/16") over 60-80% of surface, moderately fossiliferous with fossil	
_			7	70.25-70.40' - Fracture zone, rough,	工	casts (<1/2") and many cavities	
_				undulating, open 1/2" 71.50-71.95', 71.95-72.40' - Fracture zone,		(<1/2") - 68.85-70.4' - Same as 66.5-66.7'	<u> </u>
_			0	vertical, rough, undulating, vertical fractures	┢	except moderate HCl reaction,	<u> </u>
_				intersect bedding plane fractures or mechanical breaks, open <1/2"	F	extremely weak to very weak (R0 to R1), voids (<1/16") over 30-50% of	<u> </u>
_	R4-NQ 5 ft	70	2	73.7, 73.75, 75.1' - Fractures or mechanical	L ⁺	surface, trace cavities (1/2"), poorly fossiliferous]
-	97%			break, rough, undulating, tight to open 1/4" 74.0, 74.5, 75.9' - Mechanical break	H	No Recovery 70.4-71.5'	_
75_ -33.0			1		世	Limestone 71.5-72.45' - moderate yellowish	_
-33.0					\vdash	brown, (10YR 5/4), very fine to fine	SC-2 collected from 75.1- 76.35'
_			0	-	厂	grained, moderate to strong HCl reaction, weak to medium strong (R2	R4: 15 minutes
_	76.5		NR.	-	口	to R3), voids (<3/16") over 30-40% of	_
-			1	76.65, 79.1, 79.15, 79.3, 79.55' - Bedding	\vdash	surface, few cavities (<1/2"), moderately fossiliferous	_
_				plane or mechanical break (5), <10 deg, rough, undulating, open <1/4"	\vdash	72.45-73.75' - Same as 71.5-72.45'	_
_			0	77.3, 77.75, 78.7	F	except extremely weak to very weak (R0 to R1), voids (<3/16") over	_
-	D5 110			-	片	_ 30-50% of surface, few cavities	-
-	R5-NQ 5 ft	54	3		L	(<3/4") - 73.75-75.1' - Same as 71.5-72.45'	-
-	68%		4	-	╀	except medium strong (R3), mottled with very light gray (N8), voids	-
80 <u> </u>			1	_	厂	— (<3/16") over 30-60% of surface,	
-30.0			NR	-	仜	trace organics, many cavities <1/8"	R5: 21 minutes
			INE		尸		No. 21 minutes
I	1		i l		1		i l



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-10	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	NIE I HOD A	ND E	JUIPIV	MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bg	s on 4	/7/07 START : 4/6/2007 END : 4/	9/2007	LOGGER : C. Sump	
				DISCONTINUITIES	(1)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		'n	DESCRIPTION	507	DOOK TYPE OOLOD	1
N H N	N. A.Y.	(9	FRACTURES PER FOOT	BECOK!! HOW	힐	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H N N N N N N N N N N N N N N N N N N N		(%) Q	T. P.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
민류년	8888	Ø	ZAC ER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ĭ ₹	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	SHE	Я	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	်	CHARACTERISTICS	1 1, 1 1, 1
	81.5				Ш	75.1-76.35' - Same as 73.75-75.1'	16:30 on 4/7/07 End drilling
-	01.0			81.5-82.0' - Fracture zone, rough, undulating,	+	except very light gray, (N8), medium	for the day at 81.5', water
-			5	angular gravel-sized (<1-1/2") fragments		strong to strong (R3 to R4), voids (<1/16") over 20% of surface.	level at ground surface _ 07:30 on 04/09/07 Resume
_					Щ	elongate cavities (<2"x1") with	drilling, water level at 1.0'
						secondary, dark yellowish brown	below ground surface
-			0	82.95, 84.0' - Mechanical break (2)		(10YR 4/2) infill	g
-	DC NO				ш	No Recovery 76.35-76.5'	-
_	R6-NQ 5 ft	62	1		\Box	Limestone	_
	74%	02	'			76.5-79.9' - very light gray	
05				84.4' - Bedding plane or mechanical break,	Ш	 transitioning to dark yellowish brown with depth, (N8 to 10YR 5/4), very 	1
85 <u>-</u>			0	rough, undulating, open 1/2"	╁┼	fine to fine grained, moderate to	Driller's Remark: Core
					╁┼┤	strong HCl reaction, medium strong	barrel locked in formation –
			NR			to strong (R3 to R4), voids (<3/16")	at 85', advance NW casing
1 -	06 E				╂	over 10-50% of surface increasing	from 0.0-80'
-	86.5				╂┷╂	with depth, few cavities (<1/2") with	R6: 20 minutes -
I -			0		ш	trace secondary infill, trace organic laminae, extremely weak rock (R0)	SC-3 collected from 86.5-
				87.3, 89.0' - Mechanical break (2)	H	lens (1/2" thick) at 76.65'	87.3'
I -				67.5, 69.0 - Mechanical break (2)	╁┼	No Recovery 79.9-81.5'	1
-			>10	88.05-88.4'. 89.4-89.5' - Fracture zone.	┲	Limestone	-
_				rough, undulating, angular gravel-sized (<2")	+	81.5-85.2' - moderate yellowish	-
	R7-NQ	46	>10	fragments		brown to dark yellowish brown,	
	5 ft 68%	40	/10	88.6' - Fracture or mechanical break, rough,		(10YR 5/4 to 10YR 6/1), very fine to fine grained, mild HCl reaction, weak	
-	30,0		1	undulating, open <1")	╁┼	to medium strong (R2 to R3), voids	-
90 <u> </u>				89.6' - Fracture or mechanical break, rough, _	╀┼	(<3/16") over 50% of surface with	
-40.0				undulating, tight		20% very fine infill, elongate cavities	_
			NR		Н	(<2"x1") over 40% of surface, 80% of	R7: 19 minutes
-	0.4.5				╁┼╁	cavities with pale yellowish brown	-
-	91.5				⊞	(10YR 6/1) weak to medium strong (R1 to R3) secondary infill, poorly	Driller's Remark: Core loss
_					╀┼	fossiliferous	(91.5-92.8') due to core
			NR			No Recovery 85.2-86.5'	barrel blockage
					Ш	Limestone	1
-			>10	92.8-93.1' - Fracture zone, rough, undulating,	╁┼┼	- 86.5-89.9' - moderate yellowish	-
-			<u>`</u> _	angular gravel-sized (<1") fragments 93.2' - Fracture or mechanical break, <10	╀┼┼	brown, (10YR 5/4), very fine to fine	-
	R8-NQ 5 ft	54	1	deg, rough, undulating, tight	Ш	grained, mild HCl reaction, weak to medium strong (R2 to R3), voids	
I -	74%	J4	'	93.85' - Fracture or mechanical break, 30	H	(<3/16") over 25-40% of surface, few	1
-				deg, rough, undulating, tight	 	elongate cavities (<1/2"x1/4"),	-
95 <u>-</u> 53.0			0	94.0, 95.0, 95.55' - Mechanical break (3) —	╓	 transition from poor to moderately 	-
				95.15, 96.2, 96.25' - Fractures or mechanical	H	fossiliferous with depth, molds	
				break (3), smooth to rough, undulating, tight		(<1/4"), trace laminations at	R8: 33 minutes
1 -	06.5		3	to open <1/8"	Ш	 86.9-87.4', very weak (R0) lenses from 87.1-87.35' and 89.4-89.5' 	1
-	96.5				╂┼┼╂	No Recovery 89.9-92.8'	-
1 -			>10		世	Limestone	-
			``	97.0-97.1' - Fracture zone, rough, undulating,	Ш	92.8-95.6' - moderate yellowish	
1				angular gravel-sized (1"-1-1/2") fragments 97.45-97.65' - Fracture zone or bedding	+	brown, (10YR 5/4), very fine to fine	1
1 -			>10	plane, rough, undulating, open <1/2"	╁┼	grained, mild HCl reaction, weak to	
-				promotion of the promot	Ш	medium strong (R2 to R3), very weak (R1) from 93.6-93.9', voids (<3/16")	-
	R9-NQ		5 10	98.65, 98.9' - Fracture zone or mechanical	H	over 40-60% of surface, few cavities	
1 -	5 ft 95%	64	5-10	break (2), 35 deg, rough, undulating, tight to	+	(<2"x1"), light gray (N8) medium	1
	33/0			open 1/4"	口	strong (R3) secondary infill,	-
100_			>10	99.15' - Fractures (2), vertical, rough,	╂┼┼	moderately fossiliferous, trace	-
-58.0				undulating, tight 99.35' - Bedding plane, rough, undulating,	┟┼┤	organics	
I -			0	tight	Ш		R9: 15 minutes
				-5 -	1 1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-10	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	NE I HOD A	ND E	JUIPIV	MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin	<u> </u>	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bg	s on 4	/7/07 START : 4/6/2007 END : 4/	9/200	LOGGER : C. Sump	,
> O O	. (6			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
				99.75-100.0' - Fracture zone, rough,	ш	95.6-96.5' - yellowish gray, (5Y 8/1),	
-	101.5		NR 1	undulating, angular gravel-sized (<2") fragments 101.65' - Bedding plane or mechanical break,	H	 very fine to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), trace voids 	-
-			0	horizontal, rough, undulating, tight to open 1/8"		 (<3/16"), poorly fossiliferous, few molds (<1/2" diameter) 96.5-98.2' - yellowish gray, (5Y 8/1), very fine grained, strong HCI 	-
-	R10-NQ 5 ft 100%	95	0	104.0, 105.2' - Mechanical break (2)		reaction, weak to medium strong (R2 to R3), extremely weak to very weak (R0-R1) from 97.0-97.5', trace voids]
105_ -63.0_			0		H	(<3/16"), trace bioturbation 98.2-100.0' - Same as 96.5-98.2' except voids (<3/16") over 30-40% of	_
-	106.5		1	106.4' - Fracture, 65 deg, rough, undulating,	Ħ	surface, moderately to highly fossiliferous with molds (<1/2"), <20% organic laminations	R10: 13 minutes -
-			0	tight to open <1/4"		concentrated in extremely weak (R0) rock from 98.9-99.2' 100.0-101.25' - Same as 98.2-100.0']
-	R11-NQ		0	107.5, 109.0, 110.3' - Mechanical break (3)		except moderately fossiliferous, few cavities (<1") with secondary infill, trace organics No Recovery 101.25-101.5']
140	5 ft 100%	100	0			Limestone 101.5-106.5' - yellowish gray, (5Y 8/1), very fine to fine grained, strong]
-68.0 -			0			HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 20-40% of surface, few cavities (<1"x1/2") with	
-	111.5		0	111.65-113.95' - Bedding plane or fracture		 secondary infill, moderately to highly fossiliferous with elongate molds and casts (<1x1/2"), trace organics]
_			>10	(17), <10 deg, smooth to rough, planar to undulating, tight to open <1-1/2"		106.5-111.5' - yellowish gray, (5Y 8/1), very fine to fine grained, moderate to strong HCl reaction,]
_	R12-NQ 5 ft	68	6			 very weak to weak (R1 to R2), moderate yellowish brown (10YR 5/4) from 107.1-108.0', extremely weak (R0) from 107.75-108.3', voids 	SC-4 collected from 113.1- 113.9'
115	100%	00	1			(<3/16") over 30% of surface, laminated bedding from 107.1-108.0', — highly fossiliferous with elongate]
-73.0 -			0	undulating, tight		molds, casts (<3/4x1/4") 111.5-116.5' - Same as 106.5-111.5' except strong HCl reaction, voids	R12: 11 minutes
-	116.5		>10			over 10-30% of surface, poorly fossiliferous with molds at 116.0-116.5'	-
-			>10			116.5-121.3' - Same as 111.5-116.5' except fossil molds concentrated from 120.25-121.3']
-	R13-NQ 5 ft 96%	64	>10	117.6-117.8' - Fracture zone, rough, undulating, angular gravel-sized (<2") fragments 118.0' - Fracture, vertical, rough, undulating,		-	-
120 -78.0	90 /0		>10	open <1"		-	-
-					Ш	-	R13: 6 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-10	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0) ft ba	s on 4	/7/07 START : 4/6/2007 END : 4/9	9/200	7 LOGGER : C. Sump	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH,	(%) Q	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI(MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EV SEPT	CORE	ROL	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			0	119.5' - Fracture, vertical, rough, undulating,			
-	121.5		NR_	open 1", length is from 119.1-119.5' 119.95-120.25' - Fracture zone, rough,	Н	 No Recovery 121.3-121.5' Limestone 	-
-			0	undulating, angular gravel-sized (<2")	Ħ	121.5-126.5' - Same as 116.5-121.3'	-
_				fragments -	Ħ	 except moderately fossiliferous overall with poorly fossiliferous 	1
-			1	123.25, 124.1, 124.8' - Fractures or	H	interval from 124.0-125.0', secondary infill at 121.8', very fine grained from	1
_	R14-NQ		1	mechanical break (3), 60 deg, rough,	Ħ	125.2-125.4'	1
_	5 ft 100%	100	1	undulating, tight 123.9, 124.0, 124.2, 125.0' - Mechanical	Н	_]
125			1	break (4)	Н		
-83.0					Н		
l _			0	_	Ш	_	R14: 10 minutes
_	126.5				Щ]
_			2	126.6, 128.4, 129.8, 131.25' - Fractures or mechanical break (4), horizontal, smooth,	Н	126.5-131.45' - yellowish gray, (5Y - 8/1), very fine to fine grained, strong	
_				undulating, tight	Н	HCl reaction, very weak to weak (R1	_
-			1	-	H	to R2), voids over <10% of surface - except from 126.5-127.6' (30%),	-
-	D45 NO			-	H	poorly fossiliferous, becoming // yellowish gray (5Y 7/2) at	-
_	R15-NQ 5 ft	93	0	-	H	- 129.0-129.65'	-
	99%			-	H	-	-
130 <u> </u>			0		H	_	
-				-	Н	-	R15: 5 minutes
-	404.5		1	-	₽	-	-
-	131.5		NR/	404 7 400 05 400 45! Machanical break	H	No Recovery 131.45-131.5'	-
-			4	131.7, 132.35, 132.45' - Mechanical break (3), horizontal, smooth, undulating, infilling	囯	 Limestone 131.5-136.45' - yellowish gray, (5Y 	-
_				132.55, 132.9, 134.4, 134.55, 134.62' -	ш	5/1), very fine to fine grained,	-
-			0	Fractures or mechanical break (5), horizontal, smooth, undulating, tight	丗	 moderate to strong HCl reaction, very weak to weak (R1 to R2), light 	SC-5 collected from 133.1-
-	R16-NQ			nonzontal, smooth, undulating, tight	Н	olive gray (5Y 6/1) from 132.5-132.65', extremely weak (R0)	133.9' -
-	5 ft 99%	87	2	-	\square	from 132.0-132.5', voids and cavities	1
135			2			(<1/2") over <10% of surface, poorly fossiliferous with molds (1/4"),	1
-93.0				_		laminated from 132.45-132.65']
_			0		H	_	R16: 6 minutes
_	136.5		-	_	H	N- P]
_			NR /	407.0 407.4 407.0 407.0 407.0 407.0	H	No Recovery 136.45-136.5' Limestone]
_				137.0, 137.1, 137.2, 137.25, 137.3, 137.35, 137.4, 137.45' - Bedding plane (8),	H	136.5-141.45' - yellowish gray from 136.5-138.5' and moderate vellowish]
-			>10	horizontal, smooth, undulating, tight	H	brown from 138.5-141.45', (5Y 8/1,	
-	D47.NO			137.25-137.50' - Fracture zone, rough, undulating, angular gravel-sized (<1-1/2")	H	10YR 5/4), very fine to fine grained, mild to strong HCl reaction, very	-
-	R17-NQ 5 ft	65	1	fragments 138.0, 138.2, 138.3, 138.35, 138.45, 139.4,	口	 weak to weak (R1 to R2), extremely 	
-	99%			139.65, 140.75' - Bedding plane or	Ш	weak (R0) from 138.25-138.35', poorly fossiliferous (fossils up to	-
140_ -98.0			1	mechanical break (8), horizontal, smooth, undulating, tight	$oxed{\Box}$	1/4"x1/4"), laminated organic layers (4) at intervals 136.6-136.7',	-
-				-	\sqcap	131.0-137.5', 137.8-138.35', and	R17: 6 minutes
					П	139.20-139.70'	

APPENDIX 2BB-483

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-10	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

	, <u>.</u>	10 -	2011 11	TENT . Diethan D-30 3/N 232, mud totally, NQ tools, HW	000	·9	ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bgs	s on 4	/7/07 START : 4/6/2007 END : 4/	9/200	D7 LOGGER : C. Sump	
I				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE COLOR	1
O A E	Z 주장	_	RE	DESCRIFTION	$\overline{\circ}$	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A SE	SE 본	(%)	ĮΩ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	点	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무류장	888	οD	AC R F	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SSI	8개품	æ	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROFS, 1EST RESULTS, ETC.
			1		t_{\top}		
l -	141.5		NR/			No Bosovory 141 45 141 5'	-
			-		Н	No Recovery 141.45-141.5' Limestone	
I -			1	142.1, 143.4, 144.9, 145.7' - Bedding plane	Ъ	141.5-143.5' - yellowish gray to olive	1
-				or mechanical break (4), <10 deg, smooth,	╀╵	gray, (5Y 5/1 to 5Y 6/1), very fine to	-
l _			1	undulating, tight except for open 1" at 143.4'		fine grained, moderate HCl reaction,	_
			'		\vdash	very weak to medium strong (R1 to	
-	R18-NQ			•	Н	R3), voids (<3/16") over 10-20% of	1 7
-	5 ft	91	0		朾	 surface, many elongate cavities 	1 -
	94%					(1-1/2"x1") with secondary infill,	
145					\vdash	poorly fossiliferous, trace laminated	
-103.0			1	-	╁╌	bedding	-
					1	143.5-146.2' - very light gray, (N8), very fine to fine grained, moderate	1
			1			HCl reaction, medium strong to	R18: 15 minutes
1 -	440.5			,	1—	strong (R3 to R4), voids (3/16") over	1 1
1 -	146.5		NR)	146.5.146.0' Fracture zono, rough	廾	10-30% of surface, cavities (<2"x1")	1 -
I _			>10	146.5-146.9' - Fracture zone, rough, undulating, angular gravel-sized (<1-1/2")	\Box	over 30% of surface, 60% of cavities]
1 -			10	fragments	匚	with secondary infill, poorly	1
-				147.1, 147.25, 147.5, 148.0, 148.7, 149.8,	╙	fossiliferous	1 -
-			2	149.9' - Bedding plane or mechanical break	┢┯	No Recovery 146.2-146.5'	1
			_	(7), smooth, undulating, tight to open <1/2"	 	Limestone	
_	R19-NQ			148.45, 149.0, 149.6' - Mechanical break (3)		146.5-147.25' - light olive gray and	1 7
-	5 ft	43	0		╀	moderate yellowish brown, (5Y 6/1,	-
_	73%				╟	10YR 5/4), very fine to fine grained, very weak to weak (R1 to R2), voids	
150			2		Н	(3/16") over 20% of surface, many	
-108.0				_		cavities (<1-1/2"x1/4") over >5% of	_
_					₩	surface, secondary infill of 50% of	-
			NR		Н	cavities, poorly to moderately	R19: 12 minutes
-	151 5				1	fossiliferous	1 7
-	151.5				╀	147.25-147.5' - Same as	18:00 on 4/9/07 Water
l _					1	146.5-147.25' except voids (<3/16")	level at ground surface
						over 30% of surface, trace secondary	icver at ground surface
-				•	1	infill of cavities, few cavities	1
l –					4	<1-1/2"x1/4" 147.5-149.8' - Same as	-
						- 146.5-147.25' except no to moderate	
1					1	HCI reaction, medium strong (R3),	1
1 -					1	voids (<3/16") over 0-30% of surface	1 -
I -					4	increasing with depth, trace voids	1 -
1					1	with secondary infill, trace laminated	
I -				_	1	bedding/slump feature, trace	1
-					1	organics, poorly to moderately	
I _					1	fossiliferous]
1					1	149.8-150.15' - Same as	1
-					1	L 147.25-147.5' No Recovery 150.15-150.5'	1 -
I -					4		1 -
					1	Bottom of Boring at 151.5 ft bgs on	
I -					1	- 4/9/2007	1
-					1	F	-
					1	L	
I -					1		1
-					1	F	-
I _					1	L]
1 -					1		1
I -				_	1		1 -
-					1	-	1 -
1					1		
					1		
					1		
					1	1	



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-11	SHEET 1 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit

						, auto hammer, AWJ rods, 3			ORIENTATION : Vertical
WATER	LEVELS	: 6.0 ft bo	gs on 5/20		START : 5/19/2007	END : 5/20/2007	LOGGE	₹ : J. l	Burkard, C. Dellaria, B. Ellis COMMENTS
≥ 0€				STANDARD PENETRATION		SOIL DESCRIPTION		98	COIVIIVIENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOII NAME	, USCS GROUP SYMBOL,	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BI ATIC		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR			BOL	DRILLING FLUID LOSS, TESTS, AND
FRE			#TYPE	6"-6"-6" (N)	CONSISTENC	Y, SOIL STRUCTURE, MIN	IERALOGY	УMI	INSTRUMENTATION
<u> 42.7</u>	0.0			(IV)	→ Poorly Graded S	Sand (SP)		1	
	0.0	45	00.4	3-4-5	\ 0.0-0.2' - pale ye	ellowish brown, (10YR 6/2	2), dry, loose, $/$	717	-
-		1.5	SS-1	(9)	road material, fin	ne silica sand		$\sqrt{\gamma}$	-
-	1.5				Topsoil	sh black, (5YR 2/1), dry t	o moist. stiff. /	N1,	-
_					√70% organic fine	es, 30% roots/vegetation		1	-
_									-
_								-	-
_							-		_
_									_
_									_
5	5.0								
37.7				0.04	Lean Clay (CL) 5.0-5.9' - light oli	ve gray, (5Y 5/2), moist t	owet firm		_
_		0.9	SS-2	0-2-4 (6)	high plasticity, no	o dilatancy, 10-15% very	fine to fine		_
	6.5			. ,	\silica sand				_
							-		_
							·		_
-									_
10	10.0						•	1	-
32.7	10.0				Silt (ML)			Ш	_
-		1.0	SS-3	6-13-16	10.0-11.0' - mode	erate yellow, (5Y 7/6), we dilatancy, moderate HCl	et, very stiff, reaction	1	-
-	11.5			(29)	10-15% fine to m	nedium sand-sized, all ca	rbonate	1	-
-	11.0							1	-
-							-	1	-
-							-		-
-								1	-
-								1	-
-								1	-
,	45.0							1	-
15 <u> </u>	15.9	0.1	SS-4	50/1.5	│ │ Silt With Limest	one Fragments (ML)	Г	-	Driller's Remark: Lost a little circulation
-				(50/1.5")	\ 15.0-15.1' - gravi	ish yellow, (5Y 8/4), wet,	hard,	1	-
-					nonplastic, rapid	dilatancy, moderate HCl nedium sand-sized, all ca	reaction,	1	-
-					limestone lenses	s 1/4" thick		1	-
-								1	-
-								1	-
-								1	-
-								1	-
-								1	-
_								1	-
20								lacksquare	
		l						1	



PROJECT NUMBER:	BORING NUMBER:		
338884.FI	R-11	SHEET 2 OF 9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

	VATER LEVELS: 6.0 ft bgs on 5/20/07 START: 5/19/2007 END: 5/20/2007 LOGGER: J. Burkard, C. Dellaria, B. Ellis									
WATER	LEVELS	. ט.U ft bo	us on 5/20		START : 5/19/2007	END : 5/20/2007	LOGGER	(: J.	Burkard, C. Dellaria, B. Ellis COMMENTS	
≥□⊋				STANDARD PENETRATION		SOIL DESCRIPTION		99	COIVIIVIEN 15	
N (1				SAMPLE INTERVAL (ft) RECOVERY (ft) #TYPE 6"-6" (N) STANDARD PENETRATION TEST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONSISTENCY, SOIL STRUCTURE, MINERALOGY					DEPTH OF CASING, DRILLING RATE,	
H BE ATIO		RECOVE	ERY (ft)		MOISTURE	CONTENT, RELATIVE DEN	ISITY OR	30LI	DRILLING FLUID LOSS, TESTS, AND	
EV.			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MIN	ERALOGY	ΥMΕ	INSTRUMENTATION	
22.7	20.0			(N)	Silty Sand (SM	/ /\		S TIT		
	20.0			21-24-11	20.0-21.2' - gra	ayish yellow, (5Y 8/4), mois	t to wet,	Ш	-	
_		1.2	SS-5	(35)		moderate HCl reaction, fine			_	
_	21.5				grained, 35% n gravel-sized, al	nonplastic fines, trace angu Il carbonate	liar fine		_	
l _					(3.2]	_	
							-	1		
-							-	1	_	
-							-	1	-	
25	25.0						-	ı	-	
17.7	25.0				Silty Sand (SM	(1)		7.77	_	
-		1.0	SS-6	9-8-6	25.0-26.0' - yell	llowish gray, (5Y 7/2), wet,	medium -		-	
-		1.0	33-0	(14)		ate HCl reaction, fine to coa astic fines, all carbonate	irse grained,	114	=	
-	26.5				(00 4070 Horipia	adio inico, dii darbonate		l	-	
_							-		_	
_							-		_	
_							_		_	
							_			
-							-	1	_	
30	30.0						-	1	_	
12.7	30.3	0.3	SS-7	50/4	Silty Sand With	h Limestone Fragments (SM)	Ш	_	
-				(50/4")		sky yellow, (5Y 6/4), wet, verter HCI reaction, fine to coa		l	-	
-						c fines, 35-40% fine to coar		l	-	
-					gravel-sized lim	nestone, all carbonate		ł	-	
-							-	ł	-	
-							-	ł	-	
-							-	l	_	
_							_	ļ	_	
_							-		_	
_							_			
35	35.0									
7.7		0.6	SS-8	22-50/3	Silty Sand (SM	d)	oiot to wat			
1 7	35.8			(72/9")	very dense, stro	oderate yellow, (5Y 7/6), morong HCl reaction, fine to co		1111]	
					∖grained, 30% n	nonplastic fines, trace fine of	gravel, all / -	1]	
-					carbonate			1	1	
-							-	1	-	
-							-	1	-	
-							-	1	-	
-							-	ł	-	
-							-	ł	-	
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40								_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-11	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						END : 5/20/2007			ORIENTATION : VEItical
WATER	LEVELS	: 6.0 ft bo	ya UH 3/20		START : 5/19/2007	END : 5/20/2007 SOIL DESCRIPTION	LUGGE	.rx . J.	Burkard, C. Dellaria, B. Ellis COMMENTS
≳Q∉ I	CAMPIE	INTERV	1 (6)	STANDARD PENETRATION		JOIL DECORN HOW		8	CONNIVILITIO
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	RECOVE		PENETRATION TEST RESULTS	SOIL NAM MOISTURE	ME, USCS GROUP SYMBOL, E CONTENT, RELATIVE DEN	COLOR, ISITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH SURFA ELEVA			#TYPE	6"-6"-6" (N)		ICY, SOIL STRUCTURE, MIN		SYMB	INSTRUMENTATION
2.7	40.6	0.3	SS-9	50/3	Limestone Fra	agments		$oldsymbol{\perp}$	
				(50/3")	reaction, coars	isky yellow, (5Y 6/4), strong se sand-sized to fine gravel	HCI -sized	1	1
								1]
-								1	1
								1	1
								1	1
]	
_									_
45	45.0		00.15	F0/5	Cilt. Com d 1871	Ma 1 imagetona 5 ((CM)	1,	_
-2.3 -	45.4	0.4	SS-10	50/5 (50/5")	↑ 45.0-45.4' - du	th Limestone Fragments (sky yellow, (5Y 6/4), wet, v	ery dense,	411	4
_					\ strong HCl rea	action, fine to coarse graine es, 40% fine to coarse limes	d. 15%	4	-
_					fragments, all	carbonate	storic	-	-
-								-	-
-								-	-
-								1	-
-								1	-
-								1	-
50	50.0							1	
-7.3	50.4	0.3	SS-11	50/5 (F0/F")	Limestone Fra	agments	0VD 5/4)	\perp	Soil sampling completed at 10:55 on 5/19/07
				(50/5")	\strong HCl rea	oderate yellowish brown, (1 action, fine to coarse sand-s]	
_					fine to coarse of	*		_	
_					Begin Rock Co See the next sl	oring at 51.5 ft bgs heet for the rock core log		1	_
_						ŭ		4	-
-								4	-
-								+	-
-								1	-
55								1	-
-12.3							-	1	_
-								1	1
-								1	1
]]
]	
_								1	
_								1]
-								-	-
-								+	-
60								+	-
								\perp	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-11	SHEET	4	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				IEINT: CIVIE 33 3/IN 299203, ITIUU TOTATY, INQ 10015, FIW C			ORIENTATION : Vertical
WATER	LEVELS : 6.0	ft bg	s on 5		20/20	· ·	
≩Q⊋	<u> </u>			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	S F F	(%) _Q	TUR 00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ ặ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FFF	NG:	οD	RAC:	PLANARITY, INFILLING MATERIAL AND	ΜB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	CC LE PRE	ď	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	Bitor 6, 1201 (1200216, 210.
	51.5			51.55-52.3' - Fracture zone, 0-15 deg, rough,	${f \perp}$	Limestone	Rock coring begins at
_			4	undulating, bedding plane fractures or	T	- 51.5-54.5' - moderate yellowish brown, (10YR 5/4), very fine to	11:25 on 5/19/07 – Driller's Remark: Soft at
-				mechanical breaks, up to 3/4" fragments 52.6-54.25' - Fracture zone, rough,	F	coarse grained, strong HCl reaction,	52.0-52.5', 53.0-53.5', 54.5-
-			>10	undulating to stepped, fine to coarse angular	╁	 weak (R2), 40% coverage of voids 	54.9'
-	D4 NO			gravel, up to 2" diameter		1/16" or less on surface, few cavities <1/2" diameter, trace secondary infill	_
_	R1-NQ 5 ft	8	>10			- recrystallization	_
_	60%	Ū					_
55						No Recovery 54.5-56.5'	
-12.3				_	\perp		
_			NR			-	R1: 3 minutes
1 -					╁	-	-
-	56.5			56.5-56.6' - Fracture zone, smooth to rough,	Ħ	Limestone	-
-			>10	undulating, fine to coarse angular gravel	₽	- 56.5-59.95' - pale yellowish brown,	-
1 -				56.9-57.55' - Fracture zone, smooth to rough,	仜	(10YR 6/2), very fine to fine grained,	_
l _			3	undulating, fine to coarse angular gravel 57.8' - Mechanical break, 30 deg, rough,	┢	strong HCl reaction, weak (R2), 40% coverage of voids 1/16" or less on	_
				undulating, tight to <1/16" open	Ė	surface, few cavities some elongate	
	R2-NQ			58.25' - Bedding plane, 10 deg, smooth,	₽	and some spherical, trace spots of	
_	5 ft 69%	20	0	undulating, <1/4" open 58.4-58.5' - Fracture zone, smooth to rough,		 black organic material <1/2" diameter 	1
60			0	undulating, fine to coarse angular gravel		-	
-17.3				59.05' - Mechanical break —	╁	No Recovery 59.95-61.5'	
-			NR	59.5' - Mechanical break	t	-	R2: 5 minutes
_			INK		\perp	-	TVZ. 5 minutes
_	61.5				口	,	_
_			1	61.7-61.8' - Fracture zone	┢	Limestone - 61.5-64.4' - moderate yellowish	_
						brown, (10YR 5/4), fine to medium	
				62.65' - Fracture, horizontal, rough, stepped	Н	grained, mild HCl reaction, weak to	
_			4	62.9' - Fracture, horizontal, smooth,	ш	 medium strong (R2 to R3), 0-10% coverage of voids 1/16" or less 	1
-	R3-NQ			undulating 63.1' - Fracture, horizontal, smooth to rough,	╁	except 20% coverage of voids up to	-
1 -	5 ft	24	3	undulating	F	- 1/8" on surface at 61.5-61.8', no	-
-	58%			63.2' - Fracture, horizontal, rough, undulating	ᡛ	visible fossils or cavities except 61.5-61.8' cavities up to 3/8"	-
65 <u> </u>				63.5-63.6' - Fracture zone 64.1' - Fracture, 28 deg, rough, stepped	\Box	— covering 5% of rock, trace black	_
-22.3			NR	64.4' - Mechanical break	仜	organic staining No Recovery 64.4-66.5'	DO: 5 minutes
1 -				65.0.66.1' Eractura zona	\vdash	- 140 Necovery 04.4-00.3	R3: 5 minutes
1	66.5			65.9-66.1' - Fracture zone	Ľ		Driller's Remark: Soft at
1 -					Н	Limestone	66.0-67.0', 68.0-68.5'
1 -			3	·	ш	- 66.5-66.95' - Same as 61.5-64.4' 66.95-67.75' - moderate yellowish	1
1 -				67.3, 67.4' - Fractures (2), <10 deg, rough, stepped	╁	brown, (10YR 5/4), fine to medium	-
1 -			4	67.6, 67.4, 67.6, 67.9' - Fractures (4), 0-18		 grained, mild HCl reaction, very weak 	-
-	R4-NQ			deg, rough, undulating	₽	(R1), 30% coverage of voids 1/16" or less on surface, trace dark organic	-
-	5 ft	37	1	69.0' - Fracture, 20 deg, smooth to rough,	F	 inclusions, no visible cavities or 	-
-	66%			undulating	口	fossils	_
70			0	_	F		
-27.3					Ľ	_	
1			NR		\vdash		R4: 4 minutes
1 -	71.5				ш		1
					1	-	
1					1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-11	SHEET	5	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				HENT : CIVIE 33 3/N 299203, Midd Totally, NQ 10018, HW C			::
WATER	LEVELS : 6.0) ft bg:	s on 5		20/200		
≥D≎	(9)			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUTE AND DEDTIL OF GARING
ᆱ႘뎓	Ş,H A,R⊟	(%) Q	NE		1 2	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	GTI SOV) O	FET	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	S S S S S S S S S S S S S S S S S S S	a a	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ВОВ	016	ш	ш.		0)		Dellada Danas du 74 70
			10	71.5-71.8' - Fracture zone, pieces to 1" x 3"	\vdash	Limestone - 67.75-69.8' - moderate yellowish	Driller's Remark: 71-72' and 74-74.5' void
			10	72.0' - Bedding plane, <5 deg, smooth to		brown, (10YR 5/4), fine to medium	and 74-74.5 Void
-				rough, undulating, 1/4" open, missing faces	Ш	grained, mild HCl reaction, weak	1
-			10	72.8-72.9' - Fracture zone, pieces to 1/2" -	╀┤	 (R2), 0-10% coverage of voids 1/16" 	-
l _				diameter		or less except 10% coverage of 1/8"	
	R5-NQ			73.15' - Bedding plane, horizontal, smooth,	\vdash	voids on surface and trace cavities to	
-	5 ft 70%	37	3	planar, tight 73.9' - Fracture, 15 deg, smooth, undulating,	╁	 5/16" at 68.1-68.4', no visible fossils, trace black organic staining 	1 1
-	70%		<u> </u>	tight		No Recovery 69.8-71.5'	1 -
75			3	74.25' - Bedding plane, horizontal, smooth to	Н	— Limestone	_
-32.3				rough, undulating, tight to 1/4" open	Н	71.5-74.4' - moderate yellowish	
1 7			NR	74.4' - Bedding plane, rough, undulating, tight	Ш	brown, (10YR 5/4), fine grained, mild	R5: 6 minutes
] -				to 1/4" open 74.6' - Bedding plane, horizontal, smooth to	\vdash	- HCl reaction, weak (R2), 0-10%	1 -
-	76.5			rough, undulating, tight to 1/4" open	Н	coverage of voids 1/8", no visible fossils, no visible cavities except	-
I _			10	74.7' - Fracture, vertical, smooth, undulating,	Ш	trace cavities up to 1 3/16" x 3/8" at	
			'0	tight	Н	_ 72.1-73.2', some infilled with similar _]
1 7				74.85' - Fracture, 60 deg, smooth, undulating,	Ш	material to surrounding rock except	4 1
-			10	tight	H	slightly darker color	1
_				77.25-77.8' - Fracture zone, pieces to 2"		74.4-75.0' - moderate yellowish brown, (10YR 5/4), fine to medium	_
	R6-NQ		0	diameter		grained, mild HCl reaction, very weak	
	5 ft 54%	43			Н	(R1), 25-35% coverage of voids 3/8"	1
-	0170			-	ш	or less, 10% coverage of 9/16" x	1
-37.3				_	1	9/16" cavities, trace dark organic	
-37.3			NR		Н	inclusions, moderate to highly	
					Ш	fossiliferous with casts to 3/16" No Recovery 75.0-76.5'	R6: Run time not recorded
-	01 5			-	Н	Limestone	1
-	81.5			81.5-81.6, 82.45-82.55, 82.8-82.95,	1	76.5-77.4' - Same as 66.95-67.75'	End of drilling for 5/19/07
-			2	83.65-83.66' - Fracture zone, rough to	Ш	Silt (ML)	Resume drilling 5/20/07
			اللل	smooth, undulating to stepped, fine to coarse	Н	77.4-77.7' - moderate yellowish	07:35
1 7				size gravel 1-2" diameter, fragments up to 2"	Ш	brown, (10YR 5/4), carbonate derived, overlying dark gray (N3) fat	Water level is 6.0' below
-			8	diameter -	Ш	clay (CH)	ground surface -
-	D7 NO		1	82.1, 83.15, 83.25, 83.45' - Bedding plane or mechanical break, 10 deg, smooth to rough,	Н	Limestone	Driller's Remark: Soft at 82-82.5', 83-83.5', 84.5-85'
	R7-NQ 5 ft	10	\vdash	undulating to stepped, <1/2" open	口	- 77.7-79.2' - grayish orange, (10YR	02-02.0, 00-00.0, 04.0-00
	46%	.0		82.6, 82.9' - Fractures (2), 70 deg, rough,	Ш	7/4), fine grained, moderate HCl	
85				stepped to undulating, double fracture	Н	reaction, medium strong (R3), 0-15%	1
-42.3			NR	_		coverage of voids 1/8" or less, trace	-
			'''`	-	₽₽	cavities up to 1 3/4" x 3/4" with dark yellowish orange (10YR 6/6), infill	DZ: 5 minutes
					Ы	and increased % voids, trace fossil	R7: 5 minutes
1 7	86.5				口	casts to 3/16" x 3/8" in size	1
1 -	55.5			86.35' - Bedding plane or mechanical break,	Н	No Recovery 79.2-81.5'	-
-			2	10 deg, smooth to rough, undulating, tight to 3/4" open	Ш	_ Limestone	-
				86.5-86.6' - Fracture zone, with pieces to 2"	口	81.5-82.9' - moderate yellowish brown, (10YR 5/4), very fine to fine]
				diameter	$\vdash \vdash$	grained, strong HCl reaction, weak to	
1 7			0		Ш	medium strong (R2 to R3), except for	1
-	R8-NQ			OO CL Markaniaalkaa	П	bands 3/4"-1" (lighter colored) from	1 -
-	5 ft	58	1	88.6' - Mechanical break	Н	_ 81.9-82.1' and 82.5-82.8', 40%	SC-1 collected at 88.7-
	80%	-	L l		Ш	coverage of voids <1/16" on surface,	89.55'
90				89.4-89.65' - Fracture zone, 0-10 deg,	\Box	few elongate cavities <3/4" diameter	1
-47.3			6	smooth to rough, undulating, all bedding plane fractures, tight to 1/2"	Н		
-				90.25-90.5' - Fracture zone, with pieces to 2"	Ш	_	Bo: 4 minutes
I _			NR	diameter	Щ	_	R8: 4 minutes
	91.5		' '		$\vdash \vdash$		
	-				П		
			ı				1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-11	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				IENT : CME 55 S/N 299205, mud rotary, NQ tools, HW c			ORIENTATION : Vertical
WATER	LEVELS : 6.0) ft bgs	on 5		20/200		a, B. Ellis COMMENTS
₹	(%) ص			DISCONTINUITIES	90	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			>10	92.1-92.9' - Fracture zone		82.9-83.8' - very pale orange, (10YR - 8/2), strong HCl reaction, very strong to extremely strong (R5 to R6), very fine grained, 15% coverage of voids	-
-			>10	92.95, 93.0, 93.2' - Fractures (3), horizontal, rough, undulating		 1/16" or less on surface, few cavities, few black laminations 	-
-	R9-NQ 5 ft 88%	29	7	93.3-93.8' - Fracture zone, horizontal, rough, undulating, fractures along bedding plane 94.0' - Fracture, horizontal, smooth,		No Recovery 83.8-86.5' Limestone 86.5-90.5' moderate yellowish	-
95 <u> </u>			9	undulating 94.1' - Fracture, horizontal, rough, undulating 94.5, 94.6' - Fractures (2), horizontal, smooth		brown, (10YR 5/4), fine to medium grained, strong HCl reaction, weak (R2), 40% coverage of voids 1/16" or less, cavities to 3/4" diameter 5% of	R9: 5 minutes
-	96.5		NR	to rough, undulating 94.7, 94.9, 95.0' - Fractures (3), horizontal, smooth to rough, planar		 rock, trace fossil casts to 1/4" diameter 	To a minutes
-			>10	95.1, 95.25, 95.3, 95.8' - Fractures (4), horizontal, smooth, planar to undulating	H	No Recovery 90.5-91.5' Limestone 91.5-92.2' - pale yellowish brown,	Driller's Remark: Sampler clogged; shoe jammed
_ _ _	R10-NQ 5 ft	0		96.5-97.0' - Fracture zone, horizontal, dark stains on faces, pieces 3" x 2" , many bedding plane fractures		- (10YR 6/2), fine grained, strong HCl - reaction, weak (R2), 5% coverage of voids 1/16" or less, 5% cavities up to - 1" x 3/8" partially infilled with fine - grain carbonaceous material	closed with rock resulting in sample loss
100 -57.3	10%	0	NR	- - -		92.2-93.8' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate to strong HCl reaction, very weak (R1), 10-20% coverage of voids 1/2" or less, trace	R10: 9 minutes
-	101.5				H	cavities up to 3/8" in diameter, moderately fossiliferous, trace black organic material at 93.6' up to 1/16"	-
-			1	101.6-101.8' - Fracture zone		diameter 93.8-95.9' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl	-
- - 105 -62.3	R11-NQ 5 ft 1 10%	0	NR	- - -		reaction, weak (R2), 5% coverage of voids 1/16" or less, 5% cavities up to 1" x 3/8" partially infilled with fine grain sized material (carbonaceous), clay seam at 95.2-95.4' (CL) yellowish gray (5Y 7/2) No Recovery 95.9-96.5' Limestone	- -
- -	106.5			-		 96.5-97.0' - grayish yellow, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), trace voids 1/16" or less, no visible cavities 	R11: Run time not recorded
-			7	106.8' - Bedding plane, horizontal, smooth, planar, tight		or fossils No Recovery 97.0-101.5' Limestone	-
_			>10	undulating to stepped		101.5-102.0' - very pale orange to grayish orange, (10YR 8/2, 10YR 7/4), fine to medium grained, strong	
-	R12-NQ 5 ft 69%	0	>10	107.5-109.3' - Fracture zone, horizontal, smooth, undulating, bedding plane fractures, up to 1/8" open 109.3-109.65' - Fracture zone		HCl reaction, very weak (R1), 15% coverage of voids 3/16" or less, fossil casts up to 10%	-
110 -67.3 -	111 5		>10 NR			No Recovery 102.0-106.5' Limestone 106.5-109.95' - Same as 101.5-102.0' except extremely weak (R0) from 107.2-109.3'	R12: Run time not recorded -
	111.5					No Recovery 109.95-111.5'	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-11	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

COMING	I WILTHOU A	ND L	ZUIFIV	IENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 6.0	ft bg	s on 5	/20/07 START : 5/19/2007 END : 5/	20/20	07 LOGGER : J. Burkard, C. Dellaria	ı, B. Ellis
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	- FOG	ROCK TYPE, COLOR,	
B H E	ZUN H, A	(%			1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T A A	RE FIGTI	(%) Q	E S	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽ B	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SEN	a Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				111.5-111.9' - Bedding plane, horizontal,	+ +	Limestone	
-			>10	smooth, planar, 1" bedding	E	- 111.5-111.65' - Same as	-
_				111.9-112.4' - Fracture zone	₽	101.5-102.0'	-
I _			>10	112.65-115.75' - Bedding plane, smooth,	Щ	111.65-115.25' - yellowish gray, (5YR 7/2), fine grained, very weak (R1),	_
			10	planar to undulating, 1/8" to 1/2" beds	\vdash	trace voids up to 1/16", thinly bedded	
	R13-NQ					(1/8"-3/4"), extremely weak rock (R0)	<u> </u>
-	5 ft 85%	0	>10	·	₩	– at 114.3-114.9'	-
	63%			-		-	-
115 <u>-</u> -72.3			>10	-	╁┼		
-12.5			. 10	<u>.</u>		-	
_			>10		⊬	No Recovery 115.75-116.5'	R13: 5 minutes
	116.5		NR			,	
-					⊣	Limestone	_
-			>10	117.9, 118.0, 118.1, 118.15, 118.5, 118.8' -		 116.5-119.1' - yellowish gray, (5Y 8/1), medium grained, strong HCl 	·
-				Bedding plane or mechanical break (12), 10	₩	reaction, weak (R2), trace voids up to	-
-			7	deg, rough, undulating 117.0-117.2' - Fracture zone	仜	 1/16", no visible cavities, trace fossil 	-
_					┢┯	casts 3/8" X 3/16", trace dark organic	-
_	R14-NQ 5 ft	13	>10	_		material -	_
	72%	10	10	119.0-119.5' - Fracture zone	Н	119.1-120.1' - yellowish gray, (5Y	
120			1			8/1), medium to coarse grained, — strong HCl reaction, weak (R2),	<u> </u>
-77.3				119.8' - Fracture, 15 deg, smooth, undulating, — tight	╁	15-25% coverage of voids to 3/16",	_
-			ND		Ħ	fossil casts up to 1" x 3/8" over 60%	R14: 3 minutes
-			NR		╁	of rock	-
_	121.5				\perp	No Recovery 120.1-121.5' Limestone	-
l _			4	121.65, 121.75, 121.8, 122.4, 122.65, 122.8' -	┢┰	- 121.5-123.25' - Same as	-
_				Bedding plane or mechanical break (6), 10 deg, rough to smooth, planar to undulating,		_ 116.5-119.1'	_
			10	1/8"-1/4" open	H		
			10	122.9-123.25' - Fracture zone or bedding	oxdot	_ _ 123.25-123.85' - Same as	<u> </u>
_	R15-NQ		1	plane, 10 deg, smooth, undulating, 1/4" open, beds are 1/2" thick	h	119.1-120.1' except 5-10% coverage	<u>-</u>
-	5 ft	12		123.35-123.6' - Fracture zone, fine to coarse	F	of <3/8" fossil casts	-
-	47%			pieces	世	No Recovery 123.85-126.5'	-
125_ -82.3			ND	123.75' - Fracture, 20 deg, rough, undulating	\mathbf{H}		l –
-02.3			NR		口	<u>-</u>	- I
I _					\vdash	_	R15: 4 minutes Driller's Remark: Last foot -
1	126.5				片		"feels like gravel"
1 -				126.6, 126.95, 127.1, 127.2, 127.35, 127.4,	${\mathbb H}$	Limestone	_
-			6	127.6, 127.7, 127.8' - Fractures (9),	仜	- 126.5-128.4' - Same as 116.5-119.1'	· -
-				horizontal, smooth to rough, undulating, along bedding, tightly healed to 1/8" open	1	-	-
-			6	127.85-127.95' - Fracture zone	世	-	-
-			<u> </u>	128.2, 128.4, 128.6, 128.75, 128.85, 129.0,	\vdash	128.4-129.25' - Same as	-
I -	R16-NQ 5 ft	8	7	129.2, 129.45, 129.6, 129.75, 129.8' -	\perp	_ 119.1-120.1'	
	70%	J	Ľ	Fractures (11), horizontal, rough, undulating, 1/8" -1/4" open	\vdash		
130			3		Ľ		1
-87.3				_	Т	_	_
1 -			NR		仜	-	R16: 3 minutes
-			'''`	-	╁	-	-
-	131.5				F		
					1		



PROJECT NUMBER:	BORING NUMBER:					-
338884.FL	B-11	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, NQ tools, HW casing

CORING	METHOD A	ND E	QUIPN	IENT : CME 55 S/N 299205, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS : 6.0	ft bg	s on 5	/20/07 START : 5/19/2007 END : 5/	20/20	D7 LOGGER : J. Burkard, C. Dellaria	a, B. Ellis
300	(0			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			4	131.5-131.7' - Fracture zone 131.95-132.2' - Bedding plane, 5 deg, smooth, planar to undulating, 1/4" open		Limestone 129.25-130.0' - yellowish gray, (5YR 7/2), medium grained, weak (R2), trace small (<1/16") voids and trace fossil casts interbedded with medium	Driller's Remark: Brief loss of circulation
- - 135 -92.3	R17-NQ 5 ft 17%	0	NR	- - - -		to coarse grained limestone with 15-25% coverage by small (1/16") voids and 60% coverage by fossil casts, layers are 2"-4" thick No Recovery 130.0-131.5' — 131.5-132.35' - Same as 116.5-119.1' No Recovery 132.35-136.5'	– R17: 5 minutes
-	136.5		>10	136.5-137.7' - Fracture zone or bedding plane, 10 deg, smooth, planar to stepped, thin beds, 1/3" open, beds are 1/4"-2"		Limestone - 136.5-137.6' - Same as 116.5-119.1'	
_			>10	137.7-138.95' - Fracture zone or bedding plane, 5 deg, rough, planar to undulating,	Ħ	137.6-139.85' - very pale orange, (10YR 8/2), medium grained, strong HCl reaction, weak (R2), 5-15%	
_	R18-NQ 5 ft 67%	0	>10	open 1/8" or less	Ħ	coverage of voids to 1/8", trace fossil casts 3/8" x 3/16", no visible cavities, trace dark gray and light gray	
140 -97.3			1	mechanical break (3), 10 deg, rough, planar, tight		inclusions, dark laminations at 138.35-138.5', thin beds and laminates 1/4"-1/2"	-
_	141.5		NR		H	No Recovery 139.85-141.5'	R18: 5 minutes
_			5	141.55, 141.7, 141.9, 142.3, 145.05, 145.15' - Bedding plane or mechanical break (6), 10 deg, smooth to rough, planar, 1/8"- 1/4" open		Limestone 141.5-143.2' - yellowish gray, (5YR 7/2), medium grained, strong HCI	
_			>10	142.4, 143.2' - Fractures (2), <5-90 deg, smooth to rough, planar, bedding plane separation zone, beds are up to 1" thick	H	reaction, weak (R2), trace voids up to 1/16", no visible cavities, trace fossil casts 3/8" X 3/16", trace dark organic	
_	R19-NQ 5 ft 78%	14	>10	143.2-144.15' - Fracture zone, 0-90 deg, rough, undulating to stepped, open up to 1", angular fragments	H	material - 143.2-144.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl	
145_ -102.3			1	144.15-144.7' - Fracture zone —	Ħ	reaction, medium strong (R3), trace — voids up to 1/16", 10-15% coverage of cavities up to 1 9/16" x 3/8"	-
_	146.5		NR	145.43' - Mechanical break, 20 deg, tight		partially infilled with medium grain sized carbonate material, fossil molds, trace dark (organic) infill	R19: Run time not recorded
_			7	146.6, 146.7, 147.1, 147.15, 147.25, 147.9' - Bedding plane or mechanical break (6), 10 deg, smooth, undulating, tight to 1/4" thick	H	144.2-145.3' - pale yellowish brown, (10YR 6/2), fine grained, weak (R2), 5-10% coverage of voids up to 3/16",	
_			2	146.9-147.1' - Fracture zone 147.5-147.65' - Fracture zone		5-10% coverage of cavities up to 3/8" x 9/16", dark laminations at 145.1' 145.3-145.4' - yellowish brown,	
-	R20-NQ 5 ft 62%	30	1	149.2-149.6' - Fracture, 70 deg, smooth to	Ħ	(10YR 6/2), mild HCl reaction, medium strong (R3), no visible fossils or cavities, dark red staining	
150_ -107.3			0	rough, undulating, tight	Ë	on fracture surfaces No Recovery 145.4-146.5'	-
_	151.5		NR			-	R20: Run time not recorded
			I .		1		<u> </u>



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-11	SHEET	9	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				(20107 CTART : 5/40/2007				
WATER	LEVELS : 6.0	π bgs	on 5		END : 5/2	20/20		
≳Ç⊋	CORE RUN, LENGTH, AND RECOVERY (%)	<u> </u>		DISCONTINUITIES		98	LITHOLOGY COMMENTS	_
DEPTH BELOW SURFACE AND ELEVATION (ft)	Z A X	_	FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR, MINERAL OGY TEXTURE SIZE AND DEPTH OF CASING	€,
ATI B	JA F. E.	Q D (%)	FOC	DEPTH, TYPE, ORIENTATION, ROUGH	INESS,	30L	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS MOOTHNESS, CAVING ROL SMOOTHNESS, CAVING ROL SMOOTHNESS, CAVING ROL	ND I
EAR	ECC	Ø	RAC	PLAŃARITÝ, ÍNFILLING MATERIAL A THICKNESS, SURFACE STAINING, AND TI	AND IGHTNESS	YME	AND ROCK MASS CHARACTERISTICS SMOOTHNESS, CAVING ROL DROPS, TEST RESULTS, ETC	5.
Δош	Olk	22	шФ	11110144200, 00141762 01741410, 7440 11	IOITINEOO	S		
_					_		Limestone Drilling completed at 14:56 on 5/20/07	_
					_		brown to yellowish gray, (10YR 6/4 to	
							5Y 7/2), medium to coarse grained, strong HCl reaction, very weak (R1),	
					_		trace voids to 1/16", no visible	
					_		cavities or fossils	1
					-		- 147.9-149.35' - dusky yellow, (5Y 6/4), fine to medium grained,	
-					-		moderate HCl reaction, medium	-
_							strong (R3), trace coarse grain sized inclusions, trace voids up to 1/16", no	-
-					-		visible cavities or fossils	-
-					-		No Recovery 149.6-151.5	-
					-		Bottom of Boring at 151.5 ft bgs on 5/20/2007	-
					_		5/20/2007	4
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PROJECT NUMBER:	BORING NUMBER:		
338884.FL	B-12	SHFFT 1	OF 8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	VATER LEVELS: 4.3 ft bgs on 5/17/07										
				STANDARD	SOIL DESCRIPTION	╝,	g	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	TEST RESULTS		PENETRATION TEST RESULTS	COIL NAME LICCS CROUP SYMBOL COLOR		SYMBOLIC LOG	DEDTH OF CASING DRILLING DATE			
H BE ACE ATIO		RECOVE	OVERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		30 Li	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND			
DEPT SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYM	INSTRUMENTATION			
43.3	0.0				Poorly Graded Sand With Organics (SP)						
-		1.3	SS-1	0-2-2 (4)	0.0-1.25' - dark gray grading to very light to light gray, (N3 to N8 to N7), moist, very loose, very fine to fine	1		1			
	1.5			(')	grained, 20% organics decreasing to <5% with depth, trace nonplastic fines, sand is silica	/ }-	-				
_					(Tabe Horipiastic IIIIes, saila is silica	1		_			
_						1		4			
-						4		-			
-						+		-			
-						+		-			
5_	5.0					1		1			
38.3	0.0				Poorly Graded Sand With Silt (SP-SM)	1	Ŧ	For SS-2 the last 6" SPT was weight of			
		1.5	SS-2	2-1-0 (1)	5.0-6.5' - dusky yellow, (5Y 6/4), wet, véry loose, very fine to fine grained, trace roots, trace concretions to		詂	hammer			
	6.5			(.)	coarse sand-sized, 8% nonplastic fines, sand is silica	$\mathbf{I}_{\mathbf{I}}$	拈				
_						1		_			
_						4		-			
-						+		-			
-						+		-			
-						+		-			
10	10.0					1		-			
33.3	10.0	0.8	SS-3	34-50/4	Silt (ML)	1	П	٦			
	10.8	0.0		(84/10")	10.0-10.8' - yellowish gray, (5Y 7/2), moist to wet,	4	Щ]			
_					reaction, trace to 10% very fine to fine sand-sized carbonate	1					
_						4		-			
-						4		-			
-						+		-			
-						+		-			
-						1		1			
15	15.0					1		1			
28.3		0.8	SS-4	47-50/4	Silt (ML) 15.0-15.8' - yellowish gray, (5Y 7/2), moist to wet,	1	\prod	丁			
_	15.8			(97/10")	hard, nonplastic, very rapid dilatancy, mild HCl	∕╬	Щ				
-					reaction, carbonate, trace fine gravel-sized limestone fragments	`		_			
-						+		4			
-						+		-			
-						+		Driller's Remark: Harder at 18'			
-						+		1			
-						1		1			
20						1					
ı						- 1	- 1				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-12	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

DHILLIN	GIVILITI	OD AND	EQUIFIVI	EINT : CIVIE 55 5/	N 299205, mud rotary, auto hammer, AWJ rods, 3-//8" tri-cone bit OHIENTATION: Vertical
WATER	LEVELS	: 4.3 ft b	gs on 5/1	7/07	START: 5/8/2007 END: 5/17/2007 LOGGER: R. Gomez, R. Bitely, T. Stewart
1.				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
ON A A		RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, 의 DEPTH OF CASING, DRILLING RATE,
AT AT		INLOOVE	<u> </u>		MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION
E E E			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
23.3	20.0			(14)	Silt With Sand (ML)
	20.0			15-17-14	20.0-21.2' - dusky yellow, (5Y 6/4), moist to wet,
l -		1.2	SS-5	(31)	dense, fine to coarse grained, nonplastic, rapid
	21.5				dilatancy, mild to moderate HCl reaction, 5% fine gravel-sized, 20% fine to coarse sand, all carbonate
-					\(\frac{\graver-sized}{20\%\) fille to coarse sand, all carbonate \(\frac{\graver-sized}{20\}\)
-					1 1
l -					
-					1 - 1
_					1 1
_					
25	25.0				1 1
18.3	23.0		 	17.50/0	Silty Sand With Limestone Fragments (SM)
-		0.7	SS-6	17-50/6 (67/12")	25.ó-25.7' - dusky yellow, (5Y 6/4), moist to wet, very
-	26.0		-	(07/12)	dense, fine to coarse grained, mild to moderate HCl
I _					reaction, 25-30% nonplastic fines, 15% fine gravel-sized limestone, all carbonate
					Graver sized infestorie, an earboriate
_]
-					1 1
-					- 1
_					
I _]
30	30.0				1 1
13.3	00.0				Limestone Fragments
-		0.9	SS-7	26-15-8	30.0-30.4' - dusky yellow, (5Y 6/4), mild HCl reaction,
-		0.9	33-7	(23)	wafer shaped fragments to 1/2" thick
_	31.5				\ Silt With Sand (ML) \ 30.4-30.9' - dusky yellow, (5Y 6/4), moist to wet, very -
					stiff, rapid dilatancy, mild to moderate HCl reaction,
					20-25% very fine to medium grained sand, all
-					carbonate
-					
-					
-]]
l _]
35	35.0				
8.3	- 3.0				Silty Sand With Limestone Fragments (SM)
-		1.0	SS-8	6-10-19	35.0-36.0' - dusky yellow, (5Y 6/4), moist to wet,
-		'.0	55-5	(29)	medium dense, fine to coarse grained, mild to moderate HCl reaction, 34% nonplastic fines, 15%
-	36.5				fine-coarse gravel-sized limestone, all carbonate
-					
I -					11
-					Driller's Remark: Hit hard layer at 38'
-					
-					-
-					
40					
1				I	1 1



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-12	SHEET	3	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 4.3 ft bo	gs on 5/17	7/07 5	START : 5/8/2007 END : 5/17/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart
				STANDARD	SOIL DESCRIPTION 5 COMMENTS
AND N (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
A BE	RECOVERY (ft)				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
3.3	40.0	0.3	SS-9	50/3	Limestone Fragments Driller's Remark: Run was hard until last few
-				(50/3")	\dagger 40.0-40.3' - light olive gray, (5Y 5/2), mild HCI reaction, fragments up to 1" in size
-					- J
-					1
] [
_					
_					 _
_					
-					
45 <u> </u> -1.7	45.0				Silt (ML)
-		1.5	SS-10	10-18-20	45.0`-46.5' - moderate olive brown, (5Y 4/4), moist to -
-	46.5	1.0	00 10	(38)	wet, dense, fine to coarse grained, mild HCl reaction, 57% nonplastic fines, 15-20% fine gravel-sized
-	40.5				limestone fragments, all carbonate
					1
] [
_					
_					
_					
50 -6.7	50.0				Silty Sand With Limestone Fragments (SM)
-		1.3	SS-11	24-37-48	50.0-51.3' - moderate olive brown, (5Y 4/4), moist to wet, dense, fine to coarse grained, mild HCl reaction,
-	51.5		00	(85)	25% nonplastic fines and 30-35% fine to coarse
-	00				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
_					
_					
-					
55 <u> </u>	55.0				Silty Sand With Limestone Fragments (SM)
-		0.8	SS-12	21-31-50/1 (81/7")	55.0-55.8' - moderate olive brown, (5Y 4/4), moist to wet, dense, fine to coarse grained, mild HCl reaction,
-	56.1			, ,	\ 25% nonplastic fines and 30-35% fine to coarse / \ \
					\gravel-sized limestone fragments
]
] [
_	60.0				.
-	60.0	0.1	SS-13	50/1	Limestone Fragments 60 0-60 1' - moderate olive brown (5V 4/4) mild HCI End soil sampling at 60.0'
-				(50/1")	\\delta 60.0-60.1' - moderate olive brown, (5Y 4/4), mild HCI \\reaction, one limestone fragment recovered \\\ = \\ \ \\ = \\ \ \ \ \ \ \ \ \ \ \ \ \
60					Begin Rock Coring at 60.0 ft bgs
					See the next sheet for the rock core log



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-12	SHEET	4	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

WATER	LEVELS: 4.3	ft bgs	s on 5		17/200		
≥0≎	୍ତ			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
뿝병은	EX.	(%) Q	N L D	DEDTIL TYPE OPIENTATION POLICINESS	1 ≒ 1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A A	See	۵	CT RFC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		a a	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	l \	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-16.7	60.0	_		60.1-60.3' - Mechanical break, rough,		Limestone	
-	60.0		5	undulating, multiple angles	白	- 60.0-61.8' - pale yellowish brown,	l _a
l _				60.4' - Fracture, 50 deg, rough, undulating.	ш	(10YR 6/2), fine grained, mild to	Begin rock coring at 60'
				open, dark gray accretion over 30% of	Н	moderate HCl reaction, medium	
-			5	surface, <0.01' thick		- strong (R3), small voids 1/16"-1/8"	1
-	R1-NQ			60.75' - Fracture, horizontal, rough, undulating, tight	Н	over 40% of surface, trace organics, 5% voids to 3/8"	-
l -	5 ft	58	>10	61.15-61.3' - Fracture zone, rough,	Н	- 61.8-62.6' - pale yellowish brown,	
	98%			undulating, multiple angles		(10YR 6/2), mild HCl reaction,	
				61.8' - Fracture, horizontal, rough, undulating,	Н	extremely weak to very weak (R0 to	1
-			1	tight -	ш	- R1), trace to 30% organics	1
-				62.3' - Bedding plane, horizontal, at interface with soft material	Н	62.6-63.25' - Same as 60.0-61.8' except up to 50% coverage of small	D4. 0 minutes
I -			2	62.4-62.6' - Fracture zone, soft material,	H	 voids and trace fossil molds/casts 	R1: 8 minutes
65	65.0			multiple fragments		63.25-64.5' - Same as 61.8-62.6'	
-21.7	- 3.0		NR)	63.3, 64.2, 64.4' - Bedding plane (3),	$\vdash \vdash \vdash$	64.5-64.9' - Same as 60.0-61.8'	1
-			0	horizontal, rough, undulating, tight		except 10% coverage of small voids	1 -
-				64.5' - Fracture, 20 deg, rough, undulating, open	Ш	No Recovery 64.9-65.0' Limestone	Duillanda Damandu Varra aaft
l _					Н	_ 65.0-66.0' - light olive gray, grading	Driller's Remark: Very soft at 66.0-68.0'
			NR			to yellowish brown, (5Y 5/2, 10YR	Assume core loss from
-	R2-NQ		INIX		ш	5/9), <10% small (<1/16") voids on	66.0-67.8' based on driller
-	5 ft	40		-	Н	 surface, deep dissolution cavity up to 1-1/2"x1" at 65.8' 	report and recovery
_	64%		0			No Recovery 66.0-67.8'	1
l _			2	68.2' - Bedding plane, <20 deg, pieces	Ш	_ Limestone	Driller's Remark: Hard at 68.0-70.0'
			_	missing could be because soft material or		67.8-70.0' - moderate olive brown,	08.0-70.0
-				dissolution, open <1/8"	Ш	(5Y 4/4), with compacted carbonate	R2: 7 minutes
-			3	68.8' - Fracture, 75 deg, rough, undulating, open <1/8"	H	silts, trace fossils on surface, trace small voids to 1/16"	1
70	70.0			69.1' - Fracture, 40-50 deg, rough,	ш		_
-26.7			2	undulating, open	Н	70.0-73.45' - light olive gray,	
1			-	69.7, 69.9 - Bedding plane (2), <10 deg,		 yellowish brown and moderate olive brown, (5Y 5/2, 10YR 5/9 and 5Y]
I -				pieces missing could be because soft material or dissolution, open <1/8"	Ш	4/4), moderate HCl reaction, weak	1
-			>10	70.7, 71.85, 72.5 and 73.45' - Bedding plane	$\vdash\vdash$	 (R2), very weak (R1) from 70.7-71.5, 	1
-				(4), <5 deg, rough, undulating, open <1/8"	口	<10% small voids to 1/16", no fossils	4
1	R3-NQ	40	2	70.85, 71.1' - Bedding plane (2), <5 deg,	Щ	seen on surface	
1 -	5 ft 80%	48		rough, undulating, tight	Н		1
-	00,0			71.15-71.45' - Fracture zone	口	-	1
-			>10	71.95' - Bedding plane, <5 deg, rough, undulating, open 1/2"	₩	73.45-74.0' - yellowish brown, (10YR	-
-				73.8-74.0' - Fracture zone		- 5/4), moderate HCl reaction, very	l
			NID		П	weak (R1), tightly compacted silts,	R3: 8 minutes
75	75.0		NR		$\vdash\vdash$	shows "infill" of pale olive 10YR 6/2	1
-31.7	7 3.0			75.0-75.3' - Fracture zone	ш	and medium light gray (N6), shallow dissolution features to 1/2", trace	
-			>10		\square	fossils to 1/4", in both the rock and	-
] _				deg, rough, undulating, open to 1/8"	Н	tightly compacted silts the clasts/infill	
1				76.25' - Bedding plane, <10 deg, rough,	Ш	are up to 1/4"	
-			1	undulating, open to 1/8", not fully broken	$\vdash \vdash \vdash$	No Recovery 74.0-75.0'	1
1 -	R4-NQ			, , , , , , , , , , , , , , , , , , , ,	ш	-	Driller's Remark: No
-	5 ft	22			ш	_	resistance felt-very soft at
-	42%				H	 	77.0-77.5' and 78.0-78.2'
1							Assume core loss from 77.1' onward
1 -			NR		Н		77.1 Oliwaru
-				-	Ш	-	R4: 6 minutes
-					$\vdash \vdash$	-	-
80	80.0				H		
1							
1							



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-12

SHEET 5 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

-				IEM : CIVIE 55 5/N 299205, Midd Totally, NQ 1001S, HW C		•	
WATER	LEVELS: 4.3	ft bgs	s on 5		17/20		\neg
≥□≎	_ @			DISCONTINUITIES	စ္က	LITHOLOGY COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	,
ᆱ끯은	E, F, Ri	(%) _Q	R C	DEDTH TYPE OBJECTATION BOHOUNEOU	1 ≒	MINERALOGY, TEXTURE, MEATHERING HAPPINESS SIZE AND DEPTH OF CASING FLUID LOSS, CORING RATE A	
YFA Y	Sef	۵	ZY.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₩	WEATHERING, HARDNESS, AND ROCK MASS	D
SUF	REG	A Q	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS DROPS, TEST RESULTS, ETC	С.
-36.7	-			00.41		Limestone — End drilling for the day,	\dashv
-			1	80.1' - Fracture zone, rough	ш	75.0-77.1' - Same as 70.0-73.45' 80.0' at 1800 hrs on 5/9/07	- 4
				_	Н	except color grades from pale olive P. De Sa'Rego begins	
				81.2, 81.3' - Fracture (2), 7 deg, rough,		(10Y 6/2) to light olive grey (5Y 5/2) logging borehole	
1 7			6	undulating	₽	at 75.2', moderate yellowish brown SC-1 collected at 80.2- (10YR 5/4) mottling, moderate HCl 81.1'	1
-	R5-NQ			81.4-81.6 - Fracture zone	t	reaction, very weak, weak to medium	Ⅎ
-	5 ft	23	3	81.8' - Mechanical break, 60 deg, rough,	⊢	strong (R2 to R3) at 75.6-77.1',	
	72%			undulating, tight 82.1' - Fracture, horizontal, rough, planar, -	┢	tightly compacted silts, <10% small	
			2	open <1/8"		voids to 1/16", no fossils seen on	
_				82.3' - Bedding plane, horizontal, smooth,	1 —	Surface No Recovery 77.1-80.0'	=
-				planar -	Ľ	Silt (ML)	\dashv
-			NR	82.4, 82.75, 83.1, 83.4' - Fractures, <10 deg,		80.0-80.2' - moderate yellowish	4
	85.0			smooth to rough, undulating	\vdash	brown, (10YR 5/4), medium plasticity,	
-41.7				85.2-85.25' - Fractures (2), 20-30 deg,	Ľ	3/4" limestone fragments	
			4	smooth to rough, planar	╙	Limestone	1
-				85.35, 85.55' - Fractures (2), horizontal,	\vdash	80.2-83.6' - moderate yellowish brown, (10YR 5/4), moderate HCl	\dashv
_			4	rough, planar		reaction, weak to medium strong (R2	4
				86.2' - Fracture, horizontal, rough, undulating,	Н	to R3), small (1/16") voids 15-20% of	
	R6-NQ			tight - 86.3' - Mechanical break, 45 deg		surface, larger cavities/fossil molds	
-	5 ft 62%	20	>10	86.9' - Fracture, horizontal, rough to smooth,	Ь	up to 3/4", fine grained interval from Driller's Remark: "soft"	-
-	02%			undulating, tight -	₩	81.3-82.5' Zones 87.5-88.0', 89.5-	-
_				87.2-87.3 - Fracture zone		Limestone 90.0'	_
				87.6-87.8' - Fracture zone, 30 deg, rough, stepped to undulating, possible mechanical -	Ь	85.0-86.0' - moderate yellowish	
			NR	break		brown, (10YR 5/4), medium grained, R6: 5 minutes	
90	90.0			-	ш	30-40% voids up to 1/8" in size, trace fossil molds/cavities up to 3/8", trace	
-46.7	90.0			90.0-90.6' - Fracture zone	t	fossil casts up to 5/16"	\dashv
-			>10	-	-	86.0-88.1' - Same as 85.0-86.0'	
_				_	₽	except fine grained, weak (R2),	_
			,	91.1' - Mechanical break, <5 deg, rough,		10-20% inclusions of dark orange material up to 3/8" from 87.2-87.4'	
1 7			4	undulating, tight, possibility due to large	Н	No Recovery 88.1-90.0'	
-	R7-NQ			cavity - 91.65-92.2' - Fracture zone, 0-30 deg, rough,	Ľ	Limestone	\exists
-	5 ft	37	4	planar to undulating	Æ	90.0-92.2' - Same as 85.0-86.0'	4
	80%			·	\vdash	92.2-94.0' - grayish orange, (10YR SC-2 collected at 92.6-	4
			٦	93.0' - Fracture, horizontal, rough, undulating,	匚	7/4), fine grained, weak (R2), voids (up to 1/16") 0-5% from 92.2-93.2',	
1 7			2	1/8" relief 93.2' - Fracture, horizontal, smooth, planar	\vdash	trace fossils casts/cavities up to	1
-				93.6' - Fracture, horizontal, smooth, planar,	ш	3/8"x1-3/16" at 92.8' and at R7: 8 minutes	- 1
-			NR	1/4" relief	\vdash	93.2-93.7', very weak rock (R1) at	\dashv
95	95.0				ᡛ	93.0-93.2' No Recovery 94.0-95.0'	\perp
-51.7			>10	95.05' - Fracture, horizontal, smooth,	ш	Limestone	J
			- 10	undulating, 3/16" relief 95.32-95.56' - Clay seam, horizontal, smooth,	\vdash	95.0-96.3' - very pale orange, (10YR	
-				planar, contact on both sides, tight, some	Ľ	8/2), very fine to fine grained, weak	1
-			5	black staining on lower surface	Н	(R2), <5% voids up to 1/16" in size, dark laminae over 50% of surface at	\dashv
-	D0 N0			95.8-96.0' - Fracture zone	仜	95.5-95.7'	4
1 _	R8-NQ 5 ft	28	1	96.2-96.3' - Fracture zone 96.65-96.95' - Mechanical break		96.3-97.4' - Same as 95.0-96.3'	
	48%			55.55 55.55 Wednamed break	\vdash	except very weak (R1), voids	
1 1				_	Ш	(1/16"-1/8") up to 15%, fossil molds/cavities up to 3/8"x3/16" over	1
-			NR	-	⊢	5-10% of rock, poorly to moderately	+
-				-	亡	fossiliferous with depth	\dashv
				-	\vdash	No Recovery 97.4-100.0'	4
100	100.0				Ш		
					1		
					L		



PROJECT NUMBER:

33884.FL B-12 SHEET 6 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, NQ tools, HW casing

CORING	INETHOD A	ND EC	JUIPIV	IENT : CME 55 S/N 299205, mud rotary, NQ tools, HW o	casing		ORIENTATION : Vertical
WATER	LEVELS: 4.3	ft bgs	s on 5/	/17/07 START: 5/8/2007 END: 5/	17/200	17 LOGGER: R. Gomez, R. Bitely,	. Stewart
>00				DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SI.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUTE AND DEDTIL OF CACINO
HU	PATA ATA	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	┓╕╻	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
PTF FVA	NG.	Ω	AC1	PLANARITY, INFILLING MATERIAL AND	MB(AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SS	응필분	R O	띪	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-56.7			_	100.2' - Fractures (3), 40 deg, planar, small	Ш	Limestone	M. Faurote begins logging
_			3	fragments	Ш	100.0-103.4' - very pale orange,	borehole –
-				100.4' - Mechanical break, 2-5 deg, smooth,	\Box	 (10YR 8/2), very fine to fine grained, strong HCl reaction, extremely weak 	_
-			5	planar 101.2, 101.6' - Mechanical break, 0-2 deg,	廿	(R0), exhibits 8-15% fossil cast	-
-	R9-NQ			smooth, planar	╁┼┤	related open space, and there are	-
-	5 ft	26	>10	101.8' - Fracture, 60 deg, rough, undulating, open, the fracture is sub parallel to another	口	sporadic small <1/4" shells, blebs of carbon are visible at 1% or less	-
_	68%			fracture that is not separated	廾┨	-	_
_			>10	101.9, 101.95' - Fractures (2), fragments are		No Recovery 103.4-105.0'	_
				1" in diameter 102.5, 102.65, 102.7' - Bedding plane (3),	Н	No Recovery 103.4-105.0	
			NR	smooth, undulating	Ш		R9: 4 minutes
105	105.0				Ш	-	1
-61.7	.00.0			– 105.2-106.05' - Fracture zone, 0-3 deg,	Н	Limestone	_
_			>10	smooth, undulating, bedding plane	口	105.0-108.45' - very pale orange,	1
-				separations, primarily depositional, 1/2"	╁┼┤	 (10YR 8/2), very fine to fine grained, strong HCl reaction, extremely weak 	-
-			2	spacing	田	(R0), thin bedding, the organic	-
-	R10-NQ			106.7' - Mechanical break	丗	content remains the same, but	-
_	5 ft	28	>10	107.1' - Mechanical break 107.2-107.7' - Fracture zone, 0-3 deg,	╂┼	exhibits planar surface coating at 105.1', numerous 1/2" beds with	-
_	69%			smooth, undulating, bedding plane	\Box	distinctive partings in two zones. The	_
_			0	separations, primarily depositional, 1/2" spacing	╁┤	thin bedded materials show 10-15% open space from fossil casts and	_
_				108.0' - Mechanical break, horizontal	₽	molds. The more persistent, larger	
_			NR		Щ	beds exhibit larger shell openings and small dissolution cavities up to	R10: 5 minutes
	110.0			_	Н	3/8"	
-66.7			3			No Recovery 108.45-110.0'	There is a carbonate sand
			3	110.7-112.0' - Bedding plane, multiple	Ш	Limestone 110.0-113.45' - very pale orange,	associated with some of the lost recovery zones.
				partings with beds from 1/8" or less to 8" or	Н	(10YR 8/2), very fine to fine grained,	This limestone continues to
			2	more	Ш	strong HCl reaction, extremely weak (R0), exhibits 8-15% fossil cast	at least 115.0'
_	R11-NQ				Ш	related open space, and there are	1
-	5 ft 69%	22	>10		+	 sporadic small <1/4" shells, blebs of carbon are visible at 1% or less 	-
-	0976		>10		廿	_ carbon are visible at 1% or less	-
-			. 10		╂┴╂	No Recovery 113.45-115.0'	-
-			NR		口	-	R11: 6 minutes
-			INE		丗	-	End drilling for the day at
115_ -71.7	115.0			_	╁┼┨	No Recovery 115.0-120.0'	17:51 on 5/10/07
-/ 1./					\Box	NO Recovery 115.0-120.0	D. Whitaker begins logging borehole
1 -					oxdot	_	_
					Ш	_	Core barrel slid back to bottom of hole -
					Ш	_	
1	R12-NQ	0	NR		Н	_	Medium dark sand grains on outside of barrel -
	5 ft 0%	U	INIK		口		may/may not not be
1 -					世	-	carbonate
1 -					14	-	-
1 -					団	-	R12: 5 minutes
100	120.0				╁╫	-	-
120	120.0				\blacksquare		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-12	SHEET	7	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				IEINT : CIVIE 33 3/IN 299203, ITIUU TOLATY, INQ LOOIS, HW			ORIENTATION: Vertical
WATER	LEVELS: 4.3	ft bgs	s on 5/		/17/20		
>				DISCONTINUITIES	ტ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱ႘ᅙ	AUN A'A ER'A	(%	N C		၂ 일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A Y	SE F SOV	Q D (%)	P.F.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COF	S O	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-76.7	-				╁	No Recovery 120.0-125.0'	Water level 4.3' below
					上	-	ground at 08:00, 05/17/08
I _					╨		<u> </u>
							Interval may be sand, not
					1—	_	rock -
_	R13-NQ				+	-	1
_	5 ft	0	NR		╨	-	1
_	0%				十一	-	-
_					\perp	-	_
					╁		
					Ш		R13: 4 minutes
125	125.0				1	-] 1
-81.7	125.0			-	仁	No Recovery 125.0-130.0'	-
-					╨	-	-
_					上	=	_
					ᅪ		_
	R14-NQ				╀┸	=	1
-	5 ft	0	NR		仜	-	1
_	0%				╁	-	-
_					-	=	-
_					╨	-	
					ഥ		R14: 3 minutes
130	130.0				\vdash		
-86.7				130.0-130.4' - Fracture zone, rough,	世	Limestone	
-			>10	undulating, gravel size fragments <2" diameter	╁	 130.0-132.3' - yellowish gray, (5Y 8/1), fine to medium grained, strong 	1
-				130.5-132.25' - Bedding plane (14), <10 deg,	世	HCl reaction, extremely weak to very	1
-			>10	smooth to rough, undulating, tight to open	+	 weak (R0 to R1), trace voids, no 	1 -
_			. 40	1/2"	上	cavities, no fossil molds	_
	R15-NQ 5 ft	0	>10		╨	- No Recovery 132.3-135.0'	
	46%	U			Т	- No Recovery 132.3-133.0	
					\top	=	1
-			NR		世	-	1
-					$+$ \square	-	R15: 4 minutes
-					上	-	-
135_	135.0			1050 1051 1055 1050 1050 -	+	_	
-91.7			>10	135.0-135.1, 135.5-135.6, 135.8-135.9, 136.05-136.2, 138.1-138.2, 138.3-138.4' -	上	Limestone]
			10	Fracture zone (6), rough, undulating, gravel	\vdash	135.0-135.7' - yellowish gray, (5Y 8/1), very fine to medium grained,	
1 7				size fragments <1" diameter	世	extremely weak to very weak (R0 to	1
1 -			>10	135.2-135.45, 135.6, 135.85-135.95, 136.35-138.05' - Bedding plane or	+	R1), trace coarse grains	1
-	R16-NQ			mechanical break (18), <10 deg, smooth to	世	 135.7-136.2' - Same as 135.0-135.7' except very fine to fine grained, 	-
-	5 ft	20	1	rough, undulating, open <3/4"	╀┸	medium strong (R3), no voids	-
-	70%				\perp	_ 136.2-138.5' - Same as 135.0-135.7'	-
			>10		\bot	except fine to coarse grained, strong HCl reaction, voids 1/4" or less over	
					Ľ	10% of surface, trace fossils and	
1 7			NR		\mathbf{H}	fossil molds, no cavities	R16: 5 minutes
140	140.0					No Recovery 138.5-140.0'] 1
140	1-10.0			-	1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-12	SHEET	8	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				IENT : CIVIE 33 3/N 299203, ITINI TOTALLY, INQ TOTALS, FIVE			ORIENTATION : Vertical
WATER	LEVELS: 4.3	tt bg:	s on 5/		1//20		COMMENTS
≷ 9€	(%)			DISCONTINUITIES	8	LITHOLOGY	COMMENTS
ON ON	A'A'S	· ·	RES	DESCRIPTION	일	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAC	E RI GTH OVE	(%) Q	FOC	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	A Q	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-96.7		_		140.1-140.9' - Bedding plane (8), <10 deg,	+ "	Limestone	
-			9	slickensided to rough, undulating, open 1/2"	H	 140.0-141.0' - yellowish gray, (5Y 	-
-				or less	Ħ	8/1), very fine to medium grained, strong HCl reaction, extremely weak	-
-			>10	140.95-141.4, 142.0-142.4' - Fracture zone (2), rough, stepped to undulating, fine to	₽	 to very weak (R0 to R1), trace small 	-
-	D17 NO		>10	coarse gravel sized fragments <2" diameter		(1/16" or less) voids, few fossils, trace recrystallization, trace coarse	-
-	R17-NQ 5 ft	10	>10		仜	– grained	-
-	48%				+	141.0-142.4' - yellowish gray, (5Y 8/1), very fine grained, moderate HCl	_
_					F	reaction, medium strong (R3), <5%	_
_			NR		H	coverage of small (1/16") voids, 10%	
l _					₽	cavities and fossil molds, trace fossils	R17: 9 minutes
145_	145.0			_		No Recovery 142.4-145.0'	
-101.7			2		口	Limestone	_
l _				145.6' - Fractures (2), 60 deg, smooth and		145.0-146.05' - yellowish gray, (5Y 8/1), very fine grained, moderate HCl	
			3	undulating, rough and stepped, perpendicular fractures, open <1/8"	H	reaction, weak (R2), 5% voids 1/16"	
			٦	146.0' - Mechanical break	Ħ	over 50% of interval, no cavities or fossils	
-	R18-NQ			146.3-146.9' - Bedding plane (5), <10 deg, slickensided to rough, undulating, open <1/2"	₽	146.05-149.5' - yellowish gray, (5Y	SC-3 collected at 147.0-
-	5 ft 90%	72	0	shokerisided to rough, undulating, open 172		8/1), very fine to medium grained, strong HCl reaction, very weak (R1),	148.0' -
_				148.0' - Mechanical break		20% coverage of voids 1/16", trace	_
-			1		\vdash	fossils and fossil molds	_
-			3	148.85-149.45' - Bedding plane (4), <10 deg, slickensided to rough, undulating, open <1/2"	\vdash	=	R18: 8 minutes
150	150.0		NR	Shokerished to rough, undulating, open 47/2	Ħ	No Recovery 149.5-150.0'	
-106.7	100.0				1	Bottom of Boring at 150.0 ft bgs on	Total depth is 150.0'
-					1	- 5/17/2007	-
-						-	-
-					1	-	-
-						-	-
-						-	-
-					1	-	-
-					1	-	-
-					1	-	-
-					1	-	-
-				_	1	-	_
-					1	-	-
-					1	_	-
-					-	-	-
-					-	_	-
-					1	_	-
-					-	-	-
-					1	-	-
-					-	-	-
-					1	-	-
					1		
L					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-13	SHEET	1	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

					·	END 0/0/0007			ONIENTATION : Vertical
					START : 6/5/2007	END: 6/6/2007 SOIL DESCRIPTION	LUGGE	к : К. Т	McComb COMMENTS
≥ Ω€	CANADI	INTERM	1 (4)	STANDARD PENETRATION		SOIL DESCRIPTION		g	CONTINIEN 12
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE		TEST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR,						DEPTH OF CASING, DRILLING RATE,
H B ATIC		RECOVE	RY (ft)		MOISTURI	E CONTENT, RELATIVE DE	ENSITY OR	區	DRILLING FLUID LOSS, TESTS, AND
EPT CLEV			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, M	INERALOGY	SYMBOLIC LOG	INSTRUMENTATION
42.2	0.0			(14)	⊤ Topsoil			107	
-		0.9	SS-1	2-2-2	\ 0.0-0.1' - dark	gray, (N2), moist, very fir	e to fine	-	-
-		0.9	33-1	(4)	\grained, organ	nic fines, silica sand d Sand With Organics (S	· D \	+	1
-	1.5				0.1-0.9' - light	to medium gray, (N7 to N	6), moist, very	-	-
_					loose, very fine	e to fine grained, trace no	nplastic fines.	-	
_					depth, silica sa	nic fines and rootlets, decr	easing with	4	
_					(== -=			4	-
_								4	_
_								1	_
_								_	_
5	5.0							1	_
37.2				4.4.0	Silty Sand (SI	M) erate yellowish brown, (10	VR 5/4) wet	_	_
_		0.6	SS-2	1-1-0 (1)	\ very loose, no	HCI reaction, 10% fines,	trace black	1	
_	6.5			. ,	(non carbonate	e) gravel, silica sand	/		
								1]
								1	1
								1	1
-								1	1
10	10.0							1	1
32.2	10.0				Silt (ML)		_	ТП	1 7
-		1.1	SS-3	29-30-34	10.0-11.1' - gra	ayish orange, (10YR 7/2), y, mild HCl reaction, trace	wet, hard,	1	1
-	11.5			(64)	fine-grained sa	and, all carbonate	VC1 y	╫	1
-	11.0							1	1
-								1	1
-								1	1
-								┨	
-								┨	
-								1	-
	45.0							1	-
15 <u> </u>	15.9	0.1	SS-4 /	50/1	☐ Limestone Fra	agments		╆	╡ -
-				(50/1")	\ 15.0-15.1' - gr	rayish orange, (10YR 7/2), emely weak (R0), coarse s	mild HCI	1	-
-					reaction, extre	emely weak (H0), coarse s	and-sized	-	-
-					p3 11000100	•		-	
-								-	-
-								-	-
-								-	-
-								-	-
-								-	-
-								-	-
20							_	+	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-13	SHEET	2	OF 8	3

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 2.0 ft bo	s on 6/05	5/07 S	START : 6/5/2007 END : 6/6/2007 LOGGER : R. McComb
				STANDARD	SOIL DESCRIPTION 5 COMMENTS
LOW AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
ACE ATIO		RECOVERY (ft)			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
22.2	20.0			(14)	Silty Gravel With Sand (GM)
-		1.2	SS-5	29-36-26	20.0-21.2' - grayish orange, (5Y 8/4), wet, very dense, fine to coarse grained, mild HCl reaction, 30% fine to
-	21.5			(62)	coarse limestone gravel, 30% nonplastic fines
-	21.0				1
]
					Some rig chatter from 20-25'
_					_
-					_
_					-
25 <u> </u>	25.0				Sandy Silt (ML)
		0.6	SS-6	5-11-14	L 25.0-25.6' - gravish yellow, (5Y 8/4), wet, very stiff, _dllll
-	00 E	0.0	33-0	(25)	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-	26.5				\gravel, all carbonate \frac{1}{2}
-					- I
-					1
]
_]
_					_ _
30 <u> </u>	30.0 30.2	0.0	CC 7	F0/0	No December 20.0.00 U
12.2		0.0	SS-7	50/2 (50/2")	No Recovery 30.0-30.2'
-					-
-					-
-					
-					-
-					†
-					1
-					1
35	35.0				1
7.2				32-43-50/5	Silty Sand With Limestone Fragments (SM) 35.0-36.3' - grayish yellow, (5YR 8/4), wet, very
_		1.3	SS-8	(93/11")	dense, fine to coarse grained, mild to moderate HCI reaction, 20-25% nonplastic fines, 30% fine to coarse
_	36.4				│ limestone gravel, organic black staining on some rock / - │
-					\fragments, all carbonate
-					-
-					Hard drilling at 38'
-	40.0				
-	40.0 40.2	0.1	SS-9	50/2.5	☐ Limestone Fragments
40				(50/2.5")	\dagged 40.0-40.11 - light olive gray, (5Y 5/2), mild HCl reaction, extremely weak (R0)



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-13	SHEET	3	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

CORING	IVILITIOD AI	ND LC	ZUIFIV	IENT: CME 550 S/N 1860/3, mud rotary, NQ tools, NW	Casin		ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft ba	s on 6	/05/07 START : 6/5/2007 END : 6/	6/2007	LOGGER : R. McComb	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			•	SYMBOLIC LOG	L02001	COMMENTO
N S S S	z¥≿ ZZ×		FRACTURES PER FOOT	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표일은	8元年	(%) _Q	150	DEDTH TYPE OPICHTATION POLICHNESS	ובור	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₽¥	# <u>p</u> g	۵	Z F	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S O	사 구	THICKNESS, SURFACE STAINING, AND TIGHTNESS	1 5	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
2.2		ш.	44	10.0.10.051.5	, ,		A
2.2	40.0		10	40.0-40.35' - Fracture zone, limestone fragments, various orientations	\vdash	Limestone - 40.0-41.7' - dusky yellow, (5Y 6/4),	At 40.0' switched over to NQ rock coring -
			10	40.35' - Bedding plane or mechanical break,		mild to moderate HCl reaction, weak	NQ lock colling
-				horizontal, rough, planar, loose		(R2), fossiliferous (casts/molds) with	-
_			1	41.35' - Fracture, horizontal to 40 deg, rough,	ш	- some cavities generally 3/8"x3/16",	_
				stepped, loose	Н	voids up to 1/16" over 25%-30% of	
_	R1-NQ			stoppou, todoo		rock surface, light olive gray	-
-	5 ft	20			$-\Box$	 intraclasts, suspended in fine grained 	-
_	34%				\bot	matrix (intraclasts typically 3/8"x3/16"	<u>_</u>
			NR		\vdash	or less).	
-			INIX		$\pm \Pi$	No Recovery 41.7-45.0'	-
_						_	
					ш		R1: 3 minutes
45					+	-	-
45 -2.8	45.0			<u></u>		Limestone	
-2.0			4	45.1' - Fracture, 70 deg, rough, planar, tight	Ш	- 45.0-49.4' - Same as 40.0-41.7'	_
I -			+	45.5' - Bedding plane, horizontal, undulating,	\vdash	except very weak (R1)	1
-				loose	+	_ CACCPI VCI'S WCak (IVI)	Driller's Remark: 46.0-48.0'
-			0	45.65' - Fracture, 60 deg, rough, stepped,	\perp	_	very soft
				loose			isiy sen
_	R2-NQ			45.9' - Fracture, 50 deg, rough, undulating, loose	ш	-	1
_	5 ft	69	2	47.2' - Bedding plane, horizontal to <5 deg,	+	-	-
_	88%			rough, stepped, loose		_	_
				47.5, 47.8' - Fractures (2), horizontal to >80			
_			1	deg, rough, undulating, extending into	+	_	-
_				incipient fracture trace that dies out	₽	-	
			0	48.75' - Bedding plane, <5 deg, rough,			R2: 3 minutes
50	50.0		NR	undulating, loose, intersected by incipient		No Recovery 49.4-50.0'	
-7.8	50.0			fracture that is nearly vertical and dies out at _	ш	Limestone	_
'.5 _			2	end of R2	Н	- 50.0-53.5' - Same as 40.0-41.7'	_
			_	50.35' - Fracture, 20 deg, rough, undulating,		except cavities more common up to	
_				tight 50.7' - Fracture, 70 deg, rough,		3-5%, fossiliferous cast/molds	
_			1	stepped/undulating, tight, black organic	+	 becoming more fossiliferous with 	_
				staining on 1-3% surface		depth, extremely weak zone (R0)	
	R3-NQ			51.8' - Fracture or mechanical break, <5 deg,	ТП	from 52.65 to 56.85', incipient	
-	5 ft	72	1	rough, stepped, loose	\Box	- fracture from 50.9-51.2', inclined 70	Driller's Remark: 52.5-53.0'
I -	82%			52.65' - Fracture or mechanical break, <5	Щ	_ degrees.	soft –
			ا ہا	deg, rough, stepped, tight	Н	53.5-54.1' - yellowish gray, (5Y 7/2),	
I -			3	53.01' - Fracture, 40 deg, rough, undulating,		fine to very fine grained, moderate to	Driller's Remark: 53.5-54.5'
-				tight	\Box	strong HCl reaction, weak to medium	soft -
			NR	53.3-53.45' - Fracture zone, rough, stepped	\Box	strong (R2 to R3), voids covering - 10%-15%, cavities rare	R3: 5 minutes
55	55.0		INIX	to undulating, 60-70 deg to horizontal, tight to	H	(<3/16"x3/16").	1
-12.8	55.0			loose	\Box	No Recovery 54.1-55.0'	
'2.5_			1	l		- Limestone	_
			'	55.95' - Bedding plane or mechanical break,	Ш	55.0-55.9' - Same as 53.5-54.1'	
I -				horizontal to <5 deg, rough, stepped, loose	+	55.9-58.5' - dusky yellow to moderate	SC-1 collected at 55.0-
-			>10	56.38-56.7' - Fracture zone, gravel-sized	+	 olive brown, (5Y 6/4 to 5Y 5/6), mild 	55.95'
				limestone rock fragments, various	Ш	HCl reaction, weak (R2), with thin	
I -	R4-NQ			orientations	\square	wispy laminae of black organic (N1)	1
-	5 ft	18	10	56.9-57.05' - Fracture zone, various	╀╀	material, fossiliferous (casts and	-
l _	70%			orientations	\vdash	molds), voids covering 35-40% of	
I			2	57.4-57.6' - Fracture zone, same as		surface and cavities generally less	
-				56.38-56.7'	ш	than 3/16"x3/16". No Recovery 58.5-60.0'	-
_					+	NO Recovery 50.5-60.0	
			NR		\vdash		R4: 5 minutes
60	60.0				ш	-	1
- 00	00.0				+		
							I

APPENDIX 2BB-504 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-13	SHEET	4	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

					casing		
WATER	LEVELS : 2.0	ft bg	s on 6	<u>/05/07 START : 6/5/2007 END : 6/</u>	<u>6/2007</u>	LOGGER : R. McComb	
>				DISCONTINUITIES	ن ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표한한	2 4 K	(9)	본		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
I ∓X €	S E S	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F. E. E.	RNI	Ø	FRACTURES PER FOOT	PLANARITÝ, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	075	ď	шФ		S		
-17.8			١ ,	57.9-58.25' - Fracture zone, horizontal to 60	Н	Limestone	
_			3	deg, rough, with bedding plane fractures at 58.15' and 58.25', inclined fracture from	ш	 60.0-63.45' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 	1
-				57.9-58.15', rough, undulating to stepped,	H	4/4), fine to very fine grained,	1 -
-			0	loose.	₽	 moderate to strong HCl reaction, 	-
l _				60.5, 60.6, 60.7' - Bedding plane (3),	Ш	weak to medium strong (R2 to R3),	_
	R5-NQ		١	horizontal to <5 deg, rough, stepped, loose	Н	fossiliferous (casts/molds), voids up	Driller's Remark: 62.0-64.0'
_	5 ft	55	10	62.15-62.55' - Fracture zone, rough, extremely soft rock, some bedding plane	Н	 to 1/16" covering up to 50-60% surface, extremely weak rock (R0) 	very soft -
-	69%		<u> </u>	fractures horizontal to vertical,	◫	from 60.1' to 62.5' with some silt and	Driller's Remark: All fairly
_			0	undulating/stepped, tight to loose	₩	- sand-sized limestone rock	soft to 64.0'
				3 11 / 3	Н	fragments, some voids up to 3/8-3/4"	
_			NR		Ш	x 3/8-3/4".	R5: 4 minutes
-					╁┼	No Recovery 63.45-65.0'	
65 <u> </u>	65.0				╁┼┼		-
-22.0			4	65.1, 65.2' - Bedding plane (2), horizontal to	Ш	Limestone - 65.0-69.4' - Same as 60.0-63.45']
			-	<5 deg, rough, stepped, loose 65.5' - Bedding plane, <5 deg, rough, loose	Н	except extremely weak rock (R0)	
_				65.8, 66.35' - Bedding plane (2), <5 deg,	ш	(similar to 62.1-62.5') from 66.0-66.7'	1 7
-			2	rough, loose	ш	and 69.0-69.4'.	-
-				66.7- 67.7' - Fracture zone, >80 deg to	₽	-	-
	R6-NQ	26	>10	vertical, series of several fractures, rough,			
	5 ft 88%	20	-10	undulating to stepped, loose	Ш		1
_					\Box	-	1
_			0		ш	-	-
-					н	-	1
			1	69.0-69.1' - Fracture zone, horizontal to 60 deg, rough, undulating, tight	ш		R6: 4 minutes
70	70.0		NR	9,9,	Ħ	No Recovery 69.4-70.0'	Driller's Remark: 69.5-70.0'
70 <u> </u>	70.0		NR	-	H	No Recovery 69.4-70.0* Limestone	Driller's Remark: 69.5-70.0' very soft —
	70.0		NR 1	70.1-70.15' - Fracture zone, horizontal to 60		Limestone - 70.0-73.1' - light olive gray, (5Y 5/2),	
	70.0			-		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to	
	70.0		1	70.1-70.15' - Fracture zone, horizontal to 60		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3),	very soft SC-2 collected at 70.15-
	70.0			70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with	very soft
			1	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg,		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3),	very soft
	R7-NQ 5 ft	16	1	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae	very soft
	R7-NQ		3	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft
	R7-NQ 5 ft		3	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained.	very soft SC-2 collected at 70.15-71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5'
	R7-NQ 5 ft		3	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough,		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft
	R7-NQ 5 ft		3	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained.	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' Soft Driller's Remark: 73.0-74.5' very soft
	R7-NQ 5 ft		1 3 10	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break,		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0'	very soft SC-2 collected at 70.15-71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes
-27.8 - - - - - - - - - - 75	R7-NQ 5 ft		1 3 10	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water
-27.8 - - - - - - -	R7-NQ 5 ft 62%		1 3 10 NR	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0'	very soft SC-2 collected at 70.15-71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes
-27.8 - - - - - - - - - - 75	R7-NQ 5 ft 62%		1 3 10	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length;	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water
-27.8 - - - - - - - - - - 75	R7-NQ 5 ft 62%		1 3 10 NR	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground
-27.8 	R7-NQ 5 ft 62%		1 3 10 NR	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough,		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts.	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water
-27.8 - - - - - - - - - - 75	R7-NQ 5 ft 62% 75.0	16	1 3 10 NR	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4),	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground
-27.8 	R7-NQ 5 ft 62% 75.0	16	1 3 10 NR 2 >10	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface
-27.8 - - - - - - - - - - 75	R7-NQ 5 ft 62% 75.0 R8-NQ 5 ft	16	1 3 10 NR	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough,		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground
-27.8 - - - - - - - - - - 75	R7-NQ 5 ft 62% 75.0	16	1 3 10 NR 2 >10 3	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5', clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0%	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface
-27.8 	R7-NQ 5 ft 62% 75.0 R8-NQ 5 ft	16	1 3 10 NR 2 >10	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar 76.4-76.9' - Fracture zone, gravel (limestone)		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0% voids grading to zones with voids up	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface
-27.8 - - - - - - - - - - 75	R7-NQ 5 ft 62% 75.0 R8-NQ 5 ft	16	1 3 10 NR 2 >10 3	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0% voids grading to zones with voids up to 10-15%; cavities rare, generally	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Incipient fracture 75-75.6'
-27.8 - - - - - - - - - - 75	R7-NQ 5 ft 62% 75.0 R8-NQ 5 ft	16	1 3 10 NR 2 >10 3	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar 76.4-76.9' - Fracture zone, gravel (limestone) various orientations, generally planar to undulating, rough to smooth, loose 77.3' - Bedding plane, rough, undulating to		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0% voids grading to zones with voids up	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface
-27.8 - - - - - - - - -32.8 - - -	R7-NQ 5 ft 62% 75.0 R8-NQ 5 ft 64%	16	1 3 10 NR 2 >10 3	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar 76.4-76.9' - Fracture zone, gravel (limestone) various orientations, generally planar to undulating, rough to smooth, loose		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0% voids grading to zones with voids up to 10-15%; cavities rare, generally <3/8" in diameter.	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Incipient fracture 75-75.6'
-27.8 - - - - - - - - -32.8 - - -	R7-NQ 5 ft 62% 75.0 R8-NQ 5 ft	16	1 3 10 NR 2 >10 3	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar 76.4-76.9' - Fracture zone, gravel (limestone) various orientations, generally planar to undulating, rough to smooth, loose 77.3' - Bedding plane, rough, undulating to		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5', clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0% voids grading to zones with voids up to 10-15%; cavities rare, generally <3/8" in diameter. 77.3-78.2' - Same as 75.0-76.5'	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Incipient fracture 75-75.6'
-27.8 - - - - - - - -32.8 - - - -	R7-NQ 5 ft 62% 75.0 R8-NQ 5 ft 64%	16	1 3 10 NR 2 >10 3	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose 71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar 76.4-76.9' - Fracture zone, gravel (limestone) various orientations, generally planar to undulating, rough to smooth, loose 77.3' - Bedding plane, rough, undulating to		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5', clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0% voids grading to zones with voids up to 10-15%; cavities rare, generally <3/8" in diameter. 77.3-78.2' - Same as 75.0-76.5'	very soft SC-2 collected at 70.15- 71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Incipient fracture 75-75.6'



PROJECT NUMBER:

33884.FL

B-13 SHEET 5 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

				TENT . CIVIE 550 S/N 180075, Midd Totally, NQ tools, NVV	<u> </u>		ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bgs	s on 6	/05/07 START : 6/5/2007 END : 6/	6/2007	LOGGER : R. McComb	
> ^ ~				DISCONTINUITIES	ڻ ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	NA'R	(%	嚴당		1 2 1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
Ħ,Υ E,Υ E,Υ E,Υ E,Υ E,Υ E,Υ E,Υ E,Υ E,Υ E	H F S	(%) _Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P. E. E.	E E E	S O	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0716	íĽ.	ша		S		
-37.8			0	77.78' - Bedding plane, <5 deg, rough to	\vdash	Limestone	
			U	smooth, loose 77.9' - Bedding plane, <5 deg, rough, loose	Ш	 80.0-81.2' - fine grained, moderate to strong HCl reaction, medium strong 	
-				78.05' - Fracture, 60 deg, rough, planar		R3), trace fossils becoming more	-
-			3	81.2-81.3' - Fracture zone, <5 deg, rough,		common with depth (molds/casts),	Drillarda Damarki 04 E 00 El
				undulating, tight with 0.05' black	Н	_ voids grading from 10% to 20% with	Driller's Remark: 81.5-82.5' soft
	R9-NQ			carbonaceous (organic) clay lining, soft, wet		depth, cavities becoming more	3011
_	5 ft	82	0	81.6' - Bedding plane, horizontal to <5 deg, smooth, stepped to planar, loose	Ш	common with depth up to 3/8"x3/8".	1
_	96%			81.9' - Bedding plane, <5 deg, rough,	+	Clay (CL) 81.2-81.3' - black, wet, soft, rapid	-
_			0	undulating, loose	\vdash	- dilatancy, (carbonaceous, organic	SC-3 collected at 83.35-
				3,		layer)	84.40'
					Н	Limestone	R9: 6 minutes
			0	-	ᆸ	81.3-81.9' - pale yellowish brown,	-
-42.8	85.0		NR		\Box	(10YR 6/7), fine grained, mild HCI	
-42.0			0		H	reaction, becoming thinly laminated with depth and variegated (mottled),	
						voids (15-20%) decreasing with	
-				•	ш	depth.	1
-			0		+ + +	- 81.9-84.8' - Same as 80.0-81.2'	1
_						except cavities up to 1" in diameter.	_
	R10-	71	0		Ш	No Recovery 84.8-85.0'	
	5 ft 80%	/ 1	U		hd	 Limestone 85.0-87.55' - Same as 81.9-84.8' 	7
_				88.0' - Bedding plane or mechanical break,		87.55-89.0' - yellowish gray, (5Y 7/2),	Driller's Remark: 100%
_			10	horizontal, rough, undulating, loose	H	 mild HCl reaction, medium strong 	loss of water -
_				88.55-88.75' - Fracture zone, horizontal,	Ш	(R3), fine grained with some medium	Driller's Remark: 88.5-89.5'
			ND	rough, undulating, gravel sized fragments,		to coarse grained interclasts,	soft
90	90.0		NR	loose	Н	 fossiliferous, (casts/molds) very common, cavities up to 1" in 	R10: 7 minutes -
-47. 8	30.0			90.0-90.35' - Fracture zone, limestone rock	ш	diameter, some cavities filled with	_
_			>10	fragments, various orientations	+	 black organic material, voids and 	-
_				90.35' - Fracture, horizontal, smooth, planar	廾廿	cavities over 40-50% of surface.	
				to undulating, loose		No Recovery 89.0-90.0' Limestone	
			1	90.5' - Bedding plane or mechanical break, horizontal, rough, undulating/stepped, loose		-	1
_	R11-NQ			91.4' - Bedding plane, horizontal to 50 deg,	ш	91.4-91.7' - white to very light gray,	Driller's Remark: 5% water
_	5 ft	53	1	rough, undulating, loose	+	- (N9 to N8), very fine grained, strong	returns -
	77%			92.07' - Bedding plane or mechanical break,	Щ	HCI reaction, extremely weak (R0),	
			0	10 deg, smooth, planar, tight	Щ	voids over 3%-5%, clayey.	SC-4 collected at 92.0- 92.87'
1 -			١	•	Ш	- Silty Clay (CL-ML) 91.7-91.85' - white, (N9), moist, soft,]
-					Y ///	no to slow dilatancy, cohesive.	R11: 9 minutes
-			NR		V///	Limestone	-
95	95.0					91.85-92.3' - Same as 91.4-91.7'	
-52.8				95.17' - Fracture, >80 deg, rough, stepped,	Щ	except gradational with unit below.]
-			5	loose	╂┯╂	92.3-93.8' - white to very light gray,	1
1 -				95.4, 95.6, 95.72, 95.9' - Fractures (4),	口	(N9 to N8), very fine grained, strong HCl reaction, medium strong (R3),	-
-			10	horizontal to 30 deg, rough, planar to	₽₽	fossils rare to absent, voids <1/16"]
				undulating, loose to tight 96.0' - Fracture, horizontal to <10 deg, rough,	Н	over 1%-3%, rare cavities (3/8" x]
1 7	R12-NQ			planar, loose	Ш	3/8") with dark stain.	Driller's Remark: Medium
-	5 ft	26	10	96.2-96.75' - Fracture zone, 70 to 80 deg,	╂┴╂	Clay (CL)	hard run -
-	95%			rough, undulating, loose		_ 93.8-93.85' - dark brown, dry, no] -
1 _			3	97.0' - Fracture, horizontal, smooth,	口	dilatancy, strong HCl reaction, friable.	
			١	undulating, loose 97.05-97.5' - Fracture zone, vertical to 0 deg.	$\vdash \vdash \vdash$	No Recovery 93.85-95.0']
1 7			4	97.05-97.5° - Fracture zone, vertical to 0 deg, rough, loose	Ш		R12: 7 minutes
			1	100301, 10000	╂┼┦	-	1
100	100.0				₽₩		
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-13	SHEET	6	OF	8	

ORIENTATION : Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 2.0	ft bgs	s on 6/	05/07 START : 6/5/2007 END : 6/	6/200	7 LOGGER : R. McComb	
\$ D ≨	(%			DISCONTINUITIES] [2	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	225	ď		THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
-57.8 - - -			\ <u>NR</u> / 4 ———————————————————————————————————	97.6, 97.9' - Fractures (2), horizontal, rough, planar, loose 98.0' - Fracture, 40 to 50 deg, rough, planar, loose 98.2, 98.4' - Fractures (2), horizontal, rough, undulating to stepped, loose		Limestone 95.0-96.0' - Same as 92.3-93.8' except with voids becoming more common (up to 5-10%) with depth. 96.0-99.75' - light gray, (N8), very fine to fine grained, strong HCl	- - -
- - -	R13-NQ 5 ft 100%	34	1	99.05' - Fracture, <10 deg, rough, stepped, loose 100.25, 100.35, 100.6' - Bedding plane or mechanical break (3), <5 deg, rough to		reaction, weak (R2), fossiliferous (casts/molds) common, possible intraclasts, gastropod casts and molds common, voids and cavities	- - -
-			>10 10	smooth, undulating 100.6-100.95' - Fracture, 70 to 80 deg, smooth, undulating, tight 101.1-101.57' - Fracture zone, horizontal to		 over 40%-50% of rock surface. No Recovery 99.75-100.0' Limestone 100.0-105.0' - Same as 96.0-99.75' 	R13: 7 minutes
105_ -62.8 - - - -	105.0 R14-NQ		NR	>80 deg, producing fine gravel limestone rock fragments 102.35' - Fracture or mechanical break, horizontal, rough, stepped, tight 103.2-103.6' - Fracture zone, vertical to <5 deg, rough, undulating to stepped, loose to tight		except fossils become less common along with voids and cavities; cavities and voids common from 100.0'-100.9' and from 102.2'-103.0', intervals in between consist of very fine grained limestone, with void and cavities over 10%-15% of surface. No Recovery 105.0-107.5'	Suspect siliceous unconsolidated sand 105 107.5'
_	5 ft 50%	16	0			Poorly Graded Sand (SP)	-
=	30 /6		>10	108.35-109.0' - Fracture zone, vertical and	- - -	- 107.5-108.35' - moderate yellowish brown, (10YR 5/4), wet, loose, fine grained, moderately cohesive,	-
- - 110	110.0		10	horizontal planes, tight 109.5-109.6' - Fracture zone, horizontal to >80 deg	Ħ	- moderate to well sorted, subangular to subrounded, trace to 5% heavy dark minerals, sharp contact with	R14: 8 minutes
-67. 8			5			underlying limestone, sand is siliceous Limestone 108.35-110.0' - light gray to white,	
_	R15-NQ		9	112.5, 112.55, 112.62, 112.9, 113.1, 113.15, 113.2, 113.25, 113.5' - Bedding plane or mechanical break (26), horizontal, rough, planar to undulating, and loose, vertical		(N9 to N8), fine to very fine grained, very strong HCl reaction, very weak to weak (R1 to R2), with extremely weak (R0) zone from 109.5'-109.6'	-
-	5 ft 74%	0	10	fractures between horizontal discontinuities at 111.35-111.5' and 112.9-113.25'		containing some clay, fossiliferous (very small echinoids) and other fossils, voids and cavities over 5%-10% with percentage increasing	_
	115.0		NR			with depth. 110.0-113.7' - yellowish gray, (5Y 7/2), very fine grained, very strong HCl reaction, very weak to weak (R1	R15: 4 minutes
-72.8 - -			5	115.15, 115.3, 115.36, 115.65, 115.9, 116.1, 116.25, 116.3, 116.4, 116.47' - Bedding plane (10), horizontal, rough, planar to slightly		to R2), fossils rare, voids generally less than 3/16" over 1%-2% of rock, occasional cavity (worm burrow), 3/8	- Drillaria Domarke 117 F
-			10	undulating, tight	世	x 3/8", matrix very "chalk-like". No Recovery 113.7-115.0'	Driller's Remark: 117.5- 118.5' Suspect sand bed, – barrel plugged up, no
- - -	R16-NQ 5 ft 57%	10	NR	110 5' Podding plane <5 deg rough		Limestone 115.0-116.5' - Same as 110.0-113.7' No Recovery 116.5-118.5'	circulation, tried to stop pump, barrel stalled, also evidenced by decreasing core diameter suggesting
-			10	118.5' - Bedding plane, <5 deg, rough, undulating, loose	Ł	-	abrasion by sand –
- -			10 4	119.17, 119.32, 119.6, 119.8' - Bedding plane (4), smooth to rough, planar to slightly		-	R16: 6 minutes
120	120.0			undulating, loose	+-		
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-13	SHEET	7	OF	8	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 2.0	ft bgs	on 6/	05/07 START : 6/5/2007 END : 6/	6/200	7 LOGGER : R. McComb	
≥∩≎	(%)			DISCONTINUITIES	စ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	D (%)	156 196	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF ELEV	COR ENC	RQE	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-77.8	O J E	ш.		120.1, 120.3, 120.47, 120.8, 121.04, 121.57,		Limestone	
-			4	121.78, 122.2, 122.37, 122.62, 123.21, 123.3,	\vdash	 118.5-120.0' - yellowish gray, (5Y 7/2), fine to very fine grained, strong 	
-				123.36, 123.55, 123.8' - Bedding plane or mechanical break (15), horizontal to <5 deg,	F	HCl reaction, weak (R2), fossiliferous	-
_			3	rough, planar to undulating, loose	Ħ	 with numerous casts/molds (gastropods, pelecypods, echinoids); 	-
_	R17-NQ					cavities and voids over 20%-30% of	-
_	5 ft 78%	32	4	122.44' - Bedding plane, horizontal, smooth,	世	 surface. 120.0-120.6' - yellowish gray, (5Y 	-
_	. 570			within thin laminae, loose	\vdash	7/2), fine to medium grained, strong	-
_			5		I	 HCl reaction, weak (R2), fossiliferous (casts/molds) unfilled burrowed 	-
_			NR		┰	cavities/voids over 70%-80%, cavities up to 3/8" x 3/8".	R17: 7 minutes
125	125.0		INIX		\Box	120.6-123.2' - yellowish gray, (5Y	1
-82.8			7	125.05, 125.1, 125.22, 125.27, 125.55, 125.7,	\perp	7/2), fine to very fine grained, strong HCl reaction, very weak to weak (R1	
			1	125.97, 126.25, 126.43, 126.52, 126.55, 126.7, 126.85, 126.97, 127.1, 127.32, 127.35,	\vdash	to R2), fossils rare, voids and	
			7	127.5, 127.82, 127.92, 128.0, 128.1, 128.14, 128.2, 128.25, 128.32, 128.37, 128.42,	F	cavities rare, some mottling, very thinly laminated from 122.4 to 122.6'.	
			,	128.48, 128.55, 128.67, 128.78, 128.9' -	F	123.2-123.9' - Same as 120.0-120.6'	_
_	R18-NQ 5 ft	0	10	Bedding plane or mechanical break (33), horizontal, rough to smooth, planar to	片	No Recovery 123.9-125.0' Limestone	
_	81%	ŭ		undulating, generally loose; at 126.7' black	L	125.0-129.05' - Same as 120.6-123.2' except laminations	_
_			>10	carbonaceous coating on 40% of surface, fracture zone 127.35-127.5'	\vdash	absent.	_
_			\ 10 /	128.97, 128.99' - Bedding plane or	╀	- 11 - 100 05 100 01	D19: 5 minutos
_			NR	mechanical break (2), horizontal, rough to	F	No Recovery 129.05-130.0'	R18: 5 minutes
130 <u> </u>	130.0			smooth, planar to undulating, generally loose	厂	Limestone	_
-			4	130.35, 130.54, 130.75, 130.85, 131.05,	口	 130.0-131.3' - yellowish gray, (5Y 	-
_				131.17, 131.25, 131.39, 131.5, 131.67, 131.71, 131.85, 131.99, 132.32, 132.85' -	仜	7/2), fine to medium grained, strong HCl reaction, very weak to weak (R1	-
_			9	Bedding plane or mechanical break (15),	\perp	 to R2), fossiliferous with numerous casts/molds, echinoids, gastropods, 	-
-	R19-NQ			horizontal to <5 deg, smooth to rough, planar to undulating, loose	╁	cavities and voids up to 40%	-
_	5 ft 84%	24	2		F	 increasing in depth, some intraclasts present. 	-
_	3173			133.0-133.3' - Fracture, 80 deg, rough,	Ħ	131.3-132.0' - yellowish gray, (5Y	
-			3	undulating, loose 133.5' - Fracture, horizontal to 80 deg, rough,		 7/2), very fine to fine grained, strong HCl reaction, "grainy" appearance, 	1
			0	stepped, loose	世	thinly laminated, voids and cavities rare.	R19: 4 minutes
	135.0		NR		片	132.0-133.6' - Same as 130.0-131.3'	1
-92.8			>10	135.2-135.9' - Fracture zone, horizontal to 90	dash	except very weak (R1), medium to coarse grained (coarse particularly at]
			- 10	deg, smooth to rough, undulating to planar, loose	F	132.0' to 132.3'), similar to coquina,]
			7	136.06, 136.13, 136.24, 136.42, 136.8,	口	very fossiliferous. _ 133.6-134.2' - Same as 131.3-132.0']
_	_		•	136.93, 136.97, 137.2' - Bedding plane or mechanical break (8), horizontal, rough to	口	except very thinly laminated, voids/cavities rare to absent.]
_	R20-NQ 5 ft	7	_1_	smooth, undulating to planar, loose	口	No Recovery 134.2-135.0'	
_	44%				\vdash	Limestone - 135.0-135.2' - Same as 131.3-132.0'	_
-			NR		\vdash	_ 135.2-137.03' - Same as	-
_					F	130.0-131.3' except fine grained, very weak (R1), fossiliferous, very	R20: 4 minutes
-					H	thinly laminated at base with organics.	1\20. 4 Hilliules
140	140.0				H	organics.	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-13	SHEET	8	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

00111110	WILLIII OD 7 II		2011 11	IENT . CIVIE 330 3/N 100073, Mud Totary, NQ tools, NVV	odon	3	ORIENTATION . Vertical
WATER	LEVELS : 2.0	ft bgs	s on 6	/05/07 START : 6/5/2007 END : 6	/6/200	7 LOGGER : R. McComb	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(0	DESCRIPTION	SYMBOLIC LOG		
OPE	Z Z Z	~	FRACTURES PER FOOT	DESCRIFTION	길	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ASE	N.E.S.	(%) Q	ΞÖ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	፬	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
T F F 5	NS NS I	g	SAC ER F	PLANARITY, INFILLING MATERIAL AND	Į₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
20 20 E	8.2	ď	F H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	5.16. 6, 126. 1266216, 2.6.
-97.8					ш	137.03-137.2' - medium gray, (N5)	ı,
-			4	140.4, 140.45, 140.62, 140.76, 141.02, 141.1'	╁	 very fine grained, strong HCI 	-
l -				 Bedding plane or mechanical break (6), 	+	reaction, weak to medium strong (R2 -
_			10	horizontal, smooth, planar, loose	ⅉℼ	to R3), few voids. No Recovery 137.2-140.0'	
			10	141.25-141.6' - Fracture zone, various orientations, limestone gravel	\vdash	Limestone	
-	R21-NQ			141.7, 141.85, 142.0, 142.25, 143.0, 143.15,	++	140.0-141.3' - yellowish gray, (5Y	1 1
-	5 ft	31	2	143.2, 143.28' - Mechanical break or	$-\Box$	 7/2), fine grained, strong HCI 	- 1 -
l _	89%			fractures (8), horizontal to 60 deg, rough,	ᅪ	reaction, very weak to weak (R1 to	,
			_	stepped, tight		R2), fossils rare to absent;	
-			5		世	 "chalk-like" texture, cavity infilling of supported by interclasts in fine 	or
-			. 40	144 0 144 45' Frosturo zono limostono	+-	grained matrix, grains up to 3/16" i	D21: 6 minutes
I -			>10	144.0-144.45' - Fracture zone, limestone gravels, orientations unknown	╨	diameter and dark gray and white	R21: 6 minutes
145	145.0		NR	gravelo, orientations unitiowit		(N9) in color, voids <1%.	1
-102.8				– 145.1' - Fracture, horizontal, smooth,	1	141.3-144.5' - yellowish gray, (5Y	
-			10	undulating, loose	╁┼	 7/2), very fine grained, strong HCI 	_
I -				145.2' - Fracture, 60 deg, smooth, stepped,	\perp	reaction, weak to medium strong (K2
1				tight	\vdash	to R3), bioturbated with some cavities >1" long and >1" deep, so	me
-			>10	145.6-145.88' - Fracture zone, 85-90 deg	╁	cavities infilled, some cavities line	
-	R22-NQ			along outside 1/5th of core, truncated at	仜	with dark gray (N3) coatings, mottl	
-	5 ft	0	1	145.88', split at 157.7' by <5 deg fracture 145.93' - Fracture, horizontal, smooth,	ᅪ	texture with area of void-free	
	58%			undulating, loose		limestone and zones of limestone	
_				146.05-146.45' - Fracture zone, vertical,		with up to 60%-70% voids,	1
-				rough, planar, tight, cross cut by horizontal	╁	fossiliferous in casts/molds of pelecypods and gastropods.	1 -
I -			NR	fracture at 146.15' which propagates halfway	╨	No Recovery 144.5-145.0'	1,000 7 1 1
l _				through core	ഥ	Limestone	R22: 7 minutes
150	150.0			146.45-146.7' - Fracture zone _ 146.7' - Fracture, <5 deg, rough, undulating, _	Ъ.	145.0-146.15' - yellowish gray, (5Y	'
-107.8	100.0			loose	++	7/2), very fine grained, strong HCI	- I
-				146.85, 146.95, 147.05' - Bedding plane or	-	reaction, weak to medium strong (
_				mechanical break (3), horizontal to <5 deg,	1	to R3), thinly laminated, fossils random to absent, some voids up to 1/16"	
				rough, undulating to stepped, loose		less over 1%-3% of rock, cavities	³¹
_					1	rare (3/8"x3/8"), sharp contact with	1
-					1	 underlying limestone. 	-
-					4	146.15-147.9' - yellowish gray, (5Y	
1					_	7/2), fine to medium grained, stron	
I -					1	 HCl reaction, weak (R2), very friate and loose (especially at 146.4' to 	ле
-					1	146.7'), with extremely weak (R0)	
-					-	rock at 146.4'-146.7', trace fossils,	
I _					_	voids generally less than 1/16" over	
I -					1	60%-70% producing a grainy textu	re.
I -				_	1	No Recovery 147.9-150.0'	_
-					-	Bottom of Boring at 150.0 ft bgs or 6/6/2007	' -
_					4	- 0/0/2007	
					1		
-					1	Ī	1
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-14	SHEET	1	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

					·	END : 0/6/0007			ONIENTATION . Vertical
WATER	LEVELS	: 7.0 ft bo	JS UH 6/5/		START : 6/5/2007	END: 6/6/2007 SOIL DESCRIPTION	LUGGE	1 : B.	Ellis, D. Thomas COMMENTS
ŞQ⊋	CAMPIE	INTERVA	1 (6)	STANDARD PENETRATION		OOIL DESORIF HON		g	GOIVIIVILIN I G
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE		, ,	TEST RESULTS	SOIL NAME.	, USCS GROUP SYMBOL, (COLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BI ATIC		RECOVE	RY (ft)		MOISTURE C	CONTENT, RELATIVE DEN	SITY OR	岌	DRILLING FLUID LOSS, TESTS, AND
LEV.			#TYPE	6"-6"-6"	CONSISTENCY	Y, SOIL STRUCTURE, MINI	ERALOGY	ΣΨ	INSTRUMENTATION
<u> 41.7</u>	0.0			(N)	Topsoil			317/2	
	0.0			1-1-4	√ 0.0-0.3' - grayish	black to black, (N2 to N1), moist, $\sqrt{-}$		-
_		0.8	SS-1	(5)	organic fines and	d roots, wood chips			Chart CDT at 00:15, 0/5/07
_	1.5				0.3-0.75' - vellow	Sand With Silt (SP-SM) vish gray, (5Y 7/2), moist,	loose very	1	Start SPT at 08:15, 6/5/07
_					fine to fine graine	ed, trace organics decreas	sing with	1	_
_					depth, 5% nonpla	astic fines, sand is silica			
							- -	1	1
-							-	1	1
							-	1	1
5	5.0						-	1	
36.7	5.0				Sandy Fat Clay ((CH)		///	-
-		1.1	SS-2	3-4-6		sh gray, (5GY 6/1), moist,	medium /-		-
-		1.1	33-2	(10)		high plasticity, slow dilatar grained silica sand	ncy, 25-30%	Ш	-
-	6.5				Silt (ML)	-		1	-
_					5.4-6.1' - dark ye	ellowish orange, (10YR 6/6	6), wet, stiff,	-	Possible water table encountered at 7'
_					reaction, trace ve	rapid dilatancy, moderate ery fine grained sand, all c	carbonate -	1	Fossible water table encountered at 7
_					material			1	_
					·				
							_		
10	10.0						-	1	1
31.7					Sandy Silt (ML)			Ш	7
-		1.3	SS-3	5-5-2		yellowish orange, (10YR rapid dilatancy, moderate		1	1
-	115			(7)	reaction, 25-30%	6 fine to medium grained s	sand, all		1
-	11.5				carbonate materi	ial	/-	1	-
-							-	1	Driller's Remark: Lost circulation at 12'
-							-	┨	Driller's Remark: Hard formation -
-							-	-	Driller's Remark: Chatter throughout run _ from 10-15'
_							-	1	Driller's Remark: Soft drilling at 12.5'
-								1	Driller's Remark: Circulation loss at 13', hard
								1	drilling
15	15.0							<u> </u>	
26.7					Sandy Silt (ML)				4-inch casing set at 15'
		1.5	SS-4	16-3-19 (22)	15.0-15.5' - Sam			П	1
-	16.5			(22)	15.5-16.5' - grayi	ish orange, (10YR 7/4), m		世	1
-	10.0					eaction, coarse sand-size		f	-
-					\gravei-size ilmes	stone fragments, fossilifer	ous / .	1	-
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	_
20								_	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-14	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 7.0 ft bo	gs on 6/5/	07 S	START : 6/5/2007 END : 6/6/2007 LOGGE	R : B.	Ellis, D. Thomas
				STANDARD	SOIL DESCRIPTION		COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		٦ ۲	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH JRFA EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	/WB(INSTRUMENTATION
				(N)		Ś	A
21.7	20.0	1.4	SS-5	23-33-50/5.5	Limestone Fragments 20.0-21.4' - Same as 15.5-16.5'	H	Advanced 4-inch (HW) casing to 20', decision made to begin rock coring
_	21.5			(83/11.5")		H	
_					Begin Rock Coring at 21.0 ft bgs See the next sheet for the rock core log	1	_
_					and the make and the track and took and tag		_
I _							_
							_
25_]
16.7					_		
						1	·
							<u> </u>
							<u> </u>
						1	<u> </u>
							<u> </u>
-						1	<u> </u>
						1	<u> </u>
-						1	<u> </u>
30						1	<u> </u>
11.7					_	1	_
-						1	-
-						1	<u> </u>
_						1	<u> </u>
_						1	<u> </u>
_						1	<u> </u>
-						1	<u>-</u>
-						1	·
-						1	-
35						1	-
6.7					_	1	-
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_						1	-
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-						1	-
-						1	-
-						1	<u>-</u>
-						1	<u>-</u>
-						1	<u>-</u>
-						-	-
40						+	-



PROJECT NUMBER:

338884.FL

B-14

SHEET 3 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

00111110		10	<u> </u>	PIENT . CIVIE 330X 3/N 340233, Hidd Totally, Fig tools, Fiv		· 9	ORIENTATION : Vertical
WATER	LEVELS: 7.0	ft bgs	s on 6	/5/07 START : 6/5/2007 END : 6/	6/2007	LOGGER : B. Ellis, D. Thomas	
	_			DISCONTINUITIES	(7)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
필칠이	N.¥.E	9	E L		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
Ε₩₩	H F S	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	<u>8</u>	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
989	RNN	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ž	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Оωш		œ	шД		S		
	21.0			21.0-21.3' - Fracture zone, fine to coarse	Ш	Limestone	Cavities at 21.6', 21.9',
I -			4	grained subangular gravel 21.3' - Fracture, 10 deg, rough, planar	Ш	 21.0-21.3' - grayish orange, (10YR 7/4), mild to moderate HCl reaction 	22.6'
-				21.3 - Fracture, 10 deg, rough, planar		21.3-23.0' - dusky yellow, (5Y 6/4),	-
l -			1 1	,	╀┼┤	- mild to moderate HCl reaction, weak	1
					Ш	to medium strong (R2 to R3), voids	
I -	R1-HQ		3	23.0' - Fracture, 10 deg, rough, stepped,		(<1/16") over 25% of rock surface,	1
-	5 ft	35		loose	₩	- numerous elongate to platy	-
-	48%			23.0-23.1' - Fracture zone	$+ \Box$	cavities/molds from 1/4" up to 3/4" long, trace inorganic inclusions	-
<u> </u>					Д	- 23.0-23.4' - grayish orange, (10YR	_
25			NR		Н	7/4), strong HCl reaction, very weak	
16.7				_	TTI	(R1), voids (1/16") over 20% of rock	R1: Run time not reported
-					口	- surface, numerous fossil	-
I -	26.0				╂┼┨	cavities/molds 1" in diameter or	1 4
						⁻ larger ₋ No Recovery 23.4-26.0'	
I -			1	26.7' - Fracture or mechanical break.	\Box	Limestone	Cavity at 28.65'
-				horizontal, smooth, planar	╁┼┼	26.0-26.7' - dusky yellow, (5Y 6/4),	Cavity at 20.05
-			1	nonzontal, smooth, planal	ш	fine grained, strong HCl reaction,	-
_				27.7' - Fracture, 35 deg, rough, undulating,	Щ	very weak (R1)	_
	R2-HQ			(almost smooth)	Н	26.7-29.2' - dusky yellow to medium yellowish brown, (5Y 6/4 to 10YR	7
-	5 ft	40	2	28.0' - Fracture, horizontal, rough, undulating	ш	5/4), fine grained, moderate HCl	-
-	64%		1	28.6' - Fracture or mechanical break, horizontal, smooth, planar	+	reaction, weak to medium strong (R2	-
_			\vdash	29.05' - Fracture, 30 deg, smooth, planar	Н	to R3), voids (1/16") over 5-25% of	_
30				25.05 - Fracture, 50 deg, smooth, planar		rock surface, some 1/4" round	
11.7			NR	_	11	— cavities	R2: 3 minutes
-					╁┼┧	No Recovery 29.2-31.0'	1
-	31.0				Ш		_
			1		┸	Limestone - 31.0-33.1' - moderate yellowish	
			'		H	brown, (10YR 5/4), fine grained,	1
-				31.9' - Fracture, 10 deg, smooth, planar	ш	moderate HCl reaction, weak to	1
-			2	32.2' - Fracture, 45 deg, smooth, undulating	+	 strong (R2 to R4), voids (1/16") over 	-
_				32.7' - Fracture, vertical, rough, undulating	lacksquare	_ 10% of rock surface, few elongate	_
	R3-HQ			33.0-33.85' - Fracture zone, fine- to	Ш	cavities up to 1/4", transitions from	
_	5 ft 84%	40	3	coarse-grained gravel	╁┼┼	 strong to weak rock with depth, accompanied by increase to voids 	1
-	O -1 /0			33.9' - Fracture, 70 deg, rough, undulating		over 20% of rock surface	-
-			2	34.2' - Fracture, 10 deg, rough, planar	ДП	- 33.1-33.6' - Same as 31.0-33.1' lower	1 4
35				34.8' - Fracture, 80 deg, rough, undulating —	┟┼┤	portion except weak (R2)	
6.7			0	57.5 - Fracture, oo deg, rough, undulating —		33.6-35.2' - Same as 31.0-33.1'	R3: 3 minutes
1 -	000		NR		┧┴┦	 upper portion except strong (R4), 10% voids 	1
-	36.0				╂┼┨	No Recovery 35.2-36.0'	-
I -			2	26 4' Fracture 60 des rough undulation		Limestone]
			-	36.4' - Fracture, 60 deg, rough, undulating	Ш	36.0-36.8' - moderate yellowish	
_				36.8, 37.1' - Fractures (2), horizontal, smooth, planar	11	brown, (10YR 5/4), fine grained,	1
-			2	37.45' - Fracture, 70 deg, rough, undulating		moderate HCl reaction, medium	Cavities at 37.2', 38.0'
-					╀┼┤	strong (R3), voids (1/16") over 10-20% of rock surface, few elongate	1
	R4-HQ	45	2	38.0' - Fracture, 10 deg, smooth, undulating	┟┼┨	cavities up to 1/4"	
I -	5 ft 74%	40			口	36.8-37.4' - Same as 36.0-36.8'	1
1 -	. 470			38.8, 39.3' - Fractures (2), horizontal,	╁┼┼	except extremely weak to weak (R0	1
-			1	smooth, planar	╂┼╂	_ to R2)	1 -
40				_	口	37.4-38.8' - Same as 36.0-36.8'	
1.7			NR		Ш	except medium strong (R3) 38.8-39.3' - Same as 36.8-37.4'	R4: 2 minutes
I -	44.0		' '		╂┼╂	_ 00.0-00.0 - Gaine as 00.0-07.4	1 -
	41.0				仠		+
			ı		1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-14	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 7.0	ft bgs	on 6/	5/07 START : 6/5/2007 END : 6/	6/200	7 LOGGER : B. Ellis, D. Thomas	
≥∩≘	- (°)			DISCONTINUITIES	ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A CE	S.E.P.	D (%)	F.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
THE LEV	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΕ	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ОΩШ	OIR	ď	╙Δ		S		
_			>10	41.0-41.3' - Fracture zone 41.3' - Fracture zone, 5 deg, rough, planar,	H	39.3-39.7' - Same as 36.0-36.8' - except weak (R2)	_
_				angular gravel (1/2 to 1 1/2")	H	No Recovery 39.7-41.0'	_
l _			4	41.6' - Fracture zone, 20 deg, rough, planar, open	Д	Limestone - 41.0-42.2' - moderate yellowish	
			-	41.7' - Fracture zone, 70 deg, rough, planar,	Ш	brown, (10YR 5/4), fine grained,	
	R5-HQ 5 ft	20	2	fracture terminates at 41.6' and 41.85', open 41.85' - Fracture zone, 30 deg, rough,	\bot	moderate HCl reaction, weak (R2), voids (1/16") over 20-25% of rock	
	62%	20		stepped, fracture with some fragmentation,	F	surface, elongate fossil molds up to	
			0/	open 42.3-42.7' - Clay seam, non-indurated zone		1/5" over 5% of rock surface, few cavities up to 1/4", some gray to	
45				bounded by weakly indurated rock	\vdash	black inclusions	
-3.3			NR	42.9-43.15' - Clay seam, non-indurated zone bounded by weakly indurated rock	Ш	42.2-43.4' - Same as 41.0-42.2' except very weak to extremely weak	R5: 2 minutes
	46.0			43.4, 43.9' - Fractures (2), horizontal, rough,	ш	(R1 to R0)	1
1 1				undulating, open	1—	43.4-44.1' - Same as 41.0-42.2' No Recovery 44.1-46.0'	1
			1	46.4' - Fracture, 10 deg, rough, undulating,	Ħ	Limestone	1
1 1				open to tight 47.15' - Fracture, 10 deg, smooth, planar	Ħ	46.0-49.9' - moderate yellowish brown, (10YR 5/4), fine grained, mild	1
			3	47.3' - Fracture, 50 deg, smooth, planar	╨	to moderate HCl reaction, very weak	1
-	R6-HQ			47.4' - Fracture, 15 deg, rough, undulating	Þ	to medium strong (R1 to R3), voids	1
-	5 ft 78%	62	1	48.65' - Fracture, 70 deg, rough, undulating	恤	_ (1/16") over 20% of rock surface 46.4-47.45' - Same as 46.0-49.9'	1
-	7070			46.65 - Fracture, 70 deg, rough, undulating	+	except very weak (R1)	-
			1	49.6' - Fracture, horizontal, smooth,		47.45-48.6' - Same as 46.0-49.9' except medium strong (R3)	-
50 -8.3				undulating	世	48.6-49.4' - Same as 46.0-49.9'	R6: 2 minutes
-			NR		₩	except very weak (R1) 49.4-49.9' - Same as 46.0-49.9'	-
-	51.0			51.0' - 1/4-inch infilling, strong HCl reaction	₽	 except medium strong (R3) 	1
-			0	· · · · · · · · · · · · · · · · · · ·	t	No Recovery 49.9-51.0'	-
_					士	51.0-52.3' - moderate yellowish	-
-			3	52.3, 52.55, 52.7' - Fractures (3), horizontal,	Н	brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium	-
-	D7.110			smooth, planar, open	Ħ	 strong to strong (R3 to R4), voids 	-
_	R7-HQ 5 ft	57	4	53.2' - Fracture, vertical, rough, planar	世	(1/16") over 10% of rock surface, trace voids up to 1/5", trace organic	-
_	86%			53.3' - Fracture, 10 deg, smooth, planar 53.8, 53.9' - Fracture or fractures (2), 10 deg,	₽	- inclusions	-
			4	rough, planar, open	厂	52.3-52.8' - Same as 51.0-52.3' except transition with depth from	-
55 <u> </u>			1	54.1' - Fracture, 45 deg, smooth, undulating, tight	上	— weak (R2) to extremely weak (R0)	D7: 2 minutes
-13.3			<u> </u>	54.4' - Fracture, horizontal, rough, planar to	\vdash	52.8-54.75' - Same as 51.0-52.3' 54.75-55.3' - Same as 52.3-52.8'	R7: 2 minutes
1 4	56.0		NR	undulating 54.75' - Fracture, 10 deg, rough, stepped,	F	except possibly grades to stronger	_
			1	open	Ë	rock at 55.3'	
				54.9, 55.2' - Fractures (2), horizontal, rough, planar, tight	片	No Recovery 55.3-56.0' Limestone]
			1	56.6' - Fracture, horizontal and 45 deg,	\vdash	56.0-60.0' - moderate yellowish]
				rough, undulating 57.3' - Fracture, 10 deg, rough, stepped,	口	brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium	
	R8-HQ 5 ft	58	3	open	\vdash	strong to very weak (R3 to R1), voids	
	80%	50	J	58.1' - Fracture, horizontal, rough, planar, open	F	(1/16") over 25-30% of rock surface, some cavities up to 1/4", organic	
			3	58.5' - Fracture, 15 deg, rough, undulating	广	inclusions; very similar to R7-HQ]
60			_ ၁	58.8' - Fracture, 35 deg, smooth, undulating, tight to open	片		1
-18.3			ND	59.7-59.8' - Fracture zone, 1/2" limestone	\mathbb{H}	No Recovery 60.0-61.0'	R8: 2 minutes
	61.0		NR	rock fragments	Ш	[1
					1		

APPENDIX 2BB-513 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-14	SHEET	5	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

CORING	I WE I HOD AI	ND LC	אורוע	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	Casii	ig	ORIENTATION : Vertical
WATER	LEVELS: 7.0	ft bgs	s on 6	/5/07 START : 6/5/2007 END : 6/	6/2007	LOGGER : B. Ellis, D. Thomas	
				DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		Ø	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH	S A A	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
HÄÄ	GTF GOVI	Q D (%)	FO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
유統표	S S S S S S S S S S S S S S S S S S S	g	'ERA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΣΥM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
- 0, Ш	0 1 4	т.		59.8' - Fracture, high angle fracture	7,		
			2	partially penetrating core	世	Limestone - 61.0-61.7' - moderate yellowish	1
				61.4-61.6' - Fracture zone, horizontal,	Ш	brown, (10YR 5/4), fine grained,	
]			[smooth, planar		moderate to strong HCl reaction,	1
1 1			0	-		 very weak to extremely weak (R1 to R0), voids (1/16") over 3% of rock 	1 1
	R9-HQ			-		surface, few cavities up to 1/4"	1
-	5 ft	75	1	63.45' - Fracture, horizontal, rough, planar	Ш	- 61.7-63.4' - Same as 61.0-61.7'	-
	92%			, , , , , , , , , , , , , , , , , , ,	\blacksquare	except medium strong to strong (R3]
			1	64.0-64.1' - Fracture zone		to R4), voids (1/16") over 5-10% of rock surface	
65				64.6' - Fracture, horizontal, smooth, planar,	$\vdash \vdash$	63.4-64.3' - Same as 61.0-61.7'	1
-23.3			2	open	Ш	64.3-65.4' - Same as 61.0-61.7'	R9: 3 minutes
	00.0			65.35, 65.45' - Fractures (2), 10 deg, smooth,	\vdash	 except weak to medium strong (R2 to R3), voids (1/16") over 5% of rock 	-
	66.0		NR	planar		surface] -
			5	66.1, 66.15, 66.35, 66.55' - Fractures (4),	Ш	65.4-65.6' - dark yellowish orange,	1 4
				horizontal, smooth, planar, tight 66.6' - Fracture, horizontal, smooth, planar,	Ш	(10YR 6/6), moderate HCl reaction,	l J
]				open		extremely weak (R0), voids and cavities absent	1
1 1			2	67.6' - Fracture, horizontal, smooth, planar,	1-1	No Recovery 65.6-66.0'	1 1
	R10-HQ			tight to open	Ш	Limestone	1 1
-	5 ft	48	2	67.75' - Fracture, 75 deg, smooth, undulating	H	66.0-66.6' - dark yellowish orange,] -
4	82%			68.2' - Fracture, 75 deg, rough, undulating 68.5-69.1' - Fracture zone, vertical and		(10YR 6/6), moderate HCl reaction, extremely weak to very weak (R0 to	1
			4	horizontal, smooth, undulating, angular	Щ	R1), voids and cavities absent	
70				limestone rock fragments		66.6-70.1' - dark yellowish brown,	1
-28.3			0	69.1' - Fracture, 20 deg, rough, undulating	$\vdash \vdash$	(10YR 4/2), fine grained, moderate	R10: 3 minutes
	74.0		NR	69.3' - Fracture, 20 deg, smooth, undulating, infilled with sediment		HCl reaction, strong (R4), voids (1/16") over 5% of rock surface,	1 1
+	71.0			69.75-70.1' - Fracture zone, vertical, rough,	μЦ	voids (1/8") over 5% of rock surface	1 -
-			>10	undulating, open		No Recovery 70.1-71.0'	1 4
				71.0-71.2 ¹ - Fracture zone, subrounded fragments (up to 1 3/4")	\vdash	Limestone 71.0-72.9' - moderate yellowish]
				71.25-71.35' - Fracture zone, horizontal,	\vdash	brown to moderate olive brown,	
]			>10	smooth, planar to undulating	Ш	(10YR 5/4 to 5Y 4/4), fine grained,	1
	R11-HQ			72.1' - Fracture, horizontal, smooth, planar,	\vdash	- moderate HCl reaction, very weak to	1 1
	5 ft	38	6	tight 72.3-72.5' - Fracture zone, subangular		weak (R1 to R2), voids (1/16") over 10% of rock surface, few cavities up	Cavities at 73.9', 74.5'
	80%			fragments up to 1/2"	╀┤	- to 1/4"	-
			2	72.5' - Fracture, 40 deg, rough, stepped	Ш	72.9-73.5' - olive gray, (5Y 3/2), fine]
75			-	72.8' - Fracture, horizontal, rough, undulating	\vdash	grained, moderate HCl reaction, — strong to very strong (R4 to R5),	
-33.3				73.0' - Fracture, 30 deg, rough, stepped — 73.0-73.2' - Fracture zone, angular fragments		voids (1/16") over 3% of rock surface	R11: 3 minutes
	76.0		NR	(up to 1/2")	ш	73.5-75' - moderate yellowish brown,	1 1
	76.0			73.4' - Fracture, 10 deg, rough, undulating,		- (10YR 5/4), fine grained, moderate to	-
			0	open 74.1' - Fracture, 10 deg, smooth, planar, tight		strong HCl reaction, strong (R4), voids (1/16") over 15% of rock	1 4
				74.1 - Fracture, 10 deg, smooth, planar, tight 74.9' - Fracture, 50 deg, rough, stepped,	$\vdash \vdash$	surface, few cavities up to 1/4"]
			1	open	Ш	No Recovery 75.0-76.0'	
]				77.6' - Fracture, horizontal, rough, planar	\vdash	Limestone	1
	R12-HQ			78.0' - Fracture, 10 deg, rough, undulating		76.0-77.55' - moderate yellowish brown, (10YR 5/4), fine grained,	1 1
	5 ft	45	2	- 3, 3, 3	₩	moderate HCl reaction, very strong	-
	88%			78.9' - Fracture, horizontal, smooth, planar	ш	(R5), voids (1/16") over 5-10% of] -
			3	79.15, 79.35, 79.65' - Fractures (3),	\vdash	rock surface, few cavities from 1/4" up to 3/4", some cavity infilling]
80			Ľ	horizontal, rough, planar, open at 79.15'		up to 5/4 , some cavity initially	
-38.3			7	80.15-80.4' - Fracture zone, subangular	\sqcup		R12: 3 minutes
	81.0		NR	fragments (up to 2")	Ш	-	1
	01.0					-	
			L				

APPENDIX 2BB-514 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-14	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 7.0	ft bgs	s on 6/	5/07 START : 6/5/2007 END : 6/	6/200	LOGGER: B. Ellis, D. Thomas	
30₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	CC REI	RC	1	THICKNESS, SURFACE STAINING, AND TIGHTNESS 81.1' - Fracture, horizontal, rough, undulating	H SY	CHARACTERISTICS 77.5-78.9' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, extremely weak (R0), with	SC-1 collected at 81.2- 82.3'
-	R13-HQ		0			very fine carbonate-derived sand and silt 78.9-80.4' - moderate yellowish brown, (10YR 5/4), fine grained,	- - -
- -	5 ft 84%	78	1	84.0' - Fracture, 40 deg, rough, stepped		 moderate HCl reaction, weak (R2), voids (1/16") over 25% of rock surface, some cavities 1/4"-1/2", trace organic inclusions 	Cavities at 83.7', 84.0', 84.1', 84.4' (less than 1/4")
85 -43.3 -	86.0		1 NR	85.0' - Fracture, 45 deg, rough, undulating		No Recovery 80.4-81.0' Limestone 81.0-83.15' - dark yellowish orange to dusky yellow, (10YR 6/6 to 5Y	R13: 3 minutes
-			2	86.3' - Fracture, 10 deg, rough, planar 86.6' - Fracture, 10 deg, rough, stepped 87.1-87.5' - Fracture zone, angular fragments		6/4), fine grained, moderate to strong HCl reaction, medium strong (R3), voids (1/16") over 15-20% of rock surface, few cavities up to 1/4"	-
-	R14-HQ 5 ft	20	>10	(3/4 to 2") 88.0' - Fracture, 30 deg, rough, undulating, tight		83.15-85.2' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), voids (1/16") over 25-30% of rock	- - -
90	90%		>10	88.65' - Fracture, 40 deg, rough, undulating, open 88.85' - Fracture, vertical, rough, undulating, tight		surface with cavities up to 3/4", some cavities infilled with less strong, gray to brown, limestone No Recovery 85.2-86.0' Limestone	- -
-48. 3	91.0		2 NR	89.1' - Fracture, horizontal, rough, stepped, open 89.2-89.4' - Fracture zone, angular fragments (1/2 to 1"), terminated by rough-planar		86.0-87.5' - dusky yellow, (5Y 6/4), fine grained, strong HCl reaction, extremely weak (R0), voids (1/16") over up to 3% of rock surface	R14: 4 minutes –
	R15-HQ 5 ft 1 18%	0	>10 NR	horizontal fracture 89.7' - Fracture, 10 deg, rough, undulating to stepped, tight to open 90.0' - Fracture, 80 deg, rough, undulating, tight to open 90.3' - Fracture, horizontal, rough, planar, tight 91.0-91.6' - Fracture zone, angular to subrounded fragments 1/2" to 2" 91.6' - Fracture, 30 deg, rough, undulating, open		over up to 3% of rock surface 87.5-88.7' - moderate yellowish brown, (10YR 5/4), strong HCI reaction, weak to medium strong (R2 to R3), voids (1/16"-1/8") over 20% of rock surface, few cavities 1/2"-3/4", cavities mostly elongate 88.7-90.5' - yellowish gray, (5Y 8/1), fine to very fine grained, strong HCI reaction, very weak to very strong (R1 to R5), fossiliferous (less than — 1/16"), rock strength gradually transitions from weak (R2) at 88.7-89.1' to extremely weak (R0) at	Core barrel getting stuck in borehole, some casing withdrawn in order to retrieve core barrel
- - - - -	96.0 R16-HQ 5 ft 4%	0	0 NR			89.1-89.7' to strong to very strong (R4 to R5) at 89.7-90.5' No Recovery 90.5-91.0' Limestone 91.0-91.6' - moderate yellowish brown to light olive gray, (10YR 5/4 to 5Y 5/2), angular to subangular limestone rock fragments (1/2"-2"), no fines 91.6-91.9' - Same as 88.7-90.5' except yellowish gray, (5Y 8/1) No Recovery 91.9-96.0'	- - - - - -
100_ -58.3 _	101.0						R16: 3 minutes



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-14

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IENT : CIVIE 350X 3/N 340255, Mud Totally, HQ tools, HV			ORIENTATION: Vertical
WATER	LEVELS : 7.0	ft bg:	s on 6		3/2007		,
>^~				DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BB. 인인	H,A ER,A	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA.	ZE F IGTI	(%) Q	\CTI	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	JBO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	S S S S S S S S S S S S S S S S S S S	a	-RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	- 14	_			I	Limestone	
-			2	101.3' - Fracture or mechanical break, 30	口	- 96.0-96.2' - light olive gray, (5Y 5/2),	1 4
				deg, rough, stepped	ш	very fine grained, moderate to strong]
				101.7' - Fracture, horizontal, smooth, planar,	Н	HCl reaction, very strong (R5), voids]
-			0	tight -	口	 (1/16") over 5% of rock surface No Recovery 96.2-101.0' 	SC-2 collected at 102.3- 103.4'
-	R17-HQ			-	Н	Limestone	103.4
-	5 ft	80	1	103.4' - Fracture, horizontal, rough,	ш	 101.0-105.8' - yellowish gray, (5Y 	4
	96%			undulating	H	8/1), very fine grained, strong HCI]
					Ш	reaction, extremely weak (R0) from]
105			0	-	ш	 101.0-101.5', very weak (R1) from 101.5-105.8', trace to 5% fine, gray 	1 1
-63.3				_	\vdash	speckles in matrix	R17: 3 minutes
			4	105.3, 105.4, 105.5, 105.65' - Fractures (4),	ш		-
_	106.0		NR.	horizontal - 20 deg, smooth, planar, open	Щ	- No Recovery 105.8-106.0']
			igwedge	106.1, 106.3' - Fractures (2), horizontal,	Н	Limestone	1
-			2	smooth, planar, tight	П	106.0-111.0' - yellowish gray, (5Y	1
-				40741 Frankins hada 11 11	₩	 8/1), very fine grained, strong HCI 	1
-			1	107.1' - Fracture, horizontal, smooth, undulating, open	Ш	reaction, very weak to extremely weak (R1 to R0), very small fossil	1 4
				undulating, open	П	weak (RT to Ro), very small lossii - fragments	
	R18-HQ			100 01 5 1 10 1 " '	$\vdash\vdash\vdash$		1
-	5 ft 100%	78	1	108.3' - Fracture, 10 deg, smooth, planar, tight	Ш	-	1
-	100%			າຍກາເ 108.65, 109.2' - Fracture, horizontal, smooth,	\vdash	-	1
_			2	undulating, tight	냅	-	
110_				400.01 5	Ш	<u> </u>	
-68.3				109.9' - Fracture, 10 deg, smooth, undulating, — open .	Н		R18: 5 minutes
-	111.0		5	110.0, 110.05, 110.2, 110.35' - Fractures (4),		-	Drilling ends at 16:30 on
-	111.0			horizontal, smooth, undulating	₽₩	_ 111.0-115.7' - yellowish gray, (5Y	6/5/07
-			>10	110.6' - Fracture or mechanical break,		- 8/1), fine to medium grained, strong	Core tends to break along
				horizontal, smooth, planar 111.0-111.2' - Fracture zone, subrounded	口	HCl reaction, very weak to weak (R1	bedding planes, very uniform lithology
				fragments 1/2" to 2"	Н	to R2), voids (1/16") over 3% of rock	throughout core
-			2	111.2-111.4, 111.9, 112.3, 112.95' -	ш	 surface, few cavities up to 1/4", increase in voids to 10% with some 	Start drilling on 6/6/07 at
-	R19-HQ			Fractures (5), horizontal, smooth, planar to	$\vdash \vdash$	cavities up to 1/2" below 115.3'	08:30
_	5 ft	85	1	undulating, tight	ᡛ州	-	4
	94%			113.3, 114.4' - Fractures (2), horizontal, smooth, undulating	Ш	_]
			[Smooth, undulating	$\vdash \vdash$		1
115			2	-	Ш	-	1 1
115 <u></u> -73.3				114.9' - Fracture, 5 deg, rough, undulating	Ш		R19: 2 minutes
			0		Ш	_	1.13.2111114155
	116.0		NR	_	口	No Recovery 115.7-116.0'	
				116.25' - Fracture, horizontal, rough,	$\vdash\vdash$	Limestone	CC 2 collected = ± 440.0
			1	undulating	ш	116.0-118.5' - yellowish gray, (5Y	SC-3 collected at 116.3- 117.5'
-					H	8/1), fine to medium grained, strong HCl reaction, very weak (R1), voids	1'''
-			2	117.4, 117.6' - Fractures (2), 5 deg, rough,	ᡛ╣	- (1/16") over 3% of rock surface,	1 4
				stepped	Ш	bioturbated]
	R20-HQ			.,	\vdash]
	5 ft 94%	67	2	118.3, 118.6' - Fractures (2), horizontal,	ш	118.5-119.8' - Same as 116.0-118.5'	Cavities at 117.2', 120.2';
-	3+ /0			Tought, undulating	Щ	except yellowish gray to very pale	sample tends to break -
_			4	119.3' - Fracture, 30 deg, rough, planar, tight	H	orange, (5Y 8/1 to 10YR 8/2), fine	along bedding planes when
120				119.5' - Fracture, 80 deg, rough, undulating,	口	grained limestone with some textural — and color variations	handled, rock in core uniform throughout —
-78.3			2	fracture extends from 119.3-119.75'	Ш	119.8-120.7' - Same as 116.0-118.5'	R20: Run time not
-	121.0		NR	-	Ш	=	recorded
-	121.0		INK		\Box	No Recovery 120.7-121.0'	
					1		1

APPENDIX 2BB-516 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL B-14

ROCK CORE LOG

SHEET 8 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

				HENT . CIVIE 330X 3/N 340233, Hidd Totally, Fig tools, Fiv			ORIENTATION: Vertical
WATER	LEVELS: 7.0	ft bg	s on 6	/5/07 START : 6/5/2007 END : 6/	6/200	LOGGER : B. Ellis, D. Thomas	
	_			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
E NO	N. A. C.	(9)	뽒	2200 til 11011	윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAF	ER OVE	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E-SP	RNA	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	⋝	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	074	ď	╙┺	, ,	S		
				119.55, 119.75' - Fractures (2), horizontal,		Limestone	Fossiliferous inclusions at
_			2	smooth to rough, planar to undulating, tight to	T	 121.0-126.0' - yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2), 	122.6', cavity at 123.65' - (1"), cavities at 125.1' and
-				open 120.4, 120.6, 121.3, 121.4' - Fractures (4),	匚	fine to medium grained, strong HCl	125.8' (1/4"-1/2"), partial
-			0	horizontal, smooth, planar	₽	- reaction, very weak (R1), voids	white infilling of cavities –
				, , , , , , , , , , , , , , , , , , , ,	Н	(1/16") over 3-5% of rock surface,	could also be actual fossil
	R21-HQ			123.1' - Fracture, horizontal, smooth, planar		few cavities (1/4"-1/2"), some cavities	
-	5 ft	80	4	to undulating, open	₩	- infilled with white calcareous	-
_	100%			123.25' - Fracture, horizontal, smooth,	+	limestone, some textural and color variations similar to 118.5-119.8'	-
			2	stepped, open		- from 121.35-122.0', fossiliferous,	_
125			-	123.35, 123.45' - Fractures (2), horizontal, smooth, planar to undulating, open	Н	inclusions at 122.6'	
-83.3				124.5, 124.6' - Fractures (2), horizontal,	T	_	R21: 3 minutes
-			1	smooth, planar	\blacksquare	_	-
_	126.0			125.5' - Fracture, horizontal, smooth, planar,	╨		1
			_	tight		126.0-131.0' - yellowish gray to very	Large bivalve shells at
			6	126.1' - Fracture, horizontal, smooth, planar,	1	 pale orange, (5Y 8/1 to 10YR 8/2), fine to medium grained, strong HCI 	127.4', 127.5', 126.7'
-				open 126.2' - Fracture, 30 deg, smooth, planar,	₩	reaction, very weak (R1), voids	1
-			1	open		- (1/16") over 3% of rock surface, few	-
				126.75' - Fracture, horizontal, smooth, planar,	厂	cavities up to 1/4" from 126.0-127.5',	_
	R22-HQ			open	\vdash	voids (1/16") over 30% of rock	7
-	5 ft	85	0	127.8' - Fracture, horizontal, rough,	ш	- surface, many shallow cavities	-
-	100%			undulating, tight	├	(1/4"-1/2"), fossiliferous, elongate molds and casts (1/2"-3/4") from	-
_			6	129.1-129.6' - Fracture zone or bedding	┷	- 127.5-129.15'	_
130			ਁ	plane, smooth, planar, some ridging		12.10 120.10	
-88.3				130.0, 130.85' - Fractures (2), horizontal,	\vdash		R22: Run time not
-			2	smooth, planar	+-	_	recorded -
_	131.0				\Box		SC-4 collected at 130.1-
			3	131.2, 131.5, 131.6' - Fracture zone (3),	Ь	131.0-135.7' - Same as 126.0-131.0 - except voids (1/16") over 30% of	131.0'
			ا	horizontal, rough, undulating		rock surface from 131.0-131.8'; thin	1
-				•	ш	laminae with bedding planes from	1
_			3	132.5' - Fracture, 5 deg, smooth, undulating	+	- 132.6-133.3'; thicker brown laminae	-
_				132.9, 132.95, 133.1, 133.9, 134.5, 134.7,		_ (1/16"-1") from 134.7-135.1'	_
	R23-HQ		ا م	132.9, 132.99, 133.1, 133.9, 134.9, 134.7, 134.8' - Fractures (7), horizontal, smooth,			
1 7	5 ft 94%	47	2	planar	Н		1
-	0170			•		_	-
_			3		₩	_	_
135_				_			
-93.3			2	135.2, 135.35' - Fractures (2), horizontal,			R23: 3 minutes
1 7	136.0		NR	smooth, undulating	╨	No Bookson, 425 7 426 0	1 1
-	130.0		INK	· · · · · · · · · · · · · · · · · · ·	世	No Recovery 135.7-136.0'	1 +
-			4	136.1' - Fracture, 80 deg, rough, planar 136.25-136.4' - Fracture zone, irregular	厂	Limestone 136.0-139.6' - yellowish gray to very	1
				subrounded fragments up to 2-1/2", bounded	┢	_ pale orange, (5Y 8/1 to 10YR 8/2),	
				by horizontal, smooth planar fractures	Ш	fine to medium grained, strong HCl	1
-			2	136.95' - Fracture, 80 deg, smooth, planar,	1—	 reaction, very weak (R1), brown laminations from 137.3-137.8' 	1
-	R24-HQ		\vdash	tight	╀		1
-	5 ft	47	2	137.1' - Fracture, horizontal, smooth, undulating, tight	口	_	1
	92%		L	137.9' - Fracture, horizontal, smooth, planar,	\vdash		
				tight	Ľ		1
			5	138.25, 138.8' - Fractures (2), horizontal,	仜	<u>-</u> 	Covition at 120 EEL 120 EL
140 <u> </u>			<u> </u>	smooth, planar	+		Cavities at 139.55', 139.5', 139.9', 140.0', 140.1',
-90.3			2	139.1' - Fracture, horizontal, rough, planar,		_	140.2', 140.5', 140.6' (up to –
	141.0		NR	open to tight	Ш		1")
	-						
					1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-14	SHEET	9	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

00.1			<u> </u>	MENT . CIVIE 330X 3/N 340233, Mud Totally, Fig tools, Fiv	- ouoi	g		ORIENTATION : Vertical
WATER	LEVELS: 7.0	ft bgs	s on 6	/5/07 START : 6/5/2007 END : 6/6	3/200)7	LOGGER : B. Ellis, D. Thomas	
I.				DISCONTINUITIES	(D	1	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG		DOOK TYPE OOLOD	
H H H	3,5°		吊는	BESSELLE FISH	으	ı	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH		(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	ı	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무류		ο	SAC ER I	PLANARITY, INFILLING MATERIAL AND	Ĭ	ı	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
20 M		ď	F F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	ı	CHARACTERISTICS	21.01.0, 1201.12002.10, 21.0.
				139.3' - Fracture, horizontal, rough to	Ш		139.6-140.6' - yellowish gray to	R24: 4 minutes
-			1	smooth, planar to undulating, open	╁		grayish orange, (5Y 8/1 to 10YR 7/4),	Cavities at 141.0', 141.35', -
-				139.45' - Fracture, 50 deg, rough, undulating	屵		fine grained, strong HCl reaction,	141.4', 141.75', 142.1',
				139.7' - Fracture, 40 deg, rough, undulating			strong (R4), voids (1/16") over 3% of	142.7', 143.1'
-			>10	139.9' - Fracture, vertical, rough, planar 140.1' - Fracture, 70 deg, rough, undulating	Ъ-		rock surface, numerous deep cavities (1/2"-3/4") fully penetrating	1
-	R25-HQ			140.25' - Fracture, 50 deg, rough, undulating	₽	_	core	-
-	5 ft	48	>10	141.6' - Fracture, 30 deg, rough, undulating		-	No Recovery 140.6-141.0'	_
	78%			to stepped, tight		1	Limestone	SC-5 collected at 143.8-
				142.3-142.5, 142.8-142.9, 143.2-143.3' -	Н		141.0-144.9' - yellowish gray to	144.8'
l			0	Fracture zone (3), subangular fragments (up	t		dusky yellow, (5Y 7/2 to 5Y 6/4), fine	· · · · · ·
145				to 1 1/2"), bounded by 10 deg, rough, planar			grained, strong HCl reaction, strong (R4), voids (1/16") over 5-10% of	
-103.3			NR	fractures 143.5' - Fracture, horizontal, smooth,	╙		rock surface, many elongate cavities	R25: Run time not recorded –
_	146.0		1417	undulating	Lг	ſ	(1/4"x1/2") with some infilling from	Tecolueu
-	1 -1 0.0			143.9' - Fracture, horizontal, rough,	匚		141.0-143.4; voids (1/16") over 0-5%	-
l -			1	undulating	₽		of rock surface, few to no cavities	-
I _				146.3' - Fracture, 45 deg, smooth, planar	厂		from 143.4-144.9']
							No Recovery 144.9-146.0'	
-			0	-	₩		Limestone 146.0-149.2' - dark yellowish orange,	1
-	DOC LIO			-	H		(10YR 6/6), fine to medium grained,	-
l _	R26-HQ 5 ft	75	1	148.35, 149.15, 149.2' - Fractures (3),			strong HCl reaction, weak (R2),	
	98%	7.5	'	horizontal, smooth, planar	Ш		voids (1/16") over 30% of rock	
-				nonzoniai, omootii, pianai	Ħ		surface, some fine laminations	1
-			4	149.4' - Fracture, 80 deg, smooth, undulating			149.2-150.9' - moderate olive brown,	-
150				149.6' - Fracture, horizontal, smooth, planar	$oldsymbol{oldsymbol{\mu}}$		(5Y 4/4), fine to very fine grained, moderate HCl reaction, strong to	
-108.3			4	150.0' - Fracture, 80 deg, rough, undulating	Н		very strong (R4 to R5), voids (1/16")	R26: 4 minutes
-	151.0		4	150.3' - Fracture, vertical, rough, undulating			over 3% of rock surface, rare cavities	1
-	131.0		NR.	150.55' - Fracture, horizontal, rough, undulating	╁		(up to 1/4"), trace organic inclusions	_
l -				\undersity \undersity \undersity	1	– 1	No Recovery 150.9-151.0'	-
l _							Bottom of Boring at 151.0 ft bgs on	
						ı	6/6/2007	
-				-		r		1
-				-	1	F		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-15	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLIN	G METH	<u>OD AND</u>	EQUIPM	ENT : CME 55 S/I	N 316625, mud rotary, auto hammer, AWJ rods, 2-15/16" tri-cone b	oit	ORIENTATION : Vertical
WATER	LEVELS	: 4.0 ft b	gs on 5/1	5/07	START : 5/15/2007 END : 5/17/2007 LOGGER	R : T.	Stewart
				STANDARD	SOIL DESCRIPTION		COMMENTS
중무운	SAMPI F	INTERVA	d (ft)	PENETRATION			
DEPTH BELOW SURFACE AND ELEVATION (ft)				TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ATI		RECOVE	ΕΚΥ (π)		MOISTURE CONTENT, RELATIVE DENSITY OR	BOI	DRILLING FLUID LOSS, TESTS, AND
ERE			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	Σ	INSTRUMENTATION
<u>оош</u>	0.0			(N)	Silty Sand (SM)	() 	Sand is silica
42.5	0.0			1-1-1	0.0-1.0' - moderate yellowish brown, (10YR 5/4),		Salid is silica
l _		1.0	SS-1	(2)	moist, very loose, very fine to fine grained, 15% fines,	Ш	_
	1.5				15% nonplastic fines, organics and rootlets,		
					decreasing with depth		
					_	1	<u> </u>
-					-	1	-
-					-	ł	-
_					-	ł	-
_					-	ł	Water level empression at all 4 Ol haless ground
_					_	1	Water level approximately 4.0' below ground surface
5	5.0					L	
37.3					Clayey Sand (SC)		
		1.1	SS-2	3-4-5	5.0-6.1' - greenish gray, (5GY 6/1), wet, loose, very fine to fine grained, medium to high plasticity, trace		Ī
-	6.5			(9)	very fine grain black particles, trace rootlets, 35-40%	1///	1
-	6.5				\plastic fines \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	ł	-
-					-	ł	-
_					-	ł	-
_					_		_
					_		
_					_	1	1
10	10.0				-	1	-
10 32.3	10.0				Silt And Limestone Fragments (ML)	Ш	-
-		4.0	000	23-9-7	10.0-11.0' - moderate yellow, (5Y 7/6), wet, stiff, -	$\ \ $	Driller's Remark: Complete circulation loss at
_		1.0	SS-3	(16)	nonplastic, very rapid dilatancy, moderate HCl reaction, interbedded with 1/8" thick limestone lenses	Ш	10.5' below ground surface
_	11.5				\and 1" limestone fragments /	1	_
					Land 1 minostorio magniorito		
					_]
-					-	1	-
-					-	1	-
-					-	1	-
-					-	ł	-
15	15.0 15.2		00.	50/2 5	01/4 111	 	
27.3		0.2	SS-4	50/2.5 (50/2.5")	Silt And Limestone Fragments (ML) 15.0-15.2' - Same as 10.0-11.0'	ш	1
				(00/2:0)	10.0 10.2 Carrie as 10.0 11.0		
					_	1]
-					-	1	1
-					-	1	1
-					-	1	-
-					-	1	-
_					_	1	_
_					_	1	
							Driller's Remark: Will install 4" HW casing to
20					_	1	19.0' below ground surface
						T	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-15	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

					N 3 10025, 11100 1010					T 0	ORIENTATION : Vertical
WATER	LEVELS	: 4.0 ft bo	ıs on 5/1		START : 5/15/2007		: 5/17/2007 CRIPTION	LOGGI	<u> </u>	1. S	Stewart COMMENTS
ŞQ⊋I	044.5.		1 (0)	STANDARD PENETRATION		SOIL DES	UNIF HUN		-	8 	COIVIIVIENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAM	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			9	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B ATIC		RECOVE	RY (ft)		MOISTURE	CONTENT,	RELATIVE DENS	ITY OR	3	嚴	DRILLING FLUID LOSS, TESTS, AND
LEV LEV			#TYPE	6"-6"-6" (N)	CONSISTEN	ICY, SOIL STI	RUCTURE, MINE	RALOGY		Σ	INSTRUMENTATION
22.3	20.0			(14)	Silty Sand And	d Limestone	Fragments (SN	1)	Ŧ	11	
	20.0	1.0	SS-5	10-32-50/4	20.0-21.0' - mo	derate yello	w, (5Y 7/6), wet,	very			-
-	21.3			(82/10")	dense, fine to	coarse graine	ed, nonplastic, n lastic fines, 20%	noderate	4	Ш	-
-	21.0				coarse gravel	sized limesto	ne, all carbonat	e, trace	/-	- 1	-
_					very fine sand- green particles	sized white	particles, trace b	rilliant	′ -	- 1	_
_					green particles	•			4	- 1	_
_									1	- 1	_
_									1	-	
									J	- 1	
										- 1	
25	25.0								1	- 1	
17.3	-	0.8	SS-6	25-50/4.5	Silty Sand And	d Limestone	Fragments (SN	1)		П	
-	25.9	0.8	33-0	(75/10.5")	25.0-25.8' - Sa reaction, 50%	me as 20.0-2 silt and 50%	21.0' except mod	derate HCI	4		-
_					(10000011, 0070	<u> </u>				- 1	7
-									1	-	7
-									1	-	7
-									1	-	-
-									+	- 1	-
-									+	-	-
-									+	- 1	-
-									+	- 1	-
30 <u> </u>	30.0 30.3	0.2	SS-7	50/3.5	Limestone Fra	amonte			+	Н	_
12.5	00.0	0.2	33-7	(50/3.5")	\ 30.0-30.2' - me	edium to coa	rse sand-sized a	and fine	Æ	П	-
_					∖gravel-sized, p	oor recovery	<u>'</u>		4	-	-
_									4	-	_
_									4	-	_
_									1	- 1	_
										- 1	
									1	- 1	
									1	- 1	
]									1		7
35	35.0 35.2								1		-
7.3	35.Ž	0.0	SS-8	50/2	No Recovery	35.0-35.2'			丰	7	Driller's Remark: Will install 4" HW casing
-				(50/2")					1	-	down to 35.0' below ground surface -
-									1	-	7
-									1		-
-									+		-
-									+		-
-									+	-	-
-									+		-
-									+		-
-									+		-
40									+	4	



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	R-15	CHEET	•	OE	•	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ry, auto nammer, Avvj rous,			ORIENTATION: Vertical
WATER	LEVELS	. 4.U Tt bo	us on 5/1		START : 5/15/2007	END : 5/17/2007 SOIL DESCRIPTION	LOGGE	₹∶ I. T	Stewart COMMENTS
ŞQ⊋	044:5: -		1 (0)	STANDARD PENETRATION		JOIL DESORIF HON		98	COIVIIVILINTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAMI	E, USCS GROUP SYMBOL	. COLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B ATI(RECOVE	RY (ft)		MOISTURE	CONTENT, RELATIVE DE	NSITY OR	30L	DRILLING FLUID LOSS, TESTS, AND
T E R S I			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MII	NERALOGY	Σ	INSTRUMENTATION
<u> 2.3</u>	40.0			(N)	Silt With Sand	I (MI)		1111	
		0.8	SS-9	44-50/5 (94/11")	40.0-40.8' - ligh	nt olive brown, (5Y 5/6), w	et, hard, fine	$\ \ $	-
-	40.9			(0 1/11)	to coarse grain	ed, 20-30% sand, nonpla HCl reaction, 5-10% orga	stic, rapid	╂'''	1 -
_					carbonate	norreaction, 5-10% orga	ilics, all	1	_
_									_
									_
							-	1	1
_							•	1	1
45	45.0						•	1	-
-2.7	45.3	0.1	SS-10	50/3.5		gments	Γ		-
-				(50/3.5")	\ 45.0-45.1' - mo	derate olive brown. (5Y 4	/4), mild to	┨	-
-					moderate HCI i	reaction, 10% fine grain, be poor recovery, highly foss	olack particles / . iliferous	┨	-
-					(minor matrix,	poor (ooo (o.), (g) (ooo		┨	-
_								-	-
_							-	-	_
_								1	_
									_
50	50.0						•	1	1
-7.7	50.0 50.2	0.0	SS-11	50/2	No Recovery 5	50.0-50.2'		F	1
-				(50/2")				1	1
-							-	1	
-								1	-
-								┨	-
-							-	┨	-
-								┨	-
-								1	-
_								1	_
_									_
55	55.0								_
-12.7	55.3	0.1	SS-12	50/4 (50/4") /	Limestone Fra	agments edium olive brown, (5Y 4/4) medium	Γ]
				(55/4)	grained, mild to	o moderate HCl reaction, t	race medium		
					grain-sized blace	ck particles, moderately for	ossiliferous	1]
]					(casts, molds u	ιμ το 5/8)		1]
-							•	1	
-								1	
-								1	-
-								1	
-							-	┨	-
-								1	-
60								\vdash	
								1	
								1	



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	B-15	SHEET	4	OF	a	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ry, auto nammer, Avvj rous,			ORIENTATION : Vertical
WATER	LEVELS	. 4.U π bg	us on 5/1		START : 5/15/2007	END : 5/17/2007 SOIL DESCRIPTION	LOGGE	K: I.	Stewart COMMENTS
30₽				STANDARD PENETRATION		SUIL DESURIPTION		99	COIVIIVIEN 15
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAM	E, USCS GROUP SYMBOL,	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ACE ATIO		RECOVE	ERY (ft)		MOISTURE	DRILLING FLUID LOSS, TESTS, AND			
F.F.Y.			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MIN	NERALOGY	Æ	INSTRUMENTATION
프장크				(N)				Ś	
-17.7	60.0	0.7	SS-13	45-50/3.5	Silty Sand And	d Limestone Fragments (abderate olive brown, (5Y 4/	SM)	4	Driller's Remark: Will install 4" HW casing down to 61.0' below ground surface -
	60.8			(95/9.5")	dense, fine to	coarse grained, 20-25% fir	nes. low	111	down to 01.0 below ground surface
					plasticity, mild	coarse grained, 20-25% fir to moderate HCl reaction,	40% fine		
-						nestone, poorly fossiliferou	us	1	-
-					See the next sl	oring at 61.0 ft bgs heet for the rock core log		┨	-
-								┨	-
-								-	-
_								_	_
_									_
								_	
65									
-22.7							_		
								1	1
-								1	-
-								1	-
-								1	-
-								-	-
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70 <u> </u>							_		_
-27.7									
-									_
-									-
-								-	-
-								1	-
-								1	-
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75							_	_	_
-32.7									_
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80							_	+	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-15	SHEET	5	OF	9

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

	LEVELS : 4.0			/15/07 START: 5/15/2007 END: 5/		D7 LOGGER : T. Stewart	
				DISCONTINUITIES	ڻ ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	61.0		3	61.35' - Mechanical break 61.75, 61.9, 61.95' - Bedding plane (3),		Limestone 61.0-63.7' - moderate olive brown to light olive gray, (5Y 4/4 to 5Y 5/2),	-
-			2	horizontal, rough, undulating, <1/16" gap, possible mechanical break		moderate to strong HCl reaction, medium strong (R3), 15% voids <1/1/16", infilled cavities with dark gray	-
-	R1-NQ 5 ft 54%	35	2	63.0, 63.4' - Bedding plane (2), 5 deg and 10 deg, rough, undulating, open up to 3/16", fracture is through infilled cavity, possible		material (N3) No Recovery 63.7-66.0'	-
65_ -22.7			NR	mechanical break		- -	R1: 16 minutes
-	66.0		2	66.1' - Bedding plane, horizontal, rough,		- - - Limestone - 66.0-69.7' - Same as 61.0-63.7'	-
-			2	undulating, open 1/16" 66.55, 68.75, 69.0' - Bedding plane (3), horizontal, rough, undulating, tight, possible mechanical break		except olive gray, (5Y 3/2), trace fossil casts, weak rock interval from 69.0-69.7'	-
-	R2-NQ 5 ft	53	2	67.15, 67.9' - Bedding plane (2), 5 deg and 10 deg, rough, undulating, tight, possible mechanical break		- -	SC-1 collected at 67.9- 68.75'
-	74%		3	68.75, 69.0' - Bedding plane (2), horizontal, rough, undulating, tight 69.25' - Fracture, 10 deg and 15 deg, rough,		- -	-
70 <u> </u>	74.0		NR	undulating, tight — 69.55, 69.65' - Fracture (2), horizontal and 5 deg, tight, fractures are in weak rock interval		No Recovery 69.7-71.0' -	Driller's Remark: Last 14" of run was very soft R2: 16 minutes -
- - -	71.0		NR	-		No Recovery 71.0-72.9'	Assumed core loss from top 71.0-72.9'
-	R3-NQ 5 ft 62%	38	>10	72.9-73.35' - Fracture zone, subangular and rounded fragments up to 1-3/8" in size 73.35-74.1' - Joint, vertical		 Limestone 72.9-76.0' - moderate olive brown grading at 74.7' to light olive brown, 	-
75			1	74.1' - Fracture, horizontal, rough, undulating, open 1/16", broken across infilled void, black stain		(5Y 4/4 grading to 5Y 5/6), strong HCl reaction, medium strong to weak (R3 to R2), 15% voids <1/16" on surface in creasing to 30% from 74.7'	
-32. 7 - -	76.0		3	75.3, 75.5, 75.7' - Fractures (3), 10 deg and 15 deg, rough, undulating, tight, possible mechanical break		with depth, poorly fossiliferous (casts), trace unfilled cavities to 3/8"x3/16" elongated, bioturbated	R3: 17 minutes
-			2	76.1' - Bedding plane, horizontal, smooth, stepped, tight, possible mechanical break 76.9' - Fracture, 5 deg and 10 deg, rough,		areas 3% irregularly shaped cavities >1", trace dark gray infill fines - 76.0-81.0' - yellowish gray to light	SC-2 collected at 76.9-
-	R4-NQ		0	undulating, open 1/16" 78.05' - Fractures, 15 deg and 20 deg, rough,		 olive brown, (5Y 8/1 to 5Y 5/6), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 30-35% voids <1/16", poorly 	78.05' -
-	5 ft 100%	84	3	undulating, tight, possible mechanical break 78.45' - Fracture, horizontal, rough, undulating, tight to 1/2" open		fossiliferous (casts), 3-5% dark gray fine to medium grained particles]
80_ -37.7			2	78.7' - Fracture, horizontal, rough, undulating, up to 3/4" open — 79.4, 79.5' - Bedding plane (2), horizontal, rough, undulating, open 1/8", possible		- -	R4: 11 minutes
	81.0			mechanical break	H		-

APPENDIX 2BB-523 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-15	SHEET	6	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	METHOD AI	ND EC	JUIPIV	MENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5	/15/07 START : 5/15/2007 END : 5/	17/20	D7 LOGGER : T. Stewart	
> 0 =	-			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_	034	ш.	0	80.2' - Fracture, horizontal, rough, undulating, tight, possible mechanical break		Limestone - 81.0-86.0' - light olive brown, (5Y	_
-			3	82.15, 82.5' - Bedding plane (2), horizontal, rough, undulating, open 7/16", dry, fine	Ė	6/6), strong HCl reaction, weak (R2), 10-15% mottled yellowish gray (5Y 8/1) with olive gray (5Y 5/2),	-
-	R5-NQ 5 ft	88	0	laminations 82.8' - Bedding plane, horizontal, rough,		moderately fossiliferous (casts/molds), carbonate fines (irregularly shaped fines possible	-
-	100%		2	undulating, tight, possible mechanical break 84.35' - Bedding plane, horizontal, rough,		bioturbation), trace organic lenses to 3/8" thick at 82.15' and 82.5', fossils to 9/16" predominately horizontally	-
85_ -42.7			0	undulating, tight, in very weak rock, possible mechanical break	Ħ	oriented and rice shaped with corrugated patterns	R5: 13 minutes
-	86.0			84.6' - Bedding plane, horizontal, fracture in bioturbated zone, possible mechanical break 86.05, 86.2, 86.35, 86.45, 86.5, 86.7' -		86.0-86.35' - Same as 81.0-86.0'	-
-			6	Bedding plane (6), 0 deg to 5 deg, rough, undulating, 1/16" gap, possible mechanical break		86.35-90.7' - white to yellowish gray with medium dark gray and moderate yellow, (5Y 8/1 with N4 and 5Y 3/19]
-	R6-NQ		0	88.1, 88.5' - Fracture (2), horizontal, rough,	Ħ	 5Y 7/6), very fine grained, strong HCI reaction, strong (R4), very fossiliferous (casts, microforams), 	-
_	5 ft 94%	54	2	undulating, tight, possible mechanical break 89.1' - Bedding plane, horizontal		 trace spherical voids <1/16", bioturbated mottling 30-35% of surface with 15-20% voids <1/16" 	-
90 <u> </u>			3	89.4' - Bedding plane, horizontal, possible mechanical break — 89.55' - Fracture, vertical, rough, undulating,	E	-	R6: 21 minutes
-	91.0		2 NR	gray staining, tight, with bisecting mechanical breaks 90.0' - Fracture, horizontal, rough, undulating,	Ė	- No Recovery 90.7-91.0' Limestone	-
-			4	1/8" open 90.4' - Fracture, horizontal, rough, undulating, tight		 91.0-95.9' - yellowish gray with dark gray and white, (5Y 7/2 with N3 and N9), strong HCI reaction, weak (R2), 	-
-	R7-NQ		3	91.4, 91.5, 91.7, 91.95, 92.15, 92.4' - Fractures (6), horizontal, rough, undulating, tight, possible mechanical break	Ħ	very fossiliferous (casts, molds, shells) fossils to 7/8", 94.0-95.9' apparent bedding and horizontal	-
-	5 ft 98%	60	3	92.95, 93.25, 93.5' - Fractures (3), 5 deg to 10 deg, rough, undulating, tight, possible mechanical break	Ė	- fossil alignment	-
95_ -52.7			2	93.75' - Fracture, 30 deg, rough, undulating, tight		-	R7: 10 minutes
-	96.0		2	94.4, 94.6, 95.2, 95.6' - Fractures (4), 0 deg to 5 deg, rough, undulating, tight, possible mechanical break	Ħ	- ⁻ No Recovery 95.9-96.0'	
-			1	96.6' - Fracture, 45 deg, rough, undulating, tight		Limestone 96.0-101.0' - Same as 91.0-95.9' except medium-sized white (N9) and	SC 3 collected at 09 GE
-	Do No		1	97.95' - Fracture, horizontal, rough,	Ħ	_ dark gray (N3) grains	SC-3 collected at 98.65- 99.6' -
-	R8-NQ 5 ft 100%	95	2	undulating, open 3/4" 98.2' - Fracture, 55 deg, rough, undulating, tight		-	
100_			1	98.5' - Mechanical break 98.65' - Bedding plane, horizontal, rough,		_	-
-57. 7 -	101.0		1	undulating, tight, possible mechanical break 99.6' - Bedding plane, horizontal, rough, undulating, tight, possible mechanical break			R8: 9 minutes

APPENDIX 2BB-524 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-15	SHEET	7	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

COMINO	WETHODA	ND L	ZUIFIV	MENT: CIME 55 S/N 316625, mud rotary, NQ tools, HW C	asiriy		ORIENTATION: Vertical
WATER	LEVELS: 4.0	ft bg	s on 5	/15/07 START : 5/15/2007 END : 5/	17/200	7 LOGGER : T. Stewart	
>00	<u> </u>			DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUTE AND DEDTIL OF CASH
ᆱᇬᇋ	RUN H. A ÆR'	(%)	NA P	DEDTH TYPE OPIENTATION POLICINESS	1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
PTH SVA'	RE I NGT COV	R Q D (%)	ACT 7 FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	SEN	R Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥΪ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				100.5' - Bedding plane, horizontal, rough,	Ш	Limestone	
-			2	undulating, tight, possible mechanical break -	$\vdash \vdash$	- 101.0-106.0' - yellowish gray with	1
-				101.1' - Bedding plane, horizontal, rough, undulating, tight, possible mechanical break	口	medium gray, (5Y 7/2 with N9), fine to medium grained, strong HCl	1
-			3	101.9' - Fracture, 25 deg to 30 deg, rough, -	₽₩	 reaction, very weak to weak (R1 to 	-
				undulating, tight	Ш	R2), very fossiliferous (microforams,]
	R9-NQ 5 ft	84	2	102.2, 102.8' - Fracture (2), horizontal, rough, undulating, tight, possible mechanical break	Н	casts, molds >1/8") decreasing abundance with depth, white rounded]
]	100%	04	_	102.4' - Fracture, 70 deg to 80 deg, rough,	Ħ	elongated grains 25-35% increasing	1
1 7				undulating, 3-7% black stain, tight	Н	with depth, 5-10% medium gray	1
105			1	103.2, 103.5' - Fracture (2), 10 deg to 15 deg, - rough, undulating, tight	Ш	 grains, voids <1/16" 30-40% of surface from 101.0-103.2' 	1 1
-62.7				104.1' - Fracture, 30 deg, rough, undulating,	Н		R9: 9 minutes
-			1	tight, possible mechanical break -	H	-	-
-	106.0			105.0' - Fracture, horizontal, rough, undulating, tight, possible mechanical break	Н	- 100 0 111 01 walles in the array with	1 4
			3	106.15, 106.4, 106.9' - Bedding plane or -	Ш	106.0-111.0' - yellowish gray with medium gray, (5Y 7/2 with N5), fine]
			ľ	mechanical break (3), horizontal, rough,	Н	to medium grained, strong HCl	
]				planar, <1/16" gap 107.0, 107.15' - Bedding plane or mechanical	H	reaction, very weak to weak (R1 to	1
			4	break (2), horizontal, rough, undulating,	Н	 R2), very fossiliferous (predominantly microforams and molds), 3-5% 	1
-	R10-NQ	! !		10-15% black staining	Ш	medium gray grains, voids <1/16"	1 1
-	5 ft	65	3	107.2' - Bedding plane or mechanical break, - horizontal, rough, undulating, tight	Н	 10-15% of surface, 1/4" bedded 	1
-	100%			107.8, 108.1, 108.4' - Mechanical break or	H	accumulation of fossils at 109.1'	1 4
			1	bedding plane (3), 0 deg to 5 deg, smooth,	$\vdash \vdash$	_]
110_			Ŀ	planar, tight	Ш		
-67.7				109.1' - Bedding plane, horizontal, bedded fossil casts and molds	Ы		R10: 8 minutes
1 7	111.0		2	110.5' - Bedding plane, horizontal, rough,	H	-	1
				undulating, tight, hard mineral surface - 110.8' - Fracture, 55 deg to 60 deg, rough,	Ш	111.0-114.5' - yellowish gray, (5Y	1
-			2	undulating, tight	Ш	- 7/2), medium grained, strong HCI	1 1
-				111.2' - Fracture or mechanical break,	Ш	reaction, very weak (R1), very fossiliferous (microforams, shells,	-
-			5	horizontal, rough, undulating, tight 111.7, 112.0' - Bedding plane (2), 5 deg to 10	$\vdash\vdash$	molds) fossils >75% of rock to 1/16"	1 -
-	5			deg, rough, undulating, tight -	口	trace to 1"	1 4
	R11-NQ 5 ft	28	4	112.2, 112.3' - Bedding plane or mechanical	Н	_]
	70%		L	break (2), 7 deg to 10 deg, rough, undulating, 1/8" open	Ш	_	
]			2	112.5' - Bedding plane or mechanical break,	\vdash		1
115				horizontal, rough, undulating, tight	H	No Recovery 114.5-116.0'	1
-72.7			NR	112.85, 113.0, 113.2' - Bedding plane or — mechanical break (3), 5 deg to 10 deg,	$\vdash \vdash$		R11: 9 minutes
-			````	rough, undulating, fossil casts/molds on	Ш	-	1 -
-	116.0			fracture surface -	\vdash	Limestone	1 4
-			3	113.5' - Mechanical break, rough, undulating, tight	H	Limestone - 116.0-121.0' - Same as 111.0-114.5'	1 4
				ւլցու 113.95' - Fracture, 70 deg, rough, undulating, _	Н	<u>-</u>]
			2	tight	Ш	_	
1 7			-	114.1, 114.2' - Fracture or mechanical break	\vdash	-	1
	R12-NQ			(2), horizontal, rough, undulating, tight 116.15, 116.75, 116.9, 117.2, 117.3' -	Ħ	-	1 1
-	5 ft	46	>10	Fracture or mechanical break (5), 0 deg to 5	Н	-	1 1
-	100%			deg, rough, undulating, tight 118.0' - Fracture or mechanical break,	Ш	-	1
-			2	horizontal, tight, in friable rock	H	-	1 4
120				118.3, 118.6 - Fracture, vertical, rough,	H		I 545 44
-77.7			3	undulating, tight	Н	_	R12: 11 minutes
	121.0			118.85-119.1 - Fracture zone	Ш		
						-	

APPENDIX 2BB-525 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-15	SHEET	8	OF	9

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 4.0) ft bg:	s on 5	/15/07 START : 5/15/2007 END : 5/1	17/20	D7 LOGGER : T. Stewart	
>00	(0			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R13-NC 5 ft 86% 126.0 R14-NC 5 ft 100%	61	2 2 3 3 1 NR 7 6 2 2 2	119.35' - Fracture or mechanical break, 5 deg to 10 deg, rough, undulating, tight 119.8' - Bedding plane, horizontal, smooth, undulating, tight 120.2, 120.35, 120.55' - Mechanical break or bedding plane (3), horizontal, rough, planar, tight 121.1' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" open 121.6' - discontinuity, nonplanar, undulating, tight, black staining on surface 122.05, 122.7, 123.05, 123.4, 123.9, 124.6, 124.9, 125.2' - Bedding plane or mechanical break (8), horizontal, rough, undulating, tight, fractures through cavities at 125.2' and 123.05' 124.0' - Bedding plane or mechanical break, horizontal, rough, undulating, 3/16" gap 126.05-130.85' - Bedding plane (16), rough, planar, <1/16" gap 127.7, 128.05' - Mechanical break or bedding plane (2), horizontal, rough, undulating, 1/8" gap at 127.7', tight at 128.05' 128.2, 129.3' - Bedding plane or mechanical break (2), 5 deg to 10 deg, rough, undulating, tight		Limestone 121.0-125.3' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak (R1), voids <1/16" on 15-20% of surface, very fossiliferous (casts, microforams), trace black laminations possible organics, 5-7% medium dark gray grains (angular-subangular), 121.6-121.7', very strong HCl reaction, finely laminated slightly coarser grained infill with undulating bedding planes to 10 deg, possible trace fine quartz sand No Recovery 125.3-126.0' Limestone 126.0-131.0' - yellow gray with medium dark gray and pale yellowish orange, (5Y 8/1 with N4 and 10YR 8/6), very fine to medium grained, strong HCl reaction, very weak (R1), thin bedding, grain size alternates 127.5-129.0' medium to coarse grained, very fossiliferous	R13: 10 minutes
130 -87.7 -	131.0		5	129.55' - Bedding plane, horizontal, rough, undulating, tight -			R14: Run time not recorded -
- - - - 135 -92.7	R15-NC 5 ft 96%	88	0 3 0 2 1	132.0' - Bedding plane, 20 deg, rough, undulating, tight 132.45' - Fracture or mechanical break, horizontal, rough, undulating 132.95' - Bedding plane or mechanical break, 10 deg to 15 deg, rough, undulating, tight 134.35' - Bedding plane, 5 deg, rough, undulating, 1/32" silt and/or clay sized infilling, open 1/16" 134.4' - Fracture, undulating, tight		131.0-135.8' - yellowish gray with light olive gray, olive gray and medium dark gray, (5Y 8/1 with 5Y 4/1, 5Y 6/1 and N4), fine to medium grained, strong HCI reaction, laminated bedding, very fossiliferous (microforams, shells, casts/molds), fossils to 5/8"x3/16", voids <1/16" 15-20% of surface, 3-5% cavities to 3/4"x1/2" from 134.5-135.3' infilled, mineralization subhorizontally aligned, 1" scour and fill structure at 134.4'	SC-4 collected at 131.0- 132.0' - - - - R15: 12 minutes
- - - - -	136.0 R16-NC 5 ft 96%	62	1 134.4' - Fracture, undulating, tight 134.9' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 135.45' - Bedding plane or mechanical break, horizontal, rough, undulating, tight, 3/4" hard medium gray infilled cavity on surface 136.25, 136.4' - Bedding plane or mechanical break, horizontal, rough, planar, 1/16" open 136.5' - Bedding plane or mechanical break, horizontal, rough, undulating, 1" open, through cavity/ bioturbated pockets 137.2' - Bedding plane or mechanical break,		No Recovery 135.8-136.0' Limestone 136.0-136.5' - yellowish gray, (5Y 4/4), medium grained, strong HCI reaction, very weak (R1), thin bedding, 136.0-136.25' rounded clast to 1/4" with thin halo on edges, clasts strong rock (R4), strongly suggests possible fluvial deposition	- - - - -	
-97.7 -97.7	141.0		1	horizontal, rough, undulating, tight, fracture in bioturbated cavity 137.65' - Bedding plane or mechanical break, 20 deg, rough, undulating, tight		-	R16: 18 minutes



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-15	SHEET	9	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

			<u> </u>	TENT . CIVIE 33 3/N 310023, HILL TOTALLY, INC. LOOIS, HW	000.	9		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5	/15/07 START : 5/15/2007 END : 5	/17/:	200	7 LOGGER : T. Stewart	
				DISCONTINUITIES	1,	<u>, </u>	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	7	SYMBOLIC LOG	DOOK TYPE, OOLOD	
ON FEE	N. A. Y.		FRACTURES PER FOOT	BEOOK!! HOW	<u> </u>	<u>ن</u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI	IN THE	(%) Q	ΞÖ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	3	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무유진	NG S	οD	RAC	PLANARITY, INFILLING MATERIAL AND		≝	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	SHR	Ω.	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	1 6	'n	CHARACTERISTICS	Bitor o, reor neodero, ero.
				137.8' - Bedding plane or mechanical break,	t		Limestone	
-			1	horizontal, rough, undulating, tight, fracture	+	ᅪ	136.5-138.5' - light olive gray, (5Y	-
I _				through bioturbated cavity	┰	4	5/2), very fine grained, strong HCI	_
			_	138.1' - Bedding plane or mechanical break,		П	reaction, medium strong (R3), 3-5%	SC-5 collected at 141.0-
_			3	horizontal, rough, undulating, tight to 1" open	T	⇉	voids <1/32", 5% irregularly shaped	141.8'
_	D47.NO			138.7' - Fracture zone, 2" wide with 1/2" to 1-1/2" fragments	+	4	cavities >2" (bioturbation pockets) with 25-30% voids <1/16" and	-
_	R17-NQ 5 ft	! 70	0	139.1' - Fracture or mechanical break,	ᅪ	πL	mottling of moderate yellow rimming,	
	94%	70	0	horizontal, rough, undulating, tight organics			moderate yellow infill, poorly	
-	0.70			on 50% of surface	1	Ц	fossiliferous (casts, molds)	-
_			2	139.7' - Bedding plane or mechanical break,	₽	╁	138.5-140.3' - light olive gray, (5Y	_
145				horizontal, rough, undulating, tight	H	Н	5/2), very fine grained, strong HCI	
-102.7			^	139.8' - Bedding plane or mechanical break,	E	П	reaction, medium strong (R3),	R17: 11 minutes
-			3	20 deg, rough, undulating	+	ᅪ	moderately fossiliferous (casts,	1
-	146.0		NR,	140.3' - Bedding plane, rough, stepped, tight to 1/16" open, parting along wavy lamination	+	4	molds) increase abundance with depth, 5% infilled irregularly shaped	1 4
			1	141.8-145.55' - Bedding plane or mechanical	上	П	cavities to 1" with black staining,	
1 7				break (6), horizontal, rough, planar, tight	1	Д	3-5% mottling, trace elongated	13:12 water level in HW
-				142.0' - Fracture, 70 deg to 80 deg, rough,	+	4	cavities to 3/8"x3/16"	casing 6.7' below ground -
-			0	undulating, tight	1	╓	140.3-140.8' - light olive gray, (5Y	surface
				142.25' - Bedding plane or mechanical break,		1	5/2), very fine grained, strong HCI	End configuration 4" HW to
1 7	R18-NQ			horizontal, rough, undulating, 1/2"-1-3/8"	1	ᆦ	reaction, medium strong to strong	56.0' below ground surface - NQ from 61.0-151.0' below
-	5 ft	54	2	open	+	\dashv	(R3 to R4), black (<1/32" thick)	ground surface
I _	96%			144.8' - Fracture, 60 deg, rough, undulating,	1	工	microlaminations dipping 20-25 deg,	Soil/split spoon from 0.0-
				tight 146.1' - Bedding plane or mechanical break,		Ц	trace voids <1/32" No Recovery 140.8-141.0'	60.0'
150			8	horizontal, rough, undulating, <1/16" open	1	十	Limestone	Abandonment:
150 <u> </u>				146.5-147.4' - Fracture, healed	╀	┰	141.0-142.2' - Same as 140.3-140.8'	16 bags of type I/II Portland —
-107.7			2	148.3' - Bedding plane, horizontal, smooth,	上	Ц	142.2-145.7' - yellowish gray with	cement
1 7	151.0			stepped, tight	L	Д	grayish orange and light gray, (5Y 8/1	Mixed with 37 gallons of
-	101.0		NR)	148.65' - Bedding plane or mechanical break,	十	十	with 10YR 7/4, N6), fine to medium	water -
-				horizontal, rough, undulating, 1/16" open	4	ŀ	grained, strong HCl reaction, weak	Plus 3 dry bags of Portland R18: 16 minutes
				149.0, 149.15' - Bedding plane or mechanical			(R2), moderately fossiliferous (casts,	1710. 10 minutes
1 7				break (2), horizontal, rough, undulating, 1/16" open	1		shells), fossils horizontally aligned, grayish orange grains have a frosted	1
-				149.2-149.8' - Bedding plane (6), horizontal,	1	ŀ	to translucent luster	1
-				rough, undulating, 1/16" open	4	ŀ	No Recovery 145.7-146.0'	1
				150.1' - Fracture or mechanical break, 5 deg			Limestone	
1 7				to 10 deg, rough, planar, tight	1		146.0-151.0' - light olive gray to	1
-				150.6' - Bedding plane or mechanical break,	1	ŀ	moderate olive brown, (5Y 5/2 to 5Y	1
_				horizontal, rough, undulating, tight	4	L	4/4), very fine to fine grained, strong]
						- [HCl reaction, medium strong (R3),	
1 7				-	7	Γ	poorly fossiliferous (casts), 3-5% spherical voids <1/16", 149.2-150.1'	
-					+	ŀ	weak rock zone of fine to medium	1 -
_					1	L	grained laminated material]
							alternating yellowish gray and	
-					1	ı	moderate olive brown (5Y 8/1 and 5Y	1
-					+	ŀ	4/4), 149.2-150.1' similar to	-
					1	L	142.2-145.7'	
1							No Recovery 150.8-151.0']
-					1	ŀ	Bottom of Boring at 151.0 ft bgs on	1
-					+	ŀ	5/17/2007	4
						- [
1 7					1	Γ		1
-					1	ŀ		1
-				_	4	L	_	
1								
1 7					1	ı		1
-					+	+		+

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-16	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

					N 252545, Illiud Totalry, auto Hammer, AWS Tous, 4-778 III-cone bit ORIENTATION . Vertical	_
WATER	LEVELS	: 1.6 ft b	gs on 6/14	4/U7 S	START : 4/23/2007 END : 4/25/2007 LOGGER : A. Erickson	\neg
200				STANDARD	SOIL DESCRIPTION COMMENTS	4
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
ᆱ끯딭		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
H A A A			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
SU			"	(N)		
42.6	0.0				Topsoil "Water level is based on Ground Water	
_		1.0	SS-1	0-2-3	\(\bigcup_{0.0-0.2'}\) - wood chips \(\bigcup_{0.0+0.2'}\) - Monitoring at LNP site (FSAR Table 2.4.12.08)"	1
-				(5)	Poorly Graded Sand (SP) 0.2-1.0' - medium light gray, (N6), moist, loose, fine	-
-	1.5				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	-
-					organics, and rootlets, sand is silica	4
l _						┛
_					1	
-					† 	7
-					- I	-
-					- 1	-
5	5.0				Develo Overled Overl (OD)	ᅵ
37.6				0.5.4	Poorly Graded Sand (SP) 5.0-6.2' - pale yellowish gray, (5Y 8/1), some mottling,	
I -		1.2	SS-2	3-5-4 (9)	moist to wet, loose, fine grained, nonplastic, no HCl	1
-	6.5			(3)	reaction, trace organics and black mineral, trace	1
-	0.0				\pyrite nodules, sand is silica / -	1
-					-	-
-						-
_					<u> </u>	_
]	
-					Ţ 	1
-					† †	-
10 32.6	10.0				Silty Sand (SM)	
- 02.0				0-1-2	10.0-10.2' - light olive gray, (5Y 6/1), wet, very loose,	4
_		1.3	SS-3	(3)	\fine grained, low plasticity, no HCl reaction, sand is \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_
	11.5				Silica S	
					Silty Sand With Gravel (SM) 10.2-11.3' - yellowish gray, (5Y 8/1), wet, very loose,	
_					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1
-					sand-sized carbonate material, 15% gravel-sized	-
-					carbonate material, fossil fragments	-
-						4
-]]	4
]	
15	15.0				1	1
27.6	. 3.0				Limestone Fragments	\exists
-		0.8	SS-4	11-15-11	│ \ 15.0-15.1' - mottled yellowish gray and dark yellowish	+
-		0.0	55-4	(26)	orange, (5Y 7/2 and 10YR 6/6), dense, coarse gravel-sized limestone, strong HCl	\exists
-	16.5	-				4
_					Silt With Sand (ML)	4
					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	ا
					very still, horpiastic, very rapid dilatancy, mild to	
-					carbonate materials	1
-					1 1	1
-						\exists
-					-	\exists
20						4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-16

SHEET 2 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

						auto hammer, AWJ rods,			_	ORIENTATION : Vertical
WATER	LEVELS	: 1.6 ft b	gs on 6/1		START : 4/23/2007	END : 4/25/2007	LOGG	ER:	Α.	Erickson
≥□⊋				STANDARD PENETRATION		SOIL DESCRIPTION		\dashv	ဗွ	COMMENTS
N (1	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME	USCS GROUP SYMBOL,	COLOR	-	CL	DEPTH OF CASING, DRILLING RATE,
H BI ACE ATIC		RECOVI	ERY (ft)		MOISTURE C	CONTENT, RELATIVE DEI	NSITY OR	-	30L	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MIN	NERALOGY	-	SYMBOLIC LOG	INSTRUMENTATION
22.6	20.0			(14)	Silt With Sand (N	MI)		┪	U)	
	20.0	1.2	SS-5	13-17-20	20.0-21.2' - Same	e as 15.1-15.8' except 2	5% very fine	-1		
-		1.2	33-5	(37)	sand, fine gravel-	-sized limestone at top of	of sample	-		
_	21.5				-			+		
-								4		
-								4		
-								4		
_								_		
_								4		
_								4		
25	25.0				0 1 0 1 (14)			4		_
17.6		0.9	SS-6	26-50/5 (76/11")	Sandy Silt (ML) 25.0-25.9' - grayi:	sh orange, (10YR 7/4), ı	moist to wet.			Gray silica sand and white carbonate fragments in sample, assume slough from
_	25.9			(70/11)	hard, fine to coar	se grained, 30% fine to	coarse	\mathbb{A}	Щ	upper material
_						onate material, fine to co estone from 25.0'-25.4'	arse /	/]		
_					0			4		
_								1		
								1		
								1		
30	30.0							1		
12.6					Silt With Sand (WL)			П	_
		0.9	SS-7	3-36-13 (49)	hard, fine to coar	sh orange, (10YR 7/4), i se grained, mild to mod	moist to wet, erate HCl	\perp	Ш	
	31.5			(43)	reaction, 25% fin	e sand-sized, trace med	lium to	/1		
					coarse sand-size	ed, trace fine gravel-size ials	d, all	1		
								1		
								1		
_								1		
_								1		
-								1		
35	35.0							1		
7.6	55.0				Silty Sand (SM)			1	П	_
-		1.3	SS-8	8-12-19	35.0-36.3' - grayi	sh orange, (10YR 7/4), i arse grained, 46% fines	moist to wet,	1		
-	36.5			(31)	carbonate	arse grained, 40 % lines	, all	_1		
-	30.5				1			+		
-								+		
-								+		
-								+		
-								+		
-								+		
								+		
40								+	-	
			<u> </u>					_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-16	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

						ry, auto nammer, Avvu rous,			ORIENTATION : Vertical
WATER	LEVELS	: 1.6 ft bo	gs on 6/14	4/07 S	START : 4/23/2007	END : 4/25/2007	LOGGER	≀ : A.	
> 0 0 1				STANDARD		SOIL DESCRIPTION		ပ္ခ	COMMENTS
A PIC	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				CLC	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)		SOIL NAM	IE, USCS GROUP SYMBOL, E CONTENT, RELATIVE DEN	COLOR, JSITY OP	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
YFA YFA			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE, MIN	NERALOGY	MB(INSTRUMENTATION
			#1175	(N)		,		SYI	
2.6	40.0			43-50/6	Silty Sand (SN	Л)		Ш	
-		0.7	SS-9	(93/12")	40.0-40.7' - dai	rk vellowish orange to mod	lerate		-
-	41.0			(00/.2)	yellowish brow	n, (10YR 6/6 to 10YR 5/4), coarse grained, mild HCl re	wet, very		-
					nonplastic fine	s, 10% gravel-sized, all ca	rbonate / -		_
					(<u>.,, g</u>			
1 7							_	1	
1 -							-	1	1
-							-	l	-
-							-		Drillaria Damaria, Hard material et 42.5!
1 _							_		Driller's Remark: Hard material at 43.5' below ground surface
									Solon ground candos
45	45.0						_	1	
-2.4	48:8	0.0	SS-10	50/0.5	No Recovery 4	45.0-45.04'			-
-				(50/0.5")					-
-					Pogin Pock Co	oring at 46.0 ft bgs			
					See the next sl	heet for the rock core log	_]
							_		
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50									
-7.4								1	7
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-16	SHEET	4	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

00111110			<u> </u>	PIENT : CIVIE 93 3/N 232343, Mud Totally, NQ tools, HW C	aonig		ORIENTATION : Vertical
WATER	LEVELS: 1.6	ft bg	s on 6	/14/07 START : 4/23/2007 END : 4/	25/20	D7 LOGGER : A. Erickson	
1.				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
E H	N, A, Y	(9	FRACTURES PER FOOT	DECOMM HON	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H H	R F F F	(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	S S S S S S S S S S S S S S S S S S S	Ø	XX.	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
		ď	# 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	, , ,
	46.0			46.2' - 70 deg, smooth, undulating, up to 0.4"	\Box	Limestone	
-			2	gap	Н	- 46.0-48.5' - yellowish gray, (5Y 7/2),	1
-				46.65' - Bedding plane, horizontal,		fine grained, moderate to strong HCl reaction, very weak to weak (R1 to	
_			0	undulating, bedding plane fracture, smooth to	$oldsymbol{oldsymbol{eta}}$	- R2), 25% surface void (1/16"), many	
				rough, tight up to 0.1" gap	Н	cavities up to 9/16"x3/16",	SC-1 collected at 47.5-
	R1-NQ					moderately fossiliferous with fossil	48.4'
-	5 ft	95	1	48.5' - 20 deg, rough, undulating	₩	- molds	1
_	100%				+	48.5-51.0' - Same as 46.0'-48.5' except 40% surface voids (1/16"),	
_			0			 very many cavities up to 3/4" 	
50			"		Н	diameter, highly fossiliferous with	
-7.4				_		fossil molds, mostly oblong up to	R1: 8 minutes
-			0		厂	_ 9/16"x1/8"	1
-	51.0				╀		1 4
			4			51.0-53.55' - yellowish gray, (5Y 7/2),	
			+		\vdash	 fine to medium grained, strong HCl reaction, extremely weak (R0), very 	1
-				50.22, 54.05' - Mechanical break (10), 0 - 20	╁	weakly cemented	1
-			3	deg, rough, undulating, infilling, bedding	仜	-	-
I _				plane fracture probably mechanical break, all	┢	_	
	R2-NQ		١ ,	have infill due to soft nature of rock fracture	H		
-	5 ft 64%	0	3	surfaces eroding, up to 0.04" gap due to rock surface eroding off/breaking		53.55-53.7' - Same as 51.0'-53.55'	1
-	0470		>10	Surface croding on/breaking	╁┈	except 0-5% surface void up to 1/16",	1
_					Ľ	_ few cavities up to 9/16" diameter,	1 4
55			l	_	Щ	poorly fossiliferous, trace black fine	
-12.4			NR		Н	to medium grained material 53.7-54.2' - Same as 51.0'-53.55'	R2: 3 minutes
I -	56.0					No Recovery 54.2-56.0'	1
-	56.0			56.15, 56.7, 56.9, 57.0, 57.25, 57.5, 58.05,	╀	Limestone	1
-			3	58.15, 58.2, 58.3, 59.5, 59.8' - Mechanical	┢┰	- 56.0-60.4' - yellowish gray, (5Y 7/8),	1 4
_				break (12), 10 deg, smooth, undulating,		strong HCl reaction, extremely weak	
				infilling, bedding plane fracture or mechanical	Ш	(R0), up to 1/2" thick bands of	
-			3	breaks, smooth to rough, planer to undulating, tight to 3/4" thick gap, infill from		 recrystallization from 59.1-59.3' and 60.1-60.4' were very weak rock, 	1
-	R3-NQ			eroding fracture surface due to soft quality of	╁	weakly cemented, voids (<1/16") on	1
_	5 ft	30	>10		╨	- surface, 0% from 56.0-58.6', 5-25%	_
	88%		L	58.1, 58.5' - very weakly cemented rock	Ш	voids from 50.8-60.4', cavities	
1 -					\vdash	(molds) up to 3/16"x3/8", black	1
			>10		Ľ	 lineations up to 1/8" from 60.0-60.4', fine grained, trace medium grained 	1 1
-17.4			>10	59.9, 60.1' - Fractures, rock fragments zone,	igspace	inic grained, trace medium grained	R3: 5 minutes
''				black staining at 60.1' fracture surface	\vdash	No Recovery 60.4-61.0'	No. o minutes
	61.0		NR	ŭ			
I -				61.0-61.6' - Fracture zone	\vdash	Limestone	1
-			>10			 61.0-62.4' - yellowish gray, (5Y 7/2), 	1 1
-				61.7' - Bedding plane or mechanical break,		fine to medium grained, strong HCl reaction, extremely weak (R0), small	1 -
-			>10	horizontal, rough, undulating, undulating to stepped up to 1" gap	╀	- voids (1/16") cover 25% of core]
			L.,	62.15, 62.25, 62.4' - Bedding plane or		surface, many cavities up to 3/8"	
I -	R4-NQ			mechanical break (3), horizontal, rough,	lacksquare	diameter and 9/16"x3/8", some	1
-	5 ft	8	>10		╁	- cavities are fossil molds, black	1 1
I -	76%			62.6' - Fracture or mechanical break, 80 deg,	口	material up to 3/8" and black lineation up to 3/16" from 61.0-61.65'	-
I -			>10	rough, undulating, half of fracture/one side of fracture's rock is missing	\vdash	- 62.4-64.8' - Same as 61.0'-62.4']
65				62.8-63.2' - Fracture zone	\vdash	except very weak (R1)]
-22.4			,,_	64.2, 64.35' - Bedding plane or mechanical	ш	No Recovery 64.8-66.0'	R4: 6 minutes
-			NR	break (2), horizontal, rough, undulating, up to	+	-	1
	66.0			1/2" gap	Ħ		ļ
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-16	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS: 1.6	ft bgs	on 6/	14/07 START : 4/23/2007 END : 4/	25/20	D7 LOGGER : A. Erickson	
≥∩≘	- (°)			DISCONTINUITIES	စ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	J.H.	D (%)	TINE IN	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Lic	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ECC	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
Оνш	Olk	2	шД	64.3' - Fractures, 80 deg, rough, undulating	S	Limestone	
_			2	04.5 - Fractures, 60 deg, rough, undulating	岸	- 66.0-68.9' - yellowish gray, (5Y 7/2),	1 -
_				66.8' - Fractures (2), 70 deg, smooth,		fine grained, strong HCl reaction, very weak to weak (R1 to R2)	-
-			2	undulating, tight 1/16" gaps 67.12, 67.4' - Fractures (2), 5 deg, smooth,	$oldsymbol{\perp}$	r	1
-	DE NO			undulating, 1/2" gap on same surface at 67.4'		_	1
-	R5-NQ 5 ft	33	3	68.15' - Fracture, 5 deg, smooth, stepped, discontinuity fracture between hard and soft	ш	-	1
-	96%			rock, large gap	\bot	− 68.9-70.8' - Same as 66.0'-68.9'	1
_			5	68.3' - Fracture, 75 deg, rough, undulating,	F	except dark vellow. (5Y 4/2).	1
70 <u> </u>				vertical fracture, tight 68.9' - Mechanical break —		extremely weak (R0), 25% voids (<1/16") over core surface from	I ₂₅
-27.4			0	69.3, 70.8' - Mechanical break, due to rock softness	世	_ 66.0-67.8' and 70.5-70.6', no surface	R5: 7 minutes
	71.0		NR,		₽	voids present due to softness of material, few cavities up to	1
			3	71.55, 71.85' - Fractures (2), horizontal and vertical, smooth, undulating, two horizontal	Д	_ 5/16"x1/8", poorly fossiliferous	SC-2 collected at 71.2-
-				fractures, gaps up to 1/2" 71.7' - Fracture, vertical, rough, undulating,	ш	70.2-70.8' - Same as 66.0'-68.9' No Recovery 70.8-71.0'	72.0'
-			0	vertical fracture, gap up to 1/2"	士	Limestone	
-	DO NO				╁┼	71.0-71.6' - Same as 66.0-68.9' - except moderate olive brown, (5Y	-
-	R6-NQ 5 ft	80	0		H	4/4), fine grained, strong HCI	-
_	97%					reaction, extremely weak (R0) - 71.6-75.85' - Same as 66.0'-68.9'	-
_			0			except very weak to weak (R1 to R2), voids (<1/16") cover 15% of core	
75 <u> </u>					₽	— surface (variable) with depth, many	R6: 11 minutes
-52.4			0		$oldsymbol{\sqcup}$	cavities up to 3/16"	No. 11 minutes
-	76.0		NR)		ፗ	No Recovery 75.85-76.0'	-
-			0	76.4, 76.7, 77.0, 77.3, 77.4, 77.65, 77.8, 79.0,	世	Limestone 76.0-76.6' - yellowish gray, (5Y 7/2),	-
-				80.0, 80.25' - Mechanical break (11), infilling, due to erosion of soft fracture surfaces	\pm	fine grained, strong HCl reaction,	-
-			0	due to erosion or soft fracture surfaces	+	very weak (R1), 15% surface fractures (<1/16"), few cavities up to	1
-	R7-NQ				F	- 2-3/4"	-
-	5 ft	34	0		Ħ	76.6-78.6' - Same as 76.0'-76.6' except extremely weak (R0)	-
-	92%				世	- 78.6-79.8' - Same as 76.0'-76.6'	1
			0			except weak (R2), 15-25% surface voids (<1/16"), cavities up to 1-3/8"	1
-37.4			0		屽	diameter, trace black organics material up to 2" in diameter	R7: 9 minutes —
1 -	910		NR	00.13-00.40 - Flacture 2011e	口	79.8-80.6' - Same as 76.0'-76.6'	-
+	81.0		1417	04.0.04.45.04.70.04.0.00.75.00.05.00.4	口	 No Recovery 80.6-81.0' Limestone 	
			0	81.2, 81.45, 81.72, 81.8, 82.75, 82.95, 83.4, 83.75, 83.8, 84.75, 85.5' - Mechanical break	\Box	81.0-81.8' - yellowish gray, (5Y 7/2),	
				(11)	\vdash	 fine grained, strong HCl reaction, extremely weak to very weak (R0 to 	
			0		Ė	R1), 0-5% surface voids (<1/16")	
	R8-NQ				片	 over core surface dependent on softness of rock, many shallow 	
1 1	5 ft 92%	8	0			cavities up to 2" diameter 81.8-82.8' - Same as 81.0-81.8'	
1 1	52,3			·	世	except yellowish brown, (10YR 5/4)	1
85			4	84.35, 84.4, 84.5' - Fractures (3), horizontal, rough, undulating, horizontal fractures, up to	仠	82.8-85.6' - Same as 81.0-81.8'	1
-42.4			>10	1/4"	揮		R8: 7 minutes
	86.0		NR		世	- No Recovery 85.6-86.0'	1
						-	1



PROJECT NUMBER:

338884.FL

B-16 SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS : 1.6	ft bgs	on 6/	14/07 START : 4/23/2007 END : 4/	25/200	D7 LOGGER : A. Erickson	
\$ D €	(%)			DISCONTINUITIES	၂၂၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ÆS T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	(%) Q	115 105	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EPT SURF	SORE	RO	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0716	-	ш.п.	84.4' - Fracture, vertical, rough, undulating,	0)	Limestone	
_			>10	bounded by horizontal fractures at	H	- 86.0-86.6' - moderate yellowish	-
-				84.35-84.4, half of core, other fracture surface not present	Ħ	brown grading to yellowish gray, (10YR 5/4 to 5Y 7/2), fine grained,	-
-			>10	84.95-85.2' - Fracture zone	H	 strong HCl reaction, extremely weak 	-
-	R9-NQ			86.0-87.05' - Fracture zone, rock CaCO3 silt 87.65-87.9' - Fracture zone	Н	(R0), black carbon, organic material from 86.0-86.15'	SC-3 collected at 88.0-
-	5 ft	30	0	88.5' - Mechanical break, to fit in box	ш	- 86.6-87.9' - Same as 86.0'-86.6'	89.1'
_	57%			-	ш	except extremely weak (R0), 40% surface voids (<1/16"), many cavities	=
				-	ш	 up to 9/16" diameter, trace black organic material up to 1/16" 	=
90 <u> </u>			NR	-	Н	87.9-88.85' - Same as 86.0'-86.6'	R9: 7 minutes
-	01.0			-	$oxed{\Box}$	 except very weak to weak (R1 to R2), 25-40% surface voids (<1/16"), many 	-
-	91.0			91.1' - Fracture, 75 deg, rough, undulating,	Ħ	cavities up to 9/16", few fossil molds	-
-			3	vertical fracture 1/8"	H	No Recovery 88.85-91.0' Limestone	-
-				91.8' - Fracture, 60 deg, rough, undulating, - vertical fracture	Ш	91.0-95.3' - Same as 87.9'-88.85'	-
_			0	91.9' - Fracture, 40 deg, rough, undulating,	₩	 except yellowish gray to yellowish brown, (5Y 7/2 to 10YR 5/4) 	=
_	R10-NQ			diagonal fracture 92.8' - Mechanical break, for hardness test	Ħ	_ , , ,	=
_	5 ft 100%	75	2	93.5' - Fracture, 60 deg, diagonal fracture, up	ш	_	=
_				to 3/4" gap 93.8' - Fracture, horizontal, rough, undulating,	ш	=	1
95			1	horizontal fracture, fracture surfaces eroded,		_	-
-52.4				up to 3/4" gap 94.1' - Mechanical break	H	94.95-95.25' - Same as 91.0'-95.3'	R10: 8 minutes
_	96.0		>10	94.25' - Fracture, 70 deg, rough, undulating.	Ħ	 except 5% surface voids (<1/16"), few cavities up to 3/16" 	1
-	00.0			tight up to 1/4" gap 94.7, 94.85' - Mechanical break	H	95.3-96.0' - Same as 91.0'-95.3'	
			3	95.3-96.0' - Fracture zone 96.4-96.6' - Fracture zone, 45 deg, rough,	Н	 except fine grained, extremely weak (R0), 5% surface voids (<1/16"), 	-
			>10	undulating, fracture on either side	Н	black organic material up to 3/8" 96.0-97.7' - moderate yellowish	
				92.0-97.45' - Fracture zone, horizontal and 50 deg, rough, undulating	H	brown, (10YR 5/4), fine grained,	
	R11-NQ			50 deg, rough, undulating	Ш	strong HCl reaction, weak (R2), 25% voids (<1/16") on core surface, many	
	5 ft 34%	17		-	Ш	cavities up to 3/8"x9/16", fossil	
			NR		Н	(molds), many fossil casts, recrystallization present	
100				_	\mathbb{H}	No Recovery 97.7-101.0'	
-57.4					Ħ	_	R11: 5 minutes
	101.0			_	H		
_			2	101.15' - Fracture, 70 deg, rough, undulating,	H	Limestone - 101.0-102.6' - Same as 96.0'-97.7'	
			_	vertical fracture, large gap 101.6' - Bedding plane, horizontal, rough, -	Н	-	
			>10	undulating, 1/8" gap	\square	_	
				101.95- 102.1' - Fracture zone, rough, undulating, fracture on either side	Ш	102.6-103.2' - Same as 96.0'-97.7'	
	R12-NQ 5 ft	52	2	102.9' - Bedding plane, horizontal, rough,	Ш	except extremely weak (R0), 20% surface voids (<1/16"), many cavities	SC-4 collected at 103.2-
	60%			undulating, up to 1/4" gap 103.2' - 5 deg, rough, undulating	H	up to 5/16" 103.2-104.0' - Same as 96.0'-97.7'	104.0'
					F	No Recovery 104.0-106.0'	_
105 -62.4			NR		Ħ		D40: 0 minutes
-02.4				<u>-</u>	H	 	R12: 8 minutes
	106.0				H		-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-16	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.6	ft bgs	on 6/	14/07 START : 4/23/2007 END : 4/	25/200	7 LOGGER : A. Erickson	
≥∩≘	_ (°)			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	D (%)	70	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SOL!	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ОΩШ	074	ď	╙┖	THIORNESS, SORI ACE STAINING, AND HOTTINESS	S		
1 4			3	106.2' - Fracture zone		Limestone - 106.0-107.15' - yellowish gray to	1
				106.5' - Fractures, horizontal, rough, undulating, up to 1/4" gap	₽₩	dusky yellow, (5Y 7/2 to 5Y 6/4), fine	_
			4	106.75' - Mechanical break	Щ	grained, strong HCl reaction, very weak (R1), voids (<1/16") over	_
				107.1' - Fracture, horizontal, rough, stepped, up to 1/2" gap	Ш	20-40% of surface, silt infill in void	_
	R13-NQ 5 ft	50	1	107.3' - Fracture, 55 deg, rough, undulating,	Н	spaces present, many cavities up to - 1-3/16"x3/4", many fossil molds	_
	96%	50		up to 1/4" gap 107.35' - Fracture, horizontal, rough,	口	107.15-110.8' - Same as	_
			1	undulating		106.0'-107.15' except weak (R2)	
110			'	107.9' - Fracture, horizontal, smooth, undulating, large gap with rock crush on part —	Н		1
-67.4			6	of fracture	Ш		R13: 13 minutes
	111.0		NR.	108.7' - Fracture, 80 deg, smooth, undulating, half of fracture is rock crush	Ш	No Dogovomi 440 9 444 0'	1
1	-		\Box	111.2' - Mechanical break	\mathbb{H}	No Recovery 110.8-111.0' Limestone	1
1			2	111.4' - Fracture, 20 deg, rough, stepped,	\Box	111.0-114.3' - Same as	1
				gap up to 1.5" 111.65' - Mechanical break, 50 deg, smooth,	H	- 107.15'-110.8'	1
			5	undulating, tight	怡	-	1
1 1	R14-NQ			112.35' - Fracture, 80 deg, rough, undulating, black, half of fracture surface/side missing.	Ш	-	1
1 1	5 ft 66%	25	1	little black staining	ш	-	1
1 1	0070		_1	112.35, 112.75' - Fractures, 20 deg, rough, undulating, gaps up to 3/4" thick with rock	Ш	-	1
115				fragments	+	No Recovery 114.3-116.0'	1
-72.4			NR	112.8' - Fracture, 70 deg, rough, undulating, — half of fracture is rock fragments	Ħ		R14: 7 minutes
1 -	440.0			112.95' - 60 deg, smooth, undulating, up to		-	1
1 +	116.0			1/2" gap 113.7' - Fracture, 30 deg, smooth, undulating,	╁┼┤	Limestone	SC-5 collected at 116.0-
			>10	tight	Ш	- 116.0-118.4' - moderate yellowish	117.2' -
-				114' - Fracture, 80 deg, rough, undulating, fracture 113.5-114.3', half fracture is rock	団	brown, (10YR 5/4), fine grained, strong HCl reaction, very weak to	1
1 -			>10	fragments	+	 weak (R1 to R2), voids (<1/16") over 	1
1 -	R15-NQ		2	116.0-116.3' - Fracture zone 117.3' - Mechanical break	\Box	15% of core surface, many small cavities up to 3/8"x1/16"	1
1 -	5 ft	25	-	117.3 - Mechanical break 117.45-117.9' - Fracture zone	H	No Recovery 118.4-121.0'	1
1 -	48%			118.05' - Fracture, horizontal, smooth,	Ш	-	1
-			NR	undulating, tight up to 1/8" gap 118.25' - 10 deg, rough, undulating	╂┼┨	-	1
120 -77.4			1417	-	曰	_	R15: 6 minutes
				-	団	-	-
1 +	121.0			-	╁┤	Limestone	
-			1	-	\Box	- 121.0-124.1' - Same as 116.0'-118.4'	-
-				121.65, 122.6' - Fracture, rough, stepped, half of fracture is not present	H	except many cavities up to 3/8" diameter or 9/16"x3/16", few fossil	-
-			>10	121.9' - Fracture, vertical and 5 deg, rough,	Ш	- molds with recrystalized surfaces	-
	D4C NO			stepped, fracture pair runs from121.65-122.6', half of fracture is crushed	$oldsymbol{arphi}$	-	-
	R16-NQ 5 ft	40	2	or not present	Ш	-	-
	62%			122.1, 122.25' - Fracture zone 123.2' - Mechanical break, rough, stepped,	団		-
			/	up to 1/2" gap	$\vdash\vdash\vdash$	No Recovery 124.1-126.0'	4
125			NR	123.5' - Mechanical break, horizontal, rough, stepped, tight up to 1/4" gap	口		D46: 0 minutes
-82.4			`	123.75' - Mechanical break, horizontal,	凵	_	R16: 8 minutes
	126.0			rough, up to 3/4" gap	H		
					Ш		1

APPENDIX 2BB-534 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-16	SHEET	8	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS : 1.6	ft bgs	on 6/	14/07 START : 4/23/2007 END : 4/	25/20	07 LOGGER : A. Erickson	
≥∩≘	(%)			DISCONTINUITIES	စ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B	SE RU GTH SOVE	D (%)	CTU	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	1BOL	WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEF SUF ELE	COF	RQ	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			>10	126.0-126.3' - Fracture zone		Limestone - 126.0-127.35' - moderate yellowish	
				126.5' - Fracture, horizontal, rough, undulating, up to 1/2" gaps	$oxed{\Box}$	brown, (10YR 5/4), fine grained,]
_			>10	126.85' - Mechanical break, 5 deg, rough,	Д	strong HCl reaction, extremely weak to very weak (R0 to R1), surface	
_	D47 NO			undulating, up to 1/2" gaps 127.0-127.35' - Fracture zone		voids (<1/16") up to 15%, many cavities up to 3/16"x3/8", little	-
-	R17-NQ 5 ft	0		-	上	 recrystallization 	-
-	27%		NR	-		No Recovery 127.35-131.0'	-
130				-		-	1
-87.4				_	ш	_	R17: 6 minutes
-	131.0			-	┢	<u> </u>	1
	· -		>10	131.0-132.3' - Fracture zone	\perp	Limestone - 131.0-134.3' - Same as]
				_	\perp	126.0'-127.35' except light olive gray,	
_			>10		\perp	(5Y 5/2), very weak to weak (R1 to R2), voids (<1/16") over 0-5% at	
_	R18-NQ			-	+	surface, few fossil molds, cavities up to 3/8"	-
_	5 ft	0		-	+	-	-
_	26%		NR	-	H	-	-
135				-	H	- No Recovery 134.3-136.0'	-
-92.4				_	F	-	R18: 9 minutes
	136.0			-	H	-	1
	·		>10	136.35' - Fracture, 30 deg, rough, stepped,	F	Limestone - 136.0-137.0' - yellowish gray to	
_			- 10	up to 1/4" gap	H	dusky yellow, (5Y 7/2 to 5Y 6/4),	_
_			>10	136.5' - Fracture, 80 deg, rough, undulating, up to 1/8" gap	H	fine to medium grained, strong HCl reaction, extremely weak (R0), 25%	-
_	R19-NQ		>10	136.6-136.85' - Fracture zone 136.85, 137.0' - Fracture, vertical, smooth,	F	surface voids (<1/16"), many cavities up to 1/4"x3/16", trace fossil casts	-
-	5 ft 50%	15	/10	undulating, half of fracture missing 137.0-137.46' - Fracture zone	Ħ	 137.0-138.5' - light olive gray, (5Y 5/2), fine grained, strong HCl 	-
-	JU /0			137.9' - Fracture, vertical, smooth,	片	reaction, weak (R2), 5% surface	
140			NR	undulating, 1/4" gap 138.0-138.1' - Fracture zone	1	 voids (<1/16"), many cavities up to 3/8"x9/16", moderately fossiliferous 	1
-97.4				138.2, 138.35' - Mechanical break, horizontal]	with molds and casts No Recovery 138.5-141.0'	R19: 8 minutes
	141.0				片	_]
4			>10	141.25-141.6' - Fracture zone	片	Limestone − 141.0-141.3' - yellowish gray, (5Y	4
-				141.85, 141.95, 142.05' - Mechanical break	片	7/2), fine grained, strong HCl reaction, weak (R2), 15% surface	-
-			>10	(3), horizontal and 15 deg, rough, undulating, tight up to 1/4" gap	片	 voids (<1/16"), many cavities and 	-
-	R20-NQ			141.9' - Fracture, 80 deg, rough, undulating, black, rock fragments on one half of fracture	廿	molds up to 3/16"x3/8" 141.3-143.35' - Same as	
-	5 ft 47%	7		142.0-142.25' - Fracture zone	片	 141.0'-141.3' except extremely weak to very weak (R0 to R1) 	
	,3			142.25, 142.4, 142.55, 142.8, 142.95' - Bedding plane (5), rough, undulating, up to	片	No Recovery 143.35-146.0'	1
145_			NR	1/2" gap	\vdash]
-102.4					片	<u>-</u>	R20: 8 minutes
	146.0				\vdash		
$\overline{}$					4		1



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-16	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

00111110	WETTIOD 7	10 L	2011 11	MENT . CIVIE 33 3/N 232343, Midd Totally, NQ tools, HW C	Jonig	1		ORIENTATION : Vertical
WATER	LEVELS: 1.6	ft bgs	s on 6	/14/07 START : 4/23/2007 END : 4/2	25/20	07	LOGGER : A. Erickson	
				DISCONTINUITIES			LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	Г	DOCK TYPE COLOR	
필시	R, A, U	(9	E L	DESCRIPTION	으		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
E ¥ ₹	E STE	(%) Q	J.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL		WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무공교	RNA	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Оωш	074	ď	ΗД	THIORNEGO, GOTH AGE GTAINING, AND HOTTINEGO	S	╙		
			0		Н	Ł	Limestone 146.0-148.0' - yellowish gray, (5Y	
			U			ſ	7/2), fine to medium grained, strong	
-					⊢	╁	HCI reaction, extremely weak to	1 1
-			1	147.2' - Fracture, 10 deg and 40 deg, rough, undulating, up to 1" gap	<u> </u>		weak (R0 to R2), 5-15% surface	-
-				1		1	voids (<1/16"), many cavities up to	-
I _	R21-NQ 5 ft	50	>10	148.0, 148.12, 148.25, 148.4, 148.5, 148.6' - Fracture, 5 deg, rough, undulating	H	Ł	3/16" 148.0-148.3' - Same as 146.0'-148.0'	_
	100%	30	- 10	148.75' - Mechanical break, rough,			except 25% surface voids (<1/16"),	
_				undulating, 1/8"-1/4" gaps	╙	Ł	many cavities up to 3/16"x3/8"	1
450			>10	148.9' - Fracture, 70 deg, rough, undulating,		1	148.3-151.0' - Same as 146.0'-148.0'	1 1
150_ -107.4				gray/black	┢	⊦		R21: 9 minutes
07.4			>10	148.75-149.3' - Fracture zone 149.5' - Fracture, horizontal and vertical,	Ľ	1		1 (2 1. 9 Hilliutes)
	151.0			rough, undulating, tight to 1/2" gap	Ш	L		
I -				149.65-150.5' - Fracture zone			Bottom of Boring at 151.0 ft bgs on	
I -					1	L	4/25/2007] 1
-				-	ł	F		1
-				-	ł	F		1 -
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-17	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLIN	G METH	<u>OD AND</u>	EQUIPM	ENT : CME 55 S/I	N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone b	oit		ORIENTATION : Vertical
WATER	LEVELS	: 2.5 ft b	gs on 3/2	8/07	TART : 3/28/2007 END : 4/4/2007 LOGG	ER:	: A.	Teal, R. McComb
				STANDARD	SOIL DESCRIPTION	Т	(P	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS		┑	SYMBOLIC LOG	
SEL		RECOVI		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	- 1	CIC	DEPTH OF CASING, DRILLING RATE,
FAC		RECOVI			MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	- 1	IBO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
E.S.E.			#TYPE	6"-6"-6" (N)	CONSISTENCT, SOIL STRUCTURE, WIINERALOGT	- 1	SYN	INSTRUMENTATION
42.2	0.0			(,	_ Topsoil		11/	
-	0.0		00.4	0-1-2	0.0-0.3' - brownish black, (5YR 2/1)	Ŧ		Drilling with 3-7/8" tri-cone bit
-		0.3	SS-1	(3)		4		- Stilling wat 6 the at some six
-	1.5					4		
l _						4		_
						J		
						1		Driller's Remark: Water encountered at
-						1		approximately 2.5' below ground surface
_						1		-
-						\exists		<u>-</u>
						+		-
5 37.2						4		<u> </u>
J7.2						4		Modium to books shotter at 5.5.0.0
_						4		Medium to heavy chatter at 5.5-6.0'
_	6.5							_
					Clayey Sand (SC)			
		0.6	SS-2	2-2-1 (3)	6.5-7.1' - light olive gray, (5Y 6/1), wet, very loose, very fine to fine silica sand, 40% medium to high	卍	7//	-
-	8.0			(3)	plastic fines, trace roots	/ 1		-
-	0.0					+		-
-						\exists		-
-						\exists		-
_						4		
10						4		
32.2						1		Moderate chatter at approximately 10'
						1		_
_						1		-
_						1		-
-	400					H		-
-	13.0				_ Limestone Fragments	+	\top	-
-			00.5	5-5-3	\ 13.0-13.3' - moderate vellowish brown to grayish	/扣	Ш	-
_		0.8	SS-3	(8)	orange, (10YR 5/4 to 10YR 7/4), strong HCl reaction	′/╬	щ	-
_	14.5				Silt (ML) 13.3-13.8' - grayish yellow, (5Y 8/4), wet, medium stiff,			
15					nonplastic, rapid dilatancy, strong HCl reaction, 10%			_
27.2					very fine sand-sized, carbonate			
						1		_
-						1		-
-						H		-
-						\exists		-
-						4		-
-						4		
_						1		_
						J		
]	19.5					1		
20							Ш	-
						7	ш	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-17	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 2.5 ft bg	gs on 3/28	3/07 S	START : 3/28/2007 END : 4/4/2007 LOGGER : A. Teal, R. McComb
>00				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE INTERVAL (ft) PENETRATION TEST RESULTS				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY BOTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
TH BE		RECOVE	OVERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
DEP SURI ELE\			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
22.2		1.2	SS-4	12-11-6 (17)	Silt (ML) 19.5-20.7' - yellowish gray, (5Y 7/2), wet, very stiff,
_	21.0			(11)	nonplastic, very rapid dilatancy, moderate to strong
_					HCl reaction, 10% very fine to medium sand-sized,
_					
-					-
-					
-					†
]
25					<u> </u>
17.2					
-	26.0				Silt With Sand (ML)
-		0.4	SS-5	10-3-2	26.0-26.4' - yellowish gray, (5Y 7/2), wet, medium stiff, nonplastic, rapid dilatancy, moderate HCl reaction,
-	27.5	0.1		(5)	\ 20% very fine to medium sand-sized, coarse \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-	27.0				gravel-sized limestone fragments, all carbonate -
]
_					
-					
30 <u> </u>					
-					
-					-
-					1
	32.5				1
_		1.3	SS-6	17-18-50/4	Sandy Silt (ML) 32.5-33.75' - dark yellowish orange, (10YR 6/6), moist
-	33.8	1.3	33-0	(68/10")	to wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 25-30% fine to coarse
-	00.0				sand-sized, all carbonate
35					Begin Rock Coring at 34.5 ft bgs
7.2					See the next sheet for the rock core log
]
]
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-					1
40					



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-17

SHEET 3 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

CORING	IVIL IT IOD AI	ND EC	ZUIFIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW ca	asing		ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bg	s on 3/	/28/07 START : 3/28/2007 END : 4/4	1/200	7 LOGGER : A. Teal, R. McComb	
				DISCONTINUITIES	رم د	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
김징급	SHR	æ	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	bitor 3, 1231 itesder3, 216.
35_ 7.2 -	34.5 R1-NQ 2 ft 10% 36.5	0	0 NR			Limestone 34.5-34.7' - light olive gray, (5Y 5/2), fine grained, medium strong (R3), moderate HCl reaction on scratched/pulverized sample, no to very mild HCl reaction on fresh	Begin rock coring 3/28/07 at 16:14 at depth of 34.5' — Driller's Remark: Hard material, loud chatter R1: 18 minutes
-			6	36.65' - Fracture, 50 deg, rough, undulating, fairly tight 36.7' - Fracture, 10 deg, rough, undulating,		surface, 10-15% coverage of voids - 1/16" or less on matrix, some casts/molds (poorly fossiliferous)	Very hard material, set
_			3	tight	H	No Recovery 34.7-36.5' Limestone	casing to 37.5'
-	R2-NQ			36.75' - Fracture, 60 deg, rough, planar, tight 36.8' - Fracture, 75 deg, rough, undulating, open		36.5-40.5' - pale yellowish brown, (10YR 6/2), fine to medium grained, very weak to weak (R1 to R2), mild	-
-	5 ft 80%	40	4	37.0' - Fracture, 10 deg, rough, undulating, tight		HCL reaction on clean surface, moderate to fast HCl reaction on	-
40 2.2			2	37.4' - Mechanical break 37.7, 37.9, 38.4, 38.6, 38.8' - Fractures (5), 10-45 deg, rough, undulating, open	H	— pulverized sample, 10-15% coverage of voids 1/16" or less, cavities are	
_			NR	38.8-39' - crushed section, possibly due to drilling		elongate and ovate with some up to 3/4" x 3/8", fossiliferous (casts and	R2: Run time not recorded
-	41.5			39.2, 39.65, 40.25' - Fractures (3), 20-40 deg, rough, undulating, open		molds) No Recovery 40.5-46.5'	-
-				_	Ш	-	-
-				-	Ш	_	-
-	R3-NQ			-	Ш	-	-
-	5 ft 0%	0	NR	-	Ш	-	-
45	. 0/0			-	Ш	_	-
-2.8	-			_	Ш	_	_
_				_	Ш	_	R3: 2 minutes
_	46.5			-	H	_ Limestone	-
-	_		4	46.65' - Fracture, 40 deg, rough, stepped, tight	H	 46.5-49.35' - pale yellowish brown, 	-
-				46.82' - Fracture, <5 deg, rough, undulating, -tight	H	_ (10YR 6/2), fine grained, mild HCl reaction, very weak (R1), 15-20%	-
-			3	46.92' - Fracture, <5 deg, rough, stepped,	H	 coverage of voids 1/16" or less, 5-10% organic material appears as 	-
-	R4-NQ		3	tight - 47.12' - Fracture, 10 deg, rough, stepped,	H	thin black lines up to 1/32" thick, trace fossil casts/molds, cavities	-
	5 ft 57%	0	\vdash	tight 47.6' - Fracture, <5 deg, rough, stepped,	H	(generally subspherical 3/8" in diameter) over 1-2%	
50 <u> </u>	-		NID.	open 47.92' - Fracture, <5 deg, rough, undulating,		— No Recovery 49.35-51.5'	_
-			NR	tight - 48.4, 48.58' - Fractures (2), 10 deg, rough, stepped, open -	H	-	R4: 2 minutes
-	51.5			48.72' - Fracture, <5 deg, rough, stepped,	Щ	-	-
-			2	tight 48.9' - Fracture, <5 deg, rough, stepped,		_	-
-]		3	open 51.6' - Fracture, 10 deg, rough, undulating, open, 50% coverage for clay infilling	H	-	-
-	DE NO		<u> </u>	52.1, 53.2, 53.3' - Fractures (3), 20-50 deg.	H	-	-
-	R5-NQ - 5 ft 95%	85	0	rough, undulating, open 53.6' - Fracture, <5 deg, rough, undulating,		-	-
-	3370			open			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-17	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

CONING	INLTHOU A	ND L	ZOIFIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	asiriy		ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bg	s on 3	/28/07 START : 3/28/2007 END : 4/	4/200	7 LOGGER : A. Teal, R. McComb	
	_			DISCONTINUITIES	l	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG		_
O A	Z, Z, Z	_	FRACTURES PER FOOT	DESCRIPTION	길	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A TIC	SE 토팅	(%) Q	[⊉8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FR	885	αD	AC R	PLANARITÝ, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
BSH	용별뿐	Ä	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROFS, TEST RESOLTS, ETC.
55						Limestone	
-12.8			0	_	╁	 51.5-56.25' - pale yellowish brown, 	_
12.0					╨	(10YR 6/2), fine grained, mild HCl	l
			1 1	55.7' - Fracture, 60 deg, rough, planar, very		reaction, alternating zones of (R0) extremely weak rock material	R5: 2 minutes
1 7	56.5			tight	ЪН	especially from 54.0-55.5' to (R3)	1
-	30.3		NR		++	medium strong rock, 10-15%	1
-			lo		$-\Box$	 coverage of voids 1/16" or less, 	-
					\perp	cavities common up to 1" x 3", poorly	
					Н	fossiliferous (casts and molds),	1
-			2	57.8' - Fracture, vertical, rough, planar, 15%	\pm	occasional thin black organic	1
-	50.110			coverage black staining, fracture trace from 57.0-58.35'	-	laminae No Recovery 56.25-56.5'	-
	R6-NQ 5 ft	85	1	58.3' - Fracture, 60 deg, rough, undulating,	\mathbb{H}	Limestone]
	100%	00		very tight	Ш	56.5-61.5' - pale yellowish brown,	SC-1 collected at 59.0-
60	,			59.0' - Fracture, 10 deg, smooth, stepped,	\Box	(10YR 6/2), fine grained, very weak	59.9'
-17.8			1	tight	╀┤	to weak (R1 to R2), 10-15%	Note: Core box indicates special core collected from
17.0				59.9' - Fracture, 15 deg, smooth, undulating,	Ш	coverage of voids 1/16" or less, few	60.0-60.9', it also appears
				tight	H	cavities, HCl reaction changes with hardness (harder material less	that up to 0.5 of core is
1 7	61 5		1		+	reactive), sparsely fossiliferous casts	missing from box
-	61.5			61.3' - Fracture, 20 deg, rough, undulating,	Ш	and molds, occasional thin black	R6: 4 minutes -
-			1 1	open	\perp	_ organic laminae	1
				62.1' - Fracture, 10 deg, rough, undulating,	\vdash	61.5-62.3' - pale yellowish brown,	
				open		(10YR 6/2), fine grained, mild HCl	1
-			1		+	reaction, very weak (R1), 20-30% coverage of voids 1/16" or less on	1
-	D7.NO			63.2' - Fracture, 10 deg, smooth, undulating,	╀┤	surface, cavities over 5-10% surface	-
	R7-NQ 5 ft	87	3	tight 63.55, 64.1' - Fractures (2), 20 deg, rough,		up to 3/8" in diameter, irregularly	
	98%	01		undulating, tight	Н	shaped, some cavities up to 3/8"-3/4"	
				64.45, 65.0' - Fractures (2), 10-25 deg,	┰	in length, trace cavity infilling, trace	1
65 <u> </u>			2	smooth, undulating, tight —	$-\Box$	fossil molds/casts 62.3-63.15' - Same as 61.5-62.3'	I
-22.0				65.2' - Fracture, 15 deg, rough, undulating,	\perp	except absent to rare cavities, <5%	<u> </u>
			2	black carbonaceous coating over 30% of		coverage of small (<1/16") voids	R7: 3 minutes
	66 F		-	surface, open		63.15-65.35' - Same as 61.5-62.3'	1
-	66.5		NR	65.8' - Fracture, 25 deg, rough, undulating, open	╂┼┤	 except interval at 65.05-65.25' which 	-
-			1	66.2' - Fracture, 85 deg, rough, planar, very	++	is very fine grained (chalk like), very	-
			L l	tight, incipient "hair line" fracture from	Ш	weak (R1), with mild HCl reaction and <1% voids/cavities, incipient	
1 7				65.85-66.4'	\mathbb{H}	fracture traces from 65.05 to 66.4	1
-			1	67.4' - Fracture, horizontal, smooth, planar,	1	65.35-66.4' - yellowish gray to light	1 1
-	D0 N0		\vdash	very tight 67.9' - Fracture, 5 deg, smooth, undulating,	\blacksquare	 olive gray, (5Y 7/2 to 5Y 5/2), fine 	1 -
	R8-NQ 5 ft	100	7	tight	H	grained, mild HCl reaction, weak]
	100%	100	'	68.65, 69.9' - Fractures (2), 15-20 deg,	Ш	(R2), some very thin, black	
70	,			rough, undulating, tight	Ш	 carbonaceous/organic laminae, trace coverage of voids 1/16" or less on 	1
-27.8			1	_	+	surface, becoming more common	-
						(up to 10%) with depth, cavities	1
			ا م	70.7, 71.2' - Fractures (2), 50 deg, rough,	Ш	generally <3/8" in diameter	R8: 5 minutes
	71.5		2	planar, tight	\vdash	No Recovery 66.4-66.5'	1
-	11.0			· · ·	\Box	Limestone 66.5-67.4' - Same as 65.35-66.4'	-
-			0		П	except strong HCl reaction,	1 -
					\mathbb{H}	interbedding of light olive gray, very	1
1 7				72.5-72.6' - solution cavity	\vdash	fine grained material that is harder	1
-			4	72.75' - Fracture, 15 deg, smooth, undulating,	Ш	than matrix, thin beds up to 1/2"	-
-	B0 110		<u> </u>	open	+	thick, some cavity infilling, possible	1 -
	R9-NQ 5 ft	83	1	72.76-72.8' - limestone fragments 73.25' - Fracture, 20 deg, rough, undulating,	┟┼┤	bioturbation	
	90%	00		open	Ш		1
				•	1	-	1
			L		1		ı



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-17	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical												
WATER	LEVELS : 2.5	ft bgs	s on 3/	28/07 START: 3/28/2007 END: 4/-	1/200	7 LOGGER : A. Teal, R. McComb						
≩Q⊋	(%			DISCONTINUITIES	- PO	LITHOLOGY	COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LC	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.					
75_ -32.8			1	73.6, 74.8' - Fractures (2), 5-10 deg, smooth, undulating, open	H	Limestone — 67.4-69.4' - grayish orange, (10YR 7/4), very fine grained, extremely	_					
			0		口	weak to very weak (R0 to R1), trace voids and cavities but increasing	R9: 6 minutes					
-	76.5		NR >10	76.5-77.9' - Fracture zone, limestone fragments from gravel to cobble sized		below 69.0', thinly laminated with wispy, black, carbonaceous material at top of interval, fossils rare to	Stop drilling for day, - 3/29/07 at 10:29					
-			>10			absent 69.4-71.5' - Same as 65.35-66.4' except coverage of voids/cavities	Resume drilling 4/3/07 at 09:54					
- -	R10-NQ 5 ft 62%	10	>10	78.2, 78.45, 78.6' - Fractures (3), 20-30 deg, rough, undulating, open 79.1-79.6' - Fracture zone, limestone fragments from gravel to cobble size		10-15% 71.5-72.5' - Same as 67.4-71.5' - except rounded to irregularly shaped limestone clasts in a dark yellowish brown (10YR 4/2) limestone matrix,	- - -					
80 -37.8 -			NR			very fine grained, 50-60% coverage of voids 1/16" or less 72.5-75.0' - pale yellowish brown with yellowish gray mottling, (10YR 6/2 and 5Y 7/2), fine grained, mild HCl	R10: 3 minutes -					
- -	81.5		>10	81.5-82.0' - Fracture zone, limestone fragments from gravel to cobble size 82.2' - Fracture, vertical, rough, planar, tight		reaction, very weak to weak (R1 to R2), trace fossils, some irregularly shaped limestone (clast-like)	-					
_			1	(incipient) 82.4, 82.95' - Fractures (2), 15 deg, rough, undulating, tight		features with 1-3% coverage of voids 1/16" or less on surface, remainder of limestone essentially void free,	-					
-	R11-NC 5 ft 84%	68	58 1	83.6' - Fracture, 10 deg, rough, undulating, open	H	occasionally thinly laminated with trace black organic material 75.0-76.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very	=					
85 <u>-</u> -42.8				0	_	Ħ	weak (R1), 1-2% coverage of voids 1/16" or less, occasionally thinly	_				
_	86.5	1 NR		85.6' - Fracture, 30 deg, rough, undulating, open		laminated with white, discontinuous limestone, some intraclasts/cavity infilling, core surface irregular/indented	R11: 5 minutes					
-			2	86.6' - Fracture, vertical, rough, planar, open 86.7' - Fracture, 25 deg, rough, undulating, open	H	No Recovery 76.0-76.5' Limestone 76.5-79.6' - mild HCl reaction, very	SC-2 collected at 86.7- 87.65'					
-			1	87.7' - Fracture, 10 deg, rough, undulating, tight		weak (R1), highly fossiliferous, 50-60% coverage of voids 1/16" or less (highly variable through sample),	_ _					
-	R12-NQ 5 ft 84%	60	1	89.0' - Fracture, 60 deg, rough, undulating,	Ħ	many cavities up to 3/8", 10-15% coverage of black organics, elongated cavity 1" wide by 1.5" long	_					
90 <u> </u>			>10	89.75-90.7' - Fracture zone, limestone fragments from gravel to cobble size, some black carbonaceous coating on partings	Ē	by 0.5" deep at 78.2-78.35' infilled with dark yellowish brown material in a radiating horizontal pattern, non						
-	91.5		NR	-	H	calcareous, trace charcoal gray material at 79.0-79.5' No Recovery 79.6-81.5'	R12: 7 minutes –					
-			>10	91.5-92.7' - Fracture zone, rough, stepped to undulating, various angles, tight to open		Limestone 81.5-83.4' - yellowish gray mottled, (5Y 7/2 and 5Y 8/1), fine grained,	-					
-			4	93.15' - Fracture, 70 deg, rough, undulating,	Ē	mild HCl reaction, very weak to weak (R1 to R2), 35-40% coverage of voids 1/16" or less on surface,						
_	R13-NQ 5 ft 90%	6	6	tight 93.3' - Fracture, horizontal, rough, undulating, 1/16" open		cavities up to 1 3/16"- 1 9/16" by 3/8"-3/4" (especially near base of interval), trace fossils (casts/molds)	_					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-17	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	NETHOD A	ND EC	עורוטג	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft ba	s on 3	/28/07 START : 3/28/2007 END : 4/	4/200	7 LOGGER : A. Teal, R. McComb	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			<u> </u>	LOG	277102001	COMMENTO
N S S	z'Ā'≿		FRACTURES PER FOOT	DESCRIPTION	5	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표일은	S-F	Q D (%)	50	DEDTH TYPE OPICHTATION POLICHNESS	SYMBOLIC	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₽¥	# <u>p</u> 50	۵	ρž	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	Æ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S. O	장님	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ξ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ПОП	014	ш.	шш		0,		
95			ا ا	93.55' - Fracture, horizontal, rough,	\vdash	Limestone	
-52.8			3	undulating, brown clay coating over 20-30%, —	h	+ 83.4-83.7' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction,	
-			-	open 93.8' - Fracture, horizontal, smooth, planar,		very weak (R1), thinly laminated,	R13: 7 minutes
			1	tight, (clay contact)	Щ	- black carbonaceous laminae present,	R. McComb logged -
	96.5		NR	93.97' - Fracture, horizontal, smooth, planar,	\vdash	some voids (<1%) at top of interval,	discontinuities for R13
1 -	30.5			horizontal, tight		friable	discontinuities for 1015
			>10	94.25, 94.37' - Fractures (2), horizontal,	\bot	- 83.7-85.7' - Same as 81.5-83.4'	
			10	rough, undulating, 1 3/16"-1 9/16" open		except circular to subcircular cavities	
-				94.50-94.60' - Fracture zone, rough, multiple	ш	common (3/8" or less in diameter),	1
_			4	orientation	╁┯	- some cavity infilling	-
				94.9' - Fracture, horizontal, rough, undulating,	H	No Recovery 85.7-86.5'	
	R14-NQ			up to 1/16" open	LП	Limestone	1
-	5 ft	42	10	95.25' - Fracture, 0-70 deg, rough,	⊏	- 86.5-90.7' - Same as 81.3-83.4'	SC-3 collected at 98.7-
	70%			undulating, open	\vdash	except voids and cavities up to 10%	99.6'
100			5	95.5' - Fracture zone, 80 deg, rough, planar	\vdash	coverage from 87.65-89.0' increasing]
-57.8			Ė	to undulating, several en echelon fracture	1	to 20-30% coverage below 89.0',	-
] ",","				planes	\Box	black carbonaceous coating on	
			NR	96.0' - Fracture, 50 deg, rough, undulating		bedding plane at 90.5'	R14: 6 minutes
-				96.5-97.0' - Fracture zone, low to high angle,	₩	No Recovery 90.7-91.5'	Driller's Remark: Lost
_	101.5			rough, stepped to undulating, tight to open 97.4-97.7' - Fracture zone, high angle, criss	┢┯	91.5-92.0' - Same as 81.5-83.4'	circulation at about 101.0'
			۱ ا	cross fractures intersecting at 45 degrees,		_ 92.0-93.0' - yellowish gray, (5Y 8/1),	
I -			10	rough, planar, tight		very fine grained, strong HCl	1
-				97.85' - Fracture, 40 deg, rough, stepped,	-	reaction, medium strong (R3),	-
			>10	tight	Н	_ moderately fossiliferous, trace	
			-10	98.0' - Fracture, 15 deg, rough, undulating,	Н	coverage of voids 1/16" or less on	
-	R15-NQ		0	open		surface, trace cavities	-
	5 ft	20	۳	98.1' - Fracture, 45 deg, rough, planar, tight		93.0-93.6' - yellowish gray, (5Y 7/2),	
	46%			98.7' - Fracture, 20 deg, rough, undulating,	\vdash	fine grained, very weak (R1), cavities	Driller's Remark: Regained
40-				open	╁	numerous at contact of overlying	circulation at about 104.0'
105 <u> </u>			l ND	99.6-100.1' - Fracture zone, various angles, _	łП	interval, 1-2% coverage of voids	_
-02.0			NR	rough, stepped to undulating, tight to open		1/16" or less on surface	
				101.6' - Fracture, 10 deg, smooth, undulating, open, possible mechanical break	\vdash	Lignite	R15: 4 minutes
-				101.7' - Fracture, 15 deg, smooth, undulating,	+	_ 93.6-94.1' - no HCl reaction, laminar	-
	106.5			open	Ľ	bedding	
			ا مد . ا	102 3 103 2' Fracture zone predominately	Ш	Limestone	
1 7			>10	horizontal to <5 deg, stepped to undulating,	1-	 94.1-95.2' - medium grained, mild HCl reaction, extremely weak to very 	1
-			-	open, coarse gravel size rock fragments	╀	weak (R0 to R1)	-
			1	106.5-107.2' - Fracture zone, predominately	\Box	= 95.2-96.0' - yellowish gray, (5Y 7/2),	
1 7			'	horizontal to <5 deg, stepped to undulating,		moderate HCl reaction, very weak to	1
-	R16-NQ			open, coarse gravel size rock fragments	ш	weak (R1 to R2), thinly laminated	
	5 ft	40	1	107.2, 107.35' - Fractures (2), <5 deg, rough,	\vdash	with white HCl reactive limestone,	
	90%	70	'	stepped, open		fossiliferous (molds/casts), 10-15%	
 	00,0			107.43, 107.57' - Fractures (2), <5 deg,	\Box	coverage of voids on surface, trace	R16: 4 minutes
110_			>10	rough, undulating, open	+	cavities (3/8" or less in diameter)	_
-67.8				109.4' - Fracture, 30 deg, rough, undulating, tight	\vdash	No Recovery 96.0-96.5'	
I 7			>10		\vdash	Limestone	1
-				gravel size, angular to subangular		_ 96.5-100.0' - Same as 92.0-93.0'	-
	111.5		NR	gravor oizo, arigaiar to subarigaiar	Ш	except becoming pale yellowish	
]				111.5-111.85' - Fracture zone, limestone		brown (10YR 6/2) with depth, fossiliferous, with gastropods	1
-			>10		╀	common (elongated spiral	-
				112.0' - Fracture, 50 deg, rough, planar, tight	\vdash	individuals), intermittently	
			.	112.7-113.8' - Fractures (2), 30 deg, rough,		interbedded with medium grained	SC-4 collected at 112.7-
-			1	undulating, tight	仜	limestone with 15-20% coverage of	113.8'
-	_		L	andalating, tight	1	1/16" or less voids on surface	110.0
	R17-NQ				\vdash	No Recovery 100.0-101.5'	
1 7	5 ft 100%	78	1		1 op		1
-	100 /6		\vdash			_	1
					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-17 SHEET 7 OF 9

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.5	ft bgs	s on 3/	28/07 START: 3/28/2007 END: 4/	4/200	7 LOGGER : A. Teal, R. McComb	
≩Q⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
115 -72.8 -	116.5		3	114.75' - Fracture, 65 deg, rough, planar, tight 115.4' - Fracture, 25 deg, rough, undulating, open 115.6' - Fracture, 30 deg, rough, stepped, (bidirectional), open		Limestone 101.5-103.8' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), 10-15% coverage of voids 1/16" or less on surface, cavities 3/8"-3/4" in length	R17: 4 minutes
- - -			2	116.0' - Fracture, 30 deg, rough, undulating, open 116.25' - Fracture, vertical, smooth, planar, tight, secondary fracture at 90 degrees to above fracture		 (elongated), fossiliferous (casts/molds) No Recovery 103.8-106.5' Limestone 106.5-111.0' - Same as 101.5-103.8' 	
- 120 -77.8	R18-NQ 5 ft 96%	85	2	117.5' - Fracture, 20 deg, rough, undulating, tight 117.9' - Mechanical break 118.75' - Fracture, 10 deg, rough, undulating, tight, organic infilling (lignite) 119.1, 119.35' - Fractures (2), 10 deg and 15 deg, rough, undulating, tight		except very weak (R1), 20-25% coverage of small cavities, fewer fossils, very friable No Recovery 111.0-111.5' Limestone 111.5-116.5' - yellowish gray, (5Y	- -
- -	121.5		2 NR >10	120.1' - Fracture, 10 deg, smooth, undulating, open 120.5' - Fracture, 20 deg, rough, undulating, tight		 7/2), fine grained, mild HCl reaction, weak (R2), no apparent bedding, 15-25% coverage of voids 1/16" or less, many cavities up to 3/8", trace very fine grained lenses, less 	R18: 3 minutes
- -	R19-NQ		0	121.0' - Fracture, 30 deg, rough, undulating, open 121.2' - Fracture, 10 deg, smooth, undulating, open 121.5-121.7' - Fracture zone, horizontal,		fossiliferous 116.5-121.3' - Same as 111.5-116.5' except mild to moderate HCl reaction, except many cavities 1"-2", fossiliferous (molds and casts),	
- 125 -82.8	5 ft 91%	67	10	rough, planar to undulating, open 121.9' - Fracture, 40 deg, rough, planar, open 124.3' - Fracture, vertical, smooth, planar, tight 124.35-124.65' - Fracture zone, inclined to near vertical, rough, stepped to undulating,		intervals of very weak (R1) limestone with few voids/cavities with up to 1/8" thick wavy laminations No Recovery 121.3-121.5' Limestone 121.5-126.05' - yellowish gray, (5Y	-
- - -	126.5		2 NR 1	tight, several fracture planes 124.65-124.72' - Fracture zone, rough, planar, gravel size limestone fragments bounded by horizontal open bedding planes 124.92' - Fracture, <5 deg, smooth,		7/2), fine grained, medium strong to strong (R3 to R4), 15-20% coverage of voids 1/16" or less, few cavities to 1/4", fossiliferous (molds/casts of echinoids/gastropods), intervals of	R19: 6 minutes
-	R20-NQ		1	undulating, open 125.85' - Fracture, 60 deg, rough, undulating, extends from 125.7-126.05', tight, secondary fracture off main fracture also at high angles 127.0' - Fracture, 75 deg, rough, undulating,		 dusky yellow green (5GY 5/2), very fine grained limestone with strong HCl reaction at 121.7-122.3', 124.6-125.1' and 126.0-126.05' No Recovery 126.05-126.5' 	
- 130 -87.8	5 ft 95%	68	4	tight, extends from 126.5-127.3' 128.1' - Fracture, 60 deg, smooth, planar, tight 128.8' - Fracture, 15 deg, rough, undulating, open		Limestone 126.5-131.25' - Same as 111.5-116.5' except weak to medium strong (R2 to R3), with medium strong to strong (R3 to R4) interval at	_
- -	131.5		2 NR 0	129.0' - Fracture, 85 deg, rough, planar, silty sand infilling 129.2' - Fracture, <5 deg, rough, undulating, open 129.9' - Fracture, 10 deg, rough, undulating,		130.0-130.4' No Recovery 131.25-131.5' Limestone 131.5-133.2' - Same as	R20: 5 minutes
- -	D04 NO		>10	open 130.0, 130.2, 130.3' - Fractures (3), 20 deg, smooth, undulating, tight 130.6' - Fracture, 35 deg, rough, undulating,		131.5-133.2 - Same as _ 126.5-131.25' -	
<u>-</u>	R21-NQ 5 ft 90%	48	2	tight 130.85' - Fracture, 30 deg, rough, undulating, open		-	
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-17	SHEET	8	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.5	ft bas	s on 3	/28/07 START : 3/28/2007 END : 4/4	4/200	17 LOGGER : A. Teal, R. McComb	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
135_ -92.8 -	136.5		>10 0 NR	132.8-133.2' - Fracture zone, 0-90 deg, rough to smooth, planar to undulating/stepped 133.45, 133.75, 134.3' - Fractures (3), 15-20 deg, smooth, planar, tight 134.3-135.2' - Fracture zone, 0-90 deg, rough to smooth, planar to undulating/stepped,		Limestone	R21: 4 minutes
-			2	multiple high angle fracture planes 136.6' - Fracture, <5-90 deg, rough, stepped, open 137.3' - Fracture, 20 deg, smooth, planar, very tight -		on surface, fossil molds/casts trace to absent 135.25-136.0' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl reaction, very weak (R1), 3-5%	-
- -	R22-NQ 5 ft 62%	25	>10	137.85' - Fracture, 30 deg, rough, undulating, open 138.0' - Fracture, 70 deg, rough, undulating, tight 138.37' - Fracture, <5 deg, rough, stepped,		coverage of voids 1/16" or less on surface, cavities (up to 3/8") common No Recovery 136.0-136.5' Limestone 136.5-138.35' - yellowish gray, (5Y	- - -
140 -97.8 -	141.5		NR	tight 138.5' - Fracture, 0-60 deg, rough, stepped, tight 138.8-139.0' - Fracture zone, 0-90 deg, smooth, stepped		7/2), moderate HCl reaction, weak (R2), 10-15% coverage of voids 1/16" or less distributed unevenly across core surface, cavities common (3/8" or less), poorly	R22: 12 minutes -
- - -			>10	139.3' - Fracture, 0-70 deg, rough, stepped, open 139.3-139.6' - Fracture zone, 0-90 deg, smooth, stepped 141.5-142' - Fracture zone, 0-90 deg, rough, stepped to undulating, open		fossiliferous (molds/casts) 138.35-138.8' - Same as 135.25-136.0' 138.8-139.0' - yellowish gray to light gray, (5Y 7/2 to N7), very fine grained, moderate HCl reaction,	SC-5 collected at 142.0- 142.85 -
- 145_ -102.8	R23-NQ 5 ft 82%	45	10	142.85' - Fracture, 20 deg, rough, undulating, tight 143.1, 143.25, 143.4' - Fractures (3), 60 deg, smooth, planar, very tight 143.5' - Fracture, 60 deg, rough, stepped, bidirectional, open 143.6' - Fracture, 60 deg, rough, stepped,		medium strong (R3), trace coverage of voids 1/16" or less, 1 cavity (3/8"), possible limestone intraclasts, fossils absent 139.0-139.6' - yellowish gray, (5Y 7/2), moderate to strong HCl reaction, very weak to weak (R1 to	
_	146.5		NR	(bidirectional-partial removal of rock core interval), open 143.75' - Fracture, 20 deg, smooth, undulating, tight		R2), 3-5% coverage of voids 1/16" or less on surface, cavities common up to 3/8"-3/4" No Recovery 139.6-141.5'	
-			3	143.95' - Fracture, 40 deg, smooth, planar, open - 144.0-144.3' - Fracture zone, 0-50 deg, rough to smooth, planar to stepped		Limestone - 141.5-143.7' - grayish yellow to pale yellowish brown, (10YR 7/4 to 10YR 6/2), very fine grained, mild to	- - -
-	R24-NQ 5 ft 100%	87	3	144.85' - Fracture, <5 deg, rough, undulating, open 145.3' - Fracture, 30 deg, rough, undulating, open		 moderate HCl reaction, strong to very strong (R4 to R5) from 142.75-143.0', becoming less strong below 143.0', 1-2% coverage of voids 	- - -
150 -107.8 -			2	147.65' - Fracture, 60 deg, rough, planar, — open 147.9' - Fracture, 50 deg, rough, undulating, open		1/16" or less, trace cavities (<3/16"), fossils trace to absent 143.7-144.0' - variegated moderate yellowish brown to pale yellowish	R24: 8 minutes
- - - -	151.5			148.0' - Fracture, horizontal, rough, planar, tight 148.5, 148.55, 149.45' - Fractures (3), 5-10 deg, rough, undulating, tight 149.8' - Fracture, 30 deg, smooth, undulating, tight 150.0 , 150.6' - Fractures (2), 15 deg and 30 deg, rough, undulating, open 151.05' - Fracture, 20 deg, smooth, undulating, tight		brown, (10YR 5/4 to 10YR 6/2), fine to medium grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), thinly laminated, possible intraclasts 1/16" in diameter (light gray), cavities/voids trace to absent, fossils trace to absent, possible carbonaceous/organic material on thin laminae	Drilling ended 16:04 on 4/3/07 at 151.5'

APPENDIX 2BB-544 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-17	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	ORIENTATION : Vertical						
WATER	LEVELS: 2.5	ft bgs	s on 3/	/28/07 START : 3/28/2007 END : 4/4	1/200	7 LOGGER : A. Teal, R. McComb	
$\begin{bmatrix} 1 \end{bmatrix}$	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TVDE OOLOD	
D A A	Ã,₹Ş.	<u></u>	꼾드	DESCRIPTION	<u> </u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H S E	E E	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING HARDNESS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
[변주년]	N.S.	Ø	%AC ER I	PLANARITY, INFILLING MATERIAL AND	WE	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
SE	2 2 2	22	F 9	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
						144.0-144.25' - Same as	
-					ı	141.5-143.7' except very weak to	
				-	l	weak (R1 to R2)	-
				_		144.25-145.6' - Same as - 135.25-136.0'	_
						No Recovery 145.6-146.5'	
1 -				-	1	Limestone	-
-				-	ł	 146.5-151.5' - yellowish gray, (5Y 	_
				_		7/2), mild HCl reaction, weak to	_
						medium strong (R2 to R3), 3-5%	
				-	1	 coverage of voids 1/16" or less on surface, some cavities up to 1/8", 	-
-				-	ł	poorly fossiliferous (molds/casts)	-
1 4				-	l l	- Bottom of Boring at 151.5 ft bgs on	-
						4/3/2007	
1 7				_			_
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PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-18	SHEET 1 OF 8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.4 ft b	gs on 4/22	2/07	START : 4/19/2007	END : 4/23/2007	LOGGE	R : N.	Jarzyniecki
				STANDARD		SOIL DESCRIPTION		υ	COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 1111		21.00	J.	DEDT. LOE 040040 DDW 440 DATE
ACE AT S		RECOVE	ERY (ft)		MOISTURE (E, USCS GROUP SYMBOL, CO CONTENT, RELATIVE DENSI	JLOR, TY OR	Š	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MINER		SYMBOLIC LOG	INSTRUMENTATION
<u> 42.0</u>	0.0			(N)	Poorly Graded	Sand With Organics (SP)		0)	14:49 Begin drilling, SPT sample, sand is
-	0.0	1.0	SS-1	1-1-1	0.0-1.0' - olive g	ray, (5Y 3/2), moist, very loc	ose, very	-	silica -
-		1.0	30-1	(2)	organics decrea	a sand, trace nonplastic fines asing with depth	s, 20% /	+	-
-	1.5				\			┨	-
-								1	-
-								1	-
-								1	-
-								1	-
-								1	-
5	5.0							1	-
37.0	0.0				Clayey Sand (So	C)		///	_
-		1.2	SS-2	1-2-1 (3)	5.0-6.2' - pale bl	lue to grayish blue, (5BP 7/2 ht olive brown (5y 5/6), wet,	to 5BP soft		1
-	6.5			(3)	medium plasticit	ty, no dilatancy, 66% fine sili	ica sand	* ///	-
-								1	1
_								1	1
_									
l _								_	_
l _								_	_
10	10.0							1	_
32.0				7-4-3	Limestone Frag	gments ky yellow, (5Y 6/4), moderat	e HCl /	卄	_
_		0.8	SS-3	(7)	¬ \reaction			╂	-
-	11.5				Silt (ML) 10.4-10.8' - grav	yish yellow, (5Y 8/4), wet, firr	m.	4	-
-					nonplastic, rapid	d dilatancy, moderate to stro	ng HCl /	4	-
-					reaction, 10 % v	very fine to medium sand, ca	irbonate	-	-
-								-	-
-								-	-
-								1	-
- ₋ -								┨	-
15 <u> </u>	15.0				Silt With Sand A	And Limestone Fragments	(ML)	╁	-
-		1.3	SS-4	26-29-36	15.0-16.3' - Sam	ne as 10.5-11.5' except 20% ed, 10-15% coarse sand-siz	fine to	1	-
-	16.5	1.0	00 4	(65)		estone fragments at top of s		1111	-
-	10.5							1	-
-								1	-
-								1	-
-								1	1
_								1	
-								1	1
20								1	1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-18	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.4 ft bo	gs on 4/22	2/07 5	START : 4/19/2007	END : 4/23/2007	LOGGER	: N.	Jarzyniecki
				STANDARD		SOIL DESCRIPTION		Ö	COMMENTS
A PO (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 1111		0.5	C LO	
ACE AT S		RECOVE	ERY (ft)		MOISTURE C	USCS GROUP SYMBOL, COL CONTENT, RELATIVE DENSITY	′ OR	SOLIG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MINERA	LOGY	SYMBOLIC LOG	INSTRUMENTATION
22.0	20.0			(,	Sandy Silt (ML)			Π	
-		1.2	SS-5	31-14-12 (26)	20.0-21.2' - Same orange (10Y 7/4)	e as 15.5-16.5' except grayish), wet, very stiff, nonplastic, ra	n – apid		-
_	21.5			(20)	dilatancy, modera	ate HCl reaction, 35-40% fine	to _	Ш	_
_					coarse sand		/ -	1	_
							_		
_							_		_
_							_		_
_							_		_
-							_		-
25 17.0	25.0				Sandy Silt With L	Limestone Fragments (ML)		Ш	_
-		1.0	SS-6	2-3-2	25.0-26.0' - Same	e as 20.5-21.5' except firm ar	nd -		-
-	26.5	1.0	33-0	(5)	20-25% fine grave	el-sized limestone fragments	-	Ш	-
-	20.5						_		-
-							_		_
_							_		_
							_		
_							_		_
_							_		_
30 <u> </u>	30.0			FO/F F	Cond. Cilt (MI.)			.	10:15 Adding 15 years foot of agains to 20.0!
12.0	30.5	0.5	SS-7	50/5.5 (50/5.5")	Sandy Silt (ML)	e as 25.0-26.5' except hard, r	mild to /-	Ш	16:15 Adding 15 more feet of casing to 30.0' below ground surface
-					\moderate HCl rea Begin Rock Corin	action, 10% fine gravel-sized			
-					See the next shee	et for the rock core log	-		-
-							-		-
-							_		-
-							_		-
							_		-
							_		
35									_
7.0							_		_
_							_		_
-							_		-
-							-		-
-							-		-
-							-		-
-							-		-
-							-		7
40									



FRACTURES PER FOOT

1

4

0

1

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0

0 NR

0

0

O

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NR

1

3

2

2

0

40

0

RQD(%)

80 4

WATER LEVELS: 2.4 ft bgs on 4/22/07

CORE RUN, LENGTH, AND RECOVERY (%)

R1-NQ

5 ft

100%

R2-NO

5 ft 94%

R3-NQ 5 ft

98%

R4-NQ

5 ft

100%

0 | 1

DEPTH BELOW SURFACE AND ELEVATION (ft)

35

7.0

40₂

45_ -3.0

50

-8.0

51.0

36.0

410

46.0

PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-18

SHEET 3 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

START: 4/19/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

END: 4/23/2007

9

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

DISCONTINUITIES

31.9' - Bedding plane, 10 deg, rough,

32.25' - Bedding plane, <5 deg, smooth,

32.5' - Mechanical break, 5 deg, rough,

32.6' - Bedding plane, 10 deg, smooth,

32.9' - Mechanical break, 15 deg, rough,

undulating, highly fossiliferous, tight

smooth, planar, tight 33.75, 35.5' - Fractures (2), rough,

undulating, tight, high angle fractures

43.4' - Bedding plane or mechanical break,

46.7' - Bedding plane, 10 deg, rough,

rough to smooth, undulating, tight

deg, rough, undulating, tight

50.0' - Mechanical break

47.1, 47.2, 47.6' - Bedding plane (3), 10 deg,

48.55, 48.9, 49.6' - Bedding plane (3), 10

47.4, 48.15, 48.5, 49.4, 50.0' - Mechanical

49.45' - Bedding plane, 30 deg, rough,

undulating, tight

break (4)

undulating, tight

silt and/or clay sized infilling, silt infill, open 1"

33.1' - Bedding plane, 10 deg, smooth,

planar, highly fossiliferous, tight 33.5, 33.8' - Bedding plane (2), 30 deg,

undulating, highly fossiliferous

planar, highly fossiliferous, tight

undulating, open 1/8"

planar, tight

ORIENTATION: Vertical LOGGER: N. Jarzyniecki LITHOLOGY COMMENTS ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 16:57 Begin rock coring at Limestone 31.0-36.0' - moderate yellow to light 31.0' below ground surface olive gray, (5Y 7/6 to 5Y 5/2), with mottling of the two colors from 32.8-35.4', very fine grained, moderate to strong HCI reaction, weak to medium strong (R2 to R3) SC-broke during movement weak to medium strong (R2 to R3), highly fossiliferous, fossil casts and molds, voids over 50-70% of surface up to 1/16", dissolution cavities up to 1/2"x2" on 10% of surface R1: 10 minutes $36.0\mbox{-}40.7\mbox{'}$ - dusky yellow to pale olive, (5Y 6/4 to 10Y 6/2), fine 17:07 Begin coring 36.0-41.0' grained, moderate to strong HCI reaction, extremely weak (R0), fine grained silts, fossiliferous, voids up to 1/16" on 20% of surface, dissolution zones up to 10% of surface up to 1/2"x1" from 36.0-37.1' dusky yellow to pale olive (5Y 6/4 to 10Y 6/2), organic layers throughout R2: 10 minutes No Recovery 40.7-41.0' 41.0-42.5, 44.45-45.9' - Same as 36.0-40.7' except 42.5-44.45 light 17:17 Begin coring 41.0-46 0' olive gray to dusky yellow (5Y 5/2 to 5Y 6/4), highly fossiliferous, cavities over 30% of surface, up to 1/16", SC-1 collected at 42.5medium gray infill (N5) over 20% of surface, organics throughout, weak (R2) rock, moderate HCI reaction R3: Run time not recorded No Recovery 45.9-46.0' 17:27 Drilled 46.0-51.0' Limestone 46.0-51.0' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, moderate to strong HCI reaction, extremely weak to weak (R0 to R2), voids up to 1/16" on 10-20% of surface, trace organics on surface R4: Run time not recorded 4/20/07 08:21 Retrieved

08:27 Water level at 2.7'

below ground surface



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-18	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

00111110	- WIETHOD / II	ND LC	ZOIFIV	MENT: CIME 55 S/N 316625, mud rotary, NQ tools, HW o	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 2.4	ft bgs	s on 4	/22/07 START : 4/19/2007 END : 4/	23/200	7 LOGGER : N. Jarzyniecki	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BEL 10N	Z Z Z	(%	FRACTURES PER FOOT		의	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
L HAC	A TOO	Q D (%)	CT.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P S S S S S S S S S S S S S S S S S S S	SE S	S O	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БОШ	074	ш	шш		0,		4/00/07 00:00 Duillanta
_			2	50.2' - Bedding plane, 10 deg, rough, undulating, open 1/4"	\perp	Limestone - 51.0-51.2, 51.7-52.8, 53.3-54.0,	4/20/07 08:36 Driller's Remark: Core barrel
			-	50.48' - Mechanical break	Ш	54.9-55.15' - moderate yellowish	locked
				50.5' - Fracture, 75 deg, smooth, undulating,	Н	brown, (10YR 5/4), fine to very fine	4/21/07 07:55 Core barrel
-			1	tight 51.4' - Mechanical break	\Box	grained, moderate HCl reaction, weak (R2), fossiliferous, voids 1/16"	unlocked-pulled out – 08:14 Begin setting 6"
-	R5-NQ			51.4 - Mechanical break 51.7' - Fracture, <5 deg, rough, undulating,	╂┴╂	over 10-20% of surface, trace	casing
-	5 ft	28	0	bedding plane fractures, open 1/4"	ш	- organics	10:34 Water level 2.1' -
_	92%			51.8, 52.6' - Fracture (2), 50-60 deg, rough,	┵┼	51.2-51.7, 52.8-53.3, 54.0-54.9,	below ground surface
			0	undulating, open 1/8" 53.8, 54.4, 51.4' - Mechanical break (3)		55.15-55.6' - dusky yellow to pale - olive, (5Y 6/4 to 10Y 6/2), fine	10:48 Cleared the hole 11:24 Begin coring 51.0-
55			0	33.0, 34.4, 31.4 - Wechanical break (3)	Ш	grained, moderate HCl reaction,	56.0'
-13.0			0	_	ш	extremely weak (R0), fossiliferous	R5: 11 minutes
-					╆┦	(casts), voids to 1/16" over 20% of	-
-	56.0		NR		世	surface No Recovery 55.6-56.0'	13:12 Regin coring 56.0
-			1		Щ	Limestone	13:12 Begin coring 56.0- 61.0'
			-	50.01.5	Ш	56.0-56.4, 57.0-57.15, 57.55-58.5' -	
				56.9' - Fracture, 80 deg, tight, not completely broken through		Same as 51.2-51.7' Limestone	13:24 Core catcher is not
-			0	broken tillough	14	56.4-57.0, 57.15-57.55, 58.5-59.3' -	retrieved, washing loose – material and going back in
-	R6-NQ				田	moderate yellowish brown, (10YR	with wireline
-	5 ft	27	0	58.3, 58.45, 56.5' - Mechanical break (3)	+	5/4), very fine grained, moderate HCl	_
-	73%					reaction, weak to medium strong (R2 to R3), voids to 1/8" over 40% of	_
_			0		Н	surface, poorly fossiliferous, organic	
60					ш	laminae throughout	
-18.0			NR	_	Н	— 59.03-59.65' - Same as 51.0-51.2' No Recovery 59.7-61.0'	R6: Run time not recorded
_	64.0		\		\Box	No Recovery 33.7-01.0	1
-	61.0				╁┷╂	-	13:30 Begin coring 61.0-
-			1	61.5' - Bedding plane, <5 deg, smooth,	ш	-	66.0'
_				undulating, silt infill, open 5"	╁┼┤	-	_
			1	62.1, 64.9' - Fracture, 65 deg, rough,			
			'	undulating, open 1/4"	Ш		SC-2 collected at 62.65-
-	R7-NQ			62.25' - Fracture, 10 deg, rough, undulating, associated bedding plane fractures, open	1 1	-	63.5'
_	5 ft	46	0	1/4"	\Box	-	-
-	90%			62.9' - Fracture, 65 deg, rough, undulating,	╂┼╂	-	-
-			1	open 1/4"	口	-] _
65				64.2, 62.65, 63.5' - Mechanical break (3)	\mathbb{H}	_	
-23.0			2	65.1, 65.25' - Bedding plane (2), <10 deg,	口		R7: Run time not recorded
	66.0		NR	rough, undulating, open 1/4"	14	No Recovery 65.5-66.0'	1
-	55.0				丗	Limestone	13:45 Begin coring 66.0-
-			0		╂┼╂	- 66.0-69.2' - dusky yellow, (5Y 6/4),	71.0'
_					₽	fine grained, mild HCl reaction,	4
			0	67.15, 69.55' - Mechanical break (2)	Щ	extremely weak (R0), fossiliferous (casts), fine grained with voids up to]
					Ш	1/16" over 20% of surface	1
]	R8-NQ				\Box	-	1
-	5 ft	37	0		╁┼╂	-	1
-	100%				口	-	
_			0		╁┼┤	-	1
70				_	口	_	
-28.0					Ш		R8: 14 minutes
1 7	71.0		1		Ш	-	1
	, 1.0				$\dagger \dagger$		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-18	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				ENT : CME 55 S/N 316625, mud rotary, NQ tools, HW o			ORIENTATION : Vertical
	LEVELS : 2.4	ft bgs	on 4/	22/07 START : 4/19/2007 END : 4/	23/2007	7 LOGGER : N. Jarzyniecki LITHOLOGY	COMMENTS
₹	<u>@</u> (%)		<i>(</i> 0		8		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			2	70.1' - Bedding plane, <5 deg, silt and/or clay sized infilling, open 1/2", dusky yellow (5Y 6/4) silt infill		69.2-71.0' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, moderate HCl reaction,	14:46 Begin coring 71.0- 76.0'
-			0	71.2, 71.7' - Fractures (2), <5 deg and 15 deg, rough, undulating, open 1/4"		weak (R2), laminated bedding, voids to 1/16" over 20% of surface, trace laminar bedding	
-	R9-NQ 5 ft 84%	60	2	73.0' - Bedding plane, 5 deg, rough, undulating, open 1/4", tight 73.5, 74.9, 75.0' - Mechanical break (3)		Limestone 71.0-73.0' - dusky yellow to pale olive, (5Y 6/4 to 10Y 6/2), strong HCI	
75			1	73.7, 74.0' - Bedding plane (2), 5 deg, rough, undulating, open 1/4", olive gray (5Y 3/2) clay infilling		reaction, weak (R2), voids to 1/16" over <10% of surface, fossiliferous (casts), dissolution along fractures,	
-33. 0 -	76.0		0 NR		掛	 5% cover infill of medium gray (N5) 73.0-73.7' dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, extremely weak (R0), fossiliferous 	R9: 5 minutes
-			0		日	(casts), voids on 20% of surface to 1/16", mottling pale olive (10Y 6/2) 73.7-75.2' - dusky yellow to pale	14:51 Begin coring 76.0- 81.0' SC-3 collected at 76-76.9'
-	R10-NQ		1	77.8, 78.9' - Bedding plane (2), 20 deg,	Ħ	olive, (5Y 6/4 to 10Y 6/2), moderate HCl reaction, weak (R2), voids up to 1/16" over 30% of surface, clay infill	
-	5 ft 96%	64	1	rough, undulating, silt zone open 1/4"		in some fractures No Recovery 75.2-76.0' Limestone	
- 80 <u>-</u> -38.0			1	79.6, 76.9, 80.0' - Mechanical break (3)		76.0-77.8, 78.5-79.5, 79.9-80.8' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, extremely	R10: Run time not
-	81.0		1 NR	80.2' - Fracture, 20 deg, rough, undulating, silt and/or clay sized infilling, silt zone open 1/2"	Ħ	weak (R0), fossiliferous (casts), voids over 20-30% of surface to 1/16", mottled with light olive gray to	recorded 14:58 Begin coring 81.0-
_			1	81.3' - Bedding plane, <5 deg, rough, undulating, open 1/4"		yellowish gray (5Y 5/2 to 5Y 7/2) 77.8-78.5, 79.5-79.9' - dusky yellow to pale olive, (5Y 6/4 to 10Y 6/2),	83.0'
-	R11-NQ		0	82.25, 83.0, 83.5' - Mechanical break (3)	Ħ	weak (R2), voids up to 1/16" over 30% of surface 79.6-79.7' - moderate HCl reaction,	
-	5 ft 90%	83	0	84.0' - Bedding plane, <5 deg, rough,		clay infill No Recovery 80.8-81.0' Limestone 81.0-85.5' - dusky yellow to yellowish	
85 <u> </u>			1	undulating, open 1/4", associated with fossils and dissolution zones 85.0' - Bedding plane, <15 deg, rough,	Ħ	gray, (5Y 6/4 to 5Y 7/8), very fine to fine grained, mild to moderate HCl reaction, weak (R2), voids up to	R11: 12 minutes
-	86.0		NR	undulating, open 1/4"	H	1/16" on 35-40% of surface, fossiliferous (casts, molds), dissolution cavities 83.9-84.4'.	15:30 Begin coring 86.0-
-			>10	86.45-86.75' - Fracture zone, rough, undulating, intersecting fractures, open 87.1, 87.4' - Bedding plane, <5 deg, rough,		Largest dissolution zone is up to 1/2"x1", very weak (R1) to weak (R2) rock, low to moderate HCl reaction	91.0' Driller's Remark: Slight circulation loss at 87.0'
-	R12-NQ 5 ft	9		undulating, open less than 1/4" 87.3' - Fracture, 75 deg, rough, undulating, tight		No Recovery 85.5-86.0' Limestone 86.0-87.7' - Same as 81.0-85.5' No Recovery 87.7-91.0'	3.1 3diditori 1003 dt 07.0
-	34%		NR		Ħ	No Necovery 01.7-91.0	
90 <u> </u>				-		_	R12: Run time not recorded
	91.0				H		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-18	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	I WE I HOD AI	ND EC	ZUIFIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 2.4	ft bgs	s on 4/	/22/07 START : 4/19/2007 END : 4/2	23/200	7 LOGGER : N. Jarzyniecki	
	~			DISCONTINUITIES	(J)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원은	Y A A	(%	AP		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΤΫ́Ϋ́Υ	RE F GTF SOV	Q D (%)	FE	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	မ္တ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SHOW HE SHOW	S.	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		_			"	Limestone	16:44 Begin coring 91.0-
-			1	-		- 91.0-95.0' - grayish orange, (10YR	96.0'
l _				_	₽	7/4), fine grained, moderate HCI	16:59 Core drilled to 93.5',
			0	92.3' - Bedding plane, <10 deg, rough,		reaction, weak (R2), moderately fossiliferous (casts), voids up to 1/8"	drillers remark that core barrel is stuck
-			U	undulating, open 1/4"	Н	over 30% of surface	17:11 Retrieve core
-	R13-NQ			93.0-93.9' - Fracture zone or mechanical		_	sample 91.0-93.5'
-	5 ft	50	>10	break, smooth to rough, undulating, open up	₩	-	17:20 Set 4" casing -
-	80%			to 1/4", intersecting fractures 93.5-94.4' - Fracture zone or mechanical	╆┰╂	-	4/22/07 09:38 Water level 2.4' below ground surface
_			>10	break, smooth to rough, undulating, open	H	-	09:52 Begin to set 3"
95				1/4"	Н		casing
-53.0				94.55' - Bedding plane, 15 deg, rough,	Щ	No Recovery 95.0-96.0'	11:18 Core barrel freed (3"
_	96.0		NR	undulating, open 1/4" -	╁	-	casing to 85.0') – 13:40 NW casing pulled,
-	30.0			96.0-96.2, 96.7-97.0' - Fracture zone (2),	口	Limestone	setting HW casing to 90.0'
-			<10	rough, undulating, open 1/4", intersecting	╁┼╂	96.0-96.7' - dusky yellow to yellowish	15:28 4" casing set
-				fractures	口	gray, (5Y 6/4 to 5Y 7/2), very fine	15:49 Begin coring 93.5- 96.0'
I -			1	_	H	grained, moderate HCl reaction, very weak to weak (R1 to R2), voids to	R13: 23 minutes
			'	97.6, 98.6' - Bedding plane (2), 10 deg,	Н	1/8" over 35-40% of surface	4/23/07 08:00 Begin coring
	R14-NQ			rough, undulating, tight 97.7, 98.5' - Mechanical break (2)	Н	96.7-97.15' - dusky yellow, (5Y 6/4),	96.0-101.0'
-	5 ft 58%	17	4	98.2' - Bedding plane, 10 deg, rough,	ш	 fine grained, moderate HCl reaction, extremely weak (R0), fossiliferous 	1 1
-	30 /0			undulating, tight	╁┼┼	(casts), voids to 1/16" over 20% of	1
-				98.25, 98.75' - Fracture (2), 50 deg, rough,		- surface, mottled with light olive gray	-
100_			NR	undulating, with organics in vertical orientation	₽	to yellowish gray (5Y 5/2 to 5Y 7/2)	
-58.0				one nation	Ш	97.15-98.9' - dusky yellow matrix with yellowish gray infill, (5Y 6/4 with 5Y	R14: Run time not recorded
	101.0				Н	8/1), fine grained, moderate HCl	recorded
-					口	reaction, weak to medium strong (R2	08:09 Begin coring 101.0-
-			1	- 404.7. 404.01. Maskanisalkasalk(0)	₩	to R3), highly fossiliferous (casts), voids to 1/16" over 30% of surface,	106.0'
-				101.7, 104.9' - Mechanical break (2) 101.9' - Bedding plane, 10 deg, rough,	団	dissolution cavities up to 1/4"x1/2",	1
-			0	undulating, open 1/2"	+++	infill over 10-50% of surface (same	-
-				105.3, 102.4, 103.5, 104.2' - Mechanical	口	hardness matrix) No Recovery 98.9-101.0'	1
_	R15-NQ 5 ft	97	1	break (4) 102.75' - Mechanical break -	Ш	Limestone	l J
	98%	01	'			101.0-102.7' - dusky yellow with light	
_			_	103.8' - Bedding plane, 10 deg, rough, undulating, tight	H	olive gray infill, (5Y 6/4 with 5Y 5/2), moderate HCl reaction, weak to	1
105			0	104.55' - Bedding plane, <5 deg, smooth,	Ħ	medium strong (R2 to R3), highly	1 1
105_ -63.0				undulating —	₽₽	fossiliferous (casts), voids to 1/16"	R15: Run time not
-			0	105.05' - Bedding plane, <5 deg, smooth,	丗	over 30% of matrix and over 15% of	recorded -
_	106.0		NR)	undulating, very soft material, open 1/4" 105.2-105.8' - Fracture zone, smooth to	₽	infill, dissolution cavities to 1/2"x3/4", infill over 10-20% of surface, fine	00:00 Paris as 1 100 0
_			0	rough, undulating, intersecting fractures,	口	grained	08:30 Begin coring 106.0- 111.0'
				most are high angle, open 1/8"	Ш	102.7-105.9' - dusky yellow with	' ' ' '
1 -				_	Ш	yellowish gray infill, (5Y 6/4 with 5Y 8/1), strong HCl reaction, very weak	SC-4 collected at 106.0-
I -			0	-	╁	to weak (R1 to R2), highly	107.0'
-	R16-NQ			-	H	fossiliferous (casts), voids to 1/16"	1 +
-	5 ft	90	0	-	₽₽	over 30% of surface, dissolution cavities to 1/4"x1/2", infill over	1 -
-	100%			-	╓	- 15-20% of surface, fine grained	1
I _			0	_	尸	No Recovery 105.9-106.0']
110					Щ]
-68.0				_	Ш		R16: Run time not
_	111.0		2	-	ш	-	recorded -
	111.0				† †	-	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-18	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	NETHOD A	ND EC	JUIPIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 2.4	I ft bgs	s on 4	/22/07 START : 4/19/2007 END : 4/	23/200	7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
ON A P	₹.ĕ.		FRACTURES PER FOOT	DESCRIPTION	힐	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H K K		Q D (%)	J. S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Տ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	ENGR	g	ZAC ER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ĭ₩	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	OIR	ď	ш а		S	CHARACTERISTICS	
				110.4, 110.7' - Fracture (2), 50-60 deg,		Limestone	08:40 Begin coring 111.0-
I -			0	rough, undulating, tight	ΤП	 106.0-111.0' - dusky yellow, (5Y 6/4), fine grained, strong HCl reaction, 	116.0'
-						extremely weak to weak (R0 to R2),	1
-			0		₽₽	- voids to 1/16" over <20% of surface,	_
					\Box	highly fossiliferous, dissolution zones	
	R17-NQ					up to 1/2" diameter over < 5% of	
-	5 ft	80	0		Н	 surface 111.0-115.8' - dusky yellow, (5Y 6/4), 	
-	96%					fine grained, strong HCl reaction,	-
_			1		\vdash	- extremely weak to medium strong	_
115					\vdash	(R0 to R3), increasing in hardness	
-73.0			. 40	_		with depth until 105.2' below ground	R17: Run time not
-			>10		1	 surface, voids to 1/16" over <20% of surface 	recorded -
-	116.0		NR	116.0.116.2' Fracture zone amonth to		No Recovery 115.8-116.0'	09:50 Pooin drilling 116.0
l _			6	116.0-116.2' - Fracture zone, smooth to rough, undulating		Limestone	08:50 Begin drilling 116.0- 121.0'
				116.3' - Fracture, 55 deg, rough, undulating,	\vdash	116.0-120.7' - dusky yellow, (5Y 6/4),	
-				tight		fine grained, strong HCI reaction,	1
-			0	116.4' - Fracture, 80-85 deg, rough,	ш	 very weak to weak (R1 to R2), voids to 1/8" over <20% of surface. 	1
-	D40 NO			undulating, tight 116.6' - Bedding plane, 10 deg, rough,	$+ \Box$	fossiliferous	-
l _	R18-NQ 5 ft	70	0	undulating		No Recovery 120.7-121.0'	
	94%	70		ŭ		Limestone	
_				118.8, 120.15' - Mechanical break (2)		121.0-124.5' - Same as 116.0-120.7'	1
			1	-		 124.5-126.0' - light olive brown with light olive gray, (5Y 5/6 with 5Y 5/2), 	1
120_ -78.0				119.9' - Fracture, 80 deg, smooth, undulating, —	₽₩	very fine to fine grained, moderate to	DAG: Burn times and
-76.0			0	open, end missing		strong HCl reaction, weak to medium	R18: Run time not recorded
	121.0		NR		\vdash	strong (R2 to R3), laminar features	recorded
-	-					 throughout and yellowish gray (5Y 7/2) infill over 15% of surface. Matrix 	09:09 Begin drilling 121.0-
-			1	121.4' - Fracture, 80 deg, rough, undulating,	ш	is highly fossiliferous, dissolution	126.0'
-				open less than 1/8"	$+$ \Box	features over 10% of surface up to	-
_			0	_		_ 1/2"x1/2", voids over 35% of surface	
			0		\perp	up to 1/16" and trace organics, infill	
_	R19-NQ			-	П	 is very fine, poorly fossiliferous and < 5% voids 	1
-	5 ft	62	0	123.5, 125.8, 124.8' - Mechanical break (3)		126.0-126.4' - pale olive with light	SC-5 collected at 123.5-
-	100%			120.0, 120.0, 121.0 Woonamour broak (0)	₽	- olive gray laminations, (10YR 6/2	124.45'
I _			1		Ш	with 5Y 5/2), very fine grained, mild	
125				124.5' - Bedding plane, smooth, undulating,	\vdash	HCl reaction, weak (R2), poorly	
-83.0				dissolution features along outer edges of — fracture open 1/4"	1-	fossiliferous, no voids Limestone	R19: 10 minutes
-			3	125.25' - Fracture, 85 deg, not open	\Box	126.4-129.6' - light olive brown, (5Y	1
-	126.0			125.85, 125.9' - Bedding plane (2), <5 deg,	\vdash	- 5/6), same as limestone in	00:10 Posis delliss 400 0
I _			>10	smooth, planar, tight		116.0-120.7' except voids over 25%	09:19 Begin drilling 136.0- 131.0'
			10	126.0-126.4' - Fracture zone, intersecting	Ш	of surface up to 1/16" and laminar	101.0
-				fractures, open 1/8", tight	\vdash	 feature at 127.15-127.0', no voids, poorly fossiliferous, weak (R2) to 	1
-			>10	126.75, 127.3, 128.5, 128.7' - Mechanical break (4)		medium strong (R3) rock with	1
-				127.4-127.55' - Fracture zone, intersecting	\vdash	exception of 127.2-127.4' which is	1
	R20-NQ 5 ft	40	0	fractures, open 1/4", softer material	Н	strong (R4) rock, moderate to strong	
I -	72%	40	ا	127.8, 127.95' - Fracture (2), 60 deg, rough		HCl reactionNo Recovery 129.6-131.0¹	1
-	,,		2	to smooth, undulating, open 1/4"	╀┤	_ NO Recovery 129.0-131.0	1
-			2	129.35' - Fracture, 60 deg, rough to smooth,		-	-
130				undulating, open 1/4"	\Box		I
-88.0			NR	129.5' - Fracture, 60 deg, smooth, undulating	$\vdash \vdash$		R20: Run time not
	131.0						recorded -
	101.0						
ь							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-18	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				MENT . CIME 33 3/N 3 10023, Mud Totally, NQ 10015, HW (ORIENTATION : Vertical
WATER	LEVELS: 2.4	ft bgs	s on 4	/22/07 START : 4/19/2007 END : 4/	23/200	7 LOGGER : N. Jarzyniecki	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
照찬인	N. F.	9	FRACTURES PER FOOT		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
E ¥ ₹	ER OVE	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무움님	RNN	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ž	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ОВШ	OIR	ď	ша	THICKNESS, SON ACE STAINING, AND HOTTINESS	S	CHARACTERISTICS	
				131.15, 132.1, 132.8' - Bedding plane (3), <5	Ш	Limestone	09:34 Begin drilling 131.0-
1 7			>10	deg, smooth, planar, open <1/8"	╁	- 131.0-132.2' - pale yellowish brown,	136.0'
-				131.4, 133.2, 134.0' - Mechanical break	口	(10YR 6/2), fine grained, moderate to strong HCl reaction, weak to medium	-
1 4			4	131.7-132.0' - Fracture zone, smooth to	₽	strong (R2 to R3), voids to 1/8" over	_
				rough, undulating, intersecting fractures, open 1/4"	Н	20-25% of rock, fossil casts to	
1 7	R21-NQ			132.6' - Bedding plane, <5 deg, smooth,		3/8"x3/4" over 5% of rock as casts	1
-	5 ft	10	3	planar, open 1/4"	₩	- (voids)	-
1 4	64%		4	133.45, 133.6' - Fracture zone (2), 60-70 deg,	╁┼┼	132.2-134.2' - grayish orange, (10YR	_
			1	rough, undulating, open 1/4" on 133.45'		7/4), fine grained, moderate HCl reaction, weak to medium strong (R2	
135				133.6' - Fracture, 60-70 deg, rough,	Ш	to R3), voids to 1/16" over <10% of	
-93.0			NR	undulating, open 1/4" 133.8' - Bedding plane, <5 deg, rough,	$\pm \pm \pm$	surface	R21: Run time not
-				undulating, tight	┲	No Recovery 134.2-136.0'	recorded -
	136.0			133.9' - Fracture, <5 deg, rough, undulating,	Щ	_]
				tight	H	Limestone	09:50 Begin drilling 136.0-
1 1			3	134.0' - Fractures, <5 deg, smooth, planar,	\Box	- 136.0-139.7' - grayish orange, (10YR	141.0'
-				open 1/4"	₩	7/4), fine to medium grained, moderate HCl reaction, weak (R2),	-
1 4			1	135.7' - Bedding plane, <30 deg, smooth, undulating, open 1/4"	H	voids to 1/8" over 30-40% of surface,	_
			l .	136.0-136.3' - Bedding plane, <5 deg,		fossil casts (voids) to 5/16" diameter	
1 7	R22-NQ			smooth, planar, tight	ш	over 5% of surface	1
-	5 ft	53	1	136.5, 136.6' - Bedding plane (2), 10 deg,	$+ \Box +$	-	-
	74%			rough, undulating, open 1/4"		_	_
			0	137.5' - Fracture, 50 deg, smooth, undulating,			
140				tight 138.4' - Mechanical break	Ш	No Recovery 139.7-141.0'	_
-98.0			l	138.5, 137.9' - Mechanical break (2)	口	NO Recovery 135.7-141.0	R22: Run time not
-			NR	138.7' - Bedding plane, <30 deg, smooth,	₩	-	recorded -
	141.0			undulating, open 1/4"	Ш	_	_
				141.2-141.35' - Fracture zone, pieces to		Limestone	10:06 Begin drilling 141.0-
1 1			>10	2"x1", open 1/4"	╁┼	- 141.0-143.7' - light olive gray mottled	146.0' – SC-6 collected at 141.4-
-				1	$\pm \Box \dagger$	with yellowish gray, (5Y 6/1 mottled with 5Y 7/2), fine to medium grained,	142.3'
			>10	142.3-142.49' - Fracture zone, pieces to		- moderate HCl reaction, weak to	142.0
				1"x1/2", open 1/4"	Н	medium strong (R2 to R3), voids up	
1 7	R23-NQ			142.9-143.05' - Fracture zone, pieces to	Ш	to 1/16" over 10-25% of surface,	1
-	5 ft	55	>10		\Box	trace fossils up to 1/2"x1/4", cavities	-
	84%		—	143.2' - Bedding plane or mechanical break, 20 deg, rough, undulating, organic dark stain,	╁┼┼	to 1"x1/2" over 5-20% of surface 143.7-145.2' - olive gray, fine	-
			1	open 1", associated with cavities	Ш	grained, moderate HCl reaction,]
145				143.7-143.95' - Fracture zone, pieces to	\Box	medium strong (R3), trace voids to]
-103.0			1	1"x1/2", open 1/4"	╂┼┼	1/8", trace fossils to 3/16"x1/16", dark	R23: 34 minutes
-			NR	144.55' - Bedding plane, 50 deg, smooth,	┲	1/16" laminations (wavy) over 5-10%	-
]	146.0		L	undulating, tight 145.0' - Fracture, <5 deg, smooth,	+	of surface	
				undulating, open 1/2"	H	No Recovery 145.2-146.0' Limestone	10:40 Begin drilling 146.0-
1 7			1	andalating, open 1/2	Ш	146.0-147.9' - grayish orange, (10YR	151.0'
				146.95' - Fracture, 20 deg, smooth,	╂┼┼	7/4), fine to medium grained,	-
4			2	undulating, tight	╂╫	moderate HCl reaction, weak to	-
			L	147.65' - Bedding plane, 0-5 deg, smooth,	Ш	medium strong (R2 to R3), voids to	
1 7	R24-NQ			planar, tight	H	1/8" over 0-40% of surface in	1
-	5 ft	33	2	147.9' - Bedding plane, smooth, undulating,	╁┼┼	interbedded nature interchanging every 3-1/8", trace fossil casts to	10:51 Finish drilling
-	56%			open 1/4" 148.3, 148.35' - Fractures (2), 50 deg,	┲	1/8"x9/16"	I
1				smooth, undulating, tight, open 1/2"	\mathbf{H}	-	R24: Run time not recorded -
			NR	SSSai, andalating, agint, open in	Н		Used 17 bags of quick
150			INC	-	╙		cement for abandonment
150 -108.0							
					╂┼┼	-	(47-lbs/bag) and about 60
	151.0				囯	-	
	151.0					-	(47-lbs/bag) and about 60



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-18	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 2.4 ft bgs on 4/22/0				22/07 START : 4/19/2007	END : 4/2	3/200	7 LOGGER : N. Jarzyniecki	
>000	(9			DISCONTINUITIES		g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B	E RU GTH, OVE	(%) Q	CTUI	DEPTH, TYPE, ORIENTATION, ROUGH PLANARITY, INFILLING MATERIAL	INESS,	IBOL!	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	COR LEN REC	RO	FRA	THICKNESS, SURFACE STAINING, AND T	IGHTNESS	SYM	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
							147.9-148.8' - moderate yellowish	
1 1					1		brown, (10YR 5/4), medium to coarse grained, moderate HCl	
1 1							reaction, weak (R2), voids to 1/16"	1
1 1							over 40% of surface, trace fossils to 3/16"x1/16"	1
1 1					1		No Recovery 148.8-151.0'	
]		Bottom of Boring at 151.0 ft bgs on 4/23/2007	
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PROJECT NUMBER:	BORING NUMBER:
338884.FL	B-19

SHEET 1 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 4.25 ft b	ogs on 5/2	22/07	START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	· ,	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
TH BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY SOIL STRUCTURE MINERAL OCY.
DEP SURI ELE			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
41.3	0.0			4.4.0	Topsoil 0.0-0.25' - brownish black, (5YR 2/1), wet, very loose,
-		0.7	SS-1	1-1-2 (3)	│ \nonplastic, organics (root and plant debris) with <10% / │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │
-	1.5				\ \ \ \ \ \ \ \ \ \ \ \ \
-					0.25-0.55' - brownish black, (5YR 2/1), wet, very loose, very fine to fine grained, 40% organics, silica
-	-				│ \sand
-					Poorly Graded Sand (SP) 0.55-0.7' - very pale orange, (10YR 8/2), wet, very
-	-				loose, fine grained, trace nonplastic fines, trace organics, silica sand
5	5.0				
36.3				5-5-4	Silty Sand (SM) 5.0-6.15' - grayish orange, (10YR 7/4), wet, loose, fine
-		1.2	SS-2	(9)	grained, 15% nonplastic fines, trace organics (roots), silica sand, soil grades to sandy fat clay with 30-40%
-	6.5				fine sand at bottom of sample
-	-				- - - - - - - - -
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10 31.3	10.0				Silt (ML) Driller's Remark: Set 5' HW casing (10'
-		0.8	SS-3	14-17-14	│ 10.0-10.75' - grayish orange, (10YR 7/4), wet, hard,
-	11.5	0.0	33-3	(31)	nonplastic, rapid dilatancy, moderate HCl reaction, trace roots, carbonate derived
-	11.5				
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15 <u> </u>	15.0				Silt (ML)
-		1.2	SS-4	22-47-42	15.0`-16.´2' - Same as 10.0-10.75' except strong HCl reaction, 10-15% coarse sand-sized to fine
-	16.5			(89)	gravel-sized limestone, all carbonate
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-19	SHEET	2	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 4.25 ft b	ogs on 5/2	22/07	START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad
>00				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
H BE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
SURF SURF SURF SURF SURF SURF SURF SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
21.3	20.0				Silt With Limestone Fragments (ML)
_		1.0	SS-5	3-25-17 (42)	20.0-21.0' - grayish orange and pale yellowish brown, - (10YR 6/2 and 10YR 7/4), pale orange mottling, wet,
-	21.5			(+2)	hard, nonplastic, strong HCl reaction
] [
_					
_					_
-					
_					Driller's Remark: Hard at 24' below ground
75 -	25.0				- surface -
25 <u> </u>	25.0				Silt With Sand (ML)
_		1.2	SS-6	13-13-17 (30)	25.0-26.2' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate to strong HCl
-	26.5			(30)	reaction, 15-20% fine to coarse sand-sized, all
					Carbonate / -
_					_
-					
-					
-					
	20.0				
30 <u> </u>	38:9	0.0	SS-7	50/1.5	No Recovery 30.0-30.1'
-				(50/1.5")	-
]
]
_					<u> </u>
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-					
_					
	25.0				-
35 6.3	35.0				Silt With Sand (ML)
-		1.4	SS-8	13-19-26	35.0-36.4' - moderate yellowish brown, (10YR 5/4),
	36.5			(45)	strong HCl reaction, 20-25% fine to coarse sand,
					limestone fragments to 1/4" at top of sample, all carbonate
] [
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-19

SHEET 3 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

						ary, carreau, INVV 1005, 4-77		ъ.	Wellested	0.000
WATER	LEVELS	: 4.25 ft b	ys 011 5/2		START : 5/21/2007	END: 5/23/2007 SOIL DESCRIPTION	LUGGE	Т	. Wallestad COMMENTS	
≥6€	SAMPLE	INTERVA	l (ft)	STANDARD PENETRATION		JOIL DEGOTAL FION		1	SOMMERTO	
DEPTH BELOW SURFACE AND ELEVATION (#)	JAWIF LE	RECOVE		TEST RESULTS		IE, USCS GROUP SYMBOL			DEPTH OF CASING, DRILLING R.	
THE		RECOVE		011 011 011		E CONTENT, RELATIVE DE ICY, SOIL STRUCTURE, M		9	DRILLING FLUID LOSS, TESTS, A INSTRUMENTATION	AND
DEP SUR ELE			#TYPE	6"-6"-6" (N)	CONSISTEN	IOT, SOIL STRUCTURE, W	INCINALOGI	3	INSTRUMENTATION	
1.3	40.0	0.8	SS-9	30-50/4	Silt With Sand	(ML)	(D 0/0)	T		
-	40.8	0.0	00-0	(80/10")	40.0-40.75° - da	ark yéllowish orange, (10 icity, rapid dilatancy, mod	YR 6/6), wet, erate to	41	-	1
-					∖ strong HCl rea	ction, 25% fine to coarse	grained sand, /	1		1
					\all carbonate			1		1
								1		1
								1		1
_								1		1
-								1		1
-								1		1
45	45.0							1		1
-3.7					Silt With Sand		(40)(D.5(4)	T	1	
-		1.4	SS-10	27-29-50/5.5 (79/11.5")		oderate yellowish brown, (plastic, rapid dilatancy, m		1		1
-	46.5			(19/11.5)	strong HCl rea	ction, 15% fine to coarse	sand-sized,	1]	_
-					trace gravei-siz	zed, all carbonate	/	1		1
								1		1
								1		1
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50	50.0							1		1
-8.7		0.5	SS-11	41-50/2	Silt (ML)		(10)(5.5(4)	T	Driller's Remark: Hard rock 50.0-55	.0', run
-	50.7	0.0		(91/8")		oderate yellowish brown, (plastic, rapid dilatancy, m		7	time 15-20 minutes	_
					reaction, 10%	fine to coarse grained sar		1		1
					\carbonate			1		1
_								1		1
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								1		1
55	55.0							1		1
-13.7	55.3	0.3	SS-12	50/4	Silt (ML)	50.0.50.51		#	Finished drilling at 17:30 on 5/21/07	at 55.0'
1 -				(50/4")	\55.0-55.25' - S	same as 50.0-50.5'	/	1	below ground surface	1
								1	Resume drilling at 07:52 on 5/22/07	1
								1		1
								1	Water level at 07:35 is 4.25' below	ground
								1	surface	1
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-19	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

STANTA S							ary, cameau, NVV 10us, 4-7/6				ORIENTATION : VEILICAI
SAMPLE INTERVAL (e) PERCOPERTY (ft) FOR COLOR (ft) FOR COLO	WATER	LEVELS	: 4.25 ft l	ogs on 5/2	<u>22/07</u> S	START : 5/21/2007	END : 5/23/2007	LOGO	JER I	: C.	
-18.7 ea.a 0.2 SS-13 503.5 (503.5')	≥∩≎				STANDARD		SOIL DESCRIPTION			ဗ္ဂ	COMMENTS
-18.7 ea.a 0.2 SS-13 503.5 (503.5')	N A N E	SAMPLE	INTERVA	L (ft)	TEST RESULTS	00" 11	E 11000 0D0115 0\4501	001.05		C LC	DEDTIL OF CACING PRILLING DATE
-18.7 ea.a 0.2 SS-13 503.5 (503.5')	### 1956		RECOVE	ERY (ft)		SOIL NAMI MOISTURF	E, USOS GROUP SYMBOL CONTENT. RELATIVE DE	, COLOR, NSITY OR		OLI.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS. TESTS. AND
-18.7 ea.a 0.2 SS-13 503.5 (503.5')	FY AV			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MI	NERALOGY		MB	INSTRUMENTATION
18.7					(N)						
Incorposation Incorposatio	-18.7	60.6	0.2	SS-13	50/3.5	Limestone Fra	gments And Silt (ML)	D 0/0)	\neg	Ш	
Regin Rock Coring at 61.5 ft bgs See the next sheet for the rock core log 65 -23.7 70 -28.7 75 -33.7		1			(50/3.5)	nonplastic mile	nk yellowish orange, (1011 nd to moderate HCl reaction	ຕ່ານ (ກ່ອນ (ກ່ອນ ໄດ້ ກ່ອນ (ກ່ອນ ໄດ້	/1		Driller's Remark: Hard drilling at 61.0' will
See the next sheet for the rock core log	-					carbonate	2 10 1110401410 1101104040	,	/1		switch to rock coring
See the next sheet for the rock core log	-					Begin Rock Co	ring at 61.5 ft bgs				
70 -28.7 -33.7 -33.7	-	-				See the next sh	neet for the rock core log		-		-
70 -28.7 -33.7 -33.7	-								-		-
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70 -28.7 -33.7 -33.7	65								1		_
75 -33.7	-23.7	1									
75 -33.7	_	1							1		-
75 -33.7	-	1							-		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-19	SHEET	5	OF	10	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

WATER	LEVELS: 4.2	5 ft b	gs on s	5/22/07 START : 5/21/2007 END : 5/	23/20	D7 LOGGER : C. Wallestad	
≩ Ω⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THE PROPERTY OF THE PROPER	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	61.5 R1-NQ 5 ft 91%	88	1 1 1	62.1' - Mechanical break or bedding plane, horizontal, smooth, undulating, tight 63.4, 63.5' - Bedding plane or mechanical break (2), horizontal, smooth, undulating, tight to 1/2" open	AS H H H H H	CHARACTERISTICS Limestone 61.5-66.05' - dark yellowish orange, (10YR 6/6), fine to medium grained, moderate HCI reaction, extremely weak to weak (R0 to R2), voids to 1/8" diameter over 0-30% of rock (mostly 25%), trace fossil casts to 3/16" diameter, no visible cavities, trace dark (possibly organic) inclusions and laminations	5/22/07 start coring at 11:25 Driller's Remark: Cored fast (soft) at 62.0-63.0'
65 -23.7 - - -	66.5		0 0 NR			No Recovery 66.05-66.5'	R1: 5 minutes
- - - - 70 -28.7	R2-NQ 5 ft 85%	83	0 0 3	66.9' - Mechanical break or bedding plane, horizontal, smooth, undulating, tight 69.05' - Mechanical break or bedding plane, horizontal, smooth, undulating, tight 69.75' - Bedding plane, horizontal, smooth, undulating, tight to 1/2" open 70.25' - Fracture, 45 deg, smooth, undulating		brown, (10YR 5/4), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 5-20% of rock, trace fossil casts up to 5/16" diameter, no visible cavities, trace dark gray fine grained inclusions 68.9-69.75' - grayish orange, (10YR 7/4), fine to medium grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids to 1/8" over	Driller's Remark: Very soft at 69.0-70.5'
- - - - - 75	71.5 R3-NQ 5 ft 74%	70	0 NR 0 NR 0 1	to planar, tight		 20-30% of rock, trace fossil casts/molds to 3/16" diameter, no visible cavities, trace dark (possibly organic) particles 69.75-70.75' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 15-20% of rock, fossil casts to 3/8" over 5-10% of rock, no visible cavities No Recovery 70.75-71.5' Limestone 	Driller's Remark: 25% circulation loss at 73.0-74.0', extremely soft, possible silt-filled cavity
-33. 7 - - - -	76.5		1	74.9' - Mechanical break, 0-80 deg, rough, undulating, tight, related to cavities 75.65' - Fracture, 45 deg, rough, undulating, 2" thick silty gravely infill, tight 77.35' - Bedding plane or mechanical break, horizontal, smooth, undulating, associated		71.5-72.75' - grayish orange, (10YR 7/4), fine to medium grained, moderate HCI reaction, medium strong (R3), voids to 1/8" over 20-30% of rock, fossil casts to 9/16" over 10-15% of rock, no visible cavities No Recovery 72.75-74.15' Limestone	R3: 10 minutes
- - 80 -38.7	R4-NQ 5 ft 100%	80	0 1 0	with cavity, tight to 1" open 78.75' - Bedding plane, 10 deg, smooth, undulating, tight		74.15-75.6' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl reaction, medium strong (R3), trace voids, cavities to 2" diameter most with infill, trace fossil casts to 3/8"x3/16", infill is moderate yellowish brown, (10YR 5/4), medium grained, weak (R2), voids up to 3/16" over 40% of infill	Driller's Remark: Soft rock 78.5-81.5' - R4: 4 minutes
	81.5		_		\vdash		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-19	SHEET	6	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

COMING	I WILTHOU A	ND L	ZOIFIV	MENT: CIME 550 S/N 186073, mud rotary, NQ tools, HW	Casing		ORIENTATION : Vertical
WATER	LEVELS: 4.2	25 ft b	gs on	5/22/07 START : 5/21/2007 END : 5/	23/200	7 LOGGER : C. Wallestad	
>00				DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
쀪빙흔	Z, T A, X A, X	(%	FRACTURES PER FOOT	DEDTH TYPE OPIENTATION DOUGHNESS	1 일[MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	ZOV	Q D (%)	P.F.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCE	REG	A Q	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	-			81.1' - Bedding plane or mechanical break,	+	Silt With Limestone Fragments (ML)	Driller's Remark: Lost 95%
-			0	horizontal, rough, undulating, tight	Н	- 75.6-75.8' - moderate yellowish	circulation at 81.5'
_				81.3' - Bedding plane or mechanical break,	₽₩	brown, (10YR 5/4), strong HCl	SC-1 collected at 81.5-
			0	horizontal, rough, undulating, tight	Д	reaction, compacted, carbonate Limestone	82.8'
			"		Н	_ 75.8-76.5' - moderate yellowish	
-	R5-NQ					brown, (10YR 5/4), fine grained,	Driller's Remark: Soft rock
_	5 ft	98	1		₩	moderate HCl reaction, medium	at 83.5-85.0'
-	100%			84.2' - Mechanical break, horizontal, rough,	$\pm \Box$	strong (R3), voids to 1/8" over 10-20% of rock, trace fossil casts to	-
85			0	undulating, associated with cavities, tight to 1" open —	+	— 3/16"x1/8", no visible cavities	1 -
-43.7						76.5-81.5' - moderate yellowish	
					Щ	brown, (10YR 5/4), fine to medium	R5: 7 minutes
]	86.5		0		Ш	 grained, moderate to strong HCl reaction, weak (R2), very weak (R1) 	1
-	50.0				口	at 78.6-78.9' and 81.1-81.3', voids to	Driller's Remark: 100%
-			0		╁╫	1/16" over 15% of rock to 78.6' and	circulation lost at 86.5'
-					\Box	over 40% rock below 78.6', trace fossil casts to 3/8" diameter, trace	SC-2 collected at 87.5-
_			0		╁┼┤	- cavities to 3/8" x 1-9/16" increasing	88.55'
			ľ		Ш	to cover 10-15% of rock at	
	R6-NQ			88.5' - Fracture, 10 deg, rough, undulating,	Н	80.4-81.1', trace dark laminations in	Driller's Remark: Very soft
_	5 ft 70%	70	1	dark stain, tight	ш	 very weak rock sections, dark fat clay layer 3/8" thick at 78.7' 	at 88.5-90.0'
	7070		0		╁┼┤	81.5-86.5' - moderate yellowish	-
90 <u> </u>			U	_		brown, (10YR 5/4), fine grained,	_
-40.7					₽	moderate to strong HCl reaction, weak to medium strong (R2 to R3),	-
			NR		Ш	voids to 1/8" over 10-20% of rock	R6: 11 minutes
	91.5				Н	(decreasing in percent coverage with	
				91.5-91.9' - Fracture zone, rounded		depth), cavities to 2" x 1-3/16" over	
_			>10	fragments to 1-1/2" diameter, compacted silts in zone	ш	40% of rock at 83.5-84.5' (open cavities) otherwise trace cavities to	Driller's Remark: Very soft
-				92.4' - Fracture, 60 deg, smooth, undulating,	+ +	1-3/16" x 3/4" with light gray fine	at 92.0-93.5'
-			10	tight	\Box	grained infill, fossil casts comprise	
_				92.55' - Fracture, 75 deg, smooth, undulating,	╁┼┤	most of cavities 86.5-90.0' - very pale orange grading	-
	R7-NQ 5 ft	9	2	tight 93.0' - Fracture, 30 deg, smooth, planar, tight	Щ	to moderate yellowish brown with	<u> </u>
	56%	9		93.2-93.45' - Fracture zone, fragments to	H	depth, (10YK 8/2 to 10YR 5/4), fine	1
95				1-1/2" x 1"		grained, moderate to strong HCl reaction, medium strong (R3), voids	Driller's Remark: Soft at
-53.7			 	93.75' - Fracture, <10 deg, smooth, — undulating, tight	╁┼┼	to 1/8" over 15-30% of rock, trace	94.5-95.5' —
-			NR	94.05' - Fracture, 15 deg, smooth, undulating,	囯	cavities to 1-3/16" x 3/8" at 89.8',	R7: 6 minutes
-				tight	╂┯╂	trace fossil casts to 3/8" diameter,	-
_	96.5			00507015		trace dark (possibly organic)	Driller's Remark: Soft at 96.0-96.5'
			>10	96.5-97.0' - Fracture zone, fragments to 1-1/2" diameter	┟┴┨	No Recovery 90.0-91.5'	90.0-90.0
			10	97.2' - Bedding plane, horizontal, smooth,	Ш	Silt (ML)	1
			2	undulating, tight to 1/4" open	╁┼	91.5-91.9' - grayish orange, (10YR	1
-				97.5' - Bedding plane, horizontal, smooth,	\Box	7/4), very strong HCl reaction, compacted	1
-	R8-NQ			undulating, tight to 1/4" open 97.65' - Bedding plane, horizontal, smooth,	╂┴╂	-	1
-	5 ft	8		undulating, tight to 1/4"open	団	-	-
_	30%			3, 3	╁┼┦	-	
100			NR				Driller's Remark: 99.5-
-58.7				_	Ш		100.0' only resistance in — run
-					Ш	-	R8: 3 minutes
-	101.5				╂┼╂	-	1
-	101.5				╀┤	-	+
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-19	SHEET	7	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

				HENT . CIVIE 330 3/N 1860/3, Midd Totally, NQ tools, HV				ORIENTATION: Vertical
WATER	LEVELS: 4.2	25 ft b	gs on		5/23/20	007	LOGGER : C. Wallestad	
>				DISCONTINUITIES	O	L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	
핆핏흔	N.Y.	્ર	FRACTURES PER FOOT		\dashv		MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
±ĕ,¥	H F S	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	B		WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무응의	RNN	Ø	ER A	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	. ₹		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	O H R	22	FI	THICKNESS, SORFACE STAINING, AND HIGHTNESS	S		CHARACTERISTICS	·
					Ш	1	Limestone	
_			3	102.0' - Fracture, 60 deg, smooth, undulating,	1	╁	91.9-93.15' - pale yellowish brown,	1
_				open (missing opposite face)	+	╊	(10YR 6/2), fine grained, moderate	
			- 10	102.1' - Bedding plane, horizontal, smooth,			HCI reaction, medium strong (R3), in	SC-3 collected at 102.8-
			>10	undulating, open (missing opposite face)	1_	-	cavity infill, medium grained infill: voids to 1/8" over 5-15% of rock,	104.0'
-	R9-NQ			102.4-102.8' - Fracture zone, fragments to 2"	╁	╁	cavities to 2" diameter over 35-45%	1 104.0
_	5 ft	52	0	x 1-1/2"	\perp	ॄ .	of rock, trace fossil casts to 3/16"	
	100%	0_					diameter, cavity infill is grayish	
405					1	╁	orange (10YR 7/4), medium grained,	1
105_ -63.7			>10	104.8' - Bedding plane or mechanical break,	+	╁	with voids to 3/16" over 25-30% of	
-03.7				horizontal, smooth, undulating, tight		L	infill area	
				105.1-105.8' - Fracture zone, fragments to 1"		T	93.15-94.3' - moderate yellowish	Driller's Remark: Soft to
-			>10		+	╁	brown, (10YR 5/4), fine to medium	105.5' R9: 7 minutes
1 -	106.5			106.05' - Fracture, 50 deg, smooth,	+	╁	grained, moderate to strong HCl	I -
			.40	undulating, tight to open 1/2" 106.3-106.5' - Fracture zone, fragments to		1	reaction, weak to very weak (R2 to R1), voids to 1/8" over 5-15% of	Driller's Remark: Fairly soft
1 -			>10	1/2" diameter		T	rock, trace cavities to 9/16" diameter.	at 106.5-109.0'
-		1		106.5-106.6' - Fracture zone, fragments to	+	╀	with extremely weak (R0) infill, fossil	1
Ι -			2	1-1/2" diameter	\perp	1	casts to 3/16"x3/8" over 5-10% of	l J
			_	107.2-107.55' - Fracture zone, fragments to		1	rock	
_	R10-NC	!)		2" diameter		1	No Recovery 94.3-96.5'	1
_	5 ft	66	0		+	╀	Limestone	-
	85%					1	96.5-98.0' - very pale orange, (10YR	
110							8/2), fine to medium grained, strong	
-68.7			1	-	\dashv	\vdash	HCl reaction, weak to very weak (R1 to R2) in cavities, voids to 1/16" over	
_				110.3' - Bedding plane, horizontal, smooth,	\perp	╁	5-10% of rock, no visible cavities,	1
			1	undulating, tight to 1/2" open	Н	1	fossil casts to 3/4" diameter over	R10: 5 minutes
_	111.5		NR	110.55' - Fracture, 60 deg, smooth,	E	T	10-15% of rock	Driller's Remark: Soft at
-	111.5			undulating, tight	+	╂	No Recovery 98.0-101.5'	111.0-111.5' -
_			1		\perp	╁	Limestone	l
			'	112.0' - Bedding plane or mechanical break,			101.5-106.5' - pale yellowish brown,	Driller's Remark: Soft at
_				horizontal, smooth, undulating, tight	Ш	1	(10YR 6/2), fine to medium grained,	112.0-116.5'
-			1		+	╁	strong HCl reaction, weak to very	-
_				113.05' - Bedding plane, horizontal, smooth,	\perp	Ł	weak (R2 to R1), voids to 1/16" over 10-15% of rock, no visible cavities,	_
	R11-NC			undulating, tight			trace fossil casts and molds to 3/16"	
-	5 ft	98	0		1	╊	diameter	1
-	98%				+	╁	106.5-107.55' - very pale orange,	-
115				114.75' - Bedding plane, horizontal, rough,	\vdash	1	(10YR 8/2), fine to medium grained,	
-73.7			2	undulating, tight		厂	strong HCl reaction, very weak (R1),	1 7
-				115.15' - Bedding plane, horizontal, smooth,	+	╁	trace voids to 1/16", elliptical fossil	R11: 4 minutes
1 -			1	undulating, tight	\perp	╁	molds to 1/16" over 25-30% of rock,	TC17. 4 Hilliaces
	116.5		'	J. J.		1	no visible cavities	
1 -				116.3' - Fracture, 45 deg, smooth, undulating,	Ш	1	107.55-110.75' - moderate yellowish brown, (10YR 5/4), fine to medium	1 1
-			1	tight	+	╀	grained, moderate HCl reaction, very	1 4
				117.05' - Bedding plane, horizontal, rough,	\bot	L	weak to weak (R1 to R2), voids to	
				undulating, tight		ſ	1/8" over 15% of rock, trace fossil	1
-			0			1	casts to 3/16" diameter, no visible	1 +
-					+	+	cavities	-
I	R12-NC		,	118.6, 118.75, 118.9, 119.15, 119.55, 119.65,	\vdash	1	No Recovery 110.75-111.5'	1
1 -	5 ft 99%	78	4	119.95' - Bedding plane (7), horizontal,		1	Limestone	1 1
-	JJ 70			smooth, undulating, tight	$+$ \square	╁	111.5-113.05' - Same as	1
120			3		ᅪ	┺	107.55-110.75' except trace cavities	
-78.7					-	1	to 3/4"-1-3/16" 113.05-114.35' - Same as	
-						1	106.5-107.55' except trace fossil	R12: 6 minutes
-			0		+-	╁	molds to 3/16"x3/8" from	1 -
	121.5				\bot	1_	113.05-113.3'	
						1		
1						1		
					_	_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-19	SHEET	8	OF	10	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

WATER	LEVELS: 4.2	25 ft b	gs on 5	5/22/07 START : 5/21/2007 END : 5/	23/20	07 LOGGER : C. Wallestad	
⊋Q≨	(%			DISCONTINUITIES)g	LITHOLOGY	COMMENTS
ELO ON (N, AND RY (9	_	ZES T	DESCRIPTION	IC FC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - -	R13-NQ		(NR) 6 0	121.9, 122.1, 122.25, 122.35, 122.4, 122.5' - Bedding plane (6), horizontal, smooth, planar to undulating, tight		Limestone 114.35-115.5' - very pale orange, (10YR 8/2), fine to medium grained, strong HCl reaction, very weak (R1), voids to 3/16" over 25% of rock, no visible cavities, fossil casts and molds to 3/16"x9/16" over 0-10% of	Driller's Remark: Soft at 120.5-121.5' - Driller's Remark: Soft at 122.0-123.0' -
- 125 -83.7 -	5 ft 100%	89	0 0			- rock decreasing in coverage with depth 115.5-116.2' - pale yellowish brown with moderate yellowish brown mottling, (10YR 6/2 with 10YR 5/4), medium grained, strong HCI - reaction, very weak to weak (R1 to	R13: 6 minutes SC-4 collected at 125.65-
- - - -	126.5 R14-NQ		3	126.6' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open 127.4' - Bedding plane, horizontal, smooth, planar to stepped, tight to 1/4" open 127.45' - Fracture, vertical, smooth, undulating, tight		R2), voids to 1/8" over 15% of rock, fossil casts and molds to 3/8" diameter over approximately 5% of rock, no visible cavities 116.2-116.7' - Same as 106.5-107.55' except trace fossil casts and molds to 3/16"x3/8" 116.5-117.3' - Same as	126.5'
- 130 -88.7 -	5 ft 777%	45	10 10 NR	127.5' - Bedding plane, horizontal, smooth, planar to stepped, tight to 1/4" open 129.2' - Fracture, 20 deg, smooth, undulating, tight to 1/4" open 129.4-129.55' - Fracture zone, fragments to 1" diameter 129.55, 129.85' - Bedding plane (2),		_ 114.35-115.5' except cavities (fossil casts) to 3/4" diameter over approximately 30% of rock from 116.7-117.3' 117.3-119.55' - grayish orange, (10YR 7/4), fine grained, weak (R2), trace voids to 1/16", no visible	Driller's Remark: Soft at 129.5-130.0'
- - - -	131.5 R15-NQ		1	horizontal, smooth, planar to stepped, tight to 1/4" open 129.9-130.0' - Fracture zone, fragments to 1/2" x 1-1/2", horizontal bedding planes 129.9, 130.0, 130.1, 130.25' - Bedding plane (4), horizontal, smooth, planar to stepped, tight to 1/4" open 131.6, 131.7, 132.1' - Bedding plane (3), horizontal, smooth, planar to undulating, tight		cavities, trace fossil casts and molds to 3/16" diameter 119.55-120.3' - Same as 117.3-119.55' except increasing void coverage to 5-20% of rock and increase in fossil coverage to 5-10% 120.3-120.9' - Same as 115.5-116.2' except fossil coverage consistent 5-10%	Driller's Remark: Soft at 130.5-131.0' Stop coring for the day at 16:55 on 5/22/07 Begin coring for the day at 07:52 on 5/23/07
135 -93.7 -	5 ft 80% 136.5	54	10 2 NR	132.0' - Mechanical break 133.3, 133.7' - Fracture or mechanical break (2), <10 deg, rough, undulating, tight 133.9-134.0' - Fracture zone, fragments to 1" diameter 133.9, 134.0' - Bedding plane (2), horizontal, smooth, planar to undulating, tight		120.9-121.45' - Same as - 107.55-110.75' No Recovery 121.45-121.5' Limestone - 121.5-122.25' - pale yellowish brown, (10YR 6/2), fine grained, strong HCI reaction, medium strong (R3), interpretated with limestress that in the	R15: 9 minutes Driller's Remark: Hard
- - - -			2	134.05' - Mechanical break or fracture, vertical, rough, undulating, tight 134.5' - Bedding plane, horizontal, smooth, planar to undulating, tight 134.65' - Mechanical break or bedding plane, 10 deg, smooth, undulating, tight to 1/2" open 136.65' - Fracture, 30 deg, smooth,		 interbedded with limestone that is the same as 107.55-110.75', no visible voids or fossils, cavities to 3/8" diameter with infill of 107.55-110.75' material, laminations, possible bioturbation 122.5-123.5' - very pale orange 	except 136.0-136.5'
140 -98.7	R16-NQ 5 ft 1 89%	68	10	undulating, tight 136.8' - Fracture, 80 deg, smooth, undulating, tight 137.45' - Fracture or mechanical break, 60 deg, rough, undulating, associated with cavities 138.15' - Fracture or mechanical break, 15		grading to moderate yellowish brown with depth, (10YR 8/2 to 10YR 5/4), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 1/16" over 0-15% of surface increasing in coverage with depth, no visible cavities, trace fossil casts and	Driller's Remark: All fairly hard this run (R16) R16: 9 minutes
_	141.5		NR	deg, rough, undulating, associated with cavities, tight to 1/2" open	<u> </u>	molds to 3/16"x3/8"	

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-19	SHEET	9	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

			<u> </u>	TENT : CIVIE 330 3/N 180073, Midd Totally, NQ 1001S, HW	oaoiii	.9		ORIENTATION : Vertical
WATER	LEVELS: 4.2	5 ft b	gs on s	5/22/07 START : 5/21/2007 END : 5/	23/20	07	LOGGER : C. Wallestad	
				DISCONTINUITIES		Γ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	Н		
N A N	지수도 I	_	꽃	DESCRIPTION	□		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A S E	동돈씨	(%) Q	150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
문문장	# E S S	Ω	AC	PLANARITY, INFILLING MATERIAL AND	MB		AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
BS I	잉필쀲	æ	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S		CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				139.1' - Fracture or mechanical break, <10	+	۰	123.5-124.0' - grayish orange, (10YR	
l -			0	deg, rough, undulating, associated with		1	7/4), fine grained, strong HCl	-
				cavity, tight to 1/4" open	Ш	1	reaction, very weak (R1), voids to	
I -				139.6' - Fracture, horizontal, rough,	Ъ	£	1/16" over 25% of rock, no visible	SC-5 collected at 142.7-
-			1	undulating, dark stain, fracture associated	+-	1	cavities, trace fossil casts and molds	143.85'
-				with cavity, tight		1	to 3/16"x1/8"	145.05
	R17-NQ		40	139.63' - Fracture, vertical, smooth,	\vdash	1	126.5-127.4' - very pale orange to	
-	5 ft 74%	54	10	undulating, tight 139.65-139.9' - Fracture zone, associated	┰	t	grayish orange, (10YR 8/2 to 10YR 7/4), fine to medium grained, strong	1
-	7470			with cavities, fragments to 1" diameter	-	┢	HCl reaction, very weak to weak (R1	Driller's Remark: Soft at
145			2	140.7' - Bedding plane, horizontal, smooth, —		L	to R2), voids to 3/16" over 15-25% of	144.5-145.0'
-103.7				undulating, tight to 1/4" open	Ш	1	rock, no visible cavities, fossil casts	144.5-145.0
-				142.7' - Bedding plane, horizontal, smooth,	T	t	and molds to 3/16"x3/8" over 0-20%	R17: 7 minutes
-			NR	undulating, tight to 1/4" open	-	1	of rock (variable)	-
1	146.5			143.85-143.95' - Fracture zone, fragments to	ш	L	127.4-127.7' - Same as	
1 -				1/2" diameter	\vdash	ſ	121.5-122.25'	1
-			10	143.9, 143.95, 144.0, 144.1, 144.3, 144.4,	世	t	127.7-129.6' - Same as 126.5-127.4'	1
-				144.85, 145.05' - Bedding plane (8), horizontal, smooth, undulating, tight to 1/4"	\perp	1	129.6-130.35' - Same as 121.5-122.25'	
				open	\vdash	1	No Recovery 130.35-131.5'	
-			4	146.6' - Bedding plane, horizontal, smooth,	┰	Ł	Limestone	1
-	l R18-NQ			planar, tight		┢	131.5-131.7' - yellowish gray, (5Y	-
l _	5 ft	35	3	146.75-146.8' - Fracture zone, fragments to		L	7/2), fine grained, moderate HCI	
	80%	00		1/2" x 1-1/2"		1	reaction, medium strong (R3), trace	
450				146.8' - Bedding plane, horizontal, smooth,	1	t	voids to 1/16", no visible cavities or	Driller's Remark: Soft at
150 -108.7			10	planar, tight		┡	fossils	149.5-151.5' —
-100.7				147.0' - Fracture, 70 deg, smooth, undulating,	Щ	Ł	131.7-134.35' - moderate yellowish	
				tight 147.4' - Fracture, 70-80 deg, smooth,	\vdash	1	brown, (10YR 5/4), fine to medium grained, moderate HCl reaction,	R18: 7 minutes
-			NR	undulating, tight	+	t	extremely weak to medium strong	1
-	151.5			☐ 147.5' - Bedding plane, 10 deg, smooth,	$oldsymbol{\perp}$	Н	(R0 to R3), voids to 1/16" over	Daille de De se e de 5/00/07 et
				undulating, tight		Ш	5-15% of rock, no visible cavities,	Driller's Remark: 5/23/07 at
I -				147.7' - Fracture, 70-80 deg, smooth,	7	П	fossil casts to 3/4"x3/8" (trace), trace	09:00, total depth at 151.5'
-				undulating, tight	1	H	laminations	-
-				148.0' - Fracture, 70-80 deg, smooth,	4	Ы	134.35-134.5' - Same as	
				undulating, tight		Ш	131.5-131.7'	Driller's Remark: 5/23/07 at
_				148.4' - Bedding plane, horizontal, smooth, planar, tight	1		134.5-135.5' - pale yellowish brown, (10YR 6/2), fine to medium grained,	14:40, water level is 3.25'
-				148.8' - Fracture, 75 deg, smooth, undulating,	4	H	moderate HCl reaction, weak (R2),	-
I -				tight	1	H	voids to 1/8" over 15-25% of rock, no	
1				149.0' - Fracture, 50 deg, smooth, undulating,	1	П	visible cavities, fossil casts to	
1 -				tight	1	П	9/16"x3/16"	-
1 -				149.2' - Fracture, 75 deg, rough, undulating,	-	H	No Recovery 135.5-136.5'	-
I -				tight	1	Ш	Limestone	
				149.5' - Bedding plane, horizontal, rough,		П	136.5-139.9' - yellowish gray with	
I -				undulating, tight to 1/4" open	1		light olive gray mottling, (5Y 8/1 with 5Y 6/1), fine grained, moderate to	1
-				150.25-150.5 - Fracture zone, fragments to 2" diameter	-	F	strong HCl reaction, medium strong	1 4
1				<u> </u>	L	L	(R3), voids to 1/16" over 5-10% of	
1							rock, fossil casts to 3/4" diameter	1
-					1	H	over 5-10% of rock, cavities to 2-3/4"	1
1 -					4	F	x 1-9/16" over 5% of rock, some with	1 4
1						ı	coating of dark mineral with sulfur	
1 -					1	Γ	scent (possibly pyrite), most cavities	1
1 -					-	F	with infill that is grayish orange with	1 -
1 -				_	1	L	voids to 1/8" over 30-40% of infill	
1						ı	area	
1 -				•	1	r		1
-					-	F		
					1	L		
1						ı		
						1		
					-	•		-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-19	SHEET	10	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 4.2	25 ft bo	gs on s	5/22/07 START : 5/21/2007 END : 5	/23/20	007	LOGGER : C. Wallestad	
>∩ ∵	(9)			DISCONTINUITIES	ق		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS TEST RESULTS FTC
DEPA	CORI LENC RECK	RQE	FRAC PER PER PER PER PER PER PER PER PER PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ANAS TO THE TOTAL THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TOT		AND ROCK MASS CHARACTERISTICS 139.9-140.95' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, medium strong (R3), trace voids to 1/8", no visible cavities, trace fossil casts to 3/16"x3/8" No Recovery 140.95-141.5' Limestone 141.5-143.85' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate HCI reaction, medium strong (R3), voids to 1/16" over 0-20% of rock, one cavity 1-9/16" in diameter at 142.8' with medium to coarse grained infill, trace fossil casts to 1"x3/16", banding of fine to medium grained rock throughout 143.85-145.2' - moderate yellowish brown, (10YR 5/4), medium grained, moderate HCI reaction, weak (R2), voids to 1/8" over 30-40% of rock, trace fossil casts to 3/16"x3/8", no visible cavities No Recovery 145.2-146.5' Limestone 146.5-147.5' - Same as 141.5-143.85' except trace fossil casts to 3/16" diameter No Recovery 150.5-151.5' Bottom of Boring at 151.5 ft bgs on 5/23/2007	DROPS, TEST RESULTS, ETC.
						1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-20	SHEET	1	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

DIVILLIA	OWLIII	OD AND	LQUII IVI	LIVI . DIGUICII D-	50 5/14 252, Illud Total y	y, califeau, Avv3 10us, 5-770	tii-corie bit		ONLINIATION . Vertical
WATER	LEVELS	: 0 ft bgs	on 5/30/0	07	START : 5/30/2007	END: 6/3/2007	LOGGER	: J. E	Burkard
						SOIL DESCRIPTION			COMMENTS
30₽				STANDARD PENETRATION				SYMBOLIC LOG	33
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	0011 111145		201.00) C	DEDTIL OF GARNING DRIVENIA DATE
ᆱᆼᅙ		RECOVE	ERY (ft)			USCS GROUP SYMBOL, (٦	DEPTH OF CASING, DRILLING RATE,
ΗĞĞ				011 011 011		CONTENT, RELATIVE DEN Y, SOIL STRUCTURE, MINE		/BC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
교유교			#TYPE	6"-6"-6" (N)	CONSISTENC	1, SOIL STRUCTURE, MINE	LIVALOGI	Ϋ́	INSTRUMENTATION
40.4				(IV)	No December 0.0	2.00		0)	40:45 04-4 4-11:
40.4	0.0				No Recovery 0.0	J-2.U			13:45 Start drilling
				1					
-		0.0	SS-1	(1/24")			-		Surface consists of grassy wetland material
-				(,			-		that is 100% saturated.
	2.0								
-							-		-
-							_		-
							_		_
-							-		-
I _							_		_
5	5.0								
35.4					Silty Sand (SM)			Ш	Lean clay at bottom of split spoon sample
-		١		3-4-6	5.0-6.1' - light oliv	ve gray, (5Y 5/2), wet, loo	se, 14% low -		-
I _		1.1	SS-2	(10)	plastic fines, very	y fine to fine silica sand	_		_
	6.5			. ,					
-							_		-
-							-		-
l _							_		_
-							-		-
-							-		-
I _									_
							-		-
10 30.4	10.0				0:14 - 0 1 (014)			7.17.	
30.4					Silty Sand (SM)	t olive gray, (5Y 5/2), wet,	von looco		_
		0.8	SS-3	0-0-1	10.0-10.75 - light	fines, organics in last 1" of	f sample	111	
-				(1)	very fine to fine s	silica sand	/ -		-
-	11.5				(101)				<u>-</u>
-							-		-
-							_		_
_							_		_
-							-		-
-							_		_
15	15.0								
25.4					Silt (ML)			Ш	
-		١.,		5-6-5	15.0-16.1' - grayi	sh yellow, (5Y 8/4), wet, s	oft, –		-
_		1.1	SS-4	(11)	nonplastic, rapid	dilatancy, moderate to str	rong HCl		<u>_</u>
	16.5			. ,	reaction, all carbo	onate			
_							-		-
-							-		-
I _									_
-							-		-
-							-		-
									_
1									
1							-		-
20				<u> </u>					
1									



PROJECT NUMBER:	BORING NUMBER:			
338884 FI	B-20	SHEET	2 OF 9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						ary, carnead, AVVJ rods, 3-7			ORIENTATION : Vertical
WATER	LEVELS	: Uπbgs	on 5/30/0	ur S I	START : 5/30/2007	END : 6/3/2007	LOGGE	:к : J.	Burkard
≥ □ ≎				STANDARD		SOIL DESCRIPTION		- 8	COMMENTS
ANI (†	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME		COLOR	C LC	DEDTH OF CASING DRILLING DATE
DEPTH BELOW SURFACE AND ELEVATION (#)		RECOVE	ERY (ft)		MOISTURE	E, USCS GROUP SYMBOL CONTENT, RELATIVE DE	NSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PT.			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MI		₹	INSTRUMENTATION
				(N)				Ś	
20.4	20.0			5.6.40	Silt (ML) 20 0-21 1' - Sar	me as 15.0-16.1' except v	erv stiff	411	<u> </u>
		1.1	SS-5	5-6-13 (19)	20.0 21.1 Out	inc do 10.0 10.1 except t	ory sun	Ш	
	21.5			(.0)				7''	1
-								1	_
-								1	-
-								1	-
-								-	-
-								4	-
_								4	_
_								1	
25	25.0								
15.4					Silt (ML)	November (EV C/A)		Ш	
		1.2	SS-6	14-15-10 (25)	25.0-26.2 - dus wet. verv stiff. n	sky yellow, (5Y 6/4), some nonplastic, rapid dilatancy	e mouning, v. moderate to	111]
_	26.5			(23)	strong HCl read	ction, all carbonate	,	ДЦ.	4
-	20.0							1	-
-								1	-
-								-	-
_								4	-
_								4	_
_								4	_
l _								1	_
30	30.0								
10.4					Silt With Sand	(ML)	-1:66		
-		1.4	SS-7	3-2-10 (12)	nonplastic, rapid	sky yellow, (5Y 6/4), wet, d dilatancy, moderate H0	suπ, Cl reaction.	111	1
-	31.5			(12)	25% fine to coa	arse sand-sized, 2" organ	ic lens at top	111	
-	01.0				of sample, all ca	arbonate	/	T	7
-								1	-
-								+	-
-								4	-
_								4	_
-								1	_
_								1	
35	35.0								
5.4		0.8	SS-8	15-50/3	Silt With Sand	(ML)	oiot bord		
1 7	35.8		550	(65/9")	ob.u-35.75 - ye	ellowish gray, (5Y 7/2), mod d dilatancy, mild to mode	ાકા, ⊓arα, erate HCl	Щ	4
					\ reaction, 20-25	% fine to medium sand-s	ized, all	1	1
-					∖carbonate			1	-
-								1	-
-								1	-
-								+	-
-								+	-
-								4	
								1	
40								\perp	



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	B-20	CHEET	2	ΩE	۵	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

					20 S/N 252, mild rotary, cathead, AWJ rous, 5-7/6 til-corie bit ORIENTATION . Venical	
WATER	LEVELS	. υπ bgs	on 5/30/0		START : 5/30/2007	\neg
≷∂€	CAMPIE	DIE INTERVAL (6)				
DN (SAMPLE			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	
H B		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
0.4	40.0			(14)	Silt With Sand (ML)	┪
-		1.5	SS-9	20-18-22	40.0-41.5' - yellowish gray, (5Y 7/2), moist, hard, low -┃ │ │ │ │	+
-		1.5	33-9	(40)	plasticity, rapid dilatancy, moderate to strong HCl reaction, 15-20% fine to coarse sand-sized, all	\exists
-	41.5				carbonate	\exists
-						4
_						4
_						4
_					_	4
_					_	4
_					<u> </u>	4
45	45.0					
-4.6	45.6	0.6	SS-10	41-50/1 (100")	Silt With Sand (ML) 45.0-45.6' - dusky yellow, (5Y 6/4), moist, hard, low	4
_				(100)	\ plasticity, rapid dilatancy, moderate to strong HCl \	4
_					reaction, 20% fine to coarse sand-sized, one 1/8"	4
						╛
					<u> </u>	
]	1
					1	1
50	50.0				1	1
-9.6					Sandy Silt (ML)	T
-		0.9	SS-11	24-33-50/4.5 (83/10.5)	50.0-51.4' - moderate yellowish brown, (10YR 5/4), -	1
-	51.4			(63/10.5)	strong HCl reaction, 25-30% fine to coarse	1
-					sand-sized, trace organics, all carbonate	1
-					- 1	1
-					- I	1
-					- <u>- </u>	1
-					-	+
-						\exists
	^					\exists
55 <u> </u>	55.0 55.3	0.3	SS-12	50/3	_ Silt With Sand (ML)	\dashv
-				(50/3")	│ \ 55.0-55.3' - moderate yellowish brown, (10YR 5/4), │	+
-					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	+
-					trace organics, all carbonate End drilling for the day 05/30/07	+
-					- I a drilling for the day 55/50/07	+
-					-	+
-						4
-						4
-						4
_						4
60						4



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-20	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER LEVELS: 0 ft bgs on 5/30/07											
				STANDARD	SOIL DESCRIPTION	Ţ	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
H BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR	3	DRILLING FLUID LOSS, TESTS, AND				
DEPT SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	3	INSTRUMENTATION				
-19.6	60.0	0.6	SS-13	32-50/4	Silt With Sand (ML) 60.0-60.6' - Same as 55.0-55.3'		05/31/07 Start drilling at 07:35				
	60.8			(82/10")		ľ	'''				
_						1					
-						-					
-						┨					
-						1					
-						1					
]					
65	65.0 65.2	0.0	00.44	50/0	No December 05 0 05 0	╀	Dellada Daviada Dadi ak 04 5				
-24. 6		0.0	SS-14)	50/2 (50/2")	No Recovery 65.0-65.2'	Ŧ	Driller's Remark: Rock at 64.5'				
-						┨					
-						1					
-						1					
						1					
_						1					
_						1					
						┨					
70 <u> </u>	70.0				Silty Gravel (GM)	-	T				
-		1.2	SS-15	55-25-12 (37)	70.0-71.2' - dusky yellow, (5Y 6/4), moist to wet, dense, mild to moderate HCl reaction, fine to coarse	╁					
				(07)	sand-sized, 31% low plastic fines, 40% fine to coarse gravel-sized limestone, all carbonate	1	<u></u>				
_					Begin Rock Coring at 71.5 ft bgs	1					
_					See the next sheet for the rock core log	┨					
-						┨					
-						1					
-						1					
75					_	1	_				
-34.6						1					
-						-					
-						-					
-						1					
-						1					
						1					
						1					
-						-					
80						╀					



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-20	SHEET	5	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

		1.5 .	<u> </u>	TENT . Diethan D-50 5/N 252, mad rotary, NQ tools, HVV	Odon	9	ORIENTATION: Vertical				
WATER	LEVELS: 0 f	t bgs	on 5/3	0/07 START : 5/30/2007 END : 6/	3/200	7 LOGGER : J. Burkard					
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD					
	N. A. Y.		FRACTURES PER FOOT	DECOMM HOW	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,				
H N N N N N N N N N N N N N N N N N N N		(%) Q	ĬĔĞ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	l Z	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD				
민류년		g	A R	PLANARITY, INFILLING MATERIAL AND	Į₹	AND ROCK MASS	DROPS, TEST RESULTS, ETC.				
20 M	222	ď	12.2	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS					
	71.5		_		Ш	Silt (ML)	13:45 Start drilling on				
-	R1A-NQ 1.5 ft		0		1111	- 71.5-72.3' - yellowish gray, (5Y 7/2),	05/31/07				
-	88%	00	ND			moist, soft, loose, moderate HCl	Driller's Remark: Broke				
	73.0		NR		_	\reaction	drill rod (outer) 1.5' of core sample in outer rod				
						No Recovery 72.3-75.2'	R1A: 11 minutes				
-					1	-	10:55 Start drilling on				
-			NR		-	-	06/01/07				
_	R1B-NQ				_	_	_				
75	3.5 ft										
-34.6	37%		1	_	1_	Limantona					
-			-	75.4' - Joint, 10 deg, rough, undulating	+	Limestone 75.2-76.5' - pale olive, (10Y 6/2),	R1B: 3 minutes				
_			0	75.6, 76.1' - Mechanical break (2), <75 deg		medium grained, moderate HCl	- Trib. 6 minutes				
	76.5				\bot	reaction, medium strong to strong					
I -						(R3 to R4), 1/16-1/8" voids over	11:30 Driller's Remark:				
-			0	76.9, 77.2, 77.6, 77.9, 78.0, 78.2' -	┰	25-40% of surface, fossil casts and	Drillers run out of water -				
-				Mechanical break (6), 50-90 deg	+	molds 76.5-79.3' - light olive gray, (5Y 5/2),	-				
l _			1	77.5' - Joint, >5 deg, rough, undulating		medium grained, moderate to strong	_				
			'			HCl reaction, medium strong (R3),					
_	R2-NQ			78.5-78.9' - Fracture zone, 50-90 deg	1	1/16" voids over 20-40% of surface,	1				
_	5 ft	16	0	-		 fossil casts and molds 	-				
_	56%					No Recovery 79.3-81.5'	_				
80				_	Н						
-39.6			NR								
-			INE		ш	<u>-</u>	R2: 8 minutes				
-					╁╌	-	-				
-	81.5			+-	+-	+	\dashv	04.5.00.01.5.4		L	_
			>10	81.5-82.2' - Fracture zone, 60-70 deg, rough,		Limestone - 81.5-85.6' - light olive gray (5Y 5/2)					
-			/10	non-planar, fragments from 3/4-3"	Т	from 81.5-82.7', dusky yellow (5Y	1				
_					\perp	6/4) from 82.7-85.2', light olive gray	-				
-			0	82.7, 83.2' - Mechanical break (2)	₩	- (5Y 5/2) from 85.2-85.6', mild HCI	-				
l _						reaction, medium strong (R3), small	_				
	R3-NQ					(1/16-1/8") voids over 30-40% of					
_	5 ft 82%	50	0	83.9, 84.9' - Mechanical break (2)	╨	surface, several large surface cavities up to 1/2" in diameter,	1				
-	02 /0				┰	organic stains and thin lenses	-				
85			0	_	ᅪ	— throughout section					
-44.6			"		\vdash						
	1			85.4' - Mechanical break		No Recovery 85.6-86.5'	R3: 4 minutes				
-			NR		1—		-				
-	86.5				╀	Limentone	-				
I -			0			Limestone 86.5-91.1' - light olive gray, (5Y 6/1),]				
			ਁ		\vdash	medium to fine grained, moderate to	1				
_					T	strong HCl reaction, medium strong	1				
-			0	88.0' - Mechanical break	ш	- (R3), small (1/16-1/8") voids over	SC-1 collected at 88.0-				
-	_			55.5 - INCONDINGE DICAN	╁╌	25-30% of surface, highly	89.0'				
	R4-NQ 5 ft	78	0		世	fossiliferous with molds and casts 1/4-3/4" comprising up to 30% of					
1	92%	10			Ш	rock	1				
	"_"				╁	†	1				
90 -49.6			<10	89.9-90.3' - Fracture zone, 1/2"-1-1/2"	世	_	-				
-49.0				fragments, highly fossiliferous, large cavities	$oldsymbol{\perp}$	<u>-</u>					
			0	and molds	\vdash		R4: 6 minutes				
-	01.5		NR	90.9' - Mechanical break		No Recovery 91.1-91.5'	1				
	91.5		INIX		┰	1.5 1.600 (61) 0 1.1-0 1.0	-				
					1						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-20	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical WATER LEVELS: 0 ft bgs on 5/30/07 START: 5/30/2007 END: 6/3/2007 LOGGER: J. Burkard LITHOLOGY DISCONTINUITIES COMMENTS DEPTH BELOW SURFACE AND ELEVATION (#) 90 CORE RUN, LENGTH, AND RECOVERY (%) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 0 91.5-92.8' - Same as 76.5-79.3' 92.0-92.7' - Fracture zone, fragments 1/2-1" in diameter, few >1-1/2", highly fossiliferous 30-40% cavities/fossil molds 92.8-93.9' - light olive gray, (5Y 5/2), 0 SC-2 collected at 92.8fine grained, moderate to strong HCI reaction, medium strong to strong R5-NQ 93.6' - Joint, >5 deg, smooth, undulating (R3 to R4), trace voids on surface 5 ft 40 2 93.8' - Joint, 10-20 deg, rough, undulating, 68% Calcareous Silt (ML) calcareous silt 0 93.9-94.0' 94.6-94.7' - Mechanical break or fracture 95 Limestone $-54.\overline{6}$ 94.0-94.9' - dusky yellow, (5Y 6/4), R5: 5 minutes NR medium grained, strong HCI reaction, medium strong to strong 96.5 (R3 to R4) No Recovery 94.9-96.5' 96.7-98.2' - Fracture zone, many large fragments 3-4" with numerous smaller Limestone 0 96.5-98.7' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), medium fragments 1/2-1" in diameter, larger fragments exhibit high angle (60-70 deg) grained, moderate to strong HCI fracture surfaces, many in conjugate pairs, 0 reaction, weak to medium strong (R2 rough and semi-planar to R3), 1/16-1/8" voids over 25-40% R6-NO of surface, cavities/fossil molds 5 ft 46% 0 1/8-3/4" in diameter over 10-20% of surface, 5-10% cavities are infilled 100 with secondary material, fossil molds -59.6 NR and casts No Recovery 98.7-101.5' R6: 3 minutes 1015 Limestone 101.6' - Fracture, 45 deg, rough, undulating 1 101.5-102.3' - yellowish gray, (5Y 7/2), fine grained, strong HCl to non-planar 101.9' - Fracture, 60 deg, rough, undulating reaction, very strong (R5), trace to semi-planar, intersecting surface voids 102.0' - Parting surface, horizontal No Recovery 102.3-108.0' R7-NQ 5 ft 0 16% NR 105 -64.6 R7: 4 minutes 106.5 Driller's Remark: Driller noted a void space for NR 106.5' 108.0' - Fracture or mechanical break, Limestone 0 108.0-109.2' - dusky yellow, (5Y 6/4), medium grained, strong HCI horizontal, rough, undulating R8-NQ 5 ft 10 0 108.5-109.2' - Fracture zone, fragments 1/2-1" with single fragment 3", irregular fracture surface, 3" fragment exhibits near reaction, weak to medium strong (R2 to R3), 1/16-1/8" voids over 20-30% 24% 110 of surface No Recovery 109.2-111.5' vertical fracture surfaces -69.6 NR R8: 2 minutes 111.5



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-20	SHEET	7	OF	9	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS: 0 f	t bgs o	on 5/3	0/07 START : 5/30/2007 END : 6/	3/200	7 LOGGER : J. Burkard	
>00	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			<10	111.5-112.2' - Fracture zone, 3/4"-1-1/2" fragments 112.2, 112.4' - Fractures or mechanical break (2), 10-15 deg, rough, undulating to		Limestone - 111.5-112.8' - dusky yellow, (5Y 6/4), moderate HCl reaction, very weak (R1), 1/16-1/8" voids over 25% of surface	-
-	R9-NQ 5 ft 62%	25	0	semi-planar 112.6' - Fracture, horizontal, rough, planar, open 112.65' - Mechanical break, non-planar, irregular		112.8-114.6' - grayish yellow, (5Y 8/4), medium grained, extremely strong HCl reaction, very weak (R1), 1/16-1/8" voids over 20% of surface, cavities/fossil molds and casts	-
11 <u>5</u> -74.6			NR	112.9, 113.1, 113.2, 113.7, 114.4' - Fractures (5), horizontal, rough, undulating —		- 1/8-1/2" in diameter over 5-10% of surface - No Recovery 114.6-116.5'	R9: 2 minutes
-	116.5			-	H	Limestone	SC-3 collected at 116.5-
_			0		片	- 116.5-118.1' - Same as 112.8-114.6'	117.5'
_	540.110		0	117.5, 118.1' - Fractures (2), horizontal, rough, undulating, open 118.4' - Fracture, 60 deg, non-planar	Ħ	_ 118.1-120.0' - pale greenish yellow, (10Y 8/2), medium to fine grained,	-
_	R10-NG 5 ft 96%	60	0	118.9' - Fracture, 5 deg, smooth, planar 118.9' - Fracture, 15 deg, rough, undulating 119.0' - Fracture, 15 deg, rough, undulating		extremely strong HCl reaction, very weak (R1)	-
120 -79.6 -			<10 4	119.1' - Fracture, vertical, irregular, tight 119.2' - Fracture, 20 deg, rough, undulating 119.7' - Fracture or mechanical break, horizontal, rough, undulating			R10: 1 minute
	121.5		NR.	120.0-121.3' - Fracture zone, very soft, friable, 1-4" with rough, undulating, irregular	Н	- No Recovery 121.3-121.5'	
_			0	fracture surfaces		Limestone 121.5-122.5' - dusky yellow, (5Y 6/4), medium to fine grained, moderate to	-
_	R11-NC		>10	122.5-126.4' - Fracture zone, fragments 1-4", rough, undulating, irregular fracture surfaces, vertical fractures intersected by irregular, non-planar, low angle fracture, non-planar		strong HCl reaction, weak to medium strong (R2 to R3), fossil casts and molds 1/2-1" in diameter over	_
-	5 ft 98%	43	0	ion panal, low angle nations, not panal	Ħ	10-15% of surface, trace voids 122.5-123.5' - dusky yellow, (5Y 6/4), medium grained, strong HCI	-
125 -84.6 -			3		Ħ	reaction, very weak (R1), trace voids 123.5-124.0' - Same as 121.5-122.5' except no fossil molds and casts	R11: 4 minutes
-	126.5		5 NR		Ħ	124.0-126.4' - dusky yellow, (5Y 6/4), medium grained, strong HCI reaction, weak (R2), fossil casts and	-
-			0	126.65' - Fracture, horizontal, rough 127.1' - Fracture, 15 deg, semi-planar to undulating		molds up to 1/2" in diameter over 5-10% of surface, 1/16-1/8" voids over 15-25% of surface]
-	D40 NO		<10	127.1-128.0' - Fracture zone, fragments 3/4-2", bedding plane	Ħ	No Recovery 126.4-126.5' Limestone 126.5-128.0' - dusky yellow, (5Y 6/4),]
130	R12-NG 5 ft 30%	8	NR	_		medium to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), fossil casts and molds, 1/16-1/8" voids over 50-70% of surface	-
-89. 6 -	131.5					No Recovery 128.0-131.5'	R12: 4 minutes
	101.0						
					1		I



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-20	SHEET	8	OF	9

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS: 0 f	t bgs	on 5/3	0/07 START: 5/30/2007 END: 6/3	3/200	7 LOGGER : J. Burkard			
				DISCONTINUITIES	ß	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
	014	ш.	0	131.5-132.0' - Disaggregated material 132.0' - Bedding plane, horizontal, smooth,		Silt (ML) 131.5-132.0' - yellowish gray, (5Y 7/2), strong HCl reaction, with	Finish drilling for the day at 17:30 on 06/01/07 - Start drilling at 07:55 on		
_			0	132.3, 132.6, 132.9' - Fractures or mechanical break (3), rough, undulating to non-planar		\limestone fragments Limestone 132.0-133.7' - dusky yellow, (5Y 6/4),	06/03/07		
-	R13-NQ 5 ft 60%	22	<10	133.5' - Bedding plane, 10 deg, smooth, planar 133.6-134.4' - Fracture zone, fragments	H	medium to fine grained, strong HCI reaction, weak to medium strong (R2 to R3)	-		
135_ -94.6 -	136.5				NR	range from 1/2-2"			R13: 3 minutes
-			0	136.5, 136.6, 136.9, 137.1' - Fractures (4), 0-15 deg, rough, undulating to semi-planar 137.2' - fine grained limestone, no voids		Limestone - 136.5-137.2' - Same as 133.7-134.5' except very weak (R1)	-		
-			0	137.3' - Fracture, 45 deg, rough to stepped, non-planar 137.5, 138.4, 138.7, 139.0' - Fractures or	Ħ	137.2-139.0' - light olive gray, (5Y 6/1), fine grained, moderate to strong HCI reaction, strong to very strong	_ _		
-	R14-NQ 5 ft 86%	40	0	mechanical break (4), 0-10 deg, rough, undulating to semi-planar 139.0-140.8' - Fractures, rough, undulating to semi-planar, spaced 1-2" apart with zones of	Ħ	(R4 to R5), trace 1/16" voids across surface, cavities/fossil molds up to 3/4" in diameter over 5% of rock concentrated in 1-2" zones (up to	_ _		
140 -99.6 -			<10	rock fragments ranging from 3/4"-1-1/2", dark — black/brown staining on some fracture surfaces (more prevalent with depth)		— 30%), numerous fossil casts and molds — 139.0-140.8' - yellowish gray, (5Y – 7/2), medium to fine grained, strong	R14: 7 minutes		
-	141.5		NR 1	- 141.7' - Fracture, horizontal, rough,	Ħ	HCl reaction, weak to medium strong (R2 to R3), dark brown/black staining on fracture, 1/16-1/8" voids over 10%	_		
- - -			0	undulating 142.2' - Bedding plane, 5 deg, smooth, planar -		of surface No Recovery 140.8-141.5' Limestone 141.5-141.7' - yellowish gray, (5Y	SC-4 collected at 142.2- 143.1' -		
_	R15-NQ 5 ft 70%	50	2	143.7' - voids 143.7, 143.8, 143.9' - Fractures (3), horizontal, rough, undulating	H	7/2), fine grained, strong HCI reaction, strong (R4), trace cavities on surface 141.7-141.8' - Same as 141.5-141.7'	-		
145_ -104.6			1	144.2' - Mechanical break, rough to stepped, undulating to non-planar 144.5, 144.7, 145.0' - Fractures or		except voids 141.8-143.6' - Same as 141.5-141.7' 143.6-145.0' - moderate yellowish			
-	146.5		NR	mechanical break (3), horizontal, rough, undulating 145.1' - Bedding plane, horizontal, smooth,		brown, (10YR 5/4), medium grained, mild HCl reaction, very weak to weak (R1 to R2), 1/16" voids over up to	R15: 7 minutes		
- -			0	planar 146.6, 146.7, 146.75, 147.0, 147.2, 147.3, 147.6' - Fractures (7), 0-5 deg, rough,		50% of surface, cavities/fossil molds up to 1/2" in diameter over <5% of rock	- 11:30 Driller's Remark:		
-	R16-NQ 5 ft	67	0	undulating, bedding plane partings - -		No Recovery 145.0-146.5' Limestone 146.5-147.3' - moderate yellowish brown, (10YR 5/4), medium grained, mild to strong HCl reaction, very	Driller's run out of water, go to refill water tank 13:30 Driller's Remark: Refill drill with water		
150 -109.6	100%		0	- 		 weak (R1), finely laminated, wavy bedding planes, 1/16" voids over 10-20% of surface, one 1" surface 	SC-5 collected at 147.9- 148.8'		
_	151.5		0	mostly planar 150.8' - voids		- cavity -	R16: 4 minutes		
					1				

APPENDIX 2BB-572 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-20	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 0 f	t bgs o	on 5/30	0/07 START : 5/30/2007	END : 6/3	/200	7 LOGGER : J. Burkard	
				DISCONTINUITIES		ō	LITHOLOGY	COMMENTS
ELOV SN (ft	N, AND ₹Y (%		ES T	DESCRIPTION		CLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	E RU STH, OVEF	Q D (%)	FOOT	DEPTH, TYPE, ORIENTATION, ROUGI	HNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQ	FRACTURES PER FOOT	PLANARITÝ, INFILLING MATERIAL THICKNESS, SURFACE STAINING, AND T	AND FIGHTNESS	SYMBOLIC LOG	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		_		\ 151.0, 151.2, 151.25' - Fractures (3),	<5 deg, /	Ė	147.3-150.8' - light olive gray, (5Y	09:00 Finish drilling on
_				rough, undulating, bedding plane par	tings / -		- 5/2), fine grained, moderate to strong HCl reaction, strong (R4), trace fossil	06/03/07 -
_					_		molds and casts 1/2" on surface	11:30 Driller's Remark:
					_		- \ 150.8-151.5' - moderate yellowish brown, (10YR 5/4), medium grained,	Drillers run out of water, go - to refill water tank
							mild HCl reaction, very weak to weak (R1 to R2), 1/8-3/16" voids over 50%	13:30 Driller's Remark: Refill with water
_					_		of surface	-
_							Bottom of Boring at 151.5 ft bgs on 6/3/2007	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-21	SHEET	1	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" drag bit and 4-7/8" tri-cone bit

ORIENTATION : Vertical

						7, auto nammer, NVV 1005, 4-7			
WATER	LEVELS	: 3.5 ft b	gs on 6/0:	3/07 S ∎	START : 5/30/2007	END : 6/4/2007	LOGGE	R : C.	Dellaria, P. De Sa'rego
> ^ -				STANDARD PENETRATION		SOIL DESCRIPTION		۾ ا	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	TEST RESULTS	0011 11414		201.00	SYMBOLIC LOG	DEDTILOS CACINIO DELLINIO DATE
불병		RECOVE	ERY (ft)			E, USCS GROUP SYMBOL, (CONTENT, RELATIVE DENS) 	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FF A			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MINE		MB	INSTRUMENTATION
SU				(N)				SΥ	
41.8	0.0				Top Soil			7/1/	Split spoon sampling begins at 15:13
_		1.5	SS-1	0-2-3	roots	ish black, (5YR 2/1), moist	, organic		Driller's Remark: Spade bit used to 15.0'
-	4.5			(5)	Poorly Graded	Sand (SP)	/	1	1
-	1.5					ray, (N7), moist, loose, ver	y fine to fine	+	-
_					grained, 5% fine with depth, sand	es, nonplastic, organics de	creasing /	-	-
_					with depth, sand	u is silica		4	
_								1	_
								1	
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5	E 0							1	
36.8	5.0				Silty Sand (SM))		111	╡ -
-		0.7	00.0	1-2-1	5.0-5.7' - modera	rate brown to pale yellowish		-] -
-		0.7	SS-2	(3)	(5YR 4/4 to 10Y	'R 6/2), moist, very loose, v	very fine to	Ή	-
_	6.5				Viirie graineu, 20	% fines, low plasticity, sand	u is silica	1	_
									_
								1	1
-								1	1
-								1	-
-								+	-
-								4	-
10	10.0								
31.8				0.40.40	Limestone Frag	gments e yellowish brown, (10YR 6	(2) strong	▞	_
		0.8	SS-3	3-16-10 (26)	\neg \HCI reaction, an	ngular limestone rock fragn		ДШ	-
	11.5			(=0)	\3/8"				
-					Silt (ML)	yish orange, (10YR 7/4), we	ot work stiff	1	
_					nonplastic. verv	rapid dilatancy, moderate	HCI	1	1
-					reaction, limesto	one fragments in shoe, all o		-	-
-					derived			+	Driller's Remark: Switch to 4-7/8" roller cone
-								4	bit -
-								1	
_								1	
15	15.0							1]
26.8		0.8	SS-4	30-50/3	Limestone Frag	gments]
-	15.8	0.0	55-4	(80/9")	│	ne as 10.0-10.3' except fra	gments up	ДШ	1
-					Silt With Sand ((ML)	/	' -	
-					15.3-15.75' - ver	ry pale orange, (10YR 8/2)	, moist,	+	-
-						e, very rapid dilatancy, mod tion, 20% fine grained sand		+	-
-					carbonate derive		u, ali	4	-
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-21	SHEET	2	OF 8	3

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLIN	DRILLING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" drag bit and 4-7/8" tri-cone bit ORIENTATION : Vertical										
WATER	LEVELS	: 3.5 ft bo	gs on 6/03	3/07	START : 5/30/2007 END : 6/4/2007 LOGGER : C. Dellaria, P. De Sa'rego						
				STANDARD	SOIL DESCRIPTION COMMENTS						
A PIC (#) N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS							
ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND						
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
21.8	20.0			(14)	Silty Sand With Limestone Fragments (SM)						
-		1.3	SS-5	36-30-8	20.0-21.25' - very pale orange, (10YR 8/2), moist, dense, fine to coarse grained, 37% fines, low						
-	21.5			(38)	_ plasticity, moderate HČl reaction, 30% fine						
-	21.0				\delta gravel-sized limestone fragments, all carbonate \delta - \delta carbonate \delta - \delta carbonate \						
-											
-					1						
] [
] [
_					<u> </u>						
25	25.0				CHANGEL Cond (All)						
16.8			0.5	15-22-18	Silt With Sand (ML) 25.0-25.9' - grayish orange, (10YR 7/4), moist, hard, Driller's Remark: Harder material at 34.5', drill chatter						
-		0.9	SS-6	(40)	trace% gravel, nonplastic, rapid dilatancy, moderate to strong HCI reaction, 15% fine to medium grained						
-	26.5				\sand, trace fine grained gravel, all carbonate derived / -						
-											
-											
-											
-											
-											
30	30.0				11						
11.8				10.10.00	Silt With Sand (ML) 30.0-31.0' - Same as 25.0-25.9'						
l _		1.0	SS-7	10-19-20 (39)	50.0 51.0 - Same as 25.0 25.5						
_	31.5			-							
-											
-											
-											
-											
-											
35	35.0										
6.8	35.0 35.2	0.2	SS-8	50/2	Limestone Fragments Driller's Remark: Hard material						
				(50/2")	\ \ 35.0-35.2' - pale yellowish brown, (10YR 6/2), \ \ moderate to strong HCl reaction, angular fragments to \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \						
					1/4"						
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PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-21	SHEET	3	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLIN	DRILLING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" drag bit and 4-7/8" tri-cone bit ORIENTATION : Vertical										
WATER	LEVELS	: 3.5 ft bo	s on 6/03	3/07 S		R : C	. Dellaria, P. De Sa'rego				
≥□⊋			STANDARD SOIL DESCRIPTION PENETRATION				COMMENTS				
ELO)	SAMPLE INTERVAL (ft) RECOVERY (ft) #TYPE 6"-6"-6" (N)			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	O LC	DEPTH OF CASING, DRILLING RATE,				
TH B		RECOVE		011 011 011	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	DRILLING FLUID LÓSS, TESTS, AND INSTRUMENTATION				
SUR			#TYPE	6"-6"-6" (N)	GONOISTENOT, GOIL STITUOTOTIL, MINELIALGAT	SYN	INOTHOMENTATION				
1.8	40.0			04 04 04	Silt (ML) 40.0-41.4' - pale yellowish brown, (10YR 6/2), moist,	\prod					
_		1.4	SS-9	21-21-21 (42)	hard, nonplastic, rapid dilatancy, moderate to strong	Ш	_				
-	41.5				HCI reaction, 10-15% fine to medium grained sand, all carbonate derived	╨	4				
-					-	┨	-				
-					-	┨	-				
-					-	ł	-				
-					-	1	1				
-					-	1	1				
45	45.0				-						
-3.2	45.8	0.8	SS-10	61-50/3 (111/9")	Silty Sand With Limestone Fragments (SM) 45.0-45.8' - pale yellowish brown, (10YR 6/2), moist,		End drilling on 5/31/07				
_	40.0			(111/3)	very dense, fine to coarse grained, 35% fines, low	╫	Begin drilling on 6/1/07 at 07:30				
_					plasticity, moderate HCl reaction, 15% fine to coarse grained gravel, all carbonate derived	┨	-				
-					-	ł	-				
-					-	┨	-				
-					-	1	-				
-					-	1	1				
-					-	1	1				
50	50.0				_]_	_]				
-8.2		4.0	00.44	1-2-50/4	Sandy Silt With Limestone Fragments (ML) 50.0-51.2' - pale yellowish brown, (10YR 6/2), moist,	Ш	_				
-	51.3	1.2	SS-11	(52/10")	hard, nonplastic to low plasticity, rapid dilatancy, mild to moderate HCl reaction, 30% fine to coarse grained	Ш	-				
_	01.0				sand, 35% fine grained gravel, all carbonate derived	Г	-				
-					-	ł	-				
-					-	1	1				
-					-	1	1				
]				
]											
55 <u> </u>	55.0				Condu Cilt With Limestone Francisco (881)	 					
-13.2			00.40	19-31-39	Sandy Silt With Limestone Fragments (ML) 55.0-56.4' - pale yellowish brown, (10YR 6/2), moist,	$\ \ $					
-	I	1.4	SS-12	(70)	hard, low plasticity, rapid dilatancy, 35% fine to coarse grained sand, laminated black organic layers at	$\ \ $					
-	56.5				55.3-55.5', fine to coarse gravel-sized limestone fragments in last 0.25', mild to moderate HCl reaction	╀	'				
-					in all materials (except organics)	1	1				
-					-	1	1				
						1]				
-						-					
60						\vdash	-				



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-21	SHEET 4 OF 8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" drag bit and 4-7/8" tri-cone bit

ORIENTATION : Vertical

						y, auto nammer, nvv rous, 4				
WATER	LEVELS	: 3.5 11 00	gs on 6/03		START : 5/30/2007	END : 6/4/2007	LOGG	iek T	: C.	Dellaria, P. De Sa'rego
≥□₽				STANDARD PENETRATION		SOIL DESCRIPTION		\dashv	၁၉	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBOL,	COLOR		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ACE		RECOVE	ERY (ft)			CONTENT, RELATIVE DE			30LI	DRILLING FLUID LOSS, TESTS, AND
FERT			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, MIN	NERALOGY		YME	INSTRUMENTATION
				(N)	0:11 0 1 (011	N		4	S	D. III. 1. D
-18.2	60.0			10.05.00	Silty Sand (SM) 60.0-61.2' - pale	e yellowish brown, (10YR	6/2) moist	1		Driller's Remark: Harder material at 62.0- 63.0' –
		1.2	SS-13	19-35-28 (63)	hard, medium p	olasticity, rapid dilatancy, r	noderate to			
	61.5			(,		on, limestone from 60.0-6 stic silt lens from 60.7-61.1		П	Ш	
-						n [10YR 4/2]), all carbonat		/1		1
-					() ee	. [.5 45.1154	′ 1		1
-								Ⅎ		-
-								Ⅎ		-
-								-		-
-								-		-
-								4		_
65	65.0		00.11	50//						
-23.2	65.3	0.3	SS-14	50/4 (50/4")	Limestone And	d Sandy Silt (ML) derate yellowish brown, (1	IOYR 5/4)	∄	Щ	_
_				(50/4)	moderate HCI r	eaction, 60% of sample is	s fine to			
						limestone gravel, 40% is silt similar to previous sam		/1		
-					uerived saridy s	siit siiriilar to previous sair	ipies	1		1
-								٦		1
-								1		1
-								-		-
-								-		-
-								-		-
-								4		-
70 <u> </u>	70.0				0	`		4		
-28.2				17-6-9	Sandy Silt (ML) √ 70.0-70.4' - pale	.) e yellowish brown, (10YR	6/2), moist.	7	щ	_
_		0.8	SS-15	(15)		city, rapid dilatancy, mode	raté HCI		_	_
_	71.5			, ,	reaction, 25-30° carbonate deriv	% fine to coarse grained s	sand, all	$/\!\!/\!\!\perp$		_
					Limestone Frag			'		
					70.4-70.8' - pale	e yellowish brown, (10YR	6/2), mild to	\prod		
-						eaction, fine to coarse gra fragments, trace organics		11		7
-					inflestorie rock	magments, trace organics		1		1
-								1		
-								\exists		
								\exists		-
75 <u> </u>	75				l imestone Fra	gments And Silty Sand (SM)	+	HU	-
-		, _	00.46	21-2-3	75.0-76.5' - Sar	me as 70.0-70.8' except li	mestone	-		-
_		1.5	SS-16	(5)	fragments from	coarse sand to coarse gr derived silts and sands	avel mixed	4		Drilloria Romarki 1009/ water lasa
l -	76.5							_	Ш	Driller's Remark: 100% water loss 75.0-76.5' at 6 blow count level, very soft
I -					See the next sh	ring at 75.0 ft bgs neet for the rock core log		4		material
-					222 2.0	· 50 · 60.0 log		_]		_
I _								J		
								- []
								7		1
								1		1
80								1		1
								寸		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-21	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, NQ tools, HW casing

COMING	NIETHOD AI	ND E	JUIPIN	ENT : CME 75 S/N 252437, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bg:	s on 6/	03/07 START : 5/30/2007 END : 6/	4/200	LOGGER : C. Dellaria, P. De Sa'r	ego
\				DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SS	Səñ	R Q	F.E.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	75.0				1	No Recovery 75.0-77.0'	
-	R1-NQ 2 ft 0%	0	NR		-	- -	R1: Run time not recorded
_	77.0		>10	77.0-77.3' - Fracture zone, limestone rock fragments from 3/4"-1.5"	Ħ	Limestone - 77.0-78.75' - pale yellowish brown,	-
-			- 10	77.5-78.5' - Fracture zone, limestone rock fragments from 3/4"-1.5"	\blacksquare	_ (10YR 6/2), fine to medium grained, mild HCl reaction, weak (R2), voids	-
_			>10	78.55-78.75' - Fracture, vertical, rough, undulating, moderately tight	Ħ	- (3/16") over 15-20% of rock surface, trace cavities up to 9/16"x3/8"	-
80	R2-NQ 5 ft 35%	35		andulating, moderately tight	押	No Recovery 78.75-82.0'	-
-38.2	3376		NR	-	臣		
-					H	-	R2: 9 minutes
	82.0				Ħ	_	-
_			>10	82.0-82.4' - Fracture zone, limestone rock fragments from 3/4"-1.5"	H	Limestone - 82.0-85.2' - Same as 77.0-78.75'	-
_			0	82.75-82.9' - Fracture zone, limestone rock fragments from 3/4"-2" 83.1, 83.7, 84.15' - Mechanical break (3)	\pm	except moderate yellowish brown, (10YR 5/4), 5-10% partially infilled - cavities 3/4" x 1-3/16"	-
-	R3-NQ			65.1, 65.7, 64.15 - Weditalical Dreak (5)	Ē	-	-
85	5 ft 64%	51	2	84.35-84.5' - Fracture, 30 deg, rough, undulating, open	Ħ	- 	-
-43. <u>2</u> -			0	84.4-84.45' - Fracture, 30 deg, rough, undulating, open	Ħ	No Recovery 85.2-87.0'	Driller's Remark: Casing advanced to 85.0' Driller's Remark: Using
_			NR			-	polymer EZ mud (not bentonite quick gel)
-	87.0		. 10	87-88' - Fracture zone, limestone rock	Ħ	Limestone	R3: 18 minutes Drilling ends on 6/01/2007,
_			>10	fragments from 3/4"-2" 88.0-88.2' - Fracture, 60 deg, rough,		 87.0-89.9' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, medium strong (R3), 	no drilling on 6/02/07 due to rain Drilling begins on 6/03/07
_			1	undulating, open	」	 small voids (1/16"-1/8") over 5-15% of rock surface increasing with depth. 	at 07:35 - SC-1 collected at 88.0-
90	R4-NQ 5 ft 58%	25	2	89.3-89.4' - Fracture, 60 deg, rough, undulating, open	H	At 87.0-88.0': 25% cavities/casts up to 1" x 1-3/16", highly fossiliferous. At 88.0-89.9 trace cavities up to	89.1' Driller's Remark: Circulation loss at 89.0'
-48.2 -	30 /6			89.7' - Fracture, horizontal, rough, undulating, open	Ħ	3/4"x3/8", partially infilled with recrystalized carbonate, some with	-
-			NR			black staining, moderate HCl reaction	R4: 18 minutes
	92.0			02.0.02.0! Frontiero zono limontono re-li	H	 88.0-89.9' - voids (1/16"-1/8") over 5-15% of rock surface (increasing with depth) 	-
-			>10	92.0-93.0' - Fracture zone, limestone rock fragments from 1/2"-3/4"	Ħ	No Recovery 89.9-92.0' Limestone	-
-			1	93.25' - Fracture, horizontal, rough,	H	92.0-93.0' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, medium strong (R3),	-
_	R5-NQ 5 ft	15	2	undulating, open 94.0' - Fracture, 60 deg, rough, undulating,	Ħ	cavities (1" x 1-3/16") over 25% of rock surface, highly fossiliferous	-
95	5 π 44%	10		open	Ħ		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-21

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, NQ tools, HW casing

				IENT : CIVIE 75 S/N 252457, Hidd Totally, NQ tools, HW C			ORIENTATION: Vertical
WATER	LEVELS: 3.5	ft bgs	on 6/		1/200		
≥0≎	(%			DISCONTINUITIES	ပ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTIL OF CACING
ᆲ빓읃	RUI H. / ÆR	D (%)	JUR DO	DEDTH TYPE ODIENTATION POHOUNESS	[≒	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
FFA SYF	RE VGT COV) O (ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUI	S LEP	RQ	FR	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-53.2				94.1' - Fracture, horizontal, rough, undulating,		93.0-93.2' - pale yellowish brown,	Driller's Remark: No
-			NR	open -	Н	 (10YR 6/2), fine grained, medium 	circulation -
_				-	H	strong (R3), voids over 0-3% of rock	DE: 22 minutes
I _				_	ш	surface, no cavities - 93.2-94.2' - voids (1/16-1/8") over	R5: 22 minutes
	97.0				Ш	5-15% of rock surface (increasing	
				97.0-97.1' - Fracture zone, limestone rock		with depth), trace cavities up to	
_			>10	fragments from 3/4"-1.5"	Н	 3/4"x3/8", partially infilled with recrystallized carbonate, some with 	1
_				97.8-97.95' - Fracture zone, limestone rock		black staining, moderate HCl	-
_			2	fragments from 1/2"-1"	Н	- reaction	_
				98.4-98.5' - Fracture or mechanical break, 30 deg, rough, stepped -		No Recovery 94.2-97.0'	_
	R6-NQ	22		98.75' - Fracture, <10 deg, rough, undulating,	Ш	Limestone 97.0-99.05' - Same as 88.0-88.9'	
100	5 ft 41%	23		open	Ш	except cavities 1-3/16" x 2" infilled	1
-58.2	,				口	with fine grained material, voids over	-
-			NR	-	Н	3% of rock surface, medium light	Driller's Remark: Cavity at
-				-	ш	gray (N6) to grayish orange (10YR 7/4) infilling increases with depth	100.5-104.0'
I _				_	Н	from 5% at 97.0' to 40% at 99.05'	R6: 21 minutes
	102.0					No Recovery 99.05-102.0'	
				_	Н	No Recovery 102.0-104.0'	1
_				-		- Cavity	1
-			NR	-	Н	_	1
_				-		<u>-</u>	-
_				_	Ш	_	_
	R7-NQ		_0_/		Н	Limestone	
105	5 ft 2%	0			\vdash	 104.0-104.1' - Same as 88.0-88.9' except no infilling, voids over 10% of 	1
-63.2					╁	rock surface, no cavities	
-			NR	-	Ш	- No Recovery 104.1-107.0'	-
_				-	Н	_	R7: 4 minutes
_				<u>-</u>		_	R7.4 minutes
	107.0				Н		_
			4.0	107.0-107.3' - Fracture zone		Limestone	
			>10	107.6' - Fracture or mechanical break, 45	$\vdash\vdash$	 107.0-107.3' - pale yellowish brown, (10YR 6/2), fine grained, weak to 	1
-				deg, rough, undulating, open	口	medium strong (R2 to R3), voids	-
-			2	107.85' - Fracture or mechanical break,	Н	 over 10% of rock surface, 10% 	-
-	DO NO			horizontal, rough, undulating, 2 inch open 108.0' - Fracture or mechanical break, 45	Ш	cavities 3/16"-3/4" 107.3-109.25' - pale yellowish brown,	-
	R8-NQ 5 ft	23	>10	deg, rough, undulating, open	Н	- (10YR 6/2), fine grained, weak to]
110	74%			108.4' - Fracture or mechanical break,	Щ	medium strong (R2 to R3), voids	
-68.2			>10	horizontal, rough, undulating, open	Ш	over 10% of rock surface, no cavities	
-			- 10	108.5' - Fracture or mechanical break, 45 deg, rough, undulating, open	Ш	 109.25-110.7' - pale yellowish brown, (10YR 6/2), fine grained, weak to 	1
-				109.25-110.7' - Fracture zone, 60 deg and 80	$\vdash \vdash \vdash$	medium strong (R2 to R3), voids	R8: 15 minutes
-			NR	deg, limestone rock fragments from 3/4"-2"	냅	over 10% of rock surface, 10%	_
_	112.0			-	Ш	cavities 3/16"-3/4" No Recovery 110.7-112.0'	Driller's Remark: Water level at 3.5'
			>10	112.25,112.3' - Fracture (2), horizontal,	Ы	Limestone	Driller's Remark: Hole
]			- 10	rough, undulating, open ` '	F	112.0-112.85' - pale yellowish brown,	collapse, advanced NW
				112.4-113.0' - Fracture zone, limestone rock	$\vdash \vdash$	(10YR 6/2), fine to medium grained,	casing to 106.0', end - drilling on 6/03/07 at 17:00
-			>10	fragments from 1"-1.5" 113.55' - Fracture, 60 deg, rough, planar,	ш	mild HCl reaction, weak (R2), voids (1/16") over 5-10% of rock surface,	Driller's Remark:
1 -	R9-NQ			open, black staining	Н	no visible cavities	Circulation loss at 113.0', -
-	5 ft	22	1	113.7-114.0' - Fracture zone, limestone rock	口	<u> </u>	drilling soft, not like a cavity
115	55%			fragments from 1.5"-3"	Н		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-21	SHEET	7	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, NQ tools, HW casing

WATER	LEVELS : 3.5	ft bg	s on 6/	03/07 START : 5/30/2007 END : 6/4	1/200	7 LOGGER : C. Dellaria, P. De Sa'	rego
> O :=	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	(%) 🛭	FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	SORI	RO	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-73.2	0	_		114.2' - Fracture, horizontal, rough,		112.85-113.45' - Same as	Drilling resumes on 6/04/07
-			NR	undulating, open 114.5' - Mechanical break	Н	 112.0-112.85' except pale yellowish brown, (10YR 7/4), trace cavities up 	at 07:20 -
-			INK	114.5 - Wechanical Dreak	F	to 3/8"x3/8"	R9: 15 minutes
_	117.0			-	Ħ	 113.45-114.75' - medium gray to grayish orange, (N5 to 10YR 7/4), 	1
_				- 117.1' - Fracture, horizontal, rough,	Ħ	cavities (up to 3/8") over less than	1
_			4	undulating, open 117.5' - Fracture, horizontal, rough,	H	 5% of rock surface No Recovery 114.75-117.0' 	Driller's Remark: Soft
_			3	undulating, open	Ш	Limestone - 117.0-117.7' - medium gray, (N5),	zones at 117.5-118.5, - 119.0-120.0'
				117.9-117.9' - Fracture, horizontal and 60 deg, rough, undulating, open _	Н	fine to medium grained, mild HCI]
_	R10-NQ 5 ft	8		118.1' - Fracture, 45 deg, rough, undulating,	\vdash	reaction, weak to medium strong (R2 to R3), voids (up to 3/16") over 10%	
120_	31%	U		open 118.3, 118.4' - Fractures (2), horizontal,	Д	of rock surface, trace cavities up to	
-78.2			NR	rough, undulating, open	Д	3/8" 117.7-118.55' - Same as	
-				<u>-</u>	Ш	112.0-112.85' No Recovery 118.55-122.0']
_				-		-	R10: 10 minutes
-	122.0			122.0-122.15' - Fracture zone	Н	_ Limestone	_ Driller's Remark:
-			>10	122.3' - Mechanical break	H	- 122.0-123.1' - grayish orange, (10YR	Numerous 3"-6" soft zones -
-				122.85' - Fracture, horizontal, rough,	H	7/4), fine to medium grained, mild HCl reaction, weak (R2), voids (up to	in R11
_				undulating, open 123.0' - Mechanical break	Ħ	1/16") over 10% of rock surface,	-
-	R11-NQ			-	Ħ	trace cavities up to 3/8"x3/16" No Recovery 123.1-127.0'	-
125	5 ft 22%	14		-	L	-	-
-83.2	22/0		NR		Ш	_	-
-				-	Н	-	Driller's Remark: Cavity
-				-	Ш	7	from 125.5-128' - R11: 6 minutes
_	127.0			_	Ш	-	1
			>10	127.0-127.45' - Fracture zone	ш	Limestone - 127.0-127.1' - pale yellowish brown,	Driller's Remark: Several soft zones, probably not -
_			-10	127.6' - Fracture, horizontal, rough,	Ш	(10YR 6/2), fine to medium grained,	cavities
_			2	undulating, open 127.8' - Mechanical break	П	mild HCl reaction, weak (R2), voids (1/16") over 5-10% of rock surface	
_	D.C. NO			128.0-128.1' - Fracture, horizontal, rough, undulating, open		127.1-128.35' - grayish orange, (10YR 7/4), fine to medium grained,	
-	R12-NQ 5 ft	7		128.3' - Mechanical break	Н	 mild HCl reaction, weak (R2), voids 	-
130 <u>-</u> -88.2	27%		ND		Н	(up to 1/16") over 10% of rock surface, trace cavities up to	-
-			NR	130.3' - Mechanical break	H	- 3/8"x3/16"	-
-				-	H	No Recovery 128.35-132.0'	R12: 12 minutes
-	400.0			-	H	-	-
-	132.0		1	400.01 Maskanisalka	H	Limestone	-
-			1	132.2' - Mechanical break 132.4' - Fracture, horizontal, rough,	Н	 132.0-132.6' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 	-
-				undulating, open	Н	6/2), fine to medium grained, mild	
-				-	H	 HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over 15% of 	Driller's Remark: Cavities
-	R13-NQ			-	Ш	rock surface, cavities (3/8"x1/16")	from 133.5-135.0' and - 135.5-136.0'
135	5 ft 12%	8	NR	-	Ш	over 5-10%No Recovery 132.6-137.0'	1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-21	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	I WE I HOD AI	ND EC	JUIPIV	IENT: CME 75 S/N 252437, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bgs	s on 6/	/03/07 START : 5/30/2007 END : 6/4	1/200	7 LOGGER : C. Dellaria, P. De Sa'r	rego
				DISCONTINUITIES	ניי	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BEL 10 FE	N A Y	(%	滿드		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAZ E	G T S	Q D (%)	유	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
92,9	<u> </u>	a Q	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ξ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-93.2	016	ш	шш		0,		
-93.2				_	H		
_				-	Н	Limestone	R13: 9 minutes
-				-		- 137.0-138.8' - medium light gray,	1
_	137.0			137.0-137.15' - Fracture zone, limestone rock	₽	(N6), fine grained, strong HCl reaction, medium strong to strong	-
_			>10	fragments up to 1"		- (R3 to R4), trace voids (to 3/16")	_
				137.5' - Fracture, <10 deg, smooth,		over rock surface, 15% cavities up to	
				undulating		1/4"x3/16" partly infilled with	
-			1	137.65' - Fracture, horizontal, rough, undulating, open 3/4" likely due to large		 yellowish gray (5Y 7/2) mottling around cavities (similar to 	1
-	l R14-NQ			cavity	\vdash	132.0-132.6'), fossiliferous, some	-
-	5 ft	44	4	138.7-138.95' - Fracture, 60 deg, rough,		 cavities extend through core 	-
140	92%			undulating, open	₽	138.8-140.9' - very pale orange to	
-98.2			امدا	138.75, 139.15, 140.4' - Mechanical break (3)		medium light gray, (10YR 8/2 to N6), from 140.6-140.9', cavities (up to	
1 7			>10	139.05, 139.4, 139.8' - Fractures (3), 15 deg, rough, undulating, open	F	3/16") over 20% of rock surface	1
-				139.9-140.8' - Fracture zone	₩	(same as 137.0-138.8').	R14: 30 minutes
-			0	-	仜	_ 140.9-141.2' - cavities absent (same	
1 -	142.0		NR	440 0 440 451	╁	as 137.0-138.8'). 141.2-141.6' - pale yellowish brown,	-
			>10	142.0-142.15' - Fracture zone, fragments up to 1" -		(10YR 6/2), fine grained, mild HCl	_
			710	142.7' - Fracture, horizontal, rough,	Ш	reaction, medium strong (R3), trace	
-				undulating, open	ĦТ	voids (1/16") over surface of rock, no	SC-2 collected at 142.8- 143.65'
-			0	-		_ visible cavities No Recovery 141.6-142.0'	Driller's Remark: Possible
_				-	₽	Limestone	cavity from 143.5-145.5'
	R15-NQ 5 ft	48	NR			142.0-142.6' - pale yellowish brown	Light drill chatter to heavy
145	66%	40			Н	to grayish orange, (10YR 6/2 to	drill chatter
-103.2				_		10YR 7/4), fine to medium grained, moderate to strong HCl reaction,	
_			1	-	╙	voids (up to 1/16") over 10% of rock	1
_				145.9' - Fracture, horizontal, rough,	łт	surface, trace cavities up to	R15: 19 minutes
_			2	undulating, open		3/8"x1/16"	10. 19 minutes
	147.0			146.5, 146.7' - Fractures (2), horizontal,	\vdash	142.6-143.65' - light brownish gray, (5YR 6/1), fine grained, moderate to	
				rough, undulating, open 147.0-147.1' - Fracture, horizontal, rough,		strong HCl reaction, trace voids (up]
			>10	undulating, open	⊢	to 1/16") over rock surface	1
-				147.5-147.85' - Fracture zone, limestone rock	Ľ	No Recovery 143.65-145.5'	
-			0	fragments from 1/2"-1"	╀	Limestone 145.5-147.0' - Same as 132.0-132.6'	-
-					\Box	except weak (R2), coarse gravel,	
	R16-NQ	33	3	149.15' - Fracture, horizontal, rough,	\vdash	voids (up to 1/16") over 20% of rock	
150	5 ft 86%	SS	ı ه	undulating, open	\vdash	surface	1
-108.2				149.3-149.6' - Fractures or mechanical — break, 30 deg and 20 deg, smooth, planar,	仜	— 147.0-147.85' - pale yellowish brown, (10YR 6/2), fine to medium grained,	
-			>10	open	\vdash	moderate to strong HCl reaction,	1 +
-			0	150.2-150.6' - Fracture zone		 weak to medium strong (R2 to R3), 	D16: 22 minutes
			$\overline{}$	150.9-151.1' - Fracture zone, limestone rock	\vdash	voids (up to 1/16") over 15% of rock	R16: 33 minutes
	152.0		NR	fragments from 3/4"-1.5"		surface, cavities (1/16"x3/16") trace 147.85-150.2' - Same as	
1 7						147.0-147.85' except light gray, (N7),	
-				-	1	medium strong (R3), trace voids,	1
-				-	1	trace cavities up to 1/16" diameter	-
_					1	150.2-151.3' - Same as 147.0-147.85' except pale yellowish	
				-]	brown, (10YR 6/2), weak to medium	
					1	strong (R2 to R3), voids (up to 1/16")	1
-				·	1	over 15% of rock surface, cavities	1
-					1	(3/16"x3/4") over 15-20%	
					1		
					1		



PROJECT NUMBER:	BORING NUMBER:					-
338884.FL	B-21	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 3.5	ft bgs	s on 6/	/03/07 START : 5/30/2007 END : 6/4	ND: 6/4/2007 LOGGER: C. Dellaria, P. De Sa'rego						
				DISCONTINUITIES		LITHOLOGY	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASINO				
H BE ACE ATIO	TH./	(%)	TUR:	DEPTH. TYPE. ORIENTATION. ROUGHNESS.	OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS.	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND				
EPT URF LEV	ENG	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.				
ООШ	074	œ	шФ	THIORNESO, OUTLI AGE GTAINING, AND HOTTINESO	S	No Recovery 151.3-152.0'					
-				-		Bottom of Boring at 152.0 ft bgs on	-				
-				-		_ 6/4/2007	-				
-				-		-	-				
-				-		-	-				
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-22	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 1.61 ft k	ogs on 6/	14/07	START : 5/19/2007
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
ACE,		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
EPT JRF/			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
<u> </u>	0.0			(N)	σ σ String drilled in wetlands area
	0.0	0.7	SS-1	0-0-1	0 to 0.7' - dusky brown, (5YR 2/2), wet, very soft
-		0.7	33-1	(1)	- Water level is based on Ground Water
-	1.5				- Monitoring at LNP site (FSAR Table
-					2.4.12.08)" Water levels not recorded during drilling
-					
-					
_					
-					1 1
5	5.0				1 1
35.5	0.0				Poorly Graded Sand (SP)
-		0.9	SS-2	4-3-5 (8)	5.0-5.9' - moderate brown to grayish orange pink, (5YR 4/4 to 5YR 7/2), mottled, wet, loose, fine
-	6.5			(0)	grained, trace non-plastic fines, grading into clayey sand (SC) with 30% low to medium plasticity fines
					Sand (SC) with 30% low to medium plasticity lines
]
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_					
10	10.0				5/19/07, 15:00, set 6" casing to 9.5'
30.5				3-4-7	Silt (ML) 10.0-11.0' - grayish orange, (10YR 7/4), wet, stiff, very
_		1.0	SS-3	(11)	rapid dilatancy, strong HCl reaction, trace sand,
_	11.5				carbonate, sands are fine to grained
_					
_					
-					
_					- 1
-					
					-
15 <u> </u>	15.0				Silt (ML)
-		1.2	SS-4	13-13-10	15.0-16.2' - very pale orange, (10YR 8/2), wet, very
-	10.5	'	00.4	(23)	stiff, 10 to 15% sand, very rapid dilatancy, strong HCl reaction, carbonate, 10-15% fine gravel-sized
-	16.5				\limestone fragments / -
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-					
-					
-					
-					1 1
20					1 1



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-22	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 1.61 ft k	ogs on 6/	14/07	START : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez
				STANDARD	SOIL DESCRIPTION COMMENTS
NO (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	ŏ
	RECOVERY (ft)				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
E S E				(N)	
20.5	20.0			18-5-4	Silt With Sand (ML) 20.0-20.8' - very pale orange, (10YR 8/2), wet, stiff, 15
_		0.8	SS-5	(9)	∖ to 20% sand, nonplastic, very rapid dilatancy, strong
_	21.5				\HCI reaction, carbonate, sand is fine to medium \ \frac{1}{-} \ \qq \
_					
_					_
_					<u> </u>
_					<u> </u>
_					<u> </u>
_					<u> </u>
25	25.0				
15.5				6-6-4	Silt With Sand (ML) 25.0-26.0' - grayish orange, (10YR 7/4), wet, stiff, 10
-		1.0	SS-6	(10)	to 15% gravel, 25% sand, nonplastic, rapid dilatancy,
-	26.5				mild to moderate HCl reaction, carbonate, sand is fine / -
-					
_					-
_					-
_					-
-					-
-					-
30 <u> </u>	30.0				C:ta With Cond (All)
10.5				32-28-50	Silt With Sand (ML) 30.0-31.5' - grayish orange, (10YR 7/4), wet, hard, Heavy chattering at 30.0' 15 minutes to drill to 35.0'
_		1.5	SS-7	(78)	27% sand, nonplastic, very rapid dilatancy, moderate HCl reaction, carbonate, sand is fine to medium
_	31.5				grained
-					
-					-
-					-
-					-
-					
-					
35 5.5	35.0				Sandy Silt With Limestone Fragments (ML) Hard and soft drilling 35- 40'
3.3 -		0.5	SS-8	15-50/6 (65/12")	├ 35.0-35.5' - pale yellowish orange, (10YR 6/2), gray
-	36.0			(00/12)	mottling, moist, hard, 25 to 30% sand, low plasticity, rapid dilatancy, 40% moderate yellowish brown
-					\limestone fragments, HCl reaction strong for silt, mild / -
-					for limestone fragments
-					
-					
-					
-					-
-					
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-22

SHEET 3 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 1.61 ft b	ogs on 6/1	4/07	START : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez
>00					SOIL DESCRIPTION COMMENTS
N ANG	SAMPLE	SOIL NAME, USCS GROUP SYMBOL, COLOR, 의 DEPTH OF CASING, DRILLING RATE,			
H BE		RECOVERY (ft)			MOISTURE CONTENT, RELATIVE DENSITY OR BEILTING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0.5	40.0			()	Silt With Sand (ML)
-		1.3	SS-9	5-4-6 (10)	40.0-41.3' - moderate yellowish brown, (10YR 5/4), -
-	41.5			(10)	mild HCl reaction, carbonate, sand is fine grained
-					1 1
]
_					<u> </u>
_					<u> </u>
_					<u> </u>
-					.
45 -4.5	45.0				Sandy Silt (ML)
-4.5		10	00.10	3-3-2	45.0-46.0' - moderate yellowish brown, (10YR 5/4), - ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
-		1.0	SS-10	(5)	wet, medium stiff, 25 to 30% sand, nonplastic, very rapid dilatancy, mild HCl reaction, sand is fine to
-	46.5				medium grained / -
-					
-					†
-	-				Medium chattering/grinding
-	1				Lost and regained 80-90% of circulation
-					1 1
50_	50.0				11
-9.5				700	Silty Sand With Limestone Fragments (SM) 50.0-51.4' - dark yellowish brown, (10YR 4/2), wet, 50.0-51.4' - dark yellowish brown, (10YR 4/2), wet,
_		1.4	SS-11	7-3-3 (6)	loose, fine to coarse grained, 23% fines, moderate
_	51.5			. ,	HCI reaction, 40% limestone fragments, limestone is moderate yellowish brown (10YR 5/4) with mild to
-					\moderate HCl reaction
-	<u> </u>				
-					
-					
-					-
- 55	55.0				
-14.5					Silty Sand With Limestone Fragments (SM)
-	-	1.2	SS-12	3-3-7	55.0-56.15' - dark yellowish brown to pale yellowish brown, (10YR 4/2 to 10YR 6/2), wet, medium dense,
-	56.5			(10)	mild to moderate HCl reaction, fine to coarse grained,
	1				\25-30% fines, 35% limestone fragments / -
					Heavy grinding, lost 80-90% of circulation at 57'
] [""
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-22	SHEET	4	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 1.61 ft b	gs on 6/1	14/07	START : 5/19/2007
> ~				STANDARD	SOIL DESCRIPTION COMMENTS
N A N	SAMPLE	INTERVA	. ,	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
TH BI		RECOVE			MOISTURE CONTENT, RELATIVE DINISTRA ON DRILLING FUIL LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
-19.5	60.0				Limestone Fragments Limestone Fragments 5/20/07, 11:15, begin to set casing to 60.0'
-]	1.2	SS-13	4-17-32 (49)	60.0-61.2' - grayish orange and olive gray, (10YR 7/4 and 5Y 4/1), mild to moderate HCl reaction, fine to
	61.5			()	coarse gravel-sized fragments, 25% silt and sand similar to SS-12
_					<u> </u>
-	-				.
-	-				
-					
-	05.0				
65 <u> </u>	65.0				Silty Sand With Limestone Fragments (SM)
-		0.9	SS-14	6-6-3	65.0-65.9' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, loose,
-	66.5			(9)	\ mild to moderate HCl reaction, fine to coarse grained. / \ \
-	00.0				\28% fines, 40-50% limestone fragments / -
]
_					<u> </u>
_					_
-					
-					
70 <u> </u>	70.0				Silty Sand With Limestone Fragments (SM)
'-		1.4	SS-15	12-14-10	70.0-71.4' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet,
-	71.5		00 10	(24)	medium dense, mild to moderate HCl reaction, fine to
-	71.5				coarse grained, 30% fines, 40-50% limestone fragments
-					60% circulation loss
]
]
_					<u> </u>
-	75.0				
75 <u> </u>		0.1	SS-16		Limestone Fragments 5/20/07, 15:30, begin to advance HW casing
-	, , , , ,			(50/2")	75.0-75.1' - pale yellowish brown, (10YR 6/2), fragments up to 1-3/16 "
-	-				Begin Rock Coring at 75.0 ft bgs
-					See the next sheet for the rock core log
-	-				
-	1				
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-22	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 1.6	1 ft bo	gs on (6/14/07 START : 5/19/2007 END : 5/2	21/20	07 LOGGER : R. Gomez	
> O ::	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	R.B. T.H.,	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FR H	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-34.5		2	шФ	THIOTALEOG, GOTA NOL GIVARANO, VALUE HOLLINGE	S	Limestone	D
-54.5	75.0		>10	75.5-76.0' - Mechanical break, multiple	H	 75.0-75.5' - very pale orange, (10YR) 	Begin rock coring on 5/21/07 at 08:02
-				irregular breaks	世	8/2), strong HCl reaction, medium strong (R3), moderately fossiliferous,	-
-			0	-	⊬	 voids up to 1/4" over 20-30% of 	-
-	R1-HQ			-		surface 75.5-76.7' - pale yellowish brown,	-
-	5 ft	20		-	仜	(10YR 6/2), moderate to strong HCI	-
-	_ 34%			-		reaction, weak to medium strong (R2 to R3), voids up to 3/8" over 20-30%	-
-			NR	-	\vdash	 of surface 	-
-				-	H	No Recovery 76.7-80.0'	R1: 5 minutes
-				-	Ľ	-	-
-39.5	80.0			 80.0-81.0' - Fracture zone, irregular breaks,	世	Limestone	-
-			>10	some mechanical breaks	H	80.0-83.1' - pale yellowish brown,	-
-					Н	(10YR 6/2), strong HCl reaction, very weak to weak (R1 to R2), trace	-
-			1	81.1' - Fracture, 50-55 deg, rough, planar, dark grey staining	仜	 solution cavities up to 3/8", 	SC-1 collected at 81.1- 81.95'
_	R2-HQ			82.0-82.6' - Fracture zone, irregular breaks	士	moderately fossiliferous, 10-20% voids up to 1/16", 5-10% silt	-
_	- 5 ft	23	>10	-	+	-	-
-	62%		1 /	82.6' - Fracture, 50-60 deg, rough, planar	F	No Recovery 83.1-85.0'	-
-				-	Ė	No Recovery 65.1-65.0	-
-			NR	-	世	-	R2: 5 minutes
				-	H	-	-
85 <u> </u>	85.0			_	╙	Limestone	Driller's Remark: Drilling is
-			2	-		- 85.0-86.6' - Same as 80.0-83.1'	soft 85.0-87.5'
-			2	85.7, 85.9' - Mechanical break (2), rough, _ planar	ш	except solution cavities up to 9/16"over 5-10% of surface	-
_				86.1' - Fracture, horizontal, rough, planar	Ь	No Recovery 86.6-90.0'	-
-	R3-HQ			-	╁	10 1000 101 00.0-00.0	-
-	5 ft 32%	20		-	F	-	-
-	J2 /0		NR	-	Ħ	-	Driller's Remark: Core
-			INIX	-	比	-	barrel has no resistance at - 88.0-90.0'
-				-		-	R3: 5 minutes
90	90.0			-	F	-	
-49.5	55.0		1		口	Limestone	Driller's Remark: No
-				-	口	- 90.0-90.2' - Same as 80.0-83.1' No Recovery 90.2-95.0'	resistance to drilling 90.0 95.0'
1 -				-	Ь		-
-				-	F	-	
-	R4-HQ			-	F	<u> </u>	1
-	- 5 ft 4%	0	NR	-	Ħ	-	1
-	- - -			-	世	-	1
-				-		-	1
_				-	H		R4: 2 minutes
95	95.0			-	Ш]
					<u> </u>		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-22	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.6	1 ft bo	gs on (5/14/07 START : 5/19/2007 END : 5/	21/20	07 LOGGER : R. Gomez		
\$ □ €	(%)			DISCONTINUITIES	စ္တ	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
H BE ATIC	TH.	(%) Q	TUR -00-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD	
DE PT	SORE	RO	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.	
-54.5	0111	ш.	ш.	95.0-96.3' - Fracture zone, multiple fractures	+"	Limestone		
-			>10	and mechanical breaks, fragments range	F	 95.0-96.3' - pale yellowish brown, 	-	
-			>10	from 0.05' in length to 0.4' in length	⇇	(10YR 6/2), very strong HCl reaction, very weak to weak (R1 to R2), 30%	-	
-					-			
_	R5-HQ				世	No Recovery 96.3-100.0'	1	
_	- 5 ft 26%				╨	-	-	
_	2070		NR		╨	<u> </u>	1	
_					I	<u> </u>	1	
_					世	† •	R5: 3 minutes	
100	100.0				上		1	
-59.5			>10	100.0-101.0' - Fracture zone, irregular fragments		Silty Clay (CL) 100.0-100.5' - pale yellowish brown,		
			/10	nagments	\mathbb{H}	\ (10YR 6/2), stiff to very stiff,		
			1	101.2' - Fracture, 50-60 deg, rough, planar,	Д	moderate plasticity, strong HCl reaction, carbonate		
				open	Щ	Limestone	_	
_	R6-HQ 5 ft	0			上	100.5-101.5' - light brown, (5YR 6/4), strong HCl reaction, extremely weak	_	
_	30%				上	to very weak (R0 to R1), 10-20%	-	
_			NR		╁╴	voids up to 1/16", poorly fossiliferous No Recovery 101.5-105.0'	_	
_					F	<u>,</u>	R6: 3 minutes	
_					Ŧ	-	Ro. 3 minutes	
105 <u> </u>	105.0			105.0-105.6' - Fracture zone, irregular pieces	Ħ	Limestone	-	
-			>10	up to 3/4"	士	- 105.0-108.9' - grayish orange, (10YR	-	
-			2 >10		世	7/4), strong HCl reaction, extremely weak to very weak (R0 to R1), trace	SC-2 collected at 105.7- 106.8'	
_					╁	 voids, poorly fossiliferous, silfy 	-	
-	R7-HQ			106.8' - Fracture, rough, stepped, 3/8" relief on face of fracture	╨	-	-	
-	5 ft 78%	22		106.9' - Fracture, smooth, stepped, 5/16"	ፗ	-	-	
-	1070			relief 107.0-108.0' - Fracture zone, rough, planar,	口	†		
			>10	less than 1/8" infilling 108.0-108.9' - Fracture zone, rough, planar,	世	[†]	- Drillaria Damaria Harriata	
			NR	fractures and mechanical breaks	士	No Recovery 108.9-110.0'	Driller's Remark: Hard at – 109.0'	
110	110.0	_	INIT		Ъ		R7: 5 minutes	
-69.5			>10	110.0-110.2' - Fractures (2), horizontal and vertical, rough, undulating	\mathbf{F}	Limestone - 110.0-110.2' - grayish orange, (10YR		
				110.8-111.0' - Fractures, multiple, irregular	F	7/4), strong HCl reaction, very weak]	
			0	gravel-size pieces, 0.1' to 0.2' in size	片	to weak (R1 to R2), 10-15% voids up to 1/16", silty]	
					片	110.2-111.0' - pale yellowish brown,		
	R8-HQ 5 ft 28%	7			上	(10YR 6/2), strong HCl reaction, weak (R2), 20-30% voids up to 3/16"	_	
-					₽	111.0-111.4' - pale yellowish brown, (10YR 6/2), strong HCl reaction,	_	
-	4		NR		F	weak (R2), 30% voids up to 3/8"	_	
-					F	No Recovery 111.4-115.0'	R8: 2 minutes	
-	4				ፗ	 -	- No. 2 minutes -	
115	115.0				十			
					-			



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-22

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.6	1 ft bo	gs on (6/14/07 START : 5/19/2007 END : 5/	21/20	2007 LOGGER : R. Gomez
> O ::	_ (ŷ			DISCONTINUITIES	ق	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING,
A TIC	S.F.P	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	O LIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS.
EV.	ORE ECO	ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥMB	AND ROCK MASS CHARACTERISTICS SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	025	ď	# 5		Ś	
-74.5 _			>10	115.0-115.2' - Mechanical break, multiple irregular breaks, gravel-size pieces,	H	Limestone 115.0-115.35' - pale yellowish brown,
				0.05'-0.15' in size		(10YR 6/2), strong HCl reaction,
			3	115.7, 116.0' - Fractures (2), horizontal, rough, planar, horizontal		extremely weak (R0), 20-30% voids Disaggregated limestone
				rough, planar, nonzonial		\ 115.35-116.0' - Same as
	R9-HQ	17				115.0-115.35' except grayish orange, (10YR 7/4)
	5 ft 30%	''				Silt And Sand-Sized Carbonate
			NR		1111	Grains With Clay
						116.0-116.5' - medium gray, (N5), nonplastic to low plasticity, trace
					1	solution cavities up to 3/8", R9: 2 minutes
120	120.0				111	unconsolidated No Recovery 116.5-120.0'
-79.5				-	Ш	Silt And Sand-Sized Carbonate Disaggregated limestone
-			2	120.45' - Fracture, 30 deg, rough, planar,	T	Grains With Clay 120.0-120.4' - Same as 116.0-116.5'
				lithologic contact 120.6' - Fracture, 30 deg, rough, planar		Limestone
-			6	121.0, 121.3, 121.45, 121.5, 121.55, 121.6,' -	\pm	120.4-121.0' - pale yellowish brown,
-	R10-HQ		\ 1 /	Fractures (6), horizontal, smooth, planar	\vdash	(10YR 6/2), strong HCl reaction, extremely weak (R0), 20-30% voids
-	5 ft 42%	20			Ė	- up to 1/16"
_	4270					121.0-121.65' - pale yellowish brown, (10YR 6/2), medium grained, 10-20%
-			NR		₩	fines, strong HCl reaction, very weak
-					╆	to weak (R1 to R2), 20-30% voids up to 1/16", poorly fossiliferous, cyclic R10: 3 minutes
					士	─ bedding
125 -84.5	125.0				╁	121.65-122.1' - coarse grained, weak HCl reaction, very weak (R1), 5-10%
-			3	125.1' - Fracture, horizontal, rough, planar, 1/16" thick infilling, open	H	- solution cavities, 20-30% voids,
-				125.25' - Fracture, horizontal, rough,	L	highly fossiliferous No Recovery 122.1-125.0'
_				undulating, 1/16" thick infilling, open	╀	Limestone Limestone
_	D44 HO				ш	125.0-125.25' - yellowish gray, (15Y 7/2), coarse grained, mild to
_	R11-HQ 5 ft	12			士	moderate HCl reaction, very weak
_	18%		NR		┢	(R1), trace solution cavities up to 1/4", 10-20% voids up to 3/16"
					F	1/4 , 10-20% voids up to 3/16 125.25-125.5' - Same as
					Ľ	125.0-125.25' except pale yellowish
					₽	brown, (10YR 6/2) R11: 2 minutes R15.5-125.9' - Same as
130	130.0					125.0-125.25'
-89.5			>10	130.0-132.0' - Mechanical break, multiple	<i> ///</i>	No Recovery 125.9-130.0'
			- 10			\ 130.0-103.3' - dark yellowish orange, /
			>10			\(\(\(\)(10YR 6/6\)), stiff, mild to moderate \(\)\(\)
			-10			Poorly Graded Sand (SP)
	R12-HQ			132.1' - Fracture, horizontal, rough,		130.3-131.6' - grayish orange to
1 7	5 ft 60%	0	>10	undulating 132.5-132.8' - Fracture zone, multiple breaks,		─────────────────────────────────────
1 1				infilling	1	slow HCl reaction
1 1					世	<u> </u>
1 1			NR		\vdash	R12: 5 minutes
135	135.0				口	†
133	100.0			-	1	<u> </u>
					\perp	
1						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-22	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 1.6	31 ft b	gs on 6	6/14/07 START : 5/19/2007 END : 5/	21/20	07 LOGGER : R. Gomez	
₹ □₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	San	RG	FR.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-94.5 _			>10	135.0-138.3' - Mechanical break, multiple	\pm	Limestone - 131.6-133.0' - grayish orange, (10YR 7/4), moderate to strong HCl	-
_			>10		Ħ	reaction, very weak to weak (R1 to R2), trace solution cavities up to 5/16", 20-30% voids up to 1/16",	-
-	R13-HQ 5 ft 66%	0	>10		Ħ	poorly to moderately fossiliferous, 20-30% silt No Recovery 133.0-135.0'	-
	0070		_1		Е	Limestone - 135.0-135.3' - grayish orange, (10YR	_
-			NR			7/4), moderate to strong HCI reaction, very weak to weak (R1 to R2), trace solution cavities up to	R13: 8 minutes
140 <u> </u>	140.0			_	世	5/16", 20-30% voids up to 1/16", poorly to moderately fossiliferous,	_
-99.5			3	140.2, 140.4, 140.75' - Fractures (3), rough, planar, along weak contact	\pm	20-30% silt 135.3-137.5' - very light gray, (N8),	-
-			1	141.2' - Fracture, 60-70 deg, smooth, planar	E	very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), solution cavities up to 3/4" in	-
_	R14-HQ 5 ft 94%	28	2	141.8' - Fracture, horizontal, rough, planar, infilling 142.6' - Fracture, 60-70 deg, smooth, planar		diameter, 5-10% voids, moderately fossiliferous 137.5-138.3' - pale yellowish brown,	_
-	9470		>10	142.9' - Mechanical break, rough, along weak contact		(10YR 6/2), medium to coarse grained, moderate HCl reaction, very	-
_			5	143.1-144.7' - Fracture zone, possible mechanical breaks	Ħ	weak to weak (R1 to R2), solution cavities up to 3/16", 10-15% voids <1/16", silt, moderately fossiliferous	R14: 5 minutes
	145.0		NR	_	Н	No Recovery 138.3-140.0' Limestone	
-104.5 -			>10	145.2-145.4' - Fractures, gravel-sized pieces	F	140.0-140.5' - grayish orange and pale yellowish brown, (10YR7/4 and	-
-			0	145.85-145.95' - Fractures, horizontal, rough, planar, open 146.4-146.5' - Mechanical break, multiple	H	10YR 6/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), laminated bedding	-
- -	R15-HQ 5 ft	53	0	147.15' - Mechanical break	Ħ	- 140.5-140.8' - dark yellowish brown, (10YR 4/2), no HCl reaction, extremely weak to very weak (R0 to	SC-3 collected at 148.15- 149.05'
-	84%		>10	148.4-148.75' - Mechanical break	H	R1), laminated bedding, 10-15% small (<1/16") voids, 30-40% cavities (<3/8"), moderately fossiliferous, silty	(SC-3 depth adjusted from - 148.5-149.05' due to change in accounting for
-			0	148.9' - Fracture, horizontal, rough, planar, open, fragments don't fit together	Ħ	 140.8-143.0' - Same as 140-140.5' 143.0-144.7' - dark yellowish brown, 	core loss) – R15: 5 minutes
150 -109.5	150.0		NR		H	(10YR 4/2), mild to moderate HCl reaction, extremely weak to very	Total depth of boring 150.0'
-						weak (R0 to R1), 20-30% voids <1/16", moderately fossiliferous, silty No Recovery 144.7-145.0' Limestone 145.0-146.05' - moderate yellowish	
-						brown, (10YR 5/4), medium to coarse grained, moderate HCl reaction, very weak (R1), 5-10% solution cavities up to 1/4", 20-25%	-
- -						voids 146.05-148.8' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, mild HCl	-
-						reaction, weak to medium strong (R2 to R3), trace cavities and voids	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-22	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

DISCORTINUTES ODESCRIPTION PROMETTY THE ORIGINATION PROGRAMS PROBLEM THICKNESS, SURFACE STAINING, AND TIGHTINESS OUT OF THICKNESS, SURFACE STAINING, AND TIGHTINESS THICKNESS, SURFACE STAINING, AND	WATER	WATER LEVELS : 1.61 ft bgs on 6/14/0			6/14/07 START : 5/19/2007	END : 5/2	1/200	D7 LOGGER : R. Gomez	
148.8-149.2' - moderate yellowish brown, (10YR 5/4), mild HCI reaction, weak (R2), laminated bedding, 5% cavities up to 1-1/2"x1/2" No Recovery 149.2-150.0' Bottom of Boring at 150.0 ft bgs on	≥0 <i>€</i>	<u> </u>			DISCONTINUITIES		၅	LITHOLOGY	COMMENTS
148.8-149.2' - moderate yellowish brown, (10YR 5/4), mild HCI reaction, weak (R2), laminated bedding, 5% cavities up to 1-1/2"x1/2" No Recovery 149.2-150.0' Bottom of Boring at 150.0 ft bgs on	N (FILO)	Ä, ANE ≪ (%		ZES T	DESCRIPTION		CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING.
148.8-149.2' - moderate yellowish brown, (10YR 5/4), mild HCI reaction, weak (R2), laminated bedding, 5% cavities up to 1-1/2"x1/2" No Recovery 149.2-150.0' Bottom of Boring at 150.0 ft bgs on	H BI	E.R.U STH, SVEF	(%) (FOOT	DEPTH, TYPE, ORIENTATION, ROUGH	NESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
148.8-149.2' - moderate yellowish brown, (10YR 5/4), mild HCI reaction, weak (R2), laminated bedding, 5% cavities up to 1-1/2"x1/2" No Recovery 149.2-150.0' Bottom of Boring at 150.0 ft bgs on	PENSON I	COR	١۵۲	-RAC	PLANARITY, INFILLING MATERIAL A THICKNESS, SURFACE STAINING, AND TH	AND GHTNESS	SYME	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
		014	ш	ш.ш	· · · · · · · · · · · · · · · · · · ·		0)		
cavities up to 1-1/2"x1/2" No Recovery 149.2-150.0' Bottom of Boring at 150.0 ft bgs on	-					-		brown, (10YR 5/4), mild HCl reaction,	-
- No Recovery 149.2-150.0' - Bottom of Boring at 150.0 ft bgs on	-					-		weak (R2), laminated bedding, 5% cavities up to 1-1/2"x1/2"	-
Bottom of Boring at 150.0 ft bgs on 5/21/2007	-					-		No Recovery 149.2-150.0'	-
	-					-		Bottom of Boring at 150.0 ft bgs on	-
	-					-		-	-
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PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-23	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit

DNILLIN	GIVIETH	JD AND	EQUIPIVII	ENT : Dietrich D-	50 5/N 240, mud rotary,	cathead, AWJ/NWJ rods, 3	- 15/16 tri-cone	DIL	ORIENTATION: Vertical
WATER	LEVELS	: 2.3 ft bg	gs on 4/18	3/07	START : 4/11/2007	END: 4/19/2007	LOGGEF	: J.	Schaeffer, D. Roraback
				STANDARD		SOIL DESCRIPTION		(T	COMMENTS
SNO (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE		1231 NEOULIS	SOIL NAME, USCS GROUP SYMBOL, COLOR,				DEPTH OF CASING, DRILLING RATE,
VATA		1120012	<u> </u>	011 011 011	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			g B	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	6"-6"-6" (N)	OCINOIOTEINOT,	, OOIL OTTIOOTOTIL, WIINLI	BILOGI	S⊀	INOTHOMENTATION
40.7	0.0			()	Fill			XX	Driller use 10' section of NWJ rod then AWJ
-		1.0	SS-1	2-2-5		rial, road import fill	_	$\overset{\sim}{1}$	rods for SPT sampling.
-		1.0	33-1	(7)	0.3-0.5' wood frag		/	ili:	S. Hutchinson performed cathead hammer
-	1.5				0 5-1 0' - brownish	and With Silt (SP-SM) n black, (5YR 2/1), moist, I	loose fine -		work for all samples drilling with 3-15/16" –
I _					grained, no HCI re	eaction, lighter color with c	lepth, _		tricone bit.
						fines, some fines may be	organics,		
1 7					silica sand				
							-	l	1
-							_		1
-							-		-
-							-		-
5	5.0								
35.7				4.4.0	Poorly Graded Sa	and With Sand (SP-SM) e yellowish brown, (10YR	5/4) wat -		
		1.5	SS-2	4-4-3 (7)	loose, fine grained	d. no HCl reaction. 5% nor		ijij	
	6.5			(,)	fines, trace organi	cs, silica sand	-	H.	1
_	0.0								1
-							-		-
-							-		-
-							-		-
-							_		_
I _							_		_
10	10.0						_	1	1
30.7	10.0				Silty Sand (SM)			Ш	Material in shoe was more fines with higher
-		1.2	SS-3	6-13-14		live gray, (5Y 6/1), wet, m			plasticity -
-		1.2	00-0	(27)	nonplastic fines, s	d, no HCl reaction, 25-30° illica sand	% IOW to _		-
-	11.5				nonplactic infect of	mod baria			-
I -							_		_
I _							_		_
							_	1	_
-							-	1	1
-							-		-
							-		-
15 25.7	15.0				Interheddod Cilty	Sande And Sandy Clay	(SM-CL)	717	-
25.7				5-14-16		' Sands And Sandy Clay (to medium light gray to gr			_
		0.7	SS-4	(30)	gray, (N9 to N7 to	5G 6/1), wet, medium der	nse, fine		_
	16.5			()		e to strong HCl reaction, lo]
						silty sands, medium to hi			1
-					limestone pieces	embedded in material, bot	:h ∥-		
-					carbonate materia	al .			-
-					Silt (ML)	rish gray, (5Y 6/1), wet, ha	urd to stiff -		-
-					low plasticity, mod	derate HCl reaction, carbo	nate -		-
					material				_
					Limestone Fragm	nents	mottled -]
20					appearance	rate to strong HCI reaction	i, mottied	L	
							•		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-23	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 240, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION: Vertical

					START · 4/11/2007 FND · 4/19/2007 LOGGER				ONIENTATION : Vertical			
WAIER	LEVELS	: 2.3 ft b	us on 4/18		START : 4/11/2007	END: 4/19/2007 SOIL DESCRIPTION	LOGGE	1 : J.	Schaeffer, D. Roraback COMMENTS			
≥□₽				STANDARD PENETRATION				g	COIVIIVIEN 15			
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	T RESULTS SOIL NAME, USCS GROUP SYMBOL, COL MOISTURE CONTENT, RELATIVE DENSITY			CLC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
ACE		RECOVE	RY (ft)		MOISTURE	E CONTENT, RELATIVE D	ENSITY OR	Ω	DRILLING FLUID LOSS, TESTS, AND			
FFF			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, N	MINERALOGY	ΥME	INSTRUMENTATION			
20.7	00.0			(N)	Silt With Sand	J /MI \		S				
20.7	20.0			14-41-35	20.0-20.7' - yel	llowish gray, (5Y 8/1), w	et, hard, low	4	_			
_		0.7	SS-5	(76)	\ plasticity, mild	to moderate HCI reactio	n, 15-20% /	1	_			
l _	21.5			` ,	\sand size parti	icles, carbonate material	S/					
-							-	1	1			
-							-	1	1			
-							-	1	-			
-							-	1	-			
-							-	1	-			
-							-	-	-			
25 <u> </u>	25.0				Oile Miste Occard	1 /841 \		.				
15.7				27-40-50/5	Silt With Sand 25.0-26.0' - gra	3 (ML) ayish orange, (10YR 7/4)	. wet. hard.		_			
l _		1.0	SS-6	(90/11)	nonplastic, mile	d to moderate HCI react	on, 26% fine to	Ш	_			
l _	26.4				\medium sand :	size material, carbonate	materials /					
l -								1				
-							-	1				
-							-	1	1			
-							-	1	1			
-							-	1	-			
-							-	ł	-			
-							-	1	-			
30 <u> </u>	30.0				Oile Miss. O	1 (841)		.	Dellarda Darrando 001 051 della band bod sad			
10.7				10-19-22	Silt With Sand 30.0-31.0' - Sa	ame as 25.0-26.0'		1111	Driller's Remark: 20'-35' drills hard but not rock, just fairly dense -			
_		1.0	SS-7	(41)	00.0 0.10 00			Ш	_			
<u> </u>	31.5			, ,			_					
-							-		_			
-							-	1	-			
-							-	1	-			
-							-	1	=			
-							-	1	-			
-							-	1	-			
35	35.0	0.1	00 0	E0/4	D Limester -			<u> </u>	Duillanta Damantu Daak wisses see fellings's			
5.7	35.3	U.1	SS-8	50/4 (50/4")	Limestone Fra 35.0-35.1' - mo	agments oderate yellowish brown,	(10YR 5/4)	1	Driller's Remark: Rock pieces are falling into hole at approximately 12-13', can't get bit			
l _				(00, 1)	fragments up t	to 1"x1/4", very poor reco	very		back in hole; Installed 17' of 6" casing.			
									Driller's Remark: 35'-35.5' is very hard Driller's Remark: 35.5'-40.0' drills similar to			
							•	1	20-35'			
-							-	1	_			
-							-	1	-			
-							-	1	-			
-							-	1	-			
-							-	1	-			
-							-	1	-			
40								<u> </u>				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION : Vertical

WATER LEVELS : 2.3 ft bgs on 4/18/07 START : 4/11/2007 END : 4/19/2007 LOGGER : J. Schaeffer, D. Roraback SOIL DESCRIPTION COMMENTS											
				STANDARD	SOIL DESCRIPTION COMMENTS						
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	ÖlÖ						
A BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND						
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
<u> </u>	40.0				Sandy Silt (ML)						
-	41.0	0.7	SS-9	44-50/6 (94/12")	40.0-40.7' - moderate yellowish brown, (10YR 5/4), -						
-	41.0				\reaction, 25-30% sand-sized particles to 1/8",						
-					\carbonate materials \frac{1}{2}						
-					† 						
-					1						
]						
_]						
_					<u> </u>						
45 -4.3	45.0				011 MEN 0 1/4H)						
-4.3	45.0	0.9	SS-10	42-50/5 (92/11")	Silt With Sand (ML) 45.0-45.9' - Same as 40.0-40.7' except 29% sand; Driller's Remark: Chatter on and off from approximately 40' on, layers with chatter are						
-	45.9			(02/11)	trace black particles and streaks; trace green streaks						
-					-						
-					-						
_					- I						
-					† 						
_					† 						
-					†						
50	50.0 50.2				1						
-9.3	50.2	0.1	SS-11	50/2.5 (50/2.5")	Limestone Fragments 50.0-50.05' - pale yellowish brown, (10YR 6/2), mild to -						
				(50/2.5)	\moderate HCl reaction, fragments to 1/2", poor \ \ \						
_					recovery						
_					_						
_					-						
-					-						
-					-						
-					-						
					-						
55 <u> </u>	55.0 55.4	0.4	SS-12	50/5	Silt With Sand (ML)						
-				(50/5")	55.0-55.4' - moderate yellowish brown, (10YR 5/4), wet, hard, nonplastic, mild to moderate HCl reaction,						
-					\10-15% sand-sized particles to 1/16", carbonate						
-					materials, trace black organic lenses						
					1 1						
] [
] [
_]						
_					.						
60											



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 240, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION: Vertical

DRILLIN	G METH	DD AND	EQUIPMI	ENT : Dietrich D-5	50 S/N 240, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-con-	e bit	ORIENTATION : Vertical
WATER	LEVELS	: 2.3 ft bg	s on 4/18	3/07 S		R : J	. Schaeffer, D. Roraback
				STANDARD	SOIL DESCRIPTION	_ o	COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		12	
HU		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	١ĕ	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
	60.0	0.0	00.40	(N)			
-19.3 - - - - - -	60.0 60.2	0.0	<u>SS-13</u>	50/2 (50/2")	Limestone Fragments With Silt And Sand 60.0-60.2' - limestone fragments, silt and sand-sized particles, poor recovery		More chatter from 60'-65'
65	65.0					1	1
-24.3 -		0.9	SS-14	50-50 (100/12")	Silt (ML) 65.0-65.9' - moderate yellowish brown, (10YR 5/4),	\prod	Driller's Remark: 65.0'-70.0' drilled similar to 60.0'-65.0', more rock chips in cuttings
- - - -	66.0			(133.12)	moist to wet, hard, nonplastic to low plasticity, moderate to strong HCl reaction, 5-10% fine sand size particles, carbonate materials	-	- - - - -
-						1	Driller's Remark: Bouncing on SPT, will switch to rock coring at 70.0'
70	70.0	0.0	\SS-15 _\	50/1 (50/1")	Limestone Fragments 70.0-70.1' - 3 fragments to 1/2x1/8", mild to moderate HCI reaction, poor recovery Begin Rock Coring at 70.0 ft bgs See the next sheet for the rock core log	-	Finish soil drilling at 17:00 on 4/11/07; setting HW casing to 70' End day at 18:00 on 4/11/07, set 35.0' of HW casing Start at 8:00 on 4/12/07, set remainder of casing and clean out hole Cannot take water levels due to tooling in hole Finish setting casing to 70', clean and flush hole at 11:00 on 4/12/07
75_ -34.3						-	- - - - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.	. = . (=			MEINT : Dietrich D-50 5/N 240, midd rotary, NQ tools, HW			
WATER	LEVELS : 2.3	πbgs	s on 4		19/200	· · · · · · · · · · · · · · · · · · ·	
≥O.⊋	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	ე ღ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ZAN ZAN Z		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표병은	5 ± £	(%) O	15.0 15.0 15.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 ∺ [MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₽₩	#25 8 8 8 8		ACT F	PLANARITY, INFILLING MATERIAL AND	l ₩	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SHR	S Q	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-29.3		_			+ -	No Recovery 70.0-70.5'	
	70.0 R1-NQ 70.5 0.5 ft		NR			_	R1: 1 minute
	0%/		3	70.7, 70.85, 71.4, 71.6, 72.0' - Fractures (5),	Н	Limestone - 70.5-75.2' - moderate yellowish	
1 -			3	0-10 deg, rough, undulating, tight to open	ш	brown, (10YR 5/4), mild to moderate	1
-				with some fragmenting at fractures	H	HCl reaction, medium strong to	-
-			3		₽	 strong (R3 to R4), small (up to 1/16") 	-
l _				72 25' Fracture horizontal rough	Ш	voids cover 30% of surface, many	
	R2-NQ			72.35' - Fracture, horizontal, rough, undulating	Ш	1/4" to 1/2" cavities some with fossil	1
-	5 ft	65	0	72.95' - Mechanical break	₩	casts, and a 1" elongated cavity at	1
-	94%				ш	92.5', small voids decrease to <5% at 72.5-73.0', trace organic fossil infills	-
l _			3	72.0.74.01 Fractures (2) beginning	\Box	and increased fossil molds and casts	_
			ľ	73.9, 74.0' - Fractures (2), horizontal, rough, undulating, tight, join a vertical rough	Н	at 73.0-73.9', extremely weak (R1)	
7.			_	undulating, tight, join a vertical rough	┰┦	rock at 94.0-94.6'	R2: 13 minutes
75 <u> </u>			1	74.4, 74.6' - Fractures (2), horizontal, rough,	口	_	Ⅰ ⊢
	75.5		NR	undulating, two horizontal fractures bound a	₽₽	No Recovery 75.2-75.5'	1
			آ ہا	vertical fracture at 74.5'		Limestone	
1 -			4	75.5-75.6' - Fracture zone, subangular 3/4" to	口	75.5-78.6' - Same as 70.5-75.2'	1
-				1" fragments 75.6' - Fracture, termination of fracture zone	Н	except medium strong (R3), small (up to 1/16") voids cover 30% of	-
-			3	at a stepped 30 deg face	П	surface at 75.5-77.2', increased	1
				76.2' - Fracture, 70 deg, rough, undulating,		cavities up to 1/4" (elongated) at	
	R3-NQ			0.4' long cleave	Н	76.4-77.2', very weak (R1) between	1
-	5 ft	23	4	76.4' - Fracture, rough, undulating, 10 deg	ш	fractures at 77.1' and 77.2', weak	-
-	62%			and 45 deg fractures terminate above 70 deg	\Box	(R2) at 77.2-78.6'	-
				fracture, and 76 deg before fracture, appears weathered with cavities	Н	No Recovery 78.6-80.5'	_
				76.6' - Fracture, 70 deg, rough, undulating,			
			NR	missing side of core, fracture terminated	Ш	-	R3: 14 minutes
-39.3				above horizontal fracture —	₽		
	80.5			77.1, 77.2' - Fractures (2), horizontal, rough,	ш		1
			4	undulating, open, friable, voids decrease with depth	Н	Limestone	Fractures tend to occur at
			1	77.8' - Fracture, horizontal, rough, stepped	Н	 80.5-85.0' - moderate yellowish brown to dark yellowish orange, 	weaker (R2) sections that - are friable
-				77.8-77.9' - Fracture zone, rock crush	ш	(10YR 5/4 to 10YR 6/6), fine grained,	are mable
_			3	78.4' - Fracture, horizontal, rough, undulating,	\vdash	- moderate HCl reaction, medium	-
l _				open	Н	strong to weak (R3 to R2),	_
1	R4-NQ			78.5' - Fracture, 15 deg, rough, planar		fossiliferous with 25% small voids	1
1 -	5 ft	52	>10	81.1' - Fracture, horizontal, with fragmentation	╁	and several fossil cavities (up to 1"	1
1 -	90%			81.8-81.95' - Fracture, vertical, rough,	╁┼┼	long), trace 1/4" organic fragments and several organic laminations,	1 -
I -			1	undulating, bonded by horizontal to 10 deg	Ш	- weaker with depth	1
1			'	rough, undulating fracture	Н	•	
85			5	82.6' - Fracture, 70 deg, rough, undulating,	世	-	R4: 12 minutes
-44.3				leading to underlying fracture zone	田	No Recovery 85.0-85.5'	⊢
-	85.5		NR	82.8-83.0' - Fracture zone, rock crush leading to a 10 deg rough stepped fracture at 83.0'	₩		1 -
			2	83.4' - Fracture, 60 deg, rough, undulating,	Щ	Limestone - 85.5-90.5' - Same as 80.5-85.0'	
			_	with fragmentation, friable	Ш	except weak to medium strong (R2 to	1
1 -				84.2' - Fracture, 80 deg, rough, undulating,	┰	R3), fossiliferous voids cover 30% of	1
-			2	with fragmentation, friable 84.7' - Fracture, 70-90 deg, rough,	世	surface (10% minimum, 40%	1 -
1 -	_			undulating, leading into fracture zone with	ш	maximum), occasional fine	1 4
1	R5-NQ	40	F	organics	Н	laminations	
1 -	5 ft 100%	48	5	85.5' - Fracture, 30 deg, smooth, planar	口	-	1
-	100 /0			86.2' - Fracture, horizontal, rough, stepped,	╙	-	1
-			2	fracture terminates underlying vertical	╆	_	1 -
				fracture	口	_	SC-1 collected at 89.3-
90					ш		90.5'
				-	1 1		
	i l						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT: Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

CORING	S IVIE I FIOD A	ND EC	JUIPIV	MENT: Dietrich D-50 S/N 240, mud rotary, NQ tools, HW	Casin		ORIENTATION : Vertical
WATER	LEVELS : 2.3	ft bgs	s on 4		19/20	D7 LOGGER : J. Schaeffer, D. Roral	
>	(9)			DISCONTINUITIES	Ö	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
出병은	RUN H. A	Q D (%)	N I	DEDTIL TYPE OPIENTATION POLICINESS	1 2	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
E # \$	20 A	0	Z F	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	√BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	COI	S.	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-49.3			0	86.7' - Fracture, 70 deg and vertical, rough,	t		R5: 14 minutes
-	90.5			undulating, tight to open, 5/16" relief, extends		_ Limestone	_
l -			3	86.2-87.4	₽	- 90.5-91.7' - Same as 85.5-90.5'	Based on overlying and underlying rock in the rock -
				87.15' - Fracture, 40 deg, rough, undulating, extends through half core joining vertical		except moderate yellowish brown,	crush zone; picked 91.7' as
I -			>10	fracture	Н	(10YR 5/4), medium strong (R3),	contact
-				88.0-88.7' - Fracture zone, several horizontal		 fossiliferous, many cavities up to 1/2" 91.7-92.1' - light olive gray, (5Y 5/2), 	End of core from R6-NQ – matches top of R7-NQ
-	R6-NQ			fractures with a 70 deg fracture crossing all	ш	fine grained, moderate to strong HCl	core, therefore core loss
-	5 ft	28		horizontal fractures, clean large (2"-3") fragments, bounded by 30 deg fractures	H	reaction, strong (R4), increasing	interpreted to be from -
l _	50%		NR	rough to undulating on top and bottom		voids with depth from 5-15%,	middle of core run
				89.0, 89.25' - Fractures (2), horizontal, rough,	Н	elongated cavities near 94.8', large - 1"x1"x1/2" cavity at 95.1'	Core loss assumed to be from 92.1-94.6'
				undulating	Ш	No Recovery 92.1-94.6'	110111 92.1-94.0
OF.				91.0' - Fracture, 70 deg, rough, undulating, 4" long, weathered edges, tight	\vdash	Limestone	R6: 14 minutes
95 <u> </u>	-		2	91.4-92.1' - Fracture zone		94.6-95.5' - Same as 91.7-92.1'	-
"-	95.5			94.8' - Fracture, 80 deg, rough, undulating,	\vdash	_] -
-	[0	tight, 4" long 95.5' - Fracture, 45 deg, rough, planar, tight	П	95.5-99.3' - Same as 94.6-95.5' - except voids increasing to 20-25%,]
				to healed, joints with R7 core	\vdash	weak (R2) at 97.9-98.85'	
				to floatou, jointe Wart W oolo			1
-	1		0	-	ш	-	1
-	R7-NQ			-	+	-	-
_	5 ft	42	>10	97.7, 97.9' - Fractures (2), 20 deg, rough,		=	-
_	92%			undulating, open, fragmented beneath 97.9' 98.25, 98.55, 98.65' - Fractures (3), 10 deg,	\vdash	_	_
			8	somewhat fragmented			
I -			0	98.4' - Fracture, vertical, rough, undulating,	Н		
100	1		8	open and somewhat fragmented, bounded by 10 deg fractures at 98.25' and 98.55'		 99.3-100.1' - yellowish gray, (5Y 7/2), moderate HCl reaction, strong (R4), 	R7: 14 minutes
-59.3				99.1' - Fracture or mechanical break, 10 deg,	₩	voids decreasing to 5-10%, transition	_
-	100.5		NR	rough, undulating, tight to healed		 from above is irregular with infilling of 	Water level at 2.3 below
l -	_		5	99.3' - Fracture, horizontal, rough, undulating,	Н	cavities, 1/2"x3/4" deep spiral fossil at 99.5'	ground surface
l _				open at contact 99.5' - Fracture, vertical, rough, undulating,		– No Recovery 100.1-100.5'	_
				bounded at 99.3' and 99.75'	ш	Limestone	
_	1		2	99.75-100.1' - Fracture zone, angular block	T	100.5-104.0' - light olive gray, (5Y	-
-	R8-NQ			with horizontal and vertical breaks 1"-2" in	匚	 5/2), fine grained, moderate HCl reaction, strong (R4), 1/16" voids 	-
-	5 ft	52	1	size 101.15' - Fracture, rough, undulating to	╀	varying from 5-30%, few 1/2"	SC-2 collected at 103.25-
-	70%			planar, open	П	elongated fossils, few cavities,	103.95' -
_			1	101.4-101.5' - Fracture zone, bounded by <5	\vdash	mostly shallow and <1/2", trace	
1				deg, rough, undulating, very open fracture 101.8, 102.1' - Fractures (2), 50 deg, rough,	L	organics laminations and inclusions No Recovery 104.0-105.5']
105]		NR	undulating	╙	_ 1.0 1.000 tory 10-10-100.0	R8: 20 minutes
-64.3	405.5			103.25' - Mechanical break	口		-
-	105.5			103.9' - Mechanical break	\vdash	Limestone	-
1 -			>10	105.5-106.2' - Fracture zone, angular rock fragments and nearly fractures at 106.0'		- 105.5-108.0' - Same as 100.5-104.0'] -
_]			106.2' - Fracture, 10 deg, rough, stepped	Щ	except light olive gray to moderate]
			0	5, 5, 11 ·		olive brown, (5Y 5/2 to 5Y 4/4),	
1 -]		U		\vdash	 10-20% voids, fragmented at 105.5-106.2'] 1
-	R9-NQ		0	•	╁	55.0 100.2	1
-	5 ft	33		107.9' - Mechanical break	仜	No Recovery 108.0-110.5'	-
-	50%				\vdash	-	-
_]			_		_]
			NR		\vdash		
110					Ш		R9: 19 minutes
					1		
ь	1				1		1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

WATER LEVE	ELS : 2.3	ft bgs	on 4/	18/07 START : 4/11/2007 END : 4/	19/200	7 LOGGER: J. Schaeffer, D. Roral	pack
≥0£	<u></u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN,	LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-69.3					Ш		
	810-NQ 5 ft 100%	53	0 8 8 3 >10	111.7, 111.9' - Fractures (2), 50 deg, rough, undulating, tight 112.25' - Fracture zone, horizontal, stepped, 1"-2" angular fragments 113.1' - Fractures, vertical, rough, moderately open, bounded by similar horizontal fractures at 113.0' and 113.25' 113.5' - Fracture, vertical, rough, undulating, open, bounded at 113.1' by horizontal fracture		Limestone 110.5-115.5' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, very weak to strong (R1 to R4), small (1/16") voids 10-20%, minimal cavities, strong (R4) rock at 110.5-113.0', medium strong (R3) rock 113.0-113.5', intermingled zones of very weak and weak (R1 and R2) rock at 113.5-115.2', medium strong to strong (R3 to R4) at 115.1-155.5', intermittent zones of solid core and rock fragments 112.25-115.5'	R10: 17 minutes
		-	2 >10	114.25, 114.6' - Fractures (2), 40 deg, rough, undulating, between fractures are columnar vertical fragments and fractures that are rough, undulating, tight to open 115.1-115.5' - Fracture zone, angular, columnar 115.5-116.1' - Fracture, vertical, rough, undulating, half core intact, the other half		115.5-117.5' - Same as 110.5-115.5' except moderate yellowish brown, (10YR 5/4), medium strong to strong (R3 to R4), with intermittent core and fracture zones similar to 112.25-115.5'	Sand on outside of core from 115.5'-116.0', chatter started about 6-7 minutes into run
- - - 120 -79 3	R11-NQ 5 ft 40%	14	NR	multiple fragments 116.1' - Fracture, horizontal, rough, undulating, open 116.7' - Fracture, horizontal, rough, undulating to stepped, open 116.7-117.5' - Fracture zone, angular 1-3" fragments		No Recovery 117.5-120.5'	- - R11: 12 minutes -
120.8	R12-NQ 5 ft 46%	8	>10 3 >10 NR	120.8' - Fracture or bedding plane, horizontal, planar, open, weathered with rounded face on lower side, less rounded on upper side 121.1-121.5' - Fracture zone, larger angular to subangular 1-2" fragments of both over-and underlying rock 121.5, 121.75, 122.15' - Fractures (3), horizontal and 10 deg, rough, undulating, open 121.6' - Fracture, 70-90 deg, rough, undulating, small vertical terminated by horizontal fracture and fracture zone 122.15-122.25, 122.5-122.8' - Fracture zone (2), 1/4" to 1" subangular to rounded		Limestone 120.5-120.8' - Same as 115.5-117.5' except moderate HCl reaction, medium strong to strong (R3 to R4), fine grained, slighty banded with beige and gray 120.8-121.3' - Same as 120.5-120.8' except mild HCl reaction, very weak (R1), end of weaker rock in fracture zone No Recovery 122.8-125.5'	R12: 12 minutes
-	125.5 - - - - - - - - - - - - - 5 ft - 46%		>10 2 2 NR	ragments 122.25, 122.5' - Fractures (2), horizontal, rough, stepped 125.5-125.8' - Fracture zone, rounded 3/4" to 1-1/2" fragments 125.8' - Fracture, horizontal, rough, undulating 126.9' - Fracture, 60 deg, rough, undulating 127.7' - Fracture, horizontal, rough, undulating		Limestone 125.5-125.8' - Same as 120.5-122.8' except light olive gray to moderate yellowish brown, (5Y 5/2, 10Y 5/4), mild to moderate HCI reaction, very weak to weak (R1 to R2), rounded 3/4" to 1-1/2" spherical fragments 125.8-126.9' - Same as 125.5-125.8' except very weak to weak (R1 to R2), intact core 126.9-127.8' - Same as 125.5-125.8' except very weak (R1), friable No Recovery 127.8-130.5'	SC-3 collected at 125.8- 126.6' -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

				12.07 . Dietrich D-30 3/N 240, Midd Totaly, NQ 10015, FW			ORIENTATION . VEHICAL
	LEVELS : 2.3	o it bg:	5 011 4/	<u>/18/07 START : 4/11/2007 END : 4/</u> DISCONTINUITIES	19/20	D7 LOGGER : J. Schaeffer, D. Rorat LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		<i>(</i> 0		SYMBOLIC LOG		COMMENTO
O A A	Z, Z, Z	<u></u>	FRACTURES PER FOOT	DESCRIPTION	- I	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AHE	I I I I	(%) Q	TT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
- ERRI	ORE	Ø	RAC	PLANARITÝ, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×Μ	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	OHR	œ	Ηd	THICKNESS, SURFACE STAINING, AND HOTTINESS	Ś	CHARACTERISTICS	
-89.3	130.5				Н		
				130.5' - Fracture, horizontal, rough, planar		Limestone	1
-			>10	130.65-131.25' - Fracture zone, subangular 1/2" to 1-1/2"	╁	- 130.5-130.65' - yellowish gray, (5Y	1
-				130.65' - Fracture, horizontal, rough, planar	Ľ	7/2), fine grained, moderate HCl reaction, medium strong to strong	1
-			>10	131.25, 131.35, 131.40, 131.55, 131.65' -	\perp	- (R3 to R4), fine voids cover less than	-
I -				Fractures (5), planar fractures along bedding	┢	5% of surface, very abrupt transition	
	R14-NQ			planes, open 131.65-132.1' - Fracture zone, angular,		to 30% voids at 130.6' followed by a fracture	
	5 ft 36%	0		broken along horizontal planes and small 1/4"	₽	130.65-131.25' - moderate yellowish	1
_	3373			to 3/4" fragments	\perp	brown, (10YR 5/4), mild HCl reaction,	1
-			NR	132.2' - Fracture, horizontal, smooth, planar	╁	very weak to weak (R1 to R2),	1 -
_				132.25' - Fracture, beginning of vertical fracture with strong black to gray staining	亡	10-30% voids, entirely fragmented,10-30% voids	D44, 47 minutes
135_				-	╨	131.25-132.3' - Same as	R14: 17 minutes
-94.3	135.5					130.5-130.65' except strong (R4),	
				135.5-136.25' - Fracture zone, numerous 3/4"	—	<3% voids, horizontal planes visible	1
-			>10	to 2" fragments, subangular to subrounded,	₩	_ (<1/16") No Recovery 132.3-135.5'	-
-				contains lithology transition at 136.1'	皿	Limestone	-
_			1	136.7' - Fracture, 10 deg, smooth, stepped,	╁╌	_ 135.5-136.1' - moderate yellowish	1
_			·	fracture steps at cavity, tight		brown to light olive gray, (10YR 5/4	_
	R15-NQ		1	137.6' - Fracture, 0-45 deg, stepped, tight	\vdash	to 5Y 5/2), moderate HCl reaction, weak (R2), 10% 1/16" voids, few 1/4"	
_	5 ft 48%	25			\top	elongated cavities	1
-	70%				1-	136.1-137.9' - light olive gray to	
-			ND		╀	yellowish gray, (5Y 6/1 to 5Y 7/2),	-
_			NR		\perp	fine grained, moderate to strong HCl reaction, grayer transitioning to	1 4
140				_	ь	yellower with depth, 5% fine voids,	R15: 22 minutes
-99.3	140.5				L	several 1/4" to 1/2" elongated and	Driller's Remark: Water
-				140.5-141.2' - Fracture zone, angular to	╨	deep (3/4") cavities. Cavities infilled	level = 4.79' below ground - surface
-			<10	subangular fragments 1/4" to 1-1/2"	仜	in places with porous appearance, moderately HCl reaction	Bit clogged, pulled casing,
_				141.2' - Fracture, horizontal, rough,	╁	No Recovery 137.9-140.5'	rocks in clay matrix,
_			2	undulating 141.3' - Fracture, 80 deg, smooth, undulating		Limestone	stopped at 143.0' to check
			_	141.5' - Fracture, horizontal, rough,	ш	140.5-141.2' - yellowish gray to	bit (mechanical break)
	R16-NQ		1	undulating, open	\vdash	 dusky yellow, (5Y 7/2 to 5Y 6/4), strong HCl reaction, 1/16" voids over 	1
1 -	5 ft 50%	10		141.7' - Fracture, 70 deg, rough to smooth, undulating, may join with 80 deg fracture at	F	5% of surface, 1/16" to 1/8" voids] 1
1 -	30%			undulating, may join with 80 deg fracture at 141.3'	╁	over 5% of surface, fracture zone	
-				142.1' - Mechanical break	口	with 1/4" to 1-1/2" fragments at 141.2'	-
-			NR		+	- 141.2 - 141.2-143.0' - yellowish gray, (5Y]
145						7/2), fine grained, moderate HCl	R16: 23 minutes
-104.3	145.5			_	╙	reaction, medium strong to strong	1
_	. 10.0				t	 (R3 to R4), variations of 0-10% fine voids vary over interval 	1
-			2	145.9' - Bedding plane, 10 deg, smooth,	+	No Recovery 143.0-145.5'	1 1
-				planar, open	₽	_ Limestone	Detrieved core from hours!
-			5	146.3' - Fracture, horizontal, planar, open 146.4' - Fracture, 50 deg, planar	ш	145.5-146.5' - Same as 141.2-143.0'	Retrieved core from barrel when rods pulled (1.5' of -
				146.5' - Fracture, 50 deg, planal 146.5' - Fracture, horizontal, undulating, open	\vdash	146.5-148.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4),	core)
I -	R17-NQ		1	146.8, 147.1' - Fractures (2), horizontal,		medium strong to strong (R3 to R4),	1
-	5 ft 50%	20		rough, undulating, tight	╨	up to 20% 1/16" voids, few 1/4" thin	1 1
-	50%			147.2, 147.4, 147.55' - Fractures (3), horizontal, rough, undulating, open	仜	_ elongated fossils, red iron staining	1
_				nonzoniai, rougn, unuulaiing, open	+	embedded and in fractures No Recovery 148.0-150.5'	1 4
I -			NR		Ľ	-	1
150							R17: 18 minutes
<u></u>					L		
					_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.3	3 ft bgs	s on 4/	/18/07 START : 4/11/2007 END : 4/1	9/20	D7 LOGGER : J. Schaeffer, D. Roral	pack
>00	(6			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIO	L H.	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS.	JOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS. CORING RATE AND I
EPT URF	ORE	ØΒ	RAC ER F	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-109.3		~	ша	THICKNESS, SUN ACE STAINING, AND HOTTINESS	S	CHARACTERISTICS	
-109.5	150.5				H	Dettern of Devine at 150 5 ft has an	
_				-		Bottom of Boring at 150.5 ft bgs on 4/19/2007	_
_				-		-	_
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PROJECT NUMBER:	BORING NUMBER:					
338884 FI	B-23A	SHEET	1	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723147.5 N, 458207.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: Mark Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550, S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8" drag bit

						y, cathead, AWJ rods, 2-7			_	ORIENTATION : Vertical
WATER	LEVELS	: 5.0 ft bo	gs on 6/30	5/07	START : 11/28/2007	END: 11/28/2007	LOGGI	<u> </u>	D.	Whitaker COMMENTS
≩Q∉	044451	INTER	1 (6)	STANDARD PENETRATION		SOIL DESCRIPTION		\dashv	90	COMMENTS
DN (SAMPLE	INTERVA	` ,	TEST RESULTS	SOIL NAME.	USCS GROUP SYMBOL,	COLOR.		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE	RY (ft)		MOISTURE C	ONTENT, RELATIVE DEN	ENT, RELATIVE DENSITY OR			DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY					INSTRUMENTATION
42.4	0.0			(11)	Topsoil (ML)				17,	Boring conducted for hammer testing
-		1.1	SS-1	1-2-5	0.0-0.45' - grayish	n brown, (5YR 3/2), very	/ loose, little	/=		purposes only; 2-7/8" drag bit -
-			00 1	(7)	\organics, 0.3-0.45	and With Organics (SP	<u> </u>	#		-
-	1.5				0.45-1.1' - browni	sh black to light brownis	sh gray, (5YR	/-		-
-					2/1 to 5YR 6/1), n	noist, loose, very fine to 30% organic fines, decre	fine grained, easing with	1		-
-					depth		ouomig man	+		-
-								+		-
-								+		-
-								4		-
								+		-
5 37.4	5.0				Silty Sand (SM)			4,	111	
-			SS-2	5-8-12	5.0-5.9' - moderat	te yellowish brown, (10)	/R 5/4), wet,			-
-		0.9	55-2	(20)	medium dense, ver	ery fine to fine grained, nplastic fines, slight oran	no HCl nge staining	/╬	1.13	-
-	6.5				at 5.0-5.3', trace of	organics and black stain	ning.	′ ┨		-
-								4		-
-								4		-
-								+		-
-								4		-
-								+		-
-								4		-
10 32.4	10.0				Silty Sand (SM)			+	111:	-
-		4.4	SS-3	2-2-2	10.0-10.75' - dark	yellowish orange, (10Y		-#		-
-		1.1	33-3	(4)	very loose, very fi	ine to fine grained, no H ic fines	ICI reaction,	/	Ш	-
-	11.5				Sandy Silt (ML)			H		-
-					\ \ 10.75-11.1' - mod	lerate yellowish brown, (apid dilatancy, no HCl re	(10YR 5/4), eaction, 40%	1		-
-					fine silica sand	apia dilatarioy, no morre	Saction, 4070	+		-
-								+		-
-								+		-
-								+		Driller's Remark: Becomes harder-rocky at
								+		14' -
15 27.4	15.0				Silt (ML)			+	П	
		1.0	SS-4	3-7-15	15.0-16.0' - dark v	yellowish orange, (10YF	R 6/6), wet,	+		-
-		1.0	JJ-4	(22)	very stiff, nonplas	stic, rapid dilatancy, mild 0% very fine sand sized	to moderate . carbonate	∕╀	Щ	-
-	16.5				material			′ ┨		-
-								+		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23A	SHEET	2	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723147.5 N, 458207.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: Mark Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550, S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8" drag bit

		: 5.0 ft b			S/N 186073, mud rotary, cath START : 11/28/2007	END : 11/28/2007	LOGGER	· D	ORIENTATION : Vertical Whitaker
	LLVLLO	. 0.0 10 0	90 011 0/01			DESCRIPTION	EGGGER		COMMENTS
8 € 8	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION TEST RESULTS				FOG	
BEL CE A		RECOVE	ERY (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR			CIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)		L STRUCTURE, MINERA		SYMBOLIC LOG	INSTRUMENTATION
22.4 - -	20.0	1.4	SS-5	12-42-50 (92)	Silt (ML) 20.0-21.35' - Same as	15.0-16.0' except hard	-		-
25 17.4	25.0	0.9	SS-6	20-20-24 (44)	Sandy Silt And Limes 25.0-25.9' - yellowish g and 5Y 6/4), wet, hard mild HCl reaction, 35% 10-15% fine gravel-siz carbonate materials	ray and dusky yellow, (, nonplastic, rapid dilata o fine to coarse sand siz	ancy, zed,		Driller's Remark: Hard drilling from 26.5-30.0'
30 12.4 - -	30.0	1.1	SS-7	45-26-33 (59)	Sandy Silt And Limes 30.0-31.05' - Same as (5Y 6/4), moderate HC	25.0-25.9 except dusky	- y yellow, - - -		- - - - - -
- - - - 35	35.0						- - - -		Driller's Remark: Encountering rock at 33' and chattering -
7.4	36.5	0.7	SS-8	9-4-2 (6)	Silty Sand (SM) 35.0-35.65' - light olive fine to coarse grained, fine to gravel-sized lim nonplastic fines, carbo	moderate HCl reaction estone fragments, 20-2	i. 10%		Driller's Remark: Hard at 37'; change to 2-7/8" tricone bit
40									



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23A	SHEET	3	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723147.5 N, 458207.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: Mark Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550, S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8" drag bit

						, cathead, AWJ rods, 2-7/8"			ORIENTATION : Vertical
WATER	LEVELS	: 5.0 ft bo	gs on 6/30)/07	START : 11/28/2007	END: 11/28/2007	LOGGER	: D.	
>				STANDARD		SOIL DESCRIPTION		٥	COMMENTS
A S S S S S S S S S S S S S S S S S S S	SAMPLE	INTERVA	AL (ft)	STANDARD PENETRATION TEST RESULTS) LO	
BEI GE		RECOVE	ERY (ft)		SOIL NAME, U	USCS GROUP SYMBOL, C ONTENT, RELATIVE DENS	OLOR,	ЭГІС	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY	, SOIL STRUCTURE, MINE	RALOGY	SYMBOLIC LOG	INSTRUMENTATION
SUI				(N)				λS	
2.4	40.0	0.0	SS-9	50/1.5	No Recovery 40.0	0-40.1'			
				(50/1.5")			_		1
-									Driller's Remark: Medium hard drilling from
-							-		41-62'
-							-		-
-							-		-
-							-		-
-							_		-
_							_		_
_							_		_
45 <u> </u>	45.0								
-2.6		0.0	SS-10	46-50/5.5	No Recovery 45.0	0-46.0'			
	46.0	0.0	33-10	(96/11.5")					
									1
							_		1
-									1
-							-		1
-							-		-
-							-		-
-							-		-
							-		-
50 <u> </u>	50.0			33-50/3.5	_ Limestone Fragn	nents		Н	-
	50.8	0.3	SS-11	(83/9.5")	50.0-50.25' - light	olive gray, (5Y 5/2), mild vel-sized fragments	HCI /-		-
-	00.0			, ,	\reaction, fine grav	vel-sized fragments	/ -		-
-							_		-
-							_		4
_							_		_
_									
									1
55	55.0								1
-12.6	55.4	0.0	SS-12	50/5 (50/5")	No Recovery 55.0	0-55.4'			7
-				(50/5")					1
-							-		1
-							-		-
-							-		-
-							-		-
-							-		-
-							-		-
-							=		-
-							-		
60									



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23A	SHEET	4	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723147.5 N, 458207.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: Mark Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550, S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8" drag bit

					-	ary, cameau, Avvorous, 2-776			ORIENTATION : Vertical
WATER	LEVELS	: 5.0 ft bo	gs on 6/30	0/07 5	START : 11/28/2007	END : 11/28/2007	LOGGER	: D.	
200				STANDARD		SOIL DESCRIPTION		၅	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 11414			SYMBOLIC LOG	DEDTIL OF GARNING DRIVENIA DATE
B 등 등		RECOVE	RY (ft)		SOIL NAME MOISTURE	E, USCS GROUP SYMBOL, (CONTENT, RELATIVE DEN	OLOR, SITY OR	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
P.F.A.Y.			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, MINE	RALOGY	MB.	INSTRUMENTATION
SU				(N)				SΥ	
-17.6	60.0	0.0	SS-13	50-50/4	No Recovery 60	0.0-60.8'			
_	60.8	0.0	00-10	(100/10")					1
-							-		1
-							_		-
-							_		Driller's Remark: Hard at 62'
_							_		
_							_		Driller's Remark: Soft from 62.5-64.5'
_							_		1
	05.0						-		Driller's Remark: Hard from 64.5-66.5'
65 <u> </u>	65 :9	0.0	\SS-14 /	50/1	No Recovery 6	5 0-65 1'			-
		(0.0 /	(00 11)	(50/1")	ino necessary en	0.0 00.1			-
_							_		_
							_		
									Driller's Remark: Soft from 66.5-67.5'
							_		1
-							_		Driller's Remark: Hard from 67.5-70.0'
-							_		-
_							_		-
_							_		-
_							_		_
70 <u> </u>	7 0.9								
-27.6	70.1	0.0	SS-15	50/1	No Recovery 7				Boring completed at 16:55 on 11/28/2007
_				(50/1")	Bottom of Borin	g at 70.1 ft bgs on 11/28/2	007 -		Water level at 5.0' below ground surface Driller's Remark: 25% loss of circulation
-							_		throughout entire boring
-							-		
-							-		-
_							_		_
_							_		_
							_		_
-							_		-
							_		-
75 <u> </u>									-
_ 52.5							-		-
_							_		_
]									1
							_		1
-							-		
-							-		
-							-		-
							_		_
80									1



PROJECT NUMBER:	BORING NUMBER:

338884.FL B-24

SHEET 1 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 1.61 ft b	ogs on 6/1	14/07	START : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez
				STANDARD	SOIL DESCRIPTION COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
H BE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
40.9	0.0			(14)	Silty Sand With Organics (SM) "Water level is based on Ground Water
-		0.4	SS-1	0-4-4	\[\sqrt{0.0-0.4'} - grayish brown to dusky brown, (5YR 2/3 to 5Y 2/2), moist to wet, loose, fine sand, 16% fines, \[\frac{1}{2} \] Monitoring at LNP site (FSAR Table 2.4.12.08)"
-	1.5			(8)	12% organic matter
-	1.0				Begin drilling with 3-7/8" tri-cone bit at 2.0'
_					1
]
]
_					<u> </u>
_					<u> </u>
5 35.9	5.0				Doorly Creded Sand Mith Silt /CD SM\
35.9				2-3-4	Poorly Graded Sand With Silt (SP-SM) 5.0-5.95' - moderate yellowish brown, (10YR 5/4), wet,
-		1.0	SS-2	(7)	loose, very fine to fine grained, no HCl reaction, 11% low plasticity fines, trace roots, trace coarse gravel,
-	6.5				sand is silica
-					-
-					-
-					- 1
-					-
-					1
10	10.0				1
30.9	10.0				Silt (ML) Driller's Remark: Surface around borehole
		1.1	SS-3	4-5-10 (15)	10.0-11.05' - grayish orange, (10YR 7/4), wet, stiff, ononplastic, rapid dilatancy, moderate HCl reaction,
	11.5			(10)	trace fine grained sand, all carbonate derived
_					<u> </u>
_					_
_					<u> </u>
_					4
-					
15 <u> </u>	15.0			47-50/3	Limestone Fragments And Silt (ML)
-	15.8	0.6	SS-4	(97/9")	15.0-15.6' - silt is grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, 60% of sample is
-					\ limestone, pale yellowish brown, (10YR 6/2), fine
-					\grained sand to coarse grained gravel-sized -
-					-
_					1
]
]
] -]
20					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-24	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

						otary, auto nammer, Avv3 roc				ORIENTATION : Vertical
WATER	LEVELS	. 1.61 ft l	ogs on 6/		START : 5/15/2007	END : 5/17/2007	LOGGE	<u> </u>	<u>≺. (</u>	
30₽				STANDARD PENETRATION		SOIL DESCRIPTION		۲ 🏲	3 	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMBOL	COLOR		2	DEPTH OF CASING, DRILLING RATE,
H BI ACE		RECOVE	ERY (ft)		MOISTURE	E CONTENT, RELATIVE DEI	NSITY OR	2	<u> </u>	DRILLING FLUID LOSS, TESTS, AND
EV.			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE, MI	NERALOGY	3		INSTRUMENTATION
20.9	20.0			(N)	Silt With Sand	I /MI \		- 1	,	
20.5	20.0			13-47-18	21.0-21.25' - ar	ravish orange to moderate	yellowish	\parallel		_
_		1.3	SS-5	(65)	brown, (10YR	7/4 to 10YR 6/2), moist to	wet, hard,	\parallel		4
_	21.5				5-10% sand-siz	oid dilatancy, moderate HC zed grains, 5-10% mediun	n to coarse /	∕╬	۳	_
l _					\grained materia			1	-	
									-	
									-	Driller's Remark: Harder drilling at 22.5'
								1	-	_
-								1	-	-
-								1	-	=
25	25.0							1	-	-
15.9	25.0				Sandy Silt (ML	L)		+	П	-
-		1.5	SS-6	8-8-6	25.0-26.5' - Sa	me as 20.0-21.25' except	27% fine	$ \mathbf{H} $		-
-		1.5	33-0	(14)	grained sand, 1	13% medium to coarse gra	ained sand	\mathbf{H}		-
_	26.5							╨	Щ	-
-								4	-	-
_								4	-	=
_								1	-	
_									-	Driller's Remark: Hard drilling at 28', 20% circulation loss
									-	
								1	-	
30	30.0 30.2							1	-	
10.9	30.2	0.2	SS-7	50/2		agments		Æ	۹	4" casing set at 30'
-				(50/2")	\30.0-30.15' - lig	ght brown, (5YR 5/6), mild moderately fossiliferous	to moderate /	1	-	_
-					(**************************************			1	-	=
-								1	-	-
-								1	-	-
-								+	-	-
-								+	-	-
-								+	-	-
-								4		=
-								1		
35	35.0							1		
5.9				6 40 40	Silty Sand (SN 35.0-36.5' - day	/l) rk yellowish brown, (10YR	4/2) moiet to			
		1.5	SS-8	6-10-19 (29)	wet, medium d	lense, fine to coarse graine	ed, mild HCl			
]	36.5			(30)	reaction, 30% r	nonplastic fines, all carbor	nate derived			
1 7								T		_
								1		-
-								1		7
-								1		7
-								+		-
-								+		-
								+		-
40								+	+	
		l	l					┸		



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-24	SHEET	3	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 1.61 ft b	ogs on 6/1	14/07 S	START : 5/15/2007 END : 5/17/2007 LOGGE	R:	R. Go	omez
>				STANDARD PENETRATION	SOIL DESCRIPTION	\int	ی 🛚	COMMENTS
N AND N	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	OO! NAME LIGOO OBOUR OVARDOL OOLOD		O C	DEDTIL OF CACING DRILLING DATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		ğ	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMBOLIC LOG	INSTRUMENTATION
0.9	40.0	0.0	SS-9	50/3	_ No Recovery 40.0-40.3'	Ť	<u>, , , , , , , , , , , , , , , , , , , </u>	
-				(50/3")		1		-
-						1		-
-						1		
						1		_
]		
]		_
_						1		_
_						1		-
45 -4.1	45.0	0.4	CC 10	50/5	Silby Sand (SM)	+		Driller's Remark: Hard to soft material from
-4.1	45.4	0.4	SS-10	50/5 (50/5")	Silty Sand (SM)	r ll		Fig. 5 Heavy to no grinding)
-					moist, very dense, fine to coarse grained, mild HCl reaction, 25-30% low plasticity fines, 5% fine grained	4		-
-					gravel	+		-
-						+		-
-						1		-
-						1		-
-						1		-
-						1		-
50	50.0					1		_
-9.1				00.07.50	Limestone Fragments And Silty Sand (SM) 50.0-51.5' - Same as 45.0-45.6' except dark yellowish			Oriller's Remark: Medium grinding from 50-
_		1.5	SS-11	39-37-50 (87)	brown, (10YR 4/2), 60% limestone fragments, 40%		$\ \ $	-
_	51.5			. ,	silty sand			-
_						4		-
-						+		-
-						+		-
-						+		-
-						+		-
55 55	<u>54:8</u>					1		Advanced 4" casing to 55', switch to rock
-14.1		0.0_/	\SS-12 <i>)</i>	50/1 (50/1")	No Recovery 55.0-55.1' Begin Rock Coring at 55.0 ft bgs	†		coring, see rock core log
-				\	See the next sheet for the rock core log	1		-
1 -						1		-
1 -						1		_
1 []		_
1 -								
1 -						1		-
1 -						1		-
-						-		-
60						+	+	



PROJECT NUMBER:

338884.FL

B-24

SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.6	31 ft bo	as on (6/14/07 START : 5/15/2007 END : 5/	17/20	007	LOGGER : R. Gomez	
				DISCONTINUITIES			LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	907 OI		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B	RE RU GTH, OVE	D (%)	CTUI FOC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC		WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SE	REG	RQ	FRA PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN		CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-14.1	55.0		>10	55.1' - Fracture, horizontal, rough, planar,		T	Limestone 55.0-57.0' - moderate yellowish	_
_			- 10	open 55.4-55.6' - Fracture zone, multiple fractures,	F	7	brown to dark yellowish brown,	_
-			0	gravel-sized rock fragments 55.9' - Fracture or mechanical break,	F	7	(10YR 5/4 to 10YR 4/2), medium grained, mild to moderate HCl	-
-	R1-HQ			horizontal, rough, planar, tight 57.0-57.2' - Clay seam, 0.2' thick			reaction, weak (R2), voids (1/16-3/16") over 20-30% of surface,	-
-	5 ft 82%	45	2	57.0-57.2 - Clay Seam, 0.2 trick	H	╁╢	moderately fossiliferous (shell fragments), black organic lenses	-
-	0270			57.9-58.4' - Fracture zone, multiple fractures		オ╢	3/16-3/8" at 55.6-55.9' and 56.8-57.0'	-
-			>10	-	F	$\exists \mathbb{N}$	Fat Clay (CH) 57.0-57.2' - moderate brown, (5YR	-
			O NR		\mathbb{H}	\exists \mathbb{N}	4/4), high plasticity Limestone	R1: 11 minutes
60	60.0		INK	_			57.2-58.0' - Same as 55.0-57.0'	
-19.1 -			2	60.3' - Fracture or mechanical break, 60 deg	₩	+	Fat Clay (CH) 58.0-58.4' - grayish brown to dusky	-
-				60.6' - Fracture, rough, stepped, open 1/8-5/16"	\blacksquare	7	yellowish brown, (5YR 3/2 to 10YR 2/2), medium to high plasticity	-
-			0		H	+	Limestone	-
-	R2-HQ		_	62.1, 62.5, 62.7, 62.8, 63.0, 63.3, 63.4, 63.7,	Н	+	58.4-59.1' - Same as 55.0-57.0' except cavities (3/16-9/16") over 40%	-
-	5 ft 96%	33	5	64.1, 64.4' - Fractures (10), rough, planar, <1/16" clay infilling		1	of surface No Recovery 59.1-60.0'	-
			3	in to old, illining	╟	Ŧ	Limestone	
-					\vdash	}	60.0-61.2' - Same as 55.0-57.0' except pale yellowish brown, (10YR	D2: 40 minutes
			2			}	6/2), medium to coarse grained 61.2-64.8' - pale yellowish brown to	R2: 12 minutes
65 -24.1	65.0		NR_	65.0-66.2' - Fracture zone, rough to smooth,		_	dark yellowish brown, (10YR 6/2 to 10YR 4/2), fine to coarse grained,	-
-			>10	planar, <1/16" silt and/or clay sized infilling	Ш	╁	moderate HCl reaction, very weak	-
-			•		H	Ⅎ	(R1), weak rock (R2) at 63.7', 63.8' and 64.0', friable, poorly fossiliferous	-
			2	66.35, 66.5' - Fractures (2), rough, stepped, open 1/8"	Ш	Ⅎ	No Recovery 64.8-65.0' Limestone	SC-1 collected at 66.5- 67.25' -
_	R3-HQ 5 ft	38	1	67.2' - Fracture, rough, stepped, open		_	65.0-66.2' - Same as 61.2-64.8' except increase in weak rock (R2),	-
-	94%			3/16-1/4"	Ł	╁	rock chips	-
-			2	68.5, 68.7' - Fractures (2), rough, stepped,	Ш	+	66.2-69.7' - dark yellowish brown, (10YR 4/2), moderate HCl reaction,	-
-			<10	open 1/16-3/16"		\pm	very weak to weak (R1 to R2), voids (up to 3/16") over 30% of surface,	R3: 9 minutes
70	70.0		NR		世	†	solution cavities (up to 3/4") over 10% of surface, intervals of fine	-
-29.1			10	70.0-74.0' - Fracture zone, vertical, multiple fractures, mostly vertical along weak joints,	H	1	grained limestone with no voids or	
_			10	slight infilling	H	1	solution cavities from 69.0-69.7' No Recovery 69.7-70.0']
-			10		片	+	Limestone 70.0-72.4' - pale yellowish brown,	_
-	R4-HQ				世	+	(10YR 6/2), fine grained, moderate HCl reaction, weak to medium strong	-
-	5 ft 76%	0	10		/	丰\	(R2 to R3), voids (<1/8") over 5-10% of surface, silt-like matrix over 5% of	-
-	1070		10		Ħ	十\\	surface, poorly fossiliferous	-
_			10		厈	1	Fat Clay (CH) 72.4-72.6' - light brown, (5YR 5/6),]
_			NR		F	1	medium to high plasticity, no HCl reaction, with black, friable organics	R4: 8 minutes
75	75.0				F	1		
	1					_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-24	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.6	31 ft bo	gs on 6	5/14/07 START : 5/15/2007 END : 5/	17/20	D7 LOGGER : R. Gomez	
₹ □ ≘	(%)			DISCONTINUITIES	J _Q	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	D (%)	FOOF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF SLEV	SORE	RQD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3.Y.ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-34.1	0715	ഥ	шп		S	Limestone	
-			0	-	H	- 72.6-73.8' - moderate yellowish	-
-				-	H	brown, (10YR 5/4), very weak (R1), voids (up to 1/16") over 10-20% of	1
-			1	- 76 GL Fractive boxinostal revent standard	H	 surface, moderately fossiliferous 	1
-	R5-HQ			76.6' - Fracture, horizontal, rough, stepped, open 3/16-5/16", fracture along cavity	Н	No Recovery 73.8-75.0' Limestone	-
-	5 ft	72	3	77.5-77.8' - Fractures, irregular fractures	ш	- 75.0-79.6' - moderate yellowish	1
-	92%			along solution cavities	ш	brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moderate	-
-			2	- 78.6' - Fracture, 60 deg, rough, planar	Ш	 HCl reaction, very weak to weak (R1 	-
-			4	76.0 - Fracture, 60 deg, rough, planai	Н	to R2), voids (up to 1/16") over 30-40% of surface, solution cavities	R5: 7 minutes
			1	70.6' Fracture horizontal rough stanced	Ħ	at 76.4-77.3', highly fossiliferous	-
80 <u> </u>	80.0		NR	79.6' - Fracture, horizontal, rough, stepped, — open 1/16-1/8"	H	No Recovery 79.6-80.0' Limestone	-
-			2	80.5, 80.8' - Fractures (2), horizontal, rough,	Ш	- 80.0-83.4' - pale yellowish brown to	-
-				planar, some silt and sand infilling	$oldsymbol{arphi}$	dark yellowish brown, (10YR 6/2 to 10YR 4/2), weak to medium strong	-
-			>10	81.6, 82.0' - Fracture zone, multiple fractures	Ͳ	(R2 to R3), voids (1/16") over	1
-	R6-HQ			along solution cavities	世	20-30% of surface, solutions cavities (<3/4") over 10-15% of surface	1
_	5 ft 68%	37	3	82.2 - Fracture or mechanical break, vertical - 82.4 - Fracture, 3-5 deg, rough, stepped,		-	1
_	00%		1	trace infilling, open 1/8-1/4"	Н	-	1
-				83.1' - Fracture, 15 deg, rough, planar	H	No Recovery 83.4-85.0'	1
-			NR	-	Ħ	-	R6: 7 minutes
05	05.0			-	H	-	1
85 <u> </u>	85.0			85.0-85.2' - Fracture zone, irregular fractures	Н	Limestone	
-			4	along solution cavities 85.5' - Fracture, horizontal, smooth,	П	 85.0-87.3' - very pale orange to grayish orange, (10YR 8/2 to 10YR 	1
-				undulating	ш	7/4), fine grained, strong HCl	1
-			1	86.2' - Fracture, horizontal, smooth, stepped, infilling	ш	 reaction, weak (R2), trace voids, trace fossils, 20-30% silt sized matrix 	1
-	R7-HQ			87.1, 87.4' - Mechanical break (2), horizontal,	Ш	material	
-	5 ft 58%	35	1	rough, planar	\mathbb{H}	 87.3-87.9' - Same as 85.0-87.3' except extremely weak to very weak 	1
	55,3			87.9' - Fracture, smooth, planar, irregular	Ħ	(R0 to R1), silty matrix increases to	Driller's Remark: 90%
			\ <u></u>	pieces	H	- 40-50% No Recovery 87.9-90.0'	circulation loss at 88'
			NR	-	H	•	R7: 8 minutes
90	90.0			-	H		1
-49.1				90.6' - Fracture, 7-10 deg, rough, planar	Н	Limestone	
			2	90.9' - Fracture, 0-1 deg, rough, planar	Ш	 90.0-94.3' - grayish orange, (10YR 7/4), medium to coarse grained, 	1
			2	91.7, 91.8, 91.9' - Fractures (3), 2-4 deg,	Ш	moderate HCl reaction, extremely	1
1			3	rough, planar	Ы	 weak to very weak (R0 to R1), voids (up to 1/8") over 20-30% of surface, 	1
]	R8-HQ	E0.	10	92.0-92.2' - Fractures or mechanical break,	\mathbb{H}	moderately fossiliferous, silty matrix up to 40-50%	1
	5 ft 100%	52	10	irregular fractures 92.4' - Fracture, horizontal, rough, planar,	H	_ up to +0-50 /0	1
			1	trace infilling 92.7' - Fracture, 40-50 deg, rough, planar, to	H	_	1
]			1	undulating	Ш	_	1
			10	93.9' - Fracture, 5-10 deg, rough, stepped, <3/16" infilling -	Н	_	R8: 7 minutes
95	95.0		10	-0,10 iniming	Ш		



PROJECT NUMBER:	BORING NUMBER:				-	
338884.FL	B-24	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 1.6	1 ft bo	gs on (6/14/07 START : 5/15/2007 END : 5/	17/20	D7 LOGGER : R. Gomez	
				DISCONTINUITIES	Ú	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	507	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A H B H	TH./	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
ERY	ORE	Ø	SAC ER F	PLANARITY, INFILLING MATERIAL AND	YMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	225	ď	E E	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
-54.1 _			1	94.3-95.0' - Fracture zone, multiple fractures, very soft material	Щ	Limestone - 94.3-95.0' - Same as 90.0-94.3'	SC-2 collected at 95.2-
_			·	95.2' - Fracture, horizontal, smooth, planar	Щ	except strong HCl reaction, silty	96.4'
_			2	00.4.00.051	ш	matrix increases to 60-70% – 95.0-100.0' - pale yellowish brown,	_
l _				96.4, 96.85' - Fractures (2), 1 deg, rough, stepped, open 1/8-5/16"		(10YR 6/2), strong HCl reaction, very	
_	R9-HQ	78	3	97.2, 97.8, 97.9, 98.0, 98.15, 98.9' -		weak (R1), voids (up to 1/16") over 10-20% of surface, solution cavities	
	5 ft 100%	70	3	Fractures (6), rough, stepped, open 3/16"		(up to 3/8") over 5-10% of surface,	
			3			moderately fossiliferous, 5-10% silty matrix (chalk-like)	1
_			3		Ш	- Hautx (Chark-like)	1
_					Ш		R9: 6 minutes
100	100.0		2	99.6, 99.7' - Fractures (2), horizontal,	Ш	-	1
-59.1	, , , ,		, -	smooth, planar 100.0-100.35' - Fracture zone, irregular	\mathbb{H}	100.0-101.4' - grayish orange, (10YR	
-			10	pieces	\Box	 7/4), medium to coarse grained, strong HCl reaction, very weak (R1), 	1
_			1	101.0, 101.3' - Fractures (2), 60 deg, rough,	ш	voids (up to 1/16") over 5-10% of	1 7
-				planar, tight	╁	 surface, poorly to moderately fossiliferous 	1
-	R10-HQ				\top	No Recovery 101.4-105.0'	1
-	5 ft 28%	0			ш	_	-
-	2070		NR		+	-	-
-					\vdash	-	-
-					\pm	-	R10: 4 minutes
405	405.0					-	-
105 -64.1	105.0			_	╁┼	Limestone	_
-			0		$+\Box$	- 105.0-108.5' - Same as 100.0-101.4'	-
-						except pale yellowish brown, (10YR 6/2)	-
-			1		+	-	-
-	R11-HQ			106.75, 107.2' - Fractures (2), horizontal, smooth, planar, tight	H	-	-
-	5 ft	52	4	107.4, 107.7, 107.9' - Fractures (3),	\Box	-	-
-	100%			horizontal, rough, planar, open	-	_	-
-			10	108.3-108.7' - Fracture zone, irregular breaks	$+\Box$	108.5-110.0' - pale yellowish brown,	-
-				along weak fractures	HП	 (10YR 6/2), strong HCl reaction, 	R11: 5 minutes
-			3	109.3, 109.5, 109.9' - Fractures (3), rough,	団	extremely weak (R0), poorly fossiliferous, no voids	-
110 <u></u> -69.1	110.0			stepped, open 1/8-3/16"	+	Limestone	-
-			4	110.1, 110.2, 110.3' - Fractures (3), smooth, breaks along smooth fractures	H	 110.0-113.9' - grayish orange to pale 	-
-				110.8' - Fracture, rough, undulating	H	yellowish brown, (10YR 7/4 to 10YR 6/2), strong HCl reaction, very weak	-
-			4	111.1, 111.6' - Fractures (2), rough, planar	世	(R1), voids (up to 3/16") over 30-40%] -
-	D40 1/2			111.9, 111.98' - Fractures (2), 5 deg, smooth,	\mathbf{H}	of surface, trace solution cavities (up to 3/8"), 10-20% silty and sandy	-
-	R12-HQ 5 ft	23	>10	planar	Щ	- sized matrix	-
-	78%			112.1-112.6' - Fracture zone, multiple irregular breaks, some gravel sized rock	Ш	<u>-</u>	-
-			>10	fragments	H	<u>-</u>	-
] -				113.0-113.9' - Fracture zone, multiple irregular breaks along weak fractures	Ħ	[−] No Recovery 113.9-115.0'	D40: 4 min 1
_			NR	mogdial broaks along weak fractures	Ш	- 110 Necovery 110.8-110.0	R12: 4 minutes
115	115.0				Ш		
							<u> </u>

APPENDIX 2BB-610 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-24	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 1.6	1 ft bo	gs on (6/14/07 START : 5/15/2007 END : 5/	17/20	D7 LOGGER : R. Gomez	
≥ ∩ ∵	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVER	D (%)	FOOF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF SURF SILEV	SORE	RQ	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
- 74 .1	0111	ш		115.3' - Fracture, horizontal, rough, planar	100	Limestone	
-			1	-	F	- 115.0-120.0' - grayish orange to pale	SC-3 collected at 115.3 116.15'
_				-	Ħ	yellowish brown, (10YR 7/4 to 10YR 6/2), strong HCl reaction, very weak	-
-			2	116.25' - Fracture, rough, stepped, open 1/16-1/8"	Ħ	 (R1), voids over 20-30% of surface, solution cavities (9/16") over 15-20% 	1
_	I R13-HQ			116.45' - Fracture, rough, planar	L	of surface from 116.5-118.0', silty	1
_	5 ft 100%	62	1	- 117.7' - Fracture, smooth, undulating	Ш	 laminations (pale yellowish brown) with no voids/cavities at 118.7' and 	1
_	.0070			118.1' - Fracture, smooth, undulating	Н	118.9'	1
_			6	open 1/16" 118.6' - Fracture, 60 deg, rough, undulating	H	=	1
_				118.7-118.9' - Fracture zone, regular breaks	ш		R13: 7 minutes
120	120.0		2	along weak fractures 119.2, 119.4' - Fractures (2), irregular breaks —	口		1
-79.1			4	120.2, 120.3, 120.5, 120.8' - Fractures,	\perp	120.0-124.3' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR	
			4	smooth, stepped, open 1/8-3/16"	\vdash	6/2), strong HCl reaction, very weak	
			0		F	to weak (R1 to R2), voids (up to 1/16") over 20-25% of surface,]
_				_	F	10-15% silty matrix, silty laminations	
_	R14-HQ 5 ft	58	4	122.1, 122.2, 122.6, 122.95' - Fractures (4), horizontal, rough, stepped	片	at 123.5-123.6', fine grained carbonate laminations (very pale	
_	86%			-	H	orange [10YR 8/2], weak to medium strong [R2 to R3]) at 123.8' and	-
_			4	123.1, 128.2, 123.35, 123.5' - Fractures (4), 0-1 deg, smooth, planar	H	- 123.9'	-
_			0		쓴	_	R14: 6 minutes
-			NR	-	Н	- No Recovery 124.3-125.0'	-
125 <u> </u>	125.0				H	Limestone	-
_			2	125.5' - Fracture, rough, undulating	H	 125.0-130.0' - pale yellowish brown, (10YR 6/2), moderate to strong HCl 	-
_				-	仜	reaction, very weak to weak (R1 to	1
_			0	- 126.6, 127.7' - Mechanical break (2)	ш	 R2), voids (up to 1/16") over 15-20% of surface, solution cavities (up to 	1
_	R15-HQ			-	\blacksquare	3/4") over 20-30% of surface at	1
	5 ft 100%	70	0	-		 125.0-126.7', moderately fossiliferous, fine grained at 	1
			5	- 128.2, 128.3, 128.4, 128.6, 128.8, 129.0' -	\vdash	128.8-129.5 ¹ , 15-20% silty matrix	1
			ວ	Fractures (6), smooth, planar, breaks along weak fractures	Ė	_	1
			2	129.1, 129.3' - Fractures (2), 0-2 deg, rough,	片	_	R15: 6 minutes
	130.0		_	planar —	Ħ]
-89.1 -			4		片	130.0-132.5' - moderate yellowish brown, (10YR 5/4), mild to moderate]
-				130.7, 130.8, 130.9, 130.95' - Fractures (4),	世	HCl reaction, very weak (R1), solution cavities (up to 9/16") over	-
-			1	smooth, planar, breaks along weak fractures 131.3' - Fracture, rough, stepped, open	H	 5-10% of surface, moderately 	-
-	R16-HQ			1/8-3/16"	oxdappi	fossiliferous	-
-	5 ft	70	0	132.2, 132.4, 132.5, 134.6' - Mechanical break (4), irregular breaks	\vdash	132.5-134.6' - very pale orange to	-
-	92%			Sical (T), inegulal bicars	厈	pale yellowish brown, (10YR 8/2 to	-
-			0	-	口	10YR 6/2), fine grained, strong to moderate HCl reaction, medium	-
-			0	-	世	 strong to strong (R3 to R4), solution cavities (up to 3/4") over 5% of 	R16: 7 minutes
135	135.0		NR	-	\blacksquare	surface, moderately fossiliferous	-
135	133.0						



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-24	SHEET	8	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

DISCONTINUITIES DESCRIPTION OR HELDON OR	OUGHNESS, RIAL AND ND TIGHTNESS	CLOG	LITHOLOGY ROCK TYPE, COLOR,	COMMENTS
04.1	OUGHNESS,	O LC	ROCK TYPE, COLOR,	
04.1	OUGHNESS,			SIZE AND DEPTH OF CASING,
04.1		灵	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
04.1	ND TIGHTNESS >	×₩	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-VT. 1261 1267 1267 1260 Era		S	No Recovery 134.5-135.0'	
4 horizontal, rough, undulating, op		⇉	Limestone	-
yellowish brown staining		╬	135.0-136.0' - pale yellowish brown	-
136.0-136.5' - Fracture zone, so sized rock fragments	me gravel	4	to grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, moderate	_
136.6' - Fracture zone or mecha	nical break,	耳	HCl reaction, weak (R2), voids (up to 3/16") over 10-20% of surface,	_
R17-HQ 60 deg, tight 5 ft 47 0 137.2' - Fracture or mechanical	hreak 40	┰	cavities (up to 1-3/16"x3/8") over	_
deg, smooth, planar, tight	· -	\top	15-25% of surface, some fossil	SC-4 collected at 137.75-
137.6' - Fracture or mechanical planar, tight	break, rough,	7	casts/molds 136.0-136.4' - moderate yellowish	138.6'
138.6, 138.9' - Mechanical break	(2), rough,	Ⅎ	brown, (10YR 5/4), fine grained,	_
0 stepped, open 3/16-5/16" 139.3, 139.8' - Mechanical break	(2) rough	Ц.	moderate HCl reaction, very weak (R1), voids (up to 3/16") over 30-40%	R17: 9 minutes
140 140.0 NR planar	(2), rough,	Ц	of surface, trace cavities (3/8"x3/16"),	
-99.1	<u>_</u>	Щ	moderately fossiliferous \(\) 136.4-138.6' - pale yellowish brown	
	<u>_</u>	+	interlaminated with moderate	
	F	a	yellowish brown, (10YR 6/2 with 10YR 5/4), fine to medium grained,	
]	Ħ	moderate HCl reaction, weak (R2),	
R18-HQ 5 ft 93	actures (4)		trace voids (up to 1/16"), trace fossils (casts/molds), laminated	
100% 142.3, 142.3, 142.4, 142.3 111 horizontal, smooth, planar, breal		$+\Gamma$	138.6-139.4' - pale yellowish brown,	
weak fractures			(10YR 6/2), fine to medium grained, strong HCl reaction, very weak to	
		П	weak (R1 to R2), trace voids (up to	1
	_	$+\Gamma$	1/16"), some fossils No Recovery 139.4-140'	R18: 5 minutes
145 145.0	-	\dashv	Limestone	
-104 <u>.1</u> 145.1, 145.3, 145.4, 145.5, 145.		\mp	 140.0-142.5' - pale yellowish brown to moderate yellowish brown, (10YR 	
5 (5), horizontal, rough, planar, op	en 3/16"	Ⅎ	6/2 to 10YR 5/4), fine to medium	1
	1-1	十	grained, strong HCl reaction, very weak to weak (R1 to R2), voids (up	
	T	Ц	to 1/16") over 5-10% of surface,	1
R19-HQ	1	ヸ	trace fossils 142.5-142.8' - moderate yellowish	_
5 ft 67 0 88%	1	╁	brown, (10YR 5/4), fine to medium	_
	1	\dashv	grained, mild HCl reaction, very weak to weak (R1 to R2), voids (up to	1
	1	⇉	1/16") over 10-20% of surface, trace	_
	1	⇉	fossils 142.8-145.0' - pale yellowish brown,	R19: 5 minutes
150 150.0 NR	1-1	廾	(10YR 6/2), fine grained, mild to	
-109.1			moderate HCl reaction, very weak to weak (R1 to R2), voids (up to 1/8")	Total depth 150.0'
1	1	r	over 10% of surface, fossils	1
	1	r	(molds/casts) over 10% of surface 145.0-146.0' - moderate yellowish	-
	1	r	brown, (10YR 5/4), mild HCl reaction,	-
1	1	上	very weak (R1), voids (up to 1/8") over 30-35% of surface, laminated,	
	1	 	20% silty matrix, friable	
	1	 	146.0-149.4' - moderate yellowish brown to pale yellowish brown,	
	1	ŀ	(10YR 5/4 to 10YR 6/2), fine to	
	1	 	medium grained, moderate HCl reaction, very weak to weak (R1 to	
	1	 	R2), solution cavities (up to 3/4") at	
		十	147.8-148.2', laminated	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-24	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER L	EVELS : 1.6	S : 1.61 ft bgs on 6/14/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez						
>00	(9)			DISCONTINUITIES		g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SE.	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF GARRIS
#유E	RUH, H.	(%)	FRACTURES PER FOOT	DEDTH TYPE OPIENTATION POLICE	JNIEGG	CLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
₽₽₽ ₽₽₽	NGT COO	R Q D (%)	ACT R F(DEPTH, TYPE, ORIENTATION, ROUGH PLANARITY, INFILLING MATERIAL	AND I	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SS	SER	R O	RH	THICKNESS, SURFACE STAINING, AND T	IGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
							No Recovery 149.4-150.0'	
1 7					-		Bottom of Boring at 150.0 ft bgs on	1
-					-		_ 5/17/2007	-
-					-		_	
-					-		_	-
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-25	SHEET	1	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.3 ft bo	gs on 6/30	0/07 5	START : 4/19/2007 END : 4/23/2007 LO	GGEF	: D.	Roraback
				STANDARD	SOIL DESCRIPTION		O	COMMENTS
LOW AND N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SLO	
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		30LIG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMBOLIC LOG	INSTRUMENTATION
42.5	0.0			(14)	├ Topsoil		11/	Limited space in header: 3-15/16" tri-cone bit
-		1.1	SS-1	2-2-4	\0-0.2' - roots	/ -		
-	1.5			(6)	Poorly Graded Sand With Organics (SP)	Ē		Soils logged by D. Roraback and J. Schaeffer
_	1.0				\no HCl reaction, silica sand, trace nonplastic fines, roots and organics decreasing with depth	/-	i	Note: D50 S/N 240 (with cathead) started
-					roots and organics decreasing with depth		l	boring; due to mechanical issues, rig swapped to CME-55 S/N 299205 at 60 feet
						_	1	below ground surface. Soils drilled with D50.
						_		
_						_		_
5	5.0				D 1 0 1 10 1/0D			_
37.5				2-3-4	Poorly Graded Sand (SP) 5.0-6.2' - moderate yellowish brown, (10YR 5/4), we	t		_
_		1.2	SS-2	(7)	loose, very fine to fine grained, no HCl reaction, silic sand, trace nonplastic fines, trace roots/organics.	á _		-
-	6.5				sand, trace nonplastic lines, trace roots/organics.			-
-						_		-
-						_		-
-						-		-
-						-		-
-						-		-
10	10.0					-		-
32.5	10.0				Poorly Graded Sand With Silt (SP-SM)		TH	-
-		1.2	SS-3	4-4-5	10.0-11.2' - pale yellowish brown, (10YR 6/2), wet, loose, very fine to fine grained, no HCl reaction, silic	- :a		1
_	11.5			(9)	sand, 5% nonplastic fines, trace very fine sand-size	d _	414	1
					\black minerals or organics	_/ -	l	1
						_		
_						_		_
-						_		_
-						-		
15 <u> </u>	15.0				Clayey Sand (SC)		///	-
-		4.0	00.4	6-6-5	15.0-16.0' - mottled yellowish gray, (5YR 8/1), wet,	_		-
-		1.0	SS-4	(11)	very fine to fine grained, no HČl reaction, silica sand 21% medium plastic fines	i,	<i>[[]]</i>	-
-	16.5				, and the second			-
-						-		-
-						-		
-						-		1
-						-		1
-						-		1
20						_		1



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-25	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.3 ft bo	as on 6/30)/07	START : 4/19/2007 END : 4/23/2007	LOGGEF	R : D.	Roraback
>00				STANDARD	SOIL DESCRIPTION		g	COMMENTS
A NO NO NO NO NO NO NO NO NO NO NO NO NO	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COL	OP	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH BE	RECOVERY (ft)			MOISTURE CONTENT, RELATIVE DENSITY	/ OR	BOLI	DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERA	LOGY	SYM	INSTRUMENTATION
22.5	20.0				Clayey Sand (SC)			
_		1.1	SS-5	2-5-5 (10)	20.0-21.1' - yellowish gray, (5YR 8/1), moist, s plasticity, no dilatancy, no HCl reaction, 68%	stiff, high - fine		1
-	21.5			(10)	silica sand		7//	1
_						_		_
_						_		_
_						-		-
-						-		-
	25.0					-		-
25 <u> </u>	25.0				Silty Sand (SM)		Ш	-
-		1.0	SS-6	5-5-5 (10)	25.0-26.0' - pale yellowish brown, (10YR 6/4), loose, very fine to fine grained, no HCl reaction	wet, -		-
-	26.5			(10)	sand, 20% low to medium plasticity fines			1
						_		
						_		
_						_		_
-						-		-
-						-		-
						-		-
30 <u> </u>	30.0				Clayey Sand (SC)			-
-		0.7	SS-7	3-3-4	30.0-30.7' - pale ýellowish brown, (10YR 6/2), ∖ loose, very fine to fine grained, no HCl reactio	wet, -		-
-	31.5			(7)	sand, 25-30% medium to high plastic fines, cl	ay /-		1
					\lenses throughout]
						_		
_						_		_
_						_		-
-						-		-
-	05.0					-		-
35 7.5	35.0				Sandy Silt (ML)		Ш	-
-		1.4	SS-8	22-44-41	35.0-36.4' - light olive gray, (5Y 5/2), wet, very nonplastic to low plasticity, rapid dilatancy, mi	hard, - ld to		
-	36.5			(85)	moderate HCl reaction, 20-35% very fine to co	parse _	Ш	1
					sand-sized particles, carbonate materials	/-		1
						_]
_						_]
-						-		
-						-		-
-						-		-
40								



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-25	SHEET	3	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION: Vertical

WATER LEVELS : 2.3 ft bgs on 6/30/07											
				STANDARD	SOIL DESCRIPTION		COMMENTS				
A PD (#)	SAMPLE INTERVAL (ft) PENETRAT TEST RESU		PENETRATION TEST RESULTS	COLL NAME LICCO OPOLID OVARDOL COLOR	SYMBOLIC LOG	DEDTIL OF CACING PRILLING DATE					
H BE ACE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	BOLI	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION				
2.5	40.0				Sandy Silt (ML) 40.0-41.0' - Same as 35.0-36.4'	╆╖	Driller's Remark: Hitting hard material				
		1.0	SS-9	17-47-43 (90)	40.0-41.0 - Same as 35.0-36.4	$1 \parallel \parallel$]				
_	41.5			()			_				
-						4	-				
-						┨	-				
-						┨	-				
-						1	-				
						1					
45	45.0										
-2.5 -		0.0	SS-10	50/0.5 (50/0.5")	Slough And Limestone Fragments 45.0-45.05' - very poor recovery	H	Driller's Remark: 45.5-46' softer				
-						┨	-				
-						┨	-				
-						1	-				
-						1	<u> </u>				
							_				
_						1	_				
-	40.0					-	-				
50 -7.5	49.9	0.0	SS-11	50/0.5	Slough And Limestone Fragments 50.0-50.05' - Same as 45.0-45.05'	╆					
-				(50/0.5")	\\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	1	-				
					Begin Rock Coring at 50.0 ft bgs See the next sheet for the rock core log						
_						4	-				
-						┨	-				
-						+	-				
-						1	<u> </u>				
55						1	_				
-12.5											
-						-	_				
-						-	-				
-						+	-				
-						1	1				
-						1	-				
]					
_						-	_				
60						\vdash					



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-25	SHEET	4	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.3	ft bgs	s on 6/	30/07 START : 4/19/2007 END : 4/.	23/20	D7 LOGGER : D. Roraback	
≥D≎	<u> </u>			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
N (f	AN % SN %	_	ÆS T	DESCRIPTION	CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	(%)	TUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-7.5	50.0	_			,, 	No Recovery 50.0-55.0'	Rock core logged by D.
-				-	Ħ	-	Roraback and P. De
-	-			-	Ħ	-	Sa'Rego _
-				-	H	-	Driller's Remark: Possible -
-	R1-NQ			-	H	-	sand layer; tagged bottom - at 55' below ground
-	5 ft 0%		NR	-	H	-	surface
-	0/0			-	Ш	_	1
-				-	ш	_	1
_				-	Н	_	R1: 16 minutes
55	55.0			-	H	-	-
-12.5	55.0				団	Limestone	1 -
-			4	55.3' - Fracture, 20 deg, rough, undulating, - open	Ш	 55.0-59.75' - pale yellowish brown, (10YR 6/4), fine to medium grained, 	1
-				55.55' - Fracture, 10 deg, rough, undulating,	\mathbb{H}	mild delayed HCl reaction, extremely	1
-			4	open 55.7-55.75' - Fracture, 30 deg, rough, planar	Ħ	 weak to very weak (R0 to R1), variable 10-20% voids to 1/16", trace 	1
-	R2-NQ			55.8' - Fracture, horizontal, rough, undulating,	H	casts/cavities up to 3/8"x3/8"	1
-	5 ft 94%	0	7	lenticular 55.95-56.0' - Fracture, 20 deg, rough,	Ш	throughout run, 30-40% cavities at 56.0-56.15'	1
_			4.0	undulating, open 56.15' - Fracture, 20 deg, rough, undulating,	Н	_	R2: 11 minutes
_			>10	open	Н	_	1
			5	56.4-56.7' - Fracture zone 56.8, 56.85, 56.95, 57.05, 57.2, 57.3, 57.5' -	ш	-	1
60	60.0		NR	Fractures (7), <10 deg, rough, undulating,	Ш	No Recovery 59.75-60.0'	Rig switched out partway
-17.5				open — 57.7-57.8' - Fracture zone	Н	Limestone	through boring due to — mechanical issues
_			1	57.9, 58.1' - Fractures (2), horizontal, rough,	Н	60.0-62.6' - yellowish gray, (5Y 7/2), fine to medium grained, mild delayed	change to CME 55 rig SN 299705 at 60'
			2	undulating, open 58.15-58.3' - Fracture zone	H	HCl reaction, weak (R2), 15-20%	299705 at 60
				58.5, 58.6, 58.8' - Fractures (3), 10 deg,	H	voids up to 1/16", trace voids up to 1-3/16" by 3/8", thread-like black	Driller's Remark: Water level at 2.3' below ground
	R3-NQ 5 ft	9	1	rough, undulating, open 59.1-59.3' - Fracture zone	Ш	mottling up to 1-9/16" by 1/32" at	surface
	52%	9		59.6, 59.75' - Fractures (2), 10 deg, rough,	Н	62.4'-62.8' No Recovery 62.6-65.0'	SC-1 collected at 60.15- 61.20'
				undulating, open 60.1, 61.5' - Fractures (2), horizontal, rough,	H	_]
]]			NR	undulating, open 61.85-62.1' - Fracture, 60 deg, rough,	Щ	_]
_				undulating	Ш	_]
65_	65.0			62.5' - Mechanical break	Н		R3: 5 minutes
-22. 5			5	65.1, 65.2, 65.35, 65.5, 65.7, 66.3' -	F	Limestone 65.0-68.9' - moderate yellowish	
_				Fractures (6), <10 deg, rough, undulating, open	H	brown, (10 YR 5/4), mild delayed HCl	<u> </u>
_			1		H	reaction, weak (R2), 25-30% voids up to 3/16", no visible cavities except	
_			'	_	Н	67.75-67.95': large 3-1/8" by 2"]
_	R4-NQ 5 ft	42	3	67.15, 67.5' - Mechanical break (2)	F	infilled with medium gray (N5), – medium strong (R3) fine grained]
_	78%	74		67.7' - Fracture, horizontal, rough, undulating,	H	carbonate]
-	70 70.0		2	open 68.2' - Mechanical break	Ш	_]
-				68.7' - Fracture, horizontal, rough, undulating,	Н	- No Pocovery 68 9 70 0	<u>[</u>
_			NR	open	F	No Recovery 68.9-70.0'	R4: 4 minutes
70					H		_
					\Box		L



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-25	SHEET	5	OF	9	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS: 2.3 ft bgs on 6/30/0				30/07 START : 4/19/2007 END : 4/	23/200	D7 LOGGER : D. Roraback	
≳D≎	(()			DISCONTINUITIES	၂ ၂	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ATIC	J.H.	(%) _Q	T-00-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
HAR LEV.	ORE	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		ΥME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
	OIK	ď	μΔ	THORAGEO, OUT ACE STAIRING, AND HOTTINESS	S	Limestone	
-27.5			2	70.35' - Fracture, horizontal, rough,	ш	- 70.0-72.5' - Same as 65.0-68.9'	_
_				undulating, open	Н	except black (organic) 1/8" thick	1
_			0	70.95' - Mechanical break	Ш	irregular laminae at 72.3' and - moderately fossiliferous at	_
_						72.35-72.5'	_
_	R5-NQ	50	3	72.25 72.51 Fractures (2) harizantal rough	Ы	72.5-74.3' - pale yellowish brown mottled with dark yellowish brown,	
	5 ft 86%	50	3	72.35, 72.5' - Fractures (2), horizontal, rough, undulating, open	\Box	(10YR 6/2 and 10YR 4/2), fine to	
_				72.8, 73.0-73.05' - Fractures (2), 30 deg,	Н	medium grained, mild delayed HCl	1
_			3	rough, undulating, open 73.4' - Fracture, <10 deg, rough, undulating,	Ш	reaction, weak (R2), 10% voids up to 1/16", trace cavities to 3/4" x 3/8",	1
_			1	open	ш	trace black (organic) thread-like	R5: 8 minutes
75	75.0		NR	73.6' - Mechanical break 74.2' - Fracture, horizontal, rough, undulating,	Н	 mottles at 73.6' No Recovery 74.3-75.0' 	1
-32.5	75.0			open	Ħ	Limestone	-
-			2	75.1' - Fracture, horizontal, rough, undulating,	ш	- 75.0-76.9' - Same as 72.5-74.3'	1
-				open 75.25, 75.8' - Mechanical break (2)	Н	except very weak to weak (R1 to R2), 80% dark yellowish brown mottled	-
-			2	75.6' - Fracture, horizontal, smooth, planar,	田	- from 75.6-76.15'	-
-	R6-NQ			open 76.2, 76.45' - Fractures (2), horizontal, rough,	ш	76.4-76.9' - moderate yellowish brown, (10YR 5/4), fine grained, mild	1
_	5 ft	69	5	undulating, open	Н	 HCl reaction, weak to medium strong 	-
-	100%			76.7-77.5 - Fracture, 85 deg, rough, undulating, tight to open over depth	н	(R2 to R3), 15-20% voids up to 3/16", no visible casts/cavities	-
_			1	77.1-77.5 - Fracture, 85 deg, parallel to	Ш	 76.9-78.7' - pale yellowish brown to 	-
_				above 77.5, 77.6' - Mechanical break (2)	Н	moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, mild HCl	D0: 40 minutes
_			1	77.6-77.7' - Fracture, vertical, rough,	ш	reaction, medium strong (R3), no	R6: 12 minutes
80	80.0			undulating, open 77.75' - Fracture, vertical, rough, stepped —	ш	visible voids, 10% casts/cavities up to 2-3/8" by 9/16", infilled with	
-37.5			2	78.15' - Fracture, <10 deg, smooth, planar	Н	material similar to 76.4-76.9'	
_				79.75-79.8' - Fracture, 30 deg, rough, undulating, open	Ħ	78.7-80.0' - Same as 65.0-68.9'	_
_			1	80.6-80.7' - Fracture, 45 deg, rough,	ш	80.0-83.05' - moderate yellowish brown, (10YR 5/4), fine to medium	_
_				undulating, open	Н	grained, mild HCl reaction, weak to	_
_	R7-NQ 5 ft	40	2	80.8-81.2' - Fracture, 60 deg, rough, undulating, open	Ш	medium strong (R2 to R3), 15% voids up to 3/16", 10% casts/cavities	
	72%	40		82.5' - Mechanical break		up to 1-3/16" by 3/4", poorly	
			<10	82.95-83.15' - Fracture zone 83.3-83.6' - Fracture, 60 deg, rough,	\mathbb{H}	fossiliferous 83.05-83.6' - yellowish gray to very]
				undulating, open	H	pale orange, (5Y 7/2 to 10YR 8/2),]
-			NR	83.5-83.6 - Fracture zone	\Box	fine grained, mild HCl reaction, medium strong to strong (R3 to R4),	R7: 8 minutes
85	85.0				\mathbb{H}	trace voids to 1/16", 15-20%	1
-42.5	- 5.0			85.2, 85.25, 87.0' - Mechanical break (3)	Ш	 casts/cavities up to 1-9/16" x 3/4", infilled with material similar to 	
-			2	85.45-85.5' - Fracture, 30 deg, rough,	Ш	80.0-83.5'	
-				undulating, open	\mathbb{H}	No Recovery 83.6-85.0'	-
-			2	85.7-85.85' - Fracture, 60 deg, rough, undulating, open	Ħ	Limestone 85.0-87.4' - moderate yellowish	
-	R8-NQ			86.35' - Fracture, horizontal, rough,	H	 brown, (10YR 5/4), fine to medium 	-
-	5 ft	38	2	undulating, open 86.6' - Mechanical break	₩	grained, mild HCl reaction, extremely weak to very weak (R0 to R1),	
-	75%			87.2-87.5' - Fracture, 60 deg, rough,	囯	 10-15% voids up to 1/16", trace 	-
-	-		1	undulating 87.75-87.8' - Fracture, 30 deg, smooth,	Ш	casts/cavities up to 3/8" x 9/16" at 85.5-85.7'	-
-	-			undulating, black (organic?) clay infill up to	\mathbb{H}		R8: 9 minutes
-			NR	1/16" thick, open	H	_	- No. 9 minutes
90	90.0				H		_
I					1		

APPENDIX 2BB-618 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-25	SHEET	6	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	NATER LEVELS: 2.3 ft bgs on 6/30/07 START: 4/19/2007 END: 4/23/2007 LOGGER: D. Roraback									
≥ ∩ ∵	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,			
H BE ACE ATIC	L TH.	Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	J J	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND			
EV.	ORE	αD	ZAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.			
	0.77	ď	# 5		Ś		<u> </u>			
-47.5			1	88.6' - Fracture, horizontal, rough, undulating, open	H	87.4-88.75' - Same as 85.0-87.4' - except very weak to weak (R1 to R2),				
_			·	90.6-90.65' - Fracture or mechanical break,	oxdot	and at 87.7-88.2' trace voids up to				
			1	30 deg, rough, undulating, open 91.1-91.2' - Fracture or mechanical break, 60		1/16" - No Recovery 88.75-90.0'				
			1	deg, rough, undulating, open	Н	Limestone				
	R9-NQ	70	_	92.05-92.15' - Fracture, horizontal, rough,	H	90.0-92.3' - pale yellowish brown, (10YR 6/2), fine to medium grained,				
	5 ft 95%	72	4	undulating, open 92.5' - Fracture, horizontal, rough, undulating,		mild HCl reaction, medium strong				
-			4.0	open	₽	(R3), 5-10% voids up to 1/8" in size,	1			
-			>10	92.5-92.8' - Fracture, 75 deg, rough, undulating, open	\blacksquare	 casts/cavities up to 9/16"x3/8" 92.3-92.5' - Same as 90.0-92.3' 				
_			1	92.65' - Fracture, horizontal, rough,		except 20% thin (1/16") organic (dark	R9: 9 minutes			
05	05.0		1	undulating, open	╁	 brown to black) laminae 92.5-94.75' - Same as 90.0-92.3' 				
95 <u> </u>	95.0		<u>NR</u>	93.0' - Mechanical break 93.7-94.2' - Fracture zone	F	except single cavity at 93.5':	-			
-			2	94.2-94.3' - Fracture, 45 deg, rough,	L	2"x1-3/16"	-			
-				undulating, open 95.1-95.3' - Fracture, 60 deg, smooth,	屽	No Recovery 94.75-95.0' Limestone	-			
_			0	undulating -	仜	_ 95.0-97.3' - Same as 90.0-94.75'	-			
-	R10-NQ			95.75' - Fracture, horizontal, rough, undulating, open	Ь	except pale yellowish brown to moderate yellowish brown, (10YR 6/2	-			
_	5 ft	57	5	97.05' - Fracture, horizontal, rough,	\vdash	_ to 10YR 5/4)	-			
_	80%			undulating, tight 97.5, 97.5-97.6, 97.6' - Mechanical break (3)	Ë	97.3-98.15' - pale yellowish brown to moderate yellowish brown, (10YR 6/2	-			
_	_		>10	97.85' - Fracture, horizontal, rough,	H	to 10YR 5/4), fine grained, mild HCl	_			
_				undulating, open	₽	reaction, medium strong (R3), 10-15% voids up to 3/16", 10%	 			
_			NR	98.25' - Fracture, 5 deg, smooth, planar, open, 25% black staining on surface	ш	cavities up to 9/16"x3/8", trace black	R10: 12 minutes			
100_	100.0			98.4' - Fracture, horizontal, smooth, planar,	t	pyrite infilling of cavities 98.15-99.0' - Same as 90.0-94.75'	_			
-57.5			>10	open 98.6-98.7' - Fracture, 45 deg, rough,	┢	except no visible cavities				
_			- 10	undulating, open	F	No Recovery 99.0-100.0' - Limestone				
_			>10	98.7-99.0' - Fracture zone 100.0-100.3' - Fracture zone	H	_ 100.0-103.75' - pale yellowish brown				
_			- 10	100.3' - Fracture, 10 deg, rough, undulating,	⊬	to moderate yellowish brown, (10YR - 6/2 to 10YR 5/4), fine grained, mild				
	R11-NQ	20	0	open 100.55, 100.65' - Fractures (2 parallel), 20		HCl reaction, weak to medium strong				
	5 ft 75%	20	U	deg, rough, undulating, open		(R2 to R3), 10% voids up to 1/8",	SC-2 collected at 102.0-			
			7	100.55-100.65' - Fracture, 40 deg, rough, undulating, open, running between above	\vdash	 10% casts/cavities up to 3/8"x3/4" at 100.36-100.65', 101.7-101.9', and 	103.0'			
1 -				fractures	H	103.2-103.75'	1			
1 -			NR	100.65-100.9, 100.9-101.1, 101.1-101.3' - Fractures (3), 60 deg, rough, undulating,	Ľ	- No Recovery 103.75-105.0'	R11: 9 minutes			
105	105.0		1417	open, some fragments associated with	╙	-	1			
-62.5	. 50.0			fractures 101.3-101.4' - Fracture, 50 deg, rough,	仜	Limestone				
1 -			>10	planar, open	仜	 105.0-109.5' - pale yellowish brown to moderate yellowish brown, (10YR) 				
-				101.55-101.7' - Fracture zone 102.0, 103.0' - Fractures (2), horizontal,	╁	6/2 to 10YR 5/4), fine grained, mild	Driller's Remark: 106-107'			
-			4	rough, undulating, open	F	 HCl reaction, weak to medium strong (R2 to R3), 10% voids to 1/16" 	Soft drilling - "Pushed right through"			
-	R12-NQ			103.2-103.3' - Fracture, 45 deg, rough,	片	throughout run. 25% casts/cavities	r usneu ngni unougn			
-	5 ft	43	5	undulating, open 103.65-103.75' - Fracture zone	╀	up to 9/16"x3/8" at 105.0-105.2',				
-	90%			105.35-105.85' - Fracture zone	\vdash	trace casts/cavities, up to 9/16"x3/8" throughout entire run.	-			
-			9	105.85-105.95' - Mechanical break, vertical 105.85, 105.95, 106.1, 106.35' - Mechanical	士	F	-			
-				break (4)	+	-	R12: 9 minutes			
-			4 ND	106.55' - Fracture, horizontal, rough, undulating, open	厈	No Recovery 109.5-110.0'	- T. 12. 0 minutes			
110	110.0		NR		H	110 11000 761 9 100.0-110.0				
					1					
Щ_					1		L			



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-25	SHEET	7	OF	9

ORIENTATION : Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing

WATER LEVELS : 2.3 ft bgs on 6/30			s on 6/30/07 START : 4/19/2007 END : 4/		/23/20	07 LOGGER : D. Roraback				
≥D≎	(%			DISCONTINUITIES	β	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,			
H B	E RL 3TH, 3VEI	(%) _Q	ĮŠ.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD			
SURF SURF SILEV	CORI	RQ	'RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	. KME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.			
-67.5	716	ιĹ	шш	106.75' - Fracture or mechanical break, 40	0)	Limestone				
- 07.5			>10	deg, rough, undulating, open	#	 110.0-113.3' - moderate yellowish 	-			
_				107.5' - Mechanical break	\vdash	brown, (10YR 5/4), fine grained, mild HCl reaction, very weak (R1) from	-			
_			3	107.6' - Fracture, horizontal, rough, undulating, open	\perp	- 110.0-110.5', weak (R2) from	_			
_				107.6-108.05' - Fracture zone	上	110.5-113.5', 10% voids up to 1/16", trace casts/cavities up to 9/16"x2",	_			
_	R13-NQ 5 ft	50	2	107.6-108.1' - Mechanical break, >80 deg, one face fractured as described above		trace casts/cavities up to 9/16"x2", trace thin dark organic inclusions	_			
_	66%	00		108.25' - Mechanical break	F	(3/4" x 1-3/16") at 112.6'	_			
			2	108.8' - Fracture, 20 deg, smooth, undulating, open	片	- No Recovery 113.3-115.0'	_			
				108.8-109.2, 109.1-109.5' - Fractures (2), 70	\bot					
			NR	deg, rough, undulating, open 109.05, 109.25' - Fractures (2), horizontal,	\blacksquare		R13: 6 minutes			
115	115.0			rough, undulating, open	\perp		1			
-72.5				110.0-110.5' - Fracture zone	1	Limestone				
-			1	111.1' - Fracture or mechanical break, horizontal, rough, undulating, open	1	- 115.0-116.4' - Same as 110.0-113.3' except 10-15% voids up to 1/16", and	1			
-				111.7-111.85, 111.95-112.05' - Mechanical	1	no visible casts/cavities	-			
-			1	break (2) 112.5' - Fracture, 10 deg, rough, undulating,	╁	116.4-117.7' - moderate yellowish	-			
-	R14-NQ			open	口	brown, (10YR 5/4), fine grained, mild HCl reaction, very weak (R1), trace	SC-3 collected at 116.4-			
-	5 ft 97%	58	1	113.1' - Fractures (2 separated by 1/4"), 15 deg, rough, undulating, open	\pm	voids up to 1/16", no visible	117.5' -			
-	9170			115.1-115.45' - Fracture, 75 deg, rough,	+-	casts/cavities 117.7-118.4' - Same as 110.0-113.3'	=			
-			7	undulating, open, trace black (pyrite) staining <1/16" thick on surface	+	except very weak (R1) at	-			
-				116.4' - Fracture, horizontal, smooth,	世	_ 118.0-118.15' and trace voids up to 1/16", no visible casts/cavities	R14: 7 minutes			
-			>10	undulating, open 117.75, 118.05' - Mechanical break (2)	+	throughout throughout	-			
120 -77.5	120.0		NR.	118.5, 118.6' - Fractures (2), horizontal,	ፗ	118.4-118.95' - Same as 116.4-117.7'	_			
''			5	rough, undulating, open, some fragments 118.55, 118.65' - Mechanical break (2)	士	- 118.95-119.85' - Same as	-			
-				118.8, 118.95' - Fractures (2), horizontal,	+	116.4-117.7' except very weak (R1)	_			
_			>10	rough, undulating, open	F	at 119.33-119.65' No Recovery 119.85-120.0'	_			
-	.			119.35-119.65' - Fracture zone 120.4' - Mechanical break	#	Limestone	_			
	R15-NQ 5 ft	11	1	120.6' - Fracture, horizontal, rough,	\bot	120.0-122.4' - pale yellowish brown to moderate yellowish brown, (10YR				
	48%			undulating, open 120.85-120.95' - Fracture zone, 4 fragments	\blacksquare	6/2 to 10YR 5/4), fine to medium				
				121.2-121.3' - Fracture zone	上	(coarser with depth) grained, mild HCl reaction, medium strong (R3),	Driller's Remark: "Soft at 123.5 to 124 feet"			
			NR	121.5' - Fracture, 5 deg, rough, undulating, open, associated with large cavity		trace voids to 1/16", trace	_			
I -				121.7' - Fracture, horizontal, rough,	片	casts/cavities to 3/8"x3/8" except at 120.5-120.7' and 121-121.7': with	R15: 11 minutes			
125	125.0			undulating, open 121.9-122.4' - Fracture or mechanical break,	上	15-20% casts/cavities, up to 2" x 3/4"]			
-82.5				60 deg	F	x 3/4" "deep", partially infilled with				
			>10	125.0-125.3' - Fracture zone	\perp	moderate yellowish brown (10YR				
-				125.4' - Mechanical break 125.65, 125.9' - Fractures (2), horizontal,	\perp	5/4), weak, poorly fossiliferous, trace	-			
-			2	rough, undulating, open	1	 dark gray pyrite or organic material mottling at 121.9-122.0' 	=			
_	R16-NQ			126.1-126.15' - Fracture, 25 deg, rough, undulating, tight	#	No Recovery 122.4-125.0'	-			
-	5 ft 76%	30	4	126.25-126.3 - Mechanical break, 25 deg,	+	-	-			
-	70%			healed 127.225, 127.25, 127.5' - Fractures (3),	+	-	=			
-			3	horizontal, rough, undulating, open	世	-	-			
-				127.6' - Fracture, horizontal, rough, planar, open to tight	1	 -	R16: 13 minutes			
-			NR	127.85' - Fracture, horizontal, rough, planar,	+	-	-			
130	130.0			open	╬					

APPENDIX 2BB-620 Rev. 4



WATER LEVELS: 2.3 ft bgs on 6/30/07

PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-25	SHEET	8	OF	9	

ROCK CORE LOG

LOGGER : D. Roraback

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

END: 4/23/2007

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing

START: 4/19/2007

	LLVLLO . Z.	, it bg	3 011 0	30/01 START 4/19/2001 LIND . 4/2	20/20	UI LOGGEN . D. NOIADACK				
>^~				DISCONTINUITIES	ڻ ان	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.			
-87.5			1	128.2' - Fracture, 20 deg, rough, undulating, open - 128.3-128.45' - Mechanical break, 45 deg,		Limestone - 125.0-128.8' - moderate yellowish brown, (10YR 5/4), fine grained, mild	-			
-			1	tight 128.45-128.5' - Mechanical break, 30 deg, ight		HCl reaction, weak to medium strong (R2 to R3), 20% voids <1/32", trace voids to 1/16", trace spherical casts	SC-4 collected at 130.3- 131.4'			
-	R17-NG 5 ft 61%	23	>10	130.3' - Fracture, horizontal, rough, undulating, open 131.4' - Fracture, 25 deg, rough, undulating,	H	3/16"-1/4", 3/8" spherical casts at - 126.0, 126.8, 127.1', larger (2"x3/4") cavities at 127.8' and 130.1',	_			
-			_1_/ NR	open 131.7' - Fracture, horizontal, rough, undulating, open 131.05 132.05! Fracture, 45 dec. rough		moderately fossiliferous, partial infilling (carbonate, very weak to weak, medium grained) with	-			
135 <u> </u>	135.0			131.95-132.05' - Fracture, 45 deg, rough, undulating, open, likely due to cavity 132.2, 132.4, 132.5' - Fractures (3), horizontal, rough, undulating, open	Ë	recrystalized material No Recovery 128.8-130.0' Limestone 130.0-133.05' - pale yellowish brown	R17: 11 minutes			
-92.5			>10	132.5-132.7' - Fracture, vertical, rough, undulating, open 132.6-132.65' - Fracture, 30 deg, rough,		to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, mild HCl reaction, weak (R2), trace voids				
-	R18-NG		>10	undulating, open 132.9-133.05' - Fracture zone 135.15-135.35' - Fracture zone	E	up to 1/16", trace cavities up to 1-3/16" by 3/16", well-formed casts to 3/4" x 3/4" x 3/8" "deep" at 132.8'				
- - -	5 ft 44%	7	NR	135.45' - Fracture, horizontal, smooth, planar to undulating, open 135.65, 135.7, 135.75, 135.85, 136.05, 136.2, 136.4, 136.45, 136.5' - Fractures (9), horizontal, rough, planar to undulating, open 136.7-136.8' - Fractured rock fragments (3), horizontal, rough, planar to undulating, open		No Recovery 133.05-135.0' Limestone 135.0-135.65' - pale yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong (R3), <2% voids up to 1/16", single cavity 2-3/4" by 9/16" at 135.45-135.5', infilled with	R18: 7 minutes			
140 -97.5	140.0				H	material similar to 130.0-133.05' — 135.65-137.2' - pale yellowish brown] -			
- - -	D40 NO		1	140.8' - Fracture, <10 deg, rough, undulating, open 141.6' - Fracture, horizontal, rough, undulating, open		to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over 10% of surface, scattered (<5%) larger voids up to 3/16", trace cast/cavities up to	- - - -			
-	R19-NQ 5 ft 76%	48	8	142.4-142.5' - Fracture zone 142.65-142.75' - Fracture zone		9/16"x3/16", 5-10% gray shell fragments inclusions at - 136.85-137.2', mottled dark brown at 136.4-136.45'	-			
- 445	145.0		NR	143.6' - Fracture, 10 deg, rough, planar, open -		No Recovery 137.2-140.0' Limestone 140.0-141.3' - pale yellowish brown to moderate yellowish brown, (10YR	R19: 14 minutes			
145_ -102.5 -	145.0		2	–– 145.45' - Fracture, horizontal, rough, undulating, open		6/2 to 10YR 5/4), fine to medium grained, mild HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over 10% of surface, trace				
-	R20-NC		>10	145.7' - Mechanical break 146.15-146.3' - Fracture zone, 50% dark brown staining on surfaces		casts/cavities up to 1-3/16" by 3/8", partially infilled with similar material to matrix, black pyrite staining at	-			
-	5 ft 60 5 147.5-147.6' - Fracture, 70 deg, rough, undulating, open		undulating, open –	5 ft 60 5 147.5-147.6' - Fracture, 70 deg, rough,		5 ft 60 5 147.5-147.6' - Fracture, 70 deg, rough, undulating, open			141.15-141.2' and 142.3-142.35' 141.3-141.6' - light gray, (N7), fine grained, moderate HCl reaction, medium strong (R3)	-
			1	149.1-150.0' - Mechanical break		- 141.6-142.4' - Same as 140.0-141.3' -	R20: 17 minutes			
150	150.0		NR		H					

APPENDIX 2BB-621 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-25	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT: Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.3 ft bgs on 6/30/07 START: 4/19/2007 END: 4/23/2007 LOGGER : D. Roraback DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS DESCRIPTION SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 142.4-143.8' - very pale orange, (10YR 8/2), very fine grained, mild HCI reaction, medium strong to strong (R3 to R4), trace voids to 1/16", trace casts up to 1"x3/16" across unit; large (50% volume of core) cavity at 143.15-143.2', mottled light gray (N7) at 142.8-143.3' No Recovery 143.8-145.0' Limestone 145.0-145.7' - very pale orange (10YR 5/2), fine grained, mild HCI reaction, medium strong (R3), poorly fossiliferous, 5% voids up to 1/16", trace casts/cavities up to 1"x3/16", poorly infilled with black fine grained "powdery" material 145.7-146.3' - Same as 145.0-145.7' except mottled yellowish gray, (5Y 146.3-146.45' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCI reaction, weak to medium strong (R2 to R3), 25-30% voids up to 1/16", moderately fossiliferous, sharp contacts above and below 146.45-147.5' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, thin (<1/8") planar to irregular dark brown laminae, no voids, trace casts 147.5-147.8' - moderate yellowish brown, (10YR 5/4), medium grained, moderate HCI reaction, medium strong (R3), trace voids up to 1/16", no casts, poorly fossiliferous 147.8-148.2' - Same as 146.45-147.5' except grades into unit below 148.2-149.1' - Same as 147.5-147.8' except highly fossiliferous and 25% casts up to 9/16"x9/16" at 148.8-149.2' No Recovery 149.1-150.0' Bottom of Boring at 150.0 ft bgs on 4/23/2007



PROJECT NUMBER:

33884.FL

B-25A

SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.0 N, 458017.4 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND FOUIPMENT: CME 550, S/N 186073, mud rotary, cathead, AW, I rods

ORIENTATION : Vertical

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	ENT : CME 550, S	/N 186073, mud rotary, cathead, AWJ rods ORIENTATION: Vertical
WATER	LEVELS	: 4.5 ft bo	gs on 11/2	27/08 S	TART : 11/27/2007 END : 11/27/2007 LOGGER : D. Thomas
 				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEI CE/		RECOVE	ERY (ft)	TEOT RECOETS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT. RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS. TESTS. AND
YFA SYA			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION
SUI			<i>"</i> ,,,,	(N)	≿s
42.2	0.0				Limestone Fill \[\sum 0.0-0.2' - dark yellowish orange, (10YR 6/6), strong \] \[\sum \frac{\text{VIII}}{2-7/8"} \] This boring is being drilled for hammer test
		1.5	SS-1	3-5-7 (12)	\\\\0.0-0.2' - dark yellowish orange, (10YR 6/6), strong \\\\/\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
-	1.5			(12)	Topsoil
-	1.0				\(\) 0.2-1.5' - grayish black, (N2), moist, medium stiff, nonplastic, no HCl reaction, trace very fine sand
-					increasing to 10% with depth, wood at 1.3'
-					11
_					1
-					-
_					-
-					
5 37.2	5.0				☐ Lean Clay (CL) ☐ 5.0-5.1' May be slough
31.2				3-2-3	↑ 5.0-5.1' - grayish black, (N2), wet, medium plasticity, /
		0.4	SS-2	(5)	\\no HCI reaction, trace very fine sand // _
_	6.5				Silty Sand (SM) 5.1-5.4' - dark yellowish orange, (10YR 6/6), wet,
					loose, very fine to fine grained, 15% nonplastic fines, / _
					5% fine organic particles
					11
-					1
-					1
10	10.0				1
32.2	10.0				Fat Clay (CH)
-		1.0	SS-3	1-1-2	10.0-10.1¹ - light greenish gray, (5G 8/1), moist to wet, soft, high plasticity, no dilatancy, no HCl reaction,
-	44.5			(3)	trace very fine silica sand
-	11.5				Silty Sand (SM)
-					10.1-10.3' - light olive gray, (5Y 6/1), wet, very loose, very fine to fine grained, no HCl reaction, 20% low
_					plastic fines
-					Fat Clay With Sand (CH)
-					10.3-10.95' - Same as 10.0-10.1' except 15% very fine silica sand
-					
					1 1
15	15.0				
27.2				255	Fat Clay (CH) 15.0-15.3' - light greenish gray, (5G 8/1), wet, stiff,
		1.3	SS-4	3-5-5 (10)	high plasticity, no dilatancy, trace fine to coarse sand Driller's Remark: Losing water while drilling
]	16.5				that can be crushed, no HCl reaction with silty/clay matrix, strong HCl reaction for sand material
]					Silty Sand (SM)
					15.3-15.4' - light olive gray, (5Y 6/1), wet, loose, no
					HCl reaction, 20-25% low plastic fines
					Fat Clay (CH) 15.4-15.9' - Same as 15.0-15.3'
-					Silty Sand (SM)
-					15.9-16.25' - Same as 15.3-15.4'
					1
20					++



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-25A

SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.0 N, 458017.4 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLIN	DRILLING METHOD AND EQUIPMENT : CME 550, S/N 186073, mud rotary, cathead, AWJ rods ORIENTATION : Vertical								
WATER	LEVELS	: 4.5 ft bo	gs on 11/2	27/08	START : 11/27/2007 END : 11/27/2007 LOGGER	: D.	Thomas		
				STANDARD	SOIL DESCRIPTION	ا ن	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	LE INTERVAL (ft) PENETRATION TEST RESULTS COLUMN NAME LISCS CROUD SYMPOL COLOR							
		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION		
SC				(N)		ŝ			
22.2	20.0			2.4.4	Fat Clay (CH)	//	Driller's Remark: Continue to lose circulation		
l _		1.1	SS-5	3-4-4 (8)	Silty Sand (SM)				
l _	21.5				\\20.4-20.7' - Same as 15.3-15.4'		Fat clay and silty sand alternating from 10' (if not from 5')		
					\Fat Clay (CH) \20.7-21.1" - Same as 15.0-15.3' and 20.0-20.4'				
_									
_									
25	25.0								
17.2					Fat Clay (CH) ↑ 25.0-25.3' - light greenish gray, (5G 8/1), wet, soft,		7		
		1.3	SS-6	4-3-2 (5)	high plasticity, no dilatancy, mild HCl reaction, trace				
	26.5			(0)	fine to coarse carbonate sand/fragments with strong HCI reaction, (predominantly carbonate fragments)				
					Silty Sand (SM)		1		
					25.3-26.0' - vellowish gray to light olive gray. (5Y 7/2				
					to 5Y 5/2), wet, loose, very fine grained, no HCl reaction, 25-30% low plastic fines				
_					Clavev Sand (SC)		1		
-					26.0-26.3' - light greenish gray to light olive gray, (5G 8/1 to 5Y 5/2), wet, loose, very fine to fine grained,		1		
-					35% low to medium plastic fines		1		
30	30.0				-		1		
12.2					Fat Clay With Sand (CH)		٦		
-		1.5	SS-7	5-7-8 (15)	30.0-30.4' - light greenish gray to light bluish gray, (6G /= 8/1 to 5B 7/1), moist, soft, medium plasticity, no HCl		1		
_	31.5			(13)	\reaction, 20% very fine silica sand		1		
_	01.0				Silty Sand (SM) 30.4-31.5' - yellowish gray, (5Y 7/2), wet, medium	111	1		
_					dense, very fine grained, no HCl reaction, 25%		1		
_					nonplastic fines, irregular shaped lens of fat clay (CH) from 31.0-31.5'		1		
-					III II II II II II II		1		
-					†		1		
-							1		
35	35.0						1		
7.2	33.0				Fat Clay (CH)		Driller's Remark: Continuing to lose		
-		1.5	SS-8	5-4-4	─\35.0-35.4' - Same as 30.0-30.4' /=		circulation/ water since 15-20' bgs (about 25 - gallons per 5 foot run)		
-	26.5			(8)	Silty Sand (SM) 35.4-36.5' - Same as 30.4-31.0 except loose		yanons per 5 loot run)		
-	36.5				22 23.0 00 00 01.0 07.00001.0000				
-					-		-		
-					-		4		
-							4		
-					-		-		
-					-		-		
-					-		4		
40						$\vdash \vdash$			



PROJECT NUMBER:	BORING NUMBER:
338884.FL	B-25A

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.0 N, 458017.4 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550, S/N 186073, mud rotary, cathead, AWJ rods

ORIENTATION : Vertical

SHEET 3 OF 3

	WATER LEVELS: 4.5 ft bgs on 11/27/08 START: 11/27/2007 END: 11/27/2007 LOGGER: D. Thomas								
WATER	LEVELS	. 4.5 π bg	us on 11/2		START : 11/27/2007	LUGGE	κ:υ. T	I nomas COMMENTS	
≷Q⊋			1 (6)	STANDARD PENETRATION	SOIL DESCRIPTION		8	CONTINIENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, C	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,		
H B ATIC	RECOVERY (ft)			MOISTURE CONTENT, RELATIVE DENS	ITY OR	lg Bg	DRILLING FLUID LOSS, TESTS, AND		
E S S S S S S S S S S S S S S S S S S S			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINE	RALOGY	Ν×	INSTRUMENTATION	
2.2	40.0			(14)	Silt With Sand (ML)			SS-9 has an organic rich appearence	
-	10.0	1.3	SS-9	4-2-4	√ 40.0-40.4' - light olive gray, (5Y 5/2), moist,	medium /	╂	-	
-		1.5	33-9	(6)	\stiff, low plasticity, rapid dilatancy, no HCl re \20% very fine silica sand	eaction,	-	-	
-	41.5				Silt With Sand (ML)		1	-	
-					40.4-41.3' - light olive gray transitioning to c (5Y 5/2 to 5Y 3/2), moist to wet, medium sti	olive gray,	-	-	
-					medium plasticity, 25% very fine silica sand	I, organic	┨	-	
-					soil (OL/OH) seams 1/4" thick		4	-	
-							4	-	
_							4	Drillor's Domark: Docky, shotter at 44!	
-							4	Driller's Remark: Rocky, chatter at 44'	
45 -2.8	45.0	0.4	00.40	50/4.5	Silt (ML)		╂		
-2.0	45.4	0.4	SS-10	50/4.5 (50/4.5") /	√ 45.0-45.4' - dusky yellow, (5Y 6/4), moist, h		╫	bit — bit	
-					nonplastic, rapid dilatancy, mild HCl reaction limestone fragments up to 1/8", carbonate r	n, trace	4	For SS-10, 0.7' of soil in spoon; top 0.3'	
-					unitestorie fragments up to 1/6 , carbonate i	natenai	4	apparently slough. Material appears to be	
_							4	organic soil (OL), olive gray (5Y 3/2), wet, soft, low to medium plasticity, rapid	
_							1	dilantancy, no HCl reaction, 10% fine silica –	
_							1	sand	
_							_	_	
_							1		
								Driller's Remark: Firm drilling from 44-49', soft again from 49-50'	
50	50.0					_	1		
-7.8				45.05.00	Silty Sand And Limestone (SM) 50.0-51.5' - light olive gray, dusky yellow, a	nd		For SS-11, 2.1' of soil in spoon; top 0.6' apparently slough -	
_		1.5	SS-11	15-25-36 (61)	moderate olive brown, (5Y 5/2, 5Y 6/4, and	5Y 4/4),		apparently slough	
_	51.5			. ,	fine to coarse grained, mild HCl reaction, 2				
_					gravel-sized limestone fragments, carbonal			_	
_					\materials Bottom of Boring at 51.5 ft bgs on 11/27/20	07		11/27/2007 at 17:00 water level = 4.5' bgs 11/28/2007 at 08:00 water level = 4.0' bgs -	
					Bottom of Boring at 51.5 it bgs on 11/2//20	07		11/20/2007 at 00:00 water level = 4:0 bgs	
							1		
							1		
55							1	7	
-12.8						_	1		
							1	1	
							1	_	
_							1	7	
_							1	1	
_							1	1	
_							1	7	
-							1	7	
-							1	7	
60							1	-	
							1		



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	B-26	SHEET	1	OF	a	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

WATER	LEVELS	: 4.41 ft b	ogs on 3/0	06/07	START : 2/21/2007 END : 2/23/2007	LOGGER	: C.	LeBlanc
				STANDARD	SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE		PENETRATION TEST RESULTS 6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR MOISTURE CONTENT, RELATIVE DENSITY O CONSISTENCY, SOIL STRUCTURE, MINERALO	R	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
42.4 - - - - - - -				(N)		-	S	Start drilling at 15:00 on 2/21/07 "Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" 18" of topsoil at ground surface
537.4 	6.5	0.5	SS-1	3-2-2 (4)	Poorly Graded Sand (SP) 5.0-5.5' - pale yellowish brown to moderate yellow brown, (10YR 6/2 to 10YR 5/4), wet, very loose, for grained, no HCI reaction, silica sand, trace nonplifines, trace fine organics	fine /		SS-1 sampled at 15:10
- - 10 32.4 - - -	10.0	1.4	SS-2	2-2-8 (10)	Silty Sand With Limestone Fragments (SM) 10.0-11.4' - yellowish gray, (5Y 8/1), wet, loose, for coarse grained, strong HCl reaction, 26% nonplated low plasticity fines, 15-20% gravel-sized fossiliferous limestone fragments, all carbonate	fine to -		SS-2 sampled at 15:25
- - 15_ 27.4 - - -	15.0	1.0	SS-3	17-19-5 (24)	Silty Sand With Limestone Fragments (SM) 15.0-16.0' - Same as 10.0-11.4'	- - - - - -		- - - - - - - - - -
- - - 20						- - -		- - -



WATER LEVELS: 4.41 ft bgs on 3/06/07

SAMPLE INTERVAL (ft)

0.4

1.4

1.0

1.3

20:9

25.0

26.5

30.0

31.0

35.0

36.5

RECOVERY (ft)

#TYPF

SS-4

SS-5

SS-6

SS-7

DEPTH BELOW SURFACE AND ELEVATION (#)

30

 $12.\bar{4}$

35_{7.4}

40

PROJECT NUMBER:	BORING NUMBER:					
338884 FI	B-26	SHEET	2	OF	۵	

SOIL BORING LOG

LOG

SYMBOLIC

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723010.2 N, 458111.7 E (NAD83)

START: 2/21/2007

Silty Sand (SM)

STANDARD

PENETRATION TEST RESULTS

6"-6"-6"

(N) 50/6

(50/6")

40-47-44

(91)

47-50/6

(97/12")

23-33-50

(83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

SOIL NAME, USCS GROUP SYMBOL, COLOR,

MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY

25.0-26.4' - grayish orange, (10YR 7/4), moist to wet,

30.0-31.0' - dark yellowish orange, (10YR 6/6), moist to wet, hard, nonplastic, very rapid dilatancy, mild to

moderate HCl reaction, 10-15% very fine grained

35.0-36.3' - moderate yellowish brown, (10YR 5/4),

moist, hard, nonplastic, very rapid dilatancy, mild HCl reaction, 40% fine to medium grained sand-sized,

sand-sized, carbonate materials

Sandy Silt (ML)

carbonate materials

very dense, fine to coarse grained, moderate HCl reaction, all carbonate, 35-40% nonplastic fines

20.0-20.4' - yellowish gray, (5Y 8/1), wet, hard, nonplastic, very rapid dilatancy, mild HCl reaction, all carbonate, 5-10% fine to medium sand-sized

END: 2/23/2007 SOIL DESCRIPTION

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION: Vertical LOGGER: C. LeBlanc COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION SS-5 sampled at 16:00



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-26	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

						ry, cameau, Avvo rous, 3-1		_	ONIENTATION : Vertical
WATER	LEVELS	: 4.41 ft k	ogs on 3/	06/07 S	START : 2/21/2007	END : 2/23/2007	LOGGE	:K:(C. LeBlanc
≥ □≎				STANDARD PENETRATION		SOIL DESCRIPTION		۲ ا	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR			DEPTH OF CASING, DRILLING RATE,	
H BI ACE ATIC		RECOVE	RY (ft)		MOISTURE	CONTENT, RELATIVE DE	ENSITY OR	Š	DRILLING FLUID LOSS, TESTS, AND
EPT URF LEV			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, M	INERALOGY	5	INSTRUMENTATION
о́о́ш 2.4	40.0			(N) 46-50/1	Silty Sand And	Limestone Fragments	(SM)	1	
	40.0 40.6	0.3	SS-8	(96/7")	I \ 40.0-40.25' - pa	ale vellowish brown to mo	oderate	Ŧ	-
-					yellowish brown	n, (10YR 6/2 to 10YR 5/4 oarse grained, mild HCl), wet, very	+	-
-					nonplastic fines	s, 50% fossiliferous limes	stone	-	-
-					fragments			-	-
-								1	-
_								4	Dellards Describe Discolation at 40.01
_								1	Driller's Remark: Rig chatter at 43.0'
_								1	Driller's Remark: Lost circulation at 43.0'
_								1	_
45	45.0						_	1	
-2.6		0.7	SS-9	36-50/5	Sandy Silt (ML) 45.0-45.7' - pale) e yellowish brown to mod	derate		SS-9 sampled at 17:05
_	45.9			(86/11")	vellowish brown	n, (10YR 6/2 to 10YR 5/4), wet, hard,	#	-
l _					nonplastic, very	rapid dilatancy, mild to bonate, 35-40% fine to r	moderate HCI /	1	_
					sand-sized	2011410, 00 1070 11110 101		1	_
									_
								1	
								1	1
-								1	<u> </u>
50	50.0							1	-
-7.6	50.3	0.3	SS-10	50/4	Sandy Silt (ML))		中	SS-10 sampled at 17:30
-				(50/4")	\50.0-50.25' - Sa	ame as 45.0-45.7'	/	1	-
-								1	-
-								1	-
-								1	-
-								1	-
-								1	-
-								+	-
-								+	-
								+	-
55 -12.6	55.0 55.3	0.1	SS-11	50/4	│ │ Limestone Frag	aments		╆	
	00.0	<u> </u>	00 11	(50/4")	\ 55.0-55.1' - pale	e vellowish brown to mod	derate	+	-
-					yellowish brown	n, (10YR 6/2 to 10YR 5/4), mild HCl	4	-
_					reaction, lossiii	leious		4	-
-								-	-
-								-	-
_								-	-
-								1	-
-								1	-
								1	-
60							_	1	



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	B-26	SHEET	4	OF	۵	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

WATER	LEVELS	: 4.41 ft b	gs on 3/0	06/07 S	TART : 2/21/2007 END : 2/23/2007 LOGGER : C. LeBlan	nc
				STANDARD	SOIL DESCRIPTION 0	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEDITION CASING DRIVING DATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPT SURF SLEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION
-17.6	60:4	0.3	SS-12	50/5	Silty Sand (SM)	2 sampled at 08:00 on 2/22/07
-				(50/5")	60.0-60.3' - moderate yellowish brown, (10YR 5/4), wet, very dense, fine to coarse grained, mild HCI	1
					reaction, 20% nonplastic fines, 15% organics, all carbonate except organics	
_					Carbonate except organies	
_					41	-
_					4 1	-
-						-
-					- 1	-
65	65.0				11	1
-22.6					Sandy Silt (ML) 65.0-66.5' - Same as 45.0-45.7'	3 sampled at 08:20
		1.5	SS-13	15-29-47 (76)	65.0-66.5 - Same as 45.0-45.7	
_	66.5			. ,		_
_					4 1	-
-						-
-						-
-					1	1
-					11	1
70	70.0					
-27.6		1.0	SS-14	19-50/6	Silt With Sand (ML) 70.0-71.0' - Same as 65.0-66.5' except mild to	_
_	71.0			(69/12")	moderate HCl reaction, 20% fine to medium	-
-					/ -	-
-					11	-
-					11	1
_					11	1
] [
_					SS-1 Switc	5 sampled at 08:50 ch to rock coring at 75.0'
75 <u> </u>	75.0 75.1	0.0	SS-15/	50/1	☐ Limestone Fragments	
-	, 5.1			(50/1")	75.0-75.1' - few limestone fragments recovered, mild / _ HCI reaction	-
-					Begin Rock Coring at 75.0 ft bgs	
-					See the next sheet for the rock core log	1
-					11	1
] []
-					11	_
-					11	4
						-
80					++	-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-26	SHEET	5	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

WATER	LEVELS: 4.4	1 ft b	gs on 3	8/06/07 START : 2/21/2007 E	ND : 2/23	3/200	D7 LOGGER : C. LeBlanc	
> □ ≎	- ©			DISCONTINUITIES			LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	L RE	%)	FS	DEPTH, TYPE, ORIENTATION, ROUGHNES	SS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEV H	SORE	RQD(%)	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHT		ΥME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-32.6		ır.	шп			<i>S</i>	Limestone	
-	R1-NQ		0		- 4		75.0-76.3' - dusky yellow, (5Y 6/4),	R1: Run time not recorded
-	1.5 ft 73%	73	1		+	\perp	very fine to fine grained, moderate to strong HCl reaction, weak (R2),	_
-	76.5		NR)	76.15' - Fracture or bedding plane, horizo	ntal,		\(\sigma\) voids (1/16") over 15% of surface,	Driller's Remark: Rig chatter at 76.0'
-				rough, undulating, open, loose	_		<1/16" thick laminations at	
-					_		76.0-76.1', oval 3/8" fossil at 75.1' No Recovery 76.3-76.5'	Driller's Remark: Soft drilling, possible
_							No Recovery 76.5-81.5'	unconsolidated material
_								
l _	R2-NQ 5 ft	0	NR				_	
l _	0%	Ü	' ' '				_	
80								
-37.6]]			
l _								R2: Run time not recorded
	81.5				7			
					7		No Recovery 81.5-86.5'	
							_	
-					1		_	
-					1			Ī
_	R3-NQ				1			Ī
-	5 ft 0%	0	NR				_	1
85					_		_	1
-42.6								
-							_	R3: Run time not recorded
-	86.5				_		_	Switch back to SPT
-	00.0				1		No Sample 86.5-88.0'	sampling at 86.5', blind drill - without sampling from
-					1		_	86.5-88.0'
-					Ⅎ		_	-
-					†	П		Split spoon sample SS-16
-					-		-\ 88.0-88.2' - moderate yellowish brown, (10YR 5/4), fine grained, fine	advanced 88.0-88.4', 0.2' - recovery, N=50/5"
-					-		to coarse gravel-sized fragments,	Installed casing to 88.5'
					-		voids present on fragment surfaces	-
90 <u> </u>					\dashv		No Sample 88.2-94.5'	-
-			0		-		<u></u>	-
-					\dashv		<u></u>	-
-					-		_	-
-					-		_	-
-					-		_	-
-					-		_	-
-					-		_	-
-					+	+	Limestone Fragments	Split spoon sample SS-17
-	94.5				-‡	\dashv	- 94.5-94.6' - coarse grained sand-size	advanced 94.5-94.7', 0.1'
95						\dashv	rock fragments recovered	recovery, N=50/2"
	ı		I					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-26	SHEET	6	OF	9	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS: 4.4	1 ft b	gs on 3	3/06/07 START : 2/21/2007 END : 2/	23/20	07 LOGGER : C. LeBlanc	
>00	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE 410	TH,	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLK	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF	ORE	Ø	ZAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		œ			Š	CHARACTERISTICS	
-52.6 _	R4-NQ 2 ft	50	>10 NR	94.8, 94.9' - Fracture, 10 deg, rough, undulating, open		Limestone - 94.5-94.9' - yellowish gray, (5Y 7/2),	Resume rock coring at 94.5'
	85%	00		94.9-95.85' - Fracture zone, angular to	ш	fine grained, moderate HCl reaction,	R4: 4 minutes
	96.5		1	subangular fragments		extremely weak to very weak (R0 to	
				96.5' - Mechanical break, 50 deg	Н	 R1), no voids No Recovery 94.9-95.2' 	Because of fracture
			1	96.95' - Mechanical break		Limestone	surface at bottom end of - core R4 matching top end
_				97.3' - Fracture, 65 deg, smooth, undulating, ight	Ш	 95.2-96.5' - moderate yellowish brown, (10YR 5/4), moderate HCl 	of core R5, core loss for
_			1	98.15' - Fracture, 50 deg, rough, undulating	Ш	reaction, weak to medium strong (R2	R4 is interpreted to be – within fracture zone at 94.9'
-	R5-NQ			98.19 - Fracture, 50 deg, rough, undulating	世	 to R3), begins in fracture zone with many deep cavities, below 95.8' 	within fracture zone at 94.9
_	5 ft	24	3	98.8, 99.3, 99.8, 100.4, 100.7, 101.1' -	+	voids increase from 0% to 20%,	-
_	94%			Fractures (6), 60-80 deg, rough, undulating, significant fragmentation throughout,	H	- cavities up to 1" at 95.2'	
100 <u> </u>			2	fragments 1/2"-3", elongate to angular —		96.5-98.4' - moderate yellowish brown, (10YR 5/4), fine grained,	_
				99.4' - Fracture, horizontal, rough, stepped, open	\vdash	 moderate HCl reaction, medium 	R5: Run time not recorded
_			2	-	口	strong (R3), 15-20% fine voids (1/16"), few small (1/4")	R5. Ruit time not recorded
_	101.5		NR	-	┢┯	cavities/fossils	
_			>10	101.5-102.0' - Fracture zone, subangular rock fragments 1/2"-2"	F	98.4-99.3' - moderate yellowish brown interbedded with yellowish]
			- 10	· ·		grav. (10YR 5/4 with 5Y 7/2).	
			>10	102.35' - Fracture, 80 deg, smooth, undulating, terminates above at fracture zone		moderate to strong HCl reaction,	
			/10	102.8' - Fracture, 30 deg, smooth, undulating		very weak to medium strong (R1 to R3)	1
_	R6-NQ			103.0-103.3' - Fractures (3), vertical, rough, undulating, fragmented	╁	99.3-99.5' - yellowish gray, (5Y 7/2),	1
-	5 ft 60%	7	>10	103.3-104.5' - Fracture zone, rock fragments	Ħ	strong HCl reaction, very weak (R1) 99.5-101.2' - yellowish gray to dusky	1
105	0070			from silt-size to 2", friable		yellow, (5Y 7/2 to 5Y 6/4), fine	1
-62.6				-	╁	grained, strong (R4), voids (<1/16")	-
_			NR	-	╨	0-10% (intermittently), several 1/4"-1/2" cavities and spiral fossil	R6: 8 minutes
-				-		– molds	1
_	106.5			-	+	No Recovery 101.2-101.5' Limestone	1 -
_			2	106.85' - Fracture, 55 deg, rough, stepped,		- 101.5-102.0' - Same as 99.5-101.2'	1 -
-				open with small fragments	╀	except fragmented	1
			3	107.15, 107.7' - Fractures (2), 25 deg, rough, undulating, fragmented, particularly at	\Box	102.0-103.3' - Same as 99.5-101.2' - except medium strong (R3), core]
			لـــــــا	107.15'		intact until 102.8', several 1/4"-1/2"	
	R7-NQ 5 ft	64	2	107.85, 107.95' - Fractures, 10 deg, rough, undulating, tight to open	\vdash	cavities and molds - 103.3-104.5' - Same as 99.5-101.2'	
	89%	U -1		108.75' - Fracture or mechanical break, 50		except extremely weak to very weak]
110				deg, healed		(R0 to R1), friable No Recovery 104.5-106.5'	1
-67.6			2	109.25' - Fracture, horizontal, rough, — undulating to planar, open	\vdash	Limestone	7
			1	109.7' - Fracture, 30 deg, smooth, undulating,	ш	106.5-106.8' - moderate yellowish	R7: 5 minutes
	111.5		NR	tight with missing fragments 109.95' - Fracture, 75 deg, rough, undulating,	\Box	 brown to moderate olive brown, (10YR 5/4 to 5Y 4/4), fine grained, 	1
-	111.0			weathered, with slight infill	H	moderate HCl reaction, weak to	1
-			3	110.7' - Fracture, horizontal, rough, stepped - to undulating	Ħ	medium strong (R2 to R3), fine (1/16") voids over 10-25% (variably),	SC-1 collected 112.0-
-				111.75' - Fracture, 80 deg, rough, stepped,	\vdash	many 1/4" elongated cavities	112.95'
-			2	second half of fracture is fragmented into	圧	_ 106.8-107.3' - Same as 106.5-106.8' except extremely weak to very weak	-
-	R8-NQ			angular 1"-2" pieces 112.0' - Fracture, 50 deg, smooth, undulating	世	(R0 to R1), friable	-
_	5 ft	64	3	112.95' - Fracture, horizontal, rough, planar	\vdash	_ 107.3-109.25' - Same as	-
	100%			113.15' - Fracture, 60 deg, smooth, stepped, tight, with weathered edges		106.5-106.8' F 109.25-109.7' - Same as	
115				agni, mai wedanered edges	\vdash	106.5-106.8' except very weak (R1)	
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-26	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

				VIENT . CIVIE 330 3/N 180073, Mud Totally, NQ tools, NV			
WATER	LEVELS: 4.4	1 ft b	gs on	3/06/07 START : 2/21/2007 END : 2/	23/20	7 LOGGER : C. LeBlanc	
				DISCONTINUITIES	(5)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		<i>'</i> 0	DESCRIPTION	SYMBOLIC LOG		
N.E.	zZZ≻	_	FRACTURES PER FOOT	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
필일달	野井魚	(%) Q	58	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	7	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
£ 7. ₹	유호성		5.5	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD
		g	5.2	THICKNESS, SURFACE STAINING, AND TIGHTNESS	١	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	024			440.71.5	ļ "	100 7 110 0511 0	
-72.6			1	113.7' - Fracture, horizontal, rough, planar,	\vdash	109.7-110.95" - Same as	
				tight, with weathered edges	т	- 106.5-106.8'	R8: 5 minutes
-			3	113.9' - Fracture or mechanical break, 70 deg, rough, undulating, healed		No Recovery 110.95-111.5' Limestone	-
_	116.5			114.35' - Fracture, horizontal, planar to	Щ	- 111.5-116.5' - dusky yellow to	
				slightly undulating	\vdash	moderate yellowish brown, (5Y 6/4 to	
-			>10	115.3' - Fracture, 70 deg, rough, undulating,	+	10YR 5/4), fine grained, moderate	-
_				5/16" relief, terminates at a rough stepped	\perp	- HCl reaction, weak (R2), 20% fine	_
			١.	fracture at 115.65', tight		(1/16") voids, few cavities up to 1/4"	
_			1	115.9' - Fracture, 70 deg, rough, undulating,	ш	116.5-116.7' - Same as 111.5-116.5'	SC-2 collected 118.0-
_				tight, weathered	╁┼┤	 except medium strong (R3), with 	118.97'
	R9-NQ	10	٦	116.45' - Fracture, horizontal, rough,	\vdash	some weaker zones and rock	
1 7	5 ft 72%	19	2	undulating, 1/8" relief		fragments	1
-	12/0		<u> </u>	116.7-117.0' - Fracture zone, subrounded	$+\Box$	- 116.7-117.0' - Same as 111.5-116.5'	-
120_			1	rock fragments 1/2"-2"	$oldsymbol{+}$	except fragmented	
-77.6				117.45' - Fracture, 10 deg, rough, undulating,	\vdash	117.0-119.2' - Same as 111.5-116.5'	
-			,,_	tight, cuts across 80 deg fracture at 117.65'	\Box	except medium strong (R3), with	R9: 5 minutes
-			NR	117.65' - Fracture, 80 deg, rough, undulating,	Ш	some weaker zones and rock	
	121.5			10 inches long, black staining (pyrite), tight, weathered	\square	fragments 119.2-120.1' - Same as 111.5-116.5'	
_				118.0' - Fracture, 25 deg, smooth, stepped,	₩	except no to mild HCl reaction, very	-
_			0	voids and molds on fracture surface	$\pm \Box$	weak to weak (R1 to R2), sections of	-
				118.97' - Fracture, 10 deg, rough, undulating,		_ increased voids	
				white crystalline infill, trace 1/16" voids on	Ш	No Recovery 120.1-121.5'	
-			>10	surface	╁┼	Limestone	-
				119.20' - Fracture, 10 deg, rough, stepped,	┷	121.5-122.5' - dusky vellow to	
	R10-NQ		۱.,	open, friable, infilling, increased voids	717	moderate yellowish brown, (5Y 6/4 to	Н
-	5 ft	19	>10	120.8' - Fracture, horizontal, rough,	1111	10YR 5/4), fine grained, moderate to	Ц -
_	58%			undulating	₽₩	strong HCl reaction, medium strong	-
125				122.5' - Fracture, 15 deg, rough, undulating,	Ш	(R3), small (1/16") voids over	
-82.6				tight but weathered and friable —		20-25%, fossiliferous (numerous	
-			NR	122.7' - Fracture, 25 deg, smooth, stepped, top of fracture zone	ш	molds/casts, small [1/4"] circular/oval voids, larger [1"] thin elongate	R10: Run time not
_				122.7-122.9' - Fracture zone, subangular 1"	₽Н	- cavities)	recorded
	126.5			fragments		122.5-122.85' - Same as	1.000.000
				123.15, 123.4' - Fractures or bedding plane,		121.5-122.5' except very weak to	
-			>10	0-10 deg, rough, planar, tight, some	+	weak (R1 to R2), secondary infilling	
				fragmentation	H	of cavities, more friable	
				123.25' - Fracture, 80 deg, rough, planar,	Ш	122.85-123.7' - Same as	
-			>10		П	121.5-122.5' except 5% coverage of	
-	_		<u> </u>	123.66' - Fracture, 20 deg, rough, undulating,	\vdash	voids (1/16"), no fossils or cavities,	
	R11-NQ		۱,	top of unconsolidated zone	H	elongate molds 1/16" wide, sharp	
]	5 ft	42	1	124.15' - Fracture, 10 deg, rough, undulating, bottom of unconsolidated zone	Ľ	- angular breaks	SC-3 collected 128.9-
-	78%		<u> </u>	124.25' - Fracture, 70 deg, rough, undulating	-Ш	Silty Sand (SM)	129.92'
130_			0	124.25 - Fracture, 70 deg, rough, stepped, —	\perp	123.7-124.15' - dark yellowish	
-87.6			ັ	infilled	$\vdash\vdash$	orange, (10YR 6/6), wet, fine grained, nonplastic, mild HCl	
-				126.8-127.9' - Fracture zone, no clear	+	reaction, 10% coarse sand-sized,	R11: 5 minutes
_			NR			- 30% nonplastic fines, 10% fine	-
	131.5			within zone		gravel-size material, small fossil	
-				127.9' - Fracture, horizontal, rough,	+	fragments, all calcareous material	1
-			>10	undulating, open	+	Limestone	-
			L	128.05' - Fractures (2), horizontal and 30		124.15-124.4' - Same as	
I -				deg, rough, undulating, tight to open, fit		122.85-123.7' except weak (R2)	1
-			>10	together, weathered, slight infill	┰	No Recovery 124.4-126.5'	-
_				128.50' - Fracture, 20 deg, rough, undulating 128.92' - Fracture, 10 deg, smooth,	\Box	- -	
	R12-NQ			undulating			
1 -	5 ft	8		131.6-131.8' - Fracture zone, with angular	ш	_	1
-	42%			fragments 1/2"-2" in size, bounded by rough	+	_	-
135				and undulating horizontal fractures	\perp		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-26	SHEET	8	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

				1211 : CIVIL 330 3/11 100073, Hidd Totally, 11Q 10013, 11VV		.5		ONENTATION: Vertical
WATE R	LEVELS: 4.4	11 ft b	gs on :	3/06/07 START : 2/21/2007 END : 2/	23/2	007	LOGGER : C. LeBlanc	
				DISCONTINUITIES			LITHOLOGY	COMMENTS
SPE	_8		(0		- 89	H		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	J U		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	S 두 후	(%) О	128	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ä	ı	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
₽₽¥	유럽성	۵	2 2	PLANARITY, INFILLING MATERIAL AND	l M	1	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	242	S S	유판	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	ı	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0 1 11	-			1 "	╀		.
-92.6			NR	132.05, 132.2, 132.45' - Fractures (3), 0-10	\vdash	1	Limestone	
_	1			deg, rough, undulating to stepped, open,	┰	t	126.5-126.8' - moderate yellowish	R12: 6 minutes
-				increasing voids with depth	-[1-	brown to moderate olive brown,	-
1	136.5			132.85' - Fracture, horizontal, rough, stepped to planar, open, cavity at break	ш	1	(10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, weak (R2),	
	,				1_	1		· ·
-			>10	133.15' - Fracture, 10 deg, rough, undulating, soft, very weak rock material at fracture face,	┰	+	5-20% coverage of voids (1/16"), with infill of silty sand material similar to	-
l _				followed by rock fragments	ᅪ	L	123.7-124.15'	_
1 -				133.15-133.60' - Fracture zone, angular rock		T	126.8-130.4' - Same as 126.5-126.8'	1
-	1		3	fragments 1/2"-2" with horizontal fractures	-	1	except weak to medium strong (R2 to	-
I _]			within zone at 133.25' and 133.4'	<u></u>	L	R3), no infill	1
	R13-NQ			136.55, 136.6' - Fracture (2), horizontal,	Н	4	No Recovery 130.4-131.5'	
-	5 ft	28	4	smooth, planar, along bedding planes	╁╌	+	Limestone	-
_	62%			136.8 137.05, 137.2, 137.35' - Fractures (4),	╆	L	131.5-132.2' - moderate yellowish	_
140				0-10 deg, smooth, planar, fragmentation		1	brown to moderate olive brown,	
-97.6				between fractures, slight infill, some black	1	┢	(10YR 5/4 to 5Y 4/4), fine grained,	
-			NR	staining	╨	+	moderate HCl reaction, strong (R4),	I
1			INIT	137.6' - Fracture, horizontal, rough,	\vdash	1	20% fine (1/16") voids, elongate	R13: Run time not
1 -				undulating to stepped, open	┰	十	fossil molds 1/4"x1/2"	recorded -
_	141.5			138.0, 138.4, 138.55' - Fractures (3), 20-40	ᅪ	┺	132.2-132.9' - Same as 131.5-132.2'	-
1			ا ا	deg, rough, undulating, tight to open with		1	except 30% voids (up to 1/8"), more	
1 -			3	weathering at fractures	ш	1	fossiliferous with larger cavities	1
I -				139.1' - Fracture, 40 deg, rough, stepped, no	╆-	+	132.9-133.6' - Same as 131.5-132.2'	-
				matching face beneath	\vdash	1	except grading to light olive gray, (5Y	
1 -	j		3	139.1' - Fracture, horizontal, rough, planar	1	十	5/2), 0-15% voids	1
-	ļ <u>_</u>			139.6' - Mechanical break, 10 deg	Ľ	J -	No Recovery 133.6-136.5'	-
1	R14-NQ			141.85' - Fracture, horizontal, rough,		1	Limestone	
1 -	5 ft	25	6	stepped, open	1	1	136.5-137.6' - light olive gray grading	1
1 -	69%			142.25' - Fracture, 10 deg, smooth,	₩	+	to light olive brown with depth, (5Y	-
145			3	undulating, open, with color change starting	\vdash	1	5/2 to 5Y 5/6), very fine grained,	
-102.6	1			at 141.95' and noticeable at 142.25'	1	T	moderate HCl reaction, medium	_
-				142.45' - Fracture or mechanical break, 40	$-\Box$	1	strong to strong (R3 to R4), <5%	P14: 5 minutes
]		NR	deg, rough, planar, healed		Ł	voids, laminated bedding, white	R14: 5 minutes
	146.5			142.6' - Fracture, smooth, undulating, open and weathered/rounded faces coated with	\vdash	ſ	recrystallization infilling 137.6-139.1' - light olive gray to	1
1 -	140.0			lighter colored film of infill	+	+	moderate yellowish brown, (5Y 5/2 to	-
I _]		4	143' - Fracture, 20 deg, smooth, undulating,	廾	L	10YR 5/4), fine grained, moderate to	1
1			1	3/4" cavity, weathered, subangular		1	strong HCl reaction, weak to medium	
-				143.5' - Fracture, 20 deg, rough, undulating,	┰	ŀ	strong (R2 to R3), 5-25% voids	-
I -			4	tight	₽	┺	(1/16"), horizontal bedding and 0-5%	1
1			-	143.55, 143.8, 143.95, 144.2, 144.4, 144.8' -	\vdash	-	voids at 138.5-139.1', few cavities up	
1 -	R15-NQ		2	Fractures (6), 0-25 deg, rough, undulating to	╁	+	to 1/2", some dark infilling	·
I -	5 ft	9		stepped, less weathered and rounded than at	-LT	1-	139.1-139.6' - moderate yellowish	-
	48%	3		143.0', subangular fragments at all fractures,		1	brown, (10YR 5/4), fine grained,	
I	.5,3			all open, some fragments between fractures	ш	+	moderate to strong HCl reaction,	·
150			l l	146.6' - Fracture, horizontal, rough, planar, —	ᅪ	┺	weak to medium strong (R2 to R3),	_
-107.6			NR	staining on upper face only	\vdash	1	5-10% fine (1/16") voids, some	
I -				146.7' - Fracture or mechanical break,	1	†	organic infilling	R15: Run time not
-				vertical, smooth, planar, healed, terminates	Ë	1	No Recovery 139.6-141.5'	recorded
	151.5			at fractures at 146.6' and 146.5'		1	Limestone	
I -				146.8' - Fracture, horizontal, rough, stepped	1	\Box	141.5-141.95' - moderate yellowish	End of Boring at 151.5' on
I -				to planar, voids visible on fracture face	-	\mathbb{H}	brown, (10YR 5/4), fine grained,	2/23/07
]			147.3, 147.6, 147.75, 148.3' - Fractures (4),	_		moderate HCl reaction, weak (R2),	
1 -				0-10 deg, rough, planar, tight with some	1	П	10% fine (1/16") voids, several	1
1 -				minor fragmentation, angular breaks	-	H	elongate (1/4"x1") cavities and 1/4"	-
]			147.7' - Fracture, 80 deg, rough, planar,	_	l	round cavities, light gray infilling of	
1 -				terminated by fracture at 147.3', missing	1	Г	some cavities, 1/8" thick black	1
-				second half	-	H	laminations at top	-
1]			148.45' - Fracture, 70 deg, rough, planar	_	L		
1				148.6, 148.7' - Fractures (2), horizontal,	1	Γ		1
				undulating, open, weathered	1	+		
1						1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-26	SHEET	9	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

WATER	LEVELS: 4.4	11 ft bo	gs on 3	3/06/07 START : 2/21/2007	END : 2/2	3/20	07 LOGGER : C. LeBlanc	
≥0.0	(9)			DISCONTINUITIES		Ĝ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU 3TH, OVEF	(%) Q	TUF FOO	DEPTH, TYPE, ORIENTATION, ROUG	HNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF ELEV	CORI	Ø	FRA(PER	PLANARITÝ, INFILLING MATERIAL THICKNESS, SURFACE STAINING, AND T		SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
NOTE TO THE PROPERTY OF THE PR	E E E E E E E E E E E E E E E E E E E	- W	FF FF FF FF FF FF FF FF FF FF FF FF FF	TRICKNESS, SUKFACE STAINING, AND		(8)	CHARACTERISTICS 141.95-144.95' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCI reaction, strong (R4), 5-15% fine (1/16") voids, many 1/4"-1/2" cavities, often infilled with weaker rock, increased voids and more resemblance to rock at 141.5-141.95' at 144.8-144.9' (possible start of transition sequence) No Recovery 144.95-146.5' Limestone 146.5-148.6' - repeated transitions from dusky yellow to light olive gray or light olive brown, (5Y 6/4 to 5Y 5/2 or 5Y 5/6), very fine to fine grained, moderate to strong HCI reaction, strong (R4), <3% voids (1/16") but with increased voids at 146.5-146.6' (5%), 148.1-148.2' (10%), and 148.6-148.9' (-30%) 148.6-148.9' - Same as 141.5-141.95' except darker brown color, increased voids No Recovery 148.9-151.5' Bottom of Boring at 151.5 ft bgs on 2/23/2007	



PROJECT NUMBER:	BORING NUMBER:		
338884.FL	B-27	SHEET 1 OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION: Vertical

DRILLIN	GIVIETH	OD AND	EQUIPINI	ENT : CIVIE 550 S	5/IN 1860/3, mud rota	ary, cathead, AWJ rods	, 3-7/8" tri-cone bit		ORIENTATION : Vertical
WATER	LEVELS	: 4.41 ft k	ogs on 3/0	06/07	START : 2/8/2007	END: 2/10/200	7 LOGO	ER: A	A. Teal
I				STANDARD		SOIL DESCRIPTION	١		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLICLOG	
H H H		RECOVE	BY (ft)	IESI NESULIS	SOIL NAM	E, USCS GROUP SYM	BOL, COLOR,	9	DEPTH OF CASING, DRILLING RATE,
THE STA		TILOGVE	<u> </u>		MOISTURE	ECONTENT, RELATIVE CY, SOIL STRUCTURE	E DENSITY OR	8	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUB			#TYPE	6"-6"-6" (N)	CONSISTEN	OT, SOIL STRUCTURE	., WIINLINALOGT	S S	INSTRUMENTATION
42.4				(* -)	 			+	"Water level is based on Ground Water
-								-	Monitoring at LNP site (FSAR Table
-								4	2.4.12.08)"
l -								4	
l _									
									Water levels not recorded during drilling
								1	
-								1	
-								1	•
-								+	-
-	4.5				Poorly Graded	Sand With Silt (SP-	SM)	- 	SS-1: Weight of hammer drove split spoon
5 37.4				1-1-0	4.5-5.5' - mode	erate yellowish brown,	(10YR 5/4), wet,		the last 6"
37.4		1.0	SS-1	(1)	very loose, very	y fine to fine grained,	10-15%	نظر	4
l _	6.0				\nonplastic fines	s, silica sand, 10-12%	organics	/]	
-								1	
-								1	•
-								1	•
-									
-								4	-
-								4	
l _	9.5							1,,	
10					Silty Sand (SM	l) pale orange, (10YR 8/	(2) very wet very		
32.4		0.3	SS-2	0-0-0 (0)	soft, very fine to	o medium grained, st	rong HCl reaction.	П	SS-2: Weight of hammer drove split spoon
-	11.0			(0)	30% low to me	dium plastic fines, sili		/ 1	18", sample may be slough
-	11.0				sands, 5-10% (organics		/ 1	•
-								-	-
-								\exists	
-								4	-
-								4	
l -								1	
I -	14.5							1	
15					Silty Sand Wit	h Limestone Fragme	ents (SM)		
27.4		1.0	SS-3	10-17-9	14.4-15.5' - wh	ite to yellowish gray, (ense, very strong HC	(N9 to 5GY 8/2),		[·]
-				(26)	fine to coarse of	gravel, 20% low to me	edium plastic	/	· <u>·</u>
-	16.0				fines, all carbo	nate materials		/ ┨	
-								4	-
-								4	
-								1	
I -								1	
-								1	1
-	10.5							1	
	19.5							-	⊣
20								$-H^{\sqcup}$	4
	i								•



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-27	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

						lary, Califeau, Avvo 1005, 5-7/6			ONIENTATION: Vertical
WATER	LEVELS	: 4.41 ft l	ogs on 3/	06/07	START : 2/8/2007	END: 2/10/2007	LOGGE	R : A	
I				STANDARD		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		<u> </u>		SYMBOLIC LOG	
NO A A		RECOVE	-RV (#\	IESI NESULIS	SOIL NAM	ME, USCS GROUP SYMBOL,	COLOR,	일	DEPTH OF CASING, DRILLING RATE,
A HE		I DECOVE				E CONTENT, RELATIVE DEN		8	DRILLING FLUID LOSS, TESTS, AND
F 문 문 년			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, MIN	IERALOGY	⋛	INSTRUMENTATION
				(N)					
22.4		0.8	SS-4	11-7-20 (27)	Silt (ML)	von v noto orongo (10VD 9/2) wat war	\mathcal{A}^{\square}	1
	21.0			(21)	etiff nonnlastic	ery pale orange, (10YR 8/2 c, very rapid dilatancy, mod	orate HCI		
-	21.0				reaction, 5-10	% very fine to fine grained s	sand	1	-
-						, ,		4	-
I _								1	_
-								1	1
-								1	-
_								4	-
					l				
]	24.5				I				
05					Silt With Sand	d And Limestone Fragmen	ts (ML)		1
25 <u> </u>			00.5	39-18-14	24.5-25.3' - Sa	ame as 19.5-20.25' except 1	15% very -	-	
		0.8	SS-5	(32)		n grained, 20% fine gravel-s	sized	4'''	1 -
	26.0				\limestone frag	ments	/		
]					l				
_								1	1
-								+	-
_								4	-
								1	
-								1	-
-								-	-
_	29.5							4	_
30				18-29-50/3	Silt With Sand			Ш	
12.4		1.3	SS-6	(79/9")	29.5-30.8 - Sa	ame as 24.5-25.3' except m vn, (10YR 5/4), moist to wet	oderate - hard		
-	30.8			(10/0)	nonplastic, rap	oid dilatancy, mild to modera	ate HCl	111	-
-					\ reaction, trace	fine gravel, 20-25% very fi	ne to	\mathbf{T}	-
_					\medium graine	ed sand, all carbonate mate	erials /	4	_
								1	
-					l			1	1
-								+	-
_					l			1	_
					l				
1 7	34.5				I			1	1
	04.0				Silty Sand (SI	M)		111	[
35 7.4			00.7	31-18-22	34.5-35.6' - mo	oderate olive brown, (5Y 4/4 ne to coarse grained, mild H	4), wet, -	-	<u> </u>
'		1.1	SS-7	(40)	dense, very fir	ne to coarse grained, mild H	ICI reaction,		_
	36.0				10-15% fine g	ravel, 20-25% low plastic fir	nes, all	Т.	1
1 7					Carbonate mai	lenais	/	1]
-					l			1	1
-					l			+	-
					l			1	_
					l				
1 7					l			1	1
-					l			+	1
-					l			-	-
I _	39.5							1.	
40	39.8	0.1	SS-8	50/3					1
					l '		-	1	
					I				
		1		I .	1			_	1



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	B-27	SHEET	3	OF	a	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

WATER	LEVELS	: 4.41 ft b	gs on 3/0	06/07	START : 2/8/2007 END : 2/10/2007	LOGGER	: A.	
				STANDARD	SOIL DESCRIPTION		В	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE		PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COL MOISTURE CONTENT, RELATIVE DENSITY CONSISTENCY, SOIL STRUCTURE, MINERA	Y OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
2.4 - - - -				(50/3")	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	-		-
 45_ -2.6 - - -	44.5	0.0	SS-9	50/1 (50/1")	Limestone Fragments 44.5-44.6' - Same as 39.5-39.6' except poor re Begin Rock Coring at 44.0 ft bgs See the next sheet for the rock core log	ecovery		Encountered rock from 37.0-46.0' switched to NQ coring Terminate soil sampling at 44.6' Set 35.0' NW casing
						- - - - - - -		- - - - - - -
						- - - - - - -		- - - - - - - - - - - - - - - - - - -
60						<u>-</u>		-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-27	SHEET	4	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

CORING	NETHOD AL	אם בנ	JUIPIV	/IENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	casır	ıg			ORIENTATION : Vertical
WATER	LEVELS: 4.4	1 ft b	as on	3/06/07 START: 2/8/2007 END: 2/	10/20	007	LOGGER : A. Teal		
				DISCONTINUITIES		Ť	LITHOLOGY	Т	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	8	H	211102001	+	COMMENTO
U ₹ Z	z ¥≿		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ı	ROCK TYPE, COLOR,	-	SIZE AND DEPTH OF CASING,
프핑은	翌年前	(%) 🛭	150	DEDTH TYPE OPIENTATION POLICUNESS	קֿך	ı	MINERALOGY, TEXTURE,	H	FLUID LOSS, CORING RATE AND
F F S	<u> </u>	$\stackrel{\smile}{\Box}$	PÄ	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	β	ı	WEATHERING, HARDNESS, AND ROCK MASS	- 1	SMOOTHNESS, CAVING ROD
		S O	5.77	THICKNESS, SURFACE STAINING, AND TIGHTNESS	1 5	ı	CHARACTERISTICS		DROPS, TEST RESULTS, ETC.
В 07 Ш				· ·	+ "	╄		+	
	44.0		2	44.1' - Fracture, 10 deg, smooth, undulating,	\vdash	Ł	Limestone 44.0-45.1' - light olive gray, (5Y 5/2),	-	
45	R1-NQ		-	open	Т	ſ	fine grained, moderate HCl reaction,		
-2.6	2 ft	45		44.2' - Fracture, 20 deg, smooth, undulating, _	+	F	weak (R2), voids <1/16" on 50% of	А	R1: 13 minutes
	85%		1	open	4111	L	surface, trace voids to 3/16"	' I	_
	46.0		NR	45.1' - Fracture, 5 deg, smooth, undulating, sandy infilling, open		ı	Silt (ML)		18:06 End day 2/8/07 at
_	10.0		····] , , ,	Ш	T	45.1-45.7' - moderate olive brown,	П	46.0'
-			2	46.25' - Fracture, 50 deg, rough, planar	+	Н	(5Y 4/4), wet, stiff, moderate HCI	Н	=
				46.5' - Fracture, 20 deg, rough, undulating		L	reaction, trace fine sand	Ш	
						Γ	No Recovery 45.7-46.0'		
-			0		-	ŀ	Limestone		=
l _					4111	L	46.0-46.5' - moderate olive brown,		_
	R2-NQ					ı	(5Y 4/4), fine grained, moderate to		
_	5 ft	0	0		1	r	strong HCl reaction, weak (R2),		7
-	66%				4	F	voids <1/16" on 40% of surface,		4
]		0	1		l	moderately fossiliferous (molds to		
50					1111	Γ	3/16")		7
-7.6			NR	-	1111	H	_ Silt (ML)	-	R2: 7 minutes
			' ' ' '		4111	L	46.5-49.3' - Same as 45.1-45.7'		-
	51.0					ı	except trace limestone fragments to 1/16"	-	
_					Ш	T	No Recovery 49.3-51.0'	\neg	Section appears competent
_			5	51.25' - Fracture, 5 deg, smooth, undulating	┺-	₽	Limestone		but breaks into sandy silt -
_				51.3' - Fracture, 15 deg, smooth, undulating	\perp	Ł	51.0-52.5' - moderate olive brown,		sized particles when
			١.	51.8' - Fracture, 10 deg, rough, undulating 52.0' - Fracture, 25 deg, smooth, undulating,		1	(5Y 4/4), fine grained, strong HCl	-	pushed on with 2 fingers
_			1	tight		1	reaction, extremely weak (R0), trace	-	7
_				ugiit	╨	₽	organics, friable		=
	R3-NQ	42	0	F2 25 F2 9! Machanical break (2)	\vdash	1	52.5-54.7' - moderate yellowish	-	
	5 ft 97%	43	"	53.35, 53.8' - Mechanical break (2)	Т-	ſ	brown, (10YR 5/4), fine grained,		
-	1 0,70			1	\Box	ŀ	moderate HCl reaction, very weak to		=
l –			lo		╆┯	╁	weak (R1 to R2), voids <1/16" on 40% of surface, trace voids to 3/16"		_
55					Ш	t	(fossils) on <5% of surface, trace /	П	
-12.6				<u> </u>	1111	Г	organics		R3: 4 minutes
-			0		1	H	Silt (ML)		-
_	56.0		NR,		Щ	L	54.7-55.85' - moderate yellowish	Д	_
					ш	1	brown, (10YR 5/4), moderate to		
_			>10		Ъ	Ł	strong HCl reaction, trace limestone		=
-			\vdash	56.9, 57.3, 57.4' - Mechanical break	亡	1	fragments to 1/16"		⊣
1 -			>10		\perp	Ł	No Recovery 55.85-56.0'		
			'		\vdash	1	Limestone		
1 -	R4-NQ				Ľ	Ť	56.0-56.7' - moderate yellowish		7
-	5 ft	46	1		$+$ \square	ŀ	brown, (10YR 5/4), fine grained, moderate HCl reaction, extremely		-
I _	100%			58.75' - Fracture, 60 deg, rough, undulating,	╁┯	Ł	weak to very weak (R0 to R1),		
				1/8" clay infilling	\vdash	ſ	56.4-56.7' extremely weak (R0) zone		
			5	59.1' - Fracture, horizontal, smooth,	ш	1	56.7-61.0' - moderate yellowish		-
60 <u> </u>			<u> </u>	undulating, 1/8" clay infilling	4.	₽	 brown, (10YR 5/4), fine grained, 	1	D4. 5 minutes —
-17.6			0	59.1-59.5' - Fracture, 80 deg, rough, planar,	\vdash	-	moderate HCl reaction, weak (R2),		R4: 5 minutes
-	610		ا ا	open	┱	T	voids <1/16" on 50% of surface in		7
-	61.0			59.3' - Fracture, 10 deg, smooth, undulating,		1	two zones from 58.2-61.0', trace		Ⅎ
I -			4	open 59.5' - Fracture, 5 deg, smooth, undulating,	\bot	Ł	voids to 3/8" are <5% of surface on		_
				open	\vdash	1	58.2-61.0', zones of very weak rock 57.3-57.8' and 58.8-59.3', moderately		
1 -				59.6' - Fracture, 50 deg, rough, undulating,	Ľ	Ī	fossiliferous (molds) below 60.0'		7
-			1	open	\blacksquare	1	iscomicious (moius) below 00.0		╡
I -				60.35' - Mechanical break	╁┯	Ł			
	R5-NQ			60.8' - Mechanical break	+	1			
-	5 ft 88%	71	1	61.5' - Fracture, 10 deg, rough, undulating,	Ш	1			7
	0070			20% coverage clay infilling, tight	+	╁		+	-
					I				
						L		\perp	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-27	SHEET	5	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

				12141 . ONE 330 3/14 1000/3, mud rolary, reg (0013, 1444)			ORIENTATION . Vertical
WATER	LEVELS : 4.4	1 ft be	as on	3/06/07 START : 2/8/2007 END : 2/	10/20	D7 LOGGER : A. Teal	
			-,0 011	DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)				F00	LITIOLOGI	CONINIENTS
SAE SAE	-ĭZ∑		FRACTURES PER FOOT	DESCRIPTION	ΪΞ	ROCK TYPE, COLOR,	OUZE AND DEDTH OF GAGING
出병은	≥,4E	(%	1 K 2		SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
I ∓ ₹ €	#ES	(%) O	ES.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
989		Ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Z	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	074	ď	Ы	THIORNESS, SORI ACE STAINING, AND HOTTINESS	S	CHARACTERISTICS	
				61.75, 62.0' - Mechanical break	Ш	Limestone	
I	1		2	62.3' - Fracture, 20 deg, smooth, undulating,	Н	- 61.0-65.4' - moderate yellowish	1
65				15% coverage clay infilling, open to 3/8"	+	brown, (10YR 5/4), fine grained,	
-22.6			1	63.9' - Fracture, 5 deg, smooth, undulating,	П	moderate HCl reaction, medium	R5: 12 minutes
-	1		NR	10% coverage clay infilling, open		- strong (R3), very fossiliferous on	1
-	66.0			64.3' - Mechanical break 64.5' - Fracture, 40 deg, rough, undulating,	+	61.0-63.0', voids <1/16" over 40% of same surface and over 10% of	-
			4	tight	\vdash	- surface elsewhere, from 61.0-63.0'	
I -	1		4	64.7' - Fracture, 60 deg, rough, undulating,	\top	extremely fossiliferous zones with	1
-	-			10% coverage clay infilling, tight	ш	voids <1/16" on 40% of surface,	1
l _]		2	65.2' - Fracture, 20 deg, smooth, planar, clay	\perp	molds and casts up to 3/8"x3/4" on	
				infilling	Н	5% of surface, trace organics	
-	R6-NQ			66.1' - Fracture, 10 deg, smooth, undulating,	T	No Recovery 65.4-66.0	1
-	5 ft	16		open		_ Limestone	-
	34%	-		66.5' - Fracture, 15 deg, smooth, undulating,		66.0-67.7' - moderate yellowish	
1]		ND	open	\vdash	brown, (10YR 5/4), fine grained,	1
1 -	{		NR	66.65' - Fracture, 5 deg, smooth, undulating,	╁┼	moderate HCl reaction, very weak	-
70	j l			open	ш	(R1), voids <1/16" on 40 % of	
-27.6				66.8' - Fracture, 15 deg, smooth, undulating,		surface, trace voids to 3/16", trace	R6: 12 minutes
-	1			open	ш	organics, 67.2-67.7' rock appears	1
_	71.0			67.2' - Fracture, 25 deg, smooth, undulating,	ᅪ	brecciated and more fossiliferous fewer voids and medium strong to	_
				open 67.75' - Fracture, 10 deg, smooth, undulating,		strong rock (R3 to R4)	
_	1		2	open		No Recovery 67.7-71.0'	1
-	.			71.6' - Fracture, 20 deg, rough, undulating,	4	Limestone	-
			>10	20% coverage clay infilling, open to 3/8"	Н	71.0-74.1' - Same as 66.0-67.7'	
			> 10	72.1' - Fracture, 15 deg, rough, undulating,	\top	except voids <1/16" below 72.0' on	1
-	D7 NO			open	\pm	25% of surface, moderately	1
l _	R7-NQ 5 ft	29	>10	72.1-73.3' - Fracture zone, horizontal and	ш	_ fossiliferous	
	62%	20	1/10	vertical, rough, undulating, open, fragments	Н		
-	1 02/0			from 3/8" to 4"	₩	No December 74.4.70.01	1 1
-				73.3' - Fracture, 30 deg, rough, undulating,	╆┯	No Recovery 74.1-76.0'	1
75			l	open			
-32.6	1		NR	73.75' - Fracture, 10 deg, rough, undulating,	Ш		R7: 8 minutes
-	-			tight to open up to 9/16"	+	_	-
	76.0			74.1' - Fracture, 30 deg, rough, undulating, open	Н	_	
1				76.0-76.6' - Fracture zone, rough, undulating,		Limestone	1
-	1		>10	fragments 3/16" to 1-1/2"	Щ	- 76.0-79.8' - moderate yellowish	-
I -				76.8' - Fracture, 10 deg, rough, undulating,	₽₩	brown to pale yellowish brown,	1 -
				30% coverage clay infilling, open	H	(10YR 5/4 to 10YR 6/2), fine grained,	
1 -	1		1	77.1' - Fracture, 30 deg, rough, undulating,	Ľ	- moderate HCl reaction, medium	1
-			<u> </u>	30% coverage clay infilling, open	$+\square$	strong (R3), voids <1/16" on 50% of surface decreasing with depth to	-
	R8-NQ	48	4		\bot	- 25% by 79.0', trace voids to 3/16",	
1	5 ft 76%	40	1	78.5' - Fracture, 10 deg, rough, undulating,	H	moderately fossiliferous	1
-	'''		\vdash	20-25% coverage clay infilling	+		-
I -	ļ l		0	-		<u>-</u>]
80			<u> </u>		ш	N B 500010	
-37.6	1			_	+	— No Recovery 79.8-81.0'	R8: Run time not recorded —
I -	Į		NR		+	=	-
	81.0						
I -					Щ	Limestone	SC-1 collected at 81.0-
-	{		0		┰	81.0-85.4' - moderate yellowish	82.0'
I _	j l				\mathbf{H}	brown, (10YR 5/4), fine grained, mild	
					E'	HCl reaction, weak to medium strong	1
1 -	† I		1	82.4' - Mechanical break	ш	- (R2 to R3), voids <1/16" on 20% of	-
I -			L		+	surface, trace voids and fossil molds	1 -
	R9-NQ	40	.	83.25' - Fracture, 60 deg, rough, planar, tight	H	to 3/16"x3/8", trace organics	
1	5 ft 88%	40	4	to open up to 3/16"	T	F	1
-	0070			10 0poil up to 0/10	F		-
1	1		I		1		

APPENDIX 2BB-639 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-27	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

				TENT . CIVIE 330 3/N 186073, Mud Totally, NQ tools, NV	000		ORIENTATION . Vertical
WATER	LEVELS: 4.4	1 ft b	gs on	3/06/07 START : 2/8/2007 END : 2	/10/20	D7 LOGGER : A. Teal	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			•	SYMBOLIC LOG	25266.	00
Ω₹Ž	- Z Z \		FRACTURES PER FOOT	DESCRIPTION	7	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
뿝병은	5元	(%) _Q	120		7 ặ	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
±₹.₹	996	<u> </u>	PF	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BC	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
F S E		Ø	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Į≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Оωш	072	œ	ша	THICKNESS, SON ACE STAINING, AND HOTTINESS	S	CHARACTERISTICS	
				83.4' - Fracture, 20 deg, smooth, undulating,			
-	-		4	tight	+-	=	-
85]			83.65' - Fracture, 30 deg, rough, undulating, _	┵		
-42.6			2	open	Н		R9: Run time not recorded
-	1		NR	83.8' - Fracture, 20 deg, rough, undulating,	+	No Recovery 85.4-86.0'	-
l -	86.0		INIX	open _	\perp	_	_
				84.0' - Fracture, 70 deg, rough, planar, tight	—	Limestone	
-	1		>10	84.1' - Fracture, 10 deg, rough, undulating,	╨	- 86.0-86.8' - moderate yellowish	-
_				open	╁┰	brown, (10YR 5/4), fine grained, mild	_
				84.5' - Fracture, 10 deg, rough, undulating,		HCl reaction, medium strong to	
-	1		>10	tight to open up to 3/16"		strong (R3 to R4), trace voids <1/16",	1
_				84.75' - Fracture, 50 deg, rough, undulating,	—	laminated subhorizontal bedding	_
	R10-NQ		ا	open	\vdash	from 86.0-86.4'	
_	5 ft	50	>10	85.0' - Fracture, 50 deg, rough, planar, tight 85.3' - Fracture, 50 deg, smooth, planar,	1	- 86.8-87.0' - moderate yellowish	1
I -	94%			open open	+-	brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak to	-
			ا م ا	86.65' - Fracture, 20 deg, rough, undulating,		weak (R1 to R2), voids <1/16" on	
	1		0	open	1_	20% of surface	1
90 <u> </u>	{		<u> </u>	86.85-87.05, 87.4-87.5, 88.0-88.3, 90.4-90.7'	╨	87.0-90.7' - moderate yellowish	D10: Dun time not
-47.0			>10	- Fracture zone (4), rough, undulating, fine	\vdash	brown, (10YR 5/4), fine grained, mild	R10: Run time not recorded -
	1,,,		l .	gravel sized limestone fragments	7—	HCl reaction, medium strong to	recorded
-	91.0		NR	87.05-87.5' - Fracture (2), 45 deg and 80	+T	strong (R3 to R4), zone of weak (R2)	-
			>10	deg, rough, undulating, open, tight-open		rock from 87.5-88.5', voids <1/16" on	
]		-10	respectively		25% of surface, trace voids to	
-	1			91.0-92.2' - Fracture zone, 0-75 deg, rough,	+	3/16"x3/8", moderately fossiliferous	-
_]		1	undulating, fragments 1/2"-2", trace	┵	No Recovery 90.7-91.0'	_
	1		'	bi-directional drill marks	\top	Limestone	
-	R11-NQ		_	92.4, 92.6' - Mechanical break (2)	+	91.0-93.5' - Same as 87.0-90.7'	-
l _	5 ft	27	0	, ,	\Box	_	_
	50%	21			<u> </u>	No Recovery 93.5-96.0'	
-	1 0070				╨	=	-
_					ᅪ	_	_
95			NR				
-52.6	1			_			R11: Run time not
_					1	_	recorded -
	96.0						1000.000
-	00.0			96.0-96.3' - limestone fragments gravel to	╁	Limestone	T
_			>10	cobble sized	4	- 96.0-99.3' - moderate yellowish	_
				96.4' - Fracture, 10 deg, rough, undulating,		brown, (10YR 5/4), fine grained, mild	
I -	1			open	1_	HCl reaction, weak to medium strong	1
I -			3	96.7' - Fracture, 15 deg, rough, undulating,	┵	 (R2 to R3), voids <1/16" on 40% of 	-
	j l		L	open	\bot	surface, voids to 3/16" on 5% of	
I -	R12-NQ			97.0' - Fracture, 25 deg, rough, undulating,	1	surface, cavities to 3/8"x3/4" from]
-	5 ft	34	2	open	\perp	 96.0-97.3', moderately fossiliferous 	-
	66%		L	97.5' - Fracture, 10 deg, smooth, undulating	<u>」</u>	_ (casts, molds)	
			0	97.6' - Fracture, 50 deg, smooth, planar, tight	\vdash]
I -	 			98.0' - Fracture, 15 deg, rough, undulating	+-	 No Recovery 99.3-101.0' 	
100_	j l		l	98.2' - Fracture, 20 deg, rough, undulating,		<u> </u>	
-57.6			NR	open			R12: Run time not
I -	† I			99.3' - Fracture, 40 deg, smooth, planar	1	=	recorded -
I -	101.0				\perp	_	
				101.05' - Fracture, 40 deg, smooth,	\vdash	Limestone	
I -	1		3	undulating, tight	+	- 101.0-104.5' - Same as 96.0-99.3'	-
I -	ļ l		L	101.3' - Fracture, 40 deg, smooth, planar,	\bot	except weak (R2)	
			ا ۔ ا	charcoal gray staining, tight			
I -	1		2	101.8' - Fracture, 35 deg, rough, undulating,	工	_	
-			<u> </u>	open	+-	<u>-</u>	-
	R13-NQ		,	102.4, 102.65' - Fracture (2), 40 deg, rough,	\vdash		
I -	5 ft	68	1	undulating, tight	1		1
-	100%		-	103.0' - Mechanical break	+		-
					1		
			<u>L</u>				
	_	_	_		_		

APPENDIX 2BB-640 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-27	SHEET	7	OF	9	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

	, <u>.</u>		<u> </u>	TENT : CIVIE 550 5/N 186075, Mud Totally, NQ tools, NVV	odoni		ORIENTATION : Vertical
WATER	LEVELS: 4.4	11 ft b	gs on	3/06/07 START : 2/8/2007 END : 2	/10/20	D7 LOGGER : A. Teal	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			•	SYMBOLIC LOG	232001	33nE1113
Ω₹Ž	- -		FRACTURES PER FOOT	DESCRIPTION	7	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
뿝병은	5元	(%) Q	120		ובֻּוּ	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
±₹.₹	<u> </u>) <u> </u>	PF	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	B	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
유유교		Ø	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	078	ď	шД		S	CHAIGACTERIOTICS	
				103.5' - Fracture, 30 deg, rough, undulating,	ш		
	1		4	yellowish brown staining on 20% of surface,	╁	_ Limestone	SC-2 collected at 104.5-
105_				tight	┵	— 104.5-106.0' - pale yellowish brown,	105.45'
-62.6				103.6-103.9' - Fracture, 60 deg, rough,	ш	(10YR 6/2), fine grained, mild HCl	R13: 10 minutes
-	1		2	undulating, tight		reaction, very weak to weak (R1 to	-
-	106.0			104.1' - Fracture, 25 deg, rough, undulating,	\bot	- R2), voids <1/16" on 15% of surface,	_
			١	charcoal gray staining, open to 3/16"	\vdash	trace fossil molds and casts to 3/16"	
-	1		>10	104.15' - Fracture, 60 deg, rough, planar,	1-1-	106.0-107.3' - Same as 104.5-106.0'	1
_	-			open to 1/16"	$+$ \Box	_	_
			_	104.4' - Fracture, 15 deg, rough, undulating,		107.0. 100.01	
	1		6	charcoal gray staining, open to 3/8" 104.5' - Fracture, 50 deg, rough, planar,	ш	 107.3 -109.0' - moderate yellowish brown, (10YR 5/4), fine grained, mild 	7
-				charcoal gray staining, tight	+	HCl reaction, weak (R2), voids	-
	R14-NQ		>10	105.45, 105.7' - Fracture (2), 70 deg, rough,	Н	<1/16" on 25-30% of surface, trace	
	5 ft 60%	24	1 10	planar, charcoal gray staining, open	Н	fossil molds and casts to 3/8"x3/8" on	1
-	1 00 /0			106.15' - Fracture, 50 deg, rough, planar,	\perp	<5% of surface	-
I _	<u> </u>			charcoal gray staining	Ш	No Recovery 109.0-111.0'	
110				106.15-106.5' - Fracture, 30 deg, rough,	\mathbf{H}		
-67.6	1 1		NR	undulating, tight	┰		R14: 7 minutes
-07.0]			106.15-106.5' - limestone fragments 2"x2"	Н		K14. / Illillutes
	111.0			107.0' - Fracture, 15 deg, rough, undulating,			
-	111.0			open	\blacksquare	_ Limestone	1
_	1 1		1 1	107.2' - Fracture, 30 deg, rough, undulating,	\bot	- 111.0-111.9' - moderate yellowish	
			·	open	ш	brown, (10YR 5/4), fine grained, mild	
-	1			107.6' - Fracture, 30 deg, rough, undulating,	╁┼	HCI reaction, medium strong (R3),	Recovery loss assumed to
_			1 1	open	4	voids <1/16" on 20% of surface,	be from bottom of run
				108.3-108.8' - limestone fragments from		voids and fossil (casts, molds) to	30
I -	R15-NQ			3/16" to 1"x2"	1_	3/8"x1" on 15% of surface, trace	1
-	5 ft	45	2	111.9' - Fracture, horizontal, rough, stepped	₽	 organics, at 111.3' clasts of gray 	-
	55%			113.0' - Fracture, 5 deg, smooth, undulating,	Н	limestone 1/4"x1"	
	1			brown staining, tight	7	111.9-113.75' - moderate olive brown	1
-	- 1			113.4-113.8' - Fracture zone, fragments to	-	 with very pale orange and olive gray, 	-
115]		NR	1-1/2" subangular to subround	┸	(5Y 4/4 with 10YR 8/2 and 5Y 4/1),	
-72.6					ш	fine grained, moderate HCl reaction,	R15: Run time not
-	1				+	weak (R2), voids <1/16" on 15% of	recorded -
_	116.0					surface, fossil molds	_
				116.1, 116.35, 116.85, 117.0, 117.1' -	ш	1/16"x3/16"x3/4" 10% of surface, 2"	
-	1		5	Fracture (5), horizontal and 5 deg, rough,	\bot	 band of olive gray (5Y 4/1) mottling at 113.2' 	-
_				undulating	₽	No Recovery 113.75-116.0'	1
				•	Н	Limestone	
I -	1		2			116.0-117.1' - dusky yellow, (5Y 6/4),	
I -	[10.1.5]		<u> </u>	110 0 110 El Frogturo	$-\Box$	fine grained, mild HCl reaction, weak	-
	R16-NQ		3	118.0-119.5' - Fracture zone or mechanical	\perp	(R2), voids <1/16" on 15% of	
	5 ft 76%	42	ا	break (5)	Ж	surface, at 116.1' rock fragment	1
-	1 70%				+	dusky yellow with light olive gray (5Y	-
_]		2		┸	_ 6/4 with 5Y 6/1) material	_
120					Ш	117.1-119.8' - moderate yellowish	1
-77.6	1 I			_	╂┼┤	trown, (10YR 5/4), fine grained, mild	R16: Run time not
11.0]		NR		\bot	 HCl reaction, weak to medium strong 	recorded -
	121.0				\vdash	(R2 to R3), voids <1/16" over 25% of	recorded
I -	121.0			121.0-126.0' - recovery too low to accurately	+	surface, trace voids (fossil molds)	-
I -			>10	identify fracture depths	ш	_ from 3/16"-3/8" <5%, very weak to	
			1 10	identify induction deputies	\square	weak (R1 to R2) rock zone from	
I -	1 1		-		₩	- 117.9-118.3'	Low recovery
I -	. I				╆┼┤	No Recovery 119.8-121.0'	
					\vdash	Limestone	
I -	R17-NQ		NR		ш	- 121.0-122.1' - Same as 117.1-119.8'	1
I -	5 ft	0			$+\Box$	No Recovery 122.1-126.0'	-
	22%				\mathbf{H}		

APPENDIX 2BB-641 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-27	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

				IENT : CIVIE 330 3/N 1800/3, ITIUU TOLATY, NQ LOOIS, NVV			ORIENTATION: Vertical
WATER	LEVELS: 4.4	1 ft b	qs on (3/06/07 START : 2/8/2007 END : 2/	10/20	D7 LOGGER : A. Teal	
	· ·			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
O H H	N. A. C.	(9	FRACTURES PER FOOT	52001 Hert	일	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AHE	문문 문문	(%) Q	ĬΣ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30L	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
민류년	N.S.	g	ZA ER_A	PLANARITY, INFILLING MATERIAL AND	Ĭ₩	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
SE	888	ď	E 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
					Ш		
					Н	-	1
125			NR	_	+-	_	
-82.6							R17: Run time not
	126.0				1_	_	recorded
-	120.0			126.0-126.5' - Fracture zone	╁	_ Limestone	-
I -			2	120.0 120.0 1 1000010 20110		- 126.0-126.8' - pale yellowish brown,	
				126.0' Fracture harizantal rough stanged		(10YR 6/2), fine grained, mild HCI	
				126.8' - Fracture, horizontal, rough, stepped, tight	ш	reaction, medium strong (R3), voids	1
-			3	127.1' - Fracture, 5 deg, rough, undulating,	+	<1/16" over 10% of surface, trace	1
_				open		voids to 3/16"	
	R18-NQ	00		127.4-127.9' - Fracture zone	Ш	126.8-127.7' - moderate yellowish	j
1 7	5 ft 94%	32	0		\vdash	 brown, (10YR 5/4), fine grained, weak (R2), voids <1/16" over 20% of 	1
-	94%					core, predominately oriented along	Weaker rock at 129.0'
_			2	120 4 120 2! Eracture ====	Ш	 laminated bedding planes, trace 	vveakei 100k at 129.0
130				129.4-130.2' - Fracture zone	\vdash	voids to 3/16"	j
-87.6				_	1	127.7-130.7' - dusky yellow, (5Y 6/4),	R18: Run time not
_			0		ш	fine grained, mild HCl reaction, weak	recorded -
	131.0		NR		Н	to medium strong (R2 to R3), voids	
					Н	<1/16" on 25% of core, voids and	
-			3	131.5' - Fracture, 10 deg, rough, undulating,		 fossil molds to 3/16"x3/8" on 5%, zone of very weak rock (R1) with 	1
I -				open	-	laminar bedding from 129.1-129.8'	-
			4	131.7' - Fracture, 45 deg, rough, planar, open	╨	No Recovery 130.7-131.0'	
			7	131.75' - Fracture, 30 deg, rough, undulating,		Limestone	
I -	R19-NQ			tight	1_	131.0-131.5' - Same as 127.7-130.7'	1
I -	5 ft	26	>10	132.2, 132.5, 133.4' - Fracture, 20 deg, rough, undulating, open	₽	_ except more fossiliferous with both	-
	62%			132.4, 132.75, 133.2' - Fracture, 10 deg,	Н	gray and brown limestone fragments to 3/8"x3/4"	
				rough, undulating, open		_ 131.5-134.1' - yellowish gray, (5Y	
405				133.7' - Fracture, 30 deg, rough, undulating	╙	7/2), fine grained, moderate HCl	1
135 <u> </u>			NR	133.8-134.0' - Fracture zone, rough, —	$+ \Box$	reaction, strong (R4), voids <1/16" on	R19: Run time not
-92.0				undulating, fragments 3/16"-1"		_ 10% of core, voids 3/8"x3/4" on 5%,	recorded
	136.0				ш	light olive gray (5Y 6/1) mottling,	recorded
-					Ш	moderately fossiliferous	1
-			2	136.5' - Fracture, horizontal, smooth, planar,	H	No Recovery 134.1-136.0'	
				tight		Silty Sand (SM)	1
				136.7' - rough, undulating, open		136.0-136.5' - pale yellowish brown, (10YR 6/2), fine grained, 20% silt,	SC-3 collected at 137.15-
			0	136.8, 137.05, 137.37' - Mechanical break (3)	1—	poorly graded	138.0'
-	Day NO			138.0-138.3' - Fracture zone	╫	Limestone	Driller's Remark: Soft
1 -	R20-NQ 5 ft	16	>10	100.0-100.0 - Hacture Zune	\Box	- 136.5-138.0' - yellowish gray to pale	material at 138.0'
	50%	.0			\vdash	vellowish brown with vellowish brown.	
-					\vdash	(5Y 7/2 to 10YR 6/2), fine grained,	1
-			, _		仜	mild HCl reaction, strong (R4),] -
140			NR	_	\Box	laminated bedding, at 136.8' and	1
-97.6					\vdash	137.2', 136.8-137.2' moderate yellowish brown (10YR 5/4), voids	R20: 46 minutes
-	444.0					< 1/16" over 20% of surface	1
-	141.0				匚	138.0-138.5' - moderate olive brown,	1
			3	141.15' - Fracture, 5 deg, rough, undulating,	\vdash	_ (5Y 4/4), fine grained, mild to	_
				open to 3/16"	Н	moderate HCl reaction, weak (R2),	j
-				141.5' - Fracture, 10 deg, rough, undulating, open to 1/4"		trace voids <1/16" over <25% of	1 1
-			2	141.9' - Fracture, 15 deg, rough, undulating,	ш	_ surface	-
				open	\vdash	No Recovery 138.5-141.0']
	R21-NQ			142.0' - Fracture, 10 deg, rough, undulating,			1
	5 ft 86%	60	1	open to 1/8"	ш	-	1
-	00%				\vdash		
1							1
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-27	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS: 4.4	1 ft bo	gs on 3	3/06/07 START : 2/8/2007 END : 2/	10/20	007	LOGGER : A. Teal	
> O :	(9)			DISCONTINUITIES	Ō		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	D (%)	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EN SEPT	SORE LENG	RQ	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	016	ш		142.55' - Fracture, 30 deg, smooth, planar,	1	╁	Limestone	
145			5	open to 3/16" -	H	₽	141.0-142.2' - Same as 138.0-138.5'	-
145_ -102.6			2	143.3' - Fracture, 65 deg, rough, planar, 30% coverage brown staining, open to 3/16"	Ħ		except voids <1/16" increase to 40%, laminated bedding on last 4" of run	R21: 20 minutes —
-	146.0		NR	143.7, 144.0' - Mechanical break 144.4' - Fracture, 5 deg, rough, planar, tight	Ħ		142.2-145.3' - pale yellowish brown transitions to vellowish brown. (10YR	1
-	140.0			144.6, 144.7' - Fracture, horizontal, rough,		1	6/2 to 10YR 5/4), fine grained,	1
-			2	undulating, open 144.9, 144.95, 145.0' - Bedding plane,	L		moderate to mild HCI reaction, medium strong (R3), laminated	1
_				horizontal, smooth, planar, tight to open up to	╙	+	bedding below 143.5' increasing	1
_	R22-NQ		1	1/8" - 146.3' - Fracture, 75 deg, rough, undulating,	Н		crenulations with depth, bedding angles up to 10 deg, voids <1/16"	1
_	4 ft 88%	56	5	tight to open up to 3/16", gray staining on 20% at surface	ш		over 5% coverage except zone at 20% from 143.5-145.0' trace voids to	1
			5	146.5' - Fracture, 5 deg, rough, undulating,	口		3/16", color changes to moderate]
			0	tight	Ш		yellowish brown (10YR 5/4) at 144.8' No Recovery 145.3-146.0'	R22: 18 minutes
150_	150.0		NR	open ☐ 147.2' - Fracture, 25 deg, rough, undulating,	Ħ	1	Limestone	
-107.6 _				tight to open 1/8"		\mathbb{L}^{1}	146.0-148.0' - pale yellowish brown to moderate yellowish brown, (10YR]
_				147.7' - Fracture, 10 deg, rough, undulating, tight			6/2 to 10YR 5/4), fine grained, mild to moderate HCl reaction, medium	_
_				148.0' - Fracture, 10 deg, rough, undulating,	ļ	LI:	strong to strong (R3 to R4), trace	-
_				open 148.2' - Bedding plane, 10 deg, smooth,	ł		faint laminated bedding from 146.0-147.0', voids <1/16" over	-
-				undulating, tight 148.3' - Fracture, 10 deg, rough, undulating,	l		1-10% increasing with depth 148.0-148.4' - moderate yellowish	-
_				open	ł	H	brown, (10YR 5/4), fine grained,	-
-				148.9, 148.95' - Fractures, horizontal, smooth, planar, open up to 1/16"	ł		moderate HCl reaction, very weak (R1), thin laminated bedding, voids	-
-				-	ł	H	<1/16" over 25% of surface	1
-				-	ł		148.4-149.5' - yellowish gray, (5Y 7/2), fine grained, moderate HCl	-
-				_	ł		reaction, medium strong to strong (R3 to R4), thin laminated bedding, 5	
-				-	ı		deg angle bedding, trace voids	-
_				-	1		<1/16", trace fossil casts, molds No Recovery 149.5-150.0'	1
_				-	1	Γ'	Bottom of Boring at 150.0 ft bgs on	1
_				-		ħ.	2/10/2007	1
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-28	SHEET	1 ()F	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 2 ft bgs	on 4/25/0)7 S	START : 4/25/2007 END : 5/1/2007 LOGGE	R : D.	Roraback
				STANDARD	SOIL DESCRIPTION	ŋ	COMMENTS
AND N (#)	SAMPLE INTERVAL (ft) RECOVERY (ft) #TYPE 6"-6"-6" (N)				COIL NAME LICCO CROUD CVAROU COLOR	SYMBOLIC LOG	DEDTIL OF CACING POUL INC DATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	∭ S N	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPT SURF SLEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYME	INSTRUMENTATION
41.5	0.0			(,	Top Soil	1/1/	
-		1.5	SS-1	2-2-3	O-0.5' - roots Poorly Graded Sand (SP)		1
-	1.5			(5)	\ 0.5-0.9' - yellowish gray, (5Y 7/2), moist to wet, loose,]
_	1.0				fine grained, no HCl reaction, trace nonplastic fines, trace organics decreasing with depth	1	1
-					Poorly Graded Sand With Silt (SP-SM)]
					0.9-1.5' - moderate yellowish brown, (10YR 5/4), moist to wet, loose, fine grained, no HCl reaction,		
					10-15% nonplastic fines, trace roots		
_							
_							_
5 36.5	5.0				Cilly Cond (CM)	1,11	
36.5				0-0-1	Silty Sand (SM) 5.0-6.2' - yellowish gray, (5Y 7/2), wet, very loose, fine	4	-
-		1.2	SS-2	(1)	grained, no HCl reaction, 25-30% nonplastic fines, trace roots	4111	-
-	6.5				Trace 10013	Ŧ	-
-						┨	-
-							-
-						1	
-						1	1
-						1	1
10	10.0					1	1
31.5					Silty Sand (SM) 10.0-10.7' - pale yellowish brown to dark yellowish		Organic odor
		0.7	SS-3	1-2-3 (5)	$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $		
	11.5			(-)	grained, no HCl reaction, 15-20% nonplastic fines, 10% organics]
_					(10 / 0 0.1ga.mod	_	_
_						1	_
_						-	-
-						-	-
-						-	-
						-	-
15 <u> </u>	15.0				Silty Sand (SM)		┪ -
-		1.1	SS-4	2-4-10			-
-	16.5	.,,		(14)	medium plasticity fines	1111	1
-	10.0				Silt (ML) 15.35-15.55' - grayish orange, (10YR 7/4), wet, soft to	1	1
-					medium stiff, fine grained, nonplastic, very rapid	1	1
					dilatancy, mild HCl reaction, 5-10% very fine sand Silty Sand (SM)	1	1
					15.55-16.1' - vellowish gray. (5Y 8/1), moist, medium]
					dense, fine to medium grained, strong HCl reaction, 25% low to medium plasticity fines, two gravel-sized	1	
-					pieces up to 1"	1	
20						_	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-28	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 2 ft bgs	on 4/25/0)7	START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback
				STANDARD	SOIL DESCRIPTION O COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)			PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
H BE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR BETTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPT SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
21.5	20.0				Silt (ML)
		1.0	SS-5	7-9-8 (17)	20.0`-21.0' - yellowish gray, (5Y 8/1), wet, very stiff, nonplastic, very rapid dilatancy, mild HCl reaction
	21.5			(**)	
-					<u> </u>
-					
-					
-					
-					
25	25.0				†
16.5					Silt With Sand (ML) 25.0-26.4' - dark yellowish orange, (10YR 6/6), wet,
1 -		1.4	SS-6	10-15-15 (30)	very stiff, fine to medium grained, nonplastic, very rapid dilatancy, mild to moderate HCl reaction,
-	26.5				rapid dilatancy, mild to moderate HCl reaction, 15-25% fine to medium sand-sized
-					-
-					
-					
-					<u> </u>
-					1 1
30	30.0				1
11.5				17-20-17	Silt With Sand (ML) 30.0-31.0' - Same as 25.0-26.4' except moist to wet,
-		1.0	SS-7	(37)	hard, trace fine to coarse gravel-sized
-	31.5				
-					
-					1 1
]
-] [
-					
35 6.5	35.0				Sandy Silt (ML)
-		0.3	SS-8	4-0-0	35.0-35.25' - moderate yellowish brown, (10YR 5/4), wet, very loose, mild HCl reaction, 40% fine to
-	36.5	0.0		(0)	\wet, very loose, mild HCl reaction, 40% fine to _
-	00.0				
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-28	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 2 ft bgs	on 4/25/0)7 5	START: 4/25/2007 END: 5/1/2007 LOGGER: D. Roraback	_
STANDARD				STANDARD	SOIL DESCRIPTION 5 COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	7
H BE ACE ATIO	RECOVERY (ft)			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
DEPTI SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	-
1.5	40.4	0.4	SS-9	50/5	Silty Sand With Limestone Fragments (SM)	┪
-				(50/5")	40.ó-40.4' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, very	1
-					dense, mild to moderate HCl reaction, 28% fines, 20% limestone fragments in lenticular shapes	1
					20 % ilmestone tragments in tenticular shapes]
_					<u> </u>	4
-						4
-						4
-						\exists
45	45.0				-	1
-3.5	45.0				Silt With Sand (ML)	┪
-		1.0	SS-10	23-30-17 (47)	45.0-46.0' - moderate yellowish brown, (10YR 5/4), -	1
	46.5			(,	moderate HCl reaction, 10-15% fine sand-sized, 5-10% organics in <1/16" thick lenses]
-					-	4
_						4
-					-	\exists
-						+
-					-	Ⅎ
50	50.0				1 1	1
-8.5				13-24-50/5	Silt With Sand (ML) 50.0-51.3' - Same as 45.0-46.0' except 25% fine to	1
_		1.3	SS-11	(74/11")	medium sand-sized, trace organics	4
_	51.4					4
-						4
-						\exists
-					-	1
-					1 1	1
					1	1
55	55.0					_]
-13.5	55.0	0.8	SS-12	32-50/3 (82/9")	Silt (ML) 55.0-55.8' - Same as 50.0-51.3' except 10-15% fine	4
-	55.8			(02/0)	sand-sized, trace organics in thin threads and chunks	4
-					-	\exists
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-28	SHEET	4	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 2 ft bgs	on 4/25/0)7 S	START: 4/25/2007	END: 5/1/2007	LOGGE	R : D.	Roraback
				STANDARD		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	6011 1144	E 11000 00010 0\#1001	201.00	SYMBOLIC LOG	DEDTH OF CACING COULTS DATE
H BE		RECOVE	ERY (ft)		MOISTURE	E, USCS GROUP SYMBOL, (CONTENT, RELATIVE DEN	SITY OR	30LIG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT SURF SLEV			#TYPE	6"-6"-6" (N)	CONSISTEN	CY, SOIL STRUCTURE, MINI	ERALOGY	SYME	INSTRUMENTATION
-18.5	60.0	0.3	SS-13	50/4	_ Silt With Sand	And Limestone Fragment	ts (ML)		
_				(50/4")	\ 60.0-60.3' - Sar	me as 55.0-56.0' except 20 sized, 20% coarse sand to t	% fine to	1	1
-					gravel-sized lim	nestone fragments		1	1
]]
]	
_								1	_
_								4	
_								4	-
	65.0							-	Complete soil sampling at 11:45 on 4/25/07
65 -23.5	65.1	0.0	SS-14	50/1	│ Limestone Fra	gments	7	+	2 5p. 100 001 100 001 1120/01
-				(50/1")	\65.0-65.1' - ligh	nt gray, (N7), moderate to seents about 3/8"x3/4" in size	trong HCI	1	
-					Begin Rock Co	oring at 65.0 ft bgs		1	1
-					See the next sr	neet for the rock core log		1	1
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PROJECT NUMBER:

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BORING NUMBER:

B-28

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION · Vertical

CORING METHOD	AND E	QUIPN	MENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER LEVELS :	2 ft bas	on 4/2	5/07 START : 4/25/2007 END : 5/	1/2007	LOGGER : D. Roraback	
	T		DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-23.5 65.0 - - - - - - - - - - - - - - - - - - -	Q 32	1 2 NR 3 3	65.15' - Fracture, horizontal, rough, undulating, faces do not join together 66.1' - Fracture, 10 deg, rough, undulating, open, weathered faces, shell like fossil imprint on both sides of fracture 66.15' - Fracture, horizontal, rough, undulating 68.15' - Fracture, horizontal, smooth, rounded face 68.35, 68.75' - Fractures (2), horizontal, smooth, undulating, tight 69.15, 69.3, 69.55' - Fractures (3), 0-20 deg,		Limestone Fragments 65.0-66.2' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, medium strong (R3), large infilled cavities 1"-2", trace organic inclusions No Recovery 66.2-68.2' Limestone 68.2-69.7' - Same as 65.0-66.2' except small voids (<1/16") over 30% of core, fossiliferous with few 1/4"-1/2" cavities (molds) with couple	Start rock coring at 65.0' Water level approximately 2.0' (very muddy, may not be accurate, 4/25/07, 15:00) Driller's Remark: Rods dropped at 66.0-68.0', interpret lost recovery to be from 66.2-68.2' R1: 5 minutes
7070.0		NR	rough, undulating, slightly weathered, open —	ш	1/4"-1/2" cavities (molds) with couple — of casts, increased large dissolution	
-28.5 - - -		8	70.0-70.4' - Fracture zone, five 1-2" angular fragments 70.4' - Fracture, horizontal, rough, stepped, terminates fracture zone above 70.9' - Fracture, horizontal, rough, planar,		type cavities from 69.1-69.7' No Recovery 69.7-70.0' Limestone 70.0-72.5' - moderate olive brown to moderate yellowish brown, (5Y 4/4 to	- - SC-1 collected at 71.5-
R2-H - 5 ft 1009	65	2	open 71.5' - Fracture, 5 deg, rough, undulating 72.8, 73.1' - Fractures (2), 10 deg, rough, stepped, some fragmentation 73.0' - Fracture, 70 deg, rough, planar, tight, some fragmentation		 10YR 5/4), moderate HCl reaction, medium strong (R3), highly fossiliferous with 30% fine (<1/16") voids and 5% 1/16"-1/8" voids/casts/molds, several larger cavities up to 1", trace organic laminations/inclusions 	72.5' - - - -
75 75.0		3	73.85, 74.2, 74.45' - Fractures (3), 10 deg, rough, planar, open 74.8' - Fracture, 60 deg, rough, undulating, —		72.5-73.6' - Same as 70.0-72.5' except 5-10% fine (1/16") voids, very few large voids or cavities, grayer	R2: 7 minutes
-33.5 - - - - R3-H - 5 ft 76%	0	>10 >10 >10	terminates with some rock fragments at end of core (75.0') 75.0-75.4' - Fracture zone, 1-2" fragments 75.4' - Fracture, 10 deg, rough, planar, tight 75.65, 75.7, 75.9, 76.1, 76.25, 76.27' - Fractures (6), horizontal, smooth to rough, planar, open 76.25-76.4' - Fracture zone, fragments up to 3/4"		3/8" thick laminations throughout core 73.6-78.1' - Same as 72.5-73.6' except very weak (R1)	- - - -
		3	76.6' - Fracture, 45 deg, smooth, planar, slightly weathered, open 76.8, 77.15' - Fractures (2), 10 deg, rough, undulating, open, with rock fragments		78.1-78.65' - Same as 72.5-73.6' except 0-10% fine voids 78.65-78.8' - Same as 73.6-78.1' No Recovery 78.8-80.0'	R3: 4 minutes
80 <u>80.0</u> -38.5	_	NR	between 77.5-78.1' - Fracture zone 78.1' - Bedding plane, horizontal, rough,		Limestone	Drilling ended at 80.0' on 4/25/07 — Drilling resumed on
		2	stepped, open 78.3' - Fracture, 20 deg, rough, stepped, open		 80.0-83.8' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, very weak to 	4/26/07 Rock varies from - competent to friable
- - R4-H		2	78.65' - Fracture, horizontal, rough, stepped, open 80.1' - Fracture, 20 deg, rough, undulating,		 weak (R1 to R2), 25-40% fine (<1/16") voids throughout core, fossiliferous with many 3/16" to 3/8" 	intermittently with no clear contacts, but on the whole — described as friable
- 5 ft 76%		>10	80.4 - Fracture, 10 deg, rough, undulating, open	Ħ	fossil casts and molds, minor black infilling	SC-2 collected at 80.5- 81.6'
- - - 85 85.0		>10 NR	81.6' - Mechanical break 82.3' - Fracture, 60 deg, rough, undulating, open with lots of associated rock fragments 82.3-83.5' - Fracture zone, angular 3/4"-2" fragments		- - No Recovery 83.8-85.0' -	R4: 5 minutes -
	_					•



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-28	SHEET	6	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

Rev. 4

WATER	LEVELS : 2 ft	bgs c	n 4/2	5/07 START : 4/25/2007 END : 5/	1/200	7 LOGGER : D. Roraback	
≥ D ≎				DISCONTINUITIES] []	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVER	(%) Q	FOG	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
PEN PEN PEN PEN PEN PEN PEN PEN PEN PEN	SORI	ROL	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-43.5	014			83.5, 83.7' - Fractures (2), 20 deg, rough,	+ "	Limestone	
-			2	undulating, slightly weathered	\blacksquare	- 85.0-89.05' - Same as 68.2-69.7'	1
-				85.45' - Fracture, 15 deg, rough, undulating, slightly weathered, open	甘	except moderate yellowish brown, (10YR 5/4), very weak to medium	1
-			1	85.6' - Fracture, 10 deg, rough, planar,	世	 strong (R1 to R3), 10-25% fine (<1/16") voids (fewer voids at 	1
-	R5-HQ			weathered but tight 86.7' - Fracture, 40 deg, rough, undulating,	Ш	85.0-85.5', 88.1-88.2'), many 1/4"	-
-	5 ft 100%	65	1	tight 87.05' - Fracture, vertical, rough, undulating,	Ш	 fossil molds/casts, some gray or beige infill in cavities, trace organics 	1
-	100 /6			tight	Ш	_ beige iiiiii iii cavilles, trace organies	1
-			2	87.25' - Fracture, 30 deg, rough, undulating, tight, half of core is missing from 87.2-87.35'	ш	_	-
-				88.1, 88.45' - Fractures (2), 10 deg, rough,	Ш	_ 89.05-89.6' - Same as 85.0-89.05'	R5: 5 minutes
90	90.0		2	undulating, tight 89.25' - 10 deg, rough, undulating, tight to	Ш	except interbedded zones of very weak (R1) rock with few voids and	
-48.5	00.0			healed	\blacksquare	medium strong (R3) rock with 20%	-
			1	89.8' - Fracture, horizontal, rough, undulating to stepped, open	Ħ	 voids 89.6-93.4' - Same as 85.0-89.05' 	1
				90.8, 91.3' - Fractures (2), 30 deg, rough, planar, opposing, tight	Ш	_ 00.0 00.4 Odine do 00.0 00.00	1
			2		Ш	_	1
	R6-HQ			91.9, 92.1' - Mechanical break (2), 60 deg, rough, planar to undulating	\mathbb{H}		1
	5 ft 92%	72	2			_	1
			6	92.9' - Fracture, 10 deg, rough, planar, fine organic lamination	П		1
			0	93.25' - Fracture, 60 deg, rough, stepped,	Ш	93.4-94.6' - moderate olive brown to moderate yellowish brown, (5Y 4/4 to	
			1	beginning of fracture zone 93.3-93.5' - Fracture zone	\perp	10YR 5/4), very fine grained, mild to	R6: 15 minutes
	95.0		NR	93.5, 93.8, 94.2' - Fractures (3), horizontal, smooth, planar	\perp	moderate HCl reaction, strong (R4), no small (1/16") voids at top,	
-53.5			5	•	\perp	increase with depth to 5% at bottom, a few 1/4" round cavities	
_				95.5, 95.9' - Fractures (2), rough, stepped, silty sand infilling, open	H	No Recovery 94.6-95.0'	
_			1	5, 5	\perp	Limestone - 95.0-98.3' - moderate yellowish	_
-	D7.110			96.75' - Fracture, 40 deg, rough, stepped,	H	brown, (10YR 5/4), fine grained,	-
-	R7-HQ 5 ft	52	0	tight	Н	moderate HCl reaction, weak to medium strong (R2 to R3), 10-20%	-
	90%			97.5' - Mechanical break	뮈	fine voids, small cavities up to 1/4" and larger and sometime elongated	-
-			3	98.2' - Fracture, 10 deg, smooth, planar, open to tight	Щ	 cavities contain light colored infill, 	-
-				98.6, 99.5' - Fracture, vertical, rough,	Щ	trace organics 98.3-99.5' - Same as 95.0-98.3'	R7: 15 minutes
			4 NR	stepped, some fragmentation, some crystallization on surfaces	Ш	 except 3% fine voids, cavities up to 	-
100 -58.5	100.0		INIX	100.0-100.9' - Fracture zone, several	丗	1" in size No Recovery 99.5-100.0'	-
			>10	horizontal and vertical fractures	+	- Limestone 100.0-104.6' - Same as 95.0-98.3'	
-				100.9, 101.15, 101.4, 101.9, 102.25' -	Ħ	except sequence of rock with voids	-
-			3	Fractures (5), 20-40 deg, rough, undulating, open	Ħ	 and rocks without, with cavities present at at transitions, maximum of 	
	R8-HQ			•	丗	35% fine voids	
	5 ft 92%	43	3	102.25' - Fracture, vertical, rough, undulating, some fragmentation	世	<u></u>	1
	JZ /0			102.9' - Fractures (2), horizontal and 60 deg,	╆	_	1
1 1			1	rough, undulating, open 103.6' - Fracture, 20 deg, rough, undulating	円	_	1
			2	, 13, 113, 111	囯	_	R8: 10 minutes
105	105.0		NR		Ш	No Recovery 104.6-105.0'	1

APPENDIX 2BB-649



PROJECT NUMBER:

33884.FL B-28 SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

00.1			<u> </u>	TENT : CIVIE 33 3/IN 299203, ITIUU TOLATY, INQ LOOIS, HVV C	<u></u>		ORIENTATION : Vertical
WATER	LEVELS: 2 f	bgs o	on 4/2	5/07 START : 4/25/2007 END : 5/	1/2007	LOGGER : D. Roraback	
	(DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
E A ON	Ä,ĄŠ.	<u></u>	FRACTURES PER FOOT	DESCRI HOR	<u> </u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ASE	E E	(%) _Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ و	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
뚜뚜짓	NG NG C	Ø	AC R	PLANARITY, INFILLING MATERIAL AND	ΜB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
밀S급	822	æ	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	BROI 3, TEST RESULTS, ETC.
-63.5				104.45' - Fracture, horizontal, rough,		Limestone	
-			6	stepped, beige-colored infill	╁	- 105.0-108.4' - moderate yellowish	-
_				105.0-105.2' - Fracture zone, 1/2"-1" angular	Н	brown, (10YR 5/4), fine grained,	_
			١.	fragments		moderate HCl reaction, weak to	
_			1	105.3' - Fracture, 50 deg, rough, stepped,		- medium strong (R2 to R3), small	
-	DO LIO			open 105.9' - Fracture, 20 deg, rough, stepped,	₩	(1/4") fossil cavities often with cast, 10-25% fine (1/16") voids	_
l _	R9-HQ 5 ft	37	>10	open	Н	- 10-23 % line (1/10) volus	_
	78%	31	10	106.3' - Fracture, 45 deg, rough, planar, tight			
_	. 0,0			but weathered	ш	-	-
_			>10	107.1' - Fracture, 25 deg, rough, stepped,	+	108.4-108.9' - moderate yellowish	_
				very open and weathered with dissolution and		brown, (10YR 5/4), strong HCl	
				fragmentation		reaction, 20% gravel, 30% sand,	R9: 8 minutes
			NR	107.7-108.0' - Fracture zone, with angular rock fragments up to 2"	╂┼┦	50% silt-sized particles, very friable	-
110 <u> </u>	110.0			108.15' - Fracture, 60 deg, rough, undulating,	╀┤	No Recovery 108.9-110.0'	-
-00.5			0	open	Ш	Limestone 110.0-114.4' - Same as 105.0-108.4'	
			"	108.4' - Fracture, 10 deg, rough, stepped,	\vdash	110.0-114.4 - Same as 105.0-108.4	
-				open	₩	-	1
-			0		-	-	-
					\bot	_	
	R10-HQ				\vdash		Driller's Remark: Hit silt
_	5 ft	93	1	112.3' - Fracture, 45 deg, rough, undulating,		-	layer at 112.0' about 4" -
-	100%			tight to open	+	_	thick; not evident in core
_			0			_	_
			"				
_						-	R10: 13 minutes
-			1		+	114.4-115.0' - Same as 110.0-114.4'	-
115	115.0			114.9' - Fracture, horizontal, rough,		except very weak (R1)	
-73.5				undulating		115.0-117.5' - moderate yellowish	SC-3 collected at 115.1-
_			1	115.1' - Fracture, horizontal, rough,	₩	brown, (10YR 5/4), fine grained,	116.1'
-				undulating	$+ \Box$	_ moderate HCl reaction, very weak (R1), 5-10% fine voids, few	-
_			2			elongated 1/4"-1/2" fossil molds	_
			-	116.5' - Fracture, 40 deg, rough, undulating,	Н	Ciongated 1/4 - 1/2 103311 molds	
_	R11-HQ			open	\top	=	1
-	5 ft	47	1	116.6' - Fracture, 5 deg, rough, undulating, slightly weathered, open		- 117.5-117.95' - Same as	-
_	70%		<u> </u>	117.1' - Fracture, horizontal, rough,	$oldsymbol{\sqcup}$	- 115.0-117.95 - Same as	
			2	undulating, open	H	to strong (R3 to R4), 0-10% fine	
I -				118.05' - Fracture, 30 deg, rough, undulating,		voids, few elongated 1/4"-1/2"	1
-			ND	tight	Ш	- cavities/molds	R11: 6 minutes
-			NR	118.3' - Fracture, rough, undulating, tight to	\vdash	117.95-118.2' - Same as	
120	120.0			open, 3" side fracture		115.0-117.5' except very weak (R1),	1
-78.5				120.0-120.2' - Fracture zone, subangular	Щ	— with increased voids to 15% 118.2-118.5' - Same as 115.0-117.5'	
-			>10		+	except weak (R2), 10-15% fine voids	-
l –			<u> </u>	120.2' - Fracture, 5 deg, rough, undulating		- No Recovery 118.5-120.0'	1
			2	120.4, 121.0' - Fractures (2), 25 deg, rough, stepped to undulating, open with subangular		Limestone	
_				stepped to undulating, open with subangular fragments	\vdash	120.0-121.2' - moderate yellowish	1
-	R12-HQ			nagnicilo	Ш	brown to dusky yellow, (10YR 5/4 to	-
I -	5 ft	8			ш	5Y 6/4), fine grained, moderate HCl reaction, medium strong (R3), fine	1
	24%	-			\vdash	voids (<1/16"), fossiliferous with	
I -			NR		1 + 1	voids and cavities primarily	1
-					団	elongated up to 1/4"-1/2"	-
I -					\square	No Recovery 121.2-125.0'	1
					\vdash	_	R12: Run time not
125	125.0					-	recorded -
120	120.0				\Box		_
					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-28

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

CORING	INETHOD A	ND EC	JUIPIV	IENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 2 f	t bgs o	on 4/2	5/07 START : 4/25/2007 END : 5/	1/200	7 LOGGER : D. Roraback	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
E H	N. A. C.	(9)	FRACTURES PER FOOT	2200.111	익	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HE E	SHE S	Q D (%)	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F S S	RNA	g	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Z	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	074	œ	ша	THICKNESS, SON ACE STAINING, AND HOTTINESS	S	CHARACTERISTICS	
-83.5					ш	Limestone	
			3	125.35' - Fracture, 80 deg, smooth,	т	 125.0-126.25' - moderate yellowish brown to light olive brown, (10YR 5/4 	1
-				undulating, tight 125.45' - Fracture, 20 deg, rough, planar,		to 5Y 5/6), fine grained, moderate	-
_			8	tight but weathered	Н	- HCl reaction, medium strong (R3),	1 -
			-	125.85' - Fracture, 0-70 deg, rough, stepped,	Ш	10-20% small (1/16") voids, some	
	R13-HQ		ND	tight, some minor fragmentation		1/4" cavities	Driller's Remark: Rods
1 -	5 ft	22	NR	126.1' - Fracture, 10 deg, rough, undulating,	ш	 126.25-127.0' - light olive gray, (5Y 5/2), fine grained, moderate HCl 	dropped at 127.0-127.5', -
-	84%		_1_	minor fragmentation 126.35, 126.4, 126.45, 126.6, 126.75, 126.85'	П	reaction, strong (R4), 0-10% fine	interpret lost recovery to be _ from 127.0-127.8'
l _			1	- Bedding plane (6), horizontal, smooth,		- (1/16") voids, very fine horizontal	110111 127.0-127.0
			'	planar, tight to open	Н	laminations	
				126.95' - Fracture, vertical, rough, planar	ш	No Recovery 127.0-127.8'	R13: 9 minutes
,			>10	127.8' - Fracture, 10 deg, open, weathered	Н	Limestone	-
130	130.0			128.9' - Fracture, 10 deg, rough, undulating, tight, weathered	$\vdash \vdash$	127.8-130.3' - Same as 125.0-126.25' except alternating very	-
-88.5			>10	129.4' - Fractures (2), 20 deg and 70 deg,	Ш	weak (R1) and medium strong (R3)]
1 7			10	rough, undulating to planar, tight, friable	\vdash	zones below 128.8'	1
1 1			1	129.4-130.0' - Fracture zone, 1/2"-1" angular	H	130.3-131.3' - moderate yellowish	1
-				fragments -	ш	brown to moderate olive brown,	-
_				130.0-130.3' - Fracture zone, 1/2"-1"	Н	(10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, medium	_
	R14-HQ			subangular rock fragments 130.3' - Fracture, horizontal, rough, planar		strong (R3), 20% voids <1/16",	
1 7	5 ft 26%	7		130.6' - Fracture, 70 deg, rough, undulating,	Ш	several 1/4" cavities and few larger	1
-	2070		NR	trace iron oxide infill of 1/4" cavity on fracture	Н	elongated cavities	1 -
-				face		No Recovery 131.3-135.0'	-
				131.0' - Fracture, horizontal, rough,	ш	_	_
				undulating, tight	Н		R14: 6 minutes
135	135.0			-		=	1
-93.5	133.0			135.0-135.3' - Fracture zone, 1/2"-1"	Н	 Limestone	Driller's Remark: 134.0-
-			>10	subangular rock fragments	ш	- 135.0-135.3' - Same as 130.3-131.3'	135.0' soft drilling –
				135.3' - Fracture, 10 deg, rough, undulating,	Н	except moderate olive brown to light	
				open	Н	olive gray, (5Y 4/4 to 5Y 5/2)	Driller's Remark: Drilling
-			8	135.45' - Fracture, 5 deg, smooth, planar, - open	ш	 135.3-136.45' - moderate olive brown, (5Y 4/4), moderate HCl 	rod sank approximately 2" - during lunch break
-	R15-HQ		4.0	135.5, 135.65, 135.75, 135.77' - Fractures	╁┼	reaction, strong (R4), 0-3% fine	during functi break
_	5 ft	13	>10	(4), 10 deg, smooth, planar, tight but	H	- (1/16") voids, horizontal bedding	-
	52%			weathered	Ш	planes 1/8"-1/2" thick, trace organics]
				136.45' - Fracture, 0-40 deg, rough, stepped,	Н	136.45-137.1' - alternating intervals	1
1 1			NR	open 136.5' - Fracture, horizontal, rough, planar		 of material same as 135.0-135.3' and same as 135.3-136.45' 	1 1
-			INIT	136.6, 136.75, 136.85, 135.88, 136.95' -	ш	137.1-137.6' - Same as 135.0-135.3'	R15: 7 minutes
-				Fractures (5), horizontal, rough, planar, tight	\vdash	No Recovery 137.6-140.0'	
140_	140.0			to open	口	<u></u>	
-98.5				136.7' - Fracture, horizontal, rough, planar,	Н	Limestone	
1 7			4	healed 137.1' - Fracture, 20 deg, rough, stepped,	ш	- 140.0-140.15' - light olive brown, (5Y	1
-				open, weathered	口	5/6), fine grained, moderate HCl reaction, medium strong (R3), 20%	-
			2	137.1-137.6' - Fracture zone, rock fragments	Н	- small (1/16") voids] -
				1/2"-2"	Ш	140.15-143.2' - light olive gray to	
1 7	R16-HQ			140.15' - Bedding plane, horizontal, rough,	Н	yellowish gray, (5Y 5/2 to 5Y 7/2),	1
-	5 ft	22	>10	stepped, open 140.6, 140.8, 141.0, 141.25' - Fractures (4),	Н	- very fine to fine grained, moderate	-
-	64%		0	0-20 deg, rough, stepped, 1/8" infilling, open,	口	HCl reaction, strong (R4), 3-10% small (<1/16") voids, several 1/4" to	-
			\ <u> </u>	breaks typically occur at large cavities	$\vdash\vdash$	- 1/2" cavities, some molds/cast,]
				140.8-141.0' - Fracture, vertical, 1" fragments	Н	several up to 1" cavities, some with	
1 1			NR	141.95' - Fracture, 10 deg, rough, undulating,	Ш	infill	R16: 12 minutes
I				highly weathered, tight, black organics on fracture face	$\vdash \vdash$	No Recovery 143.2-145.0'	-
145	145.0			indotate tace	H		
					\Box		L



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-28	SHEET	9	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

-				12111 . OIVIE 33 3/11 299203, Midd Totally, 11Q tools, 111V C			ONLINIATION: Vertical
WATER	LEVELS : 2 f	t bgs o	on 4/2		1/200		
≥0€	(%			DISCONTINUITIES	စ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASINO
뿝병은	RH, H	(%) Q	N C	DEDTH TYPE ODIENTATION DOLLOUNESS	1 ∺	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F F S	ZGT S	0	ACT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCIE	SHE	R Q	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-103.5				142.3' - Fracture, 40 deg, rough, undulating	\vdash	Limestone	
-			>10		H	 145.0-145.55' - light olive gray, (5Y 	_
_				1"-2" rock fragments	⊬	5/2), mottled appearance, fine	_
			3	142.65' - Fracture, 0-30 deg, rough, stepped 142.8' - Fracture, horizontal, rough, stepped,		grained, moderate HCl reaction, - medium strong to strong (R3 to R4),	
			ا	underlain by angular 1"-2" rock fragments	Н	5% fine (<1/16") voids, many 3/16"	
-	R17-HQ	!		143.05' - Fracture, 20 deg, rough, undulating		voids, irregular laminations, trace	Driller's Remark: 147.0-
-	5 ft	0	8	145.0-145.4' - Fracture zone, red staining on -	╙	- organics	150.0' soft drilling -
-	58%			fracture faces, angular to subangular rock fragments, 1/2"-2"	\vdash	145.55-146.8' - grayish orange, (10YR 7/4), very fine to fine grained,	_
_				145.4' - Fracture, 30 deg, rough, stepped,	lacksquare	- strong HCl reaction, strong (R4), no	_
_			NR	trace infill, weathered	┢	voids, no cavities	
				145.55' - Fracture, 10 deg, smooth,	ш	146.8-147.9' - yellowish gray to	R17: 12 minutes
150	150.0			undulating, open 145.7' - Fracture, 10 deg, rough, stepped,	\vdash	 dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, mild to strong HCl reaction, 	_
-108.5	130.0			☐ tight	Ħ	weak to strong (R2 to R4), strength	<u> </u>
1 -				145.9' - Fracture, 70 deg, smooth, undulating,		_ \ decreasing with depth, 5% fine	-
1 -				tight, fracture extends from 145.55-146.2' 146.5, 146.8' - Fracture (2), 85 deg, rough,		\(<1/16") voids at top, increasing to \(20\)% fine voids with depth	_
1 -				undulating, tight, 1/16" relief		No Recovery 147.9-150.0'	
				146.8, 146.9' - Fractures (2), horizontal,		Bottom of Boring at 150.0 ft bgs on	
-				weathered zone	1	5/1/2007	
-				147.5-147.9' - Fracture zone, angular to subangular 1/2"-1-1/2" fragments	1	-	=
-				-	ł	-	-
_				-	4	=	_
_				_		-	_
-				_	1		_
-				-	1	-	_
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PROJECT NUMBER:	BORING NUMBER:
338884.FL	B-29

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION: Vertical

SHEET 1 OF 9

		: 4.2 ft bo			N 3 16625, Initia rotary, auto hammer, AVV3 rous, s START : 5/23/2007 END : 5/31/2007		· T	Stewart, P. De Sa'rego
WAILK	LLVLLS	. 4 .2 II b <u>ç</u>	15 UH 3/30		SOIL DESCRIPTION	LOGGEN		COMMENTS
종일(#)	SAMPI F	INTERVA	l (ft)	STANDARD PENETRATION	20.2.2.2.3		SYMBOLIC LOG	
DEPTH BELOW SURFACE AND ELEVATION (#)	OAWII EE	RECOVE	` ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL,		101	DEPTH OF CASING, DRILLING RATE,
TH E		RECOVE		011 011 011	MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN		ИВО	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUR			#TYPE	6"-6"-6" (N)	OCINOIOTENOT, OCIE OTROCTORE, MIIIV	ILI VILOOT	SYN	MOTICIMENTATION
41.7	0.0				Poorly Graded Sand With Silt (SP-SM)	410 / 51/	ŢŢ	Installed 6" SW casing to approximately 5'
_		1.5	SS-1	1-2-4	0.0-1.5' - very light gray to yellowish gray, 8/1), moist, loose, fine grained, 5% nonpl	(N8 to 5Y -		below ground surface – Using 24" split spoon (SS)
-	1.5			(6)	10% organics, trace very fine sand-sized	particles at	掃	
-	1.5				the bottom		14 "	1
-						-		-
-						_		-
-						-		1
-						-		-
-						-		-
	5.0					-		-
5 36.7	5.0				Clayey Sand (SC)			Water level assumed at 3.0' below ground
-		0.8	SS-2	0-1-2	√ 5.0-5.4' - pale green, (10G 6/2), wet, very	loose, very		surface due to wet sample at 5.0' (SS-2) and -
-		0.0	00-2	(3)	\fine to fine grained, medium to high plasti Silt (ML)	city / -		increasing moisture content in SS-1 SS-2 taken at 14:36
-	6.5				\ 5.4-5.7' - grayish yellow, (5Y 8/4), wet, so	ft, -		
-					nonplastic, very rapid dilatancy, moderate reaction, carbonate derived	HCI		-
-					reaction, carbonate derived			-
-						-		-
-						-		-
-						-		-
-						-		-
10 31.7	10.0				Silt (ML)		Ш	-
-		1.4	SS-3	8-25-50/5	10.0-11.4' - grayish yellow mottled with m	oderate -		-
-	11.4	1.4	33-3	(75/11")	yellow, (5Y 8/4 with 5Y 7/6), moist, hard, wery rapid dilatancy, moderate HCl reaction	nonplastic, on_trace		-
-	11.4				\[\tag{very fine sand, trace black fragments, car} \]		Ш	-
-					\derived			-
-						-		-
-						_		-
-						-		-
-						-		-
-						-		-
15 <u> </u>	15.0				Silt (ML)		.	SS-4 taken at 14:50
20.7		٠, ١	00.	21-11-17	15.0-16.0' - grayish yellow, (5Y 8/4), mois	st, very stiff, -		- 33-4 (anci) at 14.30
-		1.0	SS-4	(28)	nonplastic, rapid dilatancy, moderate HCl	reaction,	Ш	-
-	16.5				\derived	ם אינומנל / -		-
-								-
_						_		
_						-		
_						-		
_						-		_
_						_		
20							\vdash	



PROJECT NUMBER:

338884.FL

B-29

SHEET 2 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						TND : 5/21/2007			Charact D. Do Calcago
WAIER	LEVELS	: 4.2 ft bo	ys 011 5/30		START : 5/23/2007	END: 5/31/2007 SOIL DESCRIPTION	LUGGER		Stewart, P. De Sa'rego COMMENTS
≩Qæ⊺	041451	SAMPLE INTERVAL (ft) SAMPLE INTERVAL (ft) TEST RESULTS							CONTINIENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE		. ,	TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMBOI	_, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH B		RECOVE	<u> </u>		MOISTURE	E CONTENT, RELATIVE DE	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
SUR!			#TYPE	6"-6"-6" (N)	CONSISTEN	ICY, SOIL STRUCTURE, M	INERALOGY	SYM	INSTRUMENTATION
21.7	20.0			(1.1)	Silty Sand (SN	/ I)		П	SS-5 taken at 14:56
-		1.5	SS-5	16-12-14	20.0-21.5' - gra	ayish yellow, (5Y 8/4), we	t, medium -		1
-		1.5	00-5	(26)	trace fine grave	coarse grained, moderate el-sized, 30-40% nonplas	tic fines.	1	-
-	21.5				carbonate deri			1111	-
-							-	1	-
-							-	1	-
_							-	┨	-
-							-	-	-
_							-	1	
-							-	-	-
25 <u> </u>	25.0	_		50/5.5	Cillar Cond (Cil	A \		100	SS 6 taken at 15:02
16.7	25.5	0.5	SS-6	50/5.5 (50/5.5")	Silty Sand (SN	ก) ayish yellow, (5Y 8/4), we	t. verv dense	Ш	SS-6 taken at 15:02
_				(22 212)	\ fine to coarse of	grained, moderate HCl re	action, 15%	1	
_					gravel-sized, 2	5-30% nonplastic fines, c	arbonate / -		_
_					(2011)				_
							_		<u> </u>
_							_		
							_		
							·-]
							-		1
30	30.0						-	1	1
11.7					Silt (ML)			Ш	SS-7 taken at 15:10
_		1.2	SS-7	10-6-2		ght olive brown, (5Y 5/6), grained, mild to modera		1	1
_	31.5			(8)		nonplastic fines, carbona		₩	1
-	01.0						-	1	1
-							-	1	
_							-	1	1
-							-	1	Driller's Remark: Hard at 32.8'
-							-	ł	-
-							-	1	
-	05.5						-	1	-
35 6.7	35.9	01	SS-8	50/1.5	L → Limestone Fra	agments And Silt		┢	SS-8 taken at 15:22
-		/	555	(50/1.5")	\ 35.0-35.1' - ligl	ht olive grey, (5Y 5/2), mi	ld to moderate $/$ -	1	-
-					HCI reaction			1	-
-							-	1	
-							-	1	Driller's Remark: Drilled into softer zone after
-							-	1	37.0'
-							-	1	-
-							-	1	-
_							-	1	
_							-	1]
40								_	
								1	



PROJECT NUMBER: BORING NUMBER: SHEET 3 OF 9

338884.FL B-29

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit

						ry, auto nammer, Avvj rous			ORIENTATION : VERICAL
WATER	LEVELS	: 4.2 ft bo	as on 5/30		START : 5/23/2007	END : 5/31/2007	LOGGEF	(: T. 	Stewart, P. De Sa'rego COMMENTS
≥Q₽			1 (6)	STANDARD PENETRATION		SOIL DESCRIPTION		8	COIVIIVIENTS
ON (SAMPLE	INTERVA	. ,	PENETRATION TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMBO	L. COLOR.	ICL	DEPTH OF CASING, DRILLING RATE,
H B ATIO		RECOVE	RY (ft)		MOISTURE	E CONTENT, RELATIVE DE	ENSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTEN	ICY, SOIL STRUCTURE, M	INERALOGY	SYMBOLIC LOG	INSTRUMENTATION
1.7	40.0			35-50/5.5	Silt With Sand	d (ML)		Ш	Drill time from 37.0-40.0' approximately 1-1/2
-	-	1.0	SS-9	(85/11.5")		oderate olive brown to ligh		$\ \ $	minutes -
-	41.0			,	rapid dilatancy	5/6), moist to wet, hard, lo , moderate to strong HCl	reaction, 25%	ш	-
-	-				\ fine to medium	n sand-sized, carbonate d	lerived, trace / -	ł	-
-	-				very line sand-	-sized black particles		ł	-
-							-	ł	-
-							-	ł	-
-	-						-	ł	-
_							-	ł	-
l							-	ł	-
45 -3.3	45.0				Silt (ML)			Ш	SS-10 taken at 15:51
-		1.3	SS-10	35-48-50/4	45.0-46.3' - Sa	ame as 40.0-41.0' except	trace medium -	$\ \ $	-
-	46.3		00 .0	(98/10")	sand-sized gra	ay particles	-	$\ \ $	-
-	10.0						-	1	-
-							-	ł	-
-							-	ł	-
-							-	ł	_
_							-	ł	-
-	-						-	ł	-
-							-		-
50 -8.3	50.0				Cilty Cand Wit	th Limestone Fragments	(CM)	7177	
-0.5				34-27-30	50.0-51.4' - ligi	ht olive gray, (5Y 5/2), we	t, very dense, -		55-11 taken at 10.00
-		1.4	SS-11	(57)	fine to coarse	grained, moderate HCl re to coarse gravel-sized lin	action, 40% of		-
_	51.5					astic fines, all carbonate			-
-								ł	-
_							-	ł	-
-							-		-
-							-	1	-
-							-	1	-
-							-	-	-
55 <u> </u>	55.0				Cilty Canal (CI	A\			
-13.5	55.8	0.7	SS-12	39-50/3.5 (89/9.5")	Silty Sand (SN 55.0-55.7' - mc	oderate olive brown, (5Y 4	1/4), wet,		55-12 taken at 16.10
_	33.0			(00.000)	dense, fine to	coarse grained, moderate el-sized limestone, 40% lo	e HCl reaction,	Γ	-
-					fines, 5% orga	nics, carbonate derived	ow plastic / -	l	-
-								-	-
-							-	-	-
-							-	4	-
-							-	-	-
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60								<u> </u>	
1									
	l				1				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-29	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER		: 4.2 ft b)/07 S	TART : 5/23/2007	END : 5/31/2007		: T. :	Stewart, P. De Sa'rego
						SOIL DESCRIPTION			COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION TEST RESULTS				SYMBOLIC LOG	
E SE		RECOVE	ERY (ft)	120111200210	SOIL NAMI	E, USCS GROUP SYMBOL, COLO ECONTENT, RELATIVE DENSITY	OR,	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
THE AYE			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MINERA	LOGY	YMB	INSTRUMENTATION
-18.3		0.0	CC 12	(N) 50/2	No December 6	20.0.00.01		Ś	Drillaria Damaria Will add CO Ol of 4" LIW
-10.3	60.2		SS-13	(50/2")	No Recovery 6	00.0-60.2			Driller's Remark: Will add 60.0' of 4" HW casing before continuing SPTs -
-					Pogin Dook Co	oring at 61.0 ft bgs			Last ŠPT taken on 5/23/07 at 60.0' (SS-13) Deviated hole during 4" HW casing
-					See the next sh	heet for the rock core log	_		installation
-							_		-
-							_		-
-							_		-
-							_		-
-							-		-
							_		-
65 -23.3									-
-							-		-
-							-		-
-							_		-
_							_		1
_							_	1	1
_							_	1	_
-							_	1	_
1]									
70									_
-28.3							_		_
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_							_		_
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-29

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	I WILTHOU A	ND LC	ZUIFIV	MENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.2	ft bgs	s on 5	/30/07 START : 5/23/2007 END : 5/	31/200	DOT LOGGER: T. Stewart, P. De Sa'r	rego
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BEL 10N	N. F.	(9)	滿		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HT WAT	E E E	Q D (%)	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P S S	SE S	S O	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	∑.	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	61.0	ш	шш	,	0,		Danahala aanatmatian is
_	01.0		1		Н	Limestone - 61.0-63.6' - moderate yellowish	Borehole construction is 5.0' of 6" SW casing -
			'	61.5' - Fracture, horizontal, rough, undulating,	ш	brown, (10YR 5/4), medium grained,	installed to 5.0' below
-				possible contact between limestone and sand lens	Н	mild HCl reaction, weak (R2), 30%	ground surface with 62.0'
-			7	62.0, 62.4' - Mechanical break (2)	ш	- surface coverage of voids up to 1/8"	of 4" HW casing installed -
_	54.110			62.6-63.0' - Fracture zone	\perp	at 61.0-61.5', increasing to 40-50% coverage from 61.5-63.6', 10% dark	to approximately 60.0'
	R1-NQ 5 ft	42	0		Н	- (possibly organics) clasts up to 1/8"	P. De Sa'rego begins logging
	52%	42				size, increasing to 3/8" size at	Water level: 4.2' below
					ш	62.6-63.0'	ground surface on 5/30/07
					$+ \Box$	- No Recovery 63.6-66.0'	Driller's Remark: Possible -
65 <u> </u>			NR	_		<u> </u>	sand lense at 61.5-63.0'; driller will advance casing
-23.3					Н	_	R1: 5 minutes
	66.0				Ш		11:55 Advancing HW
1 7					\mathbb{H}	Limestone	casing to 65.0'
-			1	66 6 67 05 67 25 67 05' Fractures (4)		- 66.0-67.95' - Same as 61.0-63.6'	
-				66.6, 67.05, 67.25, 67.95' - Fractures (4), horizontal, smooth to rough, planar to	ш	except trace cavities/fossil casts up to 1-9/16"x3/8" at 66.7- 67.3'	1 -
			3	undulating, 1/8" relief	\vdash	10 1-3/10 X3/0 at 00.7-07.3	_
				.	\Box		
	R2-NQ			68.65' - Fracture, horizontal, rough,	Н	67.95-69.2' - Same as 61.0-63.6'	1
_	5 ft	42	>10	undulating, 1/4" relief	ш	 except very weak to weak (R1 to R2), 10-15 fossil casts/cavities up to 	1
_	64%		1	CO OF! Frankling (10 day rough undulating	Н	10-13 lossii casts/cavities up to 1-3/16"x3/8"	-
_			<u> </u>	69.05' - Fracture, <10 deg, rough, undulating	H	No Recovery 69.2-71.0'	1
70				_	Ш		
-28.3			NR		Н		R2: 6 minutes
_	71.0				П	-	1
-	71.0			•	₩	_ Limestone	
_			0		ш	- 71.0-71.95' - Same as 61.0-63.6'	-
_					Н	except 20-40% surface coverage of	1
			>10	72.0-72.4' - Fracture zone		voids up to 3/16" (percentage - increasing with depth),10-20%,	SC-1 collected at 71.0- 71.95' -
			/10	72.6' - Mechanical break	ш	cavities up to 1-3/16"x3/8", large	71.95
_	R3-NQ		>10	72.9-73.4' - Fracture zone	т	(3-7/8"x3-1/8") cavity infilled with fine	1
-	5 ft	28		-	\Box	grained, weak (R2) carbonate	-
-	48%				₽	material at 71.2-71.6', 20% of core contains black organic thread-like	-
					Ш	inclusions up to 1-9/16"x1/8" long]
75_			NR		Н	71.95-72.4' - Same as 61.0-63.6'	1
-33.3						except fine grained, very weak (R1), trace voids	R3: 7 minutes
-	76.0			,	Ш	- trace voids 72.4-73.4' - Same as 71.0-71.95'	1 1
-	76.0			76.0-76.1' - Fracture zone	Ш	except very weak (R1)	-
-			>10		口	No Recovery 73.4-76.0'	1 4
1 _				76.4-76.7' - Fracture zone	Н	Limestone 76.0-76.7' - moderate yellowish]
			2	77.25, 77.7' - Fracture or mechanical break,	Ш	brown, (10YR 5/4), fine grained, mild	
]				rough, undulating, tight	Н	HCl reaction, very weak to weak (R1	1
-	R4-NQ			· · · · · · · · · · · · · · · · · · ·	П	to R2), 10-15% surface coverage of	1 1
-	5 ft	20			Н	voids up to 1/8", trace infilled cavities up to 1-3/16"x3/8", infilled with	-
-	40%				ш	fossiliferous limestone	1 4
			NR		H	-]
80			1411		Н		
-38.3				_	Ш		R4: 9 minutes
-	01.0				Ш	-] 1
	81.0				\Box		
							1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-29

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

COMINC	I WETHOD A	ND LC	ZOII IV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 4.2	ft bgs	s on 5	/30/07 START : 5/23/2007 END : 5/	31/20	D7 LOGGER : T. Stewart, P. De Sa'r	ego
>	~			DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
BELOW SE AND SON (ft)	UN, H, AND ERY (%	(9)	JRES OT	DESCRIPTION	IC LO	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_			2		Ħ	Limestone - 76.7-78.0' - moderate yellowish	-
-				81.7, 82.3, 82.5' - Mechanical break (3)	₽	brown, (10YR 5/4), fine grained, mild	_
-			3	82.0' - Fracture, <5 deg, smooth, planar to undulating, tight	Н	HCl reaction, very weak to weak (R1 to R2), 30-40% surface coverage of voids up to 1/8", 10-15%	-
-	R5-NQ			82.95, 83.4' - Fractures (2), <5 deg, smooth,	Ш	casts/cavities up to 1"x2" infilled with	-
-	5 ft 88%	75	1	planar to undulating 83.5' - Mechanical break	Ш	 very soft black (possible organic) material 	-
			1	84.25' - Fracture, 10-15 deg, smooth,	Ш	No Recovery 78.0-81.0' Limestone	-
85			'	undulating	Н	81.0-83.4' - moderate yellowish	
-43.3			3	85.0, 85.2' - Fractures (2), 10-15 deg, rough, undulating	\Box	brown, (10YR 5/4), fine to medium grained, mild HCl reaction, very weak	R5: 6 minutes
_	86.0		NR	undulating	耳	(R1), 20-30% surface coverage of	_
_			1	86.3' - Mechanical break	Щ	voids up to 1/16", 10% casts and cavities up to 1-9/16"x1-3/16",	_
_				86.6' - Mechanical break	Ш	partially infilled with soft black (possible organic) material	_
l _			>10	87.1- 88.1' - Fracture zone	Н	83.4-85.1' - Same as 81.0-83.4'	_
_					F	except weak to medium strong (R2 to R3)	-
_	R6-NQ 5 ft	22	>10	88.3-88.6' - Fracture zone	H	_ 85.1-85.4' - Same as 81.0-83.4'	_
-	56%					No Recovery 85.4-86.0' Limestone	_
-					Ш	86.0-87.6' - moderate yellowish	-
90 <u> </u>			NR	_	₽	brown, (10YR 5/4), medium grained, mild HCl reaction, very weak to weak	R6: 9 minutes
-40.5					Ш	(R1 to R2), 10-15% voids up to 3/16", trace casts/cavities up to 3/8"x3/8"	Ro. 9 minutes –
-	91.0			91.0-91.4' - Fracture zone	\blacksquare	87.6-88.8' - Same as 86.0-87.6'	-
-			6	31.0-31.4 - 1 Tacture 2011c	ш	except medium strong (R3), trace dark (organic) clasts, 15%	-
-				91.7-91.75' - Fracture zone 92.0' - Fracture, <10 deg, rough, undulating,	\pm	 casts/cavities up to 3/8"x3/8" 	_
-			4	1/16" relief	+	No Recovery 88.8-91.0' Limestone	_
-	R7-NQ			92.75' - Fracture or mechanical break, 35-40 deg, rough, undulating, 1/16" relief	\blacksquare	 91.0-91.7' - moderate yellowish 	-
-	5 ft	42	1	deg, rough, undulating, 1/10 Teller	H	brown, (10YR 5/4), fine to medium grained, mild HCl reaction, medium	-
-	70%		0	93.9' - Fracture, horizontal, rough, undulating,	丗	 strong (R3), 10-15% surface 	-
05				1/8-3/16" relief 94.2-94.5' - Mechanical break	Ш	coverage of voids up to 1-3/16" 91.7-92.3' - Same as 91.0-91.7'	-
95 <u> </u>			NR		Н	— except 30-40% casts/cavities up to 2"x1"	R7: 6 minutes —
-	96.0				囯	92.3-94.5' - Same as 91.0-91.7'	-
-	90.0					except trace casts/cavities up to 9/16"x3/8", trace dark organic matter,	-
-			2	96.4' - sand/limestone contact, horizontal,	Щ	\\large (2"x1") cavity at 93.8'	-
-				rough, undulating 96.6' - Fracture, horizontal, rough, undulating	ш	No Recovery 94.5-96.0' Silty Sand (SM)	-
-			>10	97.4' - Fracture, horizontal, rough, undulating 97.55-97.75' - Fracture zone	Ш	96.0-96.4' - carbonate derived, 30%	-
_	R8-NQ			98.1, 98.5' - Fractures (2), horizontal, rough,	Ш	nonplastic fines	_
_	5 ft 98%	38	4	undulating, 3/16" relief 98.6' - Fracture, 30 deg, rough, undulating	Ħ	-	-
_			2	98.9-99.2' - Fracture zone (3 or more), 0-60	H	_	_
100			3	deg, rough, undulating 99.55, 99.85, 100.25' - Fractures (3), <30	\parallel		_
-58.3			6	deg, rough, undulating	Ш		R8: 5 minutes
	101.0		٥	100.55-100.9' - Fracture zone	Н		-



PROJECT NUMBER:

33884.FL B-29 SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

COMING	METHODA	ID L	VIII IV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asiriy		ORIENTATION: Vertical
WATER	LEVELS: 4.2	ft bg	s on 5		31/20	07 LOGGER : T. Stewart, P. De Sa'r	
>00	(9)			DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
AN FO	., YN YN (%)		SI.	DESCRIPTION	507	ROCK TYPE, COLOR,	OLZE AND DEDTH OF GAGING
ᆱ끯읃	RUN H, 4 ÆR	(%) 🛭	URI	DEDTH TYPE OPICATION POLICINICS	SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
TA ₹	RE COO	οD	ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MB(WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			(NR)			Limestone	
-			>10	101.5-102.1' - Fracture zone	╁	- 96.4-100.9' - moderate yellowish	-
-					亡	brown, (10YR 5/4), medium grained, mild HCl reaction, very weak to weak	-
_			4	100 51 5 1 0 00 1	₽	- (R1 to R2), extremely weak (R0) at	_
				102.5' - Fracture, 0-30 deg, rough, undulating, 1/8" relief	Ш	97.6', 15-20% surface coverage of	
	R9-NQ		>10	103.0-103.2' - Fracture zone, <3/16" relief		voids up to 1/8", 10% casts/cavities	
_	5 ft 44%	31		· · · · · · · · · · · · · · · · · · ·	╁	 up to 2"x3/8", partial recrystallization of carbonate material in voids 	_
_	7770					No Recovery 100.9-101.0'	-
_			NR		+	- Limestone	-
105 -63.3						101.0-102.1' - moderate yellowish brown, (10YR 5/4), medium grained,	
-03.3				_	₽	- mild HCl reaction, weak (R2), 5-10%	R9: 3 minutes Driller's Remark: Fluid loss -
	106.0					surface coverage of voids up to	at 105.0' below ground
				106.0-106.3' - Fracture zone	Н	1/16", trace cavities up to 3/4"x3/8" 102.1-103.2' - Same as 101.0-102.1'	surface
_			>10	106.5, 106.95' - Fractures (2), <10 deg,		except very weak (R1)	_
-				rough, undulating	╁	No Recovery 103.2-106.0'	-
_			1		仜	_ Limestone	-
_				107.7' - Fracture, <10 deg, rough, undulating	╁┼	106.0-109.4' - Same as 101.0-102.1' except very weak (R1) from	_
	R10-NQ 5 ft	46	2	108.0' - Fracture, 30 deg, rough, undulating		_ 106.0-107.9' and 108.2-109.4'	_
	68%	40	-	108.5' - Fracture or mechanical break, <15	Н		
			1	deg, rough, stepped, tight, <1/16" relief		_	_
110				109.3' - Fracture, horizontal, rough, undulating, 3/16" relief	╁	No Recovery 109.4-111.0'	-
-68.3			NR	undulating, 3/10 Teller	世		R10: 3 minutes
_					₩	-	-
_	111.0			444.0.444.01. Freeton	仜		_
_			3	111.0-111.3' - Fracture zone	┢	Limestone - 111.0-111.7' - Same as 101.0-102.1'	_
				111.4, 111.7' - Fractures (2), horizontal, rough, undulating		No Recovery 111.7-116.0'	
					₽	,	Driller's Remark: No
_				-	ш	=	circulation -
_	R11-NQ			-	╁	-	-
_	5 ft	0		<u>-</u>	亡	-	-
_	14%		NR		₽	_	_
_					ш	_	_
115					\vdash		
-73.3				_			R11: 3 minutes
-	116.0			-	₽	-	1
-	1 10.0			116.0-116.2' - Fracture zone	仜	_ Limestone	<u> </u>
-			>10	116.5-116.85' - Fracture zone	+	- 116.0-116.5' - Same as 101.0-102.1'	-
-				110.0-110.00 - 1100tate 20tte	Ľ	116.5-118.8' - pale yellowish orange	Water levels 4 41 5 -1
_			2		oxdot	to light gray, (10YR 8/6 to N7), - coarse grained, strong HCl reaction,	Water level: 4.4' below ground surface on 5/31/07 -
				117.5' - Fracture, horizontal, rough, planar to	ഥ	extremely weak to very weak (R0 to	g. 53.14 54.1455 511 5/5 1/5/
]	R12-NQ		4	stepped, 1/8" relief 117.6-117.85' - Fracture, 50 deg, rough,	\vdash	R1), trace voids (<3/16"), trace	Driller's Remark: Still no
-	5 ft 56%	27	_ +	undulating, 1/8" relief	Ľ	 cavities to 1"x1/8", highly friable, fossiliferous, "coquina" appearance, 	circulation -
-	30 /0			118.05' - Fracture, horizontal, rough,	╨	increase in gray color (fossils)	
-				undulating, tight, 1/16" relief 118.4-118.8' - Fracture zone	仜	 corresponds to increase in HCl 	-
120_ -78.3			NR		1	reaction and decrease in hardness No Recovery 118.8-121.0'	D12: 4 minutes
-10.3				<u> </u>	片	-	R12: 4 minutes
	121.0				\vdash		



PROJECT NUMBER:

33884.FL

B-29

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	INLITIODA	ND LC	ZOIFIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW ca	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.2	ft bgs	s on 5	/30/07 START : 5/23/2007 END : 5/3	31/20	D7 LOGGER : T. Stewart, P. De Sa'r	ego
≥∩ ∵	(9)			DISCONTINUITIES	ပ္	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
림S급	CC LEI RE	R(FR PE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-			2	- 121.85, 121.9' - Mechanical break (2)		Limestone 121.0-121.55' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, weak (R2),	SC-2 collected at 121.0- 121.9' -
-	R13-NQ		>10	121.5-123.0' - Fracture zone		 10-15% surface coverage of voids up to 1/8", trace casts/cavities up to 1-3/16"x3/8" 	Driller's Remark: No fluid circulation –
- -	5 ft 92%	36	3	123.3' - Fracture, horizontal, rough, undulating, 3/16" relief 123.95' - Fracture, 20 deg, rough, undulating, 1/8" relief		 121.55-124.7' - Same as 121.0-121.55' except 10-20% surface coverage of casts/cavities up to 1-3/16"x3/8", with trace carbonate 	-
125_ -83.3 -	126.0		2 NR	124.35' - Fracture, <10 deg, rough, undulating 124.45-124.7' - Fracture, 60 deg, rough, undulating		infill/recrystallization 124.7-125.6' - Same as 121.0-121.55' No Recovery 125.6-126.0'	R13: 5 minutes
- -	120.0		0	124.85' - Fracture, 60 deg, rough, undulating, 3/16" relief 124.85-125.2' - Mechanical break, 60 deg 125.25' - Mechanical break		Limestone 126.0-126.1' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong (R3),	- Driller's Remark: No fluid
-	R14-NQ			-		no visible voids, 10% fossil casts up to 9/16"x9/16" No Recovery 126.1-131.0'	circulation -
-	5 ft 2%	0	NR	- - -		- - - -	- -
130_ -88.3 -	131.0			-			R14: 3 minutes
-	101.0		8	131.1, 131.2, 131.25, 131.45, 131.6' - Fractures (5), horizontal, smooth to rough, planar		Limestone 131.0-133.9' - Same as 121.0-121.55' except coarse grained, 50-60% surface coverage of voids up	- Drillaria Damariu Na fivid
-	R15-NQ		5	131.7, 131.75, 131.95' - Fractures (3), <5 deg, rough, undulating 132.1, 132.2, 132.25, 132.55, 132.95' - Fractures (5), <10 deg, rough, undulating		to 3/16" at 132.1-132.3', and medium gray (N5) mottling at 133.2-133.9'	Driller's Remark: No fluid circulation -
- -	5 ft 58%	7	4	133.2, 133.4, 133.6, 133.65' - Fractures (4), <10 deg, rough, undulating -		- No Recovery 133.9-136.0'	-
135_ -93.3 -	136.0		NR	-			R15: 4 minutes
- -	. 30.0		4	136.1, 136.9' - Fractures (2), <5 deg, rough, undulating, 1/8" relief 136.75, 137.5' - Fractures (2), 15-20 deg,		Limestone - 136.0-136.9' - Same as 121.0-121.55' 136.9.140.1' medium light gray and	Drillor's Domark: No fluid
-	R16-NQ		>10	rough, undulating, 3/8" relief 137.25- 137.5' - Fracture zone, <10 deg, rough, undulating, 4 fractures 137.6-138.15' - Fracture zone		136.9-140.1' - medium light gray and very pale orange, (N6 and 10YR 8/2), fine grained, mild to moderate HCl reaction, medium strong to strong	Driller's Remark: No fluid circulation - SC-3 collected at 138.15-
-	5 ft 82%	28	5	- - - - - - - - - - - - - - - - - - -		 (R3 to R4), trace voids up to 3/16", 20-30% casts/cavities up to 2-3/8"x1-3/16" at 138.3-140.1', black organic infill at 139.4-140.1' 	139.05'
140 -98.3 -	141.0		0 NR	<1/16" relief, black stains on 80% of surface		No Recovery 140.1-141.0'	R16: 14 minutes
	-						
					ш		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-29	SHEET	9	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

			2011 11	MENT: CIME 55 S/N 316625, mud rotary, NQ tools, HW o	aonig		ORIENTATION: Vertical
WATER	LEVELS: 4.2	ft bg	s on 5	/30/07 START : 5/23/2007 END : 5/	31/20	07 LOGGER : T. Stewart, P. De Sa'r	ego
>00				DISCONTINUITIES	ပ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	- FOG	ROCK TYPE, COLOR,	
B H E	ER, A	(%			일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H Y Y	E F F S C C C C C C C C C C C C C C C C C	Q D (%)	E S	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		ď	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014				+ "	Limestone	
_			2	141.1' - Fracture, horizontal, rough, undulating, 3/8" relief		- 141.0-141.9' - grayish orange to pale	_
			_	•	Ш	yellowish brown, (10YR 7/4 to 10YR	
				141.85' - Fracture, 15 deg, rough, undulating, 1/8" relief	Н	6/2), fine grained, mild HCl reaction,	
-			1	142.05' - Fracture, horizontal, rough,		 medium strong (R3), trace (<5%) surface coverage of voids up to 	
-	R17-NQ			undulating	╂┴	1/16", trace cavities up to 9/16"x3/8"	Driller's Remark: Very soft
-	5 ft	33				- 141.9-142.05' - Same as	at 143.3-145.0'
_	40%				.	121.0-121.55'	_
						142.05-142.8' - Same as	
145			NR		ш	 141.0-141.9' 142.8-143.0' - moderate yellowish 	
-103.3				_	+	brown, (10YR 5/4), medium grained,	R17: 7 minutes
_						mild HCl reaction, weak (R2),	-
I _	146.0				┵	60-70% surface coverage of voids up	_
				440.05 440.551 5 4 40.00 1 1 4		to 3/16", 10-15% casts/cavities up to 3/4"x3/8"	
			2	146.35, 146.55' - Fractures (2), horizontal, rough, planar	\vdash	No Recovery 143.0-146.0']
-				147.05, 147.25' - Fractures (2), <15 deg,	╁	Limestone	-
-			3	rough, undulating, tight	仜	_ 146.0-146.55' - Same as	-
_				147.75' - Fracture, <15 deg, rough,	┢	142.8-143.0' T 146.55-148.5' - Same as	SC-4 collected at 147.75-
	R18-NQ 5 ft	42	3	undulating, tight		_ 141.0-141.9'	148.60'
	64%	42	٦	148.65-149.05' - Fracture zone	Ш	148.5-149.2' - Same as 142.8-143.0'	
_			1	148.65' - Fracture, <15 deg, rough,	1	† ,, , , , , , , , , , , , , , , , , ,	1
				undulating, tight	—	No Recovery 149.2-151.0'	-
150 -108.3			NR	_	╁┼	_	D40. 7 minutes
-100.3			1411			_	R18: 7 minutes
	151.0				\vdash		Total depth of boring at 151.0' below ground
					Ι΄.	Bottom of Boring at 151.0 ft bgs on	surface 10:19, 5/31/07
-					1	- 5/31/2007	<u>Januar 10:10, 0/01/01</u>
-					1	-	-
_					4	-	_
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PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-30	SHEET 1 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

						iry, auto naminer, Avvo rous, s			ONIENTATION : Vertical
WATER	LEVELS	: 2.4 ft b	gs on 5/0:	3/07 S	START : 5/2/2007	END : 5/6/2007	LOGGER	} : D.	Roraback
>				STANDARD		SOIL DESCRIPTION		٥	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
BHE		RECOVE	ERY (ft)	1	SOIL NAM	ME, USCS GROUP SYMBOL, E CONTENT. RELATIVE DEN	COLOR,) C	DEPTH OF CASING, DRILLING RATE,
YFA YFA			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MIN		√BC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#ITPE	(N)	00.10.012.1			SYI	
42.2	0.0			. ,	Poorly Graded	d Sand With Silt (SP-SM)		171	
-		١.,	00.4	2-4-4	→ 0.0-0.45" - darl	k gray, (N3), moist, loose, f	fine grained, /=	1 41	-
_		1.4	SS-1	(8)		n, silica sand to 1/32", 15%	fines,		_
_	1.5				Poorly Graded	organics, roots			_
					0 45 -1 4' - ver	ry light gray to light gray, (N	8 to N7)		
-					\moist, loose, v	ery fine grained, no HCl rea	action, silica	1	-
-					sand to <1/32"	', trace nonplastic fines		1	-
-							-		-
_							-		_
							_		
					l		·		
5	5.0						-	1	7
37.2	3.0	-			Silty Sand (SM	M)			Water level 2.4' below ground surface on
-			00.0	2-5-3	5.0-5.9' - light l	brownish gray with medium	gray -		5/03/07 -
-		0.4	SS-2	(8)	mottling, (5YR)	6/1 with N4), wet, loose, ve	ery fine _	Ш	_
	6.5				grained, mediu	um to high plasticity, no HC <1/32", 30-40% fines, trace	reaction,		_
					Silica salid to V	1702 , 00-40 /6 lilles, trace	10013		
							-	1	-
-							-	1	-
-							-	-	-
_							-		_
							-	1	
10	10.0						-	1	-
32.2	10.0				Silt (ML)			ш	_
				1-6-6	10.0-11.2' - yel	llowish gray, (5Y 7/2), wet,	medium stiff, -	.	-
_		1.2	SS-3	(12)	nonplastic, ver	ry rapid dilatancy, moderate	to strong		_
	11.5			. ,	HCl reaction, to	race very fine sand-sized, o	carbonate	ш	
					1		-		_
_							-		-
-							-	1	-
_							-		=
I _							_		_
							-	1	
,,	45.0						-	1	-
15 <u> </u>	15.0				Sandy Silt (ML	1)			-
				0-21-35	15.0-16.5' - vel	llowish gray, (5Y 5/2), wet,	hard, -		_
		1.5	SS-4	(56)	medium dense	e, nonplastic, very rapid dila	itancy,		_
	16.5			,		reaction, 25-30% fine to co			
					sand-sized, 2-3	3 limestone lenses to 1" thi	ck,		
-					Carbonate den			1	-
-					l		-		-
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PROJECT NUMBER:	BORING NUMBER:		
338884 FI	B-30	SHEET	2 OF 0

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER LEVELS: 2.4 ft bgs on 5/03/07						_			ONIENTATION : Vertical
WATER	LEVELS	: 2.4 ft bo	gs on 5/03	3/07 S	START : 5/2/2007	END : 5/6/2007	LOGGEF	R : D.	Roraback
> 0 0 1				STANDARD		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	LE INTERVAL (ft) PENETRATION TEST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR,						SYMBOLIC LOG	DEDTIL OF CACING DRILLING DATE
H H H		RECOVE	RY (ft)		SOIL NAM	IE, USCS GROUP SYMBOL E CONTENT, RELATIVE DE	, COLOR, NSITY OR	Ιĕ	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTA A			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MII		MB	INSTRUMENTATION
SU				(N)				SΥ	
22.2	20.0				Silty Sand Wit	th Limestone Fragments	(SM)	Ш	
_		0.4	SS-5	6-6-6	20.0-20.9° - ligi	ht olive gray, (5Y 5/2), wet coarse grained, moderate	, medium - HCI reaction	1111	_
-	04.5			(12)	\ 35% fine to co	arse gravel-sized limeston	e fragments,	T	_
-	21.5				√30% plastic fin	nes, all carbonate		1	=
-							-	┨	-
_							-	1	_
_							-	1	_
							_		
							-	1	
25	25.0						-	1	-
17.2	25.0				Sandy Silt (MI	L)		Ш	-
-		0.6	SS-6	4-2-8	25.0-25.6' - du	isky yellow, (5Y 6/4), wet, s	stiff, medium	Ш	-
_		0.6	33-6	(10)	dense, fine to i	medium grained, low plast lerate to strong HCl reaction	icity, rapid	1	-
_	26.5				fine to medium	n sand, 10-15% fine gravel	-sized -	1	_
_					limestone frag	ments, all carbonate		1	_
							_		
_							- -	1	_
-							-	1	-
-							-	1	-
-							-	┨	-
30 12.2	30.0				Condy Cilt Wit	th Limestone Fragments	(CM)	100	_
12.2				12-8-15	30.0-30.85' - S	Same as 25.0-25.6' except	verv stiff		_
_		0.9	SS-7	(23)		arse gravel-sized limeston		Ш	_
	31.5			, ,			_		
							-	1	_
-							-	1	<u> </u>
-							-	1	-
-							-	1	-
-							-	1	-
_							-	1	_
35	35.0 35.2							<u>L</u>	_
7.2	00.2	0.2	<u>SS-8</u>	50/2 (50/2")	Limestone Fra	agments	to moderate	\vdash	
]				(30/2)	HCl reaction. v	ht olive gray, (5Y 5/2), mild very poor recovery, two lim	estone		
					fragments, to 1	1/2"		1]
-					l		· -	1	7
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-							-	1	-
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PROJECT NUMBER:	BORING NUMBER:	
338884.FI	B-30	SHEET 3 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 2.4 ft bo	gs on 5/03	3/07	START : 5/2/2007 END : 5/6/2007	LOGGER	: D.	Roraback
				STANDARD	SOIL DESCRIPTION		В	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE		PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOI MOISTURE CONTENT, RELATIVE DENSITY C CONSISTENCY, SOIL STRUCTURE, MINERALC	OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
2.2 - - - - - -	40.0	0.2	SS-9	50/2 (50/2")	Limestone Fragments 40.0-40.2' - light olive gray, (5Y 5/2), mild to mod HCl reaction, wafer-shaped limestone fragments 1/4" thick, fine to coarse sand-sized fragments	derate s to		- - - - -
45 -2.8 - - - -	45.0	0.2	SS-10	50/2.5 (50/2.5")	Limestone Fragments And Silty Sand (SM) 45.0-45.2' - light olive gray, (5Y 5/2), wet, very d low plasticity, moderate HCl reaction, fine to me sand-sized with 15-25% fines, 70% limestone fragments, 30% sand, all carbonate Begin Rock Coring at 45.0 ft bgs See the next sheet for the rock core log		**************************************	- - - - - - -
-50_ -7.8 - 						- - - - - -		- - - - - - - - -
- 55 <u>-</u> -12.8 - - - - - -						- - - - - - -		- - - - - - - - - - - - - - - - - - -
60						_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-30	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

		it bys	on 5/	<u>03/07 </u>	3/2UU <i>i</i>	' LOGGER : D. Roraback	
≥∩ ∵				DISCONTINUITIES	ပ္	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
## E	E F F F	(%) Q	FINE 1	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF 문항	H.N.G.	ο	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		œ	E E	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
-2.8 4	15.0		₁	45.0-45.5' - Fracture, 85 deg, rough, undulating		Limestone - 45.0-48.5' - moderate olive brown,	Begin rock coring at 45'
			_ '	undulating		(5Y 4/4), mild to moderate HCl	_
			. 40			reaction, extremely weak to very	
1			>10	46.6' - Fracture, horizontal, rough, undulating,	\vdash	weak (R0 to R1), very fine to medium grained voids to 1/16", 25-30%	I -
1	R1-NQ		_	open		casts/molds up to 3/8" over 5-10% of	<u> </u>
-	5 ft 70%	33	3	46.7-46.9' - Fracture zone, <5-90 deg, rough, undulating, open	\vdash	 surface, trace black (N1) carbonaceous inclusions 	-
-	7070	ŀ	2	47.1' - Fracture, horizontal, rough, undulating,	Ш		-
-		F	_	open 47.5' - Fracture, 15-25 deg, rough,		No Recovery 48.5-50.0'	-
-			NR	undulating, tight	\vdash	-	R1: 4 minutes
			1417	47.8-48.4' - Fracture, 85-90 deg, rough, undulating, tight		-	-
50 <u>5</u> -7.8	50.0			48.1' - Fracture, horizontal, rough, stepped,		Limestone	_
'			>10	tight	igwdap	- 50.0-51.4' - moderate olive brown,	-
-		-		48.4' - Fracture, 10 deg, rough, undulating, tight	Ш	(5Y 4/4), moderate HCl reaction, weak to medium strong (R2 to R3),	-
			3	50.0-50.2' - Fracture zone, angular		 very fine to fine grained, carbonate, 	-
				gravel-sized limestone fragments 50.55-50.8' - Fracture, 45 deg, rough,	\vdash	voids to 1/16" over 20-25%, cavities	_
	R2-NQ 5 ft	23	3	undulating, tight		to 3/8" over <5%, sparsely - fossiliferous	_
	90%			51.0-51.35' - Fracture, 80-85 deg, rough, undulating, open		51.4-54.5' - moderate olive brown,	_
			>10	51.7' - Fracture, horizontal, rough, undulating,		(5Y 4/4), fine to medium grained, moderate HCl reaction, extremely	_
			-10	open		weak to very weak (R0 to R1),	
			1	51.9-52.1' - Fracture, 70-75 deg, rough, undulating, open	Н	friable, becoming very weak (R1) at 54.0' and below, black	R2: 6 minutes
55 5	55.0		NR	52.3' - Fracture, 20 deg, rough, undulating,	\vdash	carbonaceous/organic	I -
-12.8				semi-tight — 52.6, 52.8, 53.1, 53.3,' - Fractures (4),		lenses/laminae (1/16") very abundant	_
1			4	horizontal, rough, undulating, semi-tight	╁	 at 53.5', voids (<1/16") over 20-25%, cavities (<3/8") over 5% of surface, 	-
-		ŀ		53.4-53.8' - Fracture zone, horizontal 54.0' - Fracture, 50 deg, rough, undulating,		poorly fossiliferous	-
-			3	open	ш	No Recovery 54.5-55.0' Limestone	-
-	R3-NQ	-		55.25' - Fracture, <5-70 deg, rough, stepped, open	Н	55.0-56.8' - moderate yellowish	-
-	5 ft	17	4	55.42' - Fracture, <5 deg, rough, stepped,		 brown, (10YR 5/4), mild HCl reaction, weak (R2), low density, thin black 	-
-	54%			open, black carbonaceous stain over 30% of surface	丗	carbonaceous laminae at 55.0-55.2'	-
, -			<u> </u>	55.54' - Fracture, 10 deg, smooth, planar to	\vdash	with discontinuous carbonaceous laminae below, voids (generally	-
			NR	stepped, open, black carbonaceous film over	Щ	<1/16") over 15-20% of surface,	R3: 9 minutes
				20% 55.68' - Fracture, <5 deg, rough, stepped,	Ш	some cavities (<1/16"), fossil mold/casts sparse	Hit pocket at 60'
60 <u>6</u> -17.8	60.0	_	\dashv	open, black carbonaceous film over 5%	\vdash	- 56.8-57.7' - yellowish gray, (5Y 7/2),	Losing sample core kicked —
''.5		}	1	56.0' - Fracture, <5 deg, rough, undulating, tight	H	dense, mild HCl reaction, medium strong (R3), voids (1/16" or less)	over sideways, no way of knowing orientation of core
, 4				56.52' - Fracture, horizontal, rough, planar,	凵	- unevenly distributed across 10-15%	Rock re-ordered rock into -
, 1				tight 56.82' - Fracture, 0-60 deg, rough, stepped,	dash	of rock surface, cavities rare, fossil	more logical sequence
				open	Щ	molds/casts sparse - No Recovery 57.7-60.0'	during field review
,]	R4-NQ 5 ft	0		57.25' - Fracture, <5 deg, smooth, undulating, open	Ш	Limestone	_
	9%	Ĭ	NR	57.35' - Fracture, <5 deg, smooth, planar,	\mathbb{H}	60.0-60.45' - yellowish gray, (5Y 7/2), - dense, mild to moderate HCl	_
				open, carbonaceous staining/film over 10%	岸	reaction, medium strong to strong	No recovery due to blocked core barrel
, 7				57.5-57.6' - Fracture zone, gravel-sized rock fragments, rounded to angular		(R3 to R4), black, thin, carbonaceous laminae common, voids/cavities <1%	COLE DALLE!
, 1				60.25' - Fracture, horizontal, smooth,		surface, fossil molds/casts sparse to	R4: 16 minutes
65 6	65.0			undulating, tight, black carbonaceous film covering 20% of rock surface	Ш	absent	
-33 10				22.2.mg 2070 0.1000 0011000		-	
1							•



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-30	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

CORING	INE I HOD AI	ND EC	JUIPIV	MENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 2.4	ft bgs	s on 5	/03/07 START : 5/2/2007 END : 5/	6/2007	7 LOGGER : D. Roraback	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
NO A	N, A, V	(9	FRACTURES PER FOOT	BECOM HOW	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AT AC	H H H	(%) O	E S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	S S	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	OR!	Ø	ER X	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	022	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś		, , , , , , , , , , , , , , , , , , ,
-22.8				65.1' - Fracture, horizontal, rough, undulating,	Ш	No Recovery 60.45-65.0'	
_			2	open	т	- Limestone	1
-				65.9, 66.1, 66.2' - Mechanical break (3)	⊟	65.0-68.8' - light olive gray, (5Y 5/2), very fine to fine grained, mild HCl	1
_			4	· · · · · · · · · · · · · · · · · · ·	ш	reaction, extremely weak (R0),	
				66.5' - Fracture, 5-10 deg, smooth,	Н	friable, nonplastic silt along fractures,	
	R5-NQ			undulating, tight 66.7' - Fracture, 10 deg, rough, undulating,		voids to 1/16" over 10%, casts/molds	
-	5 ft	13	3	tight	₩	up to 3/8" over <5% of surface	1
_	96%			67.1' - Fracture, horizontal, rough, undulating,	$+ \Box$	_	-
			3	open		_	
			٦	67.3' - Fracture, 45-50 deg, smooth, stepped,	Ш	00 0 00 01 11 14 11 (5)(5(0)	
-				open 67.6' - Fracture, 45 deg, rough, undulating to	TT	 68.8-69.8' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, 	R5: 10 minutes
-			1	stepped, open	\Box	very weak to weak (R1 to R2), voids	1 -
70	70.0		NR,	68.3' - Fracture, 0-5 deg, rough, undulating, —	╀┤	— to 1/16", molds/casts to 3/8", on	_
-27.8			2	open	Ш	5-10% of surface, occasional	
				68.4' - Fracture, 0-5 deg, rough, undulating,	Н	carbonaceous laminae on 1-3% of	
-				open 68.8' - Fracture, 0-5 deg, rough, undulating,	++	 surface No Recovery 69.8-70.0' 	1
-			0	tight	ш	Limestone	-
_				69.5' - Fracture, horizontal, rough, undulating,	\vdash	70.0-70.7' - moderate olive brown,	
	R6-NQ		_	open	H	(5Y 4/4), fine to medium grained,	
	5 ft 94%	53	3	70.7' - Fracture, 0-5 deg, rough, undulating,	Ш	moderate to strong HCl reaction,	1
_	3470			open 70.75' - Fracture, horizontal, rough,	╁┼	medium strong (R3), voids to 1/16"on 35-40% of surface, casts/molds to	1
_			>10	undulating, open		33-40 % of surface, casts/fiolds to 3/8" over 5%, fossiliferous	
				72.2' - Fracture, 10 deg, rough, stepped,	Щ	_ (molds/casts)	
			2	open	Н	70.7-73.6' - light olive gray, (5Y 5/2),	R6: 10 minutes
75	75.0			72.6-72.8' - Fracture, 60-65 deg, rough,		moderate to strong HCl reaction,	1
75 <u> </u>	75.0		NR	undulating, open 72.8-73.6' - Fracture, 85-90 deg, rough,	╁┷	medium strong (R3), voids to 1/16" over 3-5% of surface, sparsely	
			3	undulating, tight	₽П	distributed throughout interval and	_
				73.6-73.9' - Fracture zone, 0-90 deg, rough,		concentrated in possible cavity	SC-1 collected at 75.8-
				stepped to undulating, open	\vdash	infillings, fossils rare to absent,	76.7'
-			0	74.2, 74.3' - Fractures (2), horizontal,		casts/molds to 3" on 10% of surface,	1
_	D7 NO			smooth, planar, open 75.1' - Fracture, 0-10 deg, rough, stepped,	╁┼	silty sand along fractures 73.6-74.3' - Same as 70.7-73.6'	-
_	R7-NQ 5 ft	48	>10		Н	- except yellowish gray, (5Y 7/2),	
	94%	.5		75.2-75.3, 75.4-75.5' - Fractures (4), 30 deg,		extremely weak (R0), becoming	
1 7				rough, undulating, tight	\mathbb{H}	coarser grained, with very soft clay	1
1 -			0	77.2' - Fracture, 0-5 deg, smooth, stepped,	11	along fractures, friable, sandy texture	1 1
-				open 77.4' - Fracture, 0-15 deg, smooth, stepped,	Ш	74.3-74.7' - Same as 70.7-73.6 except yellowish gray, (5Y 7/2)	R7: 9 minutes
			3	open -	H	- No Recovery 74.7-75.0'	IV. 3 Hilliutes
80	80.0		NR	77.5-78.0' - Fracture zone, 0-70 deg, rough,	口	Limestone	
-37.8				stepped to undulating, open, gravel sized	Ш	75.0-77.2' - yellowish gray, (5Y 7/2),	
-			>10		+	- very fine to fine grained, strong HCI	1 +
-				78.6-78.7' - Mechanical break 79.0-79.3' - Fracture, 50-60 deg, rough,		reaction, very weak to weak (R1 to R2), voids to 1/4" over 3-5%, cavities	-
			1	undulating, tight	Ш	to 3/8" over <1% of surface, poorly	
			'	79.45' - Fracture, horizontal, rough,	Н	fossiliferous]
1 7	R8-NQ			undulating, tight	\Box	77.2-77.7' - yellowish gray, (5Y 7/2),	1
-	5 ft	30	3	79.6' - Fracture, 50 deg, rough, stepped,	₽	mild to moderate HCl reaction,	-
-	58%			open 80.0-80.2' - Fracture zone, gravel-sized	\Box	extremely weak (R0), nonfossiliferous, very thin	1
				limestone rock fragments	П	discontinuous black carbonaceous	
1 7				80.35-80.5' - Fracture, 70-80 deg, rough,	$\vdash\vdash$	laminae, rounded to subrounded	1
1 -			NR	undulating, open	\Box	clast-like inclusions (3/8"-3/4") of	R8: 7 minutes
-				80.5-80.7 - Fracture zone, rough, planar to	H	moderate olive brown (5Y 4/4),	-
85	85.0			stepped, horizontal to high angle, open	\vdash	extremely weak (R0) limestone	
						·	

APPENDIX 2BB-666



PROJECT NUMBER:

33884.FL

B-30 SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, NO tools, HW casing

CORING	METHOD A	ND E	QUIPN	MENT: CME 55 S/N 299205, mud rotary, NQ tools, HW ca	asing		ORIENTATION : Vertical
WATER	LEVELS : 2.4	l ft bg	s on 5	/03/07 START : 5/2/2007 END : 5/6	5/2007	7 LOGGER : D. Roraback	
	•			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-42.8 - - - - -	R9-NQ 5 ft 88%	37	2 >10 1	81.3-81.6' - Fracture, 30-80 deg, rough, undulating, orientation angle increasing with depth 82.0' - Fracture, horizontal, rough, undulating, tight 82.35-82.5' - Fracture, 20-30 deg, rough, undulating, tight 82.8' - Fracture, 0-5 deg, rough, undulating, open 85.1' - Fracture, 0-10 deg, rough, undulating,		Limestone 77.7-79.7' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, medium strong (R3), voids to 1/16" on 20-25%, cavities to 3/4" on 1-2%, occasional hair-line incipient fracture traces No Recovery 79.7-80.0' Limestone 80.0-82.9' - light olive gray, (5Y 5/2),	Driller's Remark: (87.0- 90.0') open hole in rock, rods dropped one more foot when released 87-88' void 88-89.5' solid 89-5-91' void
90_	90.0		NR	open 85.35-85.4' - Fracture, 5-10 deg, rough, undulating, open 86.1' - Fracture, horizontal, rough, undulating, - tight 86.5 87.2' Fracture zone		 fine grained, mild HCl reaction, medium strong (R3), voids to 1/16" on 20-25%, cavities 1-3/16"-3/4"except at 80.9-81.0', larger cavities 1-3/16x1-3/16x3/8" on 	Driller's Remark: Lost circulation at 87.0' R9: 9 minutes
-47.8 - - - - - - -	R10-NC 5 ft 0%	0	NR	86.5-87.2' - Fracture zone 87.5' - Fracture, 5 deg, rough, undulating, open		>5%, trace fossil molds/casts No Recovery 82.9-85.0' Limestone 85.0-86.6' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids to 1/16" on 15-18%, cavities to 3/4" on <5%, fossiliferous (molds and casts) 86.6-88.1' - pale olive brown, (5Y 5/6), fine grained, weak to medium strong (R2 to R3), void spaces over 25% of surface, solution cavities over 15-20%, trace organics, iron oxide patina on some cavities, fossiliferous	Driller's Remark: 91.0-95.0' open, minimal resistance as sporadic stringers of rock, or small breccia clasts, yield rig chatter
95 -52.8 - - - - - - - - - - - - - - - - - - -	95.0 R11-NG 5 ft 0%	0	NR	- - - - - - -		(molds/casts) No Recovery 88.1-103.0'	Driller's Remark: 95.0- 103.0', rods were apparently sitting on a small piece of rock; when connection was made the rods free fell to 103.0' with no recovery R11: Run time not recorded
- - - - - -	R12-NC 5 ft 14%	0	NR 0 NR	- - - - - - -		- - - - - - -	Actual recovery was from 103.0-103.7'
105	105.0				H		



PROJECT NUMBER:

338884.FL

B-30

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

COMING	NETHOD A	ND EC	JUIPIV	IENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 2.4	ft bgs	on 5	03/07 START : 5/2/2007 END : 5/6	3/2007	LOGGER : D. Roraback	
>00	(9)			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
불병은	RUH VER	(%) O	TUR TOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,]]	MINERALOGY, TEXTURE, WEATHERING, HARDNESS.	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
FYF AV	NG.	οD	ACT R F	PLANARITY, INFILLING MATERIAL AND	MB(AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	SHR	æ	FR	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λS	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-62.8			_	105.1' - Fracture, horizontal, rough,		Limestone	
_			0	undulating, open		 103.0-103.7' - yellowish gray, (5Y 7/2)), strong HCl reaction, extremely 	1
-				105.25' - Fracture, 0-5 deg, rough, undulating, open	╁┼	weak to very weak (R0 to R1),	SC-2 collected at 105.9-
-			0	105.5' - Fracture, horizontal, rough,		- medium grained, sandy texture, voids	107.2'
-	R13-NQ			undulating, open 105.6-105.8' - Fracture zone	\blacksquare	(<1/16") over 1-2% of surface, fossils absent	1
- 1	5 ft	27	5	105.6-105.6 - Fracture 2016 107.05' - Fracture, 5 deg, rough, undulating,	ш	- No Recovery 103.7-105.0'	-
_	64%		1	tight _	\vdash	Limestone	1
-			_1_	107.4' - Fracture, 40 deg, rough, undulating, open		105.0-105.6' - Same as 103.0-103.7' - 105.6-108.2' - light olive gray to pale	
_				107.5' - Fracture, 0-5 deg, rough, undulating,	\vdash	yellowish brown, (5Y 5/2 to 10YR	
			NR	open		6/2), mild to moderate HCl reaction, weak (R2), voids (<1/16") over 5% of	R13: 12 minutes
110	110.0			107.7' - Fracture, 0-2 deg, rough, undulating, open		surface, cavities (3/8" to 3/16") <1%,	1
-67.8				108.0' - Fracture, 0-2 deg, rough, undulating,	\Box	trace fossil molds/casts	Water level 1.9' below
-				open -		No Recovery 108.2-120.0'	ground surface 5/5/07
-				-	╁	_	1
-				-	\Box	-	1
-	R14-NQ			-	\Box	-	
-	5 ft	0	NR	-	+	_	1 -
-	0%			-		_	-
_				-	╟╫	_	_
l _				_	Ш	_	
l _				_		_	R14: 4 minutes
115	115.0			_	Н		
-72.8							No recovery, pulled cutter
				_		-	casing and found core - fragment which may have
-				-	Ш	_	been blocking inner core
-				-	ш	=	barrel; problem may be - due to inner barrel not
-	R15-NQ			-	\vdash	_	locking properly
-	5 ft	0	NR	-		_	Solution: Lift outer barrel
-	0%			-	Ш	-	off bottom of hole before locking in inner barrel
-				-	Ш	_	-
-				-	Ш	_	R15: 5 minutes
-				-		_	10.5 minutes
~	120.0			_	H	Limantona	_
-//.8			>10	120.2' - Fracture, 0-80 deg, smooth, stepped,		Limestone - 120.0-120.5' - light olive gray, (5Y]
I -				open 120.3' - Fracture, horizontal, rough, stepped,	Н	_ 5/2), very fine to fine grained, `]
I _				open	Ш	moderate HCl reaction, medium - strong to strong (R3 to R4), voids to]
				120.3-120.5' - Fracture zone, angular to		1/16" over <5% of surface, casts to	
1	R16-NQ			subrounded gravel-sized rock fragments 120.5-120.75' - Fracture zone, 80 deg, rough,	\vdash	3/16" over <5%, fossils absent	1
-	5 ft 20%	0		undulating, tight, fracture plane bounded on	H	 120.5-121.0' - yellowish gray, (5Y 7/2), medium grained, strong HCl 	1
1 -			NR	either end by horizontal, stepped to - undulating, rough, open bedding planes	Н	reaction, extremely weak to very	1
1 -				120.75-121.0' - Fracture zone, subrounded	Ш	 weak (R0 to R1), sandy texture, very similar to 103.0-103.7' 	1
-				gravel-sized rock fragments	Ш	No Recovery 121.0-125.0'	R16: 4 minutes
-	405.0			-	\vdash	-	-
125	125.0			-	H	-	-
	l						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-30	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.4	ft bgs	s on 5/	03/07 START : 5/2/2007 END : 5/	6/200 ⁻	7 LOGGER : D. Roraback	
≥∩ ∵	. (9			DISCONTINUITIES	ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A BE	돌투	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
PT.	R S S S S S S S S S S S S S S S S S S S	ο	AC.	PLANARITY, INFILLING MATERIAL AND	WB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SE	825	ď	F F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ŝ	CHARACTERISTICS	
-82.8			2	125.25' - Fracture, 0-5 deg, rough, stepped,	Ш	Limestone - 125.0-126.7' - dusky yellow to	Water level 2' below ground surface on 5/6/07 -
				tight	Ш	yellowish gray, (5Y 6/4 to 5Y 7/2),	ground surface on 5/6/07
-				125.6' - Fracture, 0-5 deg, rough, undulating,	Н	fine to very fine grained, strong HCl	1
-			3	open 126.3' - Fracture, horizontal, rough,	П	 reaction, extremely weak to weak (R0 to R2), fossiliferous 	1
-	R17-NQ			undulating, open		126.7-127.9' - yellowish gray, (5Y	-
-	5 ft	42	3	126.4, 126.5' - Fractures (2), horizontal, smooth, planar, open	₩	 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 	-
_	58%			127.2' - Fracture, 5-10 deg, rough,	口	to R2), voids (1/16") over 1-2% of	-
_				undulating, tight 127.7' - Fracture, 0-5 deg, rough, stepped,	+	 surface, cavities sparse from 	-
-			NR	semi tight	H	126.7-127.5', becoming more common with depth	R17: 6 minutes
_				127.75-127.9' - Fracture, 45-50 deg, rough,	世	- No Recovery 127.9-130.0'	K17. O Millidites
130_	130.0			undulating, semi tight —	\mathbb{H}		_
-87.8			4	130.1' - Fracture, 10-15 deg, rough,	Щ	Limestone - 130.0-131.2' - yellowish gray, (5Y	
				undulating, open 130.2' - Fracture, 5-10 deg, rough,	Ш	7/2), very fine to fine grained, strong	
			3	undulating, open	H	HCl reaction, extremely weak to very - weak (R0 to R1), voids (1/16") over	
			3	130.4-130.5' - Fracture, 30-35 deg, rough, undulating, open	ш	5-10% of surface, cavities to 3/8"	
	R18-NQ			130.8' - Fracture, 0-5 deg, rough, undulating,	Н	<5%, fossiliferous (predominantly	1
_	5 ft 84%	45	4	open	ш	 micro-fossils), very irregular, undulatory surface 	SC-3 collected at 132.7-
_	0.70			131.2' - Fracture, 5-10 deg, rough, undulating, open	Ш	131.2-131.85' - vellowish gray. (5Y	133.5'
-			3	131.5' - Fracture, 0-5 deg, smooth,	\Box	 7/2), very fine to fine grained, strong HCl reaction, extremely weak to very 	-
-				undulating, semi tight 131.9' - Fracture, horizontal, smooth, stepped	世	weak (R0 to R1), voids <1%, cavities	R18: 5 minutes
_			NR	132.1' - Fracture, horizontal, rough, planar,	₽	(<1/8") over 1% surface, rock surface	-
135 <u> </u>	135.0			open	口	generally uniform (slightly undulatory), fossils absent, "silty	_
- 02.0			3	132.2-132.3' - Fracture zone, 0-50 deg, smooth to rough, planar to stepped, open	Ш	_ textured"	-
-				132.3' - Fracture, 0-5 deg, rough, undulating,	╆┼	131.85-132.2' - light olive gray, (5Y 5/2), dense, fine grained, moderate	-
_			3	open 132.7' - Mechanical break		to strong HCl reaction, medium	_
			_	133.5' - Fracture, 10 deg, rough, undulating,	╨	strong (R3), voids (<1/16") over	_
	R19-NQ 5 ft	22	3	tight 133.6-133.75' - Fracture zone, 0-50 deg,	Ш	1-2% surface, cavities (3/8"x1/32") rare, fossils trace to absent	
	76%		٥	smooth to rough, planar to stepped	Ш	132.2-134.2' - moderate yellowish]
]			5	133.75' - Fracture, 0-5 deg, rough,	\mathbb{H}	brown, (10YR 5/4), dense, moderate to strong HCl reaction, weak (R2),	1
1				undulating, open 135.1' - Fracture, 0-60 deg, rough, stepped,		voids (1/16-1/8") over 5-10% of	1
			NID	open	Ш	surface, cavities up to 3/8" over 2-3% of surface, fossils rare to absent,	R19: 16 minutes
140	140.0		NR	135.4' - Fracture, 10 deg, smooth, stepped, open	Щ	trace very dark or black	
-97.8	1-10.0			135.9' - Fracture, 5 deg, smooth, stepped,	口	carbonaceous laminae seen at	-
-			4	tight	HH	133.0-134.2' No Recovery 134.2-135.0'	-
-				136.3-136.7' - Fracture, 70-75 deg, rough, undulating, tight	Ħ		-
-			4	136.4' - Fracture, 5-10 deg, rough,	世	-	-
-	D00 N0			undulating, tight 136.8' - Fracture, horizontal, rough,	${\mathbb H}$	-	-
	R20-NQ 5 ft	20	>10	undulating, open	Ш	-	
	58%			137.0' - Fracture, horizontal, rough, stepped to undulating to planar, open	Н	_	
				137.2' - Fracture, 20 deg, rough, stepped,	厈		
			NR	tight	Ш		
				137.4-137.55' - Fracture, 60 deg, rough, undulating, open	\mathbb{H}		R20: 11 minutes
145	145.0				Ш		1
							-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-30	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

CORING	I WE I HOD A	ND EC	ZUIFIV	MENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asing	_		ORIENTATION : Vertical
WATER	LEVELS : 2.4	ft bg	s on 5	/03/07 START : 5/2/2007 END : 5/	6/200)7	LOGGER : D. Roraback	
				DISCONTINUITIES		Т	LITHOLOGY	COMMENTS
중무€	(%) (%)		<i>(</i> 0	<u> </u>	- 8	H		·· - ····-
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ı	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
AGE	J. H.	(%) Q	150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9	ı	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
	NG CO	ØΒ	AC R F	PLANARITY, INFILLING MATERIAL AND	MB	ı	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
무오리	SHR	Ä	띪	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	ı	CHARACTERISTICS	BROI 3, TEST RESOLTS, ETC.
-102.8				137.7' - Fracture, horizontal, rough,	ш	T	Limestone	SC-4 collected at 146.7-
-			2	undulating, open	╁	₽	135.0-138.2' - variegated dusky	147.3'
l -				138.0' - Fracture, horizontal, smooth,	╨	╁	yellow to grayish yellow to light gray	_
				undulating, open		1	to medium gray, (5Y 6/4 to 5Y 8/4 to	
			0	138.2' - Fracture, horizontal, smooth, undulating, tight	Ъ.	┲	N7 to N5), very fine grained, strong HCl reaction, medium strong to	1
-	R21-NQ			138.3' - Fracture, 5 deg, smooth, undulating,	+	t	strong (R3 to R4), voids (<1/16")	-
l -	5 ft	57	4	tight	ш	1	over 5% of rock surface, cavities up	-
_	92%			138.75' - Fracture, horizontal, smooth, planar,	\bot	Ł	to 3-1/8" in length near bottom of	_
				tight		1	section, some lined with black	
_			3	138.8' - Fracture, horizontal, smooth, planar, tight		T	amorphous coating (possibly hematite), large (5") cavity at	1
-			_	140.1' - Fracture, 5-10 deg, smooth, planar,	╁	╀	135.5-135.8', poorly fossiliferous	R21: 11 minutes
-			2	tight	£'	╁	(mold and casts)	1\21. 11 IIIIIIules
150	150.0		NR	140.3-140.5' - Fracture, 45-50 deg, smooth,		1	Limestone	
-107.8				planar, tight		Τ	138.2-138.8' - yellowish gray to	Bottom of boring at 150.0'
-				140.55, 140.65' - Fractures (2), horizontal,	1	H	dusky yellow to olive gray, (5Y 7/2 to	below ground surface -
-				rough, planar, open 141.2' - Fracture, 5-10 deg, rough,	-	F	5Y 6/4 to 5Y 3/2), fine grained, strong HCl reaction, weak to medium strong	-
I -				undulating, tight	1	L	(R2 to R3), laminated, voids rare to	
				141.3' - Fracture, 0-5 deg, rough, stepped,			absent, rare cavities (<1/16-1/8"	
-				open	1	r	diameter)	
-				141.8' - Fracture, horizontal, rough,	-	F	No Recovery 138.8-140.0'	-
_				undulating, open 141.9-142.2' - Fracture zone, angular to	4	L	Limestone 140.0-141.9' - yellowish gray to	_
				subangular rock fragments		ı	dusky yellow, (5Y 7/2 to 5Y 6/4), very	
				142.4, 142.6' - Fractures (2), horizontal,		Γ	fine to fine grained, strong HCI	
-				rough, undulating, open	1	H	reaction, very weak to medium	-
-				142.7' - Fracture, horizontal, rough,	-	F	strong (R1 to R3), voids to 1/16' over	-
l _				undulating, tight 145.1' - Fracture, horizontal, rough,	1	L	<1% of rock surface, cavities (3/8"x1/8"x3/16") rare	
				undulating, open		ı	141.9-142.9' - moderate olive brown,	
_				145.9-146.1' - Fracture, 60 deg, rough,		r	(5Y 4/4), fine grained, moderate HCI	1
-				undulating, tight	1	ŀ	reaction, weak to very weak (R2 to	-
_				147.3' - Fracture, horizontal, rough,	-	F	R1), voids to 1/16" over 35-40%,	_
				undulating, semi tight 147.7' - Fracture, 0-5 deg, rough, undulating,		L	cavities to 3/4" over <5%, some fossils (molds/casts)	
				tight		Г	No Recovery 142.9-145.0'	
_				147.8' - Fracture, horizontal, rough,		r	Limestone	
-				undulating, open	1	H	145.0-145.1' - moderate yellowish	-
-				147.9-147.8' - Fracture zone, horizontal,	4	L	brown, (10YR 5/4), fine grained,]
				rough, undulating 148.1' - Fracture, horizontal, rough, stepped,	_	l	strong HCl reaction, extremely weak (R0), friable	
I -				open		Γ	145.1-147.9' - Same as 140.0-141.9']
-				148.2, 148.9, 149.27, 149.3' - Fractures (4),	1	H	147.9-149.2' - variegated very light	-
-				horizontal, rough, undulating, open —	-	H	gray to yellowish gray, (N8 to 5Y 7/2),	_
I -				149.4' - Fracture, horizontal, smooth, planar,		L	strong HCl reaction, extremely weak	
				open			to very weak (R0 to R1), very thinly laminated with possibly	
_					1	r	carbonaceous or clayey material	1
-					1	H	from 147.9-148.35', voids (<1/16")	-
-					-	F	over 2-3% rock, cavities rare to	
l _					1	L	absent, trace fossil echinoderms	
					1	ľ	149.2-149.6' - dusky yellow, (5Y 6/4), mild HCl reaction, medium strong]
I -					1	r	(R3), voids (<1/16") over 1-2%,	-
-					-	F	cavities (1/16-1/8") rare, fossils rare	-
_					1	L	to absent	_
					1	ı	No Recovery 149.6-150.0'	
-					1	Γ	Bottom of Boring at 150.0 ft bgs on	1
-					+	t	5/6/2007	
1					1	1		
			l			L		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-30A	SHEET	1	OF	6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 5-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 6.0 ft b	gs on 6/12	2/07 S	TART : 6/12/2007	END : 6/13/2007	LOGGEF	R : D.	Thomas
				STANDARD		SOIL DESCRIPTION			COMMENTS
0 Q (±)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				ΙO	
		RECOVE	ERY (ft)	TEOT REGOETO	SOIL NAMI	E, USCS GROUP SYMBC CONTENT, RELATIVE D	L, COLOR,)LIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, N	MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
				(N)	0 001			S	
42.5					See B-30 for st 25.0'	hallow soils; no logging/o	coring until		0.0-10.0': Drilled with 5-7/8" tricone bit with no sampling or coring (EZ Mud)
_							-	1	-
_							-		_
_							-	1	_
_							-		_
_							-		_
_							-		_
_							-		_
_							-		_
5 37.5									_
37.5							-		-
-							-		
_							-		Driller's Remark. Encountered water at 6.0
_							-	-	-
_							-		-
-							-	-	-
-							-		-
-							-	$\mid \cdot \mid$	-
-							-	$\mid \cdot \mid$	-
10 <u> </u>							_	$\left\{ \ \ \right\}$	Driller's Remark: Hole has deviated at 10.0'
-							-	$\mid \cdot \mid$	-
-							-	$\left\{ \ \ \right\}$	10.0-25.0': 5" (PW) surface casing installed
-							-	$\ \cdot\ $	10.0-25.0': 5" (PW) surface casing installed with rock devil bit and cleaned out with 3-7/8"
-							-	$\ \cdot\ $	tricone bit 10.0-15.0': 30 minutes to drill
-							-	\mathbf{I}	-
-							-	1	-
-							-	1	-
-							-	1	-
- 45							-	┨	-
15 <u> </u>							_	1	 15.0-20.0': 14 minutes to drill
-							-	1	-
-							-	1	-
-							-	1	
-							-	1	
-							-	1	
-							-	1	
-							-	1	-
-							-	1	
20							-	1	
									-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-30A	SHEET	2	OF	6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 5-7/8" tri-cone bit

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

WATER	LEVELS	: 6.0 ft bo	gs on 6/12	2/07 5	START : 6/12/2007 END : 6/13/2007 LO	GGER	: D.	Thomas
\				STANDARD	SOIL DESCRIPTION		Ö	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIOOS COOLID OVATOR COLOR		SYMBOLIC LOG	DEDTILOF CACINO DOULING DATE
A S E A T I O		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		SOLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT URF.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	'	YME	INSTRUMENTATION
<u>о</u> о ш				(N)			0)	20.0-25.0': 4 minutes to drill
-						-		-
-						-		-
-						-		-
-						-		-
-						-		-
-						_		-
-						-		-
_								_
25_	25.0							
17.5				0.40.00	Sandy Silt (ML) 25.0-26.2' - grayish orange, (10YR 7/4), moist, hard			
_		1.2	SS-1	9-19-22 (41)	very fine to coarse grained, nonplastic, rapid			_
-	26.5				dilatancy, mild to moderate HCl reaction, 35% very fine to coarse sand-sized, 10% fine gravel-sized, all			_
-					carbonate	_/		_
-						_		-
-						_		-
-						_		-
-						-		-
-						-		-
30 <u> </u>	30.0				Sandy Silt (ML)		Ш	_
-		1.0	SS-2	22-16-27	30.0-31.0' - Same as 25.0-26.2'	-		-
-	31.5			(43)		_	ш	-
-	01.0					-		_
-						-		Driller's Remark: Firm drilling, no chatter
								Driller's Remark: Easier drilling, no chatter
_								Driller's Remark: Trip out to begin HQ rock
-					Begin Rock Coring at 34.0 ft bgs See the next sheet for the rock core log			coring
35 7.5								_
7.5						_		-
-						_		-
-						_		-
-						-		-
-						-		-
-						-		-
-						-		-
-						-		-
40						-		-
—								-



PROJECT NUMBER: BORING NUMBER:

338884.FL B-30A

ROCK CORE LOG

SHEET 3 OF 6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, PW casing ORIENTATION : Vertical

				VIENT : CIVIE 73 S/N 232437, Mud Totally, Fig tools, FW C			ORIENTATION: Vertical
WATER	LEVELS: 6.0	ft bg	s on 6	6/12/07 START : 6/12/2007 END : 6/1	13/200	D7 LOGGER : D. Thomas	
>				DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BH	ER'A	(%	FRACTURES PER FOOT		S	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
HAY.	99.5	(%) _Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
P.S.E.	N N N N	Ø	RA ER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Z	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
поп		ď	ш.	· ·	S		
	34.0		1	34.05' - Fracture, <5 deg, rough, undulating,	Н	Limestone	Rock coring begins at 34'
35				tight	т	 34.0-37.5' - moderate yellowish brown, with lineations of gray to dark 	1
7.5			0	34.1-34.3' - Fracture, sandy silt	\Box	yellowish brown, (10YR 5/4, 10YR	_
	R1-HQ				Н	- 4/2), fine grained, mild HCl reaction,	_
	3.5 ft	90	0			weak (R2), 1/16-1/8" pebbles in	_
	100%		"			matrix where gray, 20% 1/16" voids,	
-				36.5' - Fracture, 0-20 deg, rough, undulating	ш	- crumbles to silt to sand-sized	R1: 13 minutes
-			1	-	П	particles from 34.1-34.3', cavities up to 3/4" from 35.9-37.5'	-
_	37.5			_	\perp	_	_
			_		$\vdash\vdash$	37.5-40.8' - Same as 34.0-37.5'	
]			0	·	ш	- except dark yellowish brown, (10YR	
-				38.5-39.3' - Fracture zone, bounded by	\Box	4/2), 30% voids up to 1/16" and 2" x 1" cavities at 37.7', extremely weak	-
-			2	horizontal to 20 deg rough and undulating	₽	- (R0) at 38.5-39.3', voids up to 3/16"	1
			Ĺ	surfaces	Ш	from 40.3-40.8'	
40	R2-HQ			39.4' - Fracture, rough, undulating, tight	Ы	_	1
2.5	5 ft	57	2		₽		-
	66%		0	40.2' - Fracture, 30 deg, rough, undulating	ш	_	-
			┡	_	Н	- No Recovery 40.8-42.5'	_
					Н	140 14000 toly 40.0-42.0	
_			NR	-	Ш	-	R2: 2 minutes
-				-	Н	-	-
_	42.5			_	₽		_
			_			Limestone	
			0	<u> </u>	Н	 42.5-46.5' - dusky yellow, (5YR 6/4), fine grained, mild HCl reaction, very 	1
-				-	+	weak (R1), 10% gray pebbles up to	-
_			0	-	ш	- 1/4", 30% voids 1/16" with voids up	-
					Ы	to 3/16", many large voids are linear	_
45	R3-HQ						
-2.5	5 ft 80%	65	0	45.0' - Mechanical break	ш	_	_
-	00%			-	Н	-	-
_			2	45.8' - Fracture, 50 deg, rough, undulating,		<u>-</u>	_
			Ĺ	tight to healed	Щ		
1 7				46.1' - Fracture, 50 deg, rough, undulating,	Н	No Recovery 46.5-47.5'	R3: 7 minutes
-			NR	tight to healed -		-	-
-	47.5			-	₽₽	Limestone	-
_			1	47.8' - Fracture, 75 deg, rough, undulating,	H	Limestone 47.5-51.7' - dusky yellow to moderate	
			Ι'	stepped		yellowish brown, (5YR 6/4 to 10YR	
-				48.5, 48.8' - Fractures (2), horizontal,	Ш	5/4), fine grained, moderate HCl	1
-			3	smooth, undulating, open	Ы	- reaction, strong (R4), very weak (R1)	-
-						from 48.5-48.3', 15-25% 1/16" voids	-
50	R4-HQ 5 ft	75	0	49.45' - Fracture, horizontal, smooth, undulating, open —	Н	decreasing to 5-10% below 49.5'	
-7.5	84%	10	١		Ш		
-	5.,3			50.6' - Mechanical break, 10 deg, rough,	\square	-	SC-1 collected at 50.6-
_			1	undulating, tight	++	_	50-1 collected at 50.6- 51.7'
			Ι΄.		ш	_	_
				1	\mathbb{H}	No Recovery 51.7-52.5'	R4: 8 minutes
]	52.5		NR	·	++		1
-	52.5		-	·	ш	Limestone	-
_			3		\vdash	- 52.5-53.0' - Same as 47.5-51.7'	1
				53.0-54.4' - Fracture or bedding plane, horizontal, rough, undulating, multiple	Н	except with 1/16" voids increasing to	
				fractures		25%]
					1		

APPENDIX 2BB-673 Rev. 4



PROJECT NUMBER: BORING NUMBER: 338884.FL

B-30A

SHEET 4 OF 6

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, PW casing

WATER	LEVELS : 6.0	ft bg	s on 6/	12/07 START : 6/12/2007 END : 6/	13/200	7 LOGGER : D. Thomas	
≥∩≘	. (°			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
불병은	5 F.R	(%) _Q	JUR DO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,] 	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
투유장	#R R S S S	OΘ	ACI R F	PLANARITY, INFILLING MATERIAL AND	MB(AND ROCK MASS	SMOOTHNESS, CAVING ROD
SE	잉필분	S.	FIR	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			6		Ш	Limestone	
	R5-HQ				Н	- 53.0-54.1' - dusky yellow to moderate	1 1
55 <u> </u>	5 ft	50	0			yellowish brown, (5YR 6/4 to 10YR 5/4), extremely weak (R0), increasing	Driller's Remark: Softer —
12.0	80%				₽₩	- to very weak (R1) with depth,	drilling at 52.5-57.5'
			1	55.65' - Mechanical break, 10 deg, smooth,	Ш	horizontal laminations/bedding	compared to previous
				planar	Н	planes 1/16" thick, often fractured along organic rich zones, some	
				56.4' - Mechanical break, 60 deg		infilled with silts and clays	R5: 3 minutes
-			NR		ш	54.1-56.5' - Same as 52.5-53.0'	1 1
+	57.5			EZ C EZ OL Frantissa az haddina nlana	\Box	- except with increasing voids to	-
-			2	57.6-57.9' - Fracture or bedding plane, horizontal, multiple fractures/bedding planes,	+	30-40% with depth No Recovery 56.5-57.5'	l -
				infill of clay along one fracture	世	Limestone -	
			3	58.5' - Fracture, 40 deg, rough, undulating,	Щ	57.5-60.3' - Same as 52.5-53.0']
				low angle, fracture through undulating wavy zone (3/4") of dark black organics (lignite)		except strong HCl reaction, few organic laminations (minor)	1
60	R6-HQ			organics clayey and "forky" on fracture	П	throughout, extremely weak to very] 1
-17.5	5 ft	47	5	surface —	╁┼	weak (R0 to R1) and easily broken at	l
-	92%			59.3-60.1' - Bedding plane, multiple fractures	ш	_ 59.1-60.2,	1 -
_			2	60.1' - sharp discontinuity between silty limestone material with organic and medium	Н	60.3-61.0' - light olive gray, (5YR 5/2), very fine grained, strong HCl	Drillaria Damariki Lasa af
				dark gray dense limestone	П	reaction, strong (R4), 1-2" angular	Driller's Remark: Loss of water at 61.0'
			1	60.4-60.9' - Fracture, limestone fragments	Н	fragments, 5% voids (1/16")	R6: 13 minutes
	62.5		NR	60.9' - Fracture or mechanical break, 75 deg, rough, undulating, semi-planar	Ш	61.0-62.1' - yellowish gray, (5Y 7/2), very fine grained, strong HCl	1
1 1	02.0			61.0' - Fracture, 60 deg, rough, undulating	Н	reaction, strong (R4), 5% voids	1 1
-			1	63.0' - Mechanical break, vertical, rough, non	口	(1/16") increasing with depth to 25%	1 1
-				planar	Н	with depth, several 1/4" voids	1
_			2	63.6' - Fracture, 35 deg, rough, undulating,	Ш	No Recovery 62.1-62.5' Limestone	SC-2 collected at 63.6- 64.9'
				semi-planar 63.7' - Mechanical break, horizontal, rough,	Н	62.5-67.5' - yellowish gray, (5Y 7/2),	04.5
65	R7-HQ	40	0	undulating		moderate to strong HCl reaction,	
-22.5	5 ft 100%	43	"	_	Н	medium strong (R3), shallow 1/16" voids over 5%, some irregular black	
					ш	laminations, dark yellowish brown	1 1
_			0	65.8' - Fracture, horizontal, carbonate silt,	+	- (10YR 4/2) and extremely weak (R0)	1 -
-			\vdash	friable	凵	at 65.8-65.9', extremely weak (R0) to weak (R1) from 65.9-67.5',	R7: 4 minutes
			1	66.8' - Fracture, 50 deg, rough, undulating,	╂┴┨	- increasingly competent with depth	107. 4 IIIIIIules
	67.5			semi-planar fracture	Ш	-]
				67.5-67.7' - Fracture zone, horizontal, rough,	H	67.5-71.5' - dark yellowish brown,	
7			2	undulating	Ш	 (10YR 4/2), fine grained, moderate HCl reaction, extremely weak to very 	1
				68.3' - Fracture, horizontal	14	weak (R0 to R1), friable, increasing	1
			3	68.8, 68.95, 69.3, 70.0' - Bedding plane, horizontal, organics	Ш	- % of 1/16" voids (up to 40%) at	-
-	R8-HQ		\vdash		\square	68.7-71.7', fine organic laminations at 69.4' and 70.3'	-
70	5 ft	70	1	69.9' - Fracture, 10 deg, rough, undulating,		——————————————————————————————————————	-
-27.5	100%			open	Щ	_]
				·]
			1	70.9' - Fracture, friable, open	П	74 F 70 FL Comp 07 F 74 FL] 1
				71.5-71.7' - Fracture zone, friable	ᡛ╣	 71.5-72.5' - Same as 67.5-71.5' except light olive gray, (5Y 5/2), 	R8: 10 minutes
-			2		Ш	moderate HCl reaction, weak (R2),	-
	72.5				++	small 1/16" voids decrease to 5%,	-
			1	72.9' - Fracture, 30 deg, rough, undulating,	口	also several 1/2" voids to cavities	_
			L <u>.</u>	includes several 1/2 to 1" elongated cavities	Щ	_	
					Ш		1
					1 1		
							-



PROJECT NUMBER: BORING NUMBER:

338884.FL B-30A

SHEET 5 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, PW casing ORIENTATION : Vertical

				IENT : CIVIE 75 3/N 252457, ITINU TOTALY, FIQ 1001S, FW C			ORIENTATION: Vertical
WATER	LEVELS : 6.0	ft bgs	s on 6		13/200		, , , , , , , , , , , , , , , , , , , ,
30₽	<u> </u>			DISCONTINUITIES	စ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
ᆱ끯은	RUN H. A	(%) Q		DEDTIL TYPE OPIENTATION POLICINEOU	1 5 1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	Ser	0	Z Z	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF		a Q	FF.F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			0			Limestone	
_						- 72.5-78.0' - light olive gray, (5Y 5/2),	-
75	R9-HQ 5 ft	70	4	74.6, 74.8, 75.1, 75.3' - Fractures (4),	Ш	fine grained, strong HCl reaction,	
-32.5	100%	70	-	horizontal, rough, undulating, open	Н	weak to medium strong (R2 to R3),	
-						- shallow 1/16" voids over 5%, 1/2" to	1
-			2	75.7-75.9' - Fractures (2), horizontal and	\vdash	1" cavities, numerous small (1/8") casts/molds, extremely weak (R0)	
_				vertical, rough, undulating to stepped, silt-sized infilling		- silt-sized carbonate material and	l
			ا ا	76.6' - Fracture, 50 deg, rough, undulating		trace organics at 74.6-75.3', fewer	R9: 9 minutes
	77.5		3		Н	large cavities at 75.3-77.5'	
-	11.5			77.3' - Fracture, horizontal and 60 deg,	ш	_	1 -
-			3	rough, stepped 77.5' - Fracture, horizontal, smooth,	\vdash	79 0 79 5' moderate vallewich	1 -
				undulating	$\vdash \vdash$	78.0-78.5' - moderate yellowish - brown, (10YR 5/4), moist, mild HCl]
				77.6' - Fracture, horizontal, smooth,		reaction	1
1 7			1	undulating, tight	\vdash	78.5-82.1' - moderate yellowish	1
-	R10-HQ			78.0-78.5' - angular fragment 1/2" with fines infilled		brown, (10YR 5/4), fine grained,	1
80 <u> </u>	5 ft	53	0	79.2' - Fracture, 30 deg, rough, undulating,	$oxed{\square}$	strong HCl reaction, medium strong (R3), 20% 1/16" voids, fossiliferous	1 -
-37.5	92%			tight, 1/16" relief	\vdash	- with some cavities up to 1/2"]
				80.0-80.2' - Mechanical break		mar come carrace up to m=	
-			2	80.9' - Fracture, 20 deg, rough, undulating,	Ш	-	1
-				3/8" relief 81.4, 81.9' - Fractures (2), horizontal and 40	\Box	_	R10: 6 minutes
-			1	deg, rough, angular fragments to 1-1/2", open	\vdash	-	-
_	82.5		NR		Н	No Recovery 82.1-82.5'	_
			2			Limestone	
			-	83.1' - Fracture, 75 deg, rough, undulating	\vdash	 82.5-86.6' - moderate yellowish brown, (10YR 5/4), fine grained, 	1
-				83.2' - Fracture, 10 deg, rough, undulating,		moderate HCl reaction, medium	1
-			0	organics -	₩	- strong (R3), 25% 1/16" voids, many	-
_				-	\Box	up to 1/4" cavities and 1" cavities with mold at 83.8'	Dallanda Danasada Danda -
85	R11-HQ 5 ft	53	3	84.8, 85.1' - Fractures (3), rough, undulating, —		with mold at 63.6	Driller's Remark: Rods dropped at 84.5-85.5'
-42.5	82%	55	"	1/16" thick, organic laminations			агорреа ат 04.5-05.5
-				84.9' - Fracture, 30 deg		-	1
-			3	86.0' - Fracture, 75 deg, rough, undulating,	╁┼	_	Driller's Remark: Losing
-				minor black/gray staining on fracture surface			fluid at 86.0-87.5'
			NR	86.3, 86.4' - Fractures (2), horizontal, rough,	Ш	No Recovery 86.6-87.5'	R11: 10 minutes
	87.5			undulating	Н	_	Driller's Remark: Rods
]				87.7' - Fracture, horizontal, rough, undulating		Limestone	dropped at 87.5-87.9', rods - dropped before drilling
-			1	57.7 Fractare, nonzontal, rough, undulating	╁┼	- 87.5-88.7' - Same as 82.5-86.6' except yellowish gray, (5Y 7/2), with	
-			2	88.5' - Fracture, horizontal, rough, undulating,	Ш	voids up to 1/4" diameter over 10%	1 -
-			<u> </u>	iron staining	\vdash	- and many up to 3/4" cavities (still	1 4
				88.6' - Fracture, horizontal, rough, undulating		10% small voids), rock becomes]
90	R12-HQ				Ш	fractured at 88.5, fragments covered with fine grained material, no	1
-47.5	5 ft 24%	13		_	Ш	sediment infilling in molds/cavities	1
-	2-7/0		NR	-		No Recovery 88.7-93.5'	Driller's Remark: Rods
-				-	Н	-	dropped at 90.5-92.5'
-						_	1,540,000,000
					$\vdash\vdash$	_	R12: 2 minutes
]	92.5						Driller's Remark: Difficulty
-				-	Ш	-	setting core barrel due to - sediment in drill pipe
-			NR	-		-	Scament in anii pipe
-				93.5-94.5' - Fracture, traces of lignite	\vdash	-	1
				90.0-94.0 - Fracture, traces or lighte	Ш		



PROJECT NUMBER: BORING NUMBER:

338884.FL B-30A

SHEET 6 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, PW casing ORIENTATION : Vertical

WATER	LEVELS: 6.0	ft bg	s on 6/	12/07 START : 6/12/2007 END : 6/	13/200	D7 LOGGER : D. Thomas	
≥O≎	(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
ELO N (f	AND % (%	_	ZES T	DESCRIPTION	CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
			>10		П	Limestone	Driller's Remark: Logged
95 -52.5	R13-HQ 5 ft 80%	45	0	94.7' - Fracture, 10 deg, rough, undulating, open		 93.5-97.5' - yellowish gray, (5Y 5/2), fine grained, strong HCl reaction, very weak (R1), weakly cemented, friable, voids 1/16" over 10%, 	hole before starting at 93.5' - (6 inches past where previous run ended)
_			3	96.0, 96.2, 96.3' - Fractures (3), horizontal and 50 deg, rough, undulating, open		fossiliferous with voids/cavities from 1/4" to 1/2"	- R13: 1 minute
-	97.5		1	97.0' - Fracture, 45 deg, rough, undulating,	\blacksquare	-	-
_	91.5		1	open 97.5-97.8' - Fracture, angular 1"-2" fragment 97.9' - Fracture, 50 deg, rough, undulating		97.5-100.2' - Same as 93.5-97.5' - except 1/16" voids increase to 15%, unconsolidated, silt-sized, carbonate	-
-			2	98.9' - Fracture (2), 40 deg and vertical,	Ħ	material at 100.0-100.2'	-
400	R14-HQ		_	rough, undulating 99.4-100.0' - Fracture zone, horizontal and	oxdot	_	-
100 <u> </u>	5 ft 54%	28	5	vertical, non planar, friable	Ш	 No Recovery 100.2-105.1'	_
-	0170				Ш	No Recovery 100.2-105.1	-
			NR		Н	_	
_					Н	_	R14: 1 minute
_	102.5				Н	_	_
-					Н	_	-
-			ND		Н	_	_
-			NR		H	-	-
105	R15-HQ				H	-	-
-62.5	5 ft 48%	22	>10	— 105.1-105.8' - Fracture zone	H	Limestone	_
_			>10	105.7' - Fracture, horizontal, rough,	Ħ	105.1-108.7' - pale greenish yellow, yellowish gray, (10Y 8/2, 5Y 7/2),	_
_				undulating, tight 106.3' - Fracture, horizontal, open, does not fit together	H	strong HCl reaction, no voids except for one 1/16" fossil mold, extremely	R15: 2 minutes
_	107.5		0	iit togetilei	Ħ	weak (R0) and friable at 105.8-106.3', very weak (R1) and	-
			2			friable with several elongate fossil molds at 106.3-108.7'	_
-					Н	_	-
-			2		H	_ 108.7-110.8' - light olive gray, (5Y 5/2), fine grained, no to mild HCl	-
110_	R16-HQ 5 ft	38	4	_	Ħ	reaction, medium strong (R3), 5% voids (1/16" in size), less	
-67. 5	100%				H	consolidated (R1) at fractures from - 110.0-110.4' at fractures	-
			>10		Ħ	 110.8-112.3' - Same as 108.7-110.8' except friable and broken 	
-	112.5		>10		H	112.3-112.5' - Same as 108.7-110.8' - except with several elongate fossils	R16: 6 minutes
	112.0				П	Bottom of Boring at 112.5 ft bgs on - 6/13/2007	_
-					1	-	-
					\vdash		-



LNP- 0	Offest Boi	ring Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ΕÇ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	
EVA ⁻ EET I	DEPTH (FEET)	MPLE	3.W/6" 7 % F 8 (RC	OVE	PROFILE	SURFACE EL: 43.4		REMARKS
E F		S A	P.P.	REC		DESCRIPTION	nscs	
	0 -	S-1	1-2 2 (4)	0.9		0-1.5' POORLY GRADED SAND (sp), rounded, spherical, no plasticity, no dry strength, no dilatancy, no toughness, minor amount of organics (black), no odor, no reaction to 1N HCl, fine grained, wet, pale brown (5YR 5/2), very loose.	sp	Drillers using NWJ rods.
	2 	S-2	1-2 4 (6)	0.9		1.5-3.0' POORLY GRADED SAND (sp), grayish orange (10YR 7/4), rounded, spherical, fine grained, no plasticity, no dry strength, no dilatancy, no cementation, homogeneous sand, very loose, no toughness, wet, no reaction to 1N HCI.	sp	
	4 —	S-3	3-5 3 (8)	0.8		3.0-4.5' As above except with a root (organic), loose.	sp	Picture mislabeled: Labeled S-2 in pictures instead of S-3.
	-	S-4	3-3 6 (9)	1.0		4.5-6.0' As above except moderate brown (5YR 3/4) with a root (organic), loose.	sp	
	6 —	S-5	3-3 4 (7)	0.7		6.0-7.5' As above except grayish brown (5YR 3/2), loose.	sp	
	8 	S-6	4-4 6 (10)	0.8		7.5-9.0' As above except grayish orange pink (5YR 7/2), loose.	sp	
	10 —	S-7	4-6 7 (13)	0.9		9.0-13.5' As above except medium dense.	sp	
	- - 12 	S-8	6-7 8 (15)	0.9			sp	
	-	S-9	5-8 8 (16)	1.0			ap	
	14 — 	S-10	5-7 7 (14)	1.0		13.5-16.5' As above except grayish orange pink (5YR 7/2), weak reaction to 1N HCI.	sp	
DATE FIELD	STARTED COMPLE GEOLOG KED BY:	TED: 10	os		GWL: D GWL: D DRILLIN		NOTE	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offest Bor	ing Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ON SL)	т	ON ON O	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	Щ	COORDINATES N 1724391.9 E 457978.0	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	% RE (RQE	VER	PROFILE	SURFACE EL: 43.4	SYN	REMARKS
		SAN	BLO OR &	RECC	A	DESCRIPTION	nscs	
	_							
	_ 16 —	S-11	4-6 8 (14)	0.9			sp	
	- - -	S-12	4-8 7 (15)	0.9		16.5-21.0' As above except pale yellowish brown (10YR 6/2), weak reaction to 1N HCI.	sp	
	18 — – –	S-13	7-8 9 (17)	0.9			sp	
	20 —	S-14	8-9 12 (21)	0.9			sp	
	22 —	S-15	6-7 7 (14)	1.1		21.0-25.5' As above except no reaction to 1N HCI.	sp	
	-	S-16	6-6 6 (12)	0.9			sp	
	24 —	S-17	8-6 7 (13)	1.0			sp	
	26 —	S-18	8-8 9 (17)	0.9		25.5-27.0' As above except grayish brown (5YR 3/2) changing to pale yellowish brown (10YR 6/2) at bottom, weak reaction to 1N HCI.	e sp	
	28 —	S-19	7-7 9 (16)	1.3		27.0-30.0' As above except pale yellowish brown (10YR 6/2), no reaction to 1N HCl.	sp	Picture is mislabeled 27 29.5'.
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ΓED: 10	os		GWL: D GWL: D DRILLII		NOTE	ES: Energy Testing completed wit NWJ and AWJ rods on 10/15/ 09.
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offest Bor	ing Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ΕŒ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	
EVAT	DEPTH (FEET)	MPLE	7 % F RC RC	OVE	PROFILE	SURFACE EL: 43.4		REMARKS
E (FI		SA	BLC OF	REC		DESCRIPTION	nscs	
	_	S-20	9 (19)	1.1				
	30 —		7-9			30.0-31.5' As above except pale yellowish brown (10YR 6/2) to light gray (N7).	sp	
	_	S-21	9 (18)	1.4				
	32 	S-22	8-9 10 (19)	1.0		31.5-33.0' As above except very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), no reaction to 1N HCl.	sp	
	34 —	S-23	8-9 11 (20)	1.3		33.0-34.5' As above except pale yellowish brown (10YR 6/2), no reaction to 1N HCl.	sp	
	- -	S-24	6-6 3 (9)	1.0		34.5-37.5' As above except very pale orange (10YR 8/2) to grayish orange (10YR 7/4), no reaction to 1N HCI.	sp	Driller switches to AWJ rods.
	36 —						sp	
	-	S-25	4-2 3 (5)	1.4				
	38 —	S-26	3-3 3 (6)	1.3		37.5-39.0' POORLY GRADED SAND (sp), very fine grained with very fine grain black grains, rounded, spherical, non-plastic, no dry strength, slow dilatancy, no toughness, no odor, wet, no reaction to 1N HCl, homogeneous, no cementation, very pale orange (10YR 8/2) with medium gray (N5), very loose to loose.	'	
	40 —	S-27	3-2 2 (4)	1.5		39.0-40.5' Same as 34.5-37.5', very pale orange (10YR 8/2), no reaction to 1N HCI	sp	
	- -	S-28	4-4 3 (7)	1.2		40.5-42.0' As above except with medium dark gray (N4).	sp	
	42 —	S-29	4-3 5	1.5		42.0-43.5' As above except very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), loose.	sp	Picture mislabeled: shows S-2 instead of S-29.
	_		(8)			43.5-45.0' As above except very pale orange (10YR 8/2) with mediun	n sp	Driller switched back to NWJ rod.
DATE (STARTED COMPLET GEOLOG KED BY:	TED: 10	os		GWL: D GWL: D DRILLIN	DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800		ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offest Bor	ing Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724391.9 E 457978.0 SURFACE EL: 43.4	SYMBOL	REMARKS
ELE (FEF	D F)	SAM	BLOV OR &	KECO	l R	DESCRIPTION	nscs	
	44 —				211121	dark gray (N4), weak reaction to 1N HCl.	+-	
	-	S-30	4-4 5 (9)	1.4		45.0-46.5' As above except pale yellowish brown (10YR 6/2) with	sp	
	46 —	S-31	5-6 6 (12)	1.2		medium gray (N5), weak reaction to 1N HCl, medium dense.		
	_	S-32	5-5 5	1.2		46.5-48.0' As above except grayish orange (10YR 7/4) with some medium gray (N5), no reaction to 1N HCl, loose.	sp	
	48 —		(10)			48.0-54.0' As above except pale yellowish brown (10YR 6/2), mediur dense.	n sp	
	_	S-33	5-5 6 (11)	0.8			sp	
	50 -	S-34	5-7 7 (14)	0.9			3ρ	
	52 	S-35	5-6 6 (12)	0.8			sp	
	- -	S-36	5-5 7 (12)	1.0			sp	
	54 — 	S-37	6-6 5 (11)	1.5		54.0-55.5' As above except grayish orange (10YR 7/4) with medium light gray (N6) bands, no reaction to 1N HCl, medium dense.	sp	
	_					55.5-58.5' As above except with medium dark gray (N4).	sp	
	56 -	S-38	4-5 5 (10)	1.5		oc.o co.o / to above oxeopt man modalin dank gray (117).	op	
	-		4-5				sp	
	58 -	S-39	5 (10)	1.5		<u> </u>		
DATE FIELD	STARTED COMPLE [*] GEOLOG KED BY:	ΓED: 10	os		GWL: D GWL: D DRILLIN	_	NOTE	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/ 09.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LND	Offest Bor	ina Proa	ram					PROJECT NO. 07-3935
LINF	Jilest Boi	ilig Flog	Iaiii			LOG OF BORING NO. B-31		PROJECT NO. 07-5955
ION ASL)	뉴(-	NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	IE IE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	ZW/6" R % F & (RQ	OVE	PROFILE	SURFACE EL: 43.4	SS SY	REMARKS
		S Q	BL(REC		DESCRIPTION	nscs	
		S-40	5-5 6 (11)	1.3		58.5-61.5' As above except very pale orange (10YR 8/2) to grayish orange (10YR 7/4).	sp	
	60 —	S-41	4-5 5	1.3			sp	
	_	3-41	(10)	1.5		61.5-63.0' As above except grayish orange (10YR 7/4) with light gray	sp	
	62 —	S-42	4-5 5 (10)	1.1		(N7) bands.		
	64 —	S-43	5-5 6 (11)	1.1		63.0-66.0' POORLY GRADED SAND (sp), fine grained, subrounded to rounded, spherical, non-plastic, no dry strength, no dilatancy, no toughness, no odor, wet, no reaction to 1N HCl, no cementation, homogeneous, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), medium dense.	sp	Water level 10/16/09 @ 0800 6.1'.
	_	S-44	5-5 6 (11)	1.0			sp	
	66 — _ _	S-45	4-4 5 (9)	1.2		66.0-67.5' As above except with medium light gray (N6) bands.	sp	
	68 	S-46	3-3 2 (5)	1.4		67.5-69.0' As above except very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2).	sp	
	_	S-47	3-3 3	1.5		69.0-70.5' As above except with medium gray (N5) bands.	sp	
	70 — _ _	S-48	3-3 4	1.2		70.5-72.0' As above except very pale orange (10YR 8/2) with medium gray (N5) bands.	sp	
	- 72 —	0-40	(7)	1.2		72.0-73.5' As above except with fine black (N1) grains.	sp	
		S-49	2-3 2 (5)	1.5				
DATE (STARTED COMPLET GEOLOG KED BY:	ED: 10/	/15/09 /18/09 OS		GWL: D GWL: D DRILLIN		NOTE	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offest Boi	ring Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724391.9 E 457978.0 SURFACE EL: 43.4	USCS SYMBOL	REMARKS
		", "	<u> </u>	₩.	1:::::::	DESCRIPTION	-	
-30.1	74 — -	S-50	2-1 1 (2)	0.1		73.5-75.0' FAT CLAY (ch), very soft, high plasticity, slow dilatancy, medium toughness, high dry strength, wet, no reaction to 1N HCI, homogeneous, with fine sand and coarse gravel, moderate yellowish brown (10YR 5/4), very soft.	CII	
-31.6	- 76 —	S-51	1-1 1 (2)	1.3		75.0-76.5' POORLY GRADED SAND (sp), as at 72.0-73.5', very loose.	' sp	
	-	S-52	2-3 3 (6)	1.5		76.5-79.5' As above except very pale orange (10YR 8/2) to pale yellowish orange (10YR 6/2).	sp	
	78 — - -	S-53	1-2 2 (4)	1.5			sp	
	80 	S-54	1-1 1 (2)	1.3		79.5-84.0' As above except moderate yellowish brown (10YR 5/4), trace silt.	sp	
	82 —	S-55	2-2 1 (3)	1.5			sp	
	- - -	S-56	2-2 1 (3)	1.5			sp	
	84 — – –	S-57	1-1 2 (3)	1.5		84.0-85.5' As above except moderate yellowish brown (10YR 5/4) with medium gray (N5) bands, trace silt.	sp	
	86 	S-58	WOR-1 1 (2)	1.5		85.5-87.0' As above except moderate yellowish brown (10YR 5/4), trace silt.	sp	
	-		WOR- WOR			87.0-88.5' As above except with medium gray (N5) bands.	sp	
DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO					GWL: D GWL: D DRILLII		NOTES	S: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG: F	ailing 1500



LNP- Offest Boring Program LOG OF BORING NO. B-31								
ELEVATION (FEET MSL)	FΕ	NO.	& (N) REC. ID)	۲۲ (ft.)	ILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	
EVAT	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	SURFACE EL: 43.4	USCS SY	REMARKS
크류)						DESCRIPTION		
	88 —	S-59	1 (1) 	1.5		88.5-90.0' As above except moderate yellowish brown (10YR 5/4).	sp	
	90 —	S-60	WOH WOH (0)	1.5		90.0-91.5' As above except pale yellowish brown (10YR 6/2), trace	sp	
	-	S-61	1-2 2 (4)	1.3		silt.		
	92 	S-62	1-1 2 (3)	1.2		91.5-93.0' As above except moderate yellowish brown (10YR 5/4) to pale yellowish brown (10YR 6/2) and medium gray (N5) bands, trace silt.	sp	
	94 —	S-63	3-3 4 (7)	1.5		93.0-94.5' As above except moderate yellowish brown (10YR 5/4), trace silt, loose.	sp	
	-	S-64	WOH- WOH WOH (0)	1.5		94.5-96.0' As above except moderate yellowish brown (10YR 5/4), with trace of medium gray (N5), very loose.	sp	Rod advanced additional 8" before helper could stop it.
	96 — - -	S-65	WOH- WOH WOH (0)	0.9		96.0-99.0' As above except with medium dark gray (N4) bands, trace silt and coarse gravel (angular, hard), no reaction to 1N HCl, dark gray (N3).	sp	
	98 	S-66	WOH- WOH 1 (1)	1.0		99.0-100.5' As above except moderate yellowish brown (10YR 5/4) and medium light gray (N6), trace silt, medium dense.	sp	
57.4	100 —	S-67	5-7 8 (15)	1.5			sp	
-57.1	- - 102 —	S-68	1-4 6 (10)	1.1	1000000 100000 100000 100000 100000 100000 100000	100.5-103.5' POORLY GRADED SAND with SILT (sp-sm), fine grained sand, subrounded, spherical, low plasticity, low dry strength, no dilatancy, low toughness, no odor, wet, no reaction with 1N HCl, soft, laminated, weak cementation, olive gray (5Y 4/1) and moderate yellowish brown (10YR 5/4), medium dense.	sp- sm	Water level 10/17/09 @ 0750 0.0'
DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO					GWL: DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800 GWL: DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300 DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring			ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
APPROVED BY: DRILLING CO.: HUSS					DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offest Boring Program PROJECT NO. 07-3935										
LOG OF BORING NO. B-31										
TION MSL)	Ε£.	NO.	' & (N) REC. ND)	RY (ft.)	LE	COORDINATES N 1724391.9 E 457978.0	SYMBOL			
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	SURFACE EL: 43.4	nscs	REMARKS		
						DESCRIPTION				
-65.1 -66.1	104 —	S-69	2-2 5 (7)	1.0		103.5-108.5' As above except moderate yellowish brown (10YR 5/4).	sm			
		S-70	3-5 6 (11)	1.0	(sm			
	106 —	S-71	3-7 8 (15)	0.9			sp- sm			
	S-72 108 — S-73 110 — S-74 - S-75 112 — S-76 114 — S-77	S-72	3-6 5 (11)	0.9	1000 0 0 1 1000 0 0 1		sp- sm			
		S-73	1-2 3 (5)	1.2	111.U.T 121.E.T. 12.X.X.X 12.X.X.X 12.X.X 12.X.X 12.X.X 12.X.X	108.5-109.5' POORLY GRADED SAND with CLAY (sp-sc), fine grained sand, subrounded to rounded, high plasticity, high dry strength, slow dilatancy, medium toughness, no odor, no reaction with 1N HCI, no cementation, homogeneous, dark greenish gray (5GY 4/				
		S-74	1-2 2 (4)	1.2		1) and moderate yellowish brown (10YR 5/4), soft. 109.5'-114.0' FAT CLAY with SAND (ch), high plasticity, high dry strength, slow dilatancy, high toughness, no odor, wet, mottled, dark greenish gray (5GY 4/1), sand- subrounded, spherical, moderate yellowish brown (10YR 5/4), very soft.	ch			
		S-75	WOH-2 2 (4)	1.5			ch			
		WOH- WOH WOH (0)	1.5			CII				
		WOR- WOR WOR (0)	1.5		114.0-118.0' As above except medium dark gray (N4).	ch	Advanced another 6" before helper stopped rod.			
	116 	S-78	WOR- WOR WOR (0)	1.5			ch	Shortened sampled due to previous test. Driller sets casing to 115.0'.		
DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO					GWL: DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800 N GWL: DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300 DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring			ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.		
APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP- (Offest Boi	ring Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	FILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	REMARKS
LEV. FEET		AMPI R RL	NOW/ R % R) &	COV	PROFIL	SURFACE EL: 43.4	nscs s	KLIVIAKKS
ш :		ος O	В	RE		DESCRIPTION		
-74.6	118 —	S-79	WOR- WOR WOR (0)	1.3		——118' 118.0-118.5' POORLY GRADED SAND with SILT (sp-sm), subrounded to rounded, spherical, fine grained, non-plastic, no dry	sp- sm	
	-	S-80	WOR- WOR WOR (0)	1.3		strength to low dry strength, no dilatancy, low toughness, no odor, wet, no reaction to 1N HCl, homogeneous, no cementation, pale yellowish brown (10YR 6/2), very loose. 118.5-120.0' As above except moderate yellowish brown (10YR 5/4).		
	120 —	S-81	WOR- WOR WOR (0)	1.5		120.0-123.0' As above except with medium dark gray (N5) bands.	sp- sm	
	122 — -	S-82	WOR- WOR WOR (0)	0.4			sp- sm	
	124 —	S-83	WOR- WOR WOR (0)	1.0		123.0-124.5' As above except moderate yellowish brown (10YR 5/4).	sp- sm	
	- - 126	S-84	WOR- WOR WOR (0)	0.5		124.5-127.0' As above except very pale orange (10YR 8/2).	sp- sm	
-83.6	-	S-85	WOR- WOR WOR (0)	0.9			sp- sm ml	
-84.1	- 128 —		WOR- WOR			127.0-127.5' SILT (ml), low to medium plasticity, medium dry strength, slow dilatancy, medium toughness, organics but no odor, wet, no reaction to 1N HCl, mottled, grayish black (N2), very soft. 127.5-129.0' POORLY GRADED SAND with SILT as at 124.5-127.0'.		
	- -	S-86	WOR (0)	0.6		129.0-130.5' As above except with light gray (N7) bands.	sp- sm	
	130 —	S-87	WOR- WOR WOR (0)	0.7	1900 t 01 1900 t 11 1900 t 11 1900 t 10 1900 t 11			
	_ _	S-88	WOR- WOR 12 (12)	0.4	61.09 63.16 1 a a general 1 a a general 1 a a general 1 a a general	130.5-132.0' As above except with trace organics-brownish black (5YR 2/1).	sp- sm	
DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO					GWL: [GWL: [DRILLII		NOTES	S: Energy Testing completed with NWJ and AWJ rods on 10/15/ 09.
	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG: F	ailing 1500



LNP- (Offest Bor	ing Prog	ram			LOC OF PODING NO. P. 24		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	LOG OF BORING NO. B-31 COORDINATES N 1724391.9 E 457978.0 SURFACE EL: 43.4	SYMBOL	REMARKS
ELE (FEF	۵.	SAM OR F	BLOV OR &	ZECO	PR	DESCRIPTION	nscs	
-89.0	132 —	S-89	40-50/2 (50)	0.5		132.0-132.4' As above except dark yellowish brown (10YR 4/2). TOP OF AVON PARK FORMATION 132.4-132.7' DOLOMITE, degraded, fine grained, medium to high	sp-	Run-1
	134 — -	R-1	78% (39%)	1.8		plasticity, slow dilatancy, low toughness, no odor, moist, strong reaction to 1N HCl, firm consistency, homogeneous, weak cementation. 132.7-133.8' DOLOMITE, soft, moderately weathered, unfractured, yellowish gray (5Y 8/1), thick bedded, strong reaction to 1N HCl. 133.8-135.0' DOLOMITE, moderately hard, very slightly weathered, laminated, strong reaction to 1N HCl when powdered, yellowish gray (5Y 8/1), very slightly fractured (bedding planes). 135.0-135.5' DOLOMITE, soft to moderately soft, severely weathered.		Drilling Pressure: 350 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 5min 22sec Circulation loss: none 0.3' of fall-in material at top of core. Water level 10/18/09 @ 0800 1.5'. 10-18-09, GWL at 1.5 bgs at 0800.
	136 — - - - 138 —	R-2	100% (36%)	5.0		135.0-135.5' DOLOMITE, soft to moderately soft, severely weathered homogeneous, weak reaction to 1N HCl, yellowish gray (5Y 8/1), intensely fractured. 135.5-137.2' DOLOMITE, moderately hard, slightly weathered, slightly pitted (pits filled with medium gray (N5) dolomite), slightly fractured (135.8', 136.6', 136.8' horizontal), yellowish gray (5Y 8/1). 137.2-140.2' DOLOMITE, moderately hard, moderately weathered, pitted, vuggy (vugs filled with severely weathered dolomite-yellowish gray (5Y 7/2)), moderately to intensely fractured, light gray (N7), think laminated.		Run-2: Drilling Pressure: 400-350 psi Kelly Bar RPM: 198 Engine RPM: 1200-1300 Drill Time: 3min 44sec (135.0-135.5') Driller pulls out due to jammed core barrel 4.5' of lose sand in core, above 135', due to fall in. Drill Time: 27min 46sec (135.5-140') Driller Notes: circulation loss at 137.0'.
	140 — 142 — 144 —	R-3	98% (50%)	4.9		140.2-141.2' DOLOMITE, hard, fresh, strong reaction to 1N HCI, very light gray (N8), very slightly fractured, thinly laminated. 141.2-143.2' DOLOMITE, soft, moderately weathered, stains in fractures, intensely fractured (possible vertical fracture from, 141.2-142.5'), strong reaction to 1N HCI when powdered, thinly laminated, yellowish gray (5Y 7/2). 143.2-145.5' DOLOMITE, hard, very slightly fractured (horizontal fracture at 143.9'), weak reaction to 1N HCI, moderate reaction when powdered, laminated, yellowish gray (5Y 8/1).		Run-3: Drilling Pressure: 350-300 psi Kelly Bar RPM: 203 Engine RPM: 1200-1300 Drill Time: 8min 29sec (140.0-141.3') Drill Time: 8min 34sec (141.3-144.0') Drill Time: 5min 18sec (144-145') Circulation loss: 100%
DATE FIELD CHEC	146 — STARTED COMPLET GEOLOGI KED BY:	ED: 10/	os			PEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300 NG METHOD: Mud Rotary/Continuous SPT/PQ3Coring		Run-4: Drilling Pressure: 350 psi Kelly Bar RPM: 197 Engine RPM: 1200-1300 Drill Time: 11min 9sec ES: Energy Testing completed with NWJ and AWJ rods on 10/15/ 09.
	OVED BY: NG CO.:	HUSS			DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offest Bor	ing Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	REMARKS
ELEV FEE	DE (FE	AMP OR RI	OW/ OR % (F	COV	PRC	SURFACE EL: 43.4	nscs (TALINA WATER
		<i>ω</i> Ο	B	RE		DESCRIPTION yellowish gray (5Y 8/1) layers.	S)	Circulation loss: 100%
	148 —	R-4	100% (86%)	5.0		147.8-150.0' DOLOMITE, moderately hard to hard, slightly fractured (horizontal at 148.1' and 148.3'), thick bedded, yellowish gray (5Y 8/1).		Final water level 10/18/ 09 @ 1300 4.9'.
-106.6	150 —							
100.0	152 — — —————————————————————————————————					BOTTOM OF BORING 150'		
	156 — — — — — — — — — — — — — — — — — — —							
DATE (160 — STARTED COMPLET GEOLOG KED BY:	ED: 10	os		GWL: D GWL: D DRILLII		NOTE	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/ 09.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	LNP- Offset Boring Program PROJECT NO. 07-3935										
Liti	Jiiset Boi	mg r rog	uiii			LOG OF BORING NO. B-33		1 NODEOT NO. 07 0000			
ELEVATION (FEET MSL)	H.E.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	:ILE	COORDINATES N 1724328.8 E 457955.2	SYMBOL				
EVA	DEPTH (FEET)	MPL RUI	DW/6 R % I & (RC	SOVE	PROFILE	SURFACE EL: 43.0]S S	REMARKS			
		δ <u>Q</u>	BL(REC		DESCRIPTION	nscs				
	0 -	S-1	2-2 6 (8)	0.7		0.0-1.5' POORLY GRADED SAND (sp), fine grained, no plasticity, no dry strength, rapid dilatancy, low toughness, medium light gray (N6) to medium dark gray (N4), weak reaction to 1N HCl, loose.	sp				
	1.5 — –	S-2	5-6 9	0.9		1.5-4.7' Same as above except dark yellowish orange (10YR 6/6) to very pale orange (10YR 8/2), subangular to rounded grains.	sp				
	3 —		(15)				sp				
	- - -	S-3	5-7 6 (13)	0.8							
38.3	4.5 —	S-4	3-2 2 (4)	1.2		4.7-6.0' CLAYEY SAND (sc), 60% sand, 40% silt, sand-fine grained, subrounded to rounded grains, low plasticity, medium dry strength, slow dilatancy, low toughness, light gray (N7), with dark greenish gra (5G 4/1) to greenish black (5GY 2/1)-possible lignite pocket, no odor, no reaction to 1N HCl, soft.	sp sc				
37.0	6 —	S-5	3-4 5 (9)	1.0		6.0-7.5' FAT CLAY with SAND (ch), 80% clay, 20% fine grained sand medium to high plasticity, medium to high dry strength, medium toughness, light gray (N7) to light bluish gray (5B 7/1), weak to moderate reaction to 1N HCl, medium stiff.					
	7.5 — — —	S-6	2-3 4 (7)	1.0		7.5-9.0' FAT CLAY (ch), high plasticity, high dry strength, slow to no dilatancy, medium toughness, light bluish gray (5B 7/1) to greenish gray (5G 6/1), weak reaction to 1N HCI (mainly few calcareous pieces, coarse sand size), medium stiff.	ch				
34.0	9 —	S-7	6-7 10 (17)	0.8		9.0' POORLY GRADED SAND (sp), fine grained, subrounded to rounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (5Y 8/1) to white (N9), weak to moderate reaction to 1N HCI, medium dense.	sp				
	10.5 —					Same as above.	sp				
DATE FIELD	STARTED COMPLE GEOLOG KED BY:	TED: 11/)		GWL: D GWL: D DRILLIN	C	NOTE	S: Used NWJ rods for SPT sampling.			
APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG: I	Failing 1500			



LNP- 0	Offset Bor	ing Prog	ram			LOC OF BODING NO. D. 22		PROJECT NO. 07-3935			
			İ	_		LOG OF BORING NO. B-33		<u> </u>			
ELEVATION (FEET MSL)	₽£.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE I	COORDINATES N 1724328.8 E 457955.2	SYMBOL				
LEVA:	DEPTH (FEET)	AMPL R RUI	OW/6)R % I & (RC	COVE	PROFILE	SURFACE EL: 43.0	USCS S)	REMARKS			
— я.		Ø ○	ВО	RE		DESCRIPTION	Sn				
	- - -	S-8	4-6 6 (12)	0.8							
	12 —		2.0			Same as above.	sp				
	_ _ _	S-9	3-6 7 (13)	0.9							
	13.5 — —					Same as above.	sp				
	- - -	S-10	4-5 7 (12)	1.1							
	15 - -	S-11	4-5 7	1.0		Same as above.	sp				
	16.5 —		(12)			Same as above except with very fine grained black grains, loose.	sp				
	- - -	S-12	3-6 4 (10)	1.1							
	18 	S-13	3-4 6	0.9		POORLY GRADED SAND (sp), fine grained, subangular to rounded grains, well sorted, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (5Y 8/1), weak reaction to 1N HCl, loose.	sp				
	- - 19.5	3-13	(10)	0.9							
	19.5 — —	S-14	2-5 8 (13)	1.0		Same as above except medium dense.	sp				
	21 					Same as above except yellowish gray (5Y 8/1) to pale yellowish brown (10YR 6/2).	sp				
		S-15	4-5 8 (13)	0.9							
DATE FIELD	DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring	NOTE	eS: Used NWJ rods for SPT sampling.			
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			
PKILL	DRILLING CO.: HUSS DRILLING CO.: HUSS										



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. B-33		PROJECT NO. 07-3935	
ELEVATION (FEET MSL)	F.C	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724328.8 E 457955.2	SYMBOL		
EVA1	DEPTH (FEET)	MPLE RUN	7.7%(5") R % F R (RQ	OVE	PROFILE	SURFACE EL: 43.0	S SY	REMARKS	
□ □		S O	BLC	REC		DESCRIPTION	nscs		
	22.5 — —					Same as above.	sp		
	24 —	S-16	4-4 7 (11)	1.2		Same as above.	sp		
		S-17	4-5 7 (12)	1.1		Comment of the state of the sta			
	- - - -	S-18	7-6 5 (11)	1.5		Same as above except light brownish gray (5YR 6/1).	sp		
	27 — - - -	S-19	3-2 2 (4)	1.5		POORLY GRADED SAND (sp), fine grained, well sorted, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (5Y 8/1), no reaction to 1N HCl, very loose.	sp		
	28.5 —	S-20	2-3 2 (5)	1.4		Same as above except yellowish gray (5Y 8/1) to light brownish gray (5YR 6/1).	sp		
	30 —		2-2			Same as above.	sp		
	31.5 —	S-21	1 (3)	1.4		Color change at 31.3' to yellowish gray (5Y 8/1), moist, not saturated as above. Same as above.	sp		
	- - -	S-22	1-1 1 (2)	1.4					
DATE FIELD	DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring	NOTE	ES: Used NWJ rods for SPT sampling.	
	APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS								



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. B-33		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	Ξ£	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	l l	COORDINATES N 1724328.8 E 457955.2	SYMBOL	
EVAT	DEPTH (FEET)	MPLE RUN	. (RQ	OVEF	PROFILE	SURFACE EL: 43.0	SSY	REMARKS
		SAN	BLO OF	REC		DESCRIPTION	nscs	
	33 —					Same as above.	sp	
	- - -	S-23	1-1 1 (2)	1.3				
	34.5 —					Same as above.	sp	
	_ _ _	S-24	1-1 WOR (1)	1.4				
	36 — —					POORLY GRADED SAND (sp), fine grained, well sorted, subangular to rounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (5Y 8/1), weak to moderate reaction to 1N		Water level 11/4/09 @ 0745 6.5'.
	_	S-25	2-1 1 (2)	1.5		HCI, very loose.		
	37.5 — –					Same as above except no reaction to 1N HCl.	sp	
	- - -	S-26	1-1 1 (2)	1.5				
	39 —		24			Same as above.	sp	
	_	S-27	2-1 1 (2)	1.3				
	40.5 —	S-28	WOH- WOH 1 (1)	1.5		Same as above except with very fine grained black grains (10-15%).	sp	NOTE: JLO observes some sample falling out of spoon when brought up.
	42 —					Same as above.	sp	
	_	S-29	1-WOH WOH (0)	1.5				
	43.5 — —					Same as above.	sp	
DATE FIELD	DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS				GWL: D GWL: D DRILLIN	_	NOTE	ES: Used NWJ rods for SPT sampling.
APPR	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offset Boring Program PROJECT NO. 07-3935											
						LOG OF BORING NO. B-33					
ELEVATION (FEET MSL)	тн :т)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724328.8 E 457955.2	SYMBOL				
EVA.	DEPTH (FEET)	MPLI R RUN	DW/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 43.0	SS SV	REMARKS			
<u> </u>		SA	BL(REC		DESCRIPTION	nscs				
		S-30	WOR- WOR WOR (0)	1.0							
0.5	45 —	S-31	WOR- WOR WOR (0)	1.3		POORLY GRADED SAND (sp), fine grained, well sorted, subrounded to rounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (5Y 8/1), very loose, trace (5-10%) very fine black grains, no reaction to 1N HCl.					
-3.5 -3.8	46.5 —	S-32	3-5 5 (10)	1.3		46.5-46.8' FAT CLAY (ch), high plasticity, high dry strength, no dilatancy, medium to high toughness, light gray (N7) to medium light gray (N6), no reaction to 1N HCl, medium stiff, trace fine grained calcareous grains.	sp-sc				
-4.5 -4.8	48 —					46.8-47.5' POORLY GRADED SAND with CLAY (sp-sc), 90% fine grained sand, 10% fat clay, subangular to rounded grains, medium plasticity, medium to high dry strength, slow dilatancy, medium toughness, no reaction to 1N HCl, dark yellowish orange (10YR 6/6) to dusky yellowish brown (10YR 2/2), medium stiff.	ch sp-sc				
-5.7	49.5 —	S-33	5-5 5 (10)	1.5		47.5' 47.5-47.8' FAT CLAY (ch) as at 46.5-46.8'. 47.8-48.0' POORLY GRADED SAND with CLAY (sp-sc) as above except pale yellowish brown (10YR 6/2) to light olive gray (5Y 6/1). 48.0-48.7' POORLY GRADED SAND with CLAY (sp-sc) as above except light gray (N7) to greenish gray (5G 6/1).					
	- - -	S-34	2-6 2 (8)	1.5		48.7-51.0' POORLY GRADED SAND (sp), fine grained, subrounded to rounded grains, well sorted, no plasticity, no dry strength, rapid dilatancy, low toughness, very light gray (N8) to light greenish gray (5G 8/1), no reaction to 1N HCl, loose, trace very fine grained black grains.	-				
-8.0 -8.9	51 —	S-35	3-6 9 (15)	1.4		51-51.9' CLAYEY SAND (sc), 60% fine grained sand, subrounded to rounded grains, 40% clay, medium to high plasticity, medium to high dry strength, slow to no dilatancy, low toughness, light gray (N7) to light bluish gray (5B 7/1), no reaction to 1N HCl, stiff.	sc				
-0.9	52.5 — —					51.9-53.2' POORLY GRADED SAND (sp), fined grained, subrounded to rounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, medium light gray (N6) to greenish gray (5G 6/1), no reaction to 1N HCl, medium dense.					
-10.2	- - -	S-36	3-4 8 (12)	1.5		53.2-54.9' CLAYEY SAND (sc) as at 51-51.9'.	sc				
	54 — — —	S-37	6-7 7	1.3							
DATE FIELD	DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					EPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 EPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring	NOTE	S: Used NWJ rods for SPT sampling.			
	OVED BY: ING CO.:	HUSS			DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			



LNP- Offset Boring Program PROJECT NO. 07-3935											
		g . 10g				LOG OF BORING NO. B-33		1 100201 110. 01-0900			
ELEVATION (FEET MSL)	H.C	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)		COORDINATES N 1724328.8 E 457955.2	SYMBOL				
EVAT	DEPTH (FEET)	MPLE	7W/6" R % F & (RQ	OVE	PROFILE	SURFACE EL: 43.0	SSY	REMARKS			
		SA		REC		DESCRIPTION	nscs				
-11.9	55.5 — –		(14)			54.9-55.5' POORLY GRADED SAND (sp), trace clay, subrounded to rounded grains, fine grained, low plasticity, low dry strength, rapid dilatancy, low toughness, light olive gray (5Y 6/1) to medium bluish gray (5B 5/1), no reaction to 1N HCl, medium dense, well sorted. Same as above except loose.	sp sp				
	57 —	S-38	2-3 5 (8)	1.5		Same as shows	0.0				
	- - -	S-39	1-2 3 (5)	1.2		Same as above.	sp				
	58.5 —		1-5			Same as above except medium bluish gray (5B 5/1) to greenish gray (5G 6/1).	sp				
	60 —	S-40	4 (9)	1.4		Same as above.	sp				
	- - -	S-41	1-5 7 (12)	1.0							
	61.5 —	S-42	3-7 9 (16)	1.0		Same as above except light olive gray (5Y 6/1).	sp				
	63 — —	S-43	2-6 6 (12)	0.8		POORLY GRADED SAND (sp), fined grained, subrounded to rounded grains, well sorted, no plasticity, no dry strength, rapid dilatancy, low toughness, medium gray (N5) and dark yellowish orange (10YR 6/6) to moderate yellowish brown (10RY 5/4), no reaction to 1N HCI, medium dense.	sp				
	64.5 —		2-3			Same as above except yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), loose.	sp				
		S-44	2-3 4 (7)	1.3							
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ΓED: 11	Э		GWL: D GWL: D DRILLIN	9	NOTE	ES: Used NWJ rods for SPT sampling.			
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			



I ND. (LNP- Offset Boring Program PROJECT NO. 07-3935										
LINE- (ziiset DOI	my Frog	ıaııı			LOG OF BORING NO. B-33		FROJECT NO. 07-3935			
rion ASL)	Εſ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724328.8 E 457955.2	SYMBOL				
ELEVATION (FEET MSL)	DEPTH (FEET)	MPLE	DW/6" R % F & (RG	OVE	PROFILE	SURFACE EL: 43.0	SSY	REMARKS			
<u>п</u> .		S O	BLC	REC		DESCRIPTION	nscs				
-23.7	66 	0.45	5-10			66.0-66.7' Same as above.	sp				
-24.1 -24.5	- 67.5 —	S-45	15 (25)	1.3		66.7-67.1' CLAYEY SAND (sc), 20% high plasticity clay, 80% fine grained sand, subrounded to rounded grains, low to medium dry strength, slow dilatancy, low toughness, medium gray (N5), no reaction to 1N HCl, medium dense.	sc sp				
-24.5	67.5 — –					67.1 67.1-67.5' POORLY GRADED SAND (sp) as above.					
	-	S-46	14-23 33 (56)	0.6		67.5-69.7' CLAYEY SAND (sc) as above except yellowish gray (5Y 8.1) to light olive gray (5Y 6/1).					
	69 -										
-26.7	-	S-47	13-9 7 (16)	1.5		69.7-69.7-70.5' FAT CLAY (ch), medium to high plasticity, high dry strength, no dilatancy, medium toughness, olive black (5Y 2/1), no reaction to 1N HCl, stiff.	ch				
	70.5 —					Same as above.	ch				
	- -	S-48	13-50/3 (50)	0.75				No sample 71.25-72.0'.			
	72 					72.0-72.3' FAT CLAY (ch) as above.	ch				
-29.3	- - -	S-49	21-10 2 (12)	0.5		72.3-75.0' Degraded DOLOMITE, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), severly weathered, soft to very soft, moderate to strong reaction to 1N HCl, silty texture.		TOP OF AVON PARK FORMATION			
	73.5 — — — —	S-50	50/1 (50)	0.0				No recovery. Set casing to 75', no sample 73.58-75'.			
	75 — — — —					75-75.5' DOLOMITE, hard, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), moderately fractured, thin to medium bedded, weak reaction to 1N HCl, fresh to slightly weathered, some pits, few vugs, some very thin possibly healed fractures infilled with black material. 75.5-76.1' DOLOMITE, severly weathered to degraded, very soft, 40% dolomite gravel, 60% silt (totally weathered dolomite), moderate yellowish brown (10YR 5/4), no plasticity, low dry strength, low		Run-1: Drilling Pressure: 200-250 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 32min 30sec Circ. Loss: None			
	76.5 —					toughness. 76.1-80.0' DOLOMITE, moderately hard, slightly weathered,					
	STARTED		3/09		GWL: D	EPTH: 6.5' DATE/TIME: 11/4/09 @ 0745	NOTE	ES: Used NWJ rods for SPT sampling.			
	COMPLE [*] GEOLOG				GWL: D	IEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring		camping.			
CHEC	KED BY:	WE				, ,					
	OVED BY:			\dashv	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			
PKILL	NG CO.:	HUSS									



LNP- Offset Boring Program PROJECT NO. 07-3935										
LINIT	onset boi	ilig Frog	ıaııı			LOG OF BORING NO. B-33		FROJECT NO. 07-3933		
ELEVATION (FEET MSL)	ГН .T.)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724328.8 E 457955.2	SYMBOL			
LEVA ⁻	DEPTH (FEET)	AMPLE R RUN	OW/6' R % F & (RC	SOVE	PROFILE	SURFACE EL: 43.0	SS SY	REMARKS		
		<i>t</i> s 10	BLO	BE		DESCRIPTION	nscs			
	- - - 78 —	R-1	98% (16%)	4.9		moderately fractured (vertical fracture 77-79.5'), pitted, few vugs, thic bedded, no fossils, weak reaction to 1N HCl when powdered, pale yellowish brown (10YR 6/2).	k			
	79.5 —							Dur 0		
	81 — - 81 —					80.0-85.0' DOLOMITE, as above except unfractured.		Run-2: Drilling Pressure: 200 psi Kelly Bar RPM: 221 Engine RPM: 1400-1500 Drill Time: 20min 9sec Circ. Loss: None		
	82.5 — — — — 84 —	R-2	90% (78%)	4.5		83.5-84.4' Soft zone, intensely fractured.				
	85.5 — —					85.0-87.7' DOLOMITE, moderately hard, strong reaction to 1N HCI when powdered, medium bedded, slightly to moderately weathered in zones/bands, pitted, some vugs, moderately fractured (horizontal-bedding planes only), medium light gray (N6).	ו	Run-3: Drilling Pressure: 150 psi Kelly Bar RPM: 222 Engine RPM: 1400-1500 Drill Time: 50min 6sec Circ. Loss: None Water Level 11/5/09 @ 0745 8.7' NOTE: Added extra core from R-4 to R-3, recalculated recovery and RQD.		
	87 — – –	R-3	100% (70%)	5.0						
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ED: 11	0		GWL: D GWL: D DRILLIN	9	NOTE	ES: Used NWJ rods for SPT sampling.		
	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. B-33		PROJECT NO. 07-393
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724328.8 E 457955.2	SYMBOL	REMARKS
ELE)	E	SAMF OR R	LOW OR 9	ECO.	PR(SURFACE EL: 43.0	nscs	
		0, 0	B	RE		DESCRIPTION 87.7-91.0' DOLOMITE, moderately hard to hard, moderate to strong	۱ő	
	88.5 —					reaction to 1N HCl when powdered, thick bedded, fresh to slightly weathered, slightly fractured (1 horizontal fracture at 88'), some fossils, fine grained, some pits (decreasing abundance with depth), yellowish gray (5Y 8/1).		
	90 —							Run-4: Drilling Pressure: 250 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300
	91.5					91.0-95.0' DOLOMITE, moderately hard to moderately soft, strong reaction to 1N HCl, when powdered, thick bedded, slightly weathered pitted/porous, slightly fractured, some fossils, yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), few vugs (weathered-out fossils).	,	Drill Time: 17min 8sec Circ. Loss: None
	93 —	R-4	100% (54%)	5.0				
	94.5 —					94.5-95.0' Friable with very thin black organic lenses.		
	96 —					95.0-100.0' DOLOMITE same as 91.0-95.0'. 95.0-96.2' Vertical fracture, intensely fractured.		Run-5: Drilling Pressure: 250-300 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 10min 55sec Circ. Loss: None
	97.5 —	R-5	100% (68%)	5.0				
DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D		NOTE	ES: Used NWJ rods for SPT sampling.
APPROVED BY: DRILLING CO.: HUSS					DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. B-33		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724328.8 E 457955.2 SURFACE EL: 43.0 DESCRIPTION	USCS SYMBOL	REMARKS
	99 —					98.7-99.4' Intensely fractured.		
-57.0	- 100.5 -					BOTTOM OF BORING 100'		
	102 —							
	_ 103.5 — _ _							
	105 — - - -							
	106.5 — - - -							
	108 —							
	109.5 —): 11	/3/09		GWL: C	EPTH: 6.5' DATE/TIME: 11/4/09 @ 0745	NOTES	: Used NWJ rods for SPT
DATE FIELD CHEC	COMPLETED GEOLOGIC KED BY: OVED BY:	TED: 11 IST: JL W	/5/09		GWL: D	EPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring		sampling.
	ING CO.:				DKILLE	R: Eddie Palmer HELPER: Chad/Cody	KIG: Fa	ailing 1500



ĺ	PROJECT NUMBER:	BORING NUMBER:					
ı	338884.FL	CT-01	SHEET	1	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLIN	RILLING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical										
WATER	LEVELS	: 9.5 ft bo	s on 12/3	3/07	START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer						
200				STANDARD	SOIL DESCRIPTION COMMENTS						
N (#	SAMPLE INTERVAL (ft)			PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
TH BI		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND						
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY						
43.4	0.0				Topsoil ()						
-		1.1	SS-1	1-1-2 (3)	\\\\0.0-0.25' - 80-90% organics \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\						
	1.5			(0)	↑ 0.25-1.1' - very light gray, white and light brownish						
					\gray, (N8, N9 and 5YR 6/1), dry to moist, very loose, \rightarrow \very fine to fine grained, silica sand, 15% organics, \rightarrow \text{J}						
_					\trace nonplastic fines						
_					_						
_					.						
_											
-											
5 38.4	5.0				Sandy Lean Clay (CL)						
-		1.0	SS-2	2-3-4	│ \ 5.0-5.3' - mottled very light gray, grayish yellow, and /-┃./ │ │ │ │ │						
-	6.5	1.0	00-2	(7)	\dark yellowish orange, (N8, 5Y 8/4, and 10YR 6/6), \\n\noist, medium stiff, medium plasticity, slow dilatancy, \ \ \ \						
-	0.5				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\						
-					\5.3-6.0' - pale yellowish brown to dark yellowish						
_					brown, (10YR 6/2 to 10YR 9/2), wet, loose, very fine to fine grained, 20% nonplastic fines						
_					Lo mile granica, 20 / 6 nonplactic miles						
-					11						
] [
10	10.0										
33.4				3-5-6	Interbedded Poorly Graded Sand And Silt (SP-SM) 10.0-10.85' - very pale orange, pale yellowish brown,						
_		0.9	SS-3	(11)	dark yellowish brown, (10YR 8/2, 10YR 6/2, 10YR 4/2), wet, medium dense, very fine to fine grained,						
_	11.5				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\						
_											
-											
-					 						
-					 						
-					 						
15	15.0				1 						
28.4	10.0				Poorly Graded Sand With Silt (SP-SM)						
-		1.0	SS-4	3-4-5 (9)	15.0-16.0' - pale yellowish brown, (10YR 6/2), wet, loose, very fine to fine grained, silica sand, 10%						
	16.5			(5)	nonplastic fines						
		· ·] [
]						
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-01	SHEET	2	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING	DRILLING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical										
WATER	LEVELS	: 9.5 ft bo	s on 12/3	3/07	TART : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer						
 ≥ ∩ ⊕				STANDARD	SOIL DESCRIPTION COMMENTS						
ANG (#	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, 의 DEPTH OF CASING, DRILLING RATE,						
H BE ATIC		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DEFITTOR CASING, DRILLING HATE, DRILLING FLUID LOSS, TESTS, AND						
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
23.4	20.0			()	Silty Sand (SM)						
1 1		1.1	SS-5	6-5-5 (10)	20.0-21.05' - Same as 15.0-16.0' except 15-20%						
1 1	21.5			(10)							
1 1					1						
]						
]						
					<u> </u>						
					_						
-					-						
25 18.4	25.0				Poorly Graded Sand With Silt (SP-SM)						
10.4		0.9	SS-6	3-4-6	25.0-25.9' - very pale orange, pale yellowish brown, -						
1 -		0.9	33-0	(10)	(10YR 8/2, 10YR 6/2), wet, loose, very fine to fine grained, silica sand, 7% nonplastic fines						
	26.5				, -						
1 -					†						
					† 						
1 1					† 						
1 1					1						
1 1					1						
30	30.0				1						
13.4				4-4-6	Silty Sand (SM) 30.0-31.05' - very light gray, (N8), moist to wet, loose,						
		1.1	SS-7	(10)	very fine to fine grained, silica sand, 15-20%						
1 4	31.5				nonplastic fines, trace organics						
-					-						
-					-						
1 -					-						
					† 						
35_	35.0				† 						
8.4	55.0				Silty Sand (SM)						
1		1.2	SS-8	2-2-2 (4)	35.0-36.2' - Same as 30.0-31.05' except very loose						
	36.5			(1)]						
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-01	SHEET	3	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER LEVELS: 9.5 ft bgs on 12/3/07						_
WATER	LEVELS	: 9.5 ft b	gs on 12/3	3/0 <i>7</i> S	START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer	\neg
200				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS	4
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
불병은		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
E F F S			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
밀S핍				(N)		
3.4	40.0				Sandy Fat Clay (CH) 40.0-41.5' - very light gray to medium light gray, (N8 Driller's Remark: Change in drilling at 44.5' (stiffer)	
		1.5	SS-9	3-5-5 (10)	to N6), wet, medium stiff, medium to high plasticity,	
-	41.5			(10)	slow dilatancy, 40-45% very fine to fine silica sand	٦
-	41.0					-
-					-	+
-					-	+
-						-
-					<u> </u>	4
l _					<u> </u>	
_						
45	45.0]	
-1.6					Fat Clay (CH)	\exists
-		1.5	SS-10	5-8-9	\ \ \ 45.0-45.3' - yellowish gray, (5Y 8/1), moist, medium \ stiff, high plasticity, no to slow dilatancy, no HCl	1
-	40.5			(17)	reaction	+
-	46.5				Fat Clay With Sand (CH)	+
-					45.3-46.3' - mottled very light gray and light bluish gray, (N8 and 5B 7/1), moist, medium stiff, high	4
_					plasticity, no to slow dilatancy, mild HCl reaction, fine	4
_					│ ∥to coarse grained particles are both angular carbonate/ │ │	4
_					grains and rounded black and brown grains	
					Fat Clay With Poorly Graded Sand (CH) 46.3-46.4' - light greenish gray, (5 G 8/1), moist,	
-					medium stiff, nigh plasticity, no dilatancy, no HCl	
50	50.0				reaction, 1/2" lens of very fine fine silica sand at 46.5'	٦
-6.6					Fat Clay (CH) 46.4-46.5' - brownish gray, (5Y 8/1), moist to wet,	\exists
-		1.5	SS-11	4-4-3	│	+
-				(7)	veaction	+
-	51.5				50.0-51.5' - yellowish gray, (5Y 7/2), wet, loose, very	+
-					fine to fine grained, no HCl reaction, silica sand,	-
_					20-25% nonplastic to low plastic fines (amount and plasticity vary with depth), fat clay (CH) lenses occur	4
l _					up to 1/4" thick from 50.0-51.3' light bluish gray (5B	
l _					7/1), highly plastic, no HCl reaction	
I -]]	
I -					1	1
55	55.0				1	1
-11.6	JJ.U				Silty Sand With Clay (SM)	\dashv
-		1.5	SS-12	1-2-4	55.0-56.5' - yellowish gray, (10YR), wet, loose, very - 1	\exists
-		1.5	33-12	(6)	fine to fine grained, 20-30% nonplastic to low plastic fines, 15% of sample consists of 1/2" to 1", sandy fat	4
_	56.5				clay (CH) lenses, same as 50.0-51.5', no HCl reaction	4
-					\in clay materials \	4
l _]	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-01	SHEET	4	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

					on STITE AND TOLEN AND TOUS, S-7/6 IT-COILE DIL ON ENTATION . VEILLA	_
WATER	LEVELS	: 9.5 ft b	gs on 12/3	3/07	START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer	7
300				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS	4
A ANI	SAMPLE	INTERVA	L (ft)	TEST RESULTS	COLL NAME LICCO OPOLID SYMPOL COLOR	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
PT.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	١
				(N)		4
-16.6 _	60.0			3-4-6	Interbedded Clayey Sand And Fat Clay (SC-CH) 60.0-60.6' - Same as 50.0-51.5 and 55.0-56.5' except	4
_		1.4	SS-13	(10)	│ 60% clayey sand (SC), mottled yellowish gray and │ │ │ │ │	
	61.5			` ′	light olive gray (5YR 7/2 and 5Y 5/2), moist, loose, very fine to fine grained, 35% medium plastic fines,	١
					40% fat clay (CH), pale green (10G 6/2), moist,	1
					medium stiff, highly plastic, no dilatancy, no HCl	1
-					reaction - -	1
-					60.6-61.0' - dusky brown, (5YR 2/2), moist, medium	-
-					stiff, medium plasticity, slow dilatancy, shiny, flaky -	1
-					appearance, 1/4" sand lens at 60.9' Silty Sand With Organics (SM) Driller's Remark: Hard at 64.0'	\forall
					61.0-61.4' - light olive gray, (5Y 5/2), wet, loose, fine	+
65 <u> </u>	65.0 65.0	0.0	\SS-14/	50/0	grained, 20% nonplastic fine organics, 1/2" lens of	4
	00.0	/	\ <u>55-14</u> /	(50/0")	Sandy organic soil (OL) at 61.3-61.4' 25% fine silica Switch to 2-7/8" tricone bit at 65.0'	4
-					No Recovery At 65.0'	4
_					_	4
_					_	4
_					<u> </u>	
					11	
-					1	1
70	70.0				1 1	1
-26.6	70.0				Silty Sand And Limestone Fragments (SM)	1
-		1.5	SS-15	22-16-19	70.0-71.5' - yellowish gray, (5Y 7/2), wet, dense, fine to coarse grained, 25% low plastic fines, 40-45% fine	1
-	71.5			(35)	gravel-sized limestone fragments, strong HCl reaction	+
-	/1.5					\exists
-					- 1	\exists
-					- 1	+
-						-
_					<u> </u>	4
_					_	4
l _					<u> </u>	
75	75.0					
-31.6	75.0	0.0	SS-16	50/0 (50/0")	No Recovery At 75.0' few limestone fragments	
				(30/0)	Tew innestone fragments	1
					11	1
					11	1
-					1 1	1
-						+
-						+
-						+
-						+
-						+
80						4
						┙



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-01	SHEET	5	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

			gs on 12/3	3/07	START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer	
				STANDARD	SOIL DESCRIPTION COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RA DRILLING FLUID LOSS, TESTS, A INSTRUMENTATION	
JEEL JON		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, A	TE,
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	IIVD
E S E				(N)		
-36.6	80.0	1.1	SS-17	4-46-50/1	Sandy Silt And Limestone Fragments (ML) 80.0-81.1' - grayish yellow, (5Y 8/4), wet, fine to	_
_	81.1			(96/7")	coarse grained, rapid dilatancy, strong to very strong	
_					HCl reaction, 20-25% fine to coarse carbonate sand, 45-55% limestone fragments to 1" subangular, strong	_
l _					\to very strong HCl reaction / _	
l _					Begin Rock Coring at 81.0 ft bgs See the next sheet for the rock core log	
					dee the next sheet for the rook core log	
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PROJECT NUMBER:

33884.FL BORING NUMBER:

CT-01 SHEET 6 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS: 9.5	ft bgs	s on 12	2/3/07 START : 12/2/2007 END : 12	2/3/20	D7 LOGGER : T. Borton, J. Schaeffe	er
≥D≎	(%)			DISCONTINUITIES	J _Q	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	ŒS T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H B H	E RU STH, OVEF	D (%)	FOOF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	COR	RQ	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	81.0			81.1' - Mechanical break or bedding plane,		Limestone	Begin rock coring at 81.0'
-			3	<5 deg, rough, undulating, tight	╁┤	 81.0-84.3' - yellowish gray, (5Y 7/2), fine to coarse grained, strong HCl 	
-				81.4' - Fracture, 15 deg, rough, undulating, - tight	Ħ	reaction, very weak (R1), voids to 1"	1
-			>10	81.6' - Mechanical break or bedding plane,	Ħ	 (predominately <1/16") approximately 20% of core, fossiliferous (casts and 	1
_	R1-NQ			<5 deg, smooth, planar, open <1/16" 82.5' - Mechanical break, <5 deg, rough,	H	molds)	1
_	5 ft 66%	17	>10	undulating, tight 82.5-82.7' - Fracture zone, <5 deg, fragments	H		1
_			_1	to 2", angular	Н	No December 94.2.90.01	1
85				83.4' - Bedding plane, <5 deg, rough, undulating, open <1/16"	Н	- No Recovery 84.3-86.0'	1
-41.6			NR	83.6-84.0 - Fracture zone, horizontal,	Ш		R1: 11 minutes
	86.0			fragments from <1/8" to 2" angular to subangular	Ш	_	Core run times not
			>10	84.15' - Fracture, 70-80 deg, rough, undulating, tight	Ш	Limestone - 86.0-91.0' - yellowish gray, (5Y 7/2),	recorded below run R1
l _			- 10	86.0-86.1' - Fracture zone, no visible	Ы	very fine to medium grained, strong	
_			2	orientation fragments to 1/2" 86.6' - Mechanical break, <5 deg, rough,	H	HCl reaction, weak (R2), zone from 88.3-89.6' medium stong to strong	
_				undulating, tight	F	rock (R3/R4)	_
_	R2-NQ 5 ft	78	1	87.4' - Bedding plane, <5 deg, smooth, planar, open 1/2", fine infilling		_	-
_	100%			87.8' - Bedding plane, <5 deg, rough, planar, tight	H	_	-
_			0	88.0' - Bedding plane, <5 deg, rough, planar, -	H	_	-
90 <u> </u>				open, <1/16" 90.0' - Fracture, <5 deg, rough, undulating,	H	<u> </u>	_
-			3	open, <1/16", fine infill	Н	_	-
-	91.0			90.6, 90.8' - Fractures (2), 5-10 deg, rough, undulating, open, <1/16"	H	91.0-92.35' - grayish yellow, (5Y 8/4),	-
-			5	91.15, 91.25 - Fractures (2), <5 deg, rough, undulating, open to 1/4"	Ħ	 fine to coarse grained, strong HCl reaction, very weak to weak (R1 to 	-
-				91.5' - Mechanical break or bedding plane,	ш	R2), voids to <1/6", 5-15% of core	-
-			3	<5 deg, rough, undulating, tight 91.8, 91.95, 92.1, 92.15' - Mechanical break		Sandy Fat Clay (CH) 92.35-92.5' - light olive gray, (5Y	1
_	R3-NQ			or bedding plane (4), <5 deg, rough,	Ш	5/2), moist, high plasticity, no	-
_	5 ft 92%	35	1	undulating, open to 1/4" 92.35-92.5' - Fracture or bedding plane, <5	\vdash	- \dilatancy	1
-	3_,3		. , ,	deg, smooth, planar, fine infilling	Ħ	Limestone92.5-93.5' - Same as 91.0-92.35'	1
95			>10	93.75, 94.1' - Mechanical break (2), <5 deg, rough, undulating, tight	H	93.5-95.6' - Same as 91.0-92.35' except medium to coarse grained,	1
-51. 6			>10	94.5-95.6' - Fracture zone, no visible orientation, fragments to 2" angular, dark		voids to <1/16" approximately	7
	96.0		NR	gray to black staining on some fragments	H	15-25% of core No Recovery 95.6-96.0']
_			1	96.15' - Bedding plane, <5 deg, rough,	Н	Limestone 96.0-101.0' - yellowish gray to]
_			'	undulating, open <1/16" 96.6-97.7' - Mechanical break, vertical,	dash	grayish yellow, (5Y 7/2 to 5Y 8/4),]
_			2	rough, undulating, tight	尸	fine to coarse grained, strong HCI reaction, very weak to medium]
_				97.77' - Bedding plane, <5 deg, rough,	H	strong (R1 to R3), fining with depth,	
-	R4-NQ 5 ft	33	2	undulating, tight	H	voids to <1/16" 5-10% of core	
-	100%			98.5' - Fracture, 45-55 deg, rough, undulating, tight	団	-	-
-			2	98.8' - Fracture, 45-55 deg, rough, undulating, open 1/8"	H	_	-
100_ -56.6				99.6' - Mechanical break or bedding plane, —	$H\overline{I}$	_	-
-			2	<5 deg, rough, undulating, open 1/8"	Ħ	-	-
-	101.0				H		-
-					•		-

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-01	SHEET	7	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

				TENT . CIVIE 43B 3/N 331374, ITIUU TOLATY, NQ 10015, NW			ORIENTATION: Vertical
WATER	LEVELS: 9.5	ft bgs	s on 1		2/3/20	D7 LOGGER : T. Borton, J. Schaeffe	
>				DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱ႘ᇋ	AUN H,A	(%	URE		12	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	ZE F	Q D (%)	CT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COF	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
<u> </u>					Н	Limestone	
-			0		\Box	 101.0-106.0' - yellowish gray, (5Y 	_
_				400 Ol Machaniael basels 45 des assurb	₽	7/2), very fine to medium grained,	_
I _			1	102.0' - Mechanical break, <5 deg, rough, undulating, tight	Щ	strong HCl reaction, weak to medium strong (R2 to R3), voids to 1/8"	
			·	unduluting, agric	Н	(predominately <1/16") over	
	R5-NQ				Н	approximately 15% of core, trace	
	5 ft 100%	100	0		\vdash	organics	1
-	10070				ш	-	-
			0		Н	-	-
105 <u> </u>				-	\blacksquare	<u> </u>	
-01.0			0		Ľ	_	
	106.0		_		ш	_	
				106.3, 107.35, 107.6' - Mechanical break (3),	Ш	106.0-111.0' - Same as 101.0-106.0'	Water level = 9.5' below
			1	106.3, 107.35, 107.5 - Mechanical break (3),<5 deg, rough, undulating, open 1/8"	\Box	 except weak (R2), irregular wavy bedding from 106.5-107.45', 	ground surface -
_				g,g,	Н	fossiliferous zone from 107.7-108.7'	
-			2		ш	with voids to 1/8" over 10-12% of the	-
-	R6-NQ				H	_ core	_
_	5 ft	57	1	100 AEL Fracture E 10 des rough		-	_
	100%			108.45' - Fracture, 5-10 deg, rough, undulating, tight	Н	_	
			,	109.15, 110.35' - Fractures (2), 20-30 deg,			
110			1	rough, undulating, tight	Н		1
-66.6						_	_
-			1		Н	-	Total depth of boring is
_	111.0				ш	Bottom of Boring at 111.0 ft bgs on	111.0'
_					1	- 12/3/2007	_
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-02	SHEET	1	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724719.3 N, 456342.2 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" drag bit

ORIENTATION : Vertical

DHILLIN	GIVILITI	JD AND	EQUIFIVI	ENT : CIVIE 550 S	/N 186073, muu rotary, cati	nead, AWJ rods, 3-7/8" drag	DIL		ORIENTATION : Vertical
WATER	LEVELS	: 6.1 ft bo	gs on 11/3	30/07	START: 11/29/2007	END: 12/1/2007	LOGGEF	? : D.	Whitaker
				STANDARD	SOIL	DESCRIPTION		(L	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION				SYMBOLIC LOG	
ON EEC				TEST RESULTS	SOIL NAME, USC	SOIL NAME, USCS GROUP SYMBOL, COLOR,			DEPTH OF CASING, DRILLING RATE,
ACIE		RECOVE	ERY (ft)		MOISTURE CONT	ENT, RELATIVE DENSITY	OR	反	DRILLING FLUID LOSS, TESTS, AND
무무실			#TYPE	6"-6"-6"	CONSISTENCY, SO	IL STRUCTURE, MINERAL	OGY	Ϋ́	INSTRUMENTATION
				(N)				S	
42.3	0.0				Topsoil	dad aand with arganiaa		111	
		1.2	SS-1	2-3-3	Poorly Graded Sand	ded sand with organics	/ -	団建	
-				(6)		with Siit (SP-SW) wish brown grading to dar	·k –	111	†
-	1.5				vellowish brown, (10Y	'R 6/2 to 10YR 4/2), moist	i. /-	1	-
_					\loose, fine grained, no	HCI reaction, silica sand			_
					to 10% nonplastic fine	es			
1 -							_		1
-							-		-
-							-		-
_							_		_
							_		
5	5.0						_]
37.3					Clayey Sand (SC)				
-		1.3	SS-2	4-3-32		vellowish brown to light gre			1
-		1.3	33-2	(35)	gray, (10YR 5/4 to 5G	i 8/1), moist, dense, fine g I reaction, 30% medium to	Jrained, √	\prod	Driller's Remark: Hard drilling at 6.0'
	6.5				\slow dilatancy, no HC \plasticity fines, some	organics	л IIIgi I / Г-		שווופו s nemark. המוט מווווותן מנ ס.ט – –
					Silt (ML)	0.9400			
					5.75-6.3' - grayish ora	ange to moderate yellowisl	h -		1
-						0YR 5/4), moist, hard,			†
-					nonplastic, very rapid	dilatancy, mild to modera fine sand, carbonate mate	te HCI _	1	-
I -					trace organics	ille Saliu, Carbonale male	- lais,		_
I _					J				
10	10.0						-		1
32.3	10.0				Silt With Limestone I	Fragments (ML)		ш	Driller's Remark: Lost 50% circulation at
-		0.9	SS-3	3-4-50/3.5	10.0-10.85' - grayish d	orange to dark vellowish o	range, -	$\ \ $	10.0'
I -	44.0	0.5	00-0	(54/9.5")	(10YR 7/4 to 10YR 6/	6), wet, hard, nonplastic, h	high $_{ar{ar{ar{ar{ar{ar{ar{ar{ar{ar$	₩	_
	11.3					lerate HCl reaction, 10% vone lenses (angular limes			
					fragments up to 1" dia	ameter), trace black organ	nic -		
-					staining	,, .	-		Driller's Remark: Hard drilling at 12.0'
-									-
-							-		
_							_]
1 7							-	1	Driller's Remark: Losing circulation, soft,
1	45.0						-	1	possible void space at 14-14.5'
15 27.3	15.0	0.3	SS 1	50/4.5	Silty Sand With Lime	estone Fragments (SM)		717	Driller's Remark: Hard drilling, 100%
	15.4	0.3	SS-4	(50/4.5")		10.0-10.85' except 34%	Γ-	111	circulation loss at 15.0'
					\nonplastic fines, 66%	limestone fragments, no	/_		
					organics]
-							-	1	1
-							-	1	Driller's Remark: Regaining some circulation
-							-		at 17.5'
							_		Driller's Remark: Soft at 17.9-18.5', lost all
									circulation Driller's Remark: Light drill chatter at 18.0'
1 7	20.0						_		Driller's Remark: Light drill chatter at 18.0 – Driller's Remark: Hard drilling at 19.0'
-	20.1	0.0	SS-5	50/1.5	No Recovery 20.0-20.	.1'		H	_
-	_5			(50/1.5")				ł	
20					Dente D. J. O. J.	00 0 4 5 -		\vdash	
1					Begin Rock Coring at See the next sheet for	ZU.U TI DGS			
					OGG THE HEYE SHEEL IOI	i ino rook core log			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-02	SHEET	2	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724719.3 N, 456342.2 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING	CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical											
WATER	LEVELS : 6.1	ft bg	s on 1	1/30/07 START : 11/29/2007 END : 12	2/1/20	07 LOGGER : D. Whitaker						
≥0≥	- 6			DISCONTINUITIES	ပ္ထ	LITHOLOGY	COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.					
22.3	20.0 R1-NQ 1.5 ft 73% 21.5	50	1 2 NR	20.1' - Fracture, horizontal, rough, undulating, bedding plane fracture, half of fracture surface open, <1/16" silt infill 20.85' - Fracture, 10 deg, smooth to rough, undulating, open, <1/16" fine sand and silt		Limestone 20.0-21.1' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), fine grained, mild HCl reaction, weak (R2), voids to 1/16' diameter	Water level is 6.1' below ground surface on - 11/30/07 at 07:50 Begin rock coring at 20' R1: 8 minutes -					
- - -	R2-NQ		>10	infill 20.91' - Fracture, 65 deg, rough, undulating, trace of fine sand infill, open 21.65' - Fracture, 75 deg, rough, undulating, open 22.1-23.0' - Fracture zone, horizontal,		over 30% of rock, 5-10% cavities up to 1/4" diameter, poorly fossiliferous, trace recrystallization in pore space No Recovery 21.1-21.5' Limestone 21.5-24.75' - dark yellowish orange,	08:50-10:15 Changing out damaged drill bit Driller's Remark: Soft drilling at 23.0', hard at					
25_ 17.3	5 ft 65%	45	1 0 NR	angular limestone fragments with trace of silt infill 22.6' - Fracture, 5 deg, rough, undulating, tight 22.75' - Fracture, 75 deg, smooth, undulating, open to tight (other surface in fragments but		(10YR 6/6), fine grained, moderate HCl reaction, weak (R2), voids to - 1/16" diameter over 40% of core surface, 5-10% spherical and elongated cavities up to 1/4" diameter, highly fossiliferous (molds/casts)	24.0'					
-	26.5			fits tight on surface) 22.85' - Fracture, 20 deg, rough, undulating to stepped, open		No Recovery 24.75-26.5'	-					
- - -	R3-NQ		>10 >10 >10	23.5' - Fracture, 20 deg, rough, undulating, tight 24.15' - Fracture, 70 deg, rough, undulating, 1/4" open 26.75' - Fracture, 10 deg, rough, undulating, open		26.5-27.15' - dark yellowish orange to moderate yellowish brown, (10YR 6/6 to 10YR 5/4), fine to medium grained, mild HCI reaction, extremely weak (R0), voids to 1/16" cover 40% of core surface, 5-10% cavities up to	Driller's Remark: Soft drilling at 27-28' -					
30	5 ft 48%	0	NR	26.9-27.15' - Fracture zone, subangular limestone rock fragments up to 1-1/2" diameter 27.9-28.4' - Fracture zone, fragments from coarse sand size to 3/4" diameter, subangular to angular 28.5' - Fracture, vertical, rough, undulating,		1/4" diameter, possible bioturbation at 26.9'; trace silt infill, trace recrystallization in void space, poorly fossiliferous Silt (ML) 27.15-27.9' - grayish orange, (10YR	- R3: 8 minutes					
-	31.5			tight 28.6-28.7' - Fracture zone, rock fragments 28.8' - Fracture, 85 deg, rough, undulating		7/4), wet, soft, nonplastic, very rapid dilatancy, moderate HCl reaction, with 10% fine to coarse sand-sized	- -					
-			1	31.9' - Fracture, 20 deg, smooth to rough, undulating, open 32.9' - Fracture, 20 deg, rough, undulating, 1/2" open		with 10% fine to coarse sand-sized limestone fragments	Driller's Remark: Soft at 32.0-32.5', hard at 32.5' -					
35_ 7.3	R4-NQ 5 ft 91%	82	3	33.7, 34.0' - Fractures (2), 20 deg, rough, undulating to stepped, open up to 1/2", <1/16" sand infill 34.45' - Fracture, 10 deg, smooth, planar, tight		10YR 6/6), very fine to fine grained, strong HCl reaction, weak (R2), voids (1/16") over 1% of core surface, poorly fossiliferous No Recovery 28.9-31.5' Limestone						
-	36.5		1 NR >10	35.6' - Fracture, horizontal, rough, undulating, open up to 1" 36.0' - Fracture, 70 deg, rough, undulating, open (missing half of fracture surface) 36.65-36.85' - Fracture zone, subangular to		31.5-32.15' - yellowish gray to moderate yellow, (5Y 7/2 to 5Y 7/6), very fine to fine grained, mild HCI reaction, very weak (R1), small voids (1/16") over 2% of core surface, 2	R4: 21 minutes Driller's Remark: Soft drilling from 36.5-38', hard					
- - - - 40	R5-NQ 5 ft 42%	16	>10 0 NR	subrounded rock fragments with rough to smooth and undulating surfaces 37.3' - Fracture, 20 deg, rough, undulating, up to 1/4" open 37.35, 37.5, 37.7' - Fractures (3), 25 deg, rough, undulating, open up to 1/2", trace sand infill 37.85' - Fracture zone, rock fragments		possible cavities up to 3/4" diameter, very poorly fossiliferous, black staining covers 40% of surface, also trace iron staining orange-red yellow color	at 38.0', soft at 38-38.5', hard at 38.5'					
					1							



PROJECT NUMBER:	BORING NUMBER:				-	
338884.FL	CT-02	SHEET	3	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724719.3 N, 456342.2 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

				TENT : CIVIE 350 3/N 180073, Mud Totally, NQ tools, NVV			ORIENTATION : Vertical
WATER	LEVELS: 6.1	ft bg	s on 1	1/30/07 START : 11/29/2007 END : 12	2/1/200	7 LOGGER : D. Whitaker	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			•	SYMBOLIC LOG		
Π ₹ Z	Z Z ∑		FRACTURES PER FOOT	DESCRIPTION	5	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
뻐병은	5.元	(%) _Q	LR'S	DEDTIL TYPE OBJECTATION BOLIOURIES	ובֻׁוּ	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
±₹.₹	999	<u> </u>	25	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BC	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
유용필	[[[[]	Ø	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	078	œ	Ь	THISTANDES, COTA NOT CITATIVO, TAND TICHTNESS	S	OHARAGIERIOTIOG	
2.3				38.0' - Fracture, 20 deg, rough, undulating,		Limestone	
-			ND.	up to 1/2" open	+	- 32.15-36.05' - light olive gray, (5Y	R5: 7 minutes
_			NR	38.15' - Fracture, 20 deg, rough, undulating		2/2), fine to medium grained,	-
	41.5			38.2' - Fracture, 10 deg, rough, undulating		moderate HCl reaction, weak (R2),	
-	11.0					- voids 1/16" diameter cover 10% of	-
_			2		\perp	core surface, 5-10% cavities up to 1"	_
			-	42.25' - Fracture, 20 deg, rough, undulating,		diameter, highly fossiliferous	
-	1				\perp	- (molds/casts)	-
_			>10	tight 42.35' - Fracture, horizontal, rough,	\perp	No Recovery 36.05-36.5'	-
			'	undulating, up to 1" open		Limestone	
-	R6-NQ			42.9' - Fracture, 20 deg, rough, undulating,		- 36.5-38.6' - moderate olive brown,	-
-	5 ft	25		trace sand infill	+	(5Y 4/4), fine to medium grained,	-
	40%	-		43.15-43.5' - Fracture zone, fine to coarse	\vdash	mild HCl reaction, extremely weak (R0), voids up to 1/16" diameter over	
₄₅	1			gravel-sized subangular to subrounded rock	1-1	50% of core surface, 10% cavities up	1
45			NR	fragments —	++1	to 1/4", moderately fossiliferous	
-2.7				-5		(fossils), trace molds and casts, 5%	
I -]					silt infill in void space, 5%	R6: 7 minutes
-					ш	recrystallization, trace black material	-
	46.5				\vdash	(possible fossils or organics)	
-					┰┷	No Recovery 38.6-41.5'	-
-	-		2	46.8' - Fracture, horizontal, rough, undulating,	$\pm \Box$	Limestone	-
				tight to 1/4" open, trace black staining on		41.5-43.5' - Same as 36.5-38.6'	_
				surfaces	T	No Recovery 43.5-46.5'	-{
-	1		4	47.5, 47.65' - Fracture (2), horizontal, rough,	+	Limestone	-
_				undulating, tight to 1/4" open, black organic	┸	46.5-47.65' - moderate yellowish	_
	R7-NQ			staining covers 5% fracture surfaces	Т	brown, (10YR 5/4), fine grained, mild	
-	5 ft	40	>10	47.95' - Fracture, 40 deg, rough, undulating	-	HCl reaction, weak (R2), voids	-
l _	92%			to stepped, eroding fracture surface	Щ	(1/16") over up to 30% of core	_
50				47.95-48.7' - Fracture zone, horizontal, many	\vdash	surface, 10% cavities up to 1/2" size,	
-7.7			>10	bedding plane fractures, fissile/easily broken _	+-	highly fossiliferous (molds)	
				material	┸	Silty Sand (SP)	_
			1	48.7' - Fracture, 70 deg, smooth to rough,		47.65-48.0' - moderate yellowish	R7: 11 minutes
-	1			undulating, eroding fracture surface 48.7-49.25' - Fracture zone, sand to coarse	\perp	brown, (10YR 5/4), wet, fine to	-
_	51.5		NR	gravel-sized rock fragments	╆┯	coarse grained, medium plasticity	l
				49.15' - Fracture, vertical, rough, stepped,	\vdash	Limestone	Driller's Remark: Hard
-			>10		\top	48.0-49.1' - moderate yellowish	drilling at 52'
-			<u> </u>	open 49.8' - Fracture, 80 deg, rough, stepped,		brown, (10YR 5/4), fine grained, mild	-
			ا ہ ا	open		HCl reaction, extremely weak (R0),	
I -	1		0	49.8-50.2' - Fracture zone, silt to fine	1,-1	voids (1/16") over 5% of core	-
-			<u> </u>	gravel-sized rock fragments	╀┼	surface, mostly poorly competent	-
	R8-NQ	20	_	50.2' - Fracture, 80 deg, rough, stepped,	H	with silt infill	
I -	5 ft	38	3	open		49.1-51.1' - moderate yellowish	1
-	62%		0	50.6' - Fracture, 10 deg, rough, stepped, tight	$-\Box$	brown, (10YR 5/4), fine grained, mild	-
55_]		╙╜	to 1/4"open, <1/16" silt infill	$oldsymbol{oldsymbol{eta}}$	HCl reaction, very weak (R1), small	
-12.7]			51.5-52.2' - Fracture zone, rock fragments	$\vdash \vdash$	(1/16") voids over 2% of core	
-	1		NR	from fine to coarse gravel-sized, subangular	+	surface, many cavities up to 3/4",	D9: 16 minutes
1]			to subrounded	ᅪᅥ	moderately fossiliferous (molds)	R8: 16 minutes
I -	 E			52.2' - Fracture, 0-10 deg, rough, undulating,		No Recovery 51.1-51.5'	1
-	56.5		-	open	\Box	_ Limestone	-
I _]		0	53.7' - Fracture, horizontal, smooth to rough,	Щ	51.5-52.2' - pale yellowish brown to moderate yellowish brown, (10YR 6/2	_
I -			ا ا	planar, tight	\vdash		1
-	1			54.05' - Fracture, 10 deg, rough, undulating,	+	to 10YR 5/4), fine grained, mild HCl reaction, extremely weak to very	-
I -]		1	tight	\Box	weak (R0 to R1), voids (1/16") over	1 _
I			'	54.25' - Fracture, horizontal, rough,		5% of core surface, cavities up to	1
-	R9-NQ			undulating, fossil prints in black staining on	ΨП	3/4"x1/2", fossiliferous, trace molds,	-
I -	5 ft	70	3	fracture surface	\bot	trace organic staining (2% coverage)	1 _
	98%	10	ا ا	58.4' - Fracture, horizontal, rough, undulating,	\vdash	trace organic staining (2 /0 coverage)	
I	1 55,31			open, 1" sand and silt infill, black staining on	+	-	-
60				1% of fracture surface	厂		_
	1						ī



PROJECT NUMBER:

33884.FL BORING NUMBER:

CT-02 SHEET 4 OF 4

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724719.3 N, 456342.2 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 6.1			1/30/07 START : 11/29/2007 END : 12	/1/20	07 LOGGER : D. Whitaker	
				DISCONTINUITIES	_O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	907 c	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A CE	L H.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
	CORE	RQD	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-17.7	0716	IĽ.	>10	58.9' - Fracture, horizontal, rough, undulating,	S	Limestone	Driller's Remark: Hard
				tight to 1/4" open -	H	 52.2-53.7' - pale yellowish brown to 	drilling at 59.5'
-			0	59.15' - Fracture, horizontal, rough, undulating, fissile surfaces, tight	Ė	moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine	R9: 11 minutes
-	61.5		NR)	59.25' - Fracture or mechanical break, rough, -	L	 grained, moderate to strong HCl 	-
-			1	stepped, tight 59.6' - Fracture, horizontal, rough, undulating,		reaction, weak (R2), small voids (1/16") cover 5% of core surface,	-
-				1/4" open -		 poorly fossiliferous, 2% black 	-
-			1	59.8' - Fracture, horizontal, rough, undulating, 1" of silt and sand infill between the two		staining, 5% recrystallization 53.7-54.2' - pale yellowish brown to	-
-	R10-NQ			fracture surfaces -	H	moderate vellowish brown. (10YR 6/2	-
-	5 ft	100	1	60.2' - Fracture, horizontal, rough, stepped, tight	H	to 10YR 5/4), fine grained, strong HCl reaction, extremely weak (R0),	-
l	100%			62.1' - Fracture, 10 deg, smooth, undulating, –	H	 poorly fossiliferous 	-
65 <u> </u>			1	tight to 1/4"open 63.05' - Fracture or mechanical break,	L	54.2-54.6' - pale yellowish brown to moderate yellowish brown, (10YR 6/2	-
				horizontal, smooth, undulating, tight _		to 10YR 5/4), fine grained, strong	R10: 11 minutes
-			1	64.0' - Mechanical break 64.35' - Fracture, 45 deg, rough, undulating,		HCI reaction, very weak (R1), voids (1/16") cover 10% of core surface,	-
-	66.5			tight, black fossils 2% coverage 65.35' - Fracture, 0-20 deg, rough,	F	cavities up to 1/2" diameter,	-
-				undulating, tight		moderately fossiliferous with black fossils, 2% black staining	-
-				65.9' - Fracture, horizontal, rough, undulating, tight, coral mold on fracture surface		No Recovery 54.6-56.5'	-
-				light, colai moid on hacture surface	l	56.5-59.15' - pale yellowish brown to	-
-				-		moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, strong	-
-				-	l	HCl reaction, very weak (R1), voids	-
-				-	l	(1/16") cover 40% of core surface, very fossiliferous, with cavities up to	-
-					l	3/4" diameter, black fossils and fossil	
-				-	l	molds, trace fossil casts, silt with sand-sized limestone fragments at	-
-				-	l	58.4-58.5' and 57.8-57.9'	-
-				-		59.15-59.9' - pale yellowish brown to moderate yellowish brown, (10YR 6/2	-
-				-	1	to 10YR 5/4), fine grained, strong	-
-				-	l	HCI reaction, extremely weak (R0), no voids, trace cavities, moderately	-
-				-	l	 fossiliferous with black fossils 	-
-				-	l	59.9-60.4' - pale yellowish brown to moderate yellowish brown, (10YR 6/2	-
-				-		to 10YR 5/4), fine to very fine	-
-				-		grained, strong HCl reaction, weak (R2), voids (1/16") cover 15% of core	-
-						surface, cavities up to 3/4"x1/2",	
-				-	l	moderately fossiliferous (molds) 	-
-				_		except no voids or cavities, black	-
-				_	-	staining over 15% of core No Recovery 61.4-61.5'	
-				-	1	Limestone	-
-				-	1	61.5-61.9' - Same as 60.4-61.4' 61.9-66.5' - Same as 56.5-59.15'	-
-				-	-	except more fossiliferous (molds).	
-				-	l	more large cavities (up to 1"x1-1/2"), increasing with depth	-
-				-	l	Bottom of Boring at 66.5 ft bgs on	-
-				-	I	12/1/2007 -	-
					-		_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-03	SHEET	1	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724626.2 N, 456581.9 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION : Vertical

DITTELLIT	G IVIL IIII	0071140	LQOII IVII		N 1860/3, mud rotary, cathead, AWJ	1003, 3-1/0 til-cone b	JIL		ORIENTATION: Vertical
WATER	LEVELS	: 3.0 ft bo	gs on 12/0	03/07	TART: 12/2/2007 END: 12/5		GGER	: D.	Whitaker, T. Borton
> 0 0 1				STANDARD	SOIL DESCRIP	TION		စ္ခ	COMMENTS
A PIC	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 11115 11000 00010	0.44001 00100		CLC	DEDTU OF GACING DRIVING DATE
HHH		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP : MOISTURE CONTENT, RELA			OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCT		′	SYMBOLIC LOG	INSTRUMENTATION
				(N)					
40.8	0.0			1-2-2	Topsoil	2/1), organics	/-	71/	_
		1.2	SS-1	(4)	Poorly Graded Sand (SP)				_
	1.5			. ,	0.4-1.15' - yellowish gray, (5Y 7/ very fine to fine grained, no HCl	2), moist, very loose	e, /		
					\5% organics, trace nonplastic fir		u, /		
					,	-			
1 7									1
1 1									1
1 1							-		1
1 1							-		1
5_	5.0						-		1
35.8	5.0				No Recovery 5.0-6.5'				-
		0.0	SS-2	3-2-3	•		-		-
1 -		0.0	33-2	(5)			-		-
1 -	6.5				Fat Clay With Sand (CH)		_	///	Driller's Remark: Medium chatter at 6.5'
-			00.0	NA	¬ 6.5-6.9' - light olive gray, (5Y 6/1)), wet, very soft, hiç	gh /=		Due to no recovery at previous interval,
1 -		0.4	SS-3	(NA")	plasticity, slow dilatancy, no HCl silica sand	reaction, 15% fine	/-		another sample was collected at 6.5-8.0'
1 4	8.0				Silica Sariu		/ -		SPT results not recorded
							_		_
							_		_
1 4									_
10	10.0								_
30.8	10.5	0.2	SS-4	50/5.5 (50/5.5")	Silt (ML) 10.0-10.2' - moderate yellow to o	ducky vollow (5V 7/	П	ш	Driller's Remark: Moderate chatter and hard at 10.0'
				((30/3.3_)/	to 5Y 6/4), mild to moderate HC	I reaction, 70%	[/ ۲		at 10.0
					nonplastic fines				
1 7									
1 1									1
1 1							-		1
1 1							-		1
1 1							-		Driller's Remark: Light chatter at 13.5-15.0'
							-		1
,	15.0						-		│
15 25.8	15.0				Sandy Silt And Limestone Frag	ments (ML)		Ш	\dashv
		1.2	SS-5	27-13-14	15.0-16.15' - pale yellowish oran	nge to dark vellowish	h -		
-		1.2	33-3	(27)	orange, (10YR 8/6 to 10YR 6/6), dilatancy, moderate HCl reaction	, wet, very stitt, high n. 15-20% fine to	ו ב		-
	16.5				coarse grained sand and gravel		/-		
					fragments		/		-
							_		
							_		_
									<u>_</u>
									_
]
20									Driller's Remark: 19.5-20.0' soft



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-03	SHEET	2	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724626.2 N, 456581.9 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION: Vertical

DRILLIN	ORIENTATION: Vertical ORIENTATION: Vertical ORIENTATION: Vertical ORIENTATION: Vertical ORIENTATION: Vertical ORIENTATION: Vertical ORIENTATION: Vertical ORIENTATION: Vertical ORIENTATION: Vertical ORIENTATION: Vertical							
WATER	LEVELS	: 3.0 ft bo	s on 12/0	03/07	TART: 12/2/2007 END: 12/5/2007 LOGGER: D. Whitake			
 				STANDARD	SOIL DESCRIPTION g	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
JSE TOPE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	PTH OF CASING, DRILLING RATE, RILLING FLUID LOSS, TESTS, AND		
PTH RFA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION		
				(N)	·			
20.8	20.0	0.7	SS-6	3-50/3.5	Silty Sand And Limestone Fragments (SM) 20.0-20.7' - dusky yellow, (5Y 6/4), wet, very dense,			
_	20.8			(53/9.5")	fine to coarse grained, mild to moderate HCl reaction,	s Remark: Very hard at 20.5'		
					30% nonplastic fines; 40% fine gravel-sized limestone			
					magnients, carbonate sand			
					Driller'	s Remark: Heavy chatter at 22.0'		
						s Remark: 22.0-23.0' 100% loss of		
-					- circula	ltion		
-						s Remark: Regain circulation after		
_					- mixing	more mud at 23.5'		
25	25.0				1	7		
15.8				9-30-50/1.5	Silty Gravels (GM)			
-	00.4	0.7	SS-7	(80/7.5")	25.0-25.7' - dark yellowish orange, (10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl	s Remark: Dropped 3 inches from		
-	26.1			·	reaction, carbonate sand, 24% nonplastic fines, 20% / 1	5.75' (soft or possible void)		
-					gravel-sized limestone fragments			
-					1	=		
-					1 1	-		
-						-		
-						-		
-					+ 1	-		
-						-		
30 10.8	30.0			29-50/3.5	Limestone With Silty Sand	-		
-	30.8	0.6	SS-8	(79/9.5")	30.0-30.6' - dusky vellow. (5Y 6/4), wet, very dense.	-		
-					mild to moderate HCl reaction, gravel sized grains, 30% silty sand (SM) similar to 25.0-25.7'	-		
-						s Remark: Heavy Chatter at 31.5'		
-						-		
-					- I Driller'	s Remark: Heavy chatter at 32.5'		
-						's Remark: Soft at 33.0-34.5'		
-					- I Briller			
-					4 1	-		
-	25.0				- Drillor	s Remark: Heavy chatter at 34.5'		
35 5.8	35.0	0.5	SS 0	40-50/0.75	Limestone With Silty Sand Driller	s Remark: Loss of circulation at 35.0' —		
J.6 -	35.6	0.5	SS-9	(90/6.75")	35.0-35.5' - Same as 30.0-30.6 Water	level is 3.0' below ground surface at on 12/3/07		
-					Begin Rock Coring at 35.5 ft bgs See the next sheet for the rock core log	OII 12/0/07		
-					- I I TONE SHOOL OF THE TOOK SOILS TOY	-		
_					4	=		
_					<u> </u>	=		
-					1 1	_		
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]			
40								
I					1 1			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-03	SHEET	3	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724626.2 N, 456581.9 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

CORING	INICITIODA	ND L	ZUIFIV	/IENT: CME 550 S/N 1860/3, mud rotary, NQ tools, NW	Casin		ORIENTATION : Vertical
WATER	LEVELS: 3.0	ft bg	s on 1	2/03/07 START: 12/2/2007 END: 12	2/5/200	D7 LOGGER : D. Whitaker, T. Borton	n
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	SYMBOLIC LOG		
H A Z	z'A'∑	_	FRACTURES PER FOOT	DESCRIPTION	C L	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표일본	Stě	Q D (%)	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	\exists	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
₽₩¥	#결성		24	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD
	Sem	S. O.	5.2	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			_	05.5.05.05! 5	9,	Lineartone	Danis saals assis a at 05 5
	35.5 R1-NQ		>10	35.5-35.85' - Fracture zone, fine to coarse	Н	Limestone - 35.5-36.7' - dusky yellow to light olive	Begin rock coring at 35.5'
	1.5 ft	50	1	angular gravel sized fragments 35.85' - Fracture, 60 deg, rough, undulating,	П	gray, (5Y 6/4 to 5Y 5/2), very fine to	R1: 8 minutes
-	80%			open		fine grained, mild HCl reaction, weak	1
_	37.0		NR	36.6' - Fracture, 70 deg, rough, undulating,	ш	- (R2), voids 1/16" diameter over 1%	_
			_	open 1/16"-1/8", organic infilling	Н	core surface, 2 cavities up to 1/2"x1-	
_	1		3	37.0-37.15' - Fracture zone, angular fine		1/2" possibly both fossil molds, black	1
I -				gravel sized fragments		 staining over 15% core surface 	-
			_	37.65' - Fracture, horizontal, smooth,		No Recovery 36.7-37.0'	
	1		0	undulating, 1/4" open	Н	Limestone	1
-	D2 NO			37.75' - Fractures (3), 40-50 deg, smooth,	+	- 37.0-41.0' - light olive gray to dusky	-
	R2-NQ 5 ft	78	1	undulating, 2 open, 1 tight	┢	yellow, (5Y 2/2 to 5Y 6/4), very fine to	
40	96%	10	Ι'	39.1' - Fracture, horizontal, rough, planar,		fine grained, mild to moderate HCl	1
0.8	00,0			open up to 1/4" —	╂┼┦	— reaction, weak (R2), voids 1/16"	ı ⊣
-			1	39.5, 40.25' - Mechanical break (2)	₽₩	diameter over 2% core surface from 37.0-38.5' to over 5% from 38.5-40.0'	1 -
			Ι΄.	40.6' - Fractures, horizontal, rough, stepped,	\Box	37.0-38.5 to over 5% from 38.5-40.0 and 10% from 40.0-41.0', grain size	j l
1 -				tight		coarsening with depth, number and	R2: 18 minutes
-			2	41.35, 41.7' - Fractures (2), horizontal, rough,	ш	size of cavities increasing with depth,	
	42.0	L	NR	undulating, fissile up to 1/2" open	Н	up to 1"x1- 1/2", highly fossiliferous -	
	·			42.1' - Fracture, 15 deg, rough, undulating,	\vdash	molds/casts, trace possible black	1
-			3	tight, fissile	ш	fossils	1
l _				42.7, 42.8' - Fractures (2), horizontal, rough,		41.0-41.8' - dusky yellow, (5Y 6/4),	
				undulating, open up to 1/2", fissile	\vdash	fine to medium grained, mild HCI	
-	1		>10	45.0, 45.5 - Hactures (2), 0-10 deg, 10dgH,	Н	reaction, extremely weak (R0), voids	1
_				undulating, open up to 1/2"	#	_ 1/16" over 30% of core surface,	1
	R3-NQ		_1_	43.4-43.55' - Fracture zone, coarse sand to		cavities up to 3/4"x1-1/2", highly	
45	5 ft 45%	11		fine gravel size subrounded fragments	┧	fossiliferous with molds and casts,	1
45 -4.2	45%			43.8, 44.0, 44.3' - Fractures (3), horizontal,	₽₽	1% organics	_
-4.2				rough, undulating, tight to 1/2" open	ш	No Recovery 41.8-42.0' Limestone	
			NR			42.0-44.25' - Same as 41.0-41.8'	
-	1				ш	except moderate yellowish brown,	R3: 3 minutes
_					+	- (10YR 5/4), number of cavities	-
	47.0		<u></u>			increasing with depth	
1				47.15' - Fracture, horizontal, rough,		No Recovery 44.25-47.0'	1
-			2	undulating, open	╂┼┦	- Limestone	1
I -				47.41' - Fracture, horizontal, smooth to	Н	47.0-48.2' - dusky yellow to light olive	ı
				rough, undulating, open up to 1/2"		gray, (5Y 6/4 to 5Y 5/2), fine grained,	
1 -						- mild HCl reaction, weak (R2), voids	1
-					$+$ \bot \bot	1/16" over 40% of core surface; 10-20% cavities up to 1/2" diameter,	1
	R4-NQ	16			H	- highly fossiliferous with molds, casts	j l
50	5 ft 24%	10]		and fossils, 10% recrystallization in	1
-9.2	2-7/0		NR	-	ш	1/16" voids	⊢
-					\vdash	- No Recovery 48.2-52.0'	1 -
					$\vdash \vdash$	•	
1 -				•	Ш	=	R4: 18 minutes
-					\Box	_	1
1 -	52.0				₽₽	_]
				52.15' - Fracture, horizontal, rough, planar to	H	Limestone	Water level 3' 2" below
1 -			5	rough stepped, open up to 1/2", organic		- 52.0-52.55' - dusky yellow, (5Y 6/4),	ground surface at 07:20 on -
1 -				infilling, 1/16" thick	Ш	fine grained, mild HCl reaction, weak	12/4/07
				52.4' - Fracture, horizontal, rough, stepped,	H	(R2), black organic laminations	j l
1 -			>10	tight, organic infilling, 1/16" thick	14	 1/32"-1/2" thick cover over 40% of surface, most are 1/32" thick, poorly] 1
1 -	ם ו		<u> </u>	52.6' - Fracture, horizontal, rough, undulating,	+	_ surface, most are 1/32" thick, poorly fossiliferous	1
I _	R5-NQ 5 ft	0		open up to 1/2", silt infilling		-	l J
55	40%	U		52.8-52.9' - Fracture zone, 0-10 deg, rough,	Ш		1
-14.2	', ',			undulating, open —	+		⊣
<u> </u>					片		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-03	SHEET	4	OF	4	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724626.2 N, 456581.9 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

				12.141 . GIVIE 330 3/14 100073, Hidd Totally, 14Q (5013, 1444		<u> </u>	
WATER	LEVELS : 3.0	ft bgs	s on 12		2/5/20		
> ^ ^	<u></u>			DISCONTINUITIES	ß	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᇤ유현	R,4%	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΗĂΕ	1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H	D (%)	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
989		Ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ПОП	OJE	ď			S		
			NR	53.15' - Fracture, 70 deg, rough, undulating,	\vdash	Limestone - 52.55-54.0' - moderate yellowish	
				open 53.15-53.5' - Fracture zone, gravel sized rock	h	brown, (10YR 5/4), fine grained, mild	R5: 7 minutes
-				fragments	L	HCl reaction, extremely weak to very	1
l -	57.0			53.65' - Fracture, horizontal, rough,	╁┷	- weak (R0 to R1), strength decreases	
			>10	undulating, tight		with depth, voids cover 5% of core	
			-10	57.0-57.35' - Fracture zone, coarse sand to		surface, cavities that are 1/8"-1/4"	I
-				coarse gravel size subangular rock	₩	- diameter, 5% recrystallization	1
_			>10	fragments with black organic material on fracture surfaces	$+ \top$	(white), 1% black organics, 5% linear 2"x1/16" thick, gray material from	l -
_				58.45-58.8' - Fracture zone, coarse sand to		- 52.8-53.2'	_
	R6-NQ		1	coarse gravel size subangular to subrounded	H	No Recovery 54.0-57.0'	Driller's Remark: Soft at
	5 ft	30		rock fragments, fracture surface are 20 deg	T	Limestone	57-59.6', hard at 59.5-62'
60 <u> </u>	50%			at 58.45' and 70 deg at 58.8', rough, —	匚	— 57.0-59.5' - moderate yellowish	
- 10.2				undulating to stepped	╨	brown, (10YR 5/4), fine grained, mild HCl reaction, weak to extremely	_
			NR	59.25' - Fracture, 15 deg, rough, undulating, tight		weak (R2 to R0), voids 1/16" cover	
I -	1			ugiit .		20% of core surface, cavities up to	R6: 8 minutes
-					₩	3/4" diameter and 1-1/2"x2", highly	-
-	62.0				仜	fossiliferous with molds and casts,	
			4		F	1% black organic material throughout	Original boring CT-03
			1	62.4' - Mechanical break or bedding plane,	₽	core	abandoned at 62' due to - casing problems;
-				<5 deg, rough, undulating, tight	t	_ No Recovery 59.5-62.0' Limestone	replacement boring located
_			0	-	↓ _	62.0-64.5' - medium light gray to	5' north of original boring -
<u> </u>					┢	_ yellowish gray mottled, (N6 to 5Y	Replacement boring blind
	R7-NQ					7/2), medium to fine grained,	drilled to 62'
	5 ft	88	3	64.55' - Bedding plane, <5 deg, smooth,	—	moderate to strong HCl reaction,	1
65 <u> </u>	100%			undulating, tight	╀	medium strong (R3), voids <1/10"-1/2"	-
			0	64.65' - Bedding plane, <5 deg. smooth.	仜	Silty Limestone	_
				undulating, open to <1/16", fine infilling	—	64.5-64.65' - yellowish gray to olive	
I -				64.9' - Mechanical break, <5 deg, rough,	┰ᆣ	gray, (5Y 7/2 to 5Y 3/2), very fine to	R7: 19 minutes
-			1	undulating, tight 66.25' - Mechanical break or bedding plane,	仜	 fine grained, mild HCl reaction, weak 	-
-	67.0			<5 deg, rough, undulating, tight	+	(R2)	-
I _			3	67.25, 67.67, 67.8' - Mechanical break (3), <5	\vdash	Limestone - 64.65-67.0' - yellowish gray to dusky	l J
			١	deg, rough, undulating, tight		yellow, (5Y 7/2 to 5Y 6/4), medium to]
I -				· · · · · · · · · · · · · · · · · · ·	1—	coarse grained, moderate HCl	1
-			0		╀╧	 reaction, very weak to weak (R1 to 	-
l -						R2), voids <1/16" over 30-40% of]
	R8-NQ	E7	1	69.1' - Mechanical break or bedding plane,	\vdash	core surface, trace organics, irregular bedding with depth	
70	5 ft 84%	57	1	<5 deg, rough, planar, open <1/16"	Ľ	67.0-71.2' - yellowish gray to dusky	1
-29.2	01,3			70.0' - Fracture, 5-10 deg, rough, undulating,	H	yellow, (5Y 7/2 to 5Y 6/4), medium to	-
-			2	tight	+	 coarse grained, mild HCl reaction, 	-
l _			_	•	亡	voids up to 1/2" over 5% of core]
				70.9' - Mechanical break or bedding plane, <5 deg, rough, undulating, open 1/8"	\Box	surface predominately from 68.8-69.8', voids <1/16" over 45-55%	R8: 6 minutes
I -	700		NR	-5 deg, rough, undulating, open 1/6	1—	of core surface, trace organics.	Total depth of boring 72.0'
-	72.0				▐	moderately to highly fossiliferous	·
_					1	_ \ (casts/molds)]
					1	No Recovery 71.2-72.0'	
I -					1	Bottom of Boring at 72.0 ft bgs on	1
-					1	_ 12/5/2007	-
l –					1	<u> </u>	_
					1		
I -					1		1
-				_	1		⊣
					1	_	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-04	SHEET	1	OF	3	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724456.6 N, 456923.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLIN	DRILLING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical						
WATER	LEVELS	: 4.0 ft b	gs on 11/3	30/07	TART : 11/29/2007 END : 11/30/2007 LOGGER	? : T.	Borton
 _				STANDARD	SOIL DESCRIPTION	ത	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
BEI JON JON JON JON JON JON JON JON JON JON		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	200	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH RFA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MBC	INSTRUMENTATION
SU ELF				(N)			
40.8	0.0				Topsoil \[\ 0.0-0.2' - brownish black, (5YR 2/1), organics (roots, \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\\ \/	
		0.8	SS-1	0-2-2 (4)	\(\int\)\(\text{wood}\)	111	
	1.5			(.,	Poorly Graded Sand (SP)		
					0.2-0.55' - very light gray to yellowish gray, (N8 to 5Y 8/4), moist, very loose, very fine to fine grained silica	1	
-					sand, trace nonplastic fines, 30% organics (wood and	1]
-					rootlets)	1	1
-					Poorly Graded Sand With Silt (SP-SM) 0.55-0.75' - dark yellowish orange, (10YR 6/6), moist,	1	_
-					very loose, very fine to fine grained, silica sand, 15%	1	-
-					nonplastic fines, trace organic particles	1	-
5	E O				-	1	-
35.8	5.0				Lean Clay With Sand (CL)	///	\dashv
-		0.9	SS-2	1-2-3	$_{-}$ 5.0-5.6' - greenish gray and light olive gray, (5G 6/1 $_{-}$	///	-
-		0.9	33-2	(5)	and 5Y 6/1), mottled, moist, firm, low to medium plasticity, slow dilatancy, 15-20% very fine to fine	•	-
-	6.5				\silica sand, trace rootlets -	ł	-
_					Silty Gravel (limestone) With Sand (GM) 5.6-5.85' - white to yellowish gray, (N9 to 5Y 8/1), wet,	ł	-
-					loose, strong HCl reaction, very fine to coarse gravel,	l	-
_					25-30% fine to coarse sand sized, 15% nonplastic	-	-
_					fines, appears to be fossiliferous	l	_
_					_		_
_					_		_
10	10.0						
30.8				14.04.50	Silty Sand And Limestone (SM) 10.0-11.3' - yellowish gray, (5Y 8/1), moist, very		Driller's Remark: 50% water loss at 10'
		1.3	SS-3	14-34-50 (84)	dense, fine to coarse grained, strong HCl reaction,		
	11.5			. ,	15-20% nonplastic fines, 40-50% fine to coarse limestone fragments, 50-60% SM, all carbonate		_
					(inflestone fragments, 50-00 /8 GW, all carbonate		
					_	1	
]					-	1]
-					-	1	<u> </u>
-					-	1	<u> </u>
15	15.0				-	1	-
25.8	13.0				Silt (ML)	Ш	
-		1.3	SS-4	13-30-33	15.0-16.3' - grayish yellow, (5Y 8/4), moist to wet, hard, nonplastic, slow dilatancy, mild HCl reaction,	1	
-	40.5			(63)	10% fine to medium sand-sized, <5% limestone	łШ	-
-	16.5				fragments to 1/2", all carbonate materials	Π	-
-					-	ł	-
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20						<u> </u>	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-04	SHEET	2	OF	3	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724456.6 N, 456923.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER LEVELS: 4.0 ft bgs on 11/30/07									ONIENTATION: Vertical
WATER	LEVELS	: 4.0 ft b	gs on 11/3	30/07	START : 11/29/2007	END: 11/30/2007	LOGGER	: T.	
1.				STANDARD		SOIL DESCRIPTION		(ľ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		<u> </u>		SYMBOLIC LOG	
		RECOVE	RV (#\	IESI NESULIS	SOIL NAME	, USCS GROUP SYMBOL, C	OLOR,	LIC.	DEPTH OF CASING, DRILLING RATE,
THE SE		I DECOVE	<u> </u>			CONTENT, RELATIVE DENS		BO	DRILLING FLUID LOSS, TESTS, AND
무유한			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, MINE	HALOGY	ΑM	INSTRUMENTATION
				(N)	000 1000	A 11		S	
20.8	20.0					And Limestone (ML)	ard		
_		1.2	SS-5	24-32-30	20.0-21.2 - gray	vish yellow, (5Y 8/4), wet, had dilatancy, mild to moderat	aru, –		_
-				(62)	reaction, 15% fir	ne to medium sand-sized, 1	5-20% fine _		-
-	21.5				rounded limesto	one grains, some are knobb	y/_		-
_						rbonate materials	' / ₋		
-							_		-
-							_		-
l _							_		_
-							_		-
-							_		-
25	25.0								
15.8	25.3	0.0	SS-6	50/3	No Recovery 25	5.0-25.3'			
-				(50/3")			_		-
-							-		-
I -							_		_
_							_		-
-							_		-
_							_		_
-							_		-
-							-		-
l _							_		_
30	30.0								
10.8					Silty Sand (SM)			ΠT	
-			00.7	38-51-45	30.0-31.3' - gray	yish yellow, (5Y 8/4), wet, ve	ery dense, -		-
_		1.3	SS-7	(96)	fine to coarse gr	rained, moderate HCI react	ion, 30%	111	_
	31.5			` '		, 10-15% fine limestone frag	gments	4.14.	
_					\and grains, carb	onate materials	/ -		-
-							-		-
_							_		_
I -							_		-
-							-		-
-	35.0		00.0	50/1.5	L N. D	- 0.05.41		L	-
1	35.1	0.0	SS-8	50/1.5 (50/1.5")	No Recovery 35	o.U-35.1'			
35				(50/1.5")			_		_
5.8					Begin Bock Cori	ing at 35.0 ft bgs			11/30/07 08:00 continue drilling
"-			1		See the next she	eet for the rock core log	_		Water level 4.0' below ground surface
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-04

SHEET 3 OF 3

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724456.6 N, 456923.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 45B S/N 351574, mud rotary, NQ tools, NW casing

WATER	LEVELS : 4.0			1/30/07 START: 11/29/2007 END: 11			
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	010	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
FACE MATIC	E RU STH, OVEI	(%) _Q	FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SURI ELE	COR	ROI	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	35.0 R1-NQ				ш	Limestone	Begin rock coring at 35.0'
_	1 ft 36.0 90%	42	>10	35.45-35.65' - Fracture zone, fine infilling		- 35.0-35.45' - yellowish gray, (5Y 7/2), fine to coarse grained, mild HCl	R1: 2 minutes
_	30.0			(20-30% of zone) - 35.7' - Bedding plane, <5 deg, <1/16" open	╁	reaction, very weak to weak (R1 to	-
_			3	35.8' - Bedding plane, <5 deg, <1/16" open 36.2' - Fracture, <5 deg, rough, undulating,	F	R2), voids to 1/8" (predominantly <1/16") over 20-30% of surface,	1
				open to 1/4"	H	fossiliférous (casts/molds) - 35.45-35.9' - Same as 35.0-35.45'	-
			2	36.6' - Bedding plane, <5 deg, rough, undulating, tight	Ħ	except extremely weak (R0)	
	R2-NQ 5 ft	28	3	36.75' - Fracture, 70-75 deg, rough,	片	No Recovery 35.9-36.0' Limestone	
_	78%	20	٥	undulating, tight 36.9' - Mechanical break or fracture, <5 deg,	oxdot	36.0-39.9' - yellowish gray, (5Y 7/2),	
_			0	rough, undulating, tight 37.25' - Bedding plane, <5 deg, rough,	⊬	fine to coarse grained, mild HCl reaction, very weak to weak (R1 to	
40				undulating, fine to coarse sand sized infill, no	F	R2), with zones of extremely weak (R0) rock at 36.5-36.6' and	
0.8			NR	opening, open 1/8"-1/2" 37.7' - Bedding plane, <5 deg, rough,	ш	_ 37.5-38.15', voids to <1/16" over	R2: 8 minutes
_	41.0			undulating, tight _	口	15-25% of surface, fossiliferous (casts/molds), <5% possible laminar	-
_			>10	38.2' - Bedding plane, <5 deg, rough, undulating, open 3/16", fine to coarse	仜	_ bedding planes	-
-				sand-sized infill, 100% of opening filled 38.55' - Fracture, 60-70 deg, rough,	ऻ	No Recovery 39.9-41.0' Limestone	Driller's Remark: 100%
_			2	undulating, open -		41.0-41.55' - Same as 36.0-39.9' except moderately fossiliferous	water loss at 42'
-	R3-NQ			38.9' - Mechanical break 41.15' - Bedding plane, <5 deg, rough,	\vdash	41.55-45.2' - yellowish gray	-
_	5 ft 84%	53	0	undulating, open <1/16" -	H	transitioning to pale olive with depth, (5Y 7/2 to 10YR 6/2), very fine to fine	-
-	0470			41.3-41.55' - Fracture zone, fragments to 1" _ (predominately <1/2")	Ħ	grained, strong to moderate HCl	-
45			0	42.1' - Fracture, 65-70 deg, smooth, planar - 42.3' - Mechanical break or bedding plane,	Ħ	reaction, weak to medium strong (R2 to R3), trace voids (<1/16"),	-
-4.2			1	<5 deg, rough, undulating, open to 1/16",	Ľ	fossiliferous (casts and molds), burrow or solution cavity (3/16"	R3: Run time not recorded
_	46.0		NR	trace fine infilling - 45.1' - Mechanical break, 65-75 deg, rough,	L	diameter) at 42.28'	1
			2	undulating, tight 45.2' - Fracture, 5 hairline fractures from	H	No Recovery 45.2-46.0' Limestone	
				45.2' to end of core		46.0-50.0' - Same as 41.55-45.2' except zone of weak (R2) rock from]
_			3	46.85' - Bedding plane, <5 deg, rough, planar, trace fine infilling, open 1/4" -	H	46.8-46.95', voids (<1/16") increasing	
_				46.95' - Mechanical break, <5 deg, rough,	Ш	with depth, 1" solution cavities at 47.35' and 47.7', trace irregular	
_	R4-NQ 5 ft	62	0	undulating, tight 47.45' - Fracture, 5-15 deg, rough,	口	bedding planes	_
_	94%			undulating, open 47.75' - Fracture, <5 deg, closed, does not go	仜	<u> </u> -	-
-			1	all the way through	士	-	-
50 -9.2				47.85' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight	Н	 50.0-50.7' - yellowish gray, (5Y 7/2),	R4: Run time not recorded
-			2	49.55 - Mechanical break or bedding plane, - <5 deg, rough, undulating, open <1/16"	\mathbf{H}	 medium to coarse grained, mild HCl 	Total depth of boring is
-	51.0		NR	¬ 50.0-50.1' - Fracture or bedding plane, <5 ┌		reaction, very weak to weak (R1 to R2), voids <1/16" over 30-40% of	51.0'
_				deg, rough, undulating, open, one large 0.1' angular fragment	ł	-\surface, fossiliferous (casts and molds)	Driller's Remark: Water level is 3.5' below ground
-				50.5' - Mechanical break or bedding plane, <5 deg, rough, undulating, open <1/16"	ł	No Recovery 50.7-51.0'	surface
-				ueg, rough, undulating, open < 1/10	1	Bottom of Boring at 51.0 ft bgs on 11/30/2007	
-				-	1		
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-05	SHEET	1	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723052.6 N, 456340.9 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLIN	ORILLING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical								
WATER	LEVELS	: 4.4 ft bo	s on 11/	14/07	TART : 11/12/2007 END : 11/14/2007 LOGGER : J. Schaeffer, T. Borton				
200				STANDARD	SOIL DESCRIPTION COMMENTS				
ELO/ ON (f	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
TH B FACE		RECOVE	.,		MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
41.5	0.0				Poorly Graded Sand With Organics (SP) Begin drilling on 11/12/07 at 16:00				
		0.9	SS-1	1-1-2 (3)	0.0-0.9' - pale yellowish brown, (10YR 6/2), moist, very loose, very fine to fine grained, no HCl reaction,				
I _	1.5			(-)	\ silica sand, trace nonplastic fines, 5-10% organics \ \ \ \ and roots \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				
_									
_									
-									
-									
_									
5	5.0				-				
36.5	0.0				Poorly Graded Sand With Clay (SP-SC) 5.0-5.5' SS-2A				
-		1.0	SS-2	2-2-2 (4)	5.0-5.5' - dark yellowish orange, (10YR 6/6), moist to wet, very loose, fine grained, 9% moderate plasticity 5.5-6.0' SS-2B				
	6.5			(' '	\fines, silica sand Fat Clay (CH)				
_					│ 5.5-6.0' - grayish blue green, (5BG 5/2), moist, soft, │				
_					high plasticity, no dilatancy, no HCl reaction, 5-10% very fine to fine silica sand, trace rootlets				
_					-				
_					-				
-									
10	10.0								
31.5	10.0				Silty Sand (SM) 10.0-10.2 SS-3A				
-		0.9	SS-3	2-3-5 (8)	\ 10.0-10.2' - light greenish gray, (5GY 8/1), wet, loose, \ - 10.2-10.9 SS-3B - fine to coarse grained, strong HCl reaction, sand is				
	11.5			(0)	\ \ \ \ \ \ \ \ \ \ \ \ \				
_					10.2-10.9' - yellowish gray, light greenish gray, and				
_					light bluish gray, (5Y 8/1, 5GY 8/1, and 5B 7/1), wet, loose, irregularly bedded sands, predominately very				
-					fine to fine silica sands, up to 25% fine to coarse sand _ as in 10.0-10.2' (fossils), 15% nonplastic fines, strong				
-					HCl reaction in fossil materials				
-									
15	15.0								
26.5		0.7	SS-4	34-50/2	Silt And Limestone (ML)				
-	15.7	0.7		(84/8")	15.0-15.7' - grayish orange, (10YR 7/4), wet, hard, -				
					\dagger 49% coarse sand-sized and fine gravel-sized -				
					limestone ragments, strong ACI reaction in the				
_]				
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-05	SHEET	2	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723052.6 N, 456340.9 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical											
WATER LEVELS : 4.4 ft bgs on 11/14/07											
				STANDARD	SOIL DESCRIPTION	_ o	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE			PENETRATION TEST RESULTS		SYMBOLIC LOG					
HU		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	l S	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
TPT FYA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	YMB	INSTRUMENTATION				
<u> 21.5</u>	00.0			(N) 26-50/0.5	Silt And Limestone (ML)	Ś	Resume drilling at 08:12 on 11/13/07				
-	20:5	0.4	SS-5	(76/6.5")	20.0-20.4' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 60% silt and 40% limestone, limestone is fine to coarse sand-sized fragments, friable, mild HCl reaction, one 11/2" iron concretion		Driller's Remark: 100% circulation loss –				
- - - -					1/2* Iron concretion		08:47 3" NW casing installed to 20.0'				
25 16.5	25.0				Cilt With Cond And Limestone (ML)	╁	Possible slough top of sample. 3 angular to				
10.5	26.5	1.2	SS-6	29-45-27 (72)	Silt With Sand And Limestone (ML) 25.0-26.2' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 15-25% fine to medium sand-sized varies throughout sample, 25% fine grayel-sized limestone fragments, carbonate /-		Possible slough top of sample, 3 angular to subangular fragments up to 1.0", strong HCl reaction				
- - - - 30	30.0				- - - -		- - - - -				
11.5	30.0				Limestone Fragments And Silt (ML)	ш	20 blows first 6.0" then rods fell 11.0",				
-	31.5	0.5	SS-7	20-0-4 (4)	30.0-30.4' - grayish orange, (10YR 7/4), 75% limestone in fine to coarse gravel-sized fragments, mild HCl reaction, 25% silt which is wet, soft,		4 blows last inch Driller's Remark: Cavity in rod drop zone Soil descriptions for sample SS-7 assumes				
_	01.0				nonplastic, rapid dilatancy, mild HCl reaction, carbonate	Т	cavity at 30.4-31.4' based on soil sample - appearance and driller's note				
-					Assumed Cavity 30.4-31.4'		 ''				
-					Sandy Silt (ML) 31.4-31.5' - grayish orange, (10YR 7/4), wet, soft, nonplastic, rapid dilatancy, mild HCl reaction, 35% fine to coarse sand-sized, carbonate materials		10:03 Casing advanced to 30' -				
35	35.0				-						
6.5				23-51-50/2.5	Silty Sand With Limestone (SM) 35.0-35.5' - gravish orange, (10YR 7/4), wet, very		10:35 Casing advanced to 35.0' 35.0-35.5' SS-8A				
	36.2	1.2	SS-8	(101/8.5)	dense, fine to coarse grained, moderate HCl reaction,		35.0-35.5 SS-6A 35.5-36.2' SS-8B				
_	50.2				26% nonplastic fines, 32% fine to coarse gravel-sized / limestone fragments, all carbonate materials	_					
-					Silty Sand (SM)	-	-				
-					35.5-36.2' - dark yellowish orange, (10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl	-	-				
-					reaction, 30-35% nonplastic fines, 5-10% fine gravel-sized limestone fragments, all carbonate	-	Driller's Remark: 100% water loss at 38.0'				
-					materials -	+	Dimor 3 Heritarik. 100 /6 Water 1055 at 00.0				
-						-	-				
					-	1	-				
40						╁					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-05	SHEET	3	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723052.6 N, 456340.9 E (NAD83)

DRILLING METHOD AND EQUIPMENT: CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

ORIENTATION: Vertical

					on Single Hills and the Hills
WATER	LEVELS	: 4.4 ft bo	gs on 11/	14/07 S	START : 11/12/2007 END : 11/14/2007 LOGGER : J. Schaeffer, T. Borton
300				STANDARD	SOIL DESCRIPTION COMMENTS
SAMPLE INTERVAL (ft) PENETRATION TEST RESULTS			L (ft)	TEST RESULTS	COLL NAME LIGOS OPOLID OVARDOL COLOD
H H H H		RECOVERY (ft)			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
E F F S			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
김징교				(N)	
1.5	40.0				Silty Sand (SM) 40.0-41.3' - moderate yellowish brown to dark
		1.3	SS-9	15-8-6 (14)	yellowish brown, (10YR 5/4 to 10YR 4/2), wet,
-	41.5			(14)	medium dense, fine to coarse grained, mild to
-	11.0				moderate HCI reaction, 25% nonplastic fines, 10-15% fine gravel-sized limestone fragments, all carbonate
-	1				materials
-	-				
-					-
_					- Duillavia Damaniki Chattar at 40 51
_					Driller's Remark: Chatter at 43.5'
l _					<u> </u>
45	45.0	0.0	SS-10	50/2.5	No Recovery 45.0-45.2'
-3.5	45.2	0.0	100-10	(50/2.5")	Begin Rock Coring at 45.0 ft bgs
-	1				See the next sheet for the rock core log
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-05	SHEET	4	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723052.6 N, 456340.9 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS: 4.4	ft bgs	s on 1	1/14/07 START : 11/12/2007 END : 11	/14/2	007 LOGGER : J. Schaeffer, T. Borto	n	
≥∩≎	(%)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S L	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
H BE ACE ATIC	STER I	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND	
EPT URF LEV	ORE	ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≺MB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
		ď	ΞΔ	THIORNESS, SON ACE STAINING, AND HOTTINESS	S			
-3.5	45.0 R1-NQ 1 ft	33	3	45.35, 45.58' - Mechanical break (2), 10-15	世	Limestone - 45.0-46.5' - light olive gray, (5Y 6/1),	Casing set at 45.0' Begin coring with NQ, hard -	
_	46.0 100%			deg, rough, undulating, tight	⊬	fine to medium grained, moderate	formation bit	
l _			>10	45.76' - Bedding plane, <5 deg, rough, planar, open <1/16"	ш	HCl reaction, weak (R2), strong HCl reaction where pulverized, highly	Driller's Remark: Water level approximately 7.0'	
			- 10	46.15-46.3' - Fracture zone, subangular	Н	fossiliferous (casts/molds over	below ground surface	
			4	limestone fragments (up to 1-1/2")	H	40-50% of sample), voids (up to	08:11 Begin drilling first run	
			1	46.45' - Bedding plane, <5 deg, rough, undulating		- 1/16") over 10-15% of surface, trace voids up to 1/2"	on 11/14/07 – First run only 1 foot to set	
	R2-NQ			46.8' - Fracture, 80-90 deg, rough, undulating	╙	46.5-50.5' - Same as 45.0-46.5'	stroke	
-	5 ft 90%	57	2	47.1' - Mechanical break or bedding plane, <5 deg, smooth, stepped	仜	 except fine grained, very weak (R1), transitions to yellowish gray (5Y 5/2) 	R1: 4 minutes –	
-	30 /0			48.1, 48.5, 48.85' - Mechanical break (3), <10	H	with depth (by 48.9'), 15-25% fossils	-	
			3	deg, rough, undulating	F	(casts/molds), voids (up to 1/16")	Driller's Remark: Softer at	
50 -8.5				49.0' - Mechanical break or bedding plane, <10 deg, rough, undulating	世	over 5-10% of surface increasing to 15-25% with depth	49.5'	
			2	49.5, 49.6' - Mechanical break or bedding	Н	No Recovery 50.5-51.0'	R2: 27 minutes	
_	51.0		NR	plane (2), <10 deg, rough, undulating 50.0' - Fracture, 5-15 deg, rough, undulating	ш	<u> </u>	_	
_			0	50.4' - Mechanical break, 5-10 deg, rough,	H	Limestone 51.0-53.85' - yellowish gray to dusky	_	
_					undulating	F	yellow, (5Y 7/2 to 5Y 6/4), fine to	
			2	_	Ľ	medium grained, mild to moderate HCl reaction, very weak (R1),	Driller's Remark: Soft at 52.0'	
				52.5' - Mechanical break, <5 deg, rough,	H	fossiliferous (casts/molds), voids (up	32.0	
	R3-NQ		>10	undulating, tight 52.75' - Mechanical break or bedding plane,		to 1/16") over 15-25% of surface		
-	5 ft 57%	39	- 10	<5 deg, rough, undulating, tight	h	-	_	
-				53.15-53.75' - Fracture zone, general orientation 75-85 deg with multiple breaks <5	H	No Recovery 53.85-56.0'	1	
55			deg, possibly many mechai	deg, possibly many mechanical breaks or	Ħ	<u></u>	-	
-13.5			NR	bedding planes along a long fracture, — limestone fragments up to 2-1/2"	╁	_	R3: 9 minutes	
-				innestone ragments up to 2-1/2		-	Driller's Remark: Harder at	
-	56.0			56.1, 56.5' - Bedding plane (2), <5 deg,	仜	_ Limestone	55.0', no circulation	
-		2	2	rough, undulating, tight to open <1/16"	Н	56.0-61.0' - yellowish gray, (5Y 7/2),	-	
-				-	F	fine to medium grained, mild to moderate HCl reaction, very weak to	-	
_			2	-	世	weak (R1 to R2), weak (R1) rock at	_	
_		62	62		57.7' - Mechanical break, 1-5 deg, rough,	dash	58.5-58.8', fossiliferous (casts and	_
_	R4-NQ 5 ft			62	2		trace molds), voids (up to 1/16") over 5-15% of surface decreasing with	_
	100%			tight	Н	depth]	
			2	58.3' - Fracture, 5-10 deg, smooth, planar, open <1/16", trace infill (fines)	厈	_		
60				58.9' - Mechanical break, <5 deg, rough,	片]	
-18.5				undulating, tight	\vdash		R4: 11 minutes	
1 7	61.0		3	59.55' - Bedding plane, 5-10 deg, rough, undulating, open 1/8"	Ш		1	
-			2	59.75' - Mechanical break or bedding plane,	Ш	61.0-66.0' - yellowish gray to dusky	1	
-				2	<5 deg, rough, undulating, tight 60.1' - Fracture, <5 deg, rough, undulating,	\vdash	 yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, mild to moderate 	
-				open 1/8"	Ħ	HCl reaction, very weak to weak (R1	Driller's Remark: Water	
-			5	60.3' - Mechanical break, <5 deg, rough,	⊬	to R2), very weak (R1) rock	level at 4.4'	
-	R5-NQ			undulating, tight 60.8' - Fracture or bedding plane, <5 deg,	匚	transitions with depth to weak (R2) rock, voids (up to 1/16") over 5-15%	-	
-	5 ft	52	2	rough, undulating, open 1/4"-1/2", less than	士	 of surface decreasing with depth, 	-	
-	100%	1/2" fragment in opening 61.07' - Mechanical break or bedding plane,		trace fossils (casts/molds)	-			
_			>10	1-5 deg, rough, undulating, open <1/16"	Ľ	_	_	
65				-	H			
ldot					<u> </u>			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-05	SHEET	5	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723052.6 N, 456340.9 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

			<u> </u>	IENT . CIVIE 43B 3/N 331374, Mud Totally, NQ tools, NVV	ouoi	g		ORIENTATION : Vertical
WATER	LEVELS: 4.4	ft bgs	s on 1	1/14/07 START : 11/12/2007 END : 11	/14/	200	D7 LOGGER: J. Schaeffer, T. Borton	1
			•	DISCONTINUITIES			LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	<u> </u>			, S	: 	LITIOLOGI	COMMINICIALS
O A S	-, N >		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	Ĺ	ROCK TYPE, COLOR,	0175 4415 555711 05 04 014 0
ᆱ႘ᅙ	2 , R	<u>@</u>	J. T.		┫	l	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±¥,¥	SEN	(%) Q	Ĕ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	8		WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
무료린	888	Ø	ZA(PLANARITY, INFILLING MATERIAL AND	ΙĒ		AND ROCK MASS	DROPS, TEST RESULTS, ETC.
SE	222	22	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S		CHARACTERISTICS	
-23.5				61.8' - Mechanical break, <5 deg, rough,	T	T		R5: 10 minutes
_			0	undulating, tight		┰		=
	66.0			62.1' - Mechanical break or bedding plane,	ш	4		Total depth of boring 66.0',
_	00.0			<5 deg, rough, undulating, tight	1	T	Bottom of Boring at 66.0 ft bgs on	work plan criteria met
_				62.25' - Mechanical break, <5 deg, rough,	4	F	11/14/2007	/_
				undulating, tight	1			
_				62.9, 63.0' - Mechanical break or bedding	1	r		-
_				plane (2), <5 deg, rough, undulating, tight	4	F		_
				63.15' - Bedding plane, <5 deg, rough,	1			
_				undulating, tight	1	r		Total 20 bags Portland
_				63.7. 64.1' - Mechanical break (2). <5 deg.	4	L		Type I/II coated bentonite -
				rough, undulating, tight	1			chips from 23.0-16.0' below
_				64.43' - Mechanical break or bedding plane,	1	F		ground surface
_				<5 deg, rough, undulating, open 1/8"	4	F		3/4 bag bentonite, 100 -
				64.72-65.05' - Fracture zone, no orientation,	1			gallons of water
I -				limestone fragments up to 1/2"	1	上	_	_
-					-	F		17:11 Grout to surface -
					1			
-				•	1	上		1
_					4	┢		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-06	SHEET	1	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" drag bit

ORIENTATION : Vertical

,						ENTATION : Vertical
WATER	LEVELS	: 0.5 ft bg	gs on 11/	13/07	TART : 11/12/2007	
200				STANDARD	SOIL DESCRIPTION COMME	NTS
ANC (f)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		DD# 110 DATE
ᆱᇬ		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING FLUID LC	DRILLING HATE, ISS TESTS AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING FLUID LC	NTATION
SU				(N)		
41.4	0.0			0.4.0	√Topsoil √0.0-0.2' - wood chips, no roots, silica sand	_
		1.5	SS-1	3-4-6 (10)	Poorly Graded Sand (SP)	
	1.5			(- /	0.2-1.5' - pale yellowish brown, (10YR 8/2), moist,	
					loose, fine grained, no HCl reaction, silica sand, trace	1
-						1
-					1	1
-					1	1
-					11	
-					1	-
	5.0					1
5 36.4	5.0				Poorly Graded Sand (SP)	-
-		1.1	SS-2	3-4-5	5.0-6.1' - very pale orange to grayish orange, (10YR -	-
-		1.1	33-2	(9)	8/2 to 10YR 7/4), wet, loose, fine grained, no HCl reaction, silica sand, trace nonplastic fines, trace	-
-	6.5				roots	-
-						-
-					-	-
_					4 1	-
-					4 1	_
_					4 1	-
_					<u> </u>	_
10	10.0					_
31.4				4-4-5	Poorly Graded Sand (SP) 10.0-11.4' - yellowish gray, (5Y 8/1), wet, loose, fine	_
_		1.4	SS-3	(9)	grained, no HCl reaction, silica sand, trace nonplastic	_
_	11.5			` '	fines	_
]					11	1
1 7					1	1
15	15.0				1	1
26.4	. 0.0				Sand Silt (ML)	7
-		1.3	SS-4	4-5-6	15.0-16.3' - light gray, (N7), wet, stiff, nonplastic, no HCl reaction, 38% fine grained silica sand	1
-	16.5			(11)	-	1
-	. 0.0				1	1
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-06	SHEET	2	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND FOLIIPMENT : CMF 550 S/N 186073 mud rotary, cathead, AWJ rods, 3-7/8" drag bit

DRILLIN	G METH	DD AND	EQUIPMI	ENT : CME 550 S	/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" drag bit		ORIENTATION : Vertical
WATER	LEVELS	: 0.5 ft bo	s on 11/	13/07 S	START : 11/12/2007 END : 11/14/2007 LOGGEF	R : P	De Sa'rego
				STANDARD	SOIL DESCRIPTION	σ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
L BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	l S	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTF JRF/ EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ΑMB	INSTRUMENTATION
21.4	00.0			(N)	Condu Fat Clay (OU)	Ś	Chan CDT for the day 11/10/07 at 17:00
21.4	20.0			3-4-2	Sandy Fat Clay (CH) ¬ 20.0-20.5' - very light gray with very pale blue		Stop SPT for the day 11/12/07 at 17:00
_		1.3	SS-5	(6)	mottling, (N8 with 5B 8/2), wet, medium stiff, high	411	Resume SPT on 11/13/07 at 08:00
_	21.5				plasticity, no dilatancy, no HCl reaction, 25-30% very fine to fine grained silica sand	1	Water level 0.5' below ground surface
_					Silty Sand (SM)	1	_
_					20.5-21.3' - very light gray, (N9), wet, loose, fine grained, no HCl reaction, silica sand, 30% low	1	_
_					plasticity fines	1	_
_					_		
_					_		
					_		_
25	25.0					<u>L</u>	
16.4				000	Fat Clay (CH) 25.0-25.6' - pale brown, (5YR 5/2), wet, soft, medium		Weight of hammer drove SS-6 (25.0-25.6') through all 18" for SPT
_		0.6	SS-6	0-0-0 (0)	to high plasticity, slow dilatancy, no HCl reaction,	1	- Lineagiran re lei ei r
_	26.5			. ,	trace fine grained silica sand, final 0.05' of sample consists of compacted silica sand or fine grain		
					sandstone		
						J	
							Driller's Remark: 25% loss of circulation at 27.5', some drill chatter
							27.5 , some drill chatter –
					_	1	
-					-		1
30	30.0				-		1
11.4		0.6	SS-7	31-50/4.5	Silt (ML)	Ш	1 7
-	30.9	0.6	35-7	(81/10.5")	30.0-30.6' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 7% fine	╫	1
-					to medium sand sized, all carbonate materials	1	1
-					-	1	1
_					-	1	
_					-	1	
-					-	1	1
-					-	1	-
-					-	1	1
35	35.0				·	1	
6.4	55.0				Silty Sand (SM)	TIT	1
-		0.7	SS-8	25-32-29	35.0-35.7' - grayish orange, (10YR 7/4), wet, dense, ∫ fine to coarse grained, mild to moderate HCl reaction, ∫	111	
-	36.5	- "-		(61)	\25% nonplastic fines, 5-10% fine gravel-size	1	1
-	30.3				limestone fragments, all carbonate material	1	-
-					-	1	-
-					-	1	-
-					-	1	-
-	40.0					1	End SPT soil sampling
-	40.3	0.1	SS-9	50/3.5 (50/2.5")	Limestone Fragments 40.0-40.1' - moderate yellowish brown, (10YR 5/4),	T	Switching to rock coring at 09:20 (refusal -
-				(50/3.5") /	\dullet \dulle	1	blow count, limestone fragments)
40					Begin Rock Coring at 40.0 ft bgs	+	
					See the next sheet for the rock core log		
						-	•



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-06	SHEET	3	OF	7	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS: 0.5	ft bgs	s on 1	1/13/07 START : 11/12/2007 END : 11	/14/2	007 LOGGER : P. De Sa'rego	
≥ Ω <i>⊆</i>	_ ;;			DISCONTINUITIES)G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
1.4	40.0 R1-NQ 1.5 ft 40% 41.5	29	1 NR	40.2' - Mechanical break 40.4-40.8' - Fracture, 80 deg, rough, undulating, open		Limestone - 40.0-40.8' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, weak (R2), voids (1/16") - over 10% of core surface, trace casts	Begin coring from 40.0' at 10:30, 11/13/07 – (depth of coring start adjusted to remove 0.5' of slough counted on the field –
	R2-NQ 5 ft 0%	0	NR	- - - - -		to 1/4" No Recovery 40.8-46.5'	log) R1: 8 minutes Driller's Remark: No resistance to drilling at 41.5-46.5', no circulation loss Driller's Remark: Stop to clean mud at 11:30, too much silt/fines R2: 3 minutes
	R3-NQ 5 ft 40%	13	5 4 NR	46.6' - Mechanical break 46.7-46.8' - Fracture, 45 deg, rough, undulating, open 47.1-47.2' - Fracture (3), horizontal, rough, undulating, loose fragments 1" in size, open 47.4' - Fracture, 30 deg, rough, planar, 1/4" open 47.7' - Fracture, horizontal, smooth, undulating, <1/16", open, related to cavity at 47.7' 47.9' - Fracture, horizontal, rough, undulating, open 47.9-48.1' - Fracture, 60 deg, rough, undulating, 1/8" relief 48.4' - Fault, horizontal, smooth, planar to		Limestone 46.5-48.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), trace to 10% voids up to 1/16", trace cavities up to 3/4"x1-9/16", partly infilled with fossiliferous carbonate material No Recovery 48.5-56.5'	Driller's Remark: Soft at 47.0-48.5', 100% - circulation lost at 47.0' - R3: 16 minutes
- - - - - 55 -13.6	R4-NQ 5 ft 0%	0	NR	undulating, <1/8" relief		- - - - - -	Driller's Remark: Soft throughout run R4, still no circulation R4: 4 minutes
- - - - - 60	R5-NQ 5 ft 18%	0	3 NR	56.65' - Fracture, horizontal, rough, undulating, 1/8" open 56.9' - Fracture, 10 deg, rough, undulating, 1/8" open 57.0' - Mechanical break 57.1-57.3' - Fracture, 60 deg, rough, undulating to planar, black staining over 80% of surface		Limestone 56.5-57.4' - grayish orange, (10YR 7/4), fine to medium grained, mild HCl reaction, weak (R2), voids to 1/16" over 15% of core surface, trace fossil casts and cavities up to 3/8" at 56.5-56.8' No Recovery 57.4-61.5'	- - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-06	SHEET	4	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

WATER	LEVELS: 0.5	ft bgs	s on 1	1/13/07 START : 11/12/2007 END : 1	2007 LOGGER : P. De Sa'rego	7 LOGGER : P. De Sa'rego			
≥0 ⊕	(9)			DISCONTINUITIES	Ö	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
-18.6 - -	61.5					- - - -	R5: 10 minutes		
-	R6-NQ 5 ft 28%	0	0 0 NR		- -	Silt With Sand (ML) - 61.5-62.9' - grayish orange, (10YR 7/4), wet, hard, nonplastic, mild HCl reaction, 15% fine to very fine - sand-sized particles, all carbonate material - No Recovery 62.9-71.5'	No SPT taken		
65 -23.6 - - - -	66.5			_		- - - - -	R6: 8 minutes Stop for day 11/13/07 at 17:00 - Resume coring on 11/14/07 at 8:00; depth is 66.5' - Water level 4.0' below ground surface		
-0 -0 -0 -28.6 -0 -0	R7-NQ 5 ft 0% 71.5	0	NR	– 71.1' - Fracture, horizontal, rough, undulating,		- - - - -	Casing advanced to 65.0' Driller's Remark: Circulation returned R7: 26 minutes Driller's Remark: Rock fragments lodged in core		
-			>10	1/4" open 71.8-72.0' - Fracture zone, rock fragments 72.3' - Mechanical break 72.8' - Fracture, horizontal, rough, undulating, 1/2" open		Limestone - 71.5-75.5' - grayish orange, (10YR 7/4), medium grained, mild HCl reaction, extremely weak (R0), no visible voids or cavities	barrel, likely destroyed sample – Driller's Remark: Soft at 71.5-74.5', increased resistance from 74.5-76.5' –		
- - 75_ -33.6	R8-NQ 5 ft 80%	0	0	73.1' - Mechanical break 73.2' - Fracture, 0-30 deg, rough, undulating, tight, variable angle 73.9' - Fracture, horizontal, rough, undulating, tight 74.0' - Fracture, horizontal, rough, undulating,			- - -		
-	76.5		NR	tight 74.8' - Mechanical break 74.9' - Mechanical break		No Recovery 75.5-76.5'	R8: 10 minutes – Driller's Remark: –		
- - -	R9-NQ		>10	76.7' - Fracture, horizontal, rough, undulating, 1/8" open 77.45' - Fracture, 10 deg, rough, undulating, 1/8" open 77.7-77.85' - Fracture zone, fine to coarse sand-sized and gravel-sized fragments		Timestone 76.5-78.2' - grayish orange, (10YR 7/4), fine to medium grained, mild HCl reaction, weak (R2), trace voids up to 1/16", trace cavities to 3/4"x3/8" 78.2-79.6' - grayish orange, (10YR 7/4), fine to medium grained, mild	Circulation loss (100%) at 76.0' Driller's Remark: Medium resistance from 76.5-78.5' Driller's Remark: Hard at 78.5-81.8'		
80	5 ft 62%	23	2	78.3' - Fracture, horizontal, rough, undulating, 1/4" open		- HCI reaction, extremely weak (R0), no visible voids or cavities No Recovery 79.6-81.5'	Driller's Remark: Soft at 81.5-83.0' Driller's Remark: Hard at 83.0-84.5'		
					I				

APPENDIX 2BB-724 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-06	SHEET	5	OF	7	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 0.5	ft bas	s on 1	1/13/07 START : 11/12/2007 END : 1	/14/2	007 LOGGER : P. De Sa'rego	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIO	RUI TH,	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	J S	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-38.6	072	ď	╙┺	<u> </u>	S	CHARACTERISTICS	
-36.0			NR	78.9' - Fracture, horizontal, rough, undulating, tight	H	-	DO: 44 minutes
_			\	79.5' - Fracture, 20 deg, rough, undulating,	₽	-	R9: 11 minutes
_	81.5			1/8" open	F		_
_			>10	81.5-82.1' - Fracture zone, fine to coarse sand-sized and fine to coarse gravel		Limestone - 81.5-83.1' - grayish orange, (10YR	4
_				fragments		7/4), fine grained, mild HCl reaction,	4
_			1	82.1-82.4' - Fracture, 70 deg, rough, undulating, opposing face fractured	\vdash	weak (R2), trace voids to 1/16"	_
_				82.4-82.5' - Fracture, 45 deg, rough,	F	No Recovery 83.1-86.5'	_
_	R10-NQ 5 ft	8		undulating, 1/4" open 83.0' - Mechanical break		-	_
_	32%				Ľ	-	
85			NR	_	\vdash	<u></u>	Driller's Remark: Soft at 84.5-85.5'
-43. 6					厂	<u></u>	
_						-	R10: 6 minutes
_	86.5				廾		Driller's Remark: Hard at 85.5-86.5'
_			>10	86.5-87.1' - Fracture zone, two dominant 60 deg fractures, at 86.5-86.7' and 86.7-87.0',	F	Limestone - 86.5-90.2' - grayish orange, (10YR	Driller's Remark: Medium
_				rough and undulating surfaces, multiple		7/4), fine grained, moderate HCl	drilling at 86.5-88.0'
_			1	fragments of fine gravel size		reaction, weak (R2), 10-15% - coverage of voids up to 1/16", trace	1
_				88.05' - Fracture, horizontal, rough, undulating, opposite face at 60°; open	╟	cavities up to 3/8"x-9/16", cavities	Driller's Remark: Hard at 88.0-91.5'
_	R11-NQ 5 ft	32	>10	88.5-88.8 - Fracture zone, several medium	\blacksquare	increasing in frequency with depth	_
_	74%			gravel-sized fragments, terminates at 60 deg face		-	_
90			0	89.1-89.4' - Fracture zone, medium to coarse _	上	_	
-48. 6				gravel-sized fragments	╁╴	_ No Recovery 90.2-91.5'	1
_			NR		F	-	R11: 15 minutes
_	91.5			0.50.00	H	- 	_
_			>10	91.5-91.9' - Fracture zone, medium to coarse gravel-sized fragments	L	Limestone - 91.5-92.5' - grayish orange, (10YR	_
_				92.2' - Fracture, horizontal, rough, undulating,	₽	7/4), fine grained, moderate HCI	_
-				1/4" open	\coprod	reaction, weak (R2), 15% coverage of voids up to 1/16", trace	_
-					厂	cavities/fossil molds up to 1/4"x3/16"	_
-	R12-NQ 5 ft	0			上	No Recovery 92.5-96.5'	_
-	20%	·	NR		\vdash	<u></u>	_
95 <u> </u>				_	F	_	
-55.0					ļ,	<u>-</u>	D40: 6 minutes
_					片	<u>-</u>	R12: 6 minutes
_	96.5				\vdash	Limontono	_
_			>10	96.7-97.2' - Fracture zone, coarse	\vdash	Limestone - 96.5-96.7' - Same as 91.5-92.5'	Driller's Remark: Rock fragments stuck in core
-			NR	gravel-sized fragments	口	96.7-97.2' - very pale orange, (10YR	barrel at 98.0'; removed
_					士	8/2), fine grained, mild HCl reaction, – medium strong (R3)	barrel to clear, resumed coring 98.0-101.5'
-	B 40 1:-		1	98.1' - Fracture, 10 deg, rough, undulating, open	\vdash	No Recovery 97.2-97.9'	Core loss assumed to be
-	R13-NQ 5 ft	35	>10	98.6' - Fracture, horizontal, smooth,	F	Limestone - 97.9-99.3' - Same as 96.7-97.2'	97.2-97.9'; lithologic description intervals
-	86%	-		undulating, 1/4" open	片	except 2 large cavities (3-7/8"x3/8") at 98.9-99.2'	adjusted accordingly
100					\vdash	at 30.3-33.2	
					1		
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-06	SHEET	6	OF	7	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

Rev. 4

WATER	LEVELS : 0.5	ft bgs	s on 1	1/13/07 START : 11/12/2007 END : 11	/14/2	007 LOGGER : P. De Sa'rego	
				DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A TIO	TH.,	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLIC OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FRH	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-58.6	074	ď	⊥∟ <u>∩</u> >10		S		
-56.0			- 10	99.1-99.3' - Fracture zone, fine to large gravel-sized fragments -		Limestone - 99.3-101.5' - moderate yellowish	D42: 45 minutes
-			1	99.7-99.9' - Fracture zone, gravel-sized	⊬	brown, (10YR 5/4), fine grained, mild HCl reaction, weak (R2), 15%	R13: 15 minutes
-	101.5			fragments 100.3' - Fracture, 30 deg, rough, undulating, -	F	coverage of voids to 1/16", trace	1
_			1	tight	ш	casts/cavities to 3/8x1-3/16"	_
_				101.9' - Fracture, horizontal, rough, undulating, 1/8" open	ь	101.5-105.5' - pale yellowish brown, - (10YR 6/2), fine grained, mild HCl	_
_			>10	102.8-102.9' - Fracture zone, gravel-sized	⊢	reaction, weak (R2), trace to 10%	_
_				fragments	F	coverage of voids up to 1/8", trace cavities up to 1/4x1/4", large	_
-	R14-NQ 5 ft	28	3	103.1' - 30 deg, rough, undulating, 1/8" open 103.1-103.4' - Fracture, vertical, rough,	Ľ	(2-3/8x1-9/16") cavity at 101.8 to]
_	80%			undulating, 1/8" open		102.0']
105			>10	103.4' - Fracture, horizontal, rough, undulating, 1/4" open	oxdot		
-63.6			- 10	103.8' - Fracture, 40 deg, rough, undulating,	Ш		
_			NR	1/8" open 104.0' - Fracture, 40 deg, rough, undulating,	\vdash	No Recovery 105.5-106.5'	R14: 9 minutes
	106.5		INIX	1/8" open	F	_	
			>10	104.2' - Mechanical break 104.5' - Fracture, 10 deg, rough, undulating,	F	Limestone - 106.5-109.2' - grayish orange, (10YR	
			-10	1/8" open	L	7/4), fine grained, mild HCl reaction,	
			2	104.8-105.0' - Fracture zone, coarse gravel-sized fragments	Н	weak (R2), 10% coverage of voids up to 3/16", trace cavities 3/8"x2-3/8"	
				105.1-105.3' - Fracture, 60 deg, rough,		up to 3/10, trace cavities 3/0 x2-3/0	
	R15-NQ	17	>10	undulating, tight 106.5-107.4' - Fracture zone, gravel-sized	ш		1
-	5 ft 54%	17		fragments	h	No Recovery 109.2-111.5'	1
110				107.5-107.6' - Fracture, 60 deg, rough, undulating, 1/8" open	\vdash	- · · · · · · · · · · · · · · · · · · ·	1
-68.6			NR	108.4' - Fracture, horizontal, rough,			
				undulating, open 108.7-109.2' - Fracture zone, gravel-sized	L		R15: 5 minutes
	111.5			fragments	H		
			>10	111.6-111.7' - Fracture zone	Н	Limestone - 111.5-112.6' - grayish orange, (10YR	
			-10	112.1-112.2' - Fracture zone	ш	7/4), fine grained, mild HCl reaction,	
			0	_	口	weak (R2), 10% coverage of voids up to 1/16", single 1-9/16"x1-9/16"	1
				_	\vdash	cavity at 111.9', deep spherical cavity	1
_	R16-NQ	15			H	(1-3/16" diameter) at 112.1' - No Recovery 112.6-116.5'	1
I -	5 ft 22%	15			H	- No Necovery 112.0-110.5	1
115			NR		片		1
-73.6				_	\vdash		7
_					Ш		R16: 3 minutes
	116.5				Ш		1
_			_	116.5-117.5' - unconsolidated silts/sands	***	Well Graded Sand (SW)	1 1
-			0	_	! ::::	 116.5-117.5' - grayish orange, (10YR 7/4), wet, loose, fine to coarse 	1
-			- 40	117.0! Eractura 90 des rough undulation	F	□ grained, mild HCl reaction, trace □] 1
I -			>10	117.8' - Fracture, 80 deg, rough, undulating, - tight	口	- \nonplastic fines, all carbonate material	1
	R17-NQ		- 40	118.0-119.5' - Fracture zone or mechanical break -	\sqsubseteq	Limestone	1
	5 ft 64%	0	>10	Dicar -	\vdash	117.5-118.1' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction,	1
120			_1_	_	H	weak (R2), trace voids to 1/16"	1
					Γ		

APPENDIX 2BB-726



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-06	SHEET	7	OF	7	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS: 0.5	ft bgs	s on 1	1/13/07 START : 11/12/2007 END : 11	/14/20	007 LOGGER : P. De Sa'rego	
				DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIO	E RU	(%) _Q	TUF -00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	3OLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EV EV	SORE	ROL	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-78.6	034			119.5' - Fracture, horizontal, rough,		Limestone	
-			NR	undulating, open	Н	 118.1-119.5' - Same as 117.5-118.1' except extremely weak (R0) 	R17: 7 minutes
-	121.5			-	Ħ	119.5-119.7' - Same as 117.5-118.1'	-
-	121.5		_	121.7' - Fracture, horizontal, rough,	Ħ	 No Recovery 119.7-121.5' Limestone 	-
-			3	undulating, open	Н	121.5-124.4' - very pale orange	-
-				122.35' - Fracture, horizontal, rough, undulating, open	H	 mottled with medium light gray, (10YR 8/2 with N6), fine grained, 	-
-			4	122.4' - Mechanical break	Ш	mild HCl reaction, weak (R2), 10% coverage of voids up to 3/16" at	-
	R18-NQ	17	0	122.85' - Fracture, horizontal, rough, undulating, open	Н	121.5-Ĭ22.5', 10% fossil casts (up to	
	5 ft 58%	17		123.0-123.1' - Fracture, 60 deg, rough, undulating, 1/8" open	Н	3/16"x3/8") at 123.7-123.9'	
125				123.1-123.2' - Fracture, 70 deg, rough,	H	No Recovery 124.4-126.5'	
-83.6			NR	undulating, open 123.3' - Fracture, 60 deg, rough, undulating,	口	_	-
-				open	Ш	_	R18: 9 minutes
-	126.5			123.6' - Mechanical break 124.0' - Mechanical break	Н	Dettern of Devices at 400 5 ft have an	Total Depth of boring 126.5'
-				-	1	Bottom of Boring at 126.5 ft bgs on - 11/14/2007	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-07	SHEET	1	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722823.9 N, 456814.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

	DRIEDING METHOD AND EQUIPMENT. GME 436 3/N 3313/4, Hidd totally, auto natificial, AWS 1005, 3-7/6 through the Content Anon. Vertical										
WATER	LEVELS	: 3.5 ft b	gs on 11/2	2//07 S	START : 11/16/2007						
300				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS						
ANI (#	SAMPLE	INTERVA	L (ft)	TEST RESULTS	COIL NAME LIGGS OPOLID SYMPOL COLOD						
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)	<u> </u>	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
JRF.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY						
100 100				(N)							
42.0	0.0			1-1-2	Poorly Graded Sand With Organics (SP) 0.0-1.4' - moist, very loose, brownish gray (5YR 8/1)						
_		1.4	SS-1	(3)	from 0.0-0.5', very light gray (N5) from 0.5-1.4', fine						
	1.5			. ,	silica sand, trace nonplastic fines, 20% roots/organic matter over 0.0-0.5'						
					matter over 0.0 0.5						
]						
-					1						
_					1						
-					- 1						
-					- 1						
	F. ^										
5 37.0	5.0			 	Poorly Graded Sand With Silt (SP-SM)						
-			00.0	2-1-1	5.0-5.8' - grayish orange, (10YR 7/4), wet, very loose, ┨┼┼┼						
-		0.8	SS-2	(2)	no HCl reaction, fine silica sand, 5-10% nonplastic						
-	6.5				<u> </u>						
_					-						
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]						
10	10.0				1						
32.0					Limestone Fragments With Silty Sand Advanced 15.0' NW casing						
-		1.3	SS-3	8-3-6	10.0-11.3' - very pale orange, (10YR 7/4), silty sand is wet, loose, moderate HCl reaction, fine to coarse						
-	11.5			(9)	sand-sized, 35-40% low plastic fines, all carbonate,						
-	11.5				\ \ 70% fine to coarse gravel-sized limestone fragments, \ \ - \ \ 30% silty sand						
-					- J						
-					- I						
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-					 						
15	15.0										
27.0				0.00	Silty Sand (SM) 15.0-16.0' - yellowish gray, (5Y 8/1), wet, very loose, Driller's Remark: 10:08 water level at 3.5'						
		1.0	SS-4	2-2-2 (4)	strong HCl reaction, 20% fines, fine to coarse						
]	16.5			.,	sand-sized grains, all carbonate materials including						
]					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \						
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-07	SHEET	2	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722823.9 N, 456814.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 45B S	/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 3.5 ft b	gs on 11/2	27/07	TART: 11/16/2007 END: 11/27/2007 LOGGER: P. De Sa'rego, T. Borton
> !				STANDARD	SOIL DESCRIPTION g COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPTI URF,			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
22.0	20.0			(N)	Sandy Clay (CH) Tricone bit (3-7/8")
	20.0	1.4	SS-5	2-3-50/5.5	20.0-20.85 - transitions from light bluish gray to light - SS-5A from 20.0-20.85 -
-		1.4	33-3	(53/11.5)	gray, (5B 7/1 to N7), moist, medium stiff, medium to high plasticity, moderate HCl reaction, 20-25% very
-	21.5				\fine to fine silica sand
-					Silt (ML) 20.85-21.35' - grayish yellow, (5Y 8/4), moist, hard,
-					nonplastic, rapid dilatancy, mild HCl reaction, trace
-					fine to medium sand-sized grains, carbonate materials
-					-
-					†
25	25.0				†
17.0	20.0				Sandy Lean Clay (CL) SS-6A from 25.0-25.4'
-		1.5	SS-6	2-15-31 (46)	25.0-25.4' - mottled light bluish gray and grayish yellow, (5B 7/1 and 5Y 8/4), wet, stiff, medium
-	26.5			(40)	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
					silica sand, 10% fine to medium carbonate sands
					Silt (ML) 25.4-26.45' - gravish yellow, (5Y 8/4), moist, hard,
_					nonplastic, rapid dilatancy, mild HCl reaction, 5-10%
_					fine to medium sand-sized grains, all carbonate materials
_					
_					.
30 <u> </u>	30.0				Cilty Cond (CM)
12.0				7-12-22	Silty Sand (SM) 30.0-31.0' - grayish yellow, (5Y 8/4), moist, dense,
_		1.0	SS-7	(34)	mild HCl reaction, fine to coarse sand-sized, 30-35% nonplastic fines, 10-15% fine gravel-sized limestone
_	31.5				fragments, all carbonate materials
-					- 1
-					- 1
-					-
-					- 1
-					†
35	35.0				†
7.0	33.0	0.7	SS-8	18-50/3	Sandy Silt (ML)
_	35.8	0.7	33-0	(68/9")	35.0-35.7' - Same as 30.0-31.0' except nonplastic, rapid dilatancy, 35-40% fine to coarse sand-sized
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-07	SHEET	3	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722823.9 N, 456814.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

	WATER LEVELS: 3.5 ft bgs on 11/27/07 START: 11/16/2007 END: 11/27/2007 LOGGER: P. De Sa'rego, T. Borton									
WATER	LEVELS	: 3.5 ft b	gs on 11/2	27/07 S	START : 11/16/2007	END : 11/27/2007	LOGGE	<u>₹ : P.</u>	De Sa'rego, T. Borton	
200				STANDARD		SOIL DESCRIPTION		g	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	COU NIANAT	LICCE CDOLID CVMDOL 4	COLOR	SYMBOLIC LOG	DEDTH OF CASING DOLLING DATE	
ᆲ끯잍		RECOVE	ERY (ft)		SOIL NAME, MOISTURF (E, USCS GROUP SYMBOL, (CONTENT, RELATIVE DEN	SITY OR	OLK	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
PT- EVA			#TYPE	6"-6"-6"		Y, SOIL STRUCTURE, MIN		₩B	INSTRUMENTATION	
SU				(N)				ŝ		
2.0	40.0			10.00.50/5	Sandy Silt (ML)	dele vellevy (EV 0/4) mediał	h band			
		1.4	SS-9	19-26-50/5 (76/11)	nonnlastic rapid	rish yellow, (5Y 8/4), moist d dilatancy, mild HCl reacti	i, naru, ion 40-45%	1		
-	41.4			(70/11)	I fine to coarse sa	and-sized, 5% fine gravel-:	sized	1111	-	
-					\limestone fragm	ents, carbonate materials		T	-	
-								1	-	
-								4	-	
_								1	_	
									_	
45	45.0						·	1	Driller's Remark: Hard at 44.5'	
-3.0	45.0	0.0	SS-10		Limestone Frag	ments	. , ,,,,,,, <i>T</i>	T	Switch to rock coring at 45.0'	
-				(50/0.5")	45.0-45.05' - abo recovered	out ten limestone fragmen	its (<1/4")	1		
-						ing at 45.0 ft bgs		1	-	
-					See the next she	eet for the rock core log		1	-	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FI	CT-07	SHEET	4	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722823.9 N, 456814.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

				IEINT: CIVIE 43B 3/N 3313/4, ITIUU TOLAIY, NQ LOOIS, NVV			
WATER	LEVELS: 3.5	ft bg	s on 1		/27/2	· · ·	
≥0€	. (%			DISCONTINUITIES	ပ္ထ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	S F, Ä	(%) _Q	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ö	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F.F.S	NS S	OΩ	AC.	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
吕S급	8삠胐	A O	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λS	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-3.0	45.0					Limestone	13:45 Begin rock coring
-	R1-NQ 1.5 ft	67	0	-	H	- 45.0-46.0' - light olive gray, (5Y 4/4),	R1: 7 minutes
-	67%	01		-		fine to medium grained, moderate HCl reaction, weak (R2), fossiliferous	-
-	46.5		NR	<u> </u>	⊬	- (10-20%) casts and molds, voids up	_
l _			3	46.55' - Fracture, <5 deg, rough, undulating, open 1/8"		to 1/8" (predominantly <1/16") over	
				46.8' - Fracture, 10-15 deg, rough,	H	5-15% of surface, one void at 45.2'	
-				undulating, tight	╁	- (1"x1/8") No Recovery 46.0-46.5'	7
-			2	47.4' - Fracture, 0-10 deg, rough, undulating,		Limestone	-
_	R2-NQ			open 1/2" with fragments up to 1/2", subrounded to subangular	H	 46.5-49.25' - light olive gray with 	_
_	5 ft	55	1	48.1' - Bedding plane or mechanical break,		zones of yellowish gray from 47.25-47.4' and from 48.9-49.4', (5Y	_
	55%			<5 deg, rough, undulating, open <1/16"		- 5/2 with 5Y 8/4), fine to coarse	
50				48.25' - Mechanical break, <5 deg, rough,	Ш	grained, mild to moderate HCl	R2: 7 minutes
-8.0			NR	undulating, tight — 49.1' - Bedding plane, <5 deg, rough, planar,	\vdash	reaction, weak to medium strong (R2	
-			INIX	tight	亡	to R3), voids (<1/16") over 10-20% of core, moderately fossiliferous (casts	
-				-	₩	and molds)	-
_	51.5			-	仜	_ No Recovery 49.25-56.5'	Daille de Deurs adu 54 5 50 51
l _				_	┢	_	Driller's Remark: 51.5-56.5' soft
					H		Started to get soft at 50.0'
				_	ш		Ţ Ţ
-				-	H	-	-
-	R3-NQ			-		-	-
-	5 ft	0	NR	-	⊬	-	-
_	0%			_	ш	_	
55					┢┰		
-13.0							
-				-	╙	-	R3: 2 minutes
-	50.5			-	口	-	-
-	56.5			-	\vdash	Limestone	-
_			1	-		- 56.5-58.1' - yellowish gray to grayish	=
_				57.3, 57.7' - Mechanical break or bedding -	⊬	yellow, (5Y 7/2 to 5Y8/4), fine to	
			ا م	plane (2), <5 deg, rough, undulating, tight		medium grained, mild to moderate	
I -			2	58.1' - Bedding plane, <5 deg, rough,	TIT	HCl reaction, extremely weak to weak (R0 to R2), highly fossiliferous	1
1 -	R4-NQ			undulating to planar, tight		(90% casts and molds <1/16"-3/16"),	1
-	5 ft	32	1	-		voids (<1/16") over 20-30% of	
-	72%		\vdash	-		surface 	-
60 <u> </u>			0	_	Ш	58.1-59.0' - yellowish gray to grayish	_
-10.0				_	\vdash	yellow, (5Y 7/2 to 5Y8/4), fine to	
			NR		片	coarse grained, nonplastic, mild HCl	R4: 4 minutes
I -	61.5				\vdash	reaction No Description 59.0-59.6'	1
_	- 1.0			-	Ш	Sand With Silt (SM)	-
-			3	61.95, 62.1' - Bedding plane (2), <5 deg,	Щ	59.6-59.8' - Same as 58.1-59.0'	
-				rough, planar, tight -	\vdash	Limestone	-
-			2	62.5' - Fracture or mechanical break, 70-80 deg, rough, undulating, tight	匚	59.8-60.1' - Same as 56.5-58.1'	_
I -				62.6' - Same as 62.5' except opposite	Ш	except very weak (R1) No Recovery 60.1-61.5'	
	R5-NQ	40		direction of angles		Sandy Silt (ML)	
1 -	5 ft 94%	18	1	63.3' - Bedding plane, <5 deg, rough, planar,	Щ	61.5-62.2' - yellowish gray, (5Y 7/2),	1
65				tight -	ऻ	moist, nonplastic, mild HCl reaction	1
05_					F	_ 11	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-07	SHEET	5	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722823.9 N, 456814.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

CORING	NIL ITIOD A	ND E	אורוע	IENT: CME 45B S/N 351574, mud rotary, NQ tools, NW	Casii	9	ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bg	s on 1	1/27/07 START : 11/16/2007 END : 1	1/27/2	007 LOGGER: P. De Sa'rego, T. Bor	ton
\				DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	N Y Y	(%)	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
±¥,	R T T N	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
989	L SEE	Ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-23.0	016	ш	3	, ,	0)		
-23.0]			64.3' - Mechanical break or bedding plane, <5 deg, rough, undulating, open 1/2"	\vdash	Limestone - 62.2-63.3' - yellowish gray, (5Y 7/2),	_
			0	64.8' - Mechanical break, 70-80 deg, rough,		fine to medium grained, mild HCI	R5: 9 minutes
-	66 5		NR	undulating, tight	╁	reaction, very weak (R1),	_
-	66.5		INIX	65.0' - Bedding plane or mechanical break,	t	fossiliferous (casts and molds), voids	-
-			2	<5 deg, rough, undulating, tight 65.5' - Mechanical break or bedding plane,	ш	(up to <1/16") over 5-10% of surface	-
l -	1			<5 deg, rough, undulating, tight	Н	Sandy Silt (ML) - 63.3-64.0' - Same as 61.5-62.2'	_
			ا ا	66.7' - Mechanical break or bedding plane,		Limestone	
			3	<5 deg, rough, undulating, tight	Н	64.0-66.2' - Same as 62.2-63.3'	_
-	R6-NQ			67.15' - Mechanical break or bedding plane, <5 deg, rough, planar, tight		 except transitions from extremely 	-
-	5 ft	57	1	67.8' - Bedding plane, <5 deg, rough,	╁	weak to very weak (R0 to R1) at	-
-	96%			undulating, tight	Ł	64.3' No Recovery 66.2-66.5'	_
70]		1	68.0' - Mechanical break or bedding plane,	$oxed{\square}$	Limestone	_
-28.0				<5 deg, rough, undulating, tight 68.15' - Fracture, 5-10 deg, rough,		66.5-71.3' - yellowish gray, (5Y 7/2),	I
1 -	1			undulating, tight		fine to medium grained, mild HCl	R6: 8 minutes
-	1		1	69.3, 70.2 - Bedding plane (2), <5 deg,	╁	reaction, very weak (R1) with zones of weak (R2) rock from 67.1-67.6',	-
-	71.5		NR	rough, planar, tight	世	- 68.1-69.25', and 70.35-71.3', variable	-
_			0	70.8' - Fracture, 20-30 deg, rough, undulating, tight	┢	voids (<1/16"-3/16") over 10-20% of	_
			ਁ	dildulating, tigrit		surface, fossiliferous casts and	
						molds (10-15%), trace organicsNo Recovery 71.3-71.5'	_
-	1		1	72.95' - Bedding plane, <5 deg, rough,	╁	Limestone	-
-	R7-NQ			undulating, tight		 71.5-76.25' - yellowish gray to 	-
-	5 ft	68	>10	73.75-73.95' - Fracture zone, one large	₽	grayish yellow, (5Y 7/2 to 5Y 8/4),	-
I .	95%			fragment 2-1/2" with small fragments <3/4",	ш	very fine to medium grained, mild - HCl reaction, very weak (R1), voids	_
75				subrounded to subangular 74.15' - Bedding plane, <5 deg, rough,	Н	(up to <1/16") over 5-10% of surface,	
-33.0	1		1	undulating, tight	Ľ	fossiliferous (casts and molds) <5%,	
-	1		_	74.4' - Bedding plane or mechanical break,	╙	- extremely weak (R0) from 72.5-73.1'	R7: 11 minutes
-	-		2	<5 deg, rough, undulating, tight	$+$ \Box	with a trace of fines	Total depth is 76.5'
_	76.5		NR	75.15 - Bedding plane or mechanical break,		No Recovery 76.25-76.5'	Total deptil is 70.5
]			\ 75.5-75.6' - Fracture, <5 deg, rough,		Bottom of Boring at 76.5 ft bgs on	_
				undulating, open 1.0" with one large fragment		11/27/2007	
_	1			75.95' - Mechanical break or bedding plane,	1	=	-
-	-			<5 deg, rough, undulating, open <1/16"	1	-	-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-08	SHEET	1	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722706.4 N, 457111.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

					S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 5.0 ft bo	gs on 11/		START: 11/15/2007 END: 11/15/2007 LOGGER: T. Borton, P. De Sa'rego SOIL DESCRIPTION COMMENTS
<u>\$</u> 9€	CANAD: -	INTERNA	1 (61)	STANDARD PENETRATION	O CONVINCENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
FAC ATI		RECOVE	<u> </u>		MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SUR			#TYPE	6"-6"-6" (N)	CONSISTENCT, SOIL STRUCTURE, INIINERALOGT
42.2	0.0			,	↑ Topsoil Degin drilling 11/15/07, 09:00
_		1.1	SS-1	1-2-2	\(\sqrt{0.0-0.1'}\) - dark gray to grayish black, (N3 to N2) Poorly Graded Sand With Organics (SP)
_	1.5			(4)	\[\ 0.1-1.1' - dark gray to medium light gray with depth, \[\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
_					\(\(\(\)(\)(\)(\)(\)(\)(\)(\)(\)(\)(\)(\
_					silica
					1
					1
					1
					1
5_	5.0				
37.2				0.00	Silty Sand (SM) 5.0-6.1' - light olive brown, with <5% very light gray
_		1.1	SS-2	2-2-3 (5)	mottling throughout, (5Y 5/6 with N8), moist to wet,
_	6.5				very loose, fine grained, no HCl reaction, 19% medium plasticity fines, trace iron concretions, sand is
_					silica
_					<u> </u>
_					
_					
_					1 1
_					
10 <u> </u>	10.0				CHA (NAL)
32.2				4-6-14	Silt (ML) 10.0-11.0' - grayish yellow, (5Y 8/4), wet, very stiff,
_		1.0	SS-3	(20)	nonplastic, rapid dilatancy, mild to moderate HCI reaction, 10-15% very fine to medium sand-sized, all
-	11.5				carbonate material
_					- 1
_					- 1
_					- 1
-					- 1
-					1 1
<u>, </u> -					1 1
15 <u> </u>	15.0 15.4	0.4	SS-4	50/5	Silt (ML)
-	10.4	J.,-	- 55 -	(50/5")	√ 15.0-15.42' - yellowish gray, (5Y 8/1), moist, hard,
-					\nonplastic, rapid dilatancy, mild to moderate HCl reaction, 4% very fine to medium sand-sized, all
-					carbonate material -
-					1 1
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-					1
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-08	SHEET	2	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722706.4 N, 457111.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS	: 5.0 ft bo	gs on 11/	16/07 S	START : 11/15/2007 END : 11/15/2007 LOGGER	R : T.	Borton, P. De Sa'rego
				STANDARD	SOIL DESCRIPTION	₀	COMMENTS
AND N (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCO ODOUR OVARDOL COLOR	C LO	DEDTIL OF CASING POUL INC DATE
DEPTH BELOW SURFACE AND ELEVATION (#)		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION
22.2	20.0				Silt (ML)	Ш	09:44 Installing casing to 20.0'
_		1.3	SS-5	26-33-50/4 (83/10")	20.0-21.25' - Same as 15.0-15.42' except grayish - yellow to yellowish gray, (5Y 8/4 to 5Y 8/1)		
	21.3					$H^{\perp \perp \perp}$]
_					_		_
-					_		_
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-					-		-
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25	25.0				-	l	-
17.2	25.6	0.4	SS-6	24-50/1.5	Silt With Sand (ML)	Ш	
	25.0			(74/7.5")	25.0-25.4' - grayish yellow to yellowish gray, (5Y 8/4 to 5Y 8/1), moist, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 17% fine sand-sized grains,		
					moderate HCl reaction, 17% fine sand-sized grains, all carbonate materials		
_					-		_
-					-		-
-					-	1	-
-					-	ł	-
-					-	ł	-
30	30.0				-	l	-
12.2	00.0				Sandy Silt (ML)	Ш	
		1.5	SS-7	17-34-51 (85)	30.0-31.5' - dark yellowish orange, (10YR 6/6), moist, hard, nonplastic, rapid dilatancy, moderate HCl		
_	31.5			. ,	reaction, 35% fine to coarse sand-sized, trace fine gravel-sized limestone fragments, moderate to strong	Ш	_
_					HCI reaction in fragments, all carbonate materials		-
-					-		-
-					-		-
-					-		-
-					-		Driller's Remark: Hard drilling at 34.0';
35	35.0				-	1	alternating hard/soft zones similar to elsewhere on site
7.2	35.3	0.0	SS-8	50/3 (50/3") /	No Recovery 35.0-35.3'	dash	
_				(30/3)	few limestone fragments <1/4", subangular, moderate to strong HCI reaction		
-					_		_
-					_		-
-					-		_
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-08	SHEET	3	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722706.4 N, 457111.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

					5/N 351574, Hidd Totally, auto Hammer, AWJ Tous, 3-7/6 tit-corie bit ORIENTATION . Vertical
WATER	LEVELS	: 5.0 ft b	gs on 11/		START : 11/15/2007 END : 11/15/2007 LOGGER : T. Borton, P. De Sa'rego
≥⊕£				STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION 8
ELO NO CNC	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE,
H B		RECOVI			MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
2.2	40.0			(11)	Sandy Silt (ML)
-		1.2	SS-9	23-29-50	40.0-41.2' - yellowish gray to light olive gray, (5Y 7/2 -
-		1.2	00-3	(79)	to 5Y 5/2), moist, hard, low plasticity, moderate HCl reaction, 39% fine to coarse grained sand, 6% gravel, Stop SPT sampling at 41.5'
-					
-	-				\laminar bedding (grayish yellow [5Y 8/4]), all \laminar bedding (grayish yell
-	-				Begin Rock Coring at 41.5 ft bgs See the next sheet for the rock core log
-					See the next sheet for the rock core log
-					
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45 <u> </u> -2.8					
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-08	SHEET	4	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722706.4 N, 457111.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS : 5.0	ft bas	s on 1	1/16/07 START : 11/15/2007 END : 11.	/15/2	007 LOGGER : T. Borton, P. De Sa're	ego
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_	41.5		0	-		Limestone - 41.5-45.6' - pale yellowish brown,	Begin rock coring at 41.5'
-			1	-	Ħ	(10YR 6/2), fine grained, mild HCI reaction, weak to medium strong (R2 to R3), very weak (R1) at 45.1-45.6',	-
-	R1-NQ	68	1	43.05' - Fracture or mechanical break, horizontal, rough, undulating, <1/8" open		trace voids up to 1/16", a 3/8"x3/8" cavity is at 43.3' and a 2"x1-3/16" cavity is at 44.9'	_
45	5 ft 82%	00		43.9' - Fracture, 30 deg, rough, undulating, black staining over 100% of surface, open		- Cavity is at 44.9	_
-2.8			2	45.1-45.2' - Fracture, 45 deg, rough, undulating, 1/8" open			R1: 40 minutes
-	46.5		NR	45.4' - Fracture, 30 deg, rough, undulating, - 1/8" open		Limestone	-
-			3	46.6' - Fracture, 10 deg, rough, undulating, open - 47.05' - Fracture, 30 deg, rough, undulating, -		 46.5-51.0' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl 	
-			>10	1/8" open 47.2' - Fracture, 30 deg, 1/8" open, fine gravel-sized fragments		reaction, weak (R2), becoming very weak to weak rock at 49.8-51.5', trace voids up to 3/16" throughout	-
_	R2-NQ 5 ft 90%	58	0	47.55' - Fracture, 10 deg, rough, undulating, tight 47.55-47.95' - Fracture, vertical, rough,		run, 15% voids to 1/8" from 49.4-49.8', 10% cavities up to 1"x3/8" from 49.4-49.8'	_
50_ -7.8			2	undulating, 1/8" open 47.95-48.35' - Fracture zone, fine	H	- · · · · · · · · · · · · · · · · · · ·	_
-			0	gravel-sized fragments 49.8' - Fracture or mechanical break, horizontal, rough, undulating, tight		- No Recovery 51.0-51.5'	R2: 12 minutes Total depth of boring 51.5',
-	51.5		NR	50.5' - Mechanical break		Bottom of Boring at 51.5 ft bgs on 11/15/2007	on 11/15/07 at 16:00 - Recovery and RQD criteria
-				- -		-	11/16/07 at 08:15, water level is 5.0' below ground
-				-		-	surface
_				-		-	-
-				-		- -	
-				- -		-	- -
-				-		-	-
-				-		- -	_
-				-		-	-
-				_		<u></u>	_
-				-		-	_
-							



SAMPLE INTERVAL (ft)

0.8

8.0

1.2

1.2

RECOVERY (ft)

#TYPE

SS-1

SS-2

SS-3

SS-4

DEPTH BELOW SURFACE AND ELEVATION (#)

40.8

35.8

10

30.8

15

25.8

20

0.0

1.5

5.0

6.5

10.0

11.5

15.0

16.5

PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-01	SHEET	1	OF	6	

SOIL BORING LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit

ORIENTATION: Vertical WATER LEVELS: 3.0 ft bgs on 5/22/07 LOGGER: R. Bitely START: 5/22/2007 END: 5/23/2007 SOIL DESCRIPTION COMMENTS STANDARD LOG PENETRATION TEST RESULTS SYMBOLIC SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY 6"-6"-6" (N) Poorly Graded Sand W/ Organics (SP) Boring offset 11.5' SE of staked location due 0.0-0.55' - very light gray to dark yellowish brown, (N8 to 10YR 4/2), moist, very loose, very fine to fine to fallen tree at location. 1-1-3 (4) grained, 10% organic matter, less with depth, trace nonplastic fines, silica sand Silty Sand (SM) 0.55-0.85' - dark yellowish orange, (10YR 6/6), moist, very loose, very fine grained, less than 20% fines, 5% organics, silica sand Rapid, easy drilling. Water encountered at 3.0' below ground surface. Wood at 3.0' in mud pit. 5.0-5.8' - very light gray, (N8), wet, medium, very fine 5-8-8 grained, trace nonplastic fines, trace very fine grained (16)black particles Clayey Sand (SC) 10.0-11.2' - yellowish gray, (5Y 7/2), wet, medium, very fine to fine grained, 30% moderate plastic fines, 5-6-7 (13)silica sand Clayey Sand (SC) 15.0-16.2' - Same as 10.0-11.2' except 4" sandy clay 8-8-10 lens (CH) at 15.6-15.9', moderate plasticity (18)



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	D-01	SHEET	2	OF	6

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit

						ary, camead, rvvvo rods, o tir-	50.10 Dit		Official Vertical
WATER	LEVELS	: 3.0 ft bo	gs on 5/22	2/07 S	START: 5/22/2007	END: 5/23/2007	LOGGE	R : R.	Bitely
				STANDARD		SOIL DESCRIPTION			COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMDIE	INTERVA	.l (ft)	PENETRATION				SYMBOLIC LOG	
NAN (SAWIFLE			TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMBOL, C	OLOB	CL	DEPTH OF CASING, DRILLING RATE,
a SE		RECOVE	ERY (ft)			E CONTENT, RELATIVE DENS		5	DRILLING FLUID LOSS, TESTS, AND
Ļ₩.			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MINE		MB	INSTRUMENTATION
SCIE			" · · · · _	(N)				SΥ	
20.8	20.0				Clayey Sand (SC)		////	Rapid, easy drilling. SS-5 is less plastic than
-				4-4-5	20.0-20.45′ - lig	ght olive green, (5Y 6/1), we	t, loose,	1///	SS-3 and SS-4
I _		0.4	SS-5	(9)	very fine to fine	e grained, 40% low to moder	rate / ַ	1	_
	21.5			()	plasticity fines,	silica sand			
-							-	1	-
-							-	1	=
I _							_	1	_
-							-	1	=
-							-	1	-
I _									
	05.0						-	1	=
25 <u> </u>	25.0				Silty Sand (SM	/ \		ha	
15.6				E E C	25.0-26.3' - Sa	יו) וme as 20.0-20.45' except 25	5-30% low -		_
		1.3	SS-6	5-5-6 (11)	plastic fines	ine as 20.0-20.40 except 20	5-30 /6 IOW		
-	00.5			(11)	pidotio iiiloo		-	1111	-
-	26.5						-	Ŧ	-
I _							·-	1	
-							-	1	=
-							-	1	-
I _									
-							-	1	7
-							-	┨	-
30	30.0								
10.8					Silty Sand (SM		150/		
-		1.2	SS-7	3-4-4	30.0-31.2" - Sa nonplastic to lo	me as 25.0-26.3' except 40-	45%	1111	
-			00 /	(8)	Horipiastic to io	ow plastic filles	-		-
_	31.5						-	Γ	_
-							-	1	_
-							-	1	=
I -								1	_
1 7							-	1]
-							-	1	=
-							-	1	_
35_	35.0							L	
5.8					─ Organic Soil V	Vith Sand (OH)	Г	$\rangle \rangle \rangle$	Slightly slower drilling.
-		0.4	SS-8	5-3-4	□\ 35.0-35.2' - gra	ayish black, (N2), moist, firm	ı, high //-	Г	-
-		0.4	೨೨-೮	(7)	plasticity, slow	dilatancy, 20% very fine to f	ine silica	1	_
	36.5					estone rounded pebbles	/		
1 7					Silty Sand (SM	//) ht olive gray, (5Y 6/1), wet, lo	0000 1001	1]
-					fine to fine arei	nt olive gray, (5 Y 6/1), wet, it ined, 30% low plastic fines, s	silica cand	1	-
-					<1/2" thick orga	anic clay (OH) seam at 35.3	5' -	1	=
					1 <u>_</u> 1or org	c.a, (c) ccam at 60.0	-		
1 7							-		1
-							-	1	=
-							-	1	_
40							-	1]
40								\vdash	
1	I		ı						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-01	SHEET	3	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit

ORIENTATION: Vertical

DRILLIN	3 METH	JU AND	EQUIPIVII	ENT : Dietrich D-5	60 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 3.0 ft bo	as on 5/22	2/07	START : 5/22/2007 END : 5/23/2007 LOGGER : R. Bitely
200				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H H H		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTF/ JRF/ EV/			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
	40.0			(N)	
0.8	40.0	0.0	SS-9	48-48-50/4	Silt With Sand (ML) 40.0-40.9' - olive gray, (5Y 3/2), moist, hard, low - Hard, slow drilling. No chatter.
_	44.6	0.9	55-9	(100)	」 plasticity, rapid dilatancy, moderate HCl reaction,
_	41.3				<20% fine to medium-sized limestone fragments, / large fine gravel-sized limestone
_					
]
] [
1 7					1
45	45.0				1
-4.2		0.7	SS-10	50-50/3	Sandy Silt (ML)
	45.8	0.7	00 10	(100")	45.0-45.65' - olive gray, (5Y 3/2), moist, hard, low to hoderate plasticity, rapid dilatancy, moderate HCl
					\reaction, 25-30% fine sand-sized limestone fragments/
-					1
-					1
					1
_					Very light, intermittent chatter.
-					- 1
-					1
50	50.0				
-9.2	50.0	0.5	SS-11	48-50/2	Sandy Silt And Limestone Lenses (ML)
-	50.7	0.5	55-11	(100")	50.0-50.5' - olive gray, (5Y 3/2), wet, hard, low to moderate plasticity, moderate HCl reaction, <30%
-					limestone lenses, 35% fine to coarse sand-sized
-					limestone fragments
-					
-					
-					
-					
-					
	FF 2				
55 <u> </u>	55.0			10 50/5 5	Silt With Sand (ML)
-		0.8	SS-12	48-50/5.5 (100")	55.0-55.8' - light olive gray, (5Y 5/2), moist to wet, -┃┃┃┃ -
-	56.0			(1.50)	hard, low plasticity, rapid dilatancy, moderate HCl reaction, 20% fine to medium sand sized, 40%
-					\organics as seams <1/4" thick and laminations, black / - 100% circulation loss. Removed NW Lond
-					and 6" tri-cone, set HW casing to 59.0' below
-					ground surface. Regain 100% circulation at 57.5' below ground surface with HW casing.
-	60.0	0.1	\SS-13 <i>)</i>	50/1.5	Stop drilling at 17:30 5/22/07 after setting the
-	60.1	/	\	(50/1.5")	│ 60.0-60.1' - light olive gray, (5Y 5/2), moderate HCl │ │ │
-					reaction, fragments <1" diameter, voids <1/16" over 40% of surface
-					-
60					Posis Pook Caring at 60.0 ft has
					Begin Rock Coring at 60.0 ft bgs See the next sheet for the rock core log
					· I I



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-01	SHEET	4	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 3.0	ft bg	s on 5	/22/07 START : 5/22/2007 END : 5/2	23/20	07 LOGGER : R. Bitely	
≥0≎	(%)			DISCONTINUITIES	စ္က	LITHOLOGY	COMMENTS
PILO NO TANI	JN, AND RY (9		ZES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
FACI	E RU GTH, OVE	(%) Q	ETC DOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	A Q	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-19.2	60.0 R1-NQ	40	0			Limestone	Continue drilling at 0800
	1 ft 61.0 40%	40	NR		Ь	60.0-60.4' - yellowish gray, (5Y 7/2), fine grained, weak to moderate HCl	5/23/07, water level at 2.2' – below ground surface.
_			>10	61.1, 61.3' - Fracture or mechanical break,	Ь	reaction, weak (R2), voids 1/16" over	Clean out HW casing to 59.0' below ground
_				<10 deg, rough, undulating, open <1/2" 61.4, 61.65, 61.7, 61.75, 61.8, 61.85' -	\vdash	50% of surface, poorly fossiliferous, few cavities <1/4" diameter	surface, tri-cone with 3-7/8"
-			0	Fractures or mechanical break, 30 deg and 40 deg, rough, undulating, tight, open <1/4"	F	No Recovery 60.4-61.0' Limestone	bit to 60.0' Light Chatter
-	R2-NQ			61.9' - Fractures or mechanical break,	F	_ 61.0-62.4' - yellowish gray, (5Y 7/2),	Remove AWT rod and 3- 7/8" tri-cone
-	5 ft	9		horizontal, rough, undulating, tight, open <1/4"	F	fine grained, moderate HCl reaction, weak to medium strong (R2 to R3),	Set NQ tooling to 60.0'
-	28%		NR	62.2' - Mechanical break	H	voids <1/16" over 20-30% of surface, trace cavities <1/4" diameter, poorly	Advance HW casing to seat in top of rock at 60.0'
65			INIX	-	Ħ	fossiliferous, trace organics, trace	R1: 25 seconds –
-24.2					H	silts at 62.4', possible soil zone at 62.4-66'	R2: 7 minutes
-	66.0			-	L	No Recovery 62.4-66.0'	_
-	00.0		_	-	L	Limestone	
			4	66.35' - Mechanical break or fracture, 60 deg, rough, undulating, tight, open <1/4"	\vdash	66.0-67.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction,	
			0	66.45' - Mechanical break or fracture, vertical, rough, undulating, tight		weak to medium strong (R2 to R3), voids <1/16" over 30-40% of surface,	
_			NA,	66.6' - Fracture or mechanical break, 50 deg,		¬ many cavities <1/4" diameter, ¬	Driller's Remark: 100%
_	R3-NQ 5 ft	25	NR	rough, undulating, open <1/4" 66.95' - Fracture or mechanical break,		moderately fossiliferous with molds / <1/4" diameter	circulation loss at 68.0'
-	67%		INIX	horizontal, rough, undulating, open <1/4" 67.7-69.6' - poorly indurated silts and	$\ \ $	Silt And Limestone Interbeds (ML)	_
-			1	limestone fragments (8")	$\ \ $	67.7-70.45' - yellowish gray, (5Y 7/2), hard, fine to medium grained, strong	_
70 -29.2			NA	69.9' - Fracture or mechanical break, 80 deg, —	$\ \ $	HCl reaction, very weak (R1), limestone interbeds are 1" thick,	R3: 5 minutes
-	71.0		NR	rough, undulating, tight 70.45-71.0' - poorly to moderately indurated	╂┼┼	partial no recovery in interval	-
-	71.0			silt (1")	1	Carbonate Silt (ML) 70.45-71.0' - yellowish gray, (5Y 7/2),	-
-				-	1	hard, moderate to strong HCl reaction, friable	
-			NR	-		No Recovery 71.0-73.6'	_
_				_		-	
	R4-NQ 5 ft	34]		
_	48%	J -1	3	73.85' - Bedding plane (3), horizontal,	Ш	Limestone	
-			4	smooth, undulating, tight, 3+ bedding plane fractures in indurated silts/extremely weak	口	73.6-73.85' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely	_
75_ -34.2				limestone 74.9-75.05' - Fractures or mechanical break	口	weak (R0), laminated 73.85-76.0' - yellowish gray, (5Y 7/2),	R4: 3 minutes
-54.2			3	(4), rough, undulating, intersecting angles	仜	 moderate HCl reaction, strong to 	134. 3 Hilliules -
-	76.0			75.7-75.8' - Fractures or mechanical break (3), 50 deg, rough, undulating, tight, 3	世	medium strong (R4 to R3), voids <a> 1/16" over 30-40% of surface, few	-
-			>10	intersecting fractures	Ь	_ cavities <1/2" diameter, poorly fossiliferous	-
-				76.0-76.15' - Fracture zone, rough, undulating, gravel sized fragments <1"	Ь	76.0-78.0' - yellowish gray, (5Y 7/2),	-
-			>10	diameter - 76.45' - Fractures or mechanical break (2),	F	fine grained, strong HCl reaction, medium strong to strong (R3 to R4),	
-	R5-NQ			45 deg, rough, undulating, tight	F	strengthening with depth, voids <1/16" over 30-40% of surface,	
-	5 ft 60%	28	\ \	76.8' - Fractures or mechanical break (4), 70 - deg, rough, undulating, tight, open <1/4"	H	variable, few cavities <1/4" diameter,	1
			NR	77.75-78.0' - Fracture zone, rough, undulating, gravel sized fragments <2" -	片	poorly fossiliferous No Recovery 78.0-80.0'	
80				diameter	Ħ	-	
L					ĺ		

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-01	SHEET	5	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bgs	s on 5/	22/07 START : 5/22/2007 END : 5/	23/20	07	LOGGER : R. Bitely	
≳D⊋	(%			DISCONTINUITIES	၂ ဗွ	L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
FACI	E RU STH, OVE	(%) O	FOCT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR LEN(REC	a D	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-39.2	-		NA		17	上	Fat Clay (CH)	R5: 4 minutes
-	81.0		5		₩	╂∖	80.0-80.3' - high plasticity, no to slow dilatancy, strong HCl reaction, <10%	-
-	01.0			80.9-81.0' - Fracture zone, rough, undulating,	F	╊∖	limestone fragments of medium	-
-			>10	gravel sized fragments <1" diameter 81-81.1' - Fracture zone, rough, undulating,	ፗ	†	sand-sized, calcareous clay Limestone	-
-				gravel sized fragments <1-1/2" diameter 81.45' - Fracture or mechanical break, <10	ш	t	80.3-81.0' - yellowish gray, (5Y 7/2),	-
-			0	deg, rough, undulating, 3+ gravel sized	╁	ł	fine grained, strong HCl reaction, extremely weak to very weak (R0 to	1
-	R6-NQ			fragments <1/2" diameter, open <1/2" 81.75' - Fracture or mechanical break, 40		L	R1), voids <1/16" over <10-30% of	- =
-	5 ft 94%	70	0	deg, rough, undulating, open <1/2"	₩	╢	surface, increasing with depth, no cavities <1/2" diameter, poorly	1
_					I	1	fossiliferous	1
85 85			1		ш	11	81.0-83.25' - very light gray to moderate yellowish brown, (N8 to	1
-44.2			1	84.95' - Mechanical break or fracture, <10	世	1	10YR 5/4), very fine to fine grained,	R6: 5 minutes
-	86.0		NR	deg, rough, undulating, tight 85.15' - Fracture or mechanical break, <10	╁	Ŧ١	medium strong to strong (R3 to R4), voids <1/16" over <5-30% of surface,	1
_				deg, rough, undulating, open <1/4"	H		variable, many cavities <1/2"x1-1/2" diameter, 80% (with secondary	1
-			>10	96 0! Fracture or machanical break <10	H	1	recrystallized infill), trace organics,	1
_			>10	86.8' - Fracture or mechanical break, <10 deg, rough, undulating, open <1/2"	Ħ	ſ	poorly fossiliferous	
			/10	86.9-87.05' - Fracture zone, rough, undulating, gravel sized fragments <1-1/2"	H	ſ	Carbonate Silt (ML) 83.25-83.35' - very light gray to	
	R7-NQ	50	1	diameter	Н	ſ	moderate yellowish brown, (N8 to 10YR 5/4), very fine to fine grained,	
	5 ft 92%	50	'	87.45, 87.8, 88.05, 89.2' - Fracture or mechanical break, <10 deg, rough,	$oxed{\mathbb{H}}$	I	low to moderate plasticity, rapid to	
l _			3	undulating, 1/2" silt lens at 87.8', <1/4" gaps	厂		moderate dilatancy, strong HCl reaction	
90			J	88.5' - Mechanical break, for hardness test 89.55, 90.0, 90.2, 90.35' - Mechanical break	ш	L	Limestone	
-49.2			2	or fractures, <10 deg, rough, undulating,	ь	1	83.35-85.7' - very light gray to moderate yellowish brown, (N8 to	R7: 4 minutes
_	91.0		NR	fractures through cavities, open <1"	╁╴	Ł	10YR 5/4), very fine to fine grained,	_
_			0		F	L	strong HCl reaction, extremely weak to very weak (R0 to R1),	_
_					F	L	strengthening with depth, voids	_
_			0	92.35, 92.55' - Mechanical break or fractures,	Ľ	L	<1/16" over 15-30% of surface, few cavities <1"x1/2" diameter, with	_
-				<10 deg, rough, undulating, tight, open <1/4"	₽	-	partial secondary recrystallized infill,	_
-	R8-NQ 5 ft	64	0		₽	-	poorly fossiliferous, trace laminated organics	_
_	100%				ፗ	1	No Recovery 85.7-86.0' Limestone	-
-			1		扛	1	86.0-90.6' - yellowish gray to dark	-
95 <u> </u>				94.95, 95.05, 95.1, 95.65' - Bedding plane or	士	┡	yellowish brown, (5Y 7/2 to 10YR 4/2), 5b 7/1, fine to medium grained,	R8: 5 minutes
-54.2			3	mechanical break, <10 deg, smooth,	╁	+	moderate to weak HCl reaction,	IXO. 3 IIIIIIules
_	96.0			undulating, tight	F	1	weak to strong (R2 to R4), mottled light bluish gray (5B 7/1) at	
-					-	$ \cdot $	86.0-87.8', voids <1/16" over 20-30%	-
-					+	$ \cdot $	of surface, many cavities, <2" diameter, poorly to moderately	-
-					+	$ \cdot $	fossiliferous, 1/2" carbonate silt lens	-
-					+	-	at 87.8', trace laminated organics No Recovery 90.6-91.0'	-
-					-	$ \cdot $	-	-
-					-	$ \cdot $		-
-					-	$ \cdot $		-
-				_	+	╀		-
					•	-		•



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	D-01	SHEET	6	OF	6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

00.1	·		<u> </u>	IENT . Dietrich D-50 S/N 252, mud rotary, N	Q 10010, 1111	, aoin	9	ORIENTATION . Vertical
WATER	LEVELS: 3.0	ft bgs	s on 5	/22/07 START : 5/22/2007	END : 5/2	3/20	07 LOGGER : R. Bitely	
				DISCONTINUITIES			LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION		SYMBOLIC LOG	DOOK TYPE OOLOD	
E A O N	₹.ĕ.	<u></u>	ÄΥ	DESCRI HON		2	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI	E E E	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUG	HNESS,	30L	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무유의	S S S S S S S S S S S S S S S S S S S	Ø	SAC ER I	PLANARITY, INFILLING MATERIAL	AND	/WE	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
SE	222	22	F F	THICKNESS, SURFACE STAINING, AND	IIGHTNESS	S	CHARACTERISTICS	
							Limestone	
-					-		- 91.0-93.3' - pale yellowish brown,	
_					_		(10YR 6/2), strong HCl reaction,	_
					_		medium strong (R3), 20% voids <a> <1/8", many fossil molds up to 1/2"	
							(many elongate), highly fossiliferous	
-					_		93.3-96.0' - yellowish gray, (5Y 7/2),	_
-					-		 very fine grained, very strong HCI 	-
_					_		reaction, weak to medium strong (R2	_
							to R3), 0-5% 1/16" voids (increase in voids to 10% at end of core	
					_		95.9-96.0'), zones of very weak rock	
-					-		(R1) at 93.3-93.5', 93.85-94.2', and	-
-					-		– 94.55-94.85'	-
_							Bottom of Boring at 96.0 ft bgs on	
							5/23/2007	
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PROJECT NUMBER:	BORING NUMBER:	
338884.FL	D-02	SHEET 1 OF 3

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724164.5 N, 457585.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 1.0 ft bo	gs on 04/2	20/07	START: 4/20/2007 END: 4/20/2007 LOGGER: T. Stewart
>00				STANDARD	SOIL DESCRIPTION COMMENTS
ANC (# CO	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FULL DLOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
41.3	0.0				Topsoil (OL/OH)
		1.2	SS-1	1-2-2 (4)	\[\bigcup_{0.0-0.2'} \cdot \text{grayish black, (N2), moist } \ \ \bigcup_{\text{Poorly Graded Sand With Organics (SP)}} \]
-	1.5			. ,	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					\organics, roots, sand is silica \ \ \ \
-	-				Silty Sand (SM) 0.6-1.2' - dark yellowish orange, (10YR 6/6), moist to
-					wet, very loose, fine grained, 15-20% nonplastic fines, sand is silica
-	-				Saliu is silica
-	-				
5	5.0				
36.3					Poorly Graded Sand (SP) 5.0-5.8' - white, (N9), wet, medium dense, very fine to
		0.8	SS-2	6-7-7 (14)	fine grained, trace nonplastic fines, trace black
_	6.5			, ,	\particles, sand is silica /]
-					
-	-				
-					-
-	-				
-					
10	10.0				† †
31.3	10.0				Sandy Lean Clay (CL) Driller's Remark: Hard drilling at 12.0'
		1.2	SS-3	5-4-4 (8)	10.0-11.2' - greenish gray w/ pale green and olive gray with pale green and olive gray mottling, (5GY
	11.5			(0)	6/1, 10G 6/2, and 5Y 3/2), wet to moist, stiff, low to medium plasticity, slow dilatancy, 40% very fine silica
-					sand
-	-				
-					-
-					
-					
15	15.0				1 1
26.3					Sandy Silt And Limestone (ML)
		1.3	SS-4	7-4-15 (19)	15.0-16.3' - grayish yellow, (5Y 8/4), wet, very stiff, low plasticity, rapid dilatancy, mild to moderate HCl
-	16.5			, ,	reaction, 35-40% fine to coarse sand, 20% fine to coarse gravel-sized limestone fragments; carbonate,
-	-				\all carbonate \\ \
-	-				
-	-				
-	-				
-	1				
20	1				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-02	SHEET	2	OF	3	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724164.5 N, 457585.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 1.0 ft bo	gs on 04/2	20/07 S	START : 4/20/2007 END : 4/20/2007 LOGGEF	R : T	. Stewart
				STANDARD	SOIL DESCRIPTION	٥	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCS CROLID SYMPOL COLOR	SYMBOLICLOG	DEPTH OF CASING PRILLING PATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	2 0	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYME	INSTRUMENTATION
21.3	20.0			(. 1)	Sandy Silt And Limestone (ML)	ĦΪ	
-		1.2	SS-5	42-50-38	20.0-21.2' - grayish yellow, (5Y 5/4), moist, hard, nonplastic, rapid dilatancy, moderate HCl reaction,	111	-
-	21.5			(88)	- 35% fine to coarse sand, 20% fine to coarse	╨	4
-					gravel-sized limestone fragments, all carbonate, /- similar to 15.0-16.3'	1	1
-						1	1
							Driller's Remark: 22.5' got hard, then began soft drilling within next few inches
							Soft drilling within next few inches
_					_	1	_
_					<u>-</u>	1	_
25 <u> </u>	25.0 25.2	0.0	00.0	F0/0	No December 05 0 05 0	┸	4 -
16.3		0.0	SS-6	50/2 (50/2") /	No Recovery 25.0-25.2'	T	1
-					-	┨	-
-					-	┨	-
-					-	1	-
-					-	┨	-
-					-	┨	-
-					-	┨	-
-					-	┨	-
30	30.0				-	1	-
11.3	30.0				Sandy Silt (ML)	╁	Driller's Remark: 27.5' soft drilling to 30.0'
-		1.3	SS-7	22-22-12 (34)	30.0-31.3' - dark yellowish orange, (10YR 6/6), wet, hard, nonplastic, rapid dilatancy, moderate HCl	111	1
	31.5			(34)	reaction, 35% fine to coarse sand, 10% fine	Ш	1
					gravel-sized limestone fragments, all carbonate		
_							
l _					_		_
-					-	1	Drillada Damadu Hand
-					-	1	Driller's Remark: Hard again at 34.5'
35 6.3	35.0 35.1	0.1	\ SS-8 /	50/1.5	☐ Limestone Fragments	╄	-
0.5	JJ. I			(50/1.5")	35.0-35.1' - light olive gray to moderate olive brown	-	-
-					and gray yellowish fragments, (5Y 5/2 to 5Y 4/4 and 5Y 8/4), olive colored fragments have 10-15% black	┨	-
-					particles, disc shaped	+	-
-					Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log	1	-
-					-	┨	-
-					-	1	-
-					-	1	-
-					-	1	-
40					-	1	-
						t	
						1	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-02	SHEET	3	OF	3	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724164.5 N, 457585.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS : 1.0	ft bas	s on 04	4/20/07 START : 4/20/2007 END : 4/2	20/200	D7 LOGGER : T. Stewart	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
6.3	35.0		1	-		Limestone - 35.0-39.8' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction,	Driller's Remark: 100% circulation –
-			0	35.95' - Fracture, 60 deg, rough, undulating, tight - 36.6' - Mechanical break, horizontal, rough,		weak to medium strong (R2 to R3), decreasing to very weak (R1) below 38.5', 5-20% voids <1/16", poorly	
-	R1-NQ 5 ft 96%	96	0	undulating, tight		fossiliferous (clasts up to 3/16"), trace yellowish gray (5Y 7/2) mottling, secondary recrystallization	-
-			0	- -		-	- R1: 6 minutes
40 1.3	40.0		0 NR	- -		- No Recovery 39.8-40.0'	_
- 1.5			2	40.5' - Fracture or mechanical break, 60 deg, rough, undulating, tight		Limestone 40.0-41.5' - light olive gray, (5Y 5/2), moderate to strong HCl reaction,	Driller's Remark: Maintained full circulation
-	R2-NQ		1	40.6' - Fracture or mechanical break, 70 deg, rough, undulating, tight 41.4' - Fracture or mechanical break, 0-10 -		very weak (R1), 5-10% voids <1/16", non-fossiliferous, transitional to 41.0-44.5'	
-	5 ft 90%	86	>10	deg, rough, planar, tight 42.0-42.2' - Fracture zone 42.4' - Mechanical break, horizontal, rough, -		41.0-44.5' - light olive gray, (5Y 5/2), fine grained, moderate to strong HCI reaction, very weak (R1), 15-40%	-
-			0	undulating, tight		voids <1/16" and increasing to <3/16" with depth, poorly fossiliferous with increasing cavities with depth (up to 1/2" elongate), secondary	R2: 4 minutes
45 -3.7	45.0		NR	-		recrystallization No Recovery 44.5-45.0' Bottom of Boring at 45.0 ft bgs on	Total Depth at 45.0' on 4/20/07
-				-		4/20/2007	-
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-				-		-	- -
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

D-03 SHEET 1 OF 4

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724234.5 N, 457645.5 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" and 6" tri-cone bits ORIENTATION: Vertical

						y, cathead, NW rods, 4-				ORIENTATION : Vertical
WATER	LEVELS	: 1.5 ft bo	gs on 3/24	1/07 	START : 3/24/2007 I	END : 3/26/2007	LOGG	ER.	: T. S	Stewart
< □ ≤ □ ≤ □				STANDARD PENETRATION		SOIL DESCRIPTION		4	ဗ္ဂ	COMMENTS
NAN (†)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME	USCS GROUP SYMBO	OL COLOR		CL	DEPTH OF CASING, DRILLING RATE,
H BE ATIO		RECOVE	RY (ft)		MOISTURE C	CONTENT, RELATIVE [DENSITY OR		30LI	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTENC	Y, SOIL STRUCTURE,	MINERALOGY		SYMBOLIC LOG	INSTRUMENTATION
<u>о</u> мш 42.0	0.0			(N)	Topsoil			┽	V/ 1/2	08:45 Start drilling
	0.0	4.0	00.4	1-2-2	_ 0.0-0.55' - dark g	ray to grayish black,		/		24" split spoon, using N-rod
-		1.2	SS-1	(4)	20-25% fine to co	parse gravel sized roo	ots and wood	$/\pm$		Driller switches to a 6.0" tricone roller drill bit
-	1.5					Sand With Organics ((SP)	Ή.		for run between SS-1 to SS-2
-					0.55-1.2' - very li	ght gray, (N8), moist,	very loose, very	/-		Mix mud (added 3/4 of 50-lb bag quick Gel
-					roots/organics, s	ed, 5% nonplastic fine ilica sand	es, 15%			brand bentonite)
_								-		-
_								4		_
_								4		_
_								_		_
5	5.0									
37.0				654	Silty Sand (SM) 5.0-5.7' - modera	ate yellowish brown to	dark vellowish	1		
_		0.7	SS-2	6-5-4 (9)	brown, (10YR 5/₄)	4 to 10YR 4/2), wet, lo	ose, very fine	/1	ŀIJŀ	_
	6.5			. ,		ilica sand, 15% nonpl fine sand-sized black		/ ⅃		
					trace very line to	Title Salia-Sized black	(particies	′ <u> </u>		
								1		1
										1
-								1		1
10	10.0							1		7
32.0	10.0				Silt (ML)			T	Ш	Driller's Remark: Maintaining full mud
-		1.2	SS-3	11-11-11	10.0-11.2' - grayi	sh yellow, (5Y 8/4), w ncy, moderate HCl rea	et, nonplastic,	1		circulation -
-	11.5			(22)	very fine to fine s	sand-sized grains, car		4	Щ	-
-	11.5				∖materials			/		-
-								-		-
-								Ⅎ		1
-								+		-
-								+		-
-								\exists		-
,	45.0							\exists		-
15 27.0	15.0				Silt (ML)			\dashv	Ш	Driller's Remark: Spoon unseated before
-		1.2	SS-4	18-32-50/4"	15.0-15.9' - Sam	e as 10.0-11.2'		\exists		measure of last 6", drilled down to 18.0' to
-	16.3			(82/10")	Sandy Silt (ML)			Ⅎ	Ш	install 20.0' of 6" diameter casing, then switched over to 4-7/8" drill bit and continued
-						erate yellow, (5Y 7/6), dilatancy, moderate l		H		to 20.0' to take SS-5 (20.0-21.5') Driller's
-					similar to 15.0-15	5.9', 25% fine to coars				Remark: Only 15.0' of 6" diameter
-						ents, all carbonate				-
-								4		-
-								4		-
-								4		-
-								4		-
20								4		
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-03	SHEET	2	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724234.5 N, 457645.5 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" and 6" tri-cone bits ORIENTATION: Vertical

						tary, cathead, NVV 100S, 4-7/6			ORIENTATION: Vertical
WAIER	LEVELS	: 1.5 ft bo	us on 3/24		START : 3/24/2007	END: 3/26/2007 SOIL DESCRIPTION	LOGGE	₹: I. 	Stewart COMMENTS
≥ 9€1	SVMDLE	INTERVA	.l (ft)	STANDARD PENETRATION		JOIL DEGOINI HON		90.	COMMENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAWIFLE			TEST RESULTS		ME, USCS GROUP SYMBOL		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
FAC		RECOVE	<u> </u>			E CONTENT, RELATIVE DE NCY, SOIL STRUCTURE, MII		₽ BOI	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEP SUR ELE			#TYPE	6"-6"-6" (N)	CONSISTEN	NCT, SOIL STRUCTURE, IVIII	NEIVALOGI	SYN	INSTROMENTATION
22.0	20.0	0.1	SS-5	50/1	\[\] Limestone Fra				11:57 at 20.0' currently 15' 6" diameter
_				(50/1")	to 5Y 7/6), mod	ayish yellow to moderate y derate HCl reaction, poorly	ellow, (5Y 8/4 · v fossiliferous	1	casing in place, using 5.0' N-rod lengths to – advance a 4-7/8" tricone roller drill bit
-					(molds), trace	(1/2") dusky yellowish bro	wn (10YR	1	Driller's Remark: Very hard drilling
-					2/2) concretion	ns		1	
-								1	-
-								1	-
_									-
_							-	1	_
_							-	1	_
25	25.0						•	1	_
17.0	25.4	0.4	SS-6	50/5	Limestone Fra	agments	40VD 5/4)	\perp	
-				(50/5")	\ moderate HCl	oderate yellowish brown, (reaction, fine to coarse gr	avel-sized /		-
-					\limestone fragi	ments, poorly fossiliferous	(casts and	1	-
-					\molds)				_
							-	1	_
								1	
30	30.0								
12.0	30.4	0.4	SS-7	50/5 (50/5")	Silt With Sand	d (ML) ark yellowish orange, (10YI	2.6/6\ wot	Ш	Driller's Remark: Hard drilling and a lot of chatter, very slow drilling advancement
				(30/3)	nonplastic, rap	oid dilatancy, moderate HC	I reaction. \int	Т''	
					20-25% fine to	medium sand-sized mate	rial, all		Driller's Remark: 15:25, set 3' NW casing to 30' then switch to core runs -
					Begin Rock Co	oring at 31.0 ft bgs	<i></i>		
					See the next s	sheet for the rock core log			Driller's Remark: 15:33 tape measured depth of boring is 31.0'
									NQ core barrel assembly
_									NQ drill bit is a hard rock formation drill bit NW casing advancer w/ retractable tricone
_									roller drill bit accessary (serial # 83963-CN) Switch to rock coring at 31.0'
_								1	Switch to rock coring at 31.0
35							_	1	_
7.0								1	_
_									_
-							-	4	_
-								4	_
								1	_
-								-	-
-								-	-
-								-	-
-								1	-
40								+	
								1	
				1					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-03	SHEET	3	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724234.5 N, 457645.5 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

				TENT . CIVIE 330 S/N 180073, Hidd Totally, NQ tools, NVV	000		ORIENTATION : Vertical
WATER	LEVELS: 1.5	ft bg	s on 3	/24/07 START: 3/24/2007 END: 3/2	26/20	D7 LOGGER : T. Stewart	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
OFF	₹₹ <u>&</u>	~	꼾는	DESCRI HOR	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
E S E		(%) _Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ď	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
뜨쥬핑	888	οD	A P	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
吕S급	임쁘惃	æ	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
	31.0 R1-NQ		>10	31.0-31.2' - Fracture zone, fragments of core,	t	Limestone	
_	1 ft	0	NR	disc-shaped -		- 31.0-31.2' - grayish yellow mottled	R1: 2 minutes
	32.0 20%		INIT		ш	with minor light olive brown, (5Y 5/4	
_				·	Н	with 5Y 5/6), moderate to strong HCI	
-	- 1		1	22 El Frantura EE 00 dog amonth	+-	 reaction, medium strong (R3), gray 	-
				32.5' - Fracture, 55-90 deg, smooth, undulating, open 1/8"		staining, poorly fossiliferous (casts),	
				o		spherical voids (up to 1/16") over	
-	1		2	33.3' - Fracture, 80 deg, smooth, undulating,	ш	- 10% of surface	1
_				open 1/8"	H	No Recovery 31.2-32.0'	
	R2-NQ			33.5' - Fracture or mechanical break,		Limestone	
25 -	5 ft 94%	84	1	horizontal, rough, undulating, open 1/4" 34.15' - Fracture, 50-60 deg, rough,		 32.0-36.7' - grayish yellow, (5Y 8/4), very fine grained, strong HCl 	1
35 7.0	94%			undulating, tight	Ь.	reaction, poorly fossiliferous with	
7.0			4	undulating, tigrit	\vdash	several large (up to 1" elongate)	
I -			1	35.5' - Bedding plane or mechanical break,	Ш	cavities/molds, some with secondary	1
-	† I			horizontal, rough, undulating	亡	infilling, variable voids (<1/16") over	R2: 7 minutes
I -			0		ш	 3-20% of surface increasing with 	TXZ. 7 TIMIUCS
	37.0		NR	36.5' - Mechanical break	Н	depth, medium strong (R3) from	
_			····	-	1	32.0-34.8', abruptly very weak (R1)	1
-	-		3			_ below 34.8'	-
				37.55' - Bedding plane, horizontal, rough,	Ь	No Recovery 36.7-37.0'	
				undulating, open 1/2" 37.7' - Fracture, 60-70 deg, rough,	\vdash	Limestone	
-	1		1	undulating, tight	I	_ 37.0-37.55' - Same as 32.0-36.7' except very weak (R1), voids	-
_				38.0' - Bedding plane or mechanical break,		<pre>cxcept very weak (RT), voids (<1/16") over 3% of surface</pre>	_
	R3-NQ		_	horizontal, rough, undulating, open up to 1"		_ 37.55-40.7' - dark yellowish orange,	
	5 ft 74%	50	0	38.8, 39.5, 39.8, 40.0' - Mechanical break (4)	┰	(10YR 6/6), fine grained, moderate	1
40 2.0	1470				+	HCl reaction, weak (R2), voids (up to	
2.0			2	40.25' - Fracture or mechanical break,		3/16") over 25-35% of surface, trace	
				horizontal, rough, undulating, tight	Н	fine grained organic particles	
-	1			40.35, 40.6' - Mechanical break or bedding	┰	No Recovery 40.7-42.9'	R3: 4 minutes
I -			NR	plane (2), horizontal, rough, undulating, tight	H	=	Stop Drilling for the day at -
	42.0						17:00
				_	ш		Driller's Remark: 1.5' below
-	-		NR	-	\vdash	=	ground surface water level -
_				_	7	Sand With Silt (SM)	in 6" casing, 08:05 on
					Ш	_ 42.9-46.4' - very pale orange, (10YR	3/25/07 will install 6"
_	1			-	1111	8/2), very fine to fine grained, mild	diameter casing down to
-	R4-NQ			-	1111	HCl reaction, rounded, clean sands,	2.0' increasing circulation around 15.0' of 6" diameter
	4.5 ft	0			$\mathbf{H}\mathbf{H}$	10-15% pale yellowish orange (10YR	casing, will then install 3"
45	80%		NA		$\Pi\Pi$	5/6) fine grained particles, abrupt	NW casing to 41.0'
-3.0	1				1111	contact at 46.4'	R4: 8 minutes
5.5	ļ l				1111	<u> </u>	Core barrel locking during -
							run (possible sands)
I -	1,65			-	1111	F	1 " 1
-	46.5 P5-NO		<u> </u>	-	 	Limestone	Only 4.5' - unable to reach –
1 _	47.0 R5-NQ 0.5 ft	100	2	46.6' - Bedding plane or mechanical break,	匚	46.4-46.5' - light olive gray, (5Y 5/2),	full 5.0' stroke
	100%/			horizontal, rough, undulating, tight	ш	moderate HCl reaction, medium	Install 3" NW casing down
1 -	1 ` ` ` ' '		3	46.7" - Mechanical break	\vdash	strong (R3), moderately fossiliferous	to 46.0'
I -	Į		<u> </u>	47.0' - Bedding plane or mechanical break, 40-50 deg, rough, undulating, gray stains on		_ (few molds, mostly casts), voids	R5: 2 minutes
				surface, open to tight		(<1/16") over 10-15% of surface,	
1 -	1		3	47.45' - Fracture or mechanical break,	1—	trace black particles up to 1/2"	1 1
-	R6-NQ		<u> </u>	vertical, tight	₩	_ (possibly organics)	1 -
	4.5 ft	30	>10	47.85' - Fracture or mechanical break,	Н	46.5-47.0' - Same as 46.4-46.5'	
50	100%		1 10	horizontal, rough, undulating, tight			1
-8.0	 			48.05' - Bedding plane or mechanical break,	ш	-	ı ⊢
J			>10	horizontal, rough, undulating, tight	\vdash		1
			'	48.25, 48.65' - Mechanical break (2)	Н		R6: 9 minutes
					1		I



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-03	SHEET	4	OF	4	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724234.5 N, 457645.5 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

	, <u>.</u>		<u> </u>	MEINT : OME 330 3/11 1000/3, Midd Totally, 110 tools, 1111	odom	5	ONLIVIATION: Vertical
WATER	LEVELS: 1.5	ft bgs	s on 3	/24/07 START : 3/24/2007 END : 3/	26/20	07 LOGGER : T. Stewart	
				DISCONTINUITIES	(5)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TVP5 001 00	1
SEL ON	₹ <u>₹</u>		FRACTURES PER FOOT	DEGONIF HON	<u> </u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH		(%) O		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ĕ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무류	R S S S	g	SAC ER I	PLANARITY, INFILLING MATERIAL AND	Į₩	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
교의교	222	ď	표표	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	11. 1, 111. 1.201. 0, 210.
	51.5		>10	49.20' - Fracture or mechanical break,	П	Limestone	
-	31.3			horizontal, rough, undulating, tight	╁	- 47.0-51.5' - yellowish gray, (5Y 7/2),	l -
-			0	49.25' - Fracture, horizontal and 60-70 deg, rough, undulating, tight	+	mild to moderate HCl reaction, weak	-
l _				49.9-50.3' - Fracture zone	ш	(R2), very weak (R1) zone at 50.0', - spherical voids (1/16") over 20-30%	_
				50.65' - Fracture, 80-90 deg, rough,	\vdash	of surface, poorly fossiliferous,	
-	1		4	undulating, tight		casts/molds (up to 1/2"), up to 15%	1 7
-	R7-NQ			50.95-51.5' - Fracture zone or mechanical	ш	 brownish black particles as 	-
l _	5 ft	85	0	break, vertical, tight	╁╌	laminations (up to 1/16" thick)	_
	100%			52.3, 53.0' - Mechanical break (2) 53.15-53.35' - Fracture zone		51.5-56.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild to	
55]			Jo. 10-00.00 - Flacture ZUITE	\coprod	moderate HCl reaction, weak to	1
-13.0			2	54.9' - Fracture or mechanical break, 40-50	+	medium strong (R2 to R3), spherical	-
-				deg, rough, undulating, tight	亡	voids (up to 1/16") over 5-10% of	
			0		Ш	surface, black laminations (<1/16"	R7: 16 minutes
1	56.5		١		\vdash	thick) across entire interval, trace	1
-	R8-NO	100	0	•		 coarse grained black particles (possible organics) 	1
-	57.0 0.5 ft	100				56.5-57.0' - Same as 51.5-56.5'	R8: 1 minute -
I -	\100%/		2		\vdash	57.0-61.35' - yellowish gray to light]
			_	57.5, 57.8, 59.0' - Fracture (3), <10 deg,		olive gray, (5Ý 7/2 to 5Ý 5/2), fine	
-	1			rough, undulating, open 1/4"-1/2"	╙	grained, moderate HCl reaction,	1
-	-		0		+	weak to medium strong (R2 to R3),	1 -
l _						voids (<1/16") over 20-30% of surface, few fossil molds and casts	_
	R9-NQ	75	_		Ш	up to 1/2" elongate	
60	5 ft 87%	75	2	59.5, 59.6' - Mechanical break (2)	┰	1	1
-18.0	0, ,			59.95' - Fracture or mechanical break, 25-35		 -	
_			2	deg, rough, undulating, open 1/2"	₩	-	-
l _				60.35' - Fracture, 20-30 deg, rough,	厂	_	_
			0	undulating, open 1/8" 60.8' - Fracture or mechanical break,			R9: 10 minutes
1 -	62.0		NR	horizontal, smooth, undulating	╨	No Recovery 61.35-62.0'	Complete boring 3/25/07, – Total Depth 62.0'
-	02.0				╀╴	Bottom of Boring at 62.0 ft bgs on	08:03 3/26/07 water level
-					-	- 3/26/2007	2.5' below ground surface -
l _							to top of mud surface level
					1		10.00.0/00/207.5
-	1				1	†	10:00 3/26/207 finished -
-					1	ŀ	abandonment Grout seeping up out of
-					1	-	ground surface 3' away –
					_	L	from hole
I -]			_	1		
-					1	†	-
-					-	-	-
_					1	L	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-04	SHEET	1	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.5 N, 457831.9 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

					·	ary, auto naminer, Avvo rous			ONIENTATION: Vertical
WATER	LEVELS	: 2.0 ft b	gs on 3/2	8/07 S	START: 3/28/2007	END : 4/4/2007	LOGGE	R : R.	McComb
300				STANDARD PENETRATION		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBOL, (SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
A SE		RECOVE	ERY (ft)			CONTENT, RELATIVE DEN		l o	DRILLING FLUID LOSS, TESTS, AND
EV,			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, MIN	ERALOGY	¥ME	INSTRUMENTATION
a 55 교 41.9	0.0			(N)	Tamasil (OL)			ν, ν	Water level: O Ol belev ground aurice
41.9	0.0			2-3-2	Topsoil (OL) 0.0-0.2' - black,	(N1), moist, roots, wood d	lebris /	1	Water level: 2.0' below ground surface
_		0.8	SS-1	(5)	Poorly Graded ∶	Sand (SP)		+	_
l _	1.5				\ 0.2-0.8' - mediu	m dark gráy, (N4), moist, l and, 10-15% organic mate	oose, fine		_
					grained, silica sa	and, 10-15% organic male	eriai, roots		
								1	
-								1]
_								1	1
-								1	<u> </u>
-								1	-
								1	-
5 36.9	5.0				Poorly Graded	Sand (SP)	_	1.5	-
-			00.0	4-4-4		light gray grading to light g		+	
-		1.0	SS-2	(8)	N7), wet, loose,	fine grained, silica sand, t gradually increasing to sil	race	4	-
-	6.5				(SM) with 25% le	ow plasticity fines	ly Sand	4	_
_					(1)	, ,		4	_
_								1	_
								J	
								1	1
-								1	1
10	10.0							1	-
31.9	10.0				Sand With Lime			1	_
-		1.3	SS-3	5-22-28	10.0-10.2' - pale	greenish yellow, (10Y 8/2	2), wet,	TIT	-
-		1.0		(50)	gravel-sized lime	arse grained, strong HCI r estone fragments, 25% fin	eaction, ne to coarse	-	-
-	11.5				sand-sized grain	ns, 15% nonplastic fines		7	-
-					Clayey Sand (S	C)	a alii u uaa	4	-
_					dense, fine to m	le olive, (10Y 6/2), wet, me redium grained, strong HC	I reaction.	4	-
_					25-30% low plas	stic fines, carbonate	,	1	_
_					Silt (ML)	dorate vallow and graviah	vollou /EV	1	_
_					7/6 and 5Y 8/4).	oderate yellow and grayish wet, nonplastic, rapid dila	tancy, mild	1	
					HCI reaction, ca		•		
15	15.0]
26.9					Silt (ML)	10.05.11.01	100/	1111]
]		1.2	SS-4	23-33-26 (59)	15.0-16.2' - Sam fine sand-sized	ne as 10.35-11.3' except 5 grains	-10% very	1]
-	16.5			(59)	Title Saria Sizea	grano		 	-
-	10.5							1	
-								1	-
-								1	-
-								4	-
-								4	-
-								4	-
_								1	
20							_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-04	SHEET	2	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.5 N, 457831.9 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

					STADT - 2/02/0007 FND - 4/4/0007 LOCCED - D. MacComb	
WATER	LEVELS	. ∠.U (I D)	ys UH 3/28		START : 3/28/2007 END : 4/4/2007 LOGGER : R. McComb COMMENTS COMMENTS	1
ŽQ≆	CAMPIE	INTERVA	1 /#\	STANDARD PENETRATION	SOIL DESCRIPTION O CONVINIENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE		. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLIN DRILLING FLUID LOSS, TES' INSTRUMENTATION	G RATE,
TH B		RECOVE	<u> </u>		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TES	TS, AND
LEVER P			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
21.9	20.0	0.3	SS-5	50/3.5	Silt (ML)	
-				(50/3.5")	20.0-20.3' - Same as 15.0-16.2' except 5-10% very	-
-					fine sand-sized grains, trace medium to coarse sand-sized grains	-
-					-	-
-						-
_						_
_					<u> </u>	_
_					<u> </u>	_
]	
25	25.0					
16.9					Silt With Sand And Limestone (ML)	
-		1.2	SS-6	10-13-21 (34)	25.0-26.2' - grayish yellow, (5Y 7/2), nonplastic, rapid dilatancy, mild to moderate HCl reaction, 20% fine to	Ī
-	26.5			(34)	coarse sand-sized grains, 15% fine to coarse	
-	20.5				\gravel-sized limestone, carbonate / -	-
-					1	-
-					Driller's Remark: Chatter at 27.	5'
-					-	-
-					-	-
-					-	-
-					-	_
30 11.9	30.0				Silt With Sand (ML)	
-				24-32-38	30.0-31.45' - Same as 25.0-26.2' except 20-25% very	_
_		1.5	SS-7	(70)	fine to fine sand-sized grains, no gravel-sized fragments	_
_	31.5				Tragments	_
_						_
_					<u> </u>	_
_					<u> </u>	_
]]	
]	1
35	35.0				11	1
6.9					Sandy Silt (ML)	
-		1.3	SS-8	13-19-14 (33)	35.0-36.3' - light olive brown to moderate olive brown, (5Y 5/6 to 5Y 4/4), wet, low plasticity, rapid dilatancy,	_
-	36.5			(33)	mild HCl reaction, 25-30% fine to coarse sand-sized	_
-	55.5				grains, trace fine gravel-sized limestone, carbonate /-	-
-						-
-	40.0					-
-	40.0 40.1	0.1	SS-9	50/1	Limestone Fragments	-
-				(50/1")	\ \ 40.0-40.1' - moderate olive brown to olive brown, (5Y \ - \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_{5'} -
-					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	-
-					40.0' switch over to HQ rock col	rina –
40						a
					Begin Rock Coring at 40.0 ft bgs See the next sheet for the rock core log	
			l		<u> </u>	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

D-04

SHEET 3 OF 5

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.5 N, 457831.9 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

		10	<u> </u>	MENT . CIVIE 330X 3/N 340233, Mud Totally, NQ tools, HV	Ouon	.9	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bgs	s on 3		1/2007		,
>^^	(6)			DISCONTINUITIES	ڻ ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH	E, A	(%	뿔		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΞĂΞ	GTE F	(%) _Q	EE	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	မ္ဆ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		a Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≷	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
1.9		ш.	>10	40.0.44.0! Fracture 7000	0)	Limestone Fragments	
1.5 _	40.0			40.0-41.0' - Fracture zone	口	Limestone Fragments - 40.0-40.4' - grayish yellow, (5Y 7/2),	
			NR			very fine grained, moderate HCI	
I -				41.05' - Fracture, 40-60 deg, rough, planar,	Н	reaction, very weak to weak (R1 to	Driller's Remark: Very hard
-			5	open -	口	- R2), voids (<1/16") over 10-15% of	drilling from 40.0-41.5', –
-	D4 NO			41.15' - Fracture, rough, planar and	₽₽	surface No Recovery 40.4-41.0'	42.5'
I _	R1-NQ 5 ft	40	2	undulating, open 41.4, 41.5' - Fractures (2), 0-60 deg, rough,	旪	- Limestone	_
	88%	.0	-	undulating, open		41.0-45.0' - light olive gray, (5Y 5/2),	
I -				41.3' - Fracture, 0-<5 deg, rough, undulating,	Н	moderate HCl reaction, medium	1
-			3	open -	ш	strong (R3), voids covering 10-15%	1
-				42.45' - Fracture, 0-60 deg, rough,	╁┼	of surface increasing to 20-30% below 42.5', partially infilled voids	R1: 29 minutes
_			4	undulating, open 42.8' - Fracture, rough, planar to undulating, -	Н	(1/4") from 42.2-42.4', 1-3% cavities	R1. 29 Hilliutes
45	45.0		'	tight	Ш	(up to 1-9/16"), trace fossils	
-3.1			4	43.3' - Fracture, horizontal, rough, undulating,	H	45.0-45.8' - light olive gray, (5Y 5/2),	
-			1	open -	口	 fine grained, mild HCl reaction, 	1
1 -				43.65' - Fracture, <5 deg, rough, undulating, open 1/2"-3/4"	₽₽	extremely weak (R0), voids covering 5-10% of surface, many cavities up	45.8-50.0' core fell back -
-				43.9, 44.05, 44.7' - Fractures (3), <5-60 deg, -	┢┼	to 3/8" long, very friable	into borehole, upon
				rough, undulating, open		No Recovery 45.8-52.0'	recovering there was no core retrieved because of
	R2-NQ			44.8, 44.95' - Fractures (2), <5 deg, rough,	Н	-	poor quality of rock and
-	5 ft	0		undulating, open - 45.8' - Fracture, horizontal, rough, undulating	ш	-	being very friable
-	16%		NR	45.6 - Fracture, horizontal, rough, undulating	╁┼	-	-
_				_	Н	_	_
l _					Ш	_	
					Н		R2: 3 minutes
50	50.0			-	口	-	1
-8.1	50.0				Н		End 4/3/07 at 50.0'
_				-	Ш	-	Begin 4/4/07 -
I _			NR	_	\Box	_	_
			1411		Н		
-				_	Ш	-	1
-	R3-NQ			-		Poorly Graded Sand (SP)	-
-	5 ft	0	NA	-	1 1	- 52.0-53.0' - moderate yellow to dusky	-
l _	60%			_		yellow, (5Y 7/6 to 5Y 6/4), wet, loose,	_
					Н	very fine to fine grained, strong HCl	
			0	_	Ш	- \reaction, 10% silica, 90% carbonate	1
-				-	団	Limestone Fragments 53.0-54.0' - moderate olive brown,	R5: 6 minutes
-			0	-	口	(5Y 4/4), mild HCl reaction, very fine	Driller's Remark: Harder
55	55.0				₽	to fine gravel, silt to fine sand-sized	drilling at 54.0' bgs
-13.1				_	Ш	with up to 1/8" limestone fragments	
					Н	Limestone 54.0-55.0' - moderate olive brown to	1
-				-	口	light olive brown, (5Y 4/4 to 5Y 4/6),	1
1 -				-	₽₽	mild HCl reaction, extremely weak to	-
1 -	DANO		NR	-	╁	very weak (R0 to R1), carbonaceous	-
I -	R4-NQ 5 ft	0		_	口	material covering some surfaces, voids covering 30-40% of surface,	
	24%	3			Н	infilling with sandy texture, fine	
				-	団	gravel-sized rock fragments	Driller's Remark: Hard
-				-	╁┼	No Recovery 55.0-58.8'	drilling 57.9 - 60.0'
-			1	58.8' - Fracture, rough, undulating, open -	世	-	R4: 10 minutes
I _			>10	59.1' - Fracture, 0-60 deg, rough, undulating,	Ш	=	114. 10 Hilliutes
60	60.0		L	open	Ы		
					П		
					L J		
	_						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-04	SHEET	4	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.5 N, 457831.9 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

				TENT : CIVIE 330X 3/N 340233, ITING TOTALLY, INQ 1001S, H			ORIENTATION: Vertical
WATER	LEVELS: 2.0) ft bgs	s on 3	/28/07 START : 3/28/2007 END : 4	/4/200	7 LOGGER : R. McComb	
l	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
N N N N N N N N N N N N N N N N N N N	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<u></u>	FRACTURES PER FOOT	DEGGRA HON	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HSE		(%) Q	Zĕ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF 문 및	8888	οD	AC R F	PLANARITY, INFILLING MATERIAL AND	ME	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
밀S교	8필뿝	æ	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROFS, TEST RESOLTS, ETC.
-18.1				59.4' - Fracture, 0-40 deg, rough, undulating,	T	Limestone	
-			4	open	\blacksquare	 58.8-59.6' - light olive brown, (5Y) 	-
				59.6' - Fracture, horizontal, smooth, planar,	ш	5/6), very fine grained, mild HCl	
I -				open	\mathbf{H}	reaction, weak (R2), voids over 1-5%	1
-			2	60.1' - Fracture, horizontal, rough, planar,	+-	 of surface, rare 1/16"-1/8" cavities 	-
l _				open _		59.6-60.0' - Same as 58.8-59.6'	_
	R5-NQ			60.2' - Fracture, 40 deg, rough, undulating,		except very weak (R1), gravel-sized	
l -	5 ft	28	2	open	+	- limestone fragments, with	-
l –	74%			60.65' - Fracture, rough, undulating, open 60.9, 61.7' - Fractures (2), <5 deg, rough,	+	carbonaceous material on 30% of surface	
			2	undulating, open		- 60.0-62.0' - light olive brown, (5Y	
				61.9' - Fracture, vertical, rough, tight	\perp	5/6), mild HCl reaction, extremely	1
_				62.1' - Fracture, <5 deg, rough, undulating,	+-	weak (R0), friable, voids over 5% of	-
l _			NR	open	1	- surface	1
65	65.0			62.8, 63.2' - Fractures (2), <5 deg, rough,		62.0-63.7' - Same as 60.0-62.0'	
-23.1	- 5.0			undulating, open	1	except moderate HCl reaction, very	R5: 5 minutes
-			4	63.7' - Fracture, <5 deg, rough, stepped,	+	 weak to weak (R1 to R2), thin 	-
l _				open		carbonaceous laminae at 62.4', rare	
I -				65.25' - Fracture, <5 deg, rough, undulating,		elongated cavities (up to 3/8"x3/16"),	1
-			4	open	1	trace organics, trace fossils, voids	-
_				65.35' - Fracture, horizontal, rough, undulating, open	\perp	increase from 5-20% where rock is	_
	R6-NQ		1	65.4-65.7' - Fracture, vertical, rough,	-	stronger No Recovery 63.7-65.0	
_	5 ft	17	'	undulating, open		Limestone	1
_	56%			65.8' - Fracture, 40 deg, rough, undulating,	+	65.0-67.8' - dusky yellow, (5Y 6/4),	-
				tight		_ fine to very fine grained, voids	
				66.0-66.4' - Fracture zone	\mathbf{H}	covering up to 15% surface, rare	
-			NR	66.4-66.8' - Fracture, 70 deg, rough, stepped,		cavities (up to 1-1/4"), thin	R6: 8 minutes
_				tight	\bot	discontinuous carbonaceous laminae	-
70	70.0			66.9' - Fracture, <5 deg, rough, stepped, tight	\vdash	from 65.0-66.0', variable strength	
-28.1			0	67.8' - Fracture, horizontal, rough, stepped,	1	increasing with depth from weak (R2)	
-				open	$\neg\Box$	to medium strong (R3) except extremely weak (R0) from 66.1-66.4',	-
l _			NR		\perp	trace organic material	_
						No Recovery 67.8-70.0'	
-					1	Limestone	1
-	57.110				-	- 70.0-70.15' - Same as 65.0-67.8'	-
	R7-NQ	40	3	70.41 5 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	\bot	No Recovery 70.15-71.75'	
I -	5 ft 69%	40		72.4' - Fracture, horizontal, rough, undulating,	\top	Limestone	1
-	0070			open 72.4-72.9' - Fracture, 80 deg, rough, stepped,	世	- 71.75-75.0' - yellowish gray to dusky	-
I -			1 1	tight	\perp	yellow, (5Y 7/2 to 5Y 6/4), fine	1
				72.9, 73.4' - Fractures (2), 0-10 deg, rough,		grained, strong HCI reaction,	
I -				undulating, tight to open	1	 medium strong (R3), voids (up to 1/16") over 20-40% of surface, 	R7: 7 minutes
-			2	74.1-74.6' - Fracture, 70 deg, rough, stepped,	\perp	several cavities (up to 3/4") covering	-
75	75.0			tight	\bot	— 1-3% of surface predominantly at	1
-33.1				75.0' - Fracture, 45 deg, rough, undulating	\vdash	73.6'	
I -			1	l	1	75.0-78.2' - Same as 71.75-75.0'	1 -
-				75.7' - Fracture, <5 deg, rough, stepped,	亡	 except voids below 77.0' decreasing 	
			4	open	\perp	to 18-20% of surface, few elongated	
-			1	76.6' - Fracture, horizontal, rough, stepped,	\vdash	cavities (1/4"x1/2"), most with	1
-	R8-NQ			tight	+	secondary infill, gradual transition to	-
l -	5 ft	86	0	Ĭ	\perp	78.2-79.5' -	1
	100%	- 50					
I -					1	-	1 1
-			3	78.45, 78.55' - Bedding plane (2), horizontal,	+	-	-
				smooth, undulating to planar, open			
-				78.9, 79.1' - Fractures (2), 10 deg, rough,	Ш		R8: 5 minutes
I			1	undulating, open	+-	-	-
80	80.0			3/	\perp		_
L							<u> </u>

APPENDIX 2BB-753 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-04	SHEET	5	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.5 N, 457831.9 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

COMING	NETHOD A	ND EC	JUIPIV	IENT: CME 550X S/N 340253, mud rotary, NQ tools, HV	Casi	ny	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bgs	s on 3	28/07 START : 3/28/2007 END : 4/	1/2007	7 LOGGER : R. McComb	
				DISCONTINUITIES	۲۵.	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-38.1	034	ш		80.0-81.1' - Fractures, 0-90 deg, rough,		78.2 - 79.5' - pale yellowish orange to	
-	R9-NQ		0	undulating and stepped, open		moderate yellow, (10YR 8/6 to 5Y 7/6), fine grained, strong HCI reaction, extremely weak to very weak (R0 to R1), dark gray 1/8" gravel in matrix from 78.5-79.0', 5-10% voids from 78.5-79.0'	- - -
- - - - 85_	5 ft 46%	0	NR			declining to 0% at 79.0', gradual transition to 79.5-80.0' 79.5-80.0' - pale yellowish orange, (10YR 8/6), fine grained, strong HCl reaction, very weak (R1), voids (1/16") over 18% of surface, homogeneous appearance 80.0-80.9' - light olive brown, (5Y	R9: 7 minutes
-43. 1			1			5/6), very fine to fine grained, mild HCl reaction, extremely weak (R0), voids over 30-40% of surface	-
-			1	85.95' - Fracture, <5 deg, rough, undulating, open	Ħ	grading into cavities up to 3/8", gravel-sized material]
-	R10-NQ 5 ft	59	2	86.6' - Fracture, <5 deg, rough, undulating, tight 87.2' - Fracture, 30-40 deg, rough,	Ħ	Limey Clay (CL) 80.9-81.1' - moderate olive brown, (5Y 4/4), moist, soft, low plasticity,	Driller's Remark: Lost circulation at 87.0'
_	98%		2	undulating, open 87.4-87.7' - Fracture zone, 60 deg, rough, undulating, tight	Ħ	black carbonaceous staining, silty Limestone - 81.1-82.3' - Same as 80.0-80.9'	_
-			2	88.45-88.7' - Fracture zone, <5-60 deg, rough, undulating, open		except weak (R2), not broken into gravel-sized rock fragments No Recovery 82.3-85.0'	R10: 9 minutes
90 <u> </u>	90.0		NR >10	89.55' - Fracture, horizontal, rough, stepped, open 89.7' - Fracture, 80-90 deg, rough, undulating, open		Limestone 85.0-89.9' - moderate yellowish brown to yellowish gray with depth,	
- - - - -	R11-NQ 5 ft 16%	0	NR	90.0-90.8' - Fracture zone, various orientations		(10Y 5/4 to 5Y 7/2), mild to strong HCl reaction, weak to medium strong (R2 to R3), voids covering 15-40% of surface grading into cavities (up to 1-3/16") with depth, mottled with zones of light limestone becoming more fossiliferous with depth No Recovery 89.9-90.0' Limestone 90.0-90.8' - light olive brown to dusky yellow, (5Y 5/6 to 5Y 6/4), strong HCl reaction, weak (R2), voids over	R11: 5 minutes
95	95.0				Ш	20-30% of surface, gravel-sized rock	
-53.1 - - -						fragments (1/4"-2"), highly fossiliferous, black carbonaceous material up to 15-20% of surface No Recovery 90.8-98.5'	Driller's Remark: Possible void 95.0 - 96.0'; very soft drilling 96.0 - 98.5', firmer drilling at 98.5'
- -	R12-NQ 5 ft 30%	6	NR			- - Limestone - 98.5-100.0' - dusky yellow, (5Y 6/4),	- - -
-					\Box	strong HCI reaction, weak (R2),	-
-			>10	99.0-100.0' - Fracture zone, 0-90 deg, rough,	日	gravel-sized rock fragments, voids - covering 25-40% of surface, highly fossiliferous	R12: 3 minutes
100	100.0		>10	undulating, open	H	Bottom of Boring at 100.0 ft bgs on	
						4/4/2007	

APPENDIX 2BB-754 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-05	SHEET	1	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723221.4 N, 457903.2 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ry, auto nammer, Avvu rous, s			ORIENTATION : VEItical
WATER	LEVELS	: 2.0 ft bo	gs on 04/0	04/07	START : 4/4/2007	END: 4/4/2007	LOGGEF	R : A.	Teal
				STANDARD		SOIL DESCRIPTION		(D	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	J (ft)	PENETRATION				SYMBOLIC LOG	
SEE	07 11111 E.E.			TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBOL, (COLOR.	2	DEPTH OF CASING, DRILLING RATE,
A SE		RECOVE	ERY (ft)			CONTENT, RELATIVE DEN		g	DRILLING FLUID LOSS, TESTS, AND
F.F.Y			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MINE		MB	INSTRUMENTATION
SUI			"	(N)				SΥ	
41.8	0.0				_ Topsoil (OL)			7/1/	Water level: 2.0' below ground surface
-	0.0			0-0-2		, (N1), organics	/-		-
l _		0.8	SS-1	(2)	Poorly Graded	Sand With Organics (SP)	г.		_
	1.5			()	\ 0.3-0.8' - browr	nish gray, (5YR 4/1), moist,	very loose,		
-	1.0				very fine to fine	e grained, no HCl reaction, s	silica sand, 🏻 🖯	1	-
-						c fines, 20% organics as fin	es and	ł	=
					roots				
-	1						-	1	-
_							-		=
1 7]						-	1	1
							-	1	-
5	5.0					(01)		, ,,,	
36.8					Sandy Lean Cl	lay (CL)	at		Weight of hammer for last 12"
1 7	1	1.3	SS-2	1-0-0		enish gray, (5G 6/1), moist to dium plasticity, slow to rapid		V///	1
-	1			(0)	35-40% very fir		ı ullataricy,	\ ///	−
_	6.5				00 70 70 VCI Y III	no oniou ouriu		I '''	
_	1						-	1	
-	-						-	ł	-
_	[_	1	_
-	1						-	1	-
-							-	1	=
10	10.0						_	1	
31.8	10.0				Silty Sand (SM	/ /\		111	Appears to have fossil fragments
				13-14-22		llowish gray, (5Y 8/1), moist	to wet		- Appears to have loss in raginents
		1.4	SS-3	(36)		e to coarse grained, low pla			Driller's Remark: Lost circulation at 12'
_	11.5			(30)	rapid dilatancy,	, strong HCl reaction, 20-25		1	_
-	11.5				plastic trace fin	nes gravel-sized		1	-
_							-	1	_
-	1						-	1	7
-	-						-	1	-
_							-	1	
-	1						-	1	
-	-						-	1	-
15	15.0							I	
26.8					Silt (ML)				
-	1	1.0	SS-4	1-4-26	15.0-15.8' - mo	oderate yellow, (5Y 7/6), wet	t, very stiff,	1	7
-		'.0	00-4	(30)	nonplastic, rapi	id dilatancy, moderate to str 5% very fine sand-sized, car	ong HCI	П	-
	16.5				materials	70 very inte sand-sized, car	DUI IAIE	1	
I					Limestone Fra	agmente			Set 20' HW casing
-	1				15.8-16.0' - mo	ngments oderate olive brown, (5Y 4/4) strong	1	-
-		1	1		HCl reaction fi	ine to coarse gravel-sized	,, sading -	1	_
		1	1			g.a.o. o.zou			
I -]						-	1	1
-	1						-	1	=
-							-	4	_
20	1						-	1	7
20	 	-	-					\vdash	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-05	SHEET	2	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723221.4 N, 457903.2 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 2.0 ft b	gs on 04/0	04/07	START : 4/4/2007 END : 4/4/2007 LOGGER : A. Teal
300				STANDARD	SOIL DESCRIPTION g COMMENTS
N SINC	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE		RECOVE			MOISTURE CONTENT, TELATIVE DENSITY OR MOISTURE CONTENT, TELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
21.8	20.8	0.1	SS-5	50/3	Limestone Fragments
				(50/3")	20.0-20.3' - grayish yellow, (5Y 8/4), fine to coarse grained, mild HCl reaction, fine gravel-sized
					\fragments
-]
_					-
-	-				-
-	-				- I
-					
25	25.0				
16.8	20.0				Sandy Silt With Limestone (ML)
		1.1	SS-6	17-26-31 (57)	25.0-26.1' - grayish yellow, (5Y 8/4), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 10%
	26.5			(0.)	fine to coarse limestone fragments, 35-40% fine to coarse sand-sized, carbonate materials
_					Codise sand sized, carbonate materials
_					-
-					-
-					-
-	-				-
30	30.0				
11.8	30.0				Sandy Silt (ML)
-	1	1.5	SS-7	15-17-47 (64)	30.0-31.5' - Same as 25.0-26.1' except mild to moderate HCl reaction, 30% fine to coarse
	31.5			(04)	sand-sized, trace gravel-sized
_					
_					-
-					-
-					- I
-					
35	35.0				
6.8	00.0			34-24-50/2.5	Sandy Silt With Limestone (ML)
	36.2	1.1	SS-8	(74/8.5")	35.0-36.1' - light olive gray, (5Y 5/2), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 40%
_	30.2				fine to coarse sand-sized, 10% fine to coarse gravel-sized limestone fragments, carbonate
-					\materials \dagger_
-	-				
-	-				
-	1				
-	1				
40	1				



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	D-05	SHEET	3	OF	5

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723221.4 N, 457903.2 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						ary, auto hammer, AWJ rods,			ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft b	gs on 04/		START : 4/4/2007	END : 4/4/2007	LOGGE	<u>R : A.</u>	COMMENTS
<u></u> ≩ Q æ	04**=:	INITES:	11 (fr)	STANDARD PENETRATION TEST RESULTS		SOIL DESCRIPTION		8	CONNIVICIALS
BELO CE AN TION (1	SAMPLE	RECOVE		TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL	, COLOR,)LIC L	DEPTH OF CASING, DRILLING RATE,
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTEN	E CONTENT, RELATIVE DE NCY, SOIL STRUCTURE, MI	INERALOGY	SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
<u>оош</u>	40.6	0.3	SS-9	(N) 50/4	Limestone Fra	agments			
-				(50/4")	grained, mild I Begin Rock Co	pht olive gray, (5Y 5/2), fine HCI reaction oring at 40.7 ft bgs sheet for the rock core log	e to coarse	/ - - - -	- - - -
- - - 45_								- - - -	- - - -
-3.2 							-	- - - -	- - - - -
- - 50_ -8.2							-	- - - - - - - -	- - - -
_ _ _ _ _ _ 55								-	- - - - -
-13.2 - - - - - - -									-
60 60								1	-
			1						1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-05	SHEET	4	OF	5	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723221.4 N, 457903.2 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				12111 . CIVIL 33 3/14 3 10023, Midd Totally, 14Q (0013, 1144 C	aog		ONLINIATION: Vertical
WATER	LEVELS : 2.0	ft bg	s on 0		4/200		
≥00	_ (6			DISCONTINUITIES	٥	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEBTH OF CASINO
표하는 기	P.H. F.H.	(%) 🛭	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	7	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
FF4 EVA	NG CO	οD	AC1	PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S.	K H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	40.7 R1-NQ			40.9' - Fracture, 10 deg, smooth, undulating,	\blacksquare	Limestone	R1: 1 minute
l _	1 ft 41.7 85%	50	3	tight	┢	40.7-41.7' - pale yellowish brown, (10YR 6/2), fine grained, moderate	
	41.7 0070			41.0' - Fracture, 50 deg, smooth, planar, tight		HCI reaction, weak (R2), 10-20%	
			0	41.05' - Fracture, 10 deg, smooth, undulating, loose	₽	void space up to 1/8", trace cavities	1
-				loose		up to 1/4", moderately fossiliferous	1
-			5		+	_ (casts/molds) 41.7-43.5' - pale yellowish brown,	1
_				43.2' - Mechanical break		- (10YR 6/2), fine grained, delayed	-
_	R2-NQ			43.5-44.5' - Fracture zone (at least 7), tight but weathered fractures with fragmentation	_	moderate HCl reaction, weak to	_
_	5 ft 88%	35	>10	but weathered hactares with hagmentation		medium strong (R2 to R3), 15-20% voids up to 1/8", trace cavities up to	
45	00%			44.5-45.7' - Fracture zone, fragments from	\vdash	3/16", moderately fossiliferous	
-3.2			>10	1/8" to 1", subrounded —		(molds/casts)	
-				4574041.5	╁┼	 43.5-46.1' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl 	1,500
-			>10	45.7-46.1' - Fractures (at least 4), 10 deg, open, weathered, with vertical fractures and	\perp	reaction, extremely weak to very	R2: 2 minutes
1 -	46.7		NR	fragmentation	+	weak (R0 to R1), 10% void space up	-
-				46.7-50.3' - Fracture zone, very soft material		to 1/8", poorly fossiliferous	_
			>10			No Recovery 46.1-46.7' Limestone	
						46.7-50.3' - pale yellowish brown,	
-			>10		1	(10YR 6/2), fine grained, moderate	1
-						HCl reaction, extremely weak to very weak (R0 to R1), 20-30% voids,	1
-	R3-NQ	45	>10		₩	trace up to 1/3" long fossil cavities	-
-	5 ft 70%	40	10		\perp	_ and casts	-
50			>10	_	\bot		
-8.2							
			NR		\vdash	No Recovery 50.5-51.7'	R3: 1 minute
-			INK			-	
-	51.7				╁	<i>.</i>	1
-			>10	52.0' - Fracture, 10 deg, rough, undulating,		Limestone 51.7-53.8' - pale yellowish brown,	-
-			10	tight	₩	(10YR 6/2), fine grained, moderate	-
_				52.3-53.0' - Fracture zone, limestone	上	HCl reaction, very weak to weak (R1	_
I _			>10	fragments from silt to cobble-sized fragments	\bot	to R2), 10-20% voids up to 1/16"	
	R4-NQ			52.9' Fracture 20 des rough undulation		53 9 56 0! Samo as 54 7 53 9!	1
I -	5 ft	75	>10	53.8' - Fracture, 20 deg, rough, undulating, loose	╨	 53.8-56.0' - Same as 51.7-53.8' except moderate yellowish brown, 	1
FE -	86%			54.1' - Fracture, 25 deg, rough, undulating,		(10YR 5/4)	1
55 <u> </u>			0	tight — 54.2-54.7' - Fracture zone, 20 deg, same as	+	-	-
-				54.2-54.7 - Fracture zone, 20 deg, same as 52.3-53.0'		-	-
-			0	55.5' - Mechanical break	₽	No December 50 0 50 7	R4: 2 minutes
-	56.7		NR		Ш	No Recovery 56.0-56.7']
	55.1				\bot	Limestone	
1 -			0			56.7-61.3' - pale yellowish brown,	1
I -					╨	(10YR 6/2), fine grained, moderate HCl reaction, very weak to weak (R1	1
-			1	57.9' - Fracture, 30 deg, rough, undulating,	\Box	to R2), 20-25% voids up to 1/8",	1
-			اللل	tight	+	some laminations	-
I -	R5-NQ				Ë	-	1
I -	5 ft 92%	68	>10	59.2' - Fracture, 70 deg, rough, undulating,	$oldsymbol{arphi}$	_]
60	32/0			tight			
-18.2			>10	59.5-60.3' - Fracture zone, gravel-sized — fragments	\vdash		
<u> </u>					1	<u>-</u>	

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-05	SHEET	5	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723221.4 N, 457903.2 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0) ft has	s on O	4/04/07 START : 4/4/2007 END : 4/	1/200	7 LOGGER : A. Teal	
			2.10	DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		တ္သ	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원인	N Y Y	(%	SP		- C	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
PTH FYA-	RE F SOV	Q D (%)	ACT 7 FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUB	898	RG	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
_			1	60.5' - Fracture, 45 deg, rough, undulating,	П	Limestone	R5: 3 minutes
_	61.7		NR	tight 60.9' - Fracture, horizontal, smooth, planar,	ь	60.0-60.3' - dark yellowish brown, (10YR 4/2), fine grained, mild HCl	_
l _	01.7			tight		reaction, extremely weak (R0)	End of boring _
						60.9-61.0' - Same as 60.0-60.3'	_
						- \61.0-61.3' - Same as 56.7-61.3' No Recovery 61.3-61.7'	
_					1	Bottom of Boring at 61.7 ft bgs on	1
_				-	1	4/4/2007	1
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-06	SHEET	1	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723292.3 N, 457976.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						auto hammer, AWJ rods			ORIENTATION : Vertical
WATER	LEVELS	: 2.1 π D	gs on 4/23		START : 4/23/2007	END: 4/24/2007 SOIL DESCRIPTION	LUGGE	T N.	Jarzyniecki COMMENTS
≳∂€	SAMPLE	INTERVA	AL (ft)	STANDARD PENETRATION		COL BEOOKII TIOIY		9	COMMENTO
BELC SE AI	0, 11,111	RECOVI		TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL	, COLOR,	I C I	DEPTH OF CASING, DRILLING RATE,
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"		CONTENT, RELATIVE DE Y, SOIL STRUCTURE, MI		SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
当の団 41.6	0.0			(N)	Silty Sand (SM)			S TIT	
-	0.0	0.5	SS-1	1-1-1	¬ 0.0-0.5′ - modera	ate yellowish brown to o	live gray,	Ш	-
-	4.5	0.5	33-1	(2)		3/2), moist to wet, very reaction, silica sand, 15		┨	-
-	1.5				√fines, mostly orga	anic fines		┨	-
-								1	-
-								1	-
-								1	-
]	
_								1	_
5	5.0				0	(011)		ļ,,	
36.6		l		2-2-1		ue, (5PB 7/2), moist, so			-
-		1.1	SS-2	(3)	high plasticity, no very fine to fine s	o dilatancy, no HCl read	tion, 35-40%		-
-	6.5				· · · · · · · · · · · · · · · · · · ·	Siliod Caria	/	┨	-
-								1	-
-								1	-
-								1	-
-								1	-
_								1	-
10	10.0								
31.6				11-24-40	Limestone Frag	yments xy yellow, (5Y 6/4), fine t	to coarse	拁	Driller's Remark: Stiff at 9.0'
-		1.1	SS-3	(64)	∖grained, strong ⊦	HCl reaction, gravel-size			_
-	11.5				Silt (ML) 10.2-11.1' - dusk	xy yellow, (5Y 6/4), mois	t. hard.	4	-
-					\nonplastic, rapid	dilatancy, mild to mode very fine carbonate san	erate HCI	-	-
-					reaction, 3-1070	very line carbonate san	u j	┨	-
-								┨	-
-								1	-
-								1	-
15	15.0							1	_
26.6				00 50/5 55	Sandy Silt (ML)	yellowish brown, (10YF	2 6/2) maint		07:38 water level at 2.1' below ground surface
_		1.5	SS-4	22-50/5.75 (72/11.75")	very stiff, low pla	sticity, rapid dilatancy, r	moderate HCI	Ш	_
-	16.5			, ,		ne grained sand, some a slough), trace fine grave		Ш	Driller's Remark: 08:00 borehole caved in over night; 15.0-16.0' may include slough –
-					\limestone at 16.0	O', trace organics, prima	rily carbonate	4	accounting for the discrepancy between depth of penetration and recovery length
-					Silt (ML) 16.0-16.5' - yello	wish gray, (5Y 5/2), mo	ist, hard,	-	deput of perfectation and recovery length
-					nonplastic, very r	rapid dilatancy, modera very fine grained sand	te HCI	-	-
-					10000011, 0 1070	13.7 mio granica dalla		1	-
-								1	-
20								1	-
								\top	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-06	SHEET	2	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723292.3 N, 457976.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER LEVELS : 2.1 ft bgs on 4/23/07									ORIENTATION : Vertical
CTANDARD					START : 4/23/2007	END : 4/24/2007 SOIL DESCRIPTION	LUGGE	K:N	. Jarzyniecki COMMENTS
≥□₽				STANDARD PENETRATION		SOIL DESCRIPTION		- 8	COIVIIVIENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H H H H H H		RECOVE	ERY (ft)			E CONTENT, RELATIVE DE		딩	DRILLING FLUID LOSS, TESTS, AND
FF.			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MI		₩	INSTRUMENTATION
ESE				(N)				က်	
21.6	20.0			04.00.0	Silty Sand And	d Limestone (SM) ery pale orange, (10YR 8/2) moiet]	
		0.8	SS-5	21-29-3 (32)	dense, fine to	coarse grained, moderate	HCI reaction.	Ш	-
-	21.5			(32)	\ 60% silty sand	d and 40% limestone, 30%	nonplastic /	1	-
-	21.0				\fines, carbonat	te		1	1
-								┨	-
-								┨	-
-								4	-
_								4	_
_								1	_
_								_	_
25	25.0								
16.6					Silty Sand Wit	th Limestone (SM)			
_		0.6	SS-6	20-8-1	25.0-25.6' - gra	ayish orange, (10YR 6/4), grained, moderate HCl rea	moist, loose,	711	1
-	00.5			(9)	\ to 20.0-20.8', 2	25% fine to coarse gravel-	sized	1	-
-	26.5				\limestone fragr	ments, 35% nonplastic fin	es, carbonate	1	-
-					materials			4	-
-								4	-
_								4	_
								1	_
								_	
								1	
30	30.0							1	-
11.6	00.0				Sandy Silt (ML		_	TIT	08:15 Begin drilling to 35.0'
-		1.4	SS-7	6-9-15	30.0-31.4' - du	isky yellow, (5Y 6/4), wet, d d dilatancy, mild to modera	very stiff, low	111	During drilling to 25 0' lost circulation at 9:21
-			00 /	(24)		0% fine to coarse sand, ca		$\parallel \parallel$	During drilling to 35.0' lost circulation at 8:21 - lots of chatter during drilling
-	31.5				materials	, , , , , , , , , , , , , , , , , , , ,		╫	
_								4	-
_								1	_
_								_	_
								1	
-								1	-
25	25.0							1	1
35 6.6	35.0 35.2	0.0	SS-8	50/2	\No Recovery 3	35.0-35.2'		╁	Casing advanced to 35.0' below ground
-				(50/2")				┨	surface -
-					Begin Rock Co	oring at 36.0 ft bgs		-	-
-					See the next s	sheet for the rock core log		4	-
-						· ·		4]
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40_		 					_	+	
				1	1				1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-06	SHEET	3	OF	5	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723292.3 N, 457976.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.1	ft bgs	s on 4	/23/07 START : 4/23/2007 END : 4/2	24/20	07 LOGGER : N. Jarzyniecki	
≥0 <i>≎</i>	(%)			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B FACE	E RU GTH, OVE	(%) Q	CTUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR	a Q	FRA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	36.0				ш	Limestone	10:04 Begin coring R1-NQ
-			1	36.7, 37.7' - Mechanical break (2)	ш	- 36.0-39.15' - pale olive to light olive gray, (10Y 6/2 to 5Y 5/2), very fine to]
_			2	36.9' - Bedding plane, <10 deg, rough, undulating, tight	口	fine grained, strong HCl reaction, fossiliferous, fossil casts, voids over	
_	D4 NO		_	37.0' - Fracture, 50 deg, rough, undulating,	ш	20% of surface, up to 1/16" trace dissolution, trace organic features, at	_
-	R1-NQ 5 ft	47	5	tight 37.05' - Fracture, 10-25 deg, rough,	口	 36.7' weak (R2), at 37.7' very weak 	-
-	84%			undulating, tight 38.0-38.3' - Fracture zone, rough, undulating,		to weak (R1-R2)	-
40			0	intersecting bedding plane and high angle	仜	39.15-40.2' - moderate olive brown, (5Y 4/4), moderate HCl reaction,	-
1.6				38.5' - Bedding plane, same as 36.9' except	仜	extremely weak (R0), laminar features of olive gray (5Y3/2)	R1: 9 minutes
-	41.0		NR	open up to 1/2" -	Ь	No Recovery 40.2-41.0'	-
	-		0		上	Limestone 41.0-41.85' - Same as 39.15-40.2']
-				-	ഥ	except strong HCl reaction]
-			1	42.3' - Fracture, 80 deg, rough, undulating, -	上	41.85-44.6' - light olive gray to dusky yellow with pale olive infill, (5Y 5/2 to	-
-	R2-NQ			tight	恤	5Y 6/4 with 10Y 6/2), strong HCl reaction, very weak to weak (R1 to	-
-	5 ft 73%	47	1	43.5-43.8' - Mechanical break	Ь	 R2), voids (up to 1/16") over 30% of surface, moderately fossiliferous, 	-
-	7370		1	43.8, 44.1' - Bedding plane (2), 30 deg, rough, undulating, tight		fossil casts up to 1/8" to 1/2", trace	-
45						 organics, very similar to 36.0-39.15' 44.6-44.65' - Same as 39.15-40.2' 	-
-3.4			NR		Ь	except strong HCl reaction No Recovery 44.65-46.0'	R2: 6 minutes
_	46.0			_	上	_	
-			0	-	士	Limestone - 46.0-46.3' - dusky yellow to moderate	-
-				-	Ь	olive brown, (5Y 6/4 to 5Y 4/4), fine grained, mild HCl reaction, extremely	-
-			2	47.15' - Fracture, 50 deg, rough, undulating, _tight		 weak (R0), voids (<1/16") over <5% of surface, trace very fine organics, 	-
-	R3-NQ			47.55' - Bedding plane, <10 deg, rough, - undulating, open 1/4"	Ь	few organic inclusions up to 1/2",	-
-	5 ft 90%	43	1	48.15' - Bedding plane, <5 deg, rough, undulating, tight		 very similar to overlying extremely weak rock (39.15'-40.2') 	
				49.0' - Fracture, 75 deg, rough, undulating,	Ь	46.3-48.15' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y	
50 -8.4			2	tight 49.7' - Fracture, 50 deg, rough, undulating, —	上	4/4), moderate to strong HCl reaction, medium strong (R3), 25%	D2: 2 minutos
-0.4			ND	tight 50.25' - Fracture, same as 49.0'	士	fine voids predominantly <1/16",	R3: 3 minutes
-	51.0		NR		士	moderately fossiliferous, no longer cavities, trace organics	-
-			0	-	世	48.15-49.0' - Same as 46.0-46.3' 49.0-50.35' - Same as 46.3-48.15'	-
-				-	世	50.35-50.5' - Same as 46.0-46.3' No Recovery 50.5-51.0'	
_			2	52.5' - Bedding plane, <5 deg, smooth, undulating, tight	上	Limestone	1
] -	R4-NQ 5 ft	17	1	52.6' - Fracture, 70 deg, rough, undulating,	丘	51.0-52.1' - Same as 46.0-46.3']
_	100%	.,	<u> </u>	open 1/8" 53.4' - Fracture, 50 deg, same as 52.6' -		-]
-			1	53.5' - same as 47.55' 54.35' - Mechanical break, same as 48.15'	Ш	-	-
55 -13.4				- Modifical broak, same as 40.10		_	R4: 26 minutes —
-	56.0		0	-		-	-
-	56.0						
					1		

APPENDIX 2BB-762 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	D-06	SHEET	4	OF	5

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723292.3 N, 457976.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

COMING	I WIL I I IOD AI	ND L	ZUIFIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 2.1	ft bg	s on 4	/23/07 START : 4/23/2007 END : 4/	24/20	D7 LOGGER : N. Jarzyniecki	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원인	Y A A	(%	굶		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T A L	RE FIGTH	(%) Q	CTI	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SHOW HE SHOW	o O	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014				+ "	52.1-54.3' - yellowish gray to dusky	
-			2	56.4' - Fracture, 50 deg, undulating, tight	ш	yellow, (5Y 7/2 to 5Y 6/4), fine	-
_				56.8' - Bedding plane, <5 deg, 4" infilling of	Н	grained, strong HCl reaction,	_
			1	silt, tight	Ш	medium strong (R3), but weaker near transitions to over and underlying	
			1	57.5' - Fracture, same as 56.4'	Н	rock, voids (1/16") over 15-25% of	
-	R5-NQ					surface, moderately fossiliferous with	-
-	5 ft	48	1		ш	- casts and molds up to 1/4", trace	-
-	92%			58.8' - Bedding plane, same as 56.8, except	ш	organics 54.3-56.0' - Same as 46.0-46.3'	_
_			0	6" thick silt infill	\perp	- 56.0-56.2' - dusky yellow to moderate	_
60			_	_	Н	olive brown, (5Y 6/4 to 5Y 4/4), fine	
-18.4			1	CO 21 Dadding plane amouth planer and	ш	grained, mild HCl reaction, extremely weak (R0), voids over <5% of	R5: 18 minutes
-	61.0		NR	60.3' - Bedding plane, smooth, planar, open up to 1/8"	Н	surface, non-fossiliferous, gradual	-
-	01.0		'''		口	transitions to over and underlaying	_
-			0	61.2' - Mechanical break	₩	_ layers	_
-				62.0.62.25! Rodding plans (2) 45 dec	П	56.2-56.6' - Same as 52.1-54.3' except a couple of 1/2" cavities	_
l _			3	62.0, 62.25' - Bedding plane (2), <5 deg, smooth, undulating	Н	_ 56.6-57.0' - Same as 56.0-56.2'	_
				62.6' - same as 62.0', except 10 deg	Ħ	57.0-58.5' - Same as 52.1-54.3'	
	R6-NQ			62.9' - same as 62.0'	Ш	58.5-59.1' - Same as 56.0-56.2'	
-	5 ft 99%	50	1	63.5' - Bedding plane, 5 deg, smooth,	ш	_ 59.1-60.6' - light olive gray to dusky yellow, (5Y 5/2 to 5Y 6/4), very fine	-
-	39 /0			undulating, open up to 1/4"	Н	grained, strong HCl reaction, strong	-
_			>10	64.1-64.4' - Fracture zone	ш	(R4), voids over <5% of surface, few	-
65					ш	infilled cavities (1/16") that are only visible because of increased voids	
-23.4			2	65.0, 65.55' - Fractures (2), 80 deg, rough to smooth, undulating		(10%) in infill	R6: 14 minutes
	66.0			•	Н	No Recovery 60.6-61.0'	
-			NR)	65.8, 66.9' - Mechanical break (2)	ш	Limestone 61.0-61.2' - Same as 56.0-56.2'	_
-			0		Н	61.2-62.0' - yellowish gray to dusky	-
-					ш	yellow, (5Y 7/2 to 5Y 6/4), very fine	-
-			1	67.45' - Bedding plane, 30 deg, open up to 1"	Н	grained, moderate HCl reaction, strong to very strong (R4 to R5),	_
_				or.40 Bedding plane, 60 deg, open up to 1	ш	voids (1/16") over 5% of surface, no	_
_	R7-NQ 5 ft	92	1	00 41 75 15 11 11 11 11 11	Ш	cavities, 1/2" thick laminations / infill	_
	96%	92	'	68.4' - Bedding plane, smooth, undulating, open <1/8", associated with organic	Ш	of light olive gray (5Y 5/2) with no	
-				lamination		 voids 62.0-62.9' - Same as 56.0-56.2' 	-
			0	68.5, 69.4, 70.6' - Mechanical break (3)		62.9-64.1' - yellowish gray to dusky	-
70 -28.4				_	Ш	— yellow, (5Y 7/2 to 5Y 6/4), fine	R7: 9 minutes —
			1	70.3' - Bedding plane, 10 deg	Ш	grained, moderate to strong HCl reaction, weak to strong (R2 to R4),	-
-	71.0		NR		Щ	gradual transition from bounding	10.45 T. I. I. II. II. II. II. II. II. II. II
I _					1	weak (R2) rock, voids (1/16") over	13:15 Total depth of hole at 71.0'
						10-30% of surface 64.1-64.8' - Same as 56.0-56.2'	Note: Used 9 bags of
-					1	64.8-65.95' - Same as 62.9-64.1'	cement (47-lb bags) and
-					1	No Recovery 65.95-66.0'	40 gallons of water
-					1	Limestone	-
-					-	66.0-67.7' - dark yellowish orange to yellowish gray, (10YR 6/6 to 5Y 7/2),	_
-					4	swirled / mottled, very fine grained,	_
I _					1	strong HCl reaction, very strong (R5),	_
1						voids (1/16") over 0-10% of surface	
-				_	1		
-					1		-
-							
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-06	SHEET	5	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723292.3 N, 457976.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2.	l ft bas	on 4	23/07 START : 4/23/2007	END : 4/2	24/20	07 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES			LITHOLOGY	COMMENTS
AND N (ft)	Λ, 4ND :Y (%		ES	DESCRIPTION		CLOX	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASINO
TH BE	E RUI 3TH, / OVER	(%) C	TUR FOO	DEPTH, TYPE, ORIENTATION, ROU	IGHNESS,	BOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF ELEV	CORI	RQI	FRA(PER	PLANARITY, INFILLING MATERIA THICKNESS, SURFACE STAINING, AND	AL AND D TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
DEPTH BELOW SURFACE AND SURFACE AND ELEVATION (#)	CORE RUN LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUPLANARITY, INFILLING MATERIA THICKNESS, SURFACE STAINING, AND	JGHNESS, AL AND DITIGHTNESS	SAMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
-					-		-	-
-							- -	



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	E-01	SHEET 1 OF 13

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

					.S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical	
WATER	LEVELS	: 3.2 π b	gs on 5/3		START: 5/30/2007 END: 6/3/2007 LOGGER: B. Ellis SOIL DESCRIPTION COMMENTS	
≥ 9€	CAMDIE	INTERVA	\1 / f t\	STANDARD PENETRATION	O O O O O O O O O O O O O O O O O O O	
BELC SE AN	SAWIFLE	RECOVE	. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE,	
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
40.9 - - -	0.0 1.5	0.8	SS-1	1-2-3 (5)	Topsoil 0.0-0.3' - black, (N8), organics Silty Sand (SM) 0.3-0.75' - light brown to moderate brown, (5YR 5/6 to 5YR 4/4), moist, loose, very fine to fine grained, 15% nonplastic fines, 5-10% organics Start drilling at 16:00 on 5/30/07 Water table encountered at 3.2' below ground surface Silica sand	-
5 35.9	5.0	0.6	SS-2	2-2-3	Silty Sand (SM) 5.0-5.6' - mottled moderate yellowish brown and pale	- - -
- - - - -	6.5	0.6	33-2	(5)	green, (mottled 10YR 5/4 and 10G 6/2), moist, loose, slow dilatancy, fine silica sand, 17% moderate plasticity fines	-
10	10.0				-	_
30.9	11.5	0.9	SS-3	9-14-24 (38)	Silt With Sand And Limestone (ML) 10.0-10.9' - grayish orange, (10YR 7/4), wet, hard, nonplastic, very rapid dilatancy, moderate to strong HCI reaction in all materials, 15-20% very fine to medium sand-sized, 40% fine to coarse gravel-sized limestone, all material carbonate	-
- - - -					Driller's Remark: Lost circulation at 13.0'	- - -
15 25.9	15.0				Sandy Silt And Limestone (ML)	
	16.5	0.6	SS-4	1-1-8 (9)	15.0-15.6' - grayish orange, (10YR 7/2), wet, medium stiff, nonplastic, 29% fine to coarse sand, 16% fine to coarse sized limestone Set HW casing 5/31/07 at 16.0'	- -
-						- - - -
20						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	2	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER LEVELS : 3.2 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. E.								ORIENTATION : VEILICAI	
WATER	LLVELS	. J.Z IL D <u>(</u>	12 011 D/3l		START : 5/30/2007	END : 6/3/2007 SOIL DESCRIPTION	LOGGER		COMMENTS
<u>}</u> 9€	SVMDLE	INTERVA	I (ft)	STANDARD PENETRATION		COIL DECOINT HON		90.	OliviiviLivio
ON (SAMPLE			TEST RESULTS	SOIL NAMI	IE, USCS GROUP SYMBOL	COLOR,	IC L	DEPTH OF CASING, DRILLING RATE,
FH B	RECOVERY (ft)			MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			BOL	DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTEN	ICY, SOIL STRUCTURE, MII	NERALOGY	SYMBOLIC LOG	INSTRUMENTATION
20.9	20.0			(/	Silt With Sand	I (ML)		Ш	Carbonate material
-		1.4	SS-5	6-9-13	20.0-21.4' - gra	ayish orange, (10YR 7/4),	wet, very stiff, -		-
-		1	000	(22)	reaction, 20-25	old dilatancy, mild to mode of the standard size size size size	ed. 5-10%	HIII	-
-	21.5				fine gravel-size			-	-
-							-		-
_							-		-
-							-		-
-							-		-
_							-		-
-							-		-
25 <u> </u>	25.0				Silby Sand /SM	A \		nana.	Carbonate material
15.8				6-11-15	Silty Sand (SM 25.0-26.4' - gra	ayish orange, (10YR 7/4),	wet, medium -		- Carbonale malenar
_		1.4	SS-6	(26)	dense, fine to d	coarse grained, mild to mo nonplastic fines, 12% fine	derate HCl		-
_	26.5				gravel-sized lim	nestone	To coarse	1111	_
_					<u> </u>				_
_							-		_
_							-		_
_							_		_
_							_		_
_							_		_
30	30.0					(010)		1.11.	_
10.9				1-0-9	30.0-31.2' - Sai	th Limestone (SM) ime as 25.0-26.4'	_		_
_		1.1	SS-7	(9)			-		_
_	31.5						_		_
_							-		_
_							-		_
_							-		_
-							-		
							-		_
							_		_
35	35.0								_
5.9				2-10-8	Silty Sand Wit	th Limestone (SM) oderate yellowish brown, (1	10YR 5/4) -		Carbonate material
		0.5	SS-8	(18)	wet, medium de	lense, fine to coarse graine	ed, mild to		_
	36.5			. ,	moderate HCl i	reaction in all materials, 2 s, 36% fine to coarse grav	/% el-sized -		_
					limestone fragr	ments			<u> </u>
							_		Driller's Remark: Lost circulation at 37.0'
							_]
							_]
							_		
							_		
40				_					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	3	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS		gs on 5/30)/07 S	START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis
300				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
AND (f)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME LISSS CROUD SYMPOL COLOR USE TO DEPTIL OF CASING PRILLING PATE
H BE ACE	RECOVERY (ft)				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SOILMENTO DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0.9	40.0	0.6	SS-9	13-50/4	Interbedded Limestone And Sandy Silt Driller's Remark: Chatter at 40.0'
-	40.8	0.0	33-9	(63/10")	40.0-40.6' - dark yellowish brown and moderate yellowish brown, (10YR 4/2 and 10YR 5/4), 70% of Begin core at 41.0' 5/31/07, 10:45
					sample is limestone in fine sand-sized to coarse gravel-sized fragments, with mild HCl reaction and
-					\ 30% of sample is sandy silt, moist, hard, low plasticity, \ \
_					rapid dilatancy, mild HCl reaction, with varved appearance
_	_				Begin Rock Coring at 41.0 ft bgs
-	-				See the next sheet for the rock core log
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PROJECT NUMBER:	BORING NUMBER:				-	
338884.FL	E-01	SHEET	4	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

CORING	NETHOD A	ND EC	אורוע	MENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	Casil	ig	ORIENTATION : Vertical
WATER	LEVELS: 3.2	ft bg	s on 5	/30/07 START : 5/30/2007 END : 6/3	3/2007	7 LOGGER : B. Ellis	
)			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	1
E A O N	Ã.ξ.Σ.	<u></u>	FRACTURES PER FOOT	DESCRI HOR	ᅙ	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H N N N N N N N N N N N N N N N N N N N	E E E	Q D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	l g	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무류의	SUSSE	Ø	N N	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Į₹	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	SES	Ж	E 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	လ်	CHARACTERISTICS	1 1, 1
	41.0			41.0-41.2' - Fracture zone, rounded to		Limestone	Casing depth 41.0'
-			>10	angular limestone rock fragments (gravel	Н	- 41.0-41.4' - coarse gravel (limestone	1
-				size) 41.3' - Fracture, 40 deg, rough, undulating,		and chert) 41.4-43.0' - pale yellowish brown,	NR = No Recovery
_			1	open -	ш	- (10YR 6/2), dense, very fine grained,	NR - No Recovery
			'	42.35' - Fracture, horizontal, rough, planar,	\Box	moderate HCl reaction, medium	
-	R1-HQ			3/4" boring in fracture, tight		strong to strong (R3 to R4), cavities	1
-	5 ft	63	1	-	ш	up to 2-3/8"-2-3/4"x3/4"-1-3/16",	-
_	70%			43.9' - Fracture, 80 deg, rough, planar, 80%	\vdash \vdash \vdash	infilled with medium grained	1 4
			2	of surface covered by black organic coating		vesicular-textured limestone, voids up to 1/16" or less over 1-2% of	
45				<1/16" thick, fracture plane extends from	Ш	surface, fossils rare to absent,	
-4.1			NR	43.6-44.5'	T	possibly bioturbated	R1: 14 minutes
-			'*'`	44.3' - Fracture, 20-30 deg, rough, stepped,		43.0-44.5' - pale yellowish brown,	-
1 -	46.0			open 44.3-44.5' - Fracture, 80 deg, rough, stepped,	$\vdash \vdash$	(10YR 6/2), dense, fine to medium]
				open		grained, mild to moderate HCI reaction, medium strong to weak (R3	
1 -			4	46.2' - Fracture, 80 deg, rough, planar, thin	\vdash	to R2), voids (generally <1/16") over	1
-				(<1/16") layer of black (N1) carbonaceous	╁┼┤	3-5% of surface grading to 10% with	1
-			0	material, open	\perp	depth, fossils (molds/casts) rare to	-
_				46.6' - Fracture zone, 40 deg, very rough, planar, open	\vdash	absent No Recovery 44.5-46.0'	_
	R2-HQ		١ ,	46.7' - Fracture, horizontal, rough, planar,		Limestone	
_	5 ft 100%	57	2	open	$\Pi\Pi$	46.0-48.5' - Same as 43.0-44.5'	1 7
-	.0070			46.9' - Fracture, horizontal, smooth, planar,	11111	except voids increase to 5-8%,	1 -
-			2	open 48.7' - Fracture, 10 deg, smooth, undulating,	41111	_ cavities common (typically	-
50				open —		1/16"x3/16"), fossiliferous (molds/casts)	
-9.1			١,	48.9' - Fracture, 20 deg, smooth, undulating		Silty Sand (SM)	R2: 3 minutes
-	51.0		1	49.3, 49.7' - Fractures (2), horizontal,	11111	48.5-51.0' - grayish orange to dark	1
-	31.0			smooth, undulating, tight	11:11:	¬ yellowish brown, (10YR 7/4 to 10YR √	1 -1
-			1	50.7' - Fracture, horizontal, smooth, undulating, open		_ 6/6), mild HCl reaction, interbedded	-
l _				51.0-51.3' - Fracture zone, rough, stepped,	Щ	with clay, carbonate-derived	_
			40	various orientation of fractures, open, gravel		silts/clays/sand-size fragments (cohesive), with some black (N1)	
_			10	to cobble sized limestone rock fragments	\vdash	carbonaceous/organic	1
-	R3-HQ			52.2-52.9' - Fracture, 80 deg, rough,	+	laminae/deposits, fossils absent	-
-	5 ft	42	10	undulating, tight 52.4-53.8' - Fracture zone, intersecting	\Box	Limestone	-
I _	56%		<u> </u>	fractures from 50 deg to 90 deg, rough,	\vdash	51.0-53.8' - moderate yellowish]
				stepped to undulating, tight to open		brown, (10YR 5/4), mottled yellowish gray (5y 7/2), fine grained, mild HCl	
55			\ \r	-	Ш	reaction, very weak (R1), voids (up to	1
-14.1			NR	_	+	1/16"-1/8") over 15-20% of surface,	R3: 5 minutes
-				-		some cavities up to 3/8", some fossil	-
I _	56.0			_	\sqcup	molds/casts, occasionally thinly]
			_	FG 21 Fracture 10 dos very amonth		laminated with black (N1) organic/carbonaceous material	
_			2	56.3' - Fracture, 10 deg, very smooth, undulating	1+++	No Recovery 53.8-56.0'	1 1
-				56.6-57.0' - Fracture zone, rough, planar to		Silty Sand (SM)	-
_			2	undulating, large coarse gravel to cobble	\vdash	_ \56.0-56.6' - Same as 48.5-51.0'	-
1 _				size, low to high angle fracture planes, open]
	R4-HQ		_ ا ا	57.2' - Fracture, 10 deg, rough, stepped,]
-	5 ft 80%	42	1	open - 57.5-58.0' - Fracture zone, rough, planar to	╀┦	_	1
-	0076		<u> </u>	undulating, large coarse gravel to cobble	\Box	_	-
-			1	size, low to high angle fracture planes, open	\vdash	<u>-</u>] -
60			Ĺ	58.0' - Fracture, horizontal, smooth, planar,	H		
-19.1				tight, black (N1) carbonaceous film/coating			R4: 5 minutes
-	04.0		NR	over 90-95% of surface	\vdash	_	1
	61.0				H		+
							l



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	5	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IENT : CIVIE 950X 5/N 540255, ITIUU TOLAI Y, FIQ 10015, FI			ORIENTATION: Vertical
WATER	LEVELS : 3.2	2 ft bgs	s on 5		/3/200		
≥∩≘	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표하는	R.H. KER	(%) Q	150 180	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF.V.	7. 7. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6.	αD	AC R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SU	SE LEI	R	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				58.5' - Fracture, 5 deg, smooth, planar, tight,		Limestone	
-			>10	black carbonaceous film/coating over 80% of	+	- 56.6-60.0' - moderate yellowish	1
-				surface 59.6' - Fracture, 10 deg, rough, undulating to	世	brown, (10YR 5/4), fine grained, mild HCl reaction, weak to medium strong	1 -
_			1 1	stepped, tight	\bot	- (R2 to R3), voids 1/16" or less over	1
				61.0-61.6' - Fracture zone, rough, undulating,		5% of rock surface, some cavities	
	R5-HQ			gravel-sized, angular to subangular limestone		generally 3/8" in diameter or less,	
1 7	5 ft 70%	45	2	fragments, various fracture orientations, open 61.6' - Fracture, horizontal, rough, undulating,	1	 numerous thin, wispy, discontinuous black carbonaceous laminae, rare 	1 7
-	1070		1	open	-	zone of very weak to extremely weak	1
-			-	61.8' - Fracture, 0-90 deg, rough to smooth,	+	 (R1-R0) rock (typically as cavity 	-
65				stepped, black carbonaceous film over 10%		infilling)	
-24.1			NR	62.4' - Fracture, horizontal, smooth, undulating, tight, dark gray carbonaceous film	\bot	No Recovery 60.0-61.0' Limestone	R5: 5 minutes
	66.0			over 50%		61.0-61.6' - moderate yellowish	
_	00.0			63.15' - Fracture, horizontal, rough,	1	brown, (10YR 5/4), medium grained,	Mast down at 15:15
-			>10	undulating, open 63.7' - Fracture, 60 deg, rough, undulating		 mild HCl reaction, extremely weak (R0), friable, cavities and voids 	1
-				64.1' - Fracture, 60 deg, rough, undulating 64.1' - Fracture, horizontal, smooth,	+	absent, fossils absent	
_			2	undulating	\perp	_ 61.6-64.5' - moderate yellowish	_
			_	66.5' - Fracture, 30 deg, rough, stepped,	耳	brown becoming grayish orange with	_
	R6-HQ			open, silt lining <1/16" thick 66.5-67.0' - Fracture zone, irregular angles,	1	depth, (10YR 5/4 to 10YR 7/4), fine grained, mild HCl reaction, weak to	
	5 ft 73%	52	3	rock fragments		medium strong (R2 to R3), voids	1
-	1370		.	67.0' - Fracture, 0-90 deg, rough, stepped,	+-	1/16" over 5-7% of core surface,	1
-			1	open		unevenly distributed, few cavities	-
70				67.8' - Fracture, 10 deg, rough, highly undulating to stepped, tight -	┵	generally 3/8" or less in diameter, — thin black discontinuous	l
-29.1			NR	68.1' - Fracture, horizontal, rough, undulating,	Ш	_ carbonaceous laminae common,	R6: 4 minutes
	71.0			open	Н	fossil molds/casts rare to absent	
				68.5, 68.75, 69.35' - Fractures (3), 10 deg, very rough, undulating, open		 No Recovery 64.5-66.0' Limestone 	Core was stuck in core
-			3	71.5' - Fracture, 0-45 deg, rough, planar,	1	66.0-67.7' - pale yellowish brown	barrel, required all rods to
-				open	+	 grading to dark yellowish brown, 	be removed
_			1	71.8' - Fractures (2), 45 deg, smooth,	+-	(10YR 6/2 to 10YR 4/2), fine to	1
				undulating, open 71.9-72.2' - Fracture zone, irregular angles		medium grained, mild HCl reaction, - weak to medium strong (R2 to R3),]
	R7-HQ			72.2' - Fracture, horizontal, smooth, planar,		voids up to 1/16" over 15-20% of	
	5 ft 34%	18		open	1	surface, some cavities (generally	1
-	0170				亡	- 3/16" or less in diameter), fossil	1
-			NR		+	molds/casts rare 67.7-67.8' - Same as 66.0-67.7'	1 -
75 <u> </u>				-	- □	— except dark yellowish brown, (10YR	D7: 9 minutes
-34.1					\perp	4/2), medium grained, extremely	R7: 8 minutes
	76.0				上	weak (R0) - 67.8-68.1' - grayish orange mottled	
1 7					\perp	with pale yellowish brown, (10YR 7/4	1
-			3	76.4' - Fracture, horizontal, smooth, planar,	\Box	and 10YR 6/2), fine to medium	1 1
-				open 76.5' - Fracture, horizontal, rough, undulating,	+	grained, mild HCl reaction, extremely	1
-			0	open	+	weak (R0), voids/cavities/fossils absent. possible intraclasts of very	1 -
_				76.7' - Fracture, 0-20 deg, rough, stepped,	\perp	weak (R1) rock]
	R8-HQ	83	ا م	open	\mathbf{H}	68.1-69.45' - pale yellowish brown,	
]	5 ft 98%	ంు	2	78.0' - Fracture or mechanical break, horizontal, rough, undulating, tight		(10YR 6/2), fine grained, mild to moderate HCl reaction, weak to	1
-				78.9' - Fracture, 30 deg, rough, planar	1	medium strong (R2 to R3), voids	1
-			0	, 3,3 ,	III	☐ 1/16" over 10-15% of rock surface,	1 -
80 <u> </u>				-	+	few cavities (<3/8" in diameter), trace	SC-1 collected at 79.7-
-58.1			1		\perp	fossil casts/molds	80.8' R8: 10 minutes
	81.0						1.c. 10 minutes

APPENDIX 2BB-769 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	6	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 3.2	ft bgs	s on 5/	30/07 START : 5/30/2007 END : 6/	3/200	LOGGER : B. Ellis		
≥∩ ∵	(9)			DISCONTINUITIES	ق	LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S L	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR		SIZE AND DEPTH OF CASING,
H BE ACE	TH.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SOLIC	MINERALOGY, TEXTUR WEATHERING, HARDNE		FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE	ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS		SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	034	ď	EE NR/		Ś			
_			1	80.85' - Fracture, 40 deg, rough, planar, tight, <1/16"-sized black "peppering" of amorphous	世	Limestone - 69.45-69.65' - grayish orango	e. (10YR	_
_				mineral over 8-10% of fracture plane surface	₽	7/4), fine grained, mild HCl r	eaction.	_
_			1	81.5' - Fracture, horizontal, rough, undulating, open	厂	very weak to weak (R1 to R2 absent, voids <1/16" over <1	2), fossiis %	_
_			·	82.5' - Fracture, 75 deg, rough, undulating,		cavities absent, some very the		_
_	R9-HQ 5 ft	46	2	fracture plane extends from 82.2-82.8' 83.1' - Fractures, 0-40 deg, rough, stepped,	\vdash	gray laminations No Recovery 69.65-71.0'		_
	68%	٦٠	_	open		Limestone		_
			0	83.3' - Fracture, 0-90 deg, rough, stepped, open		71.0-72.7' - light olive gray to moderate yellowish brown, (_
85				-	Н	10YR 5/4), fine grained, mild	to	
-44.1			NR	_		moderate HCl reaction, stror voids 1/16" over 10-15% of s		R9: 6 minutes
	86.0				口	some cavities generally 3/8"		
]			_		Ъ	diameter or less, sparsely fossiliferous casts/molds		Start drill at 07:30 on
]			1	00.051.5.4.45.00.	\vdash	No Recovery 72.7-76.0'		6/3/07 -
				86.85' - Fracture, 45-60 deg, rough, undulating, several intersecting fracture		Limestone 76.0-78.5' - mottled yellowish	aray to	Driller's Remark: Lost
_			3	planes, open	H	light olive gray, (5Y 7/2 to 5Y	5/2),	circulation at 87.0'
	R10-HQ			87.1' - Fracture, 50 deg, rough, planar, conical	╁	fine to medium grained, mild moderate HCl reaction, med	to	_
_	5 ft 86%	80	1	87.45' - Fracture, horizontal, rough,		strong to strong (R3 to R4),	oids/	1
-				undulating, tight 87.85, 88.6' - Fractures (2), horizontal,		typically 1/16" or less over 5- rock surface, some cavities		-
90			0	smooth, planar	╁	3/8" in diameter or less but u	p to	
-49.1			0	_	Ħ	1-3/16" in diameter (filled wit		R10: 7 minutes
-	91.0		NR		Ħ	sandy carbonate grains), fos as molds/casts, <1% of surfa	ace	-
-	91.0					having a patina of white very grained carbonate staining/fi		-
_			1	91.3' - Mechanical break	\blacksquare	78.5-79.5' - grayish orange,	10YR	-
_				91.7' - Fracture, horizontal, smooth, planar, tight	工	7/4), fine grained, none to m	ild HCI	- Cavity filled with organic
-			0			reaction, extremely weak (Rifriable, voids <1/16" over <1		material at 92.1'
-	I R11-HQ				╁╌	cavities absent, non-fossilife		-
-	5 ft	83	2	93.6' - Fracture, 20 deg, rough, planar,		rare intraclasts (<1/4") of gra very weak to weak(R1 to R2		-
-	96%			coarse gravel sized fragments at interface,	世	limestone		-
-			2	open 93.95, 94.25' - Fractures (2), horizontal,	\vdash	Silt (ML) 79.5-79.7' - grayish orange,	10YR	Cavities at 94.4-94.6' and
95 <u> </u>				rough, undulating, open	oxdapprox	─ 7/4), mild HCl reaction, carbo	onate	94.6-94.8' R11: 6 minutes
-	20.0		1	94.95' - Fracture, horizontal, rough, planar, open		derived Limestone		-
-	96.0		NR_	95.25' - Fracture, horizontal, rough,	世	79.7-80.9' - grayish orange to		-
-			7	undulating to stepped, open 96.4' - Fracture, horizontal, rough, undulating,	F	pale orange, (10YR 7/4 to 10 very fine grained, moderate		-
-				open	口	reaction, medium strong to v	reak (R3	-
-			>10	96.45' - Fracture, vertical, smooth, planar,	士	to R2), voids 1/16" or less ov of rock surface, cavities rare	er 1-3%	-
-	R12-HQ			open 96.5' - Fracture, <5 deg, smooth, undulating,	+	fossil casts/molds	, uace	-
-	5 ft	18	>10	open 96.6' - Fracture, 60 deg, smooth, slightly	Ħ	No Recovery 80.9-81.0' Limestone		-
-	88%			undulating, tight	世	Limestone 81.0-81.5' - Same as 79.7-80).9'	SC-2 collected at 99.0-
-			>10	96.7' - Fracture, horizontal, rough, planar to	\vdash	-		99.9' –
100				stepped, open 96.8' - Fracture, horizontal, rough, planar, —	П	_		D40. C minutes
-59.1			2	open	口	-		R12: 6 minutes
	101.0		NR		\vdash			
					1			I



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-01	SHEET	7	OF	13

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				ILENT . CIVIE 330X 3/N 340233, ITIUU TOLAIY, FIQ 10015, FIV			
WATER	LEVELS: 3.2	ft bg	s on 5	/30/07 START : 5/30/2007 END : 6/	<u>3/2007</u>	LOGGER : B. Ellis	
	_			DISCONTINUITIES	(1)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
E H	L.A.Y.	(9	FRACTURES PER FOOT	DECOMM NOT	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A S E	HI SE	(%) Q	ΪŠĞ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
뜨쥬던	NS S	Ø	SAC ER I	PLANARITY, INFILLING MATERIAL AND	Ĭ₩	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
E S E	222	œ	뜐퓝	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	BROT 6, 1201 R200216, 216.
				96.9' - Fracture, vertical, smooth, planar,	Ш	81.5-83.5' - moderate yellowish	08:30 rig stops for water
-			10	open	╁┼	brown with yellowish gray limestone	refill -
_				97.0' - Fracture, horizontal, rough, stepped,	Н	interbeds, (10YR 5/4 with 5Y 7/2),	SC-3 collected at 101.75-
				open	Ш	fine to medium grained, mild to	102.8'
_			>10		\Box	moderate HCl reaction, weak to	1
-	D40 110			to stepped, vertical to subvertical, open 98.23' - Fracture, horizontal, smooth,	₽₩	medium strong (R2 to R3), HCI reaction strong where patina of very	-
_	R13-HQ 5 ft	53	>10		Н	fine grained limestone coats core	
	100%	55	- 10	98.5' - Mechanical break		surface, abundant fractures,	
_				98.6-99.0' - Fracture zone, 0-90 deg, rough,	ш	breccia-like features (with possible	1
-			10	stepped to undulating, open	╁┼	intraclasts) common from 82.7-83.5',	1 -
105				99.9-100.05' - Fracture zone, rough, planar,	廾	voids up to 1/16" over 15-20% of	
-64.1				various fracture orientations, gravel sized	Ш	surface, cavities common (up to	R13: No time recorded
-			5	rock fragments, open	╁┼┼	2-3/8"-2-3/4" in length, 1-9/16"-2"	1 1
-	106.0			100.2' - Fracture, horizontal, smooth, planar, open	╀┼┼	wide and extending 3/4"-1-3/16" into core), fossiliferous (casts/molds)	00:20 hasin dail. = 44.4 h = :
			4	100.5' - Fracture, horizontal, rough, planar to	Ш	83.5-84.4' - yellowish gray, (5Y 7/2),	09:30 begin drill, add 1 bag mud
			4	stepped. open	Н	fine grained, moderate to strong HCI	Illuu
-				101.4' - Fracture, 0-45 deg, smooth, planar,	╁┼	reaction, weak to medium strong (R2	Driller's Remark: Drill
_			4	open .	ш	to R3), voids (1/16" or less) unevenly	chatter throughout run –
				101.6-101.75' - Fracture zone, 0-50 deg,		distributed over 15% of rock surface,	1
	R14-HQ			rough, undulating, open	Н	cavities (<3/16"), fossil molds/casts	
-	5 ft	53	>10	102.8' - Fracture or mechanical break, horizontal, smooth, planar	$+\pi$	rare to absent No Recovery 84.4-86.0'	1 1
_	92%			1012011ai, shlootii, pianai 102.8-103.1' - Fracture zone, gravel-sized		Limestone	_
			,	rock fragments, multiple fracture orientations	Ш	86.0-87.4' - dusky yellow with	
110			4	103.13, 103.2, 103.3, 103.45' - Bedding plane	Н	yellowish gray interbeds, (5Y 6/4 with	
-69.1				(4), horizontal, rough, planar to stepped,	ш	5Y 7/2), fine to very fine grained,	R14: 4 minutes
			0	discontinuous, open	ш	weak to medium strong (R2 to R3),	SC-4 collected at 110.15-
	111.0		NR	103.5' - Fracture, 45 deg, smooth, planar,	H	voids 1/16" or less over 25-30% of	111.0'
				tight 103.8, 103.9' - Fractures (2), horizontal,	11	rock surface, some cavities up to 1-3/16"-1-9/16" x 3/4"-1-3/16", very	
-			>10	rough, planar	ш	fine grained limestone from	1 1
_				104.1, 104.2' - Fractures (2), horizontal,	╆┼	86.7-86.8', very fine grained	1
			- 10	rough, stepped, open		intraclast from 87.0-87.4'	
			>10	104.7' - Fracture, rough, cone-shaped	Ш	(subangular, up to 1/2"-3/4"), some	1
-	R15-HQ			104.7-104.75' - Fracture zone, gravels sized	╁┼┼	fossil molds/casts	1 1
-	5 ft	15	>10	fragments of irregular shape and fracture	╀┼┼	87.4-88.6' - very light gray, (N8), fine	
	76%	.	.	orientation		grained, strong HCl reaction, very	
1 7			. 40	104.83' - Fracture, horizontal, smooth, planar 105.2, 105.45, 105.57, 105.7, 105.9' -	\Box	weak (R1), voids (1/16" or less) over 3-5% of rock surface, cavities rare	1
-			>10	Bedding plane (5), horizontal, rough, planar	╂┼╂	(typically 3/8"x3/16"), trace fossil	1 -
115_				to stepped, open —	団	molds and trace echinoderms	Int
-74.1			NR	106.3' - Fracture, horizontal, smooth, planar		88.6-90.3' - variegated pale yellowish	R15: 5 minutes
1 7	116.0			106.4-106.5' - Fracture zone, horizontal,	14	brown to moderate yellowish brown,	1
-	110.0			planar, multiple fragments	╂┼┼	(10YR 6/2 to 10YR 5/4), fine to	1
-			4	106.55' - Fracture, horizontal, smooth, planar		medium grained, moderate HCI	1 -
				106.6' - Fracture, horizontal, smooth, planar 106.9' - Mechanical break, horizontal,	Ш	reaction, very weak to weak (R1 to R2), voids up to 1/16" over 5-8%,	
1 7				smooth, planar	H	cavities (typically 3/8"x3/16"),	1
-			4	107.4' - Fracture, horizontal, rough, planar	口	fossiliferous (molds/casts),	1
-				107.5' - Fracture, horizontal, rough,	ш	echinoderms, becomes coarse	1
	R16-HQ			undulating	H	grained with depth from 90.2-90.3'	
]	5 ft 96%	55	0	107.8' - Fracture or mechanical break,	ш	and extremely weak rock (R0) with	1
-	90%			horizontal, smooth, undulating	口	some black carbonaceous material	1 -
			4	107.9' - Fracture or mechanical break, horizontal, smooth, undulating	H	No Recovery 90.3-91.0']
120			,	108.0-108.3' - Fracture zone, horizontal,	Н		
-79.1				smooth, planar, bedding plane separations at	ш	7	R16: 4 minutes
-			6	108.0, 108.1, 108.2, 108.25, 108.3'	╂┼┼	. [1 -
	121.0			,	H		
					<u></u> ∐		<u> </u>
	_				_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	8	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				HENT . CIVIE 330X 3/N 340233, HILL TOTALLY, HQ 1001S, HV			ORIENTATION: Vertical
WATER	LEVELS : 3.2	ft bg	s on 5		3/200		
>00	<u>.</u>			DISCONTINUITIES	ပ	LITHOLOGY	COMMENTS
ON E	ND.		S	DESCRIPTION	2	ROCK TYPE, COLOR,	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	<u>@</u>	FRACTURES PER FOOT		SYMBOLIC LOG	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
HÄE.	GTF GOV	(%) _Q	PE	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
P.S.	E C C	S O	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	0715	Œ	шп		S		
			>10	108.5-109.0' - Fracture zone, horizontal,	\vdash	Limestone	
			-10	smooth, planar, open 109.05' - Bedding plane, horizontal, rough,		- 91.0-92.0' - very light gray, (N8), fine grained, strong HCl reaction, weak to	
-				planar to stepped, open	┰	medium strong (R2 to R3), voids	-
-			>10		₽₩	- 1/16" or less over 10-15% of rock	-
				horizontal, rough, undulating, open		surface, several cavities typically	
	R17-HQ			111.0-112.55' - Bedding plane, horizontal,	\vdash	3/8"x3/16", trace fossil molds/casts	
	5 ft 40%	0		rough, planar to undulating, open, 0.1' thick or less throughout interval, multiple breaks	₽	with occasional echinoderm fossils 92.0-93.5' - Same as 88.6-90.3'	1
-	40%			112.3-113.7' - Fracture zone, smooth to	-Ш	except trace black	-
_			NR	rough, planar to undulating, coarse gravel to	\perp	- carbonaceous/organic discontinuous	
125				cobble size fragments, various fracture plane	H	laminae/cavity infilling, intraclasts (up	
-84.1				orientations, open	ш	to 1-9/16"-2", subrounded) common	R17: 4 minutes
-				114.4-114.8' - Fracture zone, smooth to	╂┼┤	- 93.2-93.5'	1
-	126.0		0	rough, planar to undulating, coarse gravel to cobble size fragments, various fracture plane	╂╫	93.5-95.45' - yellowish gray to very light gray, (5Y 8/1 to N8), fine to	Drillor's Romarky Large
			lacksquare	orientations, open	Ш	medium grained, strong HCl	Driller's Remark: Large rock fragment jammed in
				116.15' - Fracture, horizontal, rough,	H	reaction, very weak (R1) rock from	tip of core barrel, 10:30
1 7				stepped, open		93.5-94.3', becoming weak rock (R2)	drilling suspended to fix
-				116.27' - Fracture, 10 deg, rough, undulating,	ш	from 94.3-95.2' and returning to very	wireline spool -
_				open 116.57' - Fracture, horizontal, rough, planar,	╆	weak rock (R1) from 95.2-95.45', voids (1/16" or less) over 3-5% of	One rock fragment 2.4"
	R18-HQ			open		rock surface and unevenly	long was all that was recovered during coring.
1 7	5 ft 4%	0	NR	116.68' - Fracture, horizontal, rough, planar		distributed, some cavities up to	No void reported.
-	170			to undulating, open	╁┼	1-3/16"-1-9/16"x3/8" over 2-3% of	Driller's Remark: Strong
-				117.02' - Fracture, horizontal, rough,		rock surface, chalk-like texture when	chatter -
130_				stepped, open 117.07' - Fracture, vertical, rough, stepped,	Щ	scraped with pocket knife, fossil molds/casts rare to absent	
-89.1				open	Н	Peat	R18: 3 minutes
1 7	131.0			117.1' - Fracture, 20 deg, rough, stepped,		95.45-95.7' - black to grayish black,	
-	131.0			conical, open	╁┷	(N1 to N2), no HCl reaction, firm to	-
-			8	117.32' - Fracture, horizontal, rough,	┸	stiff, interlaminated with some very	-
				undulating, open 117.9' - Mechanical break		weak limestone	
				117.9 - Mechanical break	\vdash	Limestone	
-			5	119.3' - Fracture, horizontal, rough,		 95.7-95.8' - Same as 93.5-95.45' except very weak (R1), friable 	1
-	R19-HQ		\vdash	undulating, open	+	No Recovery 95.8-96.0'	Driller's Remark: Strong
	5 ft	22	>10	119.4' - Fracture, horizontal, rough, stepped,	+	_ Limestone	chatter from 133.0-136.0'
	92%			open 119.72' - Fracture, horizontal, rough,		96.0-100.4' - yellowish gray, (5Y 8/1),	
1 7				stepped, open	H	strong HCl reaction, weak to medium	Many fractures resulted
105			6	119.8' - Fracture, horizontal, rough, planar,		 strong (R2 to R3), voids 1/16" or less over 5-10% of rock surface, cavities 	from breakage along weak
135 <u> </u>			H	open –	Ш	typically 3/8" in diameter over 3-4%,	bedding planes when removing sample from core
J			>10	120.05, 120.12, 125.25, 120.45, 120.65' -	H	trace fossil molds/casts	barrel -
	136.0		NR	Fractures (5), horizontal, rough, planar to undulating, open		No Recovery 100.4-101.0'	R19: 5 minutes
				120.75' - Fracture, 0-60 deg, rough, stepped,	Ш	Limestone	1
-			10	open	\Box	 101.0-106.0' - very pale orange to yellowish gray, (10YR 8/2 to 5Y 7/2), 	1
-				121.0' - Fracture zone, unconsolidated, 1/2"-	口	fine to medium grained, strong HCl	-
			10	4" fragments	Щ	reaction, weak (R2), chalky texture	
			. ັ	131.1, 131.3, 131.35, 131.4, 131.45, 131.55, 131.7, 131.8' - Fractures (8), horizontal,		when scraped with pocket knife,	
1 1	R20-HQ			rough, planar to undulating, open	\Box	voids up to 1/16" over 10% or less of	1
1 -	5 ft	0	7	132.25, 132.3, 132.38, 132.8, 132.9' -	₩	rock surface, some cavities up to 3/8" in diameter, some echinoid	-
-	66%			Fractures (5), horizontal, rough, planar to	ш	fossils in addition to sparse	-
			0	undulating, open	\Box	occurrences of molds/casts	
140				133.1, 133.25, 133.4, 133.5, 133.6, 133.7, 133.8, 133.85' - Fractures (8), horizontal.	Н	106.0-110.6' - Same as 101.0-106.0']
-99.1			NR	rough, planar to undulating, open	ш	except echinoderm fossils common from 106 0 107 4!	R20: 4 minutes
-				133.85-134.15' - Fracture zone, 0-90 deg,	╂┼┤	from 106.0-107.4' No Recovery 110.6-111.0'	1
	141.0			rough, undulating to stepped, open	\vdash		

APPENDIX 2BB-772 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	9	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				MENT . CIVIE 330X 3/N 340233, Midd Totally, Fig tools, Fi			ORIENTATION : Vertical
WATER	LEVELS: 3.2	2 ft bg	s on 5	/30/07 START : 5/30/2007 END : 6	/3/200	LOGGER : B. Ellis	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE COLOR	
UN A N	Ϋ́ ĀĀ	_	꼾는	DEGCINI HON	□	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
#SE	E 문문	(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ö	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무뚜짓	888	ØΒ	R _F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
BSH	SHR	R	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
				134.15, 134.25, 134.4, 134.5, 134.6, 134.8,	+	Limestone	
_			1 1	135.85' - Fractures (7), horizontal, rough,		- 111.0-113.7' - Same as 101.0-106.0'	_
				planar to stepped, open	Ш	except echinoid fossils rare to absent	
				135.07' - Fracture, horizontal, rough, planar,	1	113.7-114.45' - yellowish gray, (5Y	
-			4	open	+-	 8/1), very fine grained, strong HCl 	1
I _				135.07-135.7' - Fracture zone, multiple	Ш	reaction, extremely weak (R0),	
	R21-HQ			coarse gravel to cobble-sized fragments,		voids/cavities absent, fossils absent	
_	5 ft	62	4	various fracture plane orientations	₩	- 114.45-114.8' - Same as	-
_	88%			135.7' - Fracture, horizontal, rough, stepped,	+	111.0-113.7'	-
			ا م	open 135.85' - Fracture, horizontal, rough, planar,		No Recovery 114.8-116.0' Limestone	
145			2	open	Ш	116.0-119.7' - yellowish gray, (5Y	SC-5 collected at 144.5-
-104.1			<u> </u>	136.1, 136.2, 136.3' - Fractures (3),	+	7/2), fine grained, strong HCl	145.4' —
-104.1			0	horizontal, rough, planar, open	\bot	reaction, very weak to weak (R1 to	R21: 5 minutes
	146.0		NR	136.4-136.6' - Fracture zone, bounded by		R2), chalky texture when scraped	1
1 -	170.0			planar to undulating, rough, open bedding		with knife, voids (<1/16" over 1-2%	1
-			>10	planes	+	of surface, few cavities (generally	1
I			•	136.8, 136.9' - Fractures (2), horizontal,		3/8" in diameter or less), fossils rare	
_				rough, undulating, open	1	to absent (trace echinoderms)	
-			2	137.05, 137.2, 137.35, 137.6, 137.75, 137.8,		_ 119.7-120.8' - yellowish gray, (5Y	-
I _				137.85, 138.0, 138.1, 138.2, 138.25, 138.35,	\bot	7/2), medium to coarse grained,	
	R22-HQ			138.5, 138.55' - Fractures (14), horizontal,	H	strong HCl reaction, very weak (R1), voids <10%, some cavities (typically	
_	5 ft	68	2	rough to smooth, planar to undulating, open 138.5' - Mechanical break	1	<3/8" in diameter), fossiliferous	
_	88%			138.85' - Fracture, horizontal, rough, planar		(molds/casts), pelecypods,	4
			ا م	141.4' - Fracture or mechanical break.	Ш	_ gastropods, some echinoderms	
150			2	horizontal, rough, planar	1	(fossil hash)	
-109.1			0	142.0' - Fracture, horizontal, rough, planar	+	No Recovery 120.8-121.0'	R22: 7 minutes
-103.1				142.12' - Fracture, horizontal, rough, planar,	\blacksquare	_ 121.0-123.0 ^r - yellowish gray, (5Y	R22. / Illillutes
	151.0		NR	open	\vdash	7/2), fine grained, strong HCl	
_	10110			142.0-142.12' - Fracture zone	1	reaction, extremely weak (R0), very	Start drill at 12:15
_			2	142.33, 142.40' - Fracture or mechanical	-	_ friable, 40-50% fine to medium	Add 1/2 bag mud -
				break (2), horizontal, rough, planar		sand-sized grains grading to	SC-6 collected at 151.3-
				142.9' - Fracture or mechanical break, horizontal, rough, planar	\vdash	 gravel-sized carbonate No Recovery 123.0-126.0' 	152.35'
-			3	143.0' - Fracture, horizontal, rough,	+	Limestone	-
l _				undulating, coarse gravel-sized rock		- 126.0-126.2' - yellowish gray, (5Y	
	R23-HQ			fragments on bottom face	Ш	7/2), medium to coarse grained,	Driller's Remark: Drilling in
-	5 ft	80	0	143.3' - Fracture, vertical, rough, stepped,	1—	strong HCl reaction, very weak to	fourth gear, consistent -
-	96%		-	tight	+-	- weak (R1 to R2), fossiliferous	chatter throughout run
1			0	143.4' - Fracture, horizontal, rough, stepped,	\Box	(echinoderms, fossil hash)	
155			ا ا	open		No Recovery 126.2-131.0	1
-114.1				143.7' - Fracture, 80 deg, rough, planar, tight -	+	— Limestone	Large cast/void at 154.85', —
			0	144.1' - Fracture, 80 deg, rough, stepped,	_	131.0-135.6' - Same as 111.0-113.7'	155.2', 155.8'
1	156.0		NR	(intersects fracture at 143.7')		No Recovery 135.6-136.0'	R23: No time recorded
1 -			LINK	144.50' - Fracture or mechanical break, horizontal, rough, undulating	仜	 Limestone 136.0-137.9' - Same as 131.0-136.0' 	Lost 2.0' due to having to
-			1	146.4' - Fracture, horizontal, rough,	+-	130.0-137.9 - Same as 131.0-136.0 137.9-138.2' - olive gray, (5Y 3/2),	break 2.9' long piece to box
1				undulating, organic staining on bottom face	\perp	fine to medium grained, strong HCl	
1 -				146.4-146.6' - Fracture zone, smooth, planar,	\mathbf{T}	reaction, very weak (R1), thinly	1
-			1	coarse gravel to cobble-sized fragments		laminated	1
I -				146.6' - Fracture, horizontal, rough,	Щ	138.2-138.5' - Same as 136.0-137.9'	
1	R24-HQ		l	undulating, tight	\vdash	138.5-138.7' - yellowish gray, (5Y	
1 -	5 ft	55	1	146.8' - Fracture, vertical, rough, planar,	++	7/2), fine grained, moderate HCI	SC-7 collected at 158.3-
-	80%		<u> </u>	tight, fracture plane extends from	$-\Box$	reaction, weak (R2), laminated, voids	159.1'
1				146.6-147.0'		(<1/16") 5-8% irregularly distributed	
100]		2	147.0' - Fracture or mechanical break,	14	over core surface, few cavities	1
160 <u></u> -119.1			\vdash	horizontal, smooth, planar, open	+	<1/16" in diameter, fossils	R24: 4 minutes
-119.1			NR	147.0-147.2' - Fracture zone, rough, planar to		(casts/molds) rare to absent 138.7-139.3' - Same as 121.0-123.0'	1124. 4 1111110105
	161.0		''''	stepped, multiple fractures, open, angular gravel size fragments		No Recovery 139.3-141.0'	
	.01.0			graver size magnients		140 Necovery 103.3-141.0	
1							
1							

APPENDIX 2BB-773 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	10	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 3.2	ft bgs	on 5	/30/07 START : 5/30/2007 END : 6/	3/200	7 LOGGER : B. Ellis	
≥∩≎	. (9			DISCONTINUITIES	စ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	D (%)	TUR -00-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,] Society	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≺MB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	OIM	Ω.	Η Ф	147.7' - Fracture or mechanical break.	S	Limestone	
_			3	horizontal, smooth, planar, tight	Ë	- 141.0-141.35' - yellowish gray to pale	1 -
_				148.4' - Fracture or mechanical break, 0-50	₽	yellowish brown, (5Y 7/2 to 10YR	1
_			3	deg, smooth, planar, tight 148.9' - Fracture, 70 deg, smooth, undulating,	F	6/2), medium to coarse grained, - strong HCl reaction, very weak (R1),	_
_				tight, fracture plane extends from		voids (1/16") over 5-7% of surface,	_
_	R25-HQ 5 ft	75	1	148.5-149.5' 149.3' - Fracture, horizontal, very rough,		some cavities up to 3/8" in diameter, fossiliferous (echinoderm parts).	_
_	96%	. 0	·	undulating, tight	_	molds/casts sparse	_
_			2	149.55' - Fracture, vertical, rough, undulating to stepped, tight		141.35-142.0' - pale yellowish brown, (10YR 6/2), fine to medium grained,	
165_			_	149.8' - Fracture, 0-90 deg, rough, stepped,		strong HCl reaction, weak to medium	
-124.1			3	tight 151.2' - Fracture, 10 deg, rough, stepped,		strong (R2 to R3), voids up to 1/16" over 10% of surface, few cavities	R25: 4 minutes
	166.0		NR.	tight	口	generally 3/8" or less in diameter,]
]			8	151.3' - Fracture, 10 deg, smooth, undulating, tight	ഥ	fossiliferous (echinoids), thinly laminated with wispy, discontinuous,]
]			٥	152.6' - Fracture, horizontal, smooth,	\vdash	black (N1) carbonaceous/organic	1
]				undulating, tight 152.9' - Fracture, horizontal, smooth,	Ħ	material 142.0-143.05' - yellowish gray, (5Y	Loud drill chatter
-			6	undulating, open	H	7/2), medium grained, strong HCI	throughout, especially at - 167.0'
_	R26-HQ			152.97' - Fracture, horizontal, rough, undulating	┞	reaction, weak (R2), chalk-like texture when scraped with knife,	Large cavity >3/4" at
	5 ft 68%	18	9	156.35' - Fracture, 10 deg, rough, undulating,		irregular to undulating core surface,	168.0', 169.2'
_			2	open 157.9' - Fracture, horizontal, smooth,		voids (<1/16" or less) over 1-2%, cavities rare, fossils (molds/casts)	1
170				undulating, open	╁	difficult to discern	1
-129.1			NR	158.0' - Fracture, 10 deg, smooth, planar 158.3' - Mechanical break	F	143.05-145.4' - yellowish gray, (5Y 7/2), very fine grained, moderate to	R26: 4 minutes
-	171.0			159.4, 159.7' - Fractures (2), horizontal,	Ħ	strong HCl reaction, medium strong	1
-	171.0			rough, planar, open 161.35' - Fracture, horizontal, rough,	t	to strong (R3 to R4), voids (1/16" or less) over 3% or less of rock surface,	1
-			2	undulating, tight	\vdash	cavities common up to a few inches	1
-				161.6' - Fracture or mechanical break,	Þ	 in length (possibly bioturbated), fossiliferous (mostly casts), some 	1
-			5	horizontal, smooth, planar, open 161.95' - Fracture or mechanical break,		pelecypod molds/casts	1
-	I R27-HQ			horizontal, rough, planar, open	╁	 No Recovery 145.4-146.0' Limestone 	1
-	5 ft	57	10	162.2' - Fracture, horizontal, rough, undulating, open	F	146.0-146.4' - Same as	1
-	96%			162.45, 162.55' - Fracture or mechanical	片	- 143.05-145.4'	-
4			>10	break (2), horizontal, rough, planar, open 163.5' - Mechanical break	\vdash	146.4-148.1' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR	-
175_ -134.1				163.65' - Fracture or mechanical break, —	\vdash	— 6/2), fine grained, moderate HCl reaction, weak to medium strong (R2	R27: 4 minutes
-	1700		10	horizontal, smooth, planar, open 164.0' - Fracture or mechanical break,	仜	to R3), thin black wispy	-
-	176.0		NR_	horizontal, smooth, planar, open	士	 organic/carbonaceous laminations, 	-
-			3	164.0-164.1' - Fracture zone 164.1' - Fracture, 10 deg, rough, planar	+	voids (<1/16") over 1-3% of surface non-uniformly distributed, few	-
-				165.15, 165.2, 165.25' - Fractures (3),	厈	 cavities, fossil molds/casts rare to 	-
-				horizontal, smooth, planar, open 166.10, 166.4, 166.42, 166.45, 166.55, 166.6,	片	absent - 148.1-149.0' - yellowish gray, (5Y	-
-	R28-HQ			166.7, 166.8' - Bedding plane (8), horizontal,	₽	 7/2), very fine grained, moderate to 	Drill chatter at 178.0'
-	5 ft	0		rough, planar, open 167.15, 167.2, 167.25, 167.3, 167.35, 167.95'	\vdash	strong HCl reaction, medium strong to strong (R3 to R4), voids (<1/16")	-
-	16%		NR	- Bedding plane (6), horizontal, smooth,	仜	 over <1% of surface, cavities 	-
-				planar to stepped 168.0' - Fracture, 10 deg, rough, undulating,	一	(<3/16") rare to absent, fossils absent	-
180 -139.1				open	F	_	R28: 4 minutes
-139.1				168.2, 168.25, 168.3, 168.35, 168.4, 168.5, 168.6, 168.9' - Mechanical break (8),	片	-	NZO. 4 IIIIIIUIUUU -
	181.0			horizontal, smooth, planar	\vdash		
					1		
					1		<u> </u>

APPENDIX 2BB-774 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	11	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 3.2	ft bgs	s on 5/	/30/07 START: 5/30/2007 END: 6/	/3/2	2007	LOGGER : B. Ellis	
>00	(9			DISCONTINUITIES		₀	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION]	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	E RUI	D (%)	TUR -00-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1	30 S	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF	SORE ENG SECC	RQD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ı	3YME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0311	ш.	шш	168.5-168.6' - Fracture zone	t) 	149.0-150.0' - yellowish gray mottled	
-			2	169.0, 169.1' - Fracture or mechanical break	╁	\forall	with pale yellowish brown (<1% of rock surface), (5Y 7/2 mottled with	-
-			2	(2), horizontal, smooth, planar, along bedding planes	Ŧ	큵	10YR 6/2), coarse grained, strong	Extensive drill chatter
-				171.35' - Fracture, 80 deg, smooth, planar, tight	ŧ	⇉	 HCl reaction, weak to medium strong (R2 to R3), voids and cavities 	throughout run -
_	R29-HQ			171.8' - Fracture, 80 deg, rough, planar, tight	t	坩	absent, abundant rip up/lithoclasts	-
-	5 ft 26%	15		172.0' - Fracture or mechanical break, horizontal, rough, undulating to stepped, tight	t	Ħ	 (subrounded to rounded), fossil casts/molds rare, echinoids rare 	1
			NR	172.2' - Fracture, 80 deg, rough, planar, (possible continuation of 171.8' fracture)	ŀ	Ⅎ	150.0-150.4' - yellowish gray, (5Y - 7/2), medium grained, strong HCl	1
185				in 172.62' - Fracture or mechanical break,	╊	Н	reaction, weak (R2), although rock	
-144.1				horizontal, smooth, planar 172.80' - Fractures (2), 70 deg, rough, planar,	F	Ц	has "grainy" appearance, the interval is generally absent of voids, cavities	R29: 7 minutes
_	186.0			tight, parallel	F	Ц	absent, fossil (casts/molds) rare to	_
_				172.92' - Fracture, 30-60 deg, rough, stepped, tight	1	ļ	absent No Recovery 150.4-151.0'	Driller's Remark: Total of 37 flights used for total -
_				173.45' - Fracture, horizontal, rough, planar, open	1	ļ	Limestone 151.0-153.0' - Same as 150.0-150.4'	depth _
_				173.9-174.3' - Fracture zone, 0-60 deg,	1	ŀ	except with some intraclasts between	-
_				rough, undulating, open 174.3' - Fracture, horizontal, rough, planar,	4	ŀ	151.5' and 151.9' 153.0-155.8' - yellowish gray, (5Y	-
_				open	4	ŀ	7/2), fine grained, moderate HCI reaction, medium strong to strong	-
_				174.5-174.8' - Fracture zone, various fracture plane orientations producing angular	1	ŀ	(R3 to R4), voids up to 1/16" over	-
-				gravel-sized limestone rock fragments 174.85' - Fracture, horizontal, rough, planar,	1	ŀ	3-5% becoming more common (up to 10% below 154.5'), some cavities up	-
-				open	1	ŀ	to 3/4"-1-3/16" in diameter/length	
-				175.2' - Fracture, horizontal, rough, planar, open	1	ŀ	over 1-2% becoming more common below 154.5', some dark yellowish	-
-				175.75-175.8' - Fracture zone, 0-90 deg, rough, undulating, open	1	ŀ	orange banding from 154.9-155.8', fossil (molds/casts), echinoderms	-
-				176.0-176.1' - Fracture zone, multiple	1	ŀ	rare	-
				irregular sized, very angular cobble-sized fragments	1	Ī	No Recovery 155.8-156.0' Limestone	1
				176.35, 176.5' - Fractures or mechanical	1	ı	156.0-156.3' - variegated yellowish gray to pale brown, (5Y 7/2 to 5YR	-
				break (2), horizontal, rough, planar, open 181.25, 181.7' - Fractures or mechanical]		5/2), fine grained, moderate HCI]
_				break (2), horizontal, smooth, planar 182.05' - Fracture or mechanical break,	1		reaction, voids (1/16" or less) over 1-2% surface, cavities	
_				horizontal, smooth, planar	1	ļ	3/8"-3/4"x3/16" at base of interval	
_				_	4	ļ	(elongated), very thinly laminated (argillaceous laminae), fossils rare to	_
_					1	ŀ	absent 156.3-159.1' - Same as 153.0-155.8'	-
_					4	ŀ	except lacking dark yellowish orange	-
_					1	ŀ	banding 	-
_					┨	ŀ	orange, (10YR 6/6), medium to	-
-					+	-	coarse grained, strong HCl reaction, weak (R2), hummocky/irregular	-
-					+	ŀ	surface with 4% voids, cavities absent, fossil hash, contact sharp	
-					\dagger	ŀ	with undulating limestone	-
-					1	ŀ	159.25-160.0' - very pale orange, (10YR 8/2), medium grained, strong	
-					1	ŀ	HCI reaction, weak (R2), voids over <1%, cavities (<3/16") rare, some rip	
-				_	1	f	up/intraclast-like grain, fossil casts	-
					1	f	and molds rare No Recovery 160.0-161.0'	
					T	1		
					L			l



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	12	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	ATER LEVELS: 3.2 ft bgs on 5/30/07 START: 5/30/2007 END						LOGGER : B. Ellis	
≥ D ⊋	(%)			DISCONTINUITIES		ပ္ထ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGH PLANARITY, INFILLING MATERIAL THICKNESS, SURFACE STAINING, AND T	AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
							Limestone 161.0-161.6' - Same as 159.25-160.0' 161.6-162.5' - very pale orange, (10YR 8/2), coarse grained, strong HCI reaction, weak to medium strong (R2 to R3), fossil hash, voids (<1/16" or less) over 3-5% of rock surface, cavities rare, fossils common (echinoids, pelecypods, casts/molds), rip up/intraclasts common in base of interval 162.5-164.1' - yellowish gray mottled with moderate yellowish brown, (5Y 7/2 mottled with 10YR 5/4), medium grained, strong HCI reaction, weak to medium strong (R2 to R3), becoming finer grained with depth, voids (1/16" or less) over 3-5% of rock surface (irregularly distributed), brown mottling is wavy and discontinuous, some echinoids and fossil molds/casts 164.1-165.8' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, weak (R2), voids (1/16") over 1% or less of rock, cavities rare (1/8"-3/16" over <1%), echinoids rare, fossil molds/casts rare to absent No Recovery 165.8-166.0' Limestone 166.0-166.6' - Same as 159.25-160.0' 166.6-169.4' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, medium strong (R3), voids (1/16" or less) over 3-5% of rock surface, few cavities (typically 3/16" or less in diameter), voids and cavities becoming more common below 168.5' up to 20-25% voids, fossils (casts/molds) and echinoids rare to absent to 168.5', some fossil molds/casts and few echinoids below 168.5-169.4' No Recovery 169.4-171.0' Limestone 171.0-175.8' - yellowish gray, (5Y 7/2), fine to medium grained, mild to moderate HCI reaction, weak to medium strong (R2 to R3), voids (1/16" or less) over 5-10% of fock surface, cavities (generally 3/16" or less in diameter) over 2-3% of surface, fossil (casts/molds) rare, medium to coarse grained from 174.5-175.3' No Recovery 175.8-176.0'	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-01	SHEET	13	OF	13

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

00111110			<u> </u>	12141 . CIVIE 330X 3/14 340233, Illud Total y	,		9		ONENTATION: Vertical
WATER	LEVELS: 3.2	ft bgs	on 5/	/30/07 START : 5/30/2007	END : 6/3	/200	7	LOGGER : B. Ellis	
>00	(9)			DISCONTINUITIES		Ġ		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION		SYMBOLIC LOG		ROCK TYPE, COLOR,	
照한호	₹8	(9)	FRACTURES PER FOOT			의		MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A H E	#.E.S	(%) O	Ϋ́	DEPTH, TYPE, ORIENTATION, ROU	GHNESS,	30.		WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
면유연	2 N N N N N N N N N N N N N N N N N N N	ο	ZAC ER	PLANARITY, INFILLING MATERIA	L AND	ME		AND ROCK MASS	DROPS, TEST RESULTS, ETC.
E S D	822	2	F F	THICKNESS, SURFACE STAINING, AND	HIGHTNESS	S		CHARACTERISTICS	5.10. 0, 120. 11202.0, 2.0.
							П	Limestone	
-					-		H	176.0-176.35' - yellowish gray, (5Y	-
I _							L	7/2), fine to very fine grained, mild to	_
								moderate HCl reaction, medium	
_					-		-	strong (R3), voids (1/16" or less)	1
I -					-		L	over 3-5% of rock surface (irregularly distributed), cavities along bedding	-
								planes (elongate 3/8"-3/4"), fossils	
					_		Γ	(casts/molds) rare to absent	1
-					-		⊦	176.35-176.8' - dark yellowish	1 -
-					_		L	orange, (10YR 6/6), fine grained,	-
								mild to moderate HCl reaction, weak	
1 7							Г	to medium strong (R2 to R3), voids	
-					-		F	(typically <1/16") over 10% of	-
-					_		F	surface, cavities common (up to 3/8"x3/16") irregularly distributed,	-
							1		
1 7					7			No Recovery 176.8-181.0'	1
-					-		r	Limestone	-
-					_			181.0-182.3' - dark yellowish orange,	-
								(10YR 6/6), very fine grained, mild	
1 7							Γ	HCl reaction, weak to medium strong	1
-					-		F	(R2 to R3), voids (typically 1/16" or less) over 3-5% of rock surface,	1
_					_		L	some cavities, arcuate to ovate (up	_
								to 3/4"x3/16"), fossil (casts/molds)	
					_		Γ	rare	1
-							⊢	No Recovery 182.3-186.0'	-
_					_		L	Bottom of Boring at 186.0 ft bgs on	1
								6/3/2007	
_					_		Γ		1 7
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-02	SHEET	1	OF	11	

SOIL BORING LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" and 6" tri-cone bits **ORIENTATION: Vertical** WATER LEVELS: 1.5 ft bgs on 5/18/07 START: 5/18/2007 END: 5/21/2007 LOGGER: P. De Sa'rego, R. Bitely SOIL DESCRIPTION COMMENTS STANDARD DEPTH BELOW SURFACE AND ELEVATION (#) PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND CONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION #TYPE 6"-6"-6" (N) 39.8 Water level: 1.5-5.0' 0.0 Topsoil (OL) 0.0-0.3' - grayish brown to brownish black, (5YR 3/2 to 1-3-6 SS-1 1.0 5YR 2/1), wood debris and organics (9) Poorly Graded Sand (SP) 1.5 0.3-1.0' - grayish orange, (10YR 7/4), moist, loose, nonplastic, very fine to fine grained silica sand, trace nonplastic fines, trace fine organics and roots 5_ 34.8 5.0 Wood Debris And Silty Sand (SM) 5.0-5.95' - light olive gray to yellowish gray, (5Y 5/2 to 5-6-5 0.9 SS-2 5Y 7/2), wet, medium dense, 30% nonplastic fines, (11)very fine to fine grained silica sand 6.5 10 10.0 10.3 29.8 0.3 SS-3 50/3.5 Silty Sand (SM) Ш 10.0-10.3' - dark yellowish brown, (10YR 6/6), moist, very dense, fine to coarse grained, mild to moderate (50/3.5")HCl reaction, carbonate, 48% nonplastic fines, rapid dilatancy, bottom 1" contains fine gravel-sized limestone fragments 15.0 24.8 Limestone Driller's Remark: 100% fluid loss, no 15.0-15.2' - dark yellowish orange, (10YR 6/6), mild HCl reaction, carbonate materials circulation 4-4-5 SS-4 0.8 (9) Silt With Sand (ML) 16.5 15.2-15.85' - dark yellowish orange, (10YR 6/1), wet, stiff, nonplastic, rapid dilatancy, mild to moderate HCI reaction, carbonate materials, 20-25% fine-grained silica sand



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-02	SHEET	2	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" and 6" tri-cone bits

ORIENTATION : Vertical

WATER	LEVELS	: 1.5 ft bo	s on 5/18	3/07 5	START : 5/18/2007 END : 5/21/2007 LOGGER : P. De Sa'rego, R. Bitely
				STANDARD	SOIL DESCRIPTION O COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE ACE ATIO	RECOVERY (ft)			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
EPT SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
19.8				(14)	Install 15' HW casing to seal off flow zone
-	21.0				after collecting SS-5. 20.0-21.5' SPT
-	21.0	0.0	CC E	20-50/5	Sandy Silt (ML) Water level surface
-	21.9	0.9	SS-5	(70/11")	21.0-21.9' - grayish yellow to grayish orange, (5Y 8/4 - 100
					reaction, 38% fine to coarse grained gravel-sized, HW casing to 20.0', using 3-7/8" tricone roller and AWJ rod beyond 30.0' inside HW
					casing
_					- Driller's Remark: Smooth, moderate to rapid -
-					drilling rate, intermittent light chatter
_					
25 14.8	25.0 25.4	0.3	SS-6	50/5	Silty Sand (SM)
-	20.4	0.0	00-0	(50/5")	│ \ 25.0-25.3' - grayish orange, (10YR 7/4), wet, very
-					\dense, very fine to coarse grained, mild to moderate \delta HCI reaction, 30% nonplastic fines, trace iron
-					cemented sands, carbonate materials
-					1
_					1
					1
] [
_					
30 9.8	30.0	0.4	00.7	50/4	
9.8	30.3	0.1	SS-7	50/4 (50/4") /	Silty Sand (SM) 30.0-30.1' - Same as 25.0-25.3' except grayish -
-					orange, (10YR 7/4), no iron cemented sands, coarse / _ grained silica sand, limestone fragments
-					
-					
-					- 1 -
-					†
-					
-					
35	35.0				<u> </u>
4.8				20.26.50/0	Sandy Silt (ML) 35.0-36.3' - moderate yellowish brown, (10YR 5/4),
		1.3	SS-8	29-26-50/6 (76/12)	moist to wet, mild to moderate HCl reaction, low
-	36.5				plastic, 33% very fine to medium grained sand-sized, trace fine gravel-sized limestone, carbonate materials /-
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+0_					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-02	SHEET	3	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" and 6" tri-cone bits

ORIENTATION: Vertical

WATER	LEVELS	: 1.5 ft bo	gs on 5/18	3/07 S	START : 5/18/2007 END : 5/21/2007 LC	R : P.	De Sa'rego, R. Bitely	
				STANDARD	SOIL DESCRIPTION		(J)	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH BE		RECOVE			MOISTURE CONTENT. RELATIVE DENSITY OR	,	BOLI	DRILLING FLUID LOSS, TESTS, AND
DEP SURI ELE			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYN	INSTRUMENTATION
-0.2	40.6	0.2	SS-9	50/4 \ (50/4") /	Limestone 40.0-40.2' - moderate yellowish brown, (10YR 5/4),	Γ.		_
-				(55.1)	mild HCl reaction, coarse sand-sized and fine gravel-sized	-	-	-
-					graver-3/200	<u> </u>	1	-
-						-	1	-
						-	1	
_						_	1	_
-						-	1	-
45	45.0					-	┨	-
-5.2	45.4	0.4	SS-10	50/5	Sandy Silt (ML)		Ш	
_				(50/5")	45.0-45.4' - moderate yellowish brown, (10YR 5/4), wet, low plasticity, mild HCl reaction, 44% very fine	to \int_{-1}^{2}]	
-					medium sand-sized, carbonate materials	╝.	-	-
-						-	┨	-
-						=	1	-
						-]	
-						-	4	-
-						-	┨	-
50 <u> </u>	50.0 50.3	0.3	SS-11	50/4	Limestone			Advance HW casing from 20.0-50.0' below
				(50/4")	50.0-50.3' - pale yellowish brown, (10YR 6/2), mild HCl reaction, fine gravel-sized			ground surface to prevent circulation blow - out around pit neck
_					Begin Rock Coring at 51.0 ft bgs See the next sheet for the rock core log			Begin rock coring with NQ wireline tooling from 51' below ground surface
-					and the most of the transfer to the	-	┨	from 51' below ground surface
-						-	┨	-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-02	SHEET	4	OF	11	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 1.5	ft bgs	s on 5	18/07 START: 5/18/2007 END: 5/	21/20	07 LOGGER : P. De Sa'rego, R. Bite	ely
≩Q.⊋	(%			DISCONTINUITIES	၂ဗ္	LITHOLOGY	COMMENTS
ELO E AN ON (f	ANE RY (9		RES)T	DESCRIPTION	lo Lc	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTORE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
Оνш	0⊒£ 51.0	œ	ΨА	51.05, 51.2, 51.4, 52.85, 53.3' - Fractures (5),	S	Limestone	Begin rock coring at 16:00
-			3	<10 deg, rough, undulating, no staining or infill, open <1/4"-<1/2"	\pm	- 51.0-55.8' - moderate yellowish brown, (10YR 5/4), very fine to	with NQ wireline tooling from 51.0' using water only
-				iniii, open < 1/4 -< 1/2	Н	medium grained, 51.0-53.5'	SC-1 collected at 51.85-
_			1		Ħ	extremely weak to weak rock (R0 to R2) weakest at 51.0-51.5' and	52.85' -
	R1-NQ 5 ft	69	10		H	53.3-53.5', voids <1/16" over 50-60% of surface, highly fossiliferous with	
_	96%	03		53.5-53.55' - Soil Seam 53.7, 53.8, 54.05, 54.15, 54.6, 55.15' -	F	many fossil molds/casts <1/2"	_
_			3	Fractures (6), <10 deg, rough, undulating, open <1/4"- <3/4"	Ħ	diameter, few cavities <1/2" diameter 53.5-54.5' extremely weak to very	_
55 <u> </u>				open < 1/4 - <3/4	F	weak (R0 to R1) with depth, voids <1/16" over <20% of surface, no	R1: 4 minutes
-			1		Ħ	fossils 54.5-55.8' weak to medium strong	-
-	56.0		NR.	56.15, 56.3, 56.43, 56.55, 56.7, 56.9' -	Ħ	rock (R2 to R3) , voids <1/16" over	-
-			10	Fractures (6), <10 deg, rough, undulating,	Ħ	40-50% of surface, secondary recrystallized infill over 50% of core	-
-				open <1/2"	#	zone zone 53.5-54.5' - extremely weak to very	1
			>5	57.40-57.55' - Fracture zone, rough, undulating	Ħ	weak (R0 to R1), weaker with depth,	
	R2-NQ 5 ft	50	2	58.2, 58.45, 59.65' - Mechanical break (3),	H	voids <1/16" over <20% of surface, no fossils]
_	90%	00		<10 deg, rough, undulating, tight to open <1/2"	H	54.5-55.8' weak to medium strong rock (R2 to R3), voids <1/16" over	
_			1		L	40-50% of surface, secondary	-
60 <u> </u>			. 40	_	H	recrystallized infill over 50% of core zone	R2: 3 minutes
			>10 NR	60.3-60.45' - Fracture zone, rough,	\vdash	54.5-55.8' - weak to medium strong (R2 to R3), voids <1/16" over	- 1\tau. 5 minutes
-	61.0		INIX	undulating, gravel sized fragments <3/4" diameter	H	40-50% of surface, secondary	-
-			>10	61.0-61.1' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter	+	recrystallized infill over 50% of core zone	-
-				g	H	No Recovery 55.8-56.0'	-
			0		\vdash	56.0-60.5' - pale yellowish brown to moderate yellowish brown, (10YR 6/2	SC-2 collected at 62.65-
	R3-NQ 5 ft	58	0		$oxed{\Box}$	to 10YR 5/4), strong HCl reaction,	63.65'
_	78%	00	Ů		\perp	extremely weak to medium strong (R0 to R3), fine to medium grained,	
_			4	64.05, 64.3, 64.5, 64.7' - Fractures (4), 40 deg, rough, undulating, tight, open <1/2"	П	silts increasing with depth, voids 1/16" over 40% of surface,	_
65 <u> </u>				_	口	— moderately fossiliferous with fossil	R3: 5 minutes
-	66.0		NR		仜	casts/molds <3/4" diameter, many cavities <1" diameter, 20% of	-
-	66.0			66.2, 63.25, 65.1, 65.15, 65.55' - Fractures	口	cavities with secondary recrystallized infill	
-			1	(5), <10 deg, undulating, smooth to rough,	口	No Recovery 60.5-61.0'	
				open <1/4"	口	Limestone 61.0-64.9' - dark yellowish brown to	
			0		\perp	yellowish gray, (10YR 4/2 to 5Y 7/2), very fine to medium grained,]
	R4-NQ 5 ft	85	1		上	moderate to strong HCl reaction,	
_	95%				\vdash	strong (R4) 61.1-64'. At 61.0-61.1' and 64.0-64.9' extremely weak to]
_			0		\vdash	very weak (R0 to R1), voids <1/16" over 30% of surface, trace fossil	
70 <u> </u>				_	\vdash	molds/casts <1/2, cavities with secondary recrystallized in fill up to	R4: 3 minutes —
	74.0		2		F	2" diameter; trace organics	-
-	71.0				f	No Recovery 64.9-66.0'	-
					1		

Rev. 4



PROJECT NUMBER:

33884.FL BORING NUMBER:

E-02 SHEET 5 OF 11

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 1.5	ft bgs	s on 5	18/07 START : 5/18/2007 END : 5/	D7 LOGGER : P. De Sa'rego, R. Bite	ly	
≥∩ ∷	6)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R5-NQ 5 ft 90%		10 1 >10 5 1	71.05, 71.2, 71.65, 71.7' - Fractures (4), <10 deg, rough, undulating, open <1/4"-1/2", few intersecting fractures, 71.65-71.7' 72.4, 73.05, 73.25, 73.65' - Fractures (4), <10 deg, rough, undulating, open <1/4" 73.8-73.9' - Fracture zone, rough, undulating, gravel-sized fragments, <1" diameter 74.3, 74.4, 74.55, 74.7, 74.8, 75.15' - Fractures (6), <10 deg, rough, undulating, except 74.7-70.0' deg intersecting, tight, open		Limestone 66.0-70.75' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate to strong HCl reaction, weak rock (R2) with extremely weak rock (R0) lenses <0.1' thick rock at 66.2', 67.0', 67.45', 67.65', voids <1/16" over 30% of surface, few cavities <1" diameter, poorly fossiliferous No Recovery 70.75-71.0' Limestone 71.0-75.5' - moderate yellowish brown, (10YR 5/4), very fine to	NQ wireline lowered in boring at 76.0', backhammer 5/19/07 17:15 76.0' Water level at surface
- - - - - 80	76.0 R6-NQ 5 ft 78%	63	NR >10 10 4 3	<1/4" 75.3' - Clay seam 76.4, 76.9' - Fracture (2), <10 deg, undulating, smooth to rough, tight, open <1/2" 76.9-77.15' - Fracture zone, rough, undulating, gravel-sized fragments, <1-1/2" diameter 78.45-78.5' - Fractures (3+), rough, undulating, intersecting 78.9, 79.35, 79.45' - Fractures (3), <10 deg, rough, undulating, tight, open <1/4"		medium grained, moderate to strong HCl reaction, interbedded extremely weak to very weak rock (R0 to R1), with weak to medium strong rock (R2 to R3), voids <1/16" over 0-30% of surface, variable, trace fossil molds, few cavities <1/2" diameter, trace secondary recrystallized infill No Recovery 75.5-76.0' Limestone 76.0-79.9' - moderate yellowish brown to medium light gray, (10YR 5/4 to N6), very fine to medium	05/20/07 08:00 Continue advancing HW casing from 50.0 to 65.0' 10:30 NQ tooling freed at 76.0' with HW casing at 65.0', continue rock coring from 76.0' SC-3 collected at 77.15-78.3'
-40.2 - - - - - - - 85 -45.2	81.0 R7-NQ 5 ft 96%	65	NR 10 3 4 >10	81.3-81.45' - Fracture zone (5+ intersecting), rough, undulating 82.0-82.1' - Fracture zone (3+ intersecting), rough, undulating 82.9' - Fracture, 20 deg and 50 deg, rough, undulating, tight 83.4, 83.5, 83.6, 83.65, 83.85' - Fractures, <10 deg, undulating, organic staining, smooth to rough, <1/2" organic clay infill, tight, open <1/2" 84.4-84.7' - Fracture zone, rough, undulating, gravel-sized fragments <1" diameter		grained, 76.0-78.3' medium strong to strong rock (R3-R4), void <1/16" over <10-20% of surface increasing with depth, poorly fossiliferous, no cavities, 78.3-78.45' Fat Clay (OH), dark gray (N3), high plasticity, high organic content, no HCl reaction, 78.45-79.9' weak to medium strong rock (R2-R3), fine to medium grained, voids <1/16" over <10-40% of surface, poorly fossiliferous, secondary recrystallized infill of cavities over 40% of surface, strong HCl reaction No Recovery 79.9-81.0' Limestone 81.0-85.8' - pale yellowish brown,	R6: 4 minutes
- - - - - - 90 -50.2	86.0 R8-NQ 5 ft 72%	6	6 6 >10 2 NR	85.7-85.8' - Fractures (3+), rough, undulating, open <1/2" 86.3, 86.45, 86.55, 86.6' - Fractures, 40 deg and 60 deg, rough, undulating, open <1/2" 86.8, 86.85, 87.0, 87.2, 87.4, 87.65' - Fractures, <10 deg, rough, undulating, open <1/2" 87.8, 87.95' - Fractures (2), 40 deg and 60 deg, rough, undulating, open <1/4" 88.25-88.65' - Fracture zone, rough, undulating, gravel-sized fragments, <1" diameter 88.85, 89.1, 89.4' - Fractures, 10 deg and 40 deg, rough, undulating, open <1/4"		(10YR 6/2), very fine to medium grained, weak to medium strong rock (R2 to R3) except 83.4-83.85', grayish black, (N2), extremely weak to very weak rock (R0 to R1) with interbedded organic fat clay seams and laminations, 81.0-83.4' and 83.85-85.8' voids <1/16" over 30-50% of surface, few cavities with secondary recrystallized infill, 2" diameter at 81.9 to 82.0', poorly to moderately fossiliferous with molds <1/12" diameter, trace organics, strong to moderate HCI reaction No Recovery 85.8-86.0'	- - - - - - R8: 4 minutes

APPENDIX 2BB-782 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-02	SHEET	6	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				IENT . Dietrich D-30 3/N 232, mud rotary, NQ tools, HW				ORIENTATION : Vertical
WATER	LEVELS: 1.5	ft bg	s on 5	/18/07 START : 5/18/2007 END : 5/	<u>21/20</u>	007	LOGGER: P. De Sa'rego, R. Bit	ely
	_			DISCONTINUITIES	(D		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG		DOCK TYPE COLOR	
E H	N. A. Y.	(9)	FRACTURES PER FOOT	2200 m non	익		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H H	E E	(%) Q	Ĭ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	l g		WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
문류년	SSSS	Ø	AZ H	PLANARITY, INFILLING MATERIAL AND	ΙΞ		AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	C. LE RI	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś		CHARACTERISTICS	, , , , , , , , , , , , , , , , , , , ,
				91.0-91.4' - Fracture zone, <10 deg, rough,	Ш	Г	Limestone	
I -			>10	undulating, gravel-sized fragments, no stain	╁	╁	86.0-89.6' - yellowish gray, (5Y 7/2),	
-				or infill, <1" diameter 91.65' - Fracture, <10 deg, rough, undulating,	Ľ	1	very fine to coarse grained, extremely weak to weak (R0 to R2),	-
I _			5	tight	╨	Ł	voids 1/16" over 20% of surface,	
				92.2' - Fracture, 40 deg, rough, undulating,	Н	1	poorly fossiliferous	
I -	R9-NQ			tight, open <1/4"		t	87.8-89.6' - medium gray (N5) to	1
-	5 ft	59	0	92.6, 92.85, 92.95' - Fractures (3), <10 deg,	ΉΤ	Ħ	olive gray (5Y 4/1), medium strong	1 -
l -	90%			rough, undulating, silt and/or clay sized	411		to strong rock (R3 to R4), very	1
			2	infilling, trace of silt infill at 92.6', open <1" 93.4-93.65' - elastic silt (MH) seam	Ш		fine-grained, voids 1/16" over 30-40% of surface, moderately to	
95			_	94.55, 95.1' - Fractures (2), horizontal, rough,		\prod	highly fossiliferous with many fossil	
-55.2			4	undulating, 80 deg intervals, open <1/2"	╁	H	molds <1/2" diameter, few cavities	R9: 7 minutes
-					t	₺∥	<1" diameter, moderate to strong HCI	-
I _	96.0		NR			₽I	reaction	
					Н	11	No Recovery 89.6-91.0' Limestone	
-			3	96.4, 96.5, 96.95, 97.35, 97.6, 97.7, 98.05,		†	91.0-93.4' - pale yellowish brown to	1
-				98.2, 98.4, 98.55, 98.65, 98.7, 98.8, 100.4,	╨	ŀ۱	yellowish gray, (10YR 6/2 to 5Y 7/2),	1
l -			3	100.7, 100.9, 101.05, 101.1, 101.15' - Fractures (19), <10 deg, rough, undulating,	╁╌	╁╵	very fine to fine grained, medium	
				tight, open <1/4"			strong to strong (R3 to R4), 91-93.4'	
I -	R10-NC				ш	F	and 93.65-94.5' voids <1/16" over	1
-	5 ft	52	8		╁╌	t	30% of surface, 91-92.5',92.65-93.4', 93.65-94.5' no voids, few cavities	1
-	100%					1	<1/2" diameter, poorly fossiliferous	SC-4 collected at 98.85-
<u> </u>			0		₽	Ł	Elastic Silt (MH)	100.0'
100					Н	1	93.4-93.65' - olive gray, (5Y 4/1),	
-60.2				_			medium plasticity, strong HCl	R10: 4 minutes
-			6		₩	╁	reaction	1
-	101.0				\perp	1	Limestone	1
l _			>10	101.2, 101.25, 101.3, 101.35, 101.4, 101.7,		L	94.5-95.5' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak	
			/10	101.95, 102.45, 102.5, 102.55, 102.6, 102.65,	Н	Г	to weak (R0 to R2), voids <1/16"	
-				102.7, 102.75, 103.25, 103.35, 103.4, 103.5,	I	t	over <20% of surface, moderately	1
-			10	103.65, 103.7, 103.9, 103.95, 104.0, 104.15,	╁	╊	fossiliferous with molds/casts <1/2"	-
l _				104.2, 104.3, 104.35, 104.4, 104.45, 104.5' - Bedding plane (30), <10 deg, undulating,	₽	╁	diameter	
	R11-NC		40	smooth to rough, tight, open <1/2"			No Recovery 95.5-96.0' Limestone	
-	5 ft 99%	16	10	, , , , , , , , , , , , , , , , , , , ,	1—	╀	96.0-101.0' - yellowish gray, (5Y 7/2),	1
-	33/0				++	╁	very fine to fine grained, strong HCI	1
-			>10		\Box	1	reaction, weak to very weak rock (R1	1 4
105				104.0 105.0 105.2 105.25 405.2 105.25 —	┰	L	to R2), silt zone from 96.5-96.95',	
-65.2			40	104.9, 105.0, 105.2, 105.25, 105.3, 105.35, 105.7, 105.8' - Bedding plane (11), <10 deg,		1	voids <1/16" over <20-30% of surface, moderately fossiliferous,	R11: 4 minutes
I -	106.0		10	undulating	ш	t	with fossil molds/casts <1" diameter,	1
-	106.0		NR)		+	+	no cavities	-
-			2	106.1, 106.8, 109.1, 109.25, 109.3, 109.55,		1	Limestone	1
				109.7, 109.8, 109.85, 110.3, 110.5, 110.6, 110.65, 110.85, 110.95' - Bedding plane (15),	ш	Ł	101.0-105.95' - yellowish gray, (5Y	SC F collected at 100 05
I -				<10 deg, undulating, smooth to rough, tight,	\vdash	ſ	7/2), very fine to fine grained, extremely weak to weak rock (R0 to	SC-5 collected at 106.85- 107.9'
-			0	open <1/4"		1	R2), voids <1/16" over <20% of	1
-	D40 NO				╀	╀	surface, poorly fossiliferous,	1 -
l _	R12-NG 5 ft	62	>10	108.1-108.45' - Fracture zone, rough,	一	┖	laminated, strong HCl reaction	
	100%	02	10	undulating, gravel-sized fragments, <2" diameter		1	No Recovery 105.95-106.0'	
1 -	/ -			ulametel	╨	╁		1
-			10		+	╁		1 -
110				_	\Box	1	-	Data 5 1 -
-70.2			10		\vdash	1		R12: 5 minutes
I -	111.0		10		Ш	ſ		1
	111.0				1	t		†
					1			
					1	_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-02	SHEET	7	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bgs	s on 5/	18/07 START : 5/18/2007 END : 5/	21/20	D7 LOGGER : P. De Sa'rego, R. Bite	ely
30€	CORE RUN, CORE RUN, CENGTH, AND RECOVERY (%) R Q D (%) R R D (%) RRACTURES PER FOOT			DISCONTINUITIES	Jg J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	JN, ANE RY (9		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B FACE	E RU 3TH, OVEI	(%) _Q	FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP' SUR ELE	COR LEN(REC	RQ	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				111.1-111.2' - Fracture zone, undulating,	口	Limestone	
_			>10	gravel-sized fragments <1" diameter, smooth to rough	世	 106.0-111.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong 	1
_			. 40	111.65-112.15' - Bedding plane, <10 deg,	Ъ	HCl reaction, very weak to weak (R1	1
_			>10	rough, undulating, tight 112.25, 112.5, 112.65, 112.7, 112.8' -	\vdash	 to R2), voids <1/16" over <20% of surface, moderately fossiliferous with 	1
	R13-NQ 5 ft	22	>10	Bedding plane (5), <10 deg, undulating,	F	molds <1" diameter, laminated Limestone]
	79%	22	-10	smooth to rough, tight 112.85-114.2' - Fracture zone, and bedding	二	111.0-114.95' - yellowish gray, (5Y]
			>10	plane, gravel-sized fragments <1-1/2" diameter	片	7/2), very fine to fine grained, strong HCl reaction, extremely weak to	
115_				114.8' - Bedding plane, <10 deg, smooth, —	\perp	weak (R0 to R2), laminated, voids	
-75. <u>2</u> _			NR	undulating, open <1/2"	╨	1/16" over <10% of surface, no fossils	R13: 4 minutes
_	116.0				₽	No Recovery 114.95-116.0'	
-			1	116.15, 118.5, 118.95, 120.65' - Fractures (4), <10 deg, rough, undulating, tight	尸	Limestone - 116.0-121.0' - yellowish gray, (5Y	-
_				(4), < 10 deg, 10dgH, diliddiating, tigHt	ፗ	7/2), very fine to medium grained, very weak to weak rock (R1 to R2),	
_			0		世	voids <1/16" over <10-15%	-
_	R14-NQ				士	increasing at 118.5', highly fossiliferous, few cavities <1-1/2"	-
-	5 ft	97	2		+	 diameter, strong HCl reaction 	1
_	100%				+	-	
120			0		H	-	1
-80.2				-	亡		R14: 3 minutes
-	121.0		1		世	_	1
_	121.0				世	Limestone	1
_			2	121.35, 121.5, 122.5, 122.8, 130.0' - Bedding plane (5), <10 deg, rough, undulating, tight	\vdash	 121.0-125.05' - pale yellowish brown to yellowish gray, (10YR 6/2 to 5Y 	1
			2	p.e (c), e.e.g,g, ee	╨	7/2), very fine to medium grained,	1
					$oldsymbol{\mathbb{H}}$	 very weak to weak rock (R1 to R2), voids <1/16" over <20% of surface,]
	R15-NQ 5 ft	70	0		oxdot	highly fossiliferous at 122.5-124.1', strong HCl reaction	
_	81%	70			厂	-	
_			0		上	<u>-</u>]
125 -85.2				_	士	L.,	D45: 4 minutes
-65.2			NR		\pm	No Recovery 125.05-126.0'	R15: 4 minutes
-	126.0			126.0-126.1' - Fracture zone, rough,	+	_ Limestone	-
-			2	undulating, gravel-sized fragments, tight	+	 126.0-131.0' - yellowish gray to light 	-
-				126.8' - Fracture, <10 deg, rough, undulating,	#	olive gray, (5Y 7/2 to 5Y 5/2), very fine to medium grained, strong HCl	SC-6 collected at 126.85-
-			1	open <1/2"	##	 reaction, very weak to weak (R1 to 	127.95'
-	R16-NQ			127.9, 130.3' - Fractures (2), <10 deg, rough,	廿	R2), moderately to highly fossiliferous molds <1" diameter,	-
-	5 ft 97%	93	0	undulating, tight, open <1/4"	世	 voids <1/16" over 30% of surface, trace laminated bedding 	-
-	31 /0				╀		1
130			0		\top	-	1
-90.2				_	口	_	R16: 3 minutes
	131.0		1		世	F	1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-02	SHEET	8	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bg	s on 5	/18/07 START : 5/18/2007 END : 5/	21/20	D7 LOGGER : P. De Sa'rego, R. Bite	ly
>00	6)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B	E RU GTH, OVE	(%) Q	CTUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR	R Q	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			NR/	131.1, 131.4, 131.5, 131.85, 132.3, 132.4,		Limestone	
			6	132.55, 132.6, 132.75, 132.85, 133.25, 133.55, 133.75, 133.9, 134.0, 134.3, 134.35,	ightharpoons	 131.0-135.6' - yellowish gray, (5Y 7/2), very fine to medium grained,]
l -			6	134.45, 134.5, 134.7, 134.85, 134.9, 140.15, 140.45' - Bedding plane (24), 40 deg,	Д	strong HCl reaction, extremely weak - to weak (R0 to R2), voids <1/16"	
_	5.5.10			undulating, smooth to rough, tight, open <1/2"	Ш	over <20% of surface, poorly to moderately fossiliferous with fossil	_
_	R17-NQ 5 ft	22	5		Ш	 molds, <1" diameter, few cavities 	_
-	92%					with secondary infill <2" diameter, trace laminated bedding	-
			7		\pm	- -	_
135_ -95.2			2	_		<u> </u>	R17: 4 minutes
-	136.0		NR		\vdash	_ No Recovery 135.6-136.0'	-
-	100.0			136.1, 136.4, 136.6, 137.0, 137.05, 138.5,	F	Limestone	
_			4	139.65, 139.75, 139.8, 139.85, 139.95, 140.2' - Bedding plane (12), <10 deg, rough,	H	 136.0-140.75' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very 	
			2	undulating, tight, open <1/4"	Ħ	fine to medium grained, strong HCI reaction, very weak to weak (R1 to	
				137.7, 138.25' - Fracture (2), 30 deg, rough,	Ħ	R2), 140.0-140.75' medium strong to	
_	R18-NQ 5 ft	60	2	undulating, tight, open <1/4"	L'	strong rock (R3 to R4), voids <1/16" - over <10% of surface, poorly to	_
_	95%				H	moderately fossiliferous, laminated bedding 136.1-136.6', trace	_
_			5		H	 secondary infill, 140.2-140.75' 	_
140 -100.2				_	Ł	cavities over 30% of surface (50% of which have secondary recrystallized	R18: 5 minutes
-	141.0		1		世	infill) <1-1/2" diameter	7
-	141.0		NR		L	No Recovery 140.75-141.0' Limestone	-
-			0		\perp	141.0-145.75' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very	-
_			1		\vdash	fine to medium grained, strong HCl	
			2	142.65, 142.95, 143.3, 143.5, 143.9, 145.45' -		reaction, medium strong to strong (R3 to R4), very weak rock (R1)]
_	R19-NQ 5 ft	70	3	Fractures (6), <10 deg, rough, undulating, open <1/4" to 1/2"	\perp	145.55-145.75', voids <1/16" over <20-40% of surface, many cavities	
_	95%				Щ	<1" diameter, highly fossiliferous,	_
_			10	144.15-144.25' - Fracture zone, rough, undulating, gravel-sized fragments <1/2"	Ш	trace laminated bedding, <30% cavities with secondary recrystallized	_
145_ -105.2				diameter —	口	infill	R19: 6 minutes
-	146.0		2	145.55' - Fracture, <10 deg, rough,	仜		-
-	146.0		NR	undulating, open <1"	口	No Recovery 145.75-146.0' Limestone	-
-			2	146.1, 146.2, 147.35, 149.25' - Bedding plane (4), <10 deg, rough, undulating, tight, open	仜	146.0-150.4' - yellowish gray, (5Y 7/2), fine to medium grained, strong	-
			_	<1"	口	HCl reaction, weak (R2), moderately	
			1		上	fossiliferous with molds <1/2" diameter, sandy silt (ML) lenses	SC-7 collected at 147.35- 148.55'
	R20-NQ 5 ft	80	0		\vdash	146.0-146.1' and 1/2" at 150.25']
_	88%	- 50			\vdash	- -	
_			1		F	-	_
150 -110.2			>10	_	F	<u> </u>	R20: 5 minutes
-			NR		H	No Recovery 150.4-151.0'	- TAZO. O Militateo
	151.0				Ħ		
					1		

APPENDIX 2BB-785

Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-02	SHEET	9	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				MENT . Diethon D-30 3/N 232, mud rotary, NQ tools, HW			ORIENTATION: Vertical
WATER	LEVELS : 1.5	ft bg	s on 5		21/200		
≥ ∩ ≎	(%			DISCONTINUITIES	ပ္မ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OLZE AND DEDTIL OF GAGING
ᆱ끯은	RU. H. / ÆR	(%) Q	N C	DEDTIL TYPE OPIENTATION POLICINESS	1 ⋈ 1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T A Y	Ser.	۵ (CT RFC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₩	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COF	A Q	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY.	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				150.25-150.35' - Fracture zone, rough,	Н	Limestone	
-			1	undulating, gravel-sized fragments <1"	\Box	- 151.0-155.3' - pale yellowish brown	-
I _				diameter	Н	to moderate yellowish brown, (10YR	
				151.3, 152.4, 153.2, 153.3, 153.35, 153.5,		6/2 to 10YR 5/4), very fine to medium	
-			1	153.85' - Bedding plane (7), <10 deg, undulating, rough to smooth, tight, open to	Ш	 grained, very weak to medium strong (R1 to R3), rock strength weakening 	1
-	R21-NQ	ļ		<1/4"	₽₽	with depth, 151.0-153.5' voids <1/16"	-
-	5 ft	48	5		ш	- over <10% of surface, few cavities	_
	86%				Ы	with secondary recrystallized infill,	
				154.0-155.3' - Bedding plane, rough,	\vdash	poorly to moderately fossiliferous	
455			>10	3 ,	ш	 with fossil molds <1/2" diameter, very fine to fine grained, 153.5-154.0' 	1
155 <u> </u>			>10	tight, open <1/2"	+	laminated with organics,	D21: 7 minutes
-113.2					Н	- recrystallized fine to medium grained	R21: 7 minutes
	156.0		NR		Ш	texture, 154.0-155.3' fine to medium	
1 7				156.1, 157.75, 158.0, 158.05, 158.1, 158.15,	\mathbb{H}	grained, <10% voids, no cavities,	1
-			1	158.2, 158.6, 158.7, 158.75, 158.95, 159.05,		very weak rock (R1), 151.0-153.0'	1
-				159.2, 159.35, 159.7, 159.8' - Bedding plane	ш	mild HCl reaction, 153.5-155.3' strong HCl reaction	-
			2	(16), <10 deg, undulating, rough to smooth,	Н	No Recovery 155.3-156.0'	
			-	tight, open <1/4"		Limestone	
	R22-NQ)			ш	156.0-161.0' - very pale brown to	1
-	5 ft	70	9		+ - 1	 yellowish gray, (10YR 6/2 to 5Y 7/2), fine to medium grained, extremely 	-
_	100%					weak to weak rock (R0 to R2)	_
			5		ш	weak to weak rock (10 to 12)	
160			ا		\Box	fine to medium-grained, voids <1/16"	
-120.2				_		over <10% of surface, poorly to	R22: 5 minutes
-			2	100 01 5 1 (0) 00 1 150 1	+	_ moderately fossiliferous, molds <1/2" diameter, trace secondary infill of	-
_	161.0			160.6' - Fractures (2), 20 deg and 50 deg, rough, undulating, intersecting, open <1/4"	ш	very fine-grained material,	-
			>10	161.0-164.7' - Bedding plane, <10 to 90 deg,	Н	_ 158.0-161.0' fine grained, trace	
			10	undulating, intersecting vertical fractures,		voids, poorly to moderately	
				rough to smooth	ш	fossiliferous with fossil molds <1/4"	
-			>10		+	_ diameter, trace secondary infill, strong HCl reaction	-
_						- Limestone	_
	R23-NQ 5 ft) 0	>10		ш	_ 161.0-165.9' - yellowish gray to	SC-8 collected at 163.15-
	98%	0	10		Ш	yellowish gray, (5Y 7/2 to 5Y 8/1),	164.05'
-				•	口	 fine to medium grained, extremely weak to weak (R0 to R2), trace 	1
-			>10		╀┦	voids, no cavities, trace laminate at	-
165_				164.95, 165.2, 165.55, 165.7, 165.75, 165.35, [—]	ш	— 165.4-165.5', poorly fossiliferous with	DOOL 5 minutes
-125.2			10	164.95, 165.2, 165.95, 165.7, 165.75, 165.35, 165.9' - Bedding plane (7), undulating, rough	\vdash	fossil molds <1/2" diameter, strong	R23: 5 minutes
	166.0			to smooth, tight, open <1/4"	Ш	HCl reaction, hardness strengthens]
1 7	. 30.0		NR.	166.0-166.2' - Fracture zone, undulating,	囯	 with depth, trace medium strong lenses <1/2" thick 	1
-			>10	vertical, smooth to rough, tight	+	No Recovery 165.9-166.0'	-
-				166.6, 166.65, 167.3, 167.35, 167.5, 168.15,	口	-	-
			>10	169.05, 169.2, 170.05, 170.15, 170.5, 170.35, 170.4' - Bedding plane (13), undulating, <1/4"	Ш	_	
			[10	silt and/or clay sized infilling, rough to	H]
1 7	R24-NQ	l l		smooth, tight, open <1/2"	П	-	1
-	5 ft	53	1	167.05-167.15, 167.5-167.6' - Fracture zone	₽	-	-
-	89%			(2), rough, undulating, gravel-sized fragments <1", no stain or infill	Ш	_	4
			>10	,	Д	_	
170			[10	169.4-169.7' - silt lens to extremely friable	Н]
-130.2			5	_	Ш		R24: 10 minutes
-			NR		H	_	-
<u> </u>	171.0		INIX		H	-	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-02	SHEET	10	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				IENT . Dietrich D-50 5/N 252, Midd rotary, NQ tools, HVV			ORIENTATION : Vertical
WATER	LEVELS : 1.5	ft bg	s on 5		21/20		
200	(9			DISCONTINUITIES	Ö	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱ끯힏	≥ ± H	(%	FRACTURES PER FOOT		1 9	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	#P.00	(%) □	CT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	Ιĝ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	6.5	Ø	'RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	l ×	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
- 00 ш	014	ш	ш.	, , , , , , , , , , , , , , , , , , , ,	10)		
_			0	171.2-171.3' - silt lens	一	Limestone - 166.0-170.45' - dark yellowish brown	_
						to pale yellowish brown, (10YR 4/2 to	
1 7				172.1, 172.35, 172.6, 173.15, 173.35, 173.4,	Н	10YR 6/2), very fine to fine grained,	1
-			4	173.6, 174.1' - Bedding plane (8), <10 deg,		 grains becoming more coarse with 	-
-	505.110			rough, undulating, tight, open <1/2"		depth	_
	R25-NQ 5 ft	47	10	172.75, 174.5' - Fractures (2), 50 deg and 40		166.0-169.4' very fine to fine-grained, becoming more coarse with depth,	
	86%	41	10	deg, rough, undulating, tight, open <1/4" 173.6-173.65, 173.8-173.85, 174.0-174.1'		weak to strong rock (R2 to R4)	
				silt/sand silt (ML) lenses	ш	interbedded, <1/2" thick silt/sand	1
-			10	-	+	(carbonate) at 166.65', <10% voids,	-
175						few cavities/recrystallized cavities	
-135.2					Ш	<1" diameter, gradational contact toextremely weak rock (R0) at	R25: 11 minutes
	176.0		NR	_	П	169.3-169.4' laminated,	1
	170.0			-	厂	169.3-169.7' extremely weak rock	-
-			10	176.2, 176.25, 176.4, 176.9, 176.98, 177.1,	+	 (R0) to poorly competent silts/sand 	-
_				177.3, 178.55, 178.9, 179.25, 179.4, 179.5, 179.6, 179.8' - Bedding plane, <10 deg,		(carbonate), laminated, friable, 169.7-170.45' very fine to	_
			10	rough, undulating, tight, open <1/2"	\vdash	_ fine-grained, medium strong to stong	
			10	176.7-176.8', 177.6-177.9' - silt seams	\vdash	rock (R3 to R4), trace voids, no	Ī
-	R26-NQ			-		cavities, trace fossils, moderate HCl	1
-	5 ft	16	10	178.25-178.35, 179.6-179.7' - Fracture zone	\vdash	_ reaction	-
_	84%			(2), rough, undulating, gravel-sized fragments <1" diameter		No Recovery 170.45-171.0'	_
			>10			171.0-175.3' - pale yellowish brown,	
180			- 10	179.35' - Fractures (2+), vertical, smooth, undulating, vertical, tight	\vdash	(10YR 6/2), very fine to fine grained,	Ī
-140.2			0	179.95' - Fractures (2+), <10 deg and 40 deg,		- 171.0-173.6' weak to strong rock (R2	R26:9 minutes
-			NR	rough, undulating, intersecting, open <1/2" -	₩	to R4), 1" silt (ML) lens at 171.2-171.3' - voids <1/16' over	-
_	181.0		1411	-	匸	<20% of surface, variable, poorly	-
			2		Ь	fossiliferous, moderate odor,	SC-9 collected at 181.0- 181.8' -
			-			laminated organics in silt lens,	101.0
-				181.8, 181.95, 182.1, 182.25, 182.5, 182.8, 182.9, 183.1, 183.25, 183.4, 183.8, 184.0,	Ш	moderate HCl reaction, 173.6-174.1'	1
-			>10	184.3, 184.4, 184.45' - Bedding plane (15),	H	- interbedded silt (ML) lenses, extremely weak rock (R0), strong	-
				<10 deg, rough, undulating, tight, <1/2" -		- odor, strong HCl reaction,	_
	R27-NQ	16	>10	182.05, 182.2, 182.4, 182.7, 182.85' -	Ш	174.1-175.35' - medium strong to	
	5 ft 84%	10	- 10	Fractures (5), rough, undulating, open <1/2"	\Box	strong rock (R3 to R4), <10% voids	Ī
-				- 184.1-185.0' - Fracture zone, rough,		- <1/16", few cavities with secondary	1
-			>10	undulating, gravel-sized fragments <1"	₩	recrystallized infill <1" diameter, moderate odor, moderate to strong	-
185				diameter		— HCl reaction	
-145.2			1	185.05' - Fractures, 40 deg, rough,	\vdash	No Recovery 175.3-176.0'	R27: 8 minutes
	186.0		NR	undulating, open <1/4"	Ľ	Limestone	
						176.0-180.2' - light olive gray, (5Y 5/2), very fine to fine grained,	
-				-	1	medium strong to strong except soil	-
-				-	ł	seams (R4 to R5), voids <1/16" over	-
				_	1	0-15% of surface, variable, poorly	
						fossiliferous, few cavities <1/2" diameter, moderate to strong HCl	
1 1				-	1	reaction, moderate odor,	1
-				-	1	176.7-176.8', 177.6-177.9' - sandy	-
-				-	1	silt (ML), extremely weak rock (R0)	-
				_	1	interbedded, laminated with organics, strong odor, moderate HCl reaction	
						No Recovery 180.2-181.0'	
1 7				_	1	1.0 1.000 toly 100.2-101.0	-
-				-	1	 -	-
					1		
					1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-02	SHEET	11	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bgs	on 5/	/18/07 START : 5/18/2007 EN	ND : 5/21	/200	DT LOGGER: P. De Sa'rego, R. Bit	ely
\$ D €	(%			DISCONTINUITIES		ွှ	LITHOLOGY	COMMENTS
ELO E AN ON (f	JN, ANE RY (%		RES)T	DESCRIPTION) IC FC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS PLANARITY, INFILLING MATERIAL AND	S,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR LEN REC	a Q	FRA PER	THICKNESS, SURFACE STAINING, AND TIGHTN	NESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
_						┪	Limestone 181.0-185.2' - yellowish gray to light	_
_					4	ŀ	olive gray, (5Y 7/2 to 5Y 5/2), very fine to medium grained, grains	-
-					4	ŀ	 becoming more coarse with depth, 	-
-					-	ŀ	weak to strong rock (R2 to R4), voids <1/16" over 0-30%, poorly	-
-					1	ŀ	fossiliferous 181.0-183.5', 183.5-185.2' - moderately to highly	-
-					1	ı	fossiliferous with molds <1/2" diameter, 182.95-183.4' - laminated,	
					_]		few cavities with secondary	_
_					4		recrystallized infill, 183.0-185.2', mild to moderate HCl reaction increasing	
-					-	ŀ	with depth No Recovery 185.2-186.0'	
-					-	ŀ	- Bottom of Boring at 186.0 ft bgs on	
-					-	ŀ	_ 5/21/2007	-
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PROJECT NUMBER:	BORING NUMBER:	
338884.FI	E-03	SHEET 1 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

					OTABLE SIZIONE SALE SALE SALE SALE SALE SALE SALE SAL
WATER	LEVELS	: 2.9 ft bo	ıs on 5/0.		START : 5/7/2007 END : 5/8/2007 LOGGER : N. Jarzyniecki SOIL DESCRIPTION _ COMMENTS
≩Q≆	CAMPIE	INTERVA	1 (#)	STANDARD PENETRATION	8
ON (SAIVIPLE			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
ATI B		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
42.0	0.0			()	Topsoil / Tit
-	1	1.0	SS-1	1-2-3	\0.0-0.1'
-	1,,			(5)	Silty Sand (SM) 0.1-1.0' - dusky yellowish brown to dark yellowish Begin E-03 at 11:27 05/07/2007; HW surface
-	1.5				\brown, (10YR 2/2, 10YR 4/2), moist, loose, fine \ / \text{ casing used in boring
-	1				grained, 15-20% non plastic fines, silica sand
-	1				1 1
-	-				1 1
-	1				1 1
-	1				
	l				
5 37.0	5.0				Clayey Sand (SC)
-		0.5	SS-2	1-2-2	5.0-5.5' - greenish gray, (5G 6/1), moist, very loose.
-		0.5	55-2	(4)	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
-	6.5				
-	-				-
-	-				-
-					
-					
-	-				
-	-				1 1
10 <u> </u>	10.0				Cile Mish Cond /MI
32.0				5-18-30	Silt With Sand (ML) 10.0-10.95' - pale yellowish orange, (10YR 8/6),
-		1.0	SS-3	(48)	moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, 20% very fine to medium sand, carbonate
-	11.5				\reaction, 20% very line to medium sand, carbonate
-					
-					1 1
-	1				1 1
-					1 1
-					1 1
-					1 1
15	15.0	0.1	00.4	50/0	
27.0	15.3	0.1	SS-4	50/3 (50/3")	Limestone Fragments 15.0-15.1' - grayish orange, (10YR 7/4), mild to
_					moderate HCI reaction, fragments to 1/2"
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-03	SHEET	2	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 2.9 ft bo	gs on 5/07	7/07 5	START : 5/7/2007 END : 5/8/2007 LOGGE	R : N	N. Jarzyniecki
				STANDARD	SOIL DESCRIPTION	("	COMMENTS
AND N (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOGO CHOCKE CARROLL COLLOS		DEDTIL OF CACING SETTING SATE
A BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	E	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLICLOG	INSTRUMENTATION
22.0	20.0	0.0	SS-5	(N) 50/3	No Recovery 20.0-20.3'	10.)
-				(50/3")		-	-
-						1	-
-						1	-
-						1	-
-						1	-
-						1	1
-						1	1
_						1	1
25	25.0					1	1
17.0	25.5	0.4	SS-6	50/5.5 (50/5.5")	Sandy Silt (ML)	$ lap{1}$	
_				(30/3.3)	hard, low plasticity, rapid dilatancy, mild HCI reaction,		_
_					49% fine to medium grained sand	⇃	_
-						4	_
_						-	-
_						-	-
-						┨	-
_						┨	-
-						┨	-
30 12.0	30.0	0.3	SS-7	50/5.5	Sandy Silt (ML)	\pm	
-	30.5	0.0	00 /	(50/5.5")	\30.0-30.25' - Same as 25.0-25.4'	┨	-
-						1	1
-						1	1
-						1	1
-						1	1
]	
l _							_
_						1	_
35	35.0				Lincolous Francisco	1	_
7.0	35.8	0.2	SS-8	26-50/3 (76/9")	Limestone Fragments 35.0-35.15' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, sand with limestone fragments	+] -
_				,	mild HCl reaction, sand with limestone fragments	┨	-
-						┨	-
-						1	-
-						1	-
-						1	1
-						1	1
-						1	1
40						1	1
						Τ	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-03	SHEET	3	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

START : 57/2007 SIN : 58/2007 LOGGER : N. Jarzyniecki	
SAMPLE INTERVAL (ft)	TE, ND
2.0 40.9 0.4 SS-9 50/5 (50/5")	TE, ND
2.0 40.9 0.4 SS-9 50/5 (50/5")	
2.0 40.9 0.4 SS-9 50/5 (50/5")	- - - - - - -
2.0 40.9 0.4 SS-9 50/5 (50/5")	- - - - - - -
(50/5") (40.40.4" - moderate olive brown, (5Y 4/4), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction, 49% (fine to coarse grained sand, carbonate material 45	- - - - - -
A5	- - - - - -
45.0 45.0 45.8 0.6 SS-10 42-50/3 (92/9") Sandy Silt (ML) 45.0-45.6' - Same as 40.0-40.4' except 5-10% fine gravel-sized limestone fragments 50 50.0 80.0 SS-11 50/3 No Recovery 50.0-50.3' Driller's Remark: Drill chatter	- - - - -
-3.0	- - - - -
-3.0	- - - -
-3.0	- - - -
-3.0	- - -
-3.0	- -
-3.0	-
-3.0	
45.8 0.6 SS-10 (92/9") 45.0-45.6 - Same as 40.0-40.4' except 5-10% fine gravel-sized limestone fragments 50 50.0	
45.8 (92/9) 43.4 - 3.0 43.4 except 3 10.4 except 3 10.7 illie 11.1 1	
-8.0 50.3 0.0 SS-11 50/3 No Recovery 50.0-50.3' Driller's Remark: Drill chatter	
-8.0 50.3 0.0 SS-11 50/3 No Recovery 50.0-50.3' Driller's Remark: Drill chatter	_
-8.0 50.3 0.0 SS-11 50/3 No Recovery 50.0-50.3' Driller's Remark: Drill chatter	-
-8.0 50.3 0.0 SS-11 50/3 No Recovery 50.0-50.3' Driller's Remark: Drill chatter	_
-8.0 50.3 0.0 SS-11 50/3 No Recovery 50.0-50.3' Driller's Remark: Drill chatter	-
-8.0 50.3 0.0 SS-11 50/3 No Recovery 50.0-50.3' Driller's Remark: Drill chatter	-
-8.0 50.3 0.0 SS-11 50/3 No Recovery 50.0-50.3' Driller's Remark: Drill chatter	-
-8.0 50.3 0.0 SS-11 50/3 No Recovery 50.0-50.3' Driller's Remark: Drill chatter	-
-8.0 50.3 0.0 SS-11 50/3 No Recovery 50.0-50.3' Driller's Remark: Drill chatter	-
	_
	-
	-
1 1 1 1 1 1	-
	-
	-
	_
	-
	-
	_
55 55.0	_
-13.0 55.3 0.0 SS-13 50/2 Limestone Fragments 55.0-55.05' - moderate olive brown, (5Y 4/4), mild HCI - reaction, fragments to 1/4"	_
reaction, fragments to 1/4"	
	_
	_
	-
	- -
60.1 0.1 SS-12 50/3 No Recovery 60.0-60.1'	- - -
(50/3") \one 1/2" limestone fragment / -	- - - -
Water level at 2.9' below ground sur	- - - -
17:31	- - - - - ace at
Begin Rock Coring at 60.0 ft bgs	- - - - - ace at -
Begin Rock Coring at 60.0 ft bgs See the next sheet for the rock core log	- - - - - ace at



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-03	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.9	ft bgs	s on 5	07/07 START : 5/7/2007 END : 5/8	3/200	7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SI	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OLZE AND DEDTH OF GARING
HH	P.H.A.	(%) О	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F.F.	NG CO	αD	RAC	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		R	F. F.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	Brief e, feet reserre, e.e.
-18.0	60.0 R1-NQ 1 ft	100	1		Н	Limestone - 60.0-60.7' - light olive gray, mottled	Begin rock coring at 07:47
l _	61.0 100%	100	1	60.45' - Bedding plane, 15 deg, rough, undulating	Ш	moderate olive brown, (5Y 5/2,	05/08/2007; water level at 3.9' below ground surface
			1	61.2, 63.95' - Mechanical break		mottled 5Y 4/4), very fine to fine	R1: 2 minutes
1 -			1	61.7, 62.2' - Fracture, 75 deg, rough,	Н	 grained, weak to medium strong (R2 to R3), poorly fossiliferous, voids 	1
-				undulating		<1/16", 15-25% coverage	1
-			2		Ш	 60.7-61.0' - Same as 60.0-60.7' except highly fossiliferous with casts 	1
-	R2-NQ			62.8' - Bedding plane, <5 deg, rough, undulating	Н	and molds up to 1/2"	1
-	5 ft 86%	25	3	63.0' - Bedding plane, 35 deg, rough,	ш	 61.0-65.3' - light olive gray and moderate olive brown, (5Y 5/2, 5Y 	1
-	0070			undulating, open up to 1/4" 63.15' - Bedding plane, <5 deg, smooth,	Н	4/4), fine to medium grained,	1
			3	planar	H	 moderate to strong HCl reaction, weak to medium strong (R2 to R3), 	1
65 <u> </u>			0	63.25' - Bedding plane, <5 deg, rough, —	Ħ	voids <1/16" with 10% coverage on	R2: 3 minutes
-			NR	undulating 64.25' - Bedding plane, <5 deg, rough,	H	surface, extremely weak (R0) rock at	-
-	66.0			undulating, open up to 1/4"	Н	61.2' and 63.95', medium strong (R3) at 61.8'	SC-1 collected at 66.0-
-			1	64.65' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"	H	_ No Recovery 65.3-66.0	66.9' -
-				64.8' - Fracture, 80 deg, rough, undulating,	Н	Limestone 66.0-67.8' - light olive gray, (5Y 5/2),	1 -
-			>10	open 66.9' - Bedding plane, <5 deg, rough,	F	very fine to fine grained, moderate	-
-				undulating, open up to 1/4"		HCl reaction, medium strong to strong (R3 to R4), voids <1/16" with	1
_	R3-NQ 5 ft	34	>10	67.3-67.5' - Fracture zone, up to 1-1/2" fragments, intersecting fractures	H	_ 15% coverage of surface	_
l -	84%			67.95' - Bedding plane, 30 deg, rough,	Ш	67.8-69.2' - grayish yellow to dusky yellow, (5Y 8/4, 5Y 6/4), medium	_
l _			3	undulating, open up to 1/2" 68.5' - Bedding plane, <5 deg, smooth to	ш	grained, mild HCl reaction, medium	
70			J	rough, undulating, open up to 1/4"	Н	strong (R3), porous voids <1/16" with	
-28.0			1	68.6' - Bedding plane, <5 deg, smooth to	П	— 45 to 55% coverage, trace 1/4" cavities, moderately fossiliferous	R3: 5 minutes
	71.0		NR	rough, undulating 68.85-69.15' - Fracture zone, fragments to 2",		(casts/molds)	
			0	intersecting fractures	Н	69.2-70.2' - Same as 66.0-67.8' except extremely weak to medium	
			3	69.35, 69.7, 69.95' - Fracture, vertical, rough, undulating	Ш	strong (R0 to R3)	1
-			_	70.1' - Bedding plane, <5 deg, smooth to	Ш	No Recovery 70.2-71.0' Limestone	1
1 -			5	rough, undulating, open up to 1/4" 71.1' - Fracture, 60 deg, rough, stepped to	$\vdash \vdash$	70.2-71.8' - Same as 66.0-67.8'	1
1 -	R4-NQ			undulating, open up to 1/8"	Ħ	 except trace organics 71.8-72.15' - dusky yellow, (5Y 8/4), 	1
1 -	5 ft 80%	7	>10	71.3, 71.6' - Bedding plane, 25 deg, rough, undulating, open to 1/8", 1/2" at 71.6'	Ħ	fine to medium grained, moderate to	1
-	33,3			72.1, 72.35, 72.7' - Bedding plane, <5 deg,	Ш	 strong HCl reaction, extremely weak to weak (R0 to R2), poorly to 	1
75			>10	rough to smooth, planar, along abrupt lithology change, open up to 1/8" at 72.1', no	囯	moderately competent, trace voids	1 1
-33.0				gap at 72.7	囯	— <1/16" on surface 72.15-74.15' - Same as 66.0-67.8'	R4: 10 minutes —
-	70.0		NR	72.15-72.4' - Fracture zone, 70-80 deg, multiple hairline fractures, branch-like	Н	74.15-75.0' - Same as 67.8-69.2'	-
-	76.0			appearance -	H	No Recovery 75.0-76.0' Limestone	-
-			2	72.8' - Bedding plane, 60 deg, rough to	ᄇ	76.0-80.0' - dusky yellow and	-
-				smooth, undulating 73.1-73.3' - Fracture zone, fragments to 2",	버	 yellowish gray, (5Y 6/4 and 5Y 7/2), 	-
-			1	intersecting fractures	H	mild to moderate HCl reaction, medium strong (R3), voids <1/16"	-
-	R5-NQ			73.5' - Bedding plane, 60 deg, rough to smooth, undulating	口	covering 45-55% of surface, trace	-
-	5 ft	53	1	73.7-74.2, 74.35, 74.6' - Fracture zone,	H	cavities to 1/4", moderately fossiliferous (casts and molds), trace	4
-	80%			fragments to 2", intersecting fractures, open up to 1/4" at 74.35' and 74.6'	F	_ organics	-
-			5	-	H	-	-
80					H		

Rev. 4



PROJECT NUMBER:	BORING NUMBER:				-	
338884.FL	E-03	SHEET	5	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.9	ft bgs	s on 5	/07/07 START : 5/7/2007 END : 5/	8/2007	7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES	ڻ ن	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASING
HH	RUI VER	(%) О	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
EV#	ORE ING	αD	RAC-	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	SHR	œ	F F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	· ·
-38.0			NR	74.8-74.9' - Bedding plane, 60 deg, rough to smooth, undulating, intersects high angle	Н	No Recovery 80.0-81.0'	R5: 3 minutes
l _	81.0		141	fracture, fragments to 2", predominantly 1/4"	Ш	_	
l _			2	76.4, 76.6' - Bedding plane, 20 deg, open up to 1/2" at 76.4'; up to 1/8" gap at 76.6'		Limestone - 81.0-85.7' - Same as 76.0-80.0'	
				77.1' - Bedding plane, 30 deg, open up to	Н	except yellowish gray to dusky	
-				1/2"		yellow, (5Y 7/2 to 5Y 6/4), trace	1
			1	78.6' - Bedding plane, 20 deg, tight 79.1, 79.3' - Bedding plane, 20 deg, open up		- cavities to 1"	1
-	R6-NQ			to 1/2" at 79.1'	\vdash	_	1
-	5 ft 94%	63	>10	79.6, 79.7' - Bedding plane, 20 deg, open up to 1/2"	ш	=	1
-	0.70			79.9' - Fracture, 85 deg, rough, undulating		_	
05 -			>10	81.2' - Bedding plane or mechanical break, - 40 deg, rough, undulating	Н	-	1
-43.0				81.9' - Bedding plane or mechanical break,	Ħ		SC-2 collected at 84.7- 85.7'
-			0	<5 deg, rough to smooth, undulating to planar \$2.81 Fracture 75 deg, rough, undulating			R6: 3 minutes
-	86.0		NR	82.8' - Fracture, 75 deg, rough, undulating 83.8-84.1' - Fracture zone, fragments to 1"	\mathbb{H}	No Recovery 85.7-86.0' Limestone	-
-			>10	84.75' - Fracture, 75 deg, rough, undulating,	ш	86.0-88.1' - very light gray, (N8), very	-
-				open up to 1/4" 86.4' - Bedding plane, <5 deg, smooth to	Н	fine to fine grained, mild HCl reaction, medium strong (R3), voids	-
-			>10	rough, planar, open to <1/8" gap, organic	H	- <1/16" with <2% coverage on	4
-	57.110			stain 86.6, 87.5, 88.5, 88.6' - Mechanical break		surface	-
_	R7-NQ 5 ft	58	1	86.9-87.2' - Fracture zone, fragments to 3	H	88.1-90.9' - dusky yellow, (5Y 6/4, N8), fine grained, mild to moderate	_
_	98%			1/2" 88.4' - Fracture, 80 deg, rough, undulating,	ш	 HCl reaction, medium strong (R3), 	_
l _			1	open 1/8"		mottled very light gray (N8) from	
90				89.1' - Bedding plane, 30 deg, rough, undulating —	Н	88.1-88.6', voids up to 1/16" covering 30-40% of surface, cavities up to 1/4"	
-48.0			1	90.2' - Bedding plane, 40 deg, rough,	Н	covering up to 3% of surface, trace	R7: 6 minutes
l _	91.0		ND	undulating	Ш	organics	
l _			(<u>NR</u>) 1			No Recovery 90.9-91.0' Limestone	
			'	91.7' - Fracture, 75 deg, associated with	Н	91.0-96.0' - yellowish gray, (5Y 8/1),	
				dissolution features or very extensive breaks	Ш	fine to medium grained, strong HCl reaction, weak to medium strong (R2	
			0	in softer area, open up to 2"	Ш	to R3), laminated bedding 91.0-92.5',	1
-	R8-NQ			93.1-93.35' - Fracture zone, intersecting	\square	trace voids <1/6" and cavities to 1/4", trace fossil casts	1
-	5 ft 100%	80	>10	fractures, fragments to 2"	H	_ 2250 100011 00010	1
1 -				94.0' - Fractures (2), 65 deg, rough,	Ш	-	1
95			3	undulating, open up to 1/2", organic features on fracture surface	Ш	-	1
-53.0				94.6, 95.7' - Bedding plane, <5 deg, smooth	Ш	_	R8: 10 minutes
-	06.0		1	to rough, undulating, open up to 1/2", organic features on fracture surface; no organics at	Ш	-	
-	96.0			95.7'	${\mathbb H}$	96.0-100.6' - light olive gray to	
-			3	96.2' - Fracture, 80 deg, rough, undulating,	Ħ	 yellowish gray, (5Y 5/2 to 5Y 7/2), 	-
-				open 96.7' - Bedding plane (2), 10 deg and 60 deg,	Н	fine grained, strong HCl reaction, weak to medium strong (R2 to R3),	-
-			1	rough to smooth, undulating	${\mathbb H}$	 mottled from 96.6-97.5, trace voids 	-
-	R9-NQ			97.5' - Bedding plane, <5 deg, rough to smooth, undulating	Ш	from <1/16" to 1/8", organic layers from 97.6-97.7' (black), trace fossil	-
-	5 ft	57	1	97.6-97.7' - Fracture (3), 0-10 deg, open to	Ш	- casts	-
-	92%			1/4", 1/4" organic infill 98.5' - Bedding plane (2), 10 deg and 60 deg,	\square	_	
-			0	rough to smooth, undulating	H	<u>-</u>	SC-3 collected at 99.1- 99.85'
100				99.3, 97.6, 99.85' - Mechanical break	H		
L					1		

APPENDIX 2BB-793 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-03	SHEET	6	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.9	ft bgs	s on 5/	07/07 START : 5/7/2007 END : 5/	8/200	7 LOGGER : N. Jarzyniecki	
≥∩≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH, OVEF	D (%)	TO-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Š	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Y ME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-58.0	Olk	2		THORACOO, OUT A NOT OF A NAME OF A NOT THE	S	GHARAGTERIOTIOS	R9: 7 minutes
-50.0			0		Ħ		R9. / Hilliutes
_	101.0		NR		Ł	No Recovery 100.6-101.0' Limestone	1 -
_			8	101.1' - Bedding plane, 10 deg, rough, undulating, open up to 1/8"	₽	 101.0-104.4' - yellowish gray to 	1 -
_				101.3, 101.35, 101.4, 101.5' - Bedding plane,	Т	dusky yellow, (5Y 7/2, 5Y 6/4), fine to medium grained, strong HCl	1
_			4	5-10 deg, rough, undulating, open up to 1/8" 101.6' - Bedding plane, 35 deg, rough,	Ł	reaction, very weak (R1), 1/16" voids	1
_	D40 NO			undulating	\vdash	with 10% coverage, trace cavities to 1/4", trace planar bedding of variable	1 -
_	R10-NQ 5 ft	19	4	101.8' - Fracture, 65 deg, rough, undulating 101.9' - Bedding plane, 10 deg, rough,	\vdash	 thickness, poorly to moderately 	1
_	68%			undulating, open up to 1/4"		fossiliferous, zone of circular discoloration from 103.8-104.2'	-
_			0	102.2' - Fracture (2), 60 deg and <5 deg, rough, undulating, open up to 1/8"	世	(possible leaching)	-
105 <u> </u>			ND	102.9' - Fracture (2), 60 deg and 80 deg,	╀	No Recovery 104.4-106.0'	Dato: 4 minutes
-03.0			NR	rough, undulating, open up to 1/8" 103.1' - Bedding plane, 10 deg, rough,	\perp	-	R10: 4 minutes
_	106.0			undulating, open up to 1/8"		Limentone	1
_			1	103.25, 103.5' - Bedding plane, 35 deg, rough, undulating	上	Limestone - 106.0-109.9' - yellowish gray, (5Y	1
_				103.7' - Fracture, 80 deg and vertical, rough,	╁╴	8/1), fine grained, strong HCl reaction, very weak (R1), trace voids	1
_			1	undulating, open up to 1/8" 103.9' - Bedding plane, <5 deg, rough,	F	- <1/16" on surface, laminated bedding	1
_	D44 NO			stepped 106.6' - Bedding plane, 30 deg, rough,	Ħ	-	1
_	R11-NQ 5 ft	43	>10	undulating	L	=	-
_	78%			107.8' - Bedding plane, 25 deg, rough, undulating	╀	_	1 -
_			>10	108.2-109.8' - Fracture zone, intersecting	\blacksquare	_	1 -
110 <u> </u>				fractures, fragments to 2"	仜	No Recovery 109.9-111.0	R11: 3 minutes
-00.0			NR			-	KTT. 5 minutes
_	111.0				\vdash	_ Limestone	1 -
_			1	111.3' - Bedding plane, 30 deg, rough,	H	- 111.0-116.0' - mottled yellowish gray	1 -
_				undulating, open to 1/2"	F	and yellowish gray, (5Y 7/2 and 5Y 8/1), fine to coarse grained, strong	1 -
-			0		世	 HCl reaction, very weak to weak (R1 	1 -
_	R12-NQ			112.7, 113.5' - Mechanical break	╀	to R2), voids <1/16" with 10-20% coverage, cavities to 1/4" with 5-10%	1 -
_	5 ft	88	1		\vdash	 coverage decreasing with depth, 1" 	1 -
-	100%			113.9, 114' - Bedding plane, <5 deg, rough to	匚	laminated bedding at 114.0', moderately fossiliferous	-
			1	smooth, undulating, open up to 1/4"	仜	-	-
115 <u></u> -73.0				_	\pm	—	R12: 2 minutes
-			0		+	-	
-	116.0			116.1 116.25' Redding plans <5 dog	厈	Limestone	-
-			4	116.1, 116.25' - Bedding plane, <5 deg, rough to smooth, undulating to planar, open	岸	 116.0-121.0' - yellowish gray, (5Y 	-
-				to <1/8" 116.45' - Bedding plane, 35 deg, rough,	世	8/1), fine to coarse grained, strong HCl reaction, weak to medium strong	-
-			0	undulating	╨	 (R2 to R3), laminated bedding at 	-
-	R13-NQ			116.7' - Bedding plane, <5 deg, rough, undulating to planar, open up to 1/4"	匚	116.0-116.35', voids <1/16" with 40% coverage, trace cavities to	-
-	5 ft	60	1	117.1, 118.4, 118.8, 119.7, 120.9' -	士	1/2"-1-1/2" cavity at 117.6',	
-	100%			Mechanical break 118.2' - Bedding plane, 10-15 deg, rough,	士	_ moderately fossiliferous (casts and molds)	-
400			3	undulating to planar, open up to <1/4"	+	-	-
120					Ħ		-
					1		
			_		_		-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-03	SHEET	7	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	NIE I HOD AI	ND EC	אורוע	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS : 2.9	ft bgs	s on 5	/07/07 START : 5/7/2007 END : 5/8	3/2007	Z LOGGER : N. Jarzyniecki	
				DISCONTINUITIES	(5)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TVDE COLOR	
SEL ON	N A Y	(9)	FRACTURES PER FOOT	DEGGNI HON	2	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI ATI	H H H	(%) O	LES	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	ORI	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ĭ₩	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	Ola	œ	正品		S	CHARACTERISTICS	· ·
-78.0			4	119.0-119.1' - Bedding plane, <5 deg, rough	Ш		SC-4 collected at 119.7-
1 7	121.0		1	to smooth, undulating to planar, open to <1/8" - 119.05' - Fracture, 85 deg, fracture between		-	120.55' – R13: 2 minutes
-	121.0			two bedding fractures, open up to 1/8"		_ Limestone	1015. 2 minutes
-			3	120.55' - Bedding plane, <5 deg, rough to	╀┤	- 121.0-125.95' - Same as	-
_				smooth, undulating to planar, open to <1/8"		_ 116.0-121.0' except transitions from	
			[121.3' - Fracture, 85 deg, rough, undulating,		coarse to fine grained with depth,	1
1 7			2	open to <1/8"	₩	 percentage of voids and fossils decrease with depth, laminated 	1
-	R14-NQ			deg, smooth to rough, undulating, open up to		bedding from 122.6-125.1'	-
-	5 ft	40	1	1/4"	\vdash	-	-
	99%	-		122.2' - Bedding plane, <5 deg, smooth to		_	
				rough, undulating, open to <1/8"			1
105			>10	122.4' - Fractures or mechanical break (2), 75 deg and <5 deg, rough, undulating, high	\vdash	-	1
125 <u> </u>				angle fracture intersected by bedding (partial			R14: 2 minutes
			>10	fracture), open up to 1/8"	Ш	_	1 (14. 2 Hilliutes
	126.0			123.9, 124.5' - Bedding plane, <5 deg,	\vdash		
1 7			NR)	smooth to rough, undulating, open up to 1/4" 124.6' - Fracture, 50 deg, rough, undulating,		No Recovery 125.95-126.0'	1
-			0	open to <1/4"	₩	 Limestone 126.0-130.85' - yellowish gray, (5Y]
-			—	124.65' - Bedding plane, <5 deg, smooth to		8/1), fine to medium grained, strong	-
-			1	rough, undulating, open up to 1/4"		HCl reaction, very weak to weak (R1]
				124.9-125.8' - Fracture zone, intersecting	$\vdash \vdash$	to R2), voids <1/16" with 10%	
1 7	R15-NQ			fractures, fragments to 1-1/2"		coverage, trace voids to 1/4" and	1
-	5 ft	63	2	127.3' - Bedding plane, 30 deg, rough, undulating, open up to 1/2"	╂┼┦	 voids <1/16" with 30% coverage from 127.2-128.6' and 130.0-130.85', zone 	-
-	97%			128.4, 128.65' - Mechanical break	╀┤	of slightly undular laminated bedding	-
_			4	128.85, 128.9, 129.1, 129.3' - Bedding plane,	Ш	from 128.7-129.2'	
130				<5 deg, rough to smooth, undulating, open up	\vdash		
-88.0				to 1/4"; may have associated dissolution — cavities at 128.9', 129.1', and 129.3'			R15: 3 minutes
-	404.0		1	129.5, 129.55' - Bedding plane, <5 deg,	Ш	-	1
-	131.0		NR	smooth, planar to undulating, open to <1/8"		No Recovery 130.85-131.0'	-
-			>10	130.25' - Bedding plane, 20 deg, rough to		_ Limestone	1
				smooth, undulating, open to <1/8"	Н	131.0-132.8' - yellowish gray, (5Y	
1 7				131.1' - Bedding plane, <5 deg, rough to smooth, organic stain, open up to 1/4"		 8/1), fine to medium grained, strong HCl reaction, very weak (R1), 	1
-			>10	131.2-131.4' - Fracture zone, intersecting	$\vdash \vdash$	undular bedding planes (variable	1 1
-	D46 NO			fractures, fragments to 1-1/2"	╂┼┤	 thickness 1/2" to 1-1/2"), trace voids 	-
_	R16-NQ 5 ft	0	3	131.7' - Fracture, 70 deg, rough, undulating,		to 1/16"	
	78%	-	Ĺĺ	open, piece of fracture missing, organic staining	\vdash	132.8-134.9' - yellowish gray and light olive gray, (5Y 8/1 and 5Y 5/2),	
1 7			. 40	132.0-132.7' - Fracture zone or bedding		fine to medium grained, very weak to	1
405			>10	plane, <5 deg, rough, undulating, open up to	Ш	weak (R1 to R2), up to 1/16" voids	1
135 <u> </u>				1/8" —	\vdash	— cover 5-10%, wavy laminated	R16: 2 minutes —
			NR	132.7-132.85' - Fracture zone, fragments to		bedding transitioning to planar with	1.10. 2 1111110165
	136.0			1/2"	$\vdash \vdash$	depth, trace fossils (casts) No Recovery 134.9-136.0'	
1 7				134.65' - Fracture zone or bedding plane. <5		Limestone	1
-			>10	deg, rough, undulating, open up to 1/8"	\Box	136.0-139.6' - yellowish gray, (5Y	1 1
-				134.5-134.6' - Fracture zone, fragments to	\vdash	- 7/2, 5Y 8/1), very fine to fine grained,	-
-			3	1/2" 136.0-136.4' - Fracture zone, intersecting		strong HCl reaction, trace fossil casts/molds, elongated voids to 1/2"	1 4
			Ĺĺ	fractures, fragments to 1-1/2"	\vdash	with 5-10% coverage from	
1 7	R17-NQ			136.5, 136.8, 136.9, 137.1' - Bedding plane,		136.0-137.5', voids <1/16" with 10%	1
-	5 ft	13	>10	<5 deg, rough, undulating, open up to 1/2",	ш	coverage	1 1
-	72%		\vdash	associated with dissolution		-] -
-			2	137.4' - Fracture, 65 deg, rough, undulating, open up to 1"; fossils and voids		_	
140				open up to 1 , resone una voids	Ш	No Recovery 139.6-141.0'	
							<u> </u>
-							

APPENDIX 2BB-795 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-03	SHEET	8	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

COMING	INLTHODA	ND LC	ZUIFIV	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiri	1	ORIENTATION : Vertical
WATER	LEVELS : 2.9	ft bgs	on 5	/07/07 START: 5/7/2007 END: 5/	8/2007	Z LOGGER : N. Jarzyniecki	
	_			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(0	DESCRIPTION	SYMBOLIC LOG		
O A A	조절	_	FRACTURES PER FOOT	DESCRIPTION	<u></u> 2	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ACI	SE E, A	D (%)	25	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무유의	888	αD	AC R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SS	응핔뿞	R	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
-98.0			NR	137.8' - Bedding plane, <5 deg, rough,			R17: 5 minutes
-			INIX	undulating, open up to 3/4"		_	-
1 _	141.0			138.1-138.5' - Fracture zone, fragments to	Н		_
				1-1/2"		Limestone	
1 7			>10	138.8, 139.1' - Bedding plane, <5 deg, rough, undulating, open up to 1/2", associated with	ш	- 141.0-143.5' - yellowish gray, (5Y	1
-				dissolution	Н	8/1), fine to medium grained, strong HCl reaction, very weak (R1), voids	-
			>10		Н	- <1/16" with 30% coverage, wavy	_
				undulating, open to <1/8"		bedding planes to 1/2"	
	R18-NQ			141.2-141.7' - Fracture zone or bedding	ш		
-	5 ft	15	2	plane, <10 deg, rough, undulating, open to	НП	_ 143.5-144.7' - yellowish gray, (5Y	-
_	74%			<1/2" (most <1/8")		- 8/1), very fine grained, moderate HCl	_
			1	141.75-142.2' - Fracture zone, intersecting fractures, fragments to 1/2"	Ш	reaction, medium strong to strong	
145				142.25, 142.3' - Bedding plane, <5 deg,	\mathbb{H}	(R3 to R4), voids <1/16" with 10-20%	1
-103.0				rough, planar	口	— coverage, 1/4" zone at 143.75' of	R18: 3 minutes
			NR	142.4-143.0' - Fracture zone, fragments to	ш	weak to medium strong rock (R2 to	
	146.0			1-1/2"	H	R3) with voids <1/16" covering - 30-40% of the surface and slightly	
1 7				143.1, 143.3' - Bedding plane, open to 1/4"		darker color	
-			1	143.5' - Mechanical break	ш	No Recovery 144.7-146.0'	-
_				144.1' - Fracture, 75-80 deg, rough, undulating, organic stain or mineralization,	Н	- Limestone	_
			1	open		146.0-147.0' - grayish yellow to	
			'	144.3' - Mechanical break	Ш	yellowish gray, (5Y 8/4 to 5Y 7/2),	
-	R19-NQ			146.85' - Fracture, 70 deg, rough, undulating	т	 very fine to fine grained, strong HCl reaction, strong to weak (R4 to R2), 	_
-	5 ft	58	3	147.75' - Bedding plane, <5 deg, rough,		trace organics and voids <1/16"	_
	98%			undulating	ш	147.0-147.9' - yellowish gray, light	_
			_	148.0, 148.6, 148.65, 150.8, 150.9' - Bedding plane, <5 deg, rough, undulating, 1/4" open	Н	olive gray, and grayish yellow, (5Y	
150			0	148.1, 148.5, 149.95' - Mechanical break		7/2, 5Y 5/2 and 5Y 8/4), fine grained,	1
150 <u> </u>				-	Н	strong HCl reaction, very weak to	SC-5 collected at 148.95-
100.0			2		Н	weak (R1 to R2), voids <1/16" with 10% coverage, trace organics, wavy	150.80'
	151.0					_ laminated bedding, possible cross	R19: 4 minutes
			NR.	151.0-151.35' - Fracture zone, intersecting	Ш	bedding	
-			>10	fractures, fragments to 1-1/4", some organic	\mathbf{H}	− 147.9-150.9' - grayish yellow, (5Y	-
_				staining		_ 8/1), fine to medium grained, strong	_
			2	151.6' - Bedding plane, 15-40 deg, open up to 1"	ш	HCl reaction, weak to medium strong	
				152.15, 152.45' - Bedding plane, <5 deg,	Н	(R2 to R3), voids <1/16" with 10%	
-	R20-NQ			rough, undulating, open to <1/8"	世	_ coverage, trace cavities to 1/4" No Recovery 150.9-151.0'	-
-	5 ft	37	3	153.15' - Fracture, 40-45 deg, rough,	ДЦ	Limestone	-
	97%			undulating, open <1/8" to 1/2"	Н	_ 151.0-152.15' - yellowish gray, (5Y	
1 7				153.3, 153.9, 154.9' - Bedding plane, <5 deg,		7/2), fine grained, strong HCI	1
			3	rough, planar, open to 1/4" at 154.9' 154.6' - Fracture (2), 65 deg and <5 deg,	Ш	reaction, weak to medium strong (R2	-
155_ -113.0				intersected with bedding fracture, open up to	+	to R3), trace voids <1/16", poorly	P20: 2 minutes
-113.0			1	1/8"	\Box	fossiliferous - 152.15-155.85' - Same as	R20: 2 minutes
	156.0		ND	1EE 01 Bodding plans of document	Ш	151.0-152.15' except yellowish gray	
			NR.	155.8' - Bedding plane, <5 deg, rough, undulating, open to <1/8"	\mathbb{H}	to dusky yellow, (5Ý 7/2 to 5Y 6/4),	1
-			2	156.15' - Bedding plane, <5 deg, smooth to	Ш	- weak (R2)	-
-				rough, planar to undulating, trace organics,	ш	No Recovery 155.85-156.0	-
			\10	open to <1/4"	Н	Limestone 156.0-160.4' - yellowish gray to	
]			>10	130.7 - Bedding plane, 10 deg, 10dgin,		mottled yellowish gray, and dusky	1
-	R21-NQ			undulating, open up to 1"	╁┼	yellow, (5Y 7/2 to mottled 5Y 6/4 and	-
-	5 ft	23	>10	157.1' - Bedding plane, <5-35 deg, rough, undulating, open up to 1"	H	 5Y 6/2), fine to medium grained, 	-
	88%			157.2' - Bedding plane, 35 deg, rough,	П	strong HCl reaction, medium strong	
				undulating, open up to 1/8"	H	(R3), trace voids, trace fossils (casts)	
460			4	· · · · ·	H	_	
160				_	Ħ		 -
ldot							

APPENDIX 2BB-796 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-03	SHEET	9	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.9	ft bas	s on 5	/07/07 START : 5/7/2007 END : 5/	8/2007	7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIO	RUI TH,	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	JOLK	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FRH	ORE	Ø	RAC ER F	PLANARITÝ, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-118.0	OIR	22			S	O IAI AO TENIO 1100	Driller's Remark: 100%
-116.0			>10	157.35' - Bedding plane, <5 deg, rough, undulating, open up to 1/8"	H	No Recovery 160.4-161.0'	loss of circulation at 159.5'
-	161.0		NR	157.45-157.7' - Fracture zone, intersecting	Н		R21: 3 minutes
_			4	fractures, fragments to 1" 157.8, 157.9, 158.5' - Bedding plane, <5 deg,	Ш	Limestone - 161.0-162.6' - yellowish gray, (5Y	_
_				rough, undulating, open up to 1/8"	П	7/2), fine grained, moderate to strong	_
_			3	158.6-158.8' - Fracture zone, intersecting fractures, fragments to 1-1/2"	Ш	HCI reaction, medium strong (R3), <1/16" voids with 5-10% coverage,	_
_				158.9, 159.05, 159.15, 159.3' - Bedding	Н	trace cavities to 1/4", poorly	_
_	R22-NQ 5 ft	28	8	plane, <5 deg, rough, undulating, open 1/8-1/4"	Н	fossiliferous - 162.6-165.25' - alternating dusky	_
_	85%			159.6' - Bedding plane, 10-30 deg, rough,	Ш	yellow to light olive gray, (5Y 6/4 to	<u> </u>
_			5	undulating, open up to 1/8" 160.05' - Bedding plane, 35 deg, rough,	Н	5Y 5/2), medium to very fine grained, strong to moderate HCl reaction,	<u> </u>
165				undulating, open up to 1/8"	Ш	15-20% coverage of voids <1/16"	
-123.0			>10	160.1-160.2' - Fracture zone 161.05, 161.5, 161.6' - Bedding plane, <5	口	and fossiliferous in dusky yellow zones; trace voids <1/16" and no	R22: 3 minutes
l _	166.0		NR	deg, rough, undulating, open up to 1/4" 161.75' - Bedding plane, <5 deg, rough,		visible fossils in light olive gray zones	_
l _			1	undulating, open up to 1"	Н	No Recovery 165.25-166.0' Limestone	<u> </u>
_				162.6' - Bedding plane, <5 deg, rough, undulating, open to <1/8"	H	166.0-170.6' - light olive gray and dusky yellow, (5Y 5/2 and 5Y 6/4),	SC-6 collected at 166.0-
_			2	162.8, 162.9' - Bedding plane, <5 deg, rough,	Ш	fine to medium grained, moderate	166.85'
_			_	planar, open up to 1/4" 163.1' - Fracture, 60 deg, rough, undulating,	Н	HCl reaction, medium strong to]
_	R23-NQ 5 ft	29	>10	open to 1/8"	Ш	strong (R3 to R4), voids to 1/16" with 30-40% coverage and cavities up to]
l _	92%	23	- 10	163.3, 163.4' - Bedding plane, <5 deg, rough,	ш	1/4"x1/2", color transitions to	
l _			4	undulating, open up to 1/4" 163.45' - Fracture, 85 deg, rough to smooth,	Н	moderate yellowish brown (10YR 5/4) at 169.7' with interbeds of light	
170_			+	planar to undulating, intersects bedding plane	Н	olive gray material up to 2"	
-128.0			1	fracture — 163.55, 163.6, 163.65' - Bedding plane, <5	H	_	R23: 3 minutes
_	171.0		NR	deg, rough, undulating, open up to 1/4" 163.9' - Bedding plane, horizontal and 35		No Recovery 170.6-171.0'	
_			4	deg, open		Limestone - 171.0-174.3' - Same as 166.0-170.6'	
_			7	164.3, 164.4, 164.6, 164.75, 164.8' - Bedding plane, <5 deg, rough, undulating, open up to	Н	except light olive gray to dusky	
			>10	1/4"	Щ	yellow, (5Y 5/2 to 5Y 6/4)	
			- 10	165.0-165.2' - Fracture zone, fragments to 1", most to 1/4", intersecting fractures	Щ	_	
	R24-NQ	33	>10	166.85, 167.4, 167.5' - Bedding plane, <15	Н		1
	5 ft 66%	JJ		deg, rough, undulating, open to 1/8" 168.0' - Fracture, 75 deg, rough, undulating,	F		1
			1	open up to 1/8"	片	- No Recovery 174.3-176.0'	1
175				168.25, 168.35, 168.5' - Bedding plane, <15 deg, rough, undulating, open up to 1/8" —	Щ		1
-133.0			NR	168.7, 168.85' - Bedding plane, <5 deg,	Н	_	R24: 4 minutes
_	176.0			rough, undulating, open to 1/8" 169.1, 169.7, 169.75' - Bedding plane, <5	Ш		1
			2	deg, smooth to rough, planar, open to 1/8"	Ш	Limestone	1
_			3	169.85, 170.35' - Fracture, 55-60 deg, rough, undulating, open to 1/2"	Н	 176.0-177.3' - yellowish gray, (5Y 8/1), very fine to medium grained,]
-			_	171.2, 171.45, 171.55, 171.95' - Bedding	Ħ	moderate to strong HCl reaction,	1
_			3	plane, <5 deg, rough to smooth, planar, open up to 1/4", open to 1/2" at 171.95	H	 medium strong to strong (R3 to R4), moderately fossiliferous (casts, trace 	1
	R25-NQ			172.8-178.4 - Fracture zone, intersecting	Ш	molds), voids <1/16" with 10%	1
-	5 ft 95%	18	3	fractures, fragments to 1-1/2" 173.5, 174.05' - Bedding plane, <5 deg,	\mathbb{H}	 coverage, cavities to 1/4" with 5% coverage 	1
-				rough to smooth, planar, open up to 1/4",	Ш	3 -	1
180			6	gray staining at 173.5'	Ш	-	1
					П		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-03	SHEET	10	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.9	ft bgs	s on 5/	/07/07 START : 5/7/2007 END : 5/	3/200	07	LOGGER : N. Jarzyniecki	
				DISCONTINUITIES			LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,_	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	D (%)	TUR 100-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥME		AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-138.0	0716	22	шп	176.35, 176.5, 176.8, 177.3' - Bedding plane,	S		177.3-178.3' - yellowish gray to	R25: 4 minutes
-			5	<10 deg, rough, undulating, open to <1/8",	Ħ	⊢	dusky yellow, (5Y 8/4 to 5Y 6/4), fine	1\20. 4 minutes
-	181.0		NR	organic stains or thin laminae at 177.3' 177.5' - Bedding plane, <5 deg, rough, planar	L		o medium grained, moderate HCl eaction, medium strong to weak (R3	-
-			4	to undulating, open to <1/8"	⊬	- - t	o R2), voids to 1/8" with 10-20%	-
_				177.7' - Bedding plane, 35 deg, rough, undulating, open to <1/2"			coverage increasing with depth 178.3-180.75' - Same as	-
_			>10	178.15, 178.5' - Mechanical break	口]- 1	176.0-177.3' except poorly	-
-	R26-NQ			178.65, 178.75, 178.9,179.0, 179.15, 179.3, 179.5' - Bedding plane, <5 deg, rough, planar	仜		ossiliferous and trace voids <1/16", aminated bedding	-
-	5 ft	20	>10	to undulating, open to <1/8"	╁┌	- Ի	No Recovery 180.75-181.0'	-
-	85%			179.75' - Bedding plane, <5 deg, rough, planar to undulating, open to 1/8"	F		_imestone 181.0-182.5' - Same as 177.3-178.3'	-
			4	179.8, 180.2, 180.3' - Bedding plane, <5 deg,	Ë		except mild to moderate HCl reaction	-
185 <u> </u>			1	rough, planar to undulating, open to <1/8" 180.1' - Fracture, 60 deg, rough, undulating	Ħ	_	182.5-185.25' - alternating yellowish gray, (alternating 5Y 8/1 and 5Y 7/2),	R26: 3 minutes
-			NR	180.4' - Fracture, 85-90 deg, rough, undulating	L		very fine to medium grained, strong o moderate HCl reaction, strong to	-
-	186.0			☐ 180.65' - Bedding plane, <5 deg, rough, ☐	\vdash	†∖r	medium strong (R4 to R3),	
-				stepped, open up to 1/4" 181.2, 181.5, 181.7, 181.9' - Bedding plane,	ł		alternating beds, trace voids <1/16" and cavities to 1", voids <1/16" with	-
-				<10 deg, stain on some fracture planes, open	ł		20-30% coverage, cavities to 1/4"	-
-				up to 1/8" 182.3' - Bedding plane, 15 deg, organic stain,	ł		with 10% coverage, 1/16" laminated bedding only visible in finer grained	-
-				open to <1/8"	1	- \t	peds	-
-				182.5' - Bedding plane, <10 deg, open to 1/8" 182.85-183.0' - Fracture zone, fragments to	1		No Recovery 185.25-186.0' Bottom of Boring at 186.0 ft bgs on	-
-				1", intersecting fractures	1		5/8/2007	1
-				183.1' - Bedding plane, 15 deg, organic stain, open to <1/8"	t	F		-
-				183.4-183.5' - Fracture zone, fragments to 1", intersecting fractures	1	\vdash		-
-				183.6, 183.9, 184.2, 184.8, 184.4, 185.0,	1	F		-
-				185.2' - Bedding plane, <10 deg, open to 1/8" 183.65, 184.25' - Fracture, 55-60 deg, rough,	1	F		-
-				undulating, open to <1/8"	1	F		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	1	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 5.5 ft bo	s on 5/03	3/07	START : 5/2/2007 END : 5/3/2007 LOGGER : M. Faurote, N. Jarzyniecki	
300				STANDARD	SOIL DESCRIPTION g COMMENTS	
AND (f	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, $\begin{array}{ c c c c c c c c c c c c c c c c c c c$	
H BE ATIC		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR BEFTH OF CASING, BRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
43.1	0.0				Topsoil	
-]	1.4	SS-1	1-2-2 (4)	\[\text{\ 0.0-0.3'} \] \[\text{Poorly Graded Sand With Organics (SP)} \] \[\text{\ John water level - start hole Cathead operator: Paul Buchler} \]	
	1.5			(' /	0.3-1.4' - medium light gray grading to medium gray and greenish black, (N6 to N5 and 5GY 2/1), moist,	
-					\very loose, fine grained, 20-25% organic fines,	-
-					\decreasing with depth, sand is silica	-
-						-
-	_					-
-					1 1	-
5	5.0				1 1	-
38.1	0.0				Clayey Sand (SC)	
		1.0	SS-2	1-2-2 (4)	5.0-5.35' - light greenish gray, (5GY 8/1), wet, very loose, very fine to fine grained, 35% low to medium	
_	6.5				\plasticity fines, sand is silica Silty Sand (SM)	_
_	-				5.35-6.0' - gravish orange, (10YR 7/4), wet, very	_
-					loose, very fine to fine grained, 25% nonplastic fines, sand is silica	-
-					- 1	-
-	-				<u> </u>	-
-	-				1 1	-
10	10.0				1 1	_
33.1				22-40-50/5	Silt With Sand (ML) 10.0-11.2' - dark yellowish orange, (10YR 6/6), moist,	
_		1.2	SS-3	(90/11")	hard, nonplastic, rapid dilatancy, mild HCl reaction,	-
-	11.4				16% of sand-sized, carbonate material	_
-						_
-	_				- 1	_
-					- 1	-
-	-				1 1	-
-					1 1	-
15_	15.0				1	
28.1	45.0	0.7	SS-4	40-50/4 (90/10")	Silt With Sand (ML) 15.0-15.7' - grayish orange, (10YR 7/4), wet, hard,	
-	15.8			(80/10/)	── nonplastic, rapid dilatancy, mild to moderate HCl	-
-					\reaction, 15% fine to medium sand-sized, carbonate \ - \ \rmaterial	-
-	-					-
-	-				1 1	-
-	-				1 1	-
-	-				1 1	-
-	1				1 1	_
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	2	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 5.5 ft b	gs on 5/03	3/07	START : 5/2/2007 END : 5/3/2007 LOGGER : M. Faurote, N. Jarzyniecki
300				STANDARD	SOIL DESCRIPTION g COMMENTS
AND SN (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
H BE ATIC		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
23.1	20.0	0.1	SS-5	50/2	Limestone Fragments
-	1			(50/2")	\ 20.0-20.1' - grayish orange, (10YR 7/4), mild HCl reaction, coarse sand-sized fragments, very poor
					recovery
]
_					.
-					-
-					
-					
-	05.0				-
25 <u> </u>	25.0				Silty Sand (SM)
-	1	1.0	SS-6	13-20-25	25.0-26.0' - grayish orange, (10YR 7/4), wet, dense, fine to coarse grained, mild HCl reaction, 30%
-	26.5			(45)	↑ nonplastic fines, 13% gravel-sized limestone
-					fragments with many fossil molds/casts, all carbonate -
_					
_					.
-					-
-					
30 <u> </u>	30.0				Sandy Silt (ML)
-		1.1	SS-7	5-17-14	30.0-31.1' - dusky yellow, (5Y 6/4), wet, hard, fine to
-	31.5	'''		(31)	coarse grained, fine% gravel, nonplastic, rapid dilatancy, mild HCl reaction, 30% fine to coarse
-	01.0				\sand-sized, 10% fine gravel-sized limestone \
-	1				
]
_					」
-					- .
-					
35 8.1	35.0 35.3	0.3	SS-8	50/4	Limestone Fragments
-		0.0	300	(50/4")	Limestone Fragments 35.0-35.3' - moderate yellowish brown, (10YR 5/4),
-	-				\mild to moderate HCl reaction, coarse sand to fine \displays gravel sized fragments, poor recovery
-	1				-
-	1				1
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	3	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	WATER LEVELS : 5.5 ft bgs on 5/03/07										
				STANDARD	SOIL DESCRIPTION			COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	OOU NAME HOOG COOLED OVER DOLLARS		SYMBOLIC LOG	DEDTILOS OLONO CONTINO CATE			
4 BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOI MOISTURE CONTENT, RELATIVE DENSITY (R, OR	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND			
LEV.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALO	OGY	SYME	INSTRUMENTATION			
3.1	40.8	0.1	SS-9	50/4	│ Limestone Fragments	Γ	, , , , , , , , , , , , , , , , , , ,	Very hard rock, a lot of bit chatter - if			
-				(50/4")	\daggedus 40.0-41.0' - pale olive, (10Y 6/2), mild HCl react	tion, /-	t	continues will start coring at 45.0'			
-					poor recovery		1	-			
-						-	1	-			
-						_	1	_			
						_					
_						_		_			
_						_		_			
_						_		_			
45 -1.9	45.0			00.50/4	Silty Sand With Limestone (SM)		11111	Continue drilling soils based on drillers log of			
"-	45.8	0.6	SS-10	30-50/4 (80/10")	45.0-45.6' - light olive, (10Y 5/4), wet, very dens	se, fine		nearby boring GSC-6 where they went -			
-					to coarse grained, mild HCl reaction, 40% low p fines, 15% fine gravel-sized, carbonate material	olastic / _ I	ł	through a tough rock layer, then about 5.0' of sand from about 48.0-53.0', the driller wants			
-							ł	to make sure they case deep enough at the - start of the hole			
-						-	t	start of the noie			
-						-	1	-			
_						-	1	_			
_						_		_			
						_					
50	50.0										
-6.9	50.4	0.3	SS-11	50/5 (50/5")	Silty Gravel With Sand (GM) 50.0-50.3' - moderate olive brown, (5Y 4/4), wet	t. verv /-		_			
-					dense, fine to coarse grained, mild HCl reaction low plastic fines, 38% fine to coarse sand, carbo	i, 22%	1	-			
_					material	onate -	ł	-			
-						-	ł	-			
-						-	\mathbf{I}	-			
-						-	ł	-			
-						-	ı	-			
-						-	1	-			
55	55.0					-	1	-			
-11.9					Silty Sand With Limestone (SM)		Ш				
		1.4	SS-12	22-35-35 (70)	55.0-56.4' - moderate olive brown, (5Y 4/4), wet dense, fine to coarse grained, mild HCl reaction	i, very – i,]			
	56.5			(. 0)	20-25% low plastic fines, 20% fine to coarse gravel-sized, carbonate materials						
_					(3.2.3.5.2.2.4, 52.25.1.2.6 materials			_			
_						_		_			
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-						-	$\left\{ \ \ \right\}$	-			
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	4	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER LEVELS: 5.5 ft bgs on 5/03/07					START : 5/2/2007 END : 5/3/2007 LOGGER : M. Faurote, N. Jarzyniecki
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
HE HE		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
				(N)	I I
-16.9	60.0			33-42-50/5	Silty Sand With Gravel (SM) 60.0-61.3' - moderate olive brown, (5Y 4/4), moist,
l _]	1.3	SS-13	(92/11")	very dense, fine to coarse grained, rapid dilatancy.
l _	61.4				mild to moderate HCl reaction, 40% nonplastic fines, 17% gravel-sized limestone fragments
l _]				Begin Rock Coring at 61.5 ft bgs See the next sheet for the rock core log
l _					See the next sheet for the rock core log
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65	1				1
-21.9	1				-
-	1				1
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-					1
-					1
-	1				1
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70	1				1
-26.9	1				
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	5	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION · Vertical

CORING	METHOD A	ND E	QUIPN	MENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS : 5.5	ft ba	s on 5	/03/07 START : 5/2/2007 END : 5/	3/2007	LOGGER : M. Faurote, N. Jarzyr	niecki
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - 65	61.5 R1-NQ 4.5 ft 89%	63	3 2 1 3	61.6' - Fracture, rough, undulating 61.95' - Mechanical break 62.3' - Mechanical break 62.5' - Fracture, rough, undulating, along solution cavity 62.85' - Bedding plane, possible separation 63.9' - Mechanical break		Limestone 61.5-65.5' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, weak (R2), 30% void space typically related to fossil casts, trace stringers and lenses of black organic material from 61.5', moderate HCl reaction where pulverized, solution cavities to 1-1/2"x3/8", organic lenses, partings and blebs disseminated through the	16:05 Began inserting new bit and reamer to 61.5' Driller's Remark: Reamed the borehole to 61.5' below ground surface 5/2/07 at 16:23, Commence coring First core run is 4.5' long to get even run at 66.0'
-21.9 - - -	66.0		NR 1	65.1' - Mechanical break or fracture, along solution cavity 65.25' - Mechanical break or fracture, along solution cavity		R1: 2 minutes -	
- - - -	R2-NQ 5 ft 98%	90	1 0	66.5' - Mechanical break 67.25' - Mechanical break 67.95' - Fracture, smooth, planar, at contact with finer grained segment		 66.0-67.8' - Same as 61.5-65.5' 67.8-68.0' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), limestone is composed of silt sized particles with trace organic 	- - - -
70 -26.9 - - -	71.0		1 (NR) 2	69.55' - Fracture, 65 deg, rough, irregular 70.0' - Mechanical break 70.6' - Mechanical break or fracture, very rough, irregular 71.5' - Fracture, smooth, undulating, some		pieces 68.0-69.6' - light olive gray, (5Y 5/2), fine to medium grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), 40% open voids that are fossil casts of forams and some possible pelecypods, thin	R2: 4 minutes -
- - - 75_ -31.9	R3-NQ 5 ft 98%	78	1 2	fines buildup from drilling 71.95' - Mechanical break 73.0' - Fracture, smooth, undulating, soft thin gouge zone and gently undulant surface near contact 73.5' - Fracture, appears shattered, angular faces 74.3' - Mechanical break 74.95' - Fracture, appears shattered at		stringers of carbon or organic black material between 68.0' and 68.3' 69.6-70.45' - Same as 67.8-68.0' except laminar bedding 70.45-70.9' - Same as 68.0-69.6' No Recovery 70.9-71.0' Limestone 71.0-72.9' - moderate olive brown, (5Y 4/4), fine grained, mild HCl reaction, very weak to weak (R1 to R2), except 72.3-72.9' zone medium	
- - - - - - 80	76.0 	50	4 NR 1 4 >10	may have been broken during drilling 79.0' - Fracture, 40 deg, 1" thick where there is a parallel fracture, these have been broken then another fractured piece to 79.4, the		strong to strong (R3 to R4), voids to 1/16" covering 20% of surface, fossiliferous (casts) 72.9-73.5' - light brown, (5Y 6/4), fine to medium grained, mild HCl reaction, very weak (R1), bedding planes irregular, with varying angles and gently crenelated, the angle increases with depth, small stress fractures between and through the planes, which are laminar to thin bedded 73.5-75.0' - moderate yellowish brown, (10YR 5/4), fine to medium	- - - - -
-36.9 - - -	81.0		NR	remainder of the rock is unbroken		grained, mild to very mild HCI reaction, medium strong (R3), 12-15% voids (fossil casts), trace laminar bedding, trace organics	R4: 7 minutes Driller's Remark: Lost circulation at 80.0-80.3'



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	6	OF	12	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 5.5	ft bg	s on 5	03/07 START: 5/2/2007 END: 5/	3/200	LOGGER : M. Faurote, N. Jarzyn	iecki
≥∩≘	(%)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	Olk	Ľ.	>10	81-81.7' - Fracture zone, rock fragments from 1/4'-1/2", no visible orientation, angular to subangular fragments 81.9' - Fracture, undulating, generally		75.0-75.75' - Same as 72.9-73.5' - except trace organics 75.75-77.6' - light brown, (5Y 6/4), fine grained, weak to medium strong	-
-	R5-NQ 5 ft 84%	27	5	horizontal, irregular 82.2' - Bedding plane, <5 deg, open 82.6-83.0' - Fractures, 0-90 deg, open, fragments vary in shape and size 83.0-83.5' - Fractures, 0-90 deg, open,		(R2 to R3), 15-30% void space (fossil casts), mild HCl reaction unless pulverized 77.6-79.65' - light olive gray with pale olive alteration bands, (5Y 5/2 with	-
85 -41.9			>5 1 NR	fragments vary in shape and size 85.7' - Fracture, fracture from 85.7-85.9' does — not extend across the core		10Y 6/2), very fine to medium grained, moderate to strong HCl reaction, strong (R4) No Recovery 79.65-81.0'	R5: 4 minutes
- -	86.0		0	86.5-86.9' - Fracture zone, fragments <1" x 1" average at 1/2" x 1/2"		Limestone 81.0-82.2' - light bluish gray grading to light olive gray, (5B 7/1 to 5Y 6/1), very fine to fine grained, mild HCl reaction, strong to very strong (R4 to	End of drilling for the day, 5/2/07 at 86' - Resume drilling on 5/3/07 Water level 5.5' below
- -	R6-NQ 5 ft 86%	63	0	87.75' - Fracture or bedding plane, 0-20 deg, rough, undulating, 1" open, 88.3' - Mechanical break 88.5' - Mechanical break		R5), delayed reaction to HCl, voids <1/16" over 20% of surface, trace cavities to 1/8", trace organics, poorly fossiliferous 82.2-83.1' - yellowish gray to dusky	ground surface on 5/3/07 - - -
90 -46.9			>10	89.35' - Fracture, 80 deg, rough, undulating, 1/8" open 89.7-90.15' - Fracture zone, intersecting fractures, up to 1" x 1/2" fragments, some silt		yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), voids to 1/16" 5% coverage, trace organics	R6: 6 minutes
-	91.0		NR 0	with organics from 89.7-89.8' 91.85' - Mechanical break		83.1-85.2' - dusky yellow transitioning to yellowish gray, (5Y 6/4 to 5Y 8/1), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), voids <1/16" 30-40% coverage	Possible start of breccia zone at 89.7-90.5' – –
- - - - 95	R7-NQ 5 ft 96%	67	3 2	92.6-93.05' - Fracture zone, with some clay infill 93.4, 93.75' - Fracture or bedding plane (2), horizontal, rough, undulating, 5% organics on bottom surface of fracture, up to 1/4" open 93.6' - Fracture, 80 deg, rough, undulating, organics on 5% of fracture		No Recovery 85.2-86.0' Limestone 86.0-90.3' - Same as 83.1-85.2' - except moderately fossiliferous, with 5-10% coverage of cavities to 1/2" No Recovery 90.3-91.0' - Limestone 91.0-93.5' - yellowish gray and light	- - - -
-51.9 - - -	96.0		0 NR 1	94.2' - Mechanical break 94.45' - Fracture, 5 deg, smooth, planar, tight, slight organics on fracture surface (5-10%) 94.9' - Bedding plane, 5 deg, rough,		olive gray, (ŚY 7/2 and 5Ý 8/1), fine to medium grained, mild to moderate HCI reaction, medium strong (R3), voids <1/16" 25-35% of surface, trace cavities to 1/2", trace organics	R7: 5 minutes
- -	R8-NQ		3	undulating, organic staining, open 2", clay infill with limestone fragments 95.25' - Mechanical break 96.3' - Mechanical break 96.8' - Fracture, 5 deg, organic staining,		93.5-95.8' - yellowish gray, (5Y 8/1), very fine to fine grained, moderate HCI reaction, voids <1/16" predominately from 93.8-94.1', 10-20% of surface, <1% cavities to	- - -
- - 100	5 ft 98%	83	0	bedding plane fracture, open 3", infill fines 97.0, 97.05' - Bedding plane (2), smooth, undulating, organics (5-10%) of surface of fracture, up to 1/8" open 97.8' - Fracture, 80 deg, rough, undulating,		1/2", trace fossil casts No Recovery 95.8-96.0' Limestone 96.0-100.9' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl	- - -
-56.9 -	101.0		0 (NR)	organic staining 98.5' - Mechanical break 99.1' - Mechanical break 100.2' - Mechanical break		reaction, weak to medium strong (R2 to R3), 10-20% voids (<1/16") over surface, trace cavities up to 1/2", moderately fossiliferous (casts/molds)	R8: 9 minutes -
						,	

APPENDIX 2BB-804 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-04	SHEET	7	OF	12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				VICENT : Dietrich D-30 3/N 232, Midd Totally, NQ tools, HW		-	ORIENTATION : Vertical
WATER	LEVELS : 5.5	πpg	s on 5		3/200		
₹9 €	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	8	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	RY. RY.		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE	J.H. H.H.	(%) Q	128	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FR	ORE ING	ØΒ	SAC ER F	PLANARITÝ, INFILLING MATERIAL AND	J ₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	C. L.E. R.E.	ď		THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
			3	101.2' - Fracture, 5 deg, rough, undulating,	Ш	No Recovery 100.9-101.0'	
-				bedding plane fracture, up to 1/8" open 101.7, 101.9' - Mechanical break (2), high	Ш	 Limestone 101.0-106.0' - yellowish gray, (5Y 	1 1
-			0	angle, tight	\vdash	8/1), very fine to fine grained, strong	1 1
-	R9-NQ				Н	 to very strong HCl reaction, very 	
_	5 ft	85	1	103.25, 103.5, 104.45' - Mechanical break (3)	Ш	weak to weak (R1 to R2), voids <1/16" 5-10%, trace cavities to 1/4",	1
_	100%				Н	- moderately fossiliferous	SC-1 collected at 103.5- 104.45' -
						(casts/molds), <1% oval to circular,	104.40
105			0		ш	calcite filled voids	1
-61.9				-	ш	_	R9: 4 minutes
-			>5	105.5' - Fractures or mechanical break,	Н	-	1
-	106.0			multiple fractures intersecting	ш	100 0 111 01 000 101 0 100 01	-
_			3	106.1' - Fracture, 5 deg, smooth, undulating,	Щ	106.0-111.0' - Same as 101.0-106.0' - except yellowish gray, (5Y 8/1 to 5Y	_
				bedding plane fracture, up to 1/4" open 106.25' - Fracture, 5 deg, smooth, undulating,		7/2), trace planar bedding of variable	
				bedding plane fracture, up to 1/2" open	\vdash	widths, trace cavities to 1"	1
-			1	106.5' - Fracture, 10 deg, smooth, undulating,	Ш	-	1
-	R10-NC			bedding plane fracture, up to 1/4" open	ш	-	1
_	5 ft	68	1	107.4' - Mechanical break	Н	-	-
	100%			108.85' - Mechanical break or bedding plane,		_	
			,	5 deg, tight	Н		
110			4	109.15' - Fracture, 5 deg, smooth, undulating,	ш	_	1
-66.9				bedding plane fracture, up to 1/4" open —	┧	_	R10: 3 minutes
-			3	109.35' - Fracture, 5 deg, smooth, undulating, bedding plane fracture, up to 1/4" open	ш	-	-
_	111.0			109.55' - Fracture, 30 deg, smooth,	ш	- 444 0 445 0L white to vallewish grow	-
I _			3	undulating, bedding plane fracture, except 1"	Н	111.0-115.8' - white to yellowish gray, - (N9 to 5Y 8/1), very strong HCl	
			ਁ	open 109.8' - Fracture, 5 deg, smooth, undulating,		reaction, extremely weak to weak	
				hedding plane fracture, up to 1/4" open	Н	(R0 to R2), trace organics, <2%	
-			>10	110.05' - Fracture, high angle	ш	 voids to 1/16", trace wavy bedding, poorly fossiliferous (casts) 	1
-	R11-NC			110.45' - Mechanical break, 5 deg, tight	Н		1
-	5 ft	57	>10	110.5' - Mechanical break, 65 deg, rough, undulating, dark (possibly organic)	\blacksquare	_	-
_	96%			111.2' - Fracture zone, intersecting fractures	₽	-	_
			0	up to 1/2" fragments	Ш		
115			"	111.6, 111.95, 112.02, 112.25, 112.25, 112.4, 112.6, 112.7, 112.8' - Fracture (9), 0-5 deg, —	Н		
-71.9			4	smooth, undulating, bedding plane fracture,			R11: 5 minutes
-	116.0		1	easily separates	┰	-	1
-	116.0		NR.	112.85-113.2' - Fracture zone, intersecting	口	- No Recovery 115.8-116.0'	-
-			1	fractures up to 1/2" fragments	\vdash	│ Limestone │ 116.0-120.95' - Same as	-
				440.05.440.75.440.0.400.4.400.01	口	- 111.0-120.95 - Same as - 111.0-115.8' except fine to medium	
			0	116.95, 119.75, 119.8, 120.1, 120.8' - Fracture (5), smooth, undulating, bedding	Ш	grained, 20-30% voids to 1/16", trace	
]			ا ا	plane fracture, easily separates		cavities to 1/2", moderately	1
-	R12-NC			, , , , , , , , , , , , , , , , , , , ,	\square	– fossiliferous	1
-	5 ft	80	0		Ш	-	-
-	99%				НΠ	_	-
_			2		団	-	-
120				_	尸		
-76.9					\vdash		R12: 3 minutes
1 7	121.0		4		Ш		1
-	121.0		NR/		Н	No Recovery 120.95-121.0'	1
-					F	_	
					1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-04	SHEET	8	OF	12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	NETHOD A	ND LC	ZUIFIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casiii		ORIENTATION : Vertical
WATER	LEVELS: 5.5	ft bgs	on 5	/03/07 START : 5/2/2007 END : 5/	3/2007	LOGGER : M. Faurote, N. Jarzyn	iecki
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
프 이 이	N A A	(9)	FRACTURES PER FOOT	2200.111 11011	잌	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HE K	N FER	D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무용의	RNA	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Z	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	074	ď			S	CHARACTERISTICS	
			2	120.9' - Fracture zone, intersecting fractures,		Limestone	
_				fragments up to 1/2" 121.2' - Fracture, 50 deg, smooth, undulating,	Ш	- 121.0-125.7' - yellowish gray, (5Y 8/1), fine to coarse grained, strong	-
-			2	up to 1/8" open		HCl reaction, very weak to weak (R1	-
_				121.6' - Fracture or mechanical break,	Н	to R2), medium to coarse grained	-
	R13-NQ	65	2	horizontal, bedding plane		zone at 123.2-124.0', trace voids	
	5 ft 94%	00		122.1' - Fracture, 5 deg, rough, undulating,		<1/16", cavities to 1/4" <2% of	
-	0.70			bedding plane, up to 1/4" open	ш	- surface, moderately fossiliferous	-
-			>5	122.4' - Fracture, 5 deg, rough, undulating, bedding plane, up to 1/4" open	$+ \Box$	(casts/molds), trace ovular voids with calcite infill	-
125_				123.2' - Fracture, 5 deg, rough, undulating, —		—	
-81.9			4	bedding plane, up to 1/4" open	\perp		R13: 2 minutes
	126.0		NR	123.5' - Fracture, 60 deg, undeveloped	Ш	No Decovery 405 7 400 0	-
-	126.0		INIX	fracture associated with 123.9'	$\vdash \vdash$	No Recovery 125.7-126.0' Limestone	-
-			>10	123.9' - Fracture, 60 deg, rough, undulating, up to 1/8" open	╀┤	- 126.0-129.9' - Same as 121.0-125.7'	-
				124.6-124.7' - Fracture zone, intersecting	Ш	except fine to medium grained, trace	1 .
				fractures, fragments up to 1"	\vdash	organics	
			0	125.6-125.7' - Fracture zone, intersecting		-	-
-	l R14-NQ			fractures, fragments up to 1"	ш	-	-
_	5 ft	70	1	126.4' - Fracture, 75 deg, rough, undulating, medium light gray staining	\vdash	_	_
	98%	. •	·	126.5-126.7' - Fracture zone, intersecting			
				fractures, fragments up to 1"	Ш	-	_
400			1	126.95' - Fractures (3), 70 deg, rough,	H	-	-
130 <u> </u>				undulating		No Recovery 129.9-131.0'	R14: 4 minutes
-00.5			3	128.4' - Mechanical break 128.6' - Fracture, 70 deg, rough, undulating,	Щ	-	R 14. 4 minutes
	131.0			medium light gray staining	Н		
			NR)	129.4' - Fractures (2), rough, undulating,	Щ	Limestone	_
-			>10	medium light gray staining, intersecting	╁	- 131.0-135.75' - yellowish gray, (5Y	-
-				fractures		7/2), fine to coarse grained, moderate HCl reaction, very weak to	-
_			1	130.45' - Fracture, horizontal, rough, undulating, bedding plane fracture	\vdash	- weak (R1 to R2), voids to 1/16" over	_
			·	130.6' - Fracture, 75 deg, rough, undulating,		5-10% of surface, trace planar	
	R15-NQ			medium light gray staining, up to 1/4" open		bedding of variable widths, rock is	_
-	5 ft	13	3	130.9' - Fracture, horizontal, rough,	Н	- friable at 132.0-133.5', trace fossil	-
-	95%			undulating, bedding plane fracture, up to 1/4"	Ľ	_ casts -	-
			>10	open 131.2' - Fracture, horizontal, rough,	Ш	_	1 .
135			- 10	undulating, bedding plane fracture, up to 1/8"	\vdash		
-91.9			_	open	Ш		R15: 3 minutes
-			5	131.3-131.5' - Fracture zone, intersecting	Ш	-	-
-	136.0		NR	fractures, up to 1" fragments 131.7-131.85' - Fracture zone, intersecting	Н	No Recovery 135.75-136.0'	-
			0	fractures, up to 1/2" fragments		Limestone	l .
			J	132.6' - Fracture, 5 deg, bedding plane	$\vdash\vdash$	136.0-140.7' - Same as 131.0-135.75' except mottled with	
-				fracture, open less than 1/8"	Ш	light olive grav (5Y 5/2), becoming	-
-			1	133.1' - Fracture, 55 deg, rough, undulating	\Box	predominantly light olive gray at	-
-	D			133.8' - Fracture, 0-5 deg, rough, undulating, bedding plane fracture, up to 1/4" open	╀┤	_ 138.8-139.1' and 140.1-140.35', trace	-
	R16-NQ 5 ft	76	2	133.9' - Fracture, 55 deg, rough, undulating,	Ш	cavities to 1/4", 5-10% coverage of	_
]	94%	10		up to 1/2" open	\vdash	voids to 1/2" with calcite infill from 139.1-140.1	1
-	• • • •			134.1-134.95' - Fracture zone, intersecting	ш	_ 100.1-140.1	1
-			3	fractures .	Ш	-	-
140_				135.2, 135.25' - Fracture (2), 5 deg, bedding plane fracture, open less than 1/8"	\vdash		l _{B40} o · · · —
-96.9			1	135.3' - Fracture, 25 deg, rough, undulating,			R16: 3 minutes
	141.0		NR	bedding plane fracture	Ш	No Recovery 140.7-141.0'	1
-	1 71.0		INIX	135.55' - Fracture, <5 deg, rough, undulating,	\vdash	_ 140 Necovery 140.7-141.0	-
-				bedding plane fracture	H		-
I !							
	!						

APPENDIX 2BB-806 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	9	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.5	ft bg	s <u>on 5</u>	/03/07 START : 5/2/2007 END : 5/3	3/200	7 LOGGER : M. Faurote, N. Jarzyn	iecki
>00	(6			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	(%) _Q	150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
THE STATE	CORE	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	0716	œ	>10	135.65' - Fracture, <5 deg, rough, undulating,	S	Limestone	
-				bedding plane fracture	H	 141.0-145.4' - yellowish gray to light 	-
-			>10	136.9' - Mechanical break 137.75' - Fracture, 5-10 deg, rough,	H	olive gray, (5Y 7/2 to 5Y 8/1), very fine to fine grained, mild to moderate	-
-	R17-NQ			undulating, bedding plane fracture, up to 1/4" -	H	 HCl reaction, strong (R4), trace 	-
-	5 ft	45	>10	open 138.2' - Mechanical break	Н	organics, voids to <1/16" over 5-10% of surface, trace cavities to 1", highly	-
-	88%			138.5' - Mechanical break -	Ш	 to moderately fossiliferous 	-
			3	138.55' - Bedding plane, 5 deg, rough, undulating	ш	decreasing with depth, trace laminar bedding	-
145 <u></u> -101.9			1	138.75, 139.1' - Bedding plane (2), 0-5 deg, —	\vdash		R17: 7 minutes
_			NR	rough, planar 140.15, 140.35' - Bedding plane (2), 0-5 deg,	H	No Recovery 145.4-146.0'	-
_	146.0		IVIX	rough, planar, up to 1/2" open	H	Limestone	-
-			>10	140.2' - Bedding plane, 5 deg, rough, undulating	H	- 146.0-146.5' - Same as 141.0-145.4'	-
-				141.5' - Fracture, 30 deg, up to 1/4" open	Н	except only trace voids to 1/8" size 146.5-149.4' - dusky yellow to	-
-			2	142.2-142.3' - Fracture zone, intersecting fractures, up to 1/2" fragments	Н	 moderate olive brown, (5Y 6/4 to 5Y 	-
-	R18-NQ			142.4' - Fracture, 0-5 deg, bedding plane fracture, olive gray (5Y 3/2) organic staining,	口	4/4), medium to coarse grained, mild HCl reaction, medium strong to	-
_	5 ft	53	2	up to 1/4" open	Ш	 strong (R3 to R4), porous, voids 	-
_	80%			142.6' - Fracture, 0-5 deg, organic staining, up to 1/4" open	Н	<1/16" 20-30% of surface, cavities to 1/4" 10% of surface, moderately	-
			4	142.85-142.45' - Fracture zone, intersecting	Н	 fossiliferous (casts/molds) 	-
150_ -106.9				fractures, up to 1/2" fragments 143.95-143.6' - Fracture zone, intersecting		149.4-150.0' - Same as 146.0-146.5' No Recovery 150.0-151.0'	R18: 3 minutes
-			NR	fractures, up to 1/2" fragments	H	-	-
-	151.0			143.7' - Fracture, 0-5 deg, organic staining, tight	Н	Limestone	1
-			2	143.9' - Fracture, 0-5 deg, organic staining,	H	 151.0-155.0' - yellowish gray, (5Y 8/1 	1
-				up to 1/8" open 144.0' - Fracture, 0-5 deg, organic staining,	囯	to 5Y 7/2), fine to medium grained, mild HCl reaction, medium strong to	-
-			>10	up to 1/8" open	ш	 strong (R3 to R4), 10% black/olive 	-
-	R19-NQ			144.3' - Fracture, 0-5 deg, organic staining, up to 1/4" open	Н	gray organic staining, voids to 1/16" over 5-10% of surface, zone of	-
_	5 ft 80%	23	5	144.5' - Fracture, 15 deg, organic staining,	Н	 moderately competent rock with wavy laminar bedding planes at 	1
_	60%			tight 144.8' - Mechanical break	Ħ	153.0-153.5'	1
155 -			4	145.0' - Fracture, 15 deg, possible organic		-	1
155_ -111.9				stain on 50% of surface, up to 1/4" open	Ш	No Recovery 155.0-156.0'	R19: 4 minutes —
-	156.0		NR	fractures, fragments up to 1/2" - 146.9, 146.95' - Fracture (2), 0-5 deg, rough,	Н	-	
-	156.0			undulating, bedding plane fractures, up to	囯	_ Limestone	
-			3	1/8" open 147.1' - Fracture, 20 deg, rough, undulating,	口	 156.0-157.2' - dusky yellow, (5Y 8/1), medium grained, mild HCl reaction, 	SC-2 collected at 156.3- 157.23'
-				up to 1/4" open	団	weak (R2), voids to 1/16" 20-30%,	-
-			1	147.95' - Fracture, 5 deg, rough, undulating, up to 1/4" open	Н	 cavity to 1/2" 5-10%, moderately fossiliferous (casts/molds) 	
-	R20-NQ		0	148.1, 149.1' - Fracture (2), 5 deg, rough,	Ħ	157.2-158.1' - yellowish gray, (5Y	-
-	5 ft 42%	37		undulating, up to 1/8" open 148.3' - Fracture, 20 deg, rough, undulating,	Ħ	 8/1), fine to medium grained, moderate to strong HCl reaction, 	
-	12/3			up to 1/2" open	Ш	voids to <1/16" 5-10% of surface,	1
160			NR	148.5' - Fracture, 50-60 deg, undeveloped or healed	Ш	 trace cavities to 1/4", trace organics, trace fossils (casts) 	1
-116.9				149.3, 149.4, 149.8' - Fracture (3), 5 deg, rough, undulating, 1/8"-1/4" open	円	No Recovery 158.1-161.0'	R20: 6 minutes
-	161.0			151.6' - Fracture, 70-80 deg, rough,	H	-	1
-				undulating, organic stain on 95% of fracture surface, up to 1/4" open	Ш	-	1
				Sanase, up to 1/4 open			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	10	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.5	ft bas	s on 5	/03/07 START : 5/2/2007 END : 5/3	3/200	7 LOGGER : M. Faurote, N. Jarzyn	iecki
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASINO
불병은	RUI H. / VER	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
THE STATE	ORE NG	σD	AC.	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
品の日	SE	Ä		THICKNESS, SURFACE STAINING, AND TIGHTNESS	s	CHARACTERISTICS	5.101 0, 1201 NEODETO, ETO.
			3	151.65' - Fracture, 5 deg, rough, undulating, organic staining, bedding plane fracture, -	Н	Limestone - 161.0-164.6' - yellowish gray with	
				intersecting, <1/8" open, olive gray (5 Y 3/2)	Ш	light olive gray mottling, (5Y 7/2 with	
			4	152.0-152.2' - Fracture zone, fragments up to	Н	5Y 5/2), fine to medium grained, mild	1
-	R21-NQ			1", intersecting fractures - 152.25' - Fracture, <5 deg, rough, undulating,	H	 to moderate HCl reaction, medium strong to strong (R3 to R4), 5-10% 	1
_	5 ft 72%	16	>10	bedding plane fracture, <1/8" open		voids to <1/16" decreasing with	1
-	1270		4	152.4' - Fracture, <5 deg, rough, undulating, - bedding plane fracture, up to <1/4" open	H	 depth, <1% cavities to 1/4", mildly fossiliferous, trace planar bedding 	1
165			_	152.45' - Fracture or mechanical break, <5	Ш	No Recovery 164.6-166.0'	1
165_ -121.9			NR	deg, rough, undulating, bedding plane — fracture, up to <1/4" open	ш	No Recovery 104.0-100.0	R21: 7 minutes
-			INE	152.55' - Fracture, <5 deg, rough, undulating,	Н	-	-
-	166.0			bedding plane fracture, tight -	口	Limestone	-
-			5	152.9' - Fracture zone, fragments up to 1", intersecting fractures	Ш	 166.0-170.8' - yellowish gray and 	-
-				153' - Fracture zone, fragments up to 1",	Щ	dusky yellow in alternating zones of variable widths (3"-8"), (5Y 7/2 and	-
_			1	intersecting fractures 153.05, 153.15, 153.3' - Fracture (3), <5 deg,	ш	- 5Y 6/4), moderate HCl reaction,	-
_				rough, undulating, bedding plane fracture,	Н	medium strong to strong (R3 to R4),	_
_	R22-NQ 5 ft	62	2	<1/8" open 153.4' - Fracture, <5 deg, rough, undulating,	F	medium strong (R3) zone from – 166.5-167.2', voids to <1/16" 10-20%	<u> </u>
_	96%	02		bedding plane fracture, up to 1/2" open	H	decreasing with depth, trace cavities	
			3	153.5' - Mechanical break	Н	to 1/2", mild to moderately fossiliferous decreasing with depth,	
170			3	153.6' - Fracture, 10 deg, rough, undulating, bedding plane fracture, up to 1/2" open	Ш	planar bedding of variable widths	1
-126.9			0	154.2, 154.3' - Fracture (2), 10 deg, rough,	Ш		R22: 7 minutes
_	171.0			undulating, bedding plane fracture, up to 1/4" - open	Н	T	1
_	17 1.0		NR.	154.45' - Fracture, 85 deg, rough, undulating,	Ħ	 No Recovery 170.8-171.0' Limestone 	1
-			>5	remineralization, olive gray (5Y 3/2) organic	Ш	171.0-176.0' - yellowish gray and	1
-				staining 154.65' - Fracture or bedding plane, 30 deg,	Н	 dusky yellow in alternating zones of variable widths (<4"-6"), (5Y 7/2 and 	
-			>10	smooth to rough, undulating, up to 1" open -	Ш	5Y 6/4), fine to medium grained,	-
-	R23-NQ			156.05' - Fracture, 5-10 deg, up to 1/4" open 156.15, 156.3' - Fracture (2), 5-10 deg, up to	Н	 moderate HCl reaction, medium strong to strong (R3 to R4), voids 	1
-	5 ft	45	3	1/2" open -	H	<1/16" 10-20% of surface, trace	-
-	100%			157.25' - Fracture, 5 deg, smooth, undulating, bedding plane fracture along abrupt bedding,	H	organics, poorly to moderately	-
-			3	up to 1/4" open -	Н	fossiliferous (casts/molds)	-
175_ -131.9			-	157.4' - Fracture, healed or undeveloped, olive gray (5Y 3/2) organic staining	Ш	<u> </u>	R23: 5 minutes
'51.9			1	161.3' - Fracture, 10 deg, rough, undulating, -	Ш	-	1125. 5 minutes
-	176.0			bedding plane, up to 2/3" open 161.55' - Fracture, 40 deg, rough, undulating,	Н	176 0 100 71	_
_			2	up to 1/2" open -	口	176.0-180.7' - Same as 171.0-176.0' - except trace cavities to 1/2", trace	
_			<u> </u>	161.8' - Fracture or bedding plane, up to 1/2"	H	light olive gray (5Y 5/2) laminae,]
_			2	open 162.2, 162.45' - Fracture (2), <5 deg, rough, _	Н	zone of wavy bedding with possible - cross bedding from 176.5-176.95']
				undulating, bedding planes, up to <1/2" open	Щ		
	R24-NQ	73	1	162.3' - Fracture, 80-90 deg, partially healed 162.75' - Fracture, 10 deg, rough, undulating,	Ш]
	5 ft 94%	13	'	bedding plane	\vdash		1
-				163.15 ^T - Fracture, 10 deg, rough, undulating, bedding plane	H] 1
180			2	163.35-163.5' - Fracture zone, fractures	Ш		1
-136.9			2	intersecting, up to 1" fragments	H	-	R24: 6 minutes
-	101.0		NR	163.8' - Fracture, 10 deg, rough, undulating, _ bedding plane, up to 2/3" open	団	No December 400 7 404 01	
-	181.0		INK	163.9' - Fracture, 40 deg, rough, undulating,	Н	No Recovery 180.7-181.0'	-
-				up to 1/2" open	П		
				-			

APPENDIX 2BB-808 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	11	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

	LEVELS : 5.5			/03/07 START : 5/2/2007 END : 5/3	3/20	D7 LOGGER : M. Faurote, N. Jarzyr	niecki
			_ 011 0	DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S.	DESCRIPTION	507	ROCK TYPE, COLOR,	OIZE AND DEDTH OF CACKES
ᆱᇬ	RUN ÆRY, A	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
FYF A	NGT COO	Qρ	ACT R F	PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SUS	SHE	Ä		THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	Divor 9, TEST NEGOETS, ETC.
			9	163.95' - Fracture, 10 deg, rough, undulating,	Н	Limestone	
				along bedding plane, <1/8" open 164.05' - Fracture, 80-90 deg	П	 181.0-185.6' - dusky yellow transitioning with depth to yellowish 	1
			2	164.2, 164.25' - Fracture (2), 10 deg, rough,	Һ	gray, (5Y 6/4 to 5Y 7/2), fine to	1
	R25-NQ			undulating, bedding plane 164.35' - Fracture, 80-90 deg	H	medium grained, moderate HCl reaction, weak to medium strong (R2	1
_	5 ft 92%	37	2	166.1, 166.15, 166.25' - Mechanical break	П	to R3), weak (R2) zone from	1 7
-	02/0			(3), <5 deg, smooth, planar, bedding plane - 166.5' - Fracture, <5 deg, rough, undulating,	Н	181.9-182.9', voids <1/16" 10-20% increasing with depth, highly	1
185			5	bedding plane, 1/4" open	ш	fossiliferous from 183.2-184.8',	-
-141.9			>10	116.7, 167.1, 169.1' - Mechanical break (3), — <5 deg, smooth, planar, bedding plane, up to	Ծ	— casts/molds up to 1/2", zones of planar bedding with variable	R25: 5 minutes
-			NR	1/8" open	H	thickness from 181.0-181.25',	-
-	186.0		INK	167.15-167.7' - Fracture, 80-90 deg, smooth,		182.9-183.2', and 184.7-185.6'	-
-				planar, bedding plane, up to 1/8" open 168.15' - Fracture, <5 deg, rough, undulating,	1	No Recovery 185.6-186.0' Bottom of Boring at 186.0 ft bgs on	-
-				bedding plane, 1/4" open	1	- 5/3/2007	-
-				168.5' - Mechanical break 168.7' - Mechanical break, <5 deg, smooth,	┨	-	-
-				planar, bedding plane	1	-	-
_				169.45, 107.35' - Fracture (2), <5 deg, rough, undulating, undeveloped or healed, bedding	1	-	-
-				plane fractures	1	-	-
_				169.5' - Mechanical break, 10 deg, bedding plane	1	-	1
_				169.6' - Fracture, 10 deg, rough, undulating,		_	
l -				bedding plane 169.8' - Mechanical break, <5 deg, smooth, -	1	_	
l _				planar, bedding plane	1		_
l _				171.45-171.55' - Fracture zone, intersecting fractures, up to 1/2" fragments -	1	L	_
l _				171.85' - Fracture, <5 deg, rough, undulating,		L	
				olive gray (5Y 3/2) organic staining on bottom			
				surface, up to 1/2" open 172.15' - Fracture, <5 deg, rough, undulating	1		1
				to planar, bedding plane, possible	1		1
-				remineralization	1		1
				bedding plane, possible remineralization	1		1
_				172.5-172.6' - Fracture zone, intersecting - fractures, up to 1/2" fragments	1	Ť.	1
-				172.8, 174.1' - Fracture (2), <5 deg, rough,	1		-
-				undulating, bedding plane, possible remineralization, up to 1/8" open	1	F	
-				173.0' - Fracture, 50 deg, rough, undulating,	1	<u> </u>	
1 -				less than 1/8" open 173.1' - Fracture, 80-90 deg, rough,	1	F	-
-				undulating, tight	1	<u> </u>	-
-				173.2' - Fracture, <5 deg, rough, undulating, bedding plane	1	F	-
-				173.5' - Mechanical break	1	F	-
-				174.75, 174.8' - Fracture (2), <5 deg, rough,	1	F	-
-				undulating, bedding plane, possible remineralization, up to 1/4" open	1	F	-
-				175.7-175.75' - Fracture, intersecting	1	F	-
-				fractures, up to 1/4" fragments 176.15' - Fracture, <5 deg, smooth,	-	\vdash	-
-				undulating, bedding plane, up to 1/8" open	1	-	-
-				176.7, 177.4, 179.15' - Fracture (3), <5 deg, smooth, undulating, bedding plane, up to 1/4" -	-	F	-
				open	_		
					1		
L					1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-04	SHEET	12	OF	12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.5	ft bgs	on 5/	/03/07 START : 5/2/2007 END	: 5/3	/200	007 LOGGER : M. Faurote, N. Jarzyniecki
\$ □ €	(%)			DISCONTINUITIES		90	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNE	SS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
				177.25' - Fracture, vertical, rough, undulating 178.05' - Mechanical break 178.4' - Mechanical break 178.6' - Mechanical break 178.6, 179.35, 180.55' - Fracture (3), <5 deg. smooth, undulating, bedding plane, up to 1/8' open 179.25' - Fracture, <5 deg, smooth, undulating, bedding plane, tight 180.25' - Fracture, 50 deg, rough, undulating 181.05, 181.15, 181.6, 181.7, 181.9, 182.95' Fracture (6), <5 deg, rough to smooth, undulating 181.4' - Fracture, 65-75 deg, rough, undulating 181.6' - Fracture, 85 deg, rough, undulating 181.8' - Fracture, 85 deg, rough, undulating, open up to 1/4" 182.4, 183.1, 184.1, 184.5' - Fracture (4), <5 deg, rough to smooth, undulating 183.5' - Mechanical break 184.6' - Fracture, 60 deg, rough, undulating 184.85-185.6' - Fracture zone, <10 deg, rough to smooth, undulating, bedding plane fractures			
1							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-05	SHEET	1	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" drag bit

ORIENTATION: Vertical

						auto hammer, AWJ rods,	-		ORIENTATION : Vertical
WATER	LEVELS	: 1.61 ft t	ogs on 6/	14/07	START : 4/10/2007	END : 4/18/2007	LOGGE	₹ : R.	Bitely, K. Coke, A. Erickson, W. Elliott
ŞQ⊋	044.5.			STANDARD PENETRATION		SOIL DESCRIPTION		8	COMMENTS
DN (SAMPLE	INTERVA		TEST RESULTS	SOIL NAME.	USCS GROUP SYMBOL,	COLOR.	ICL	DEPTH OF CASING, DRILLING RATE,
DEPTH BELOW SURFACE AND ELEVATION (#)		RECOVE			MOISTURE C	CONTENT, RELATIVE DEN	ISITY OR	SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND
SUR!			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MIN	IERALOGY	SYM	INSTRUMENTATION
42.6	0.0			(1.1)	Poorly Graded S	Sand With Organics (SP)		SS-1: First 6" was weight of hammer
-		1.3	SS-1	0-2-3	0-1.3' - grayish b	lack grading to medium to the total to the total to the total tota	ight gray, -		
-	1 5			(5)	20-30% organics	s, fines decreasing with d	epth, silica		Water level is based on Ground Water
-	1.5				sand, roots			ı	Monitoring at LNP site (FSAR Table
-							-	ı	2.4.12.08)
-							-	ı	
-							-	1	
-								ł	
-							-	1	
5	5.0						-	1	
37.6	J.U				Poorly Graded S				-
-		1.0	SS-2	2-3-3		ellowish brown, (10YR 6 fine to fine grained, 3% n			
-	6.5			(6)	plastic fines, silic	ca sand		Y / /	
-	0.5				Fat Clay With Sa	and (CH) blue to pale olive, (5B 6/2	to 10V 6/2)	1	
-						tiff, high plasticity, no dila		l	
-					very fine silica sa	and		l	
_							-	1	
-							-	1	
-							-	1	
10	10.0						-	1	
32.6	10.0				Clayey Sand (SC	C)	Γ	////	-
-		1.2	SS-3	5-7-8	10-10.25' - pale t	blue to pale olive, (5B 6/2 lense, fine to medium gra	2 to 10Y 6/2), /-		
-	11.5			(15)		y fines, iron cemented sa			
-	11.0				Poorly Graded S	Sand (SP) y pale orange, (10YR 8/2) wet	1	
_					medium dense, v	very fine to fine grained,	trace		
_					nonplastic fines,	trace black mineral grain	is -	1	
-							-	1	
-							-	1	
-							-	1	
15	15.0						-	1	
27.6	-			_	Poorly Graded S	Sand With Silt (SP-SM)	lavviah	帯	
		1.0	SS-4	6-9-9 (18)	15.0-15.55' - very brown, (10YR 8/2	y pale orange to pale yel 2 to 10YR 6/2), wet, med	ium dense,		
]	16.5			(10)	very fine to fine g	grained, 6% nonplastic fi		Ĭ	
	-				∖sand Sandy Lean Clav	v (CL)		1	
1 7					15.55-16.0' - pale	e yellowish brown, (10YF	8 6/2), wet,		
1 7					very stiff, low to r	medium plasticity, slow de to fine silica sand	ilatancy,		
1 7							-		
							-		
20									



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-05	SHEET	2	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

						, auto hammer, AWJ rods,	-		ORIENTATION: Vertical
WATER	LEVELS	: 1.61 ft	ogs on 6/		START : 4/10/2007	END : 4/18/2007	LOGGEF	₹ : R. 	Bitely, K. Coke, A. Erickson, W. Elliott
≩Qæ1	04451	INITEDIT	11 (ft)	STANDARD PENETRATION		SOIL DESCRIPTION		8	COMMENTS
ON (SAMPLE	INTERVA		TEST RESULTS	SOIL NAME.	, USCS GROUP SYMBOL,	COLOR.	ICL	DEPTH OF CASING, DRILLING RATE,
H B		RECOVI	ERY (ft)		MOISTURE (CONTENT, RELATIVE DEI	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENC	Y, SOIL STRUCTURE, MIN	NERALOGY	SYMBOLIC LOG	INSTRUMENTATION
22.6	20.0			(14)	Silty Sand (SM)			111	
-	20.0	1.0	SS-5	6-9-10	20.0-21.0' - pale	yellowish brown, (10YR	6/2), wet,	$\ \ $	-
-		1.0	00-5	(19)	nonplastic fines,	very fine to fine grained, silica sand	30-40%		-
-	21.5				-		-	ł	-
-							-	ł	-
-							-	ł	-
-							-	ł	-
-							-	ł	-
-								ł	-
-							-	ł	-
25 17.6	25.0				Silty Sand (SM)			1111	
-		10	SS-6	6-7-6	25.0-26.0' - Sam	ne as 20.0-21.0'	-		-
_		1.0	55-6	(13)				111	-
-	26.5				-		-	ł	-
-							-	ł	-
_							-	ł	-
_							-	ł	-
_							-	ł	-
_							-	l	-
_							-	1	-
30	30.0				Loon Clay (CL)			////	
12.6				4-6-8	Lean Clay (CL) 30.0-31.3' - pale	yellowish brown to dark	vellowish -		-
_		1.3	SS-7	(14)	brown becoming	greenish gray in last 0.1 G 6/1), moist, stiff, medi	', (10YR 6/2		-
_	31.5				no dilatancy, 5-1	0% very fine silica sand	in plasticity,	<i>////</i>	-
_								l	-
_							-		_
_							-		-
_							-	l	-
_							-	-	-
_							-	-	-
35	35.0							.	_
7.6				4-4-4	Silty Sand (SM) 35.0-36.2' - light	olive gray, (3Y 5/2), moi	st to wet		_
_		1.2	SS-8	(8)	loose, very fine t	to fine grained, 30% low	plastic fines,		_
_	36.5				silica sand, medi from 35.4-35.6'	ium bluish gray (5B 5/1)	ciay lens	 	_
_									_
_							_	1	_
_							_]	_
_							_	1	_
							_	1	
							_		
40								L	
								<u> </u>	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-05	SHEET	3	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" drag bit

ORIENTATION: Vertical

					N 252545, ITIUU TOTATY, AUTO ITAMITHEI, AWJ TOUS, 4-776 Grag Dit ORIENTATION . VERICAL STADT : 4/40/2007
WATER	LEVELS	. ו.סוונג	ogs on 6/		START: 4/10/2007 END: 4/18/2007 LOGGER: R. Bitely, K. Coke, A. Erickson, W. Elliott SOIL DESCRIPTION COMMENTS
종무 <i>章</i>	CAMPIE	INTERVA	I /#\	STANDARD PENETRATION	O CONVINIENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE		` ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H B		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
PEP SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY 불 INSTRUMENTATION
2.6	40.0			(14)	Lean Clay (CL)
-		1.5	SS-9	2-4-5	40.0-41.5' - dark gray, (N3), moist, stiff, medium
-		1.5	33-9	(9)	plasticity, no dilatancy, 40.7-40.8' organic soil (OH) seam, light olive gray (5Y 6/1), brittle organic layer
-	41.5				40.45- 40.65'
_					
_					-
_					_
_					<u> </u>
					_
45	45.0				
-2.4					Lean Clay (CL)
-		1.5	SS-10	0-1-2 (3)	45.0-46.5' - Same as 40.0-41.5' except 45.2-45.6' - seam of silty sand (SM), light olive gray (5Y 6/1), very
-	46.5			(3)	fine to fine silica sands, 20% nonplastic fines
-	40.0				
-					-
-					-
-					-
-					-
-					-
-					-
50 -7.4	50.0				Silty Sand (SM)
-7.4				3-4-7	50.0-50.65' - dark gray, (N3), moist to wet, medium
_		1.5	SS-11	(11)	├ dense, very fine to fine grained, 17% low plastic fines, / ├
_	51.5				∖∖ possible organics, 1/4" clayey organic seam, silica │ ┃ ┃ ┃
_					Organic Soil (OL)
					50.65-50.85' - duśky yellowish brown, (10YR 2/2), moist, stiff, low to medium plasticity, rapid dilatancy
_					Elastic Silt (MH)
					\$0.85-51.4' - yellowish gray, (5Y 7/2), moist, stiff, low
					to medium plasticity, rapid dilatancy, mild to moderate HCI reaction, carbonate
1 7					Organic Soil (OL)
55	55.0				51.4-51.5' - Same as 50.65-50.85' except olive black, T
-12.4					(5Y 2/1) Silt With Sand (ML)
-		1.5	SS-12	14-27-36	55.0-56.5' - light olive gray, (5Y 5/2), moist, hard, low
-	56.5			(63)	plasticity, rapid dilatancy, mild HCl reaction, 20% very fine to fine sand, trace organics
-	50.5				1111
-					
-					
-					-
-					
-					Driller's Remark: Harder drilling at 59.0'
-					- Julio 3 Normanic Flancia drinning at 39.0
60					<u> </u>



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	F-05	SHEET	4	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" drag bit

ORIENTATION: Vertical

					N 252545, Mild Totally, auto Hammer, AVVJ Tods, 4-776 drag bit. ORIENTATION . Vehical ORIENTATION . Vehical ORIENTATION . Vehical
WATER	LEVELS	. ו.סוונג	ogs on 6/		START : 4/10/2007 END : 4/18/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott SOIL DESCRIPTION COMMENTS
≷Q∉ I	CAMPIE	INTERVA	I (f4)	STANDARD PENETRATION	SOIL DESCRIPTION 9
ON (SAMPLE		` ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, 으로 DEPTH OF CASING, DRILLING RATE,
H B		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
<u>-17.4</u>	60.0			(14)	Silty Sand And Limestone (SM)
-	00.0	1.5	SS-13	26-29-30	60.Ď-61.5' - moderate yellowish brown, (10YR 5/4), │ │ │ │
-		1.5	33-13	(59)	wet, very dense, fine to coarse grained, mild HCl reaction, 25-30% low plastic fines, 30-40%
-	61.5				gravel-sized lime stone, 1/4" organic layer at 61.3'
_					, <u> </u>
_					<u>.</u>
_					<u> </u>
					Driller's Remark: Reports clay at 63.0'
]
]] [
65	65.0				11
-22.4					Elastic Silt (MH)
		1.5	SS-14	2-10-10	65.0-65.4' - moderate yellowish brown, (10YR 5/4), wet, very stiff, low to medium plasticity, rapid
-	66.5			(20)	dilatancy, moderate HCl reaction, carbonate material
-	00.5				Organic Soil (OH) (65.4-65.65' - brownish black, (5YR 2/1), moist, soft,
-					high plasticity, slow dilatancy, no HCl reaction
-					Limestone Fragments
-					65.65-66.50' - yellowish brown, (10YR 5/4), fine grained, mild HCl reaction
-					granicu, miliu rioricacion
-					-
_					
70 <u> </u>	70.0				Silt With Sand (ML)
-27.4				11-16-7	70.0-71.0' - moderate yellowish brown, (10YR 5/4),
_		1.0	SS-15	(23)	wet, very stiff, low plasticity, rapid dilatancy, moderate
-	71.5				HCI reaction, 15-20% fine to coarse sand-sized, trace fine gravel-sized limestone fragments, carbonate
_					material
_					
_]
]]
					Driller's Remark: Lost circulation at 73.5'
]] [
75	75.0				11
-32.4					Silt With Sand (ML)
		1.1	SS-16	1-3-2	75.0-76.1' - moderate yellowish brown to dusky yellowish brown, (10YR 5/4 to 10YR 2/2), wet,
-	76.5			(5)	─\ medium stiff, fine to medium grained, low plasticity, /
-	, 5.5				\rapid dilatancy, mild HCl reaction, trace fine \rapid gravel-sized limestone; organic seam at 75.85-76.0'
-					graver energy minostorie, organic south at 10.00 10.0
-					
-					
-					
-					Driller's Remark: Hard zone 79.0-80.0'
-					- Dillioi o Remark. Hara zone 70.0-00.0
80					-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-05	SHEET	5	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

						ry, auto nammer, Avvj rods,	-		ORIENTATION : Vertical
WATER	LEVELS	: 1.61 π ι	ogs on 6/		START : 4/10/2007	END: 4/18/2007 SOIL DESCRIPTION	LOGGEI	R∶R. T	Bitely, K. Coke, A. Erickson, W. Elliott COMMENTS
≷Q⊋	044:5:		1 (6)	STANDARD PENETRATION		JOIL DESORIF HON		8	COIVIIVILINTO
N (SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAMI	E, USCS GROUP SYMBOL	COLOR	IC L	DEPTH OF CASING, DRILLING RATE,
H B ATIC		RECOVE	ERY (ft)		MOISTURE	CONTENT, RELATIVE DE	NSITY OR	l l	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTEN	CY, SOIL STRUCTURE, MI	NERALOGY	SYMBOLIC LOG	INSTRUMENTATION
-37.4	80.0			41-50-50	Silty Sand And	d Limestone (SM)		1111	Break for evening 17:30 on 4/10/2007
-	80.8	0.9	SS-17	(100)	80.0-80.9' - mo	derate yellowish brown, (10YR 5/4),	-[-
-					wet, very dense reaction 25% l	e, fine to coarse grained, low plastic fines, 35% of s	mild HCl ample is fine	1111	-
-					to coarse grave	el-sized limestone fragme	nts	-	
_					Begin Rock Co	oring at 81.5 ft bgs		-	-
-					See the next si	heet for the rock core log		-	_
-								4	_
_								4	_
_								1	_
l _									
85							_		
-42.4								1	
l _									
								1	
_							•	1]
_							•	1	_
_								1	1
-								1	1
90								1	-
-47.4							_	1	
-								1	-
-								1	-
-								1	-
-								┨	-
-								1	-
-								┨	-
-								┨	-
-								┨	-
-								-	-
95 <u> </u>							_	4	-
-52.4								4	_
_								4	_
-									
_								1	_
I -								1	
I _									
]
								1]
100							•	1]
								1	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-05	SHEET	6	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

COMINO	I WILTHOU A	ND L	אורוע	/IENT: CME 55 S/N 252345, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 1.6	1 ft b	gs on	6/14/07 START : 4/10/2007 END : 4/	18/200	7 LOGGER: R. Bitely, K. Coke, A.	Erickson, W. Elliott
> 0 0				DISCONTINUITIES	ڻ ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱᇊ	Ş,±	(%	R P	DEDTIL TYPE OBJECTATION BOUGHNESS	1 2 1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YF A F	SOV	Q D (%)	ACT 7	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	SHE	R Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	81.5			81.6' - Mechanical break, 75 deg, smooth,	ш	Limestone	Continue drilling, switch to
-			>10	undulating	╁┼	- 81.5-83.3' - moderate yellowish	rock coring 04/11/07 at
-				82.1-82.5 - Fracture zone (>5), rough,	Ш	brown, (10YR 5/4), fine to medium grained, mild HCl reaction, very weak	08:00
_			>10	undulating, 2" gravel-sized fragments, angular	₽₽	to weak (R1 to R2), voids increasing	-
	R1-NQ 4 ft	13		82.5-82.8' - Fracture or mechanical break,	Ш	with depth along the surface	_
	45%	13		smooth, undulating, open with 1/2"-2"	\vdash	83.0-83.3' - yellowish gray, (5Y 7/2) - No Recovery 83.3-85.5'	
1 7			NR	opening 83.0-83.2' - Fracture or mechanical break,	Ш	No Recovery 63.3-65.5	1
85 -			INIX	very fine to fine grained	ш	-	R1: 8 minutes
-42.4					ш		_
_	85.5		>10	85.5-85.9' - Fracture zone, rough, undulating,	╁┼┼	Limestone	-
_			/10	1-1/2" gravel-sized fragments, mostly <1"	口	- 85.5-85.9' - moderate yellowish	-
_					₽₽	brown, (10YR 5/4), fine to medium	
					Ш	grained, mild HCl reaction, very weak to weak (R1 to R2), voids cover 5%]
]					Н	surface area]
	R2-NQ				Ħ	No Recovery 85.9-90.5'	_
-	5 ft 8%	0	NR	-	₩	-	-
-	0 /0			-	口	-	-
_				-	+	-	-
_				-		-	
90					₽₩		R2: 2 minutes
-47.4	90.5				Ш	_	_
			>5	90.5-91.0' - Fracture zone (>5), smooth,	Н	Limestone	
			/5	undulating, 2" gravel-sized fragments, angular	Н	- 90.5-92.5' - Same as 85.5-85.9' except moderately fossiliferous	1
_				91.5, 91.7, 92.4' - Fracture or mechanical	Ħ	(molds and casts)	1
-			>10	break (3), smooth, undulating	H	-	-
-	R3-NQ			-	ш	92.5-93.2' - moderate yellowish	-
-	5 ft	24	0	93.0' - Mechanical break	\vdash	brown, (10YR 5/4), fine grained,	-
_	54%			95.0 - Mechanical break	Ш	moderate HCl reaction, weak (R2),	_
				_	Н	small (1/16") voids over 5% of the surface, trace silt	_
			NR			No Recovery 93.2-95.5'	
95					H	-	R3: 8 minutes
-52 4	95.5			95.7' - Mechanical break	丗	_	
-	00.0			95.9, 96.8, 97.25, 97.6, 97.7, 98.1, 98.4,	╁┼┼	Limestone	SC-1 collected at 95.9-
-			1	98.5, 99.2, 100.3' - Fracture or mechanical	口	95.5-95.9' - light olive gray, (5Y 5/2),	96.7'
-				break (10), 40 deg and 45 deg, rough, undulating, healed	H	very fine to medium grained, moderate HCl reaction, very weak	-
_			>2	-	口	- (R1), trace organics	-
				_	₽	95.9-100.3' - pale yellowish brown,	-
	R4-NQ 5 ft	88	4		Ш	(10YR 6/2), fine grained, moderate - HCl reaction, weak (R2), small]
	100%	00			Ш	(1/16") voids cover 15% of the]
]					Н	surface, large voids (3/16") cover	1
-			2	-	世	 less than 5% of the surface, trace organics 	SC-2 collected at 99.1-
400				-	┯		100.3'
100_ -57.4			>10		Ш		R4: 11 minutes
- 7	100.5			100.3-100.5' - Fracture zone (>10), 45 deg,	\square	-	-
_			6	rough, undulating, 2" diameter gravel	凵	-	
			Ľ	fragments	Ш		
					1 1		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-05 SHEET 7 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				DIAMETER ALADIOARY NO LOUIS, FIVE COLORS		07 LOOOFD D D'UL K O.L. A	CRIENTATION . Vertical
WATER	LEVELS : 1.6	ıπb	gs on (6/14/07 START : 4/10/2007 END : 4/ DISCONTINUITIES	18/20	07 LOGGER : R. Bitely, K. Coke, A. LITHOLOGY	Erickson, W. Elliott COMMENTS
ĕ9€	CORE RUN, LENGTH, AND RECOVERY (%)				8	LITHOLOGY	COMMENTS
ON O	ZAN YAN	~	RES	DESCRIPTION	0 0	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI ATI	JE E	(%) Q	J. S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	岌	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	SENCE	ROI	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БОШ	0716	IL.	шш	101.5-101.7, 102.2- 102.6, 102.7- 103.0,	0)	Limestone	
_			6	103.4-103.7' - Fracture (>10), rough,	H	- 100.3-100.5' - moderate yellowish	
_				undulating, gravel fragments with <1" in size,	₽	brown, (10YR 5/4), fine grained,	_
	R5-NQ 5 ft	30		angular 101.5, 101.7, 101.9, 102.3, 103.0, 103.4' -	ш	moderate HCl reaction, very weak (R1), trace organics, trace silt	_
	64%	00	>10	Fracture or mechanical break (6), rough,	\vdash	100.5-103.7' - moderate yellowish	
				undulating, open (3/4")		brown, (10YR 5/4), fine grained,	
						 moderate HCl reaction, weak (R2), zone of breccia fragments pale 	1
105			NR			yellowish brown ([10YR 6/2], weak	R5: 8 minutes
-62.4	105.5			_	口	— [R2], moderate HCl reaction) within 10YR 5/4 matrix from 100.5-101.4',	_
-	105.5				╁╌	trace organics, small (<1/16") voids	-
-			>10		\vdash	- cover 15-25%, few large (3/16")	-
-				100 C 107 (I Markariantha I C I	片	voids, weak zone (R1) at 102.6-102.7'	-
_			1	106.6, 107.1' - Mechanical break, tight	₽	No Recovery 103.7-105.5'	-
	D 0.115			107.4-107.6' - Fracture (4), horizontal, rough,	仜	Limestone 105.5-109.8' - pale yellowish brown	
_	R6-NQ 5 ft	75	3	undulating, small (1/2") fragments	\vdash	to moderate yellowish brown, (10YR	_
	85%	. •	Ů	108.0' - Fracture (2), 50 deg and 50 deg, rough, undulating, tight to open up to 3/16"	\Box	6/2, 10YR 5/4), fine grained,	SC-3 collected at 108.3-
				rough, undulating, light to open up to 3/10		moderate HCl reaction, weak (R2), trace organics, small voids (<1/16")	109.8'
			0		Ш	cover 25% of the surface, larger	
110						voids (3/8"x3/4") cover 10% of the surface fossiliferous (molds and	R6: 10 minutes
-67.4	110.5		NR	_	╁	casts), trace organics	-
_	110.5			440.7.440.0.444.4.444.71. Frankins	F	No Recovery 109.8-110.5' Limestone	-
-			>10	110.7-110.9, 111.4-111.7' - Fracture zone, horizontal and vertical, rough, undulating,		110.5-112.4' - moderate yellowish	-
-				3/8" and larger size rock fragments	₩	brown, (10YR 6/4), very fine to fine	-
-			>5	111.1' - Fracture, 60 deg, rough, undulating, tight to open up to 1/16"	┰	grained, moderate HCl reaction, very weak to weak (R1 to R2), 1/16" voids	-
_	R7-NQ			111.2' - Fracture, horizontal, smooth,	╁┰	cover 20-30% of the surface, larger	-
_	5 ft	38	1	undulating, open		voids (3/16") cover less than 5%,	Drillaria Barrariki Water
_	76%			112.0' - Fracture, 70 deg, rough, undulating, intersecting, one is tight and other is open up		fossil molds and casts - 112.4-114.3' - moderate yellowish	Driller's Remark: Water loss at 113.0'
			2	to 1/16"	₽	brown, (10YR 5/4), fine grained,	
				112.4' - Fracture, horizontal, rough and undulating on one face, smooth and	口	moderate HCl reaction, very weak - (R1), small voids (1/16") cover 35%	
115			NR	undulating on the other, open	\vdash	of the surface up to 3/16" size voids	R7: 6 minutes
-72.4	115.5		` '	113.4' - Fracture, 65 deg, rough, undulating,	Ė	cover about 5% of the surface	
1 7				open up to 1/16" 114.0, 114.1' - Fracture, horizontal, rough,		- No Recovery 114.3-115.5' Limestone	1
1 -			0	undulating, open, possible bedding plane	₽	115.5-118.9' - moderate yellowish	
-					扛	 brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), very fine to 	
-			2		\vdash	fine grained, moderate HCl reaction.	-
-	R8-NQ			117.2, 117.4' - Fracture zone (>2), rough, undulating, up to 1/2" gravel-sized fragments,	F	 very weak to weak (R1 to R2), 3/16" sized voids cover 20-30% of the 	-
-	5 ft	64	1	angular	Ħ	surface area, fossil molds cast up to	-
-	68%		0	118.1' - Fracture, horizontal, rough, undulating, tight to open up to 3/16"	╀	_ 3/16" cover 5% of the surface area,	-
-				andulating, tight to open up to 3/10	口	some mottling with grayish orange (10YR 7/4) below 117.0'	-
			, _		世	No Recovery 118.9-120.5'	DOLG minutes
120			NR	_	\vdash	_	R8: 6 minutes
-77.4	120.5				片	_	
			2	120.8, 121.0, 121.6, 121.9, 122.0, 122.3' -	\vdash	_	
				Mechanical break (6), rough, undulating			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-05	SHEET	8	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NETHOD A	ND E	JUIPIV	IENT: CME 55 S/N 252345, mud rotary, NQ tools, HW c	asing		ORIENTATION: Vertical
WATER	LEVELS : 1.6	31 ft b	gs on (18/20		
≥∩≘	_ (9			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	1000	ROCK TYPE, COLOR,	CIZE AND DEDTIL OF CACING
불병은	JA H. H.	Q D (%)	12 E	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
E K	NG.	ΩC	AC R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
吕오리	SHR	A O	FR	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λS	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
				120.8-120.9' - Fracture zone, rough,		Limestone	
-			4	undulating, gravel-sized fragments <1/4" diameter, angular, no openings >1/4"	╁┈	- 120.5-121.0' - yellowish gray, (5Y 7/2), fine grained, mild to moderate	-
-	R9-NQ			121.9, 122.0' - fit tightly with opening up to	匚	HCl reaction, medium strong to	-
-	5 ft	24		1/16"	╂╫	strong (R3 to R4), small voids (1/16")	-
_	42%				\blacksquare	cover 15% of the surface 121.0-122.6' - light olive gray, (5Y	-
l _			NR		\perp	- 5/2), fine grained, mild to moderate	_
l _			INIX			HCl reaction, weak to medium strong	_
125					\vdash	(R2 to R3), small voids (1/16") cover	R9: 5 minutes
-82.4	125.5			_	ш	10-25% of the surface, moderately fossiliferous with fossil casts and	
_	120.0			125.5-126.4' - Fracture zone, horizontal and	T	molds about 5% of the surface	-
-			>10	70 deg, rough and smooth, undulating, rock	╁┈	No Recovery 122.6-125.5' Limestone	-
-				fragments from 3/16"-1-1/2" in size, few fragment faces match together	世	125.5-126.4' - yellowish gray, (5Y	-
-			>3	126.8' - Fracture, 20 deg, rough, undulating,	╨	 7/2), fine grained, strong HCl 	-
-	_			tight and open(1/8")	上口	reaction, very weak to weak (R1 to R2), few small voids (1/16"), 3/4"	l .
l _	R10-NQ 5 ft	34	1	127.1-127.2' - Fracture, horizontal, rough, undulating, open, some small (1/2")	┢	thick of light olive gray 5Y 5/2	_
	70%	34	'	fragments		limestone (slow HCl, medium strong	Driller's Remark: Hard
			>5	127.4' - Fracture, horizontal, smooth, planar	╨	R3]) is present (interval unknown	material at 128.0'
-				and undulating, open 127.6' - Fracture, horizontal, rough,	仜	uue to fractured nature of the interval)	-
1 400 -			NR	undulating, tight with some openings up to	╁	126.4-129.0' - light olive gray and	R10: 8 minutes
130 -87.4			INIX	1/16" —	╁	grayish orange, (5Y 5/2 and 10YR 7/4), mottled, fine grained, mild HCl	_
_	130.5			128' - Fracture, horizontal, rough, undulating, tight with some openings up to 1/16"	╀	reaction, weak to moderately strong	_
-			1	128.7-129.0' - Fracture zone, horizontal,	ш	(R2 to), moderately fossiliferous, few	_
l _				rough and smooth, undulating to planar,	一	small voids (1/16") cover about 20% of the area, large voids and fossil	_
				fragment faces do not fit together 130.55' - Fracture, horizontal, rough,	\bot	molds/casts up to 3/8"x9/16" cover	_
I -				undulating, open	Ш	5% at 127.2-127.4' is a zone of light	
	R11-NQ				╨	l olive grey (5Y 5/2) limestone, slow HCl reaction, medium strong to	Driller's Remark: Soft
-	5 ft 8%	7	NR		世	strong (R3 to R4), no small voids as	material throughout the run -
-	070				╁	fossil molds/casts, another 1" thick	-
_					匸	zone is present at about 129.0' No Recovery 129.0-130.5'	-
-					╨	- Limestone	D11: 1 minutes
135_				_	ፗ	130.5-131.0' - pale yellowish brown	R11: 1 minutes
-92.4	135.5				\perp	and grayish orange, (10YR 6/2 and 10YR 7/4), mottled, fine grained,	1 .
			7	135.55' - Fracture, horizontal, smooth, planar		moderate to strong HCl reaction,	
I -			'	and undulating, open 135.65, 135.75, 136.3, 136.35' - Fracture,	H	very weak (R1), small voids (1/16")	1
_			1	horizontal, smooth, planar, tight to open up to	$oldsymbol{\perp}$	- cover about 10%, 3/16" size cavities No Recovery 131.0-135.5'	_
-				1/8", appear to be bedding plane	廿	Limestone	-
-	R12-NQ			135.7-136.1' - Bedding plane 136.0, 136.2' - Fracture, horizontal, smooth,	╁	135.5-136.0' - yellowish gray and grayish orange, (5Y 7/2 and 10YR	-
-	5 ft	0		planar and undulating, open	世	7/4), mottled, fine grained, mild HCl	-
-	22%		NR	136.1-136.7' - rock fragments	╀	reaction, strong (R4), some thinly	-
-				136.5' - Fracture, horizontal, smooth, planar and undulating, open	ፗ	laminated bedding at 135.5-135.7', bedding angle 0-5 deg	-
_				5	╁╌	L 136.0-136.2' - yellowish gray, (5Y	_
140						7/2), fine grained, strong HCI	R12: 4 minutes
-97.4	140.5				\vdash	reaction, extremely weak (R0), very fossiliferous	
				140.5-140.7' - Fracture zone, smooth,	口		-
-			>10	undulating, 1/2" fragments	士	†	-
-					F		-
			L				1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-05	SHEET	9	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING METHOD AND EQUIP	MENT: CME 55 S/N 252345, mud rotary, NQ tools, HW ca	asing	ORIENTATION : Vertical
WATER LEVELS : 1.61 ft bgs or	n 6/14/07 START : 4/10/2007 END : 4/1	8/2007 LOGGER: R. Bitely, K. Coke, A	. Erickson, W. Elliott
	DISCONTINUITIES	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN LENGTH, AND RECOVERY (%) R Q D (%)	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
R13-NQ 2 2 12 44%	numerous fragments from 3/16"-2" in size 142.4-142.7' - Fracture, horizontal and 60 deg, rough, undulating, open, both fractures have several small (about 3/16") fragments	Limestone 136.2-136.6' - Same as 135.5-136.0' except thinly laminated bedding, bedding angle about 5 deg No Recovery 136.6-140.5 140.5-141.2' - dusky yellow, (5Y 6/4), fine grained, moderate HCI reaction, weak (R2), fossiliferous, small voids (1/16") cover about 25% of the surface, large voids (up to 3/16"x3/8") cover about 5% of the surface area	Driller's Remark: Become harder at 143.0'
- - - 5	145.7' - Fracture, 10 deg, rough, undulating, tight with some open up to 3/16" 146.0-146.4' - Fracture zone, rough and smooth, undulating, Numerous small fragments 3/16"-1" 146.4-147.0' - Fracture, 80 deg, smooth,	141.2-142.7' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, medium strong (R3), small voids (<1/16") cover 10% of the surface area, large voids (3/16"x3/4") cover about 5%, fossiliferous	Driller's Remark: Piece stuck in core, pullout, clean and then run last 2.0'
- R14-NQ 5 ft 80% 20 >10 - 2	undulating, tight 146.7' - Fracture, 5 deg, smooth, undulating, tight, appears to be along bedding plane 147' - Fracture, 10 deg, rough, undulating, open, few fragments 147.1' - Fracture or mechanical break, 45 deg rough, undulating, open	No Recovery 142.7-145.5' Limestone 145.5-146.2' - Same as 141.2-142.7' 146.2-148.6' - yellowish gray to grayish orange, (5Y 7/2 to 10YR 7/4), fine grained, moderate HCI reaction, medium strong (R3), thinly laminated	- - - R14: 22 minutes
-107.4 150.5 NF	147.4-148.2 - Fracture zone, norizontal and 70 deg, rough, undulating, several fragments - 1"-3" in size, undulating, many fragments fit together, fragments at 148.0' shows coring marks in 2 directions - 148.2' - Fracture, horizontal, smooth, planar, open -	bedding from 146.4-147.0' and 148.2-148.6', trace voids (1/16") 148.6-149.5' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), very fossiliferous (mold and casts), less than 1/16" size voids cover	
R15-NQ - 5 ft 16 6 - 66% 2 - 155 -112.4	undulating, some dark staining, gravel-sized	about 25% of the surface area. voids and fossil molds (up to 3/8"x3/4") cover 15% of the surface area, trace organics No Recovery 149.5-150.5' Limestone 150.5-151.7' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), small	R15: 8 minutes
- R16-NQ - 5 ft 30 46%	fragments 151.2-151.4' - Fracture (2), vertical and 70 deg, rough, undulating, dark, tight to open up to 3/16",10% stain coverage on both surface 151.5-151.9' - Fracture zone, horizontal and 60 deg, rough, undulating, several fragments up to 1-1/2", few pieces fit together 152.3, 152.4, 152.6, 152.9' - Fracture (4), 40 deg and 50 deg, rough, undulating, fracture in alternating direction, tight, some open up to 3/16"	voids (up to 1/16") cover about 15% surface, few large voids 151.7-153.8' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, strong (R4), fossiliferous, 2-13/32 zone of light olive gray (5Y 5/2) mottling at about 151.5', small voids (<1/16") cover 5% of surface, few larger voids (fossil molds) No Recovery 153.8-155.5' Limestone	- - - -
160 -117.4 160.5	152.6-152.9' - Fracture, 70 deg, rough, undulating, tight to open up to 1/16" 153.2' - Fracture, 55 deg, rough, undulating, dark, tight, 10% dark staining 153.3, 153.4' - Fracture (2), horizontal, smooth, undulating, open 153.4-153.55' - Fracture zone	155.5-155.6' - dark yellowish brown, (10YR 4/2), fine grained, strong to moderate HCl reaction, very weak (R1), laminated bedding, trace voids (<1/16")	R16: 5 minutes — SC-4 collected at 160.5- 161.4'

APPENDIX 2BB-819 Rev. 4



PROJECT NUMBER:	BORING NUMBER:			
338884.FL	E-05	SHEET	10 OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING	METHOD A	ND E	QUIPM	ENT : CME 55 S/N 252345, mud rotary, NQ tools, HW ca	asing		ORIENTATION: Vertical
WATER	LEVELS: 1.6	31 ft b	gs on 6	6/14/07 START : 4/10/2007 END : 4/	18/200	DOT LOGGER: R. Bitely, K. Coke, A.	Erickson, W. Elliott
≥ o ≎	(%			DISCONTINUITIES	ပ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 165 -122.4	R17-NQ 5 ft 32%	28	6 NR	153.7, 153.75' - Fracture (2), horizontal, smooth and undulating, rough and undulating, moderately tight 155.6' - Fracture, rough, planar, open 155.7-156.2' - Fracture, 70 deg, rough, undulating, tight and open (1/16") 156.7, 156.8' - Fracture, horizontal, rough, planar, open 157.2' - Fracture, 20 deg, rough, undulating, tight 157.4' - Fracture, 50 deg, rough, undulating, tight		Limestone 155.6-156.7' - light olive gray, (5Y 5/2), fine grained, mild HCI reaction, medium strong to strong (R3 to R4), small voids (<1/16") cover about 15% surface, moderately fossiliferous, few 3/16" fossil molds and casts 156.7-157.8' - dusky yellow, (5Y 6/4), fine grained, mild to moderate HCI reaction, very weak (R1), becoming weak to moderately strong (R2 to R3) by 157.6', laminated bedding 156.7-157.2', moderately	R17: 4 minutes
- - - -	R18-NC 5 ft 64%	17	4	tight 161.4' - Bedding plane, smooth, planar 161.8-162.1' - Bedding plane, horizontal, smooth, planar, open 165.5-165.9, 166.6' - Bedding plane (3), smooth, planar 166.2' - Fracture, horizontal, rough, undulating, open 166.4' - Fracture, horizontal, rough, undulating, open 166.7' - Fracture, 5 deg, smooth, undulating,		fossiliferous, small voids (<1/16") cover about 5% surface area, few large voids No Recovery 157.8-160.5' Limestone 160.5-162.1' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), fine grained, moderate HCI reaction, medium strong (R3), small voids (<12/16") cover 15% of the surface area, few large voids (3/16")	- - - - - -
170 -127.4	170.5		NR 4	open 167.1' - Fracture, 5 deg, rough, undulating, tight with open up to 3/16" 167.4, 167.9' - Fracture (2), horizontal, rough, undulating, open		No Recovery 162.1-165.5' Limestone 165.5-166.3' - Same as 160.5-162.1' 166.3-167.2' - moderate olive brown, (5Y 4/4), fine grained, mild HCl	R18: 12 minutes
_				167.7' - Fracture, 30 deg, rough, undulating, tight with open up to 1/16" - 168.1, 168.7' - Fracture (2), horizontal, rough,		reaction, medium strong (R3), small voids (<1/16") cover 50% of the surface area, few larger voids	
-	R19-NQ 5 ft 84%	45	>10	undulating, open 170.5-170.8' - Fracture, 80 deg, closed 170.8, 171.2, 172.0, 172.2' - Fracture (4), horizontal, rough, undulating		(3/16"), moderately fossiliferous, fragments of gray limestone (up to 3/8") inclusion from 167.0-167.2' 167.2-168.7' - yellowish gray, (5Y	
-	0470		>10	170.8-171.2' - Fracture, 80 deg, open up to 3/16" 171.7' - Fracture, horizontal and 40 deg, rough, undulating, dark		 7/2), mild to moderate HCl reaction, medium strong (R3), laminated bedding 168.0-168.2', small voids (1/16") cover 5% of the surface area 	
175 <u>-</u> -132.4	175.5		0 NR	172.5' - Fracture, 50 deg, dark gray, tight with open up to 3/16" 172.7' - Fracture, horizontal, smooth,		No Recovery 168.7-170.5' Limestone - 170.5-174.7' - light olive gray to	R19: 13 minutes —
-			>10	undulating, open 173.0-173.8' - Fracture zone, horizontal and		yellowish gray, (5Y 5/2 to 5Y 7/2), mild to moderate HCl reaction,	
			4	vertical, rough, undulating, dark, many 3/16"-2" size fragments, some faces are	H	- strong (R4), voids (up to 1/16") cover 10% surface area, zone of increased	
 180 -137.4	R20-NC 5 ft 30%	7	NR	smooth and planar 174.0, 174.1, 174.2' - Fracture (3), 5 deg, rough, undulating, open 174.4' - Fracture, 60 deg, smooth, undulating, tight 175.8, 175.9' - Fracture or mechanical break, 20 deg and 30 deg, rough, undulating, tight 175.8-176.0' - Fracture, vertical, rough, undulating, open 176.1-176.3' - Fracture zone, rough, undulating, several 1" size fragments, no		small voids (20%) from 173.4-173.6', fewer larger voids (3/16") No Recovery 174.7-175.5' Limestone 175.5-177.0' - Same as 170.5-174.7' except increased amount of voids (30%) from 175.9 to 176.5' No Recovery 177.0-180.5'	R20: 6 minutes
_			5	identifiable fracture angle 176.3, 176.4, 176.5, 176.55, 176.65' - Fracture, horizontal, rough, undulating, open		-	-
					1 T		

APPENDIX 2BB-820 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-05	SHEET	11	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.6	1 ft b	gs on (6/14/07 START : 4/10/2007 END : 4/1	18/20	007	LOGGER : R. Bitely, K. Coke, A.	Erickson, W. Elliott
≥0 ::	(9)			DISCONTINUITIES	Ō		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	(%) O	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	COR	ROI	FRA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		_		176.7, 177.0' - Fracture, horizontal, smooth,	Ĭ	t	Limestone	00.5 11 4.04.7
-			0	planar, open - 180.6, 180.7, 180.8, 180.9, 181.5, 181.6,		ł	180.5-180.8' - moderate yellowish brown, (10YR 5/4), fine grained,	SC-5 collected at 181.7 183.4'
-	R21-NQ		_	181.7" - Fracture (7), horizontal, smooth,	H	┲	moderate HCl reaction, weak (R2),	-
-	5 ft 72%	45	0	planar to undulating, openings ranging from - 1/16"-3/8", no faces match to other	H		thinly laminated bedding, few small voids (<1/16")	-
-			>10	181.4' - Fracture, horizontal, smooth, undulating, open -		Ť	180.8-181.7' - moderate yellowish brown, (10YR 5/4), fine grained,	_
				183.4' - Fracture, horizontal, rough,	L	4	moderate to strong HCl reaction,	
185_			NR	undulating, open 183.7-184.1' - Fracture zone, horizontal and —	L		very weak (R1), thinly laminated bedding (10 deg angle), zone of olive	R21: 9 minutes
-142.4	185.5			vertical, rough and undulating, smooth and planar, 1/2"-1- 1/2" size rock fragments	H		gray (5Y 3/2) lamination about 1/16"-3/16" thick with 1/2" spacing	
_				pianar, 1/2 -1- 1/2 size rock fragments			from 181.3-183.6'	_
-				-			183.4-183.7' - yellowish gray, (5Y 7/2), fine grained, mild to moderate	-
-				-		\vdash	HCl reaction, medium strong (R3), fragments (3/16"x3/8") of gray	-
-				-	ł		limestone present in the yellowish	-
-				-	ł		gray matrix, up to 1/16" voids cover about 15% of the surface area, up to	-
_				-	ł	$ \cdot $	3/16" voids cover 5% of the surface	-
-				-	İ		area 183.7-184.1' - light olive gray and	-
_				_	İ		grayish orange, (5Y 5/2 and 10YR 7/4), fine grained, mild HCl reaction,	1
1 -					1		medium strong (R3), thinly	
l _				_			laminated, few small voids (1/16") No Recovery 184.1-185.5'	
_				_			Bottom of Boring at 185.5 ft bgs on 4/18/2007	
_				-		F	4/10/2007	_
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-06	SHEET	1	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

						ry, auto nammer, Avvo rous, a			ORIENTATION: Vertical
WATER	LEVELS	: 5.5 ft bo	us on 5/0	2/U <i>1</i> S	START : 5/2/2007	END : 5/4/2007	LOGGE	≺ : C. T	
200				STANDARD		SOIL DESCRIPTION		- 8	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 11414	IE 11000 000110 0\41001	001.00	SYMBOLIC LOG	DEDTIL OF CACINIC DRILLING DATE
불병은		RECOVE	ERY (ft)			IE, USCS GROUP SYMBOL, E CONTENT, RELATIVE DEN		Ğ	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
TAY N			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MIN		ΜB	INSTRUMENTATION
SU				(N)				SΥ	
42.8	0.0				Poorly Gradeo	d Sand With Silt (SP-SM)			
_		1.1	SS-1	1-1-2	U.U-1.1' - DrOWI	nish black, (5YR 2/1), mois e grained, color grades to li	st, very loose, ight grav	125	_
-	4-5			(3)	√ (N7) below 0.6	b', 6% nonplastic fines, orga	anics /		=
-	1.5				decreasing with	h depth, silica sand	/ .	1	-
_								4	-
_								4	_
								1	_
-							•	1	_
_							•	1	-
								1	-
5 37.8	5.0				Sandy Fat Cla	v (CH)		1	_
- 37.0				1-3-4	5.0-6.0' - very l	light gray, (N8), moist, med	dium stiff,		_
_		1.0	SS-2	(7)	high plasticity.	no dilatancy, with iron oxid	le staining		_
	6.5				(5.0-5.3'), 25-3	80% very fine grained, trace	e organic /		
					(particles, silica	i Sanu		1	
-							•	1	-
-								1	-
-								-	-
_								4	_
_								1	_
10	10.0							1	
32.8					Sandy Lean C	lay (CL)			_
-		1.5	SS-3	1-2-3	10.0-11.5' - Sa	me as 5.0-6.0' except thin plasticity, 41% fine sand, s	light gray,	V ///	=
-		1.0		(5)	(IN7), medium p	piasticity, 41% line sand, s	andy seams	\ ///	-
-	11.5							<i>Y///</i>	-
_								4	_
_									_
							•	1	_
-							•	1	-
-								1	-
-								-	-
15	15.0				Canalis F-4 C	(CLI)			First regetion to UCI
27.8				1 4 7	Sandy Fat Cla	y (∪H) ame as 5.0-6.0'	/.		First reaction to HCI
		1.1	SS-4	1-4-7 (11)	Silt (ML)				
]	16.5			,	↑ 15.2-16.1' - gra	ayish orange, (10YR 7/4), r	moist, soft,	1''']
-					\ nonplastic, ver	y rapid dilatancy, mild to mery fine sand-sized, carbor	oderate HCI /	1	7
-					reaction, 5% Ve	ery illie saliu-sized, carbor	iate material	1	-
-								1	-
-								-	-
_								1	_
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20								1	1
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-06	SHEET	2	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS	: 5.5 ft b	gs on 5/02	2/07 5	START : 5/2/2007	
				STANDARD	SOIL DESCRIPTION O COMMENTS	
AND (#)	SAMPLE INTERVAL (ft) SAMPLE INTERVAL (ft) RECOVERY (ft) #TYPE 6"-6"-6" (N)		PENETRATION TEST RESULTS			
ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING RATE,	
LEV/			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
22.8	20.0			(14)	Clayey Sand (SC)	
-		1.3	SS-5	3-4-5	20.0-21.3' - yellowish gray, (5Y 8/1), moist to wet, loose, very fine to fine grained, no HCl reaction, 18%	-
-	21.5			(9)	medium to high plastic fines, silica sand	-
-	21.0				1	- 1
-					1	_
_					1	_
_					1	1
]	
]	
25	25.0					
17.8				8-20-49	Clayey Sand (SC) 25.0-25.2' - Same as 20.0-21.3' except dark yellowish	4
_		1.3	SS-6	(69)	\brown, (10YR 4/2), clay lens	4
_	26.5				Silty Sand With Limestone (SM) 25.2-26.3' - grayish orange to dark yellowish orange,	-
-					\((10YR 7/4 to 10YR 6/6), moist to wet, very dense, low plasticity, moderate HCl reaction, 15-20% low plastic	-
-					\fines, fine gravel-sized limestone, fine to coarse -	-
-					sand-sized, carbonate materials	-
-					-	-
-					 	-
30	30.0					-
12.8	30.0				Silty Sand With Limestone (SM)	
-		1.5	SS-7	31-31-55 (86)	30.0-31.1' - Same as 25.2-26.3'	- 1
-	31.5			(00)	Silt (ML)	
_					31.1-31.5' - light brown, (5YR 6/4), moist, hard, low plasticity, rapid dilatancy, mild HCl reaction, trace very	1
					fine sand-sized, carbonate material	
_]	
l _]]	_
-]]]	_
-					1 1	4
35 7.8	35.0				Silty Sand (SM)	_
'.0 -		1,		39-47-45	Silty Sand (SM) 35.0-36.3' - dark yellowish brown, (10YR 4/2), moist,	4
-		1.3	SS-8	(92)	very dense, fine to coarse grained, mild to moderate HCl reaction, 30% nonplastic fines, trace to 10% fine	-
-	36.5				gravel-sized limestone, carbonate material	-
-					1 1	-
-					1 1	-
-					1 1	-
-					1 1	-
-					1 1	1
40					1 1	1



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	F-06	SHEET	3	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

						ary, auto nammer, AVVJ rous,				
WATER	LEVELS	. 5.5 π bg	gs on 5/02		START : 5/2/2007	END : 5/4/2007 SOIL DESCRIPTION	LUGGE	κ:(T	: C. Sump COMMENTS	
≩Qæ⊺	0445: -	INITEDIC	1 (6)	STANDARD PENETRATION		SOIL DESCRIPTION		۲ ا	O	
ELO ON (SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL	. COLOR.	2	DEPTH OF CASING, DRILLING RATE,	
H B		RECOVE			MOISTURI	E CONTENT, RELATIVE DE	NSITY OR	ā	DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, MI	NERALOGY	> >	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
2.8	40.0 40.6	0.6	SS-9	56-50/1	Sandy Silt (M	L)		т		_
-	40.6	0.0	000	(106/7")	40.0-40.6' - gr	ayish orange to pale yellow 10YR 6/2), mottled, moist,	vish brown,	₩	 	-
-	1				coarse grained	d, nonplastic, rapid dilatan	cy, mild to	1		-
-	1				moderate HCI	reaction, 38% fine to coar	se	1		-
-	1				material	ace line graver-sized, carbi	onate	┨		-
-	1							┨		-
_	-							┨		-
-								┨		_
-								┨		-
								┨		-
45 <u> </u>	45.0			36-50/4	Sandy Silt (M	L)		+	\blacksquare	
-	45.8	0.3	SS-10	(86/10")	45.0-45.8' - Sa	ame as 40.0-40.6' except 1		$\parallel \parallel$		-
-					vertically exter	nded black organic seam f	rom	Ŧ		-
_	-							┨		-
-	-							┨		-
-	-							┨		-
-								┨		_
_								1		_
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-								┨		-
50 -7.2	50.0				Sandy Silt (M	L)		+	\mathbf{m}	
-		0.2	SS-11	25-43-45	50.0-51.2' - ye	ellowish gray, (5Y 7/2), moi	st, hard, fine	$\ \ $		-
-		0.2	33-11	(88)	to coarse grain HCl reaction.	ned, nonplastic, rapid dilat 33% fine to coarse sand-si	ancy, mild zed. trace	Ш		-
-	51.5					carbonate material, trace o		┨		-
-	-							┨		-
-	-							┨		-
-								┨		-
-	-							┨		-
-								┨		-
								+		-
55 <u> </u>	55.0			43-50/4	Silt With Sand	d (ML)		╁╖	\mathbf{m}	
-	55.8	0.8	SS-12	(93/10")	55.0-55.8' - Sa	ame as 50.0-51.2' except of	rading to	$\parallel \parallel$		-
-					thin organic le	wn, (5YR 4/4), 10-15% san	id-sized and	╫		-
-	-				(3 - 3 - 1			┨		-
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60							_	╁		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-06	SHEET	4	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS	: 5.5 ft bo	gs on 5/02	2/07 5	START : 5/2/2007 END : 5/4/2007	LOGGE	R : (: C. Sump	
>∩≎				STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		بر 🌡	COMMENTS	_
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, C	COLOR.	2	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
TH B		RECOVE	#TYPE	011 011 011	MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINE	SITY OR	2	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
PEP SUR ELE				6"-6"-6" (N)		INALOGI	5	S INSTRUMENTATION	
-17.2	60.0	0.1	\SS-13	50/1.5 (50/1.5")	Limestone Fragments 60.0-60.1' - vellowish gray (5Y 7/2) fine to	o coarse	T		
_				(00/1.0)	60.0-60.1' - yellowish gray, (5Y 7/2), fine to grained, mild to moderate HCl reaction, sa	nd-sized	1		
-					∖fragments		1		
-							┨		-
-							┨		-
-							1		-
-							1		-
]		
65	65.0 65.2		00.44	50/0.0			1	_	
-22.2		0.2	SS-14)	50/2.0 (50/2.0")	Limestone Fragments 65.0-65.2' - Same as 60.0-60.1'	/	Ŧ		-
-					Begin Rock Coring at 66.0 ft bgs		1		
-					See the next sheet for the rock core log		1		-
_							1		-
							1		_
_]		_
-							1		_
l							1		_
70 <u> </u>						_	┨		_
-							1		-
_							1		-
]		
_							1		_
_							1		_
-							┨		-
-							1		-
75							1		-
-32.2						_]		
_							1		_
_							1		_
-							1		-
-							1		-
-							1		-
							1		_
							1		_
80							\bot		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-06

SHEET 5 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

00111110	METHODY	10 0	<u> </u>	TENT : CIVIE 35 3/IN 232345, ITIUU TOLALY, INQ LOOIS, HVV C	asirig		ORIENTATION : Vertical
WATER	LEVELS: 5.5	ft bgs	s on 5	/02/07 START : 5/2/2007 END : 5/	4/200	7 LOGGER : C. Sump	
	<u></u>			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		လ္ပ	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
핊유현	ER'A	<u>@</u>	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΤΫ́ΕΫ́Ε	RE F GTF SOV	(%) Q	LD S	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	IBO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
		a a	-RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λ×	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
- 00 ш	66.0			66.0' - Fracture, horizontal, rough	1 0)	Limestone	Numerous low angle to
_	00.0		5	66.2' - Fracture, horizontal, rough		- 66.0-69.9' - pale yellowish brown,	vertical healed fractures -
				66.4' - Fracture, 45 deg, rough, semi planar	Ш	(10YR 6/2), fine to medium grained,	_
				66.6, 66.8, 67.3' - Fracture, 45 deg and 60	Н	strong HCl reaction, weak (R2),	
-			1	deg, non-planar		 dissolution along bedding plane lamination, spaced (1/16"-1/4"), voids 	1
-	R1-NQ			CO 1 CO 21 conditions	╁	(1/16"-3/16") cover 10% surface	-
-	5 ft	8	4	68.1-68.2' - sandy interbed 68.1, 68.5, 68.8, 68.9' - Fracture (4), rough,	皿	-	-
l _	78%			undulating, irregular, non-planar	┢┰	-	_
			>10	69.0-69.9 - Fracture zone (>10)			
70			- 10		Ш		
-27.2				_		No Recovery 69.9-71.0'	R1: 5 minutes
-			NR	-	╁	=	-
1 -	71.0			71 0 72 0' Eractura zona fragmenta	Ľ	Limestone	-
1 -			>10	71.0-72.0' - Fracture zone, fragments	\Box	Limestone - 71.0-72.3' - Same as 66.0-69.9'	0.5" organic seam -
						except very weak (R1), increasing	3
				72.0-73.0' - Fracture zone, fragments		percent small voids, friable	
-			>10	-	╁	 72.3-75.6' - moderate yellowish brown, (10YR 5/4), very fine to fine 	1
-	R2-NQ			73.1' - Fracture, vertical, rough, undulating	仜	grained, very weak to weak (R1 to	-
-	5 ft	23	1	75.1 - Fracture, vertical, rough, undulating	+	 R2), finely laminated, trace 	-
_	72%			<u>.</u>		voids/cavities, dissolution texture	_
_			7	74.1, 74.2, 74.4, 74.5, 74.6, 74.8, 74.8, 74.9' -	$oldsymbol{oldsymbol{eta}}$	along the bedding plane (1/4" thick)	
75			′	Bedding plane or mechanical break (8), <5			
-32.2			2	deg, rough, planar, open <1/16" — 75.1-75.2' - Fracture or mechanical break, 80	╁		R2: 8 minutes
-			NR	deg and vertical, rough, planar, tight		L No Recovery 75.6-76.0'	1
-	76.0		INIX		₩	Limestone	Intact core 19.2" (76.1-
-			0		\vdash	- 76.0-78.3' - grayish yellow to	77.7') break to reduce size -
I _				_		orangish gray, (5Y 8/4 to 10YR 7/4),	SC-1 collected at 76.1-
						strong HCl reaction, weak (R2),	76.9'
			>10	77.7-78.1' - Fracture zone, <1/2" fragments	Ш	 voids (up to 1/16") cover 15-20% of the surface, cavities up to 3/4" 	1
-	R3-NQ		0	11.1-10.1 - Tracture zone, \1/2 magnients	╁	diameter (10-20 per foot), fossil	1
-	5 ft	33		-	匚	 molds and solution cavities, dark 	-
-	46%				╀┼	brown /black staining on some larger cavities, light to dark gray fine	-
I -			l		口	- grained inclusions, rip up clasts	
80			NR		┢	between 77.0-77.5', needle-like	
-37.2				_		organic imprints on fracture surface,	R3: 4 minutes
-	81.0				\vdash	 dark brown layering visible over 3/4" zone 	1
-	01.0			91 1 91 2 91 4 91 5! Eracture or	仜	No Recovery 78.3-81.0'	-
-			4	81.1, 81.2, 81.4, 81.5' - Fracture or mechanical break (4), rough, irregular	+	_ Limestone	-
-						81.0-84.0' - Same as 76.0-78.3' except strong HCl reaction, voids] -
			2	82.1' - Fracture, rough, planar, dark	$oldsymbol{oldsymbol{oldsymbol{\square}}}$	(1/16") and cavities cover 15-25% of	
				gray/black, possible organic pyrite 82.4' - Fracture, rough, undulating		the surface, fossiliferous with molds	1
	R4-NQ			82.9-83.3' - Fracture zone, percent of large		and casts (lot more than molds)	1
-	5 ft	37	>10	cavities (>1/2") increasing in this zone	╁	-	-
-	60%		\vdash		ш	No Recovery 84.0-86.0'	-
-					\vdash	- 140 Necovery 0-4.0-00.0]
85			NR				
-42.2			'*'`		\vdash		R4: 4 minutes
1	86.0			-		-	1
	55.0				1		
1							
			I		_		I

APPENDIX 2BB-826 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-06	SHEET	6	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

			<u> </u>	IENT . CIVIE 33 3/N 232343, ITIUU TOLATY, NQ LOOIS, HW C				ORIENTATION : Vertical
WATER	LEVELS: 5.5	ft bg	s on 5	/02/07 START : 5/2/2007 END : 5/4	1/200	Z LOGGER : C. Sump	_	
> -	<u> </u>			DISCONTINUITIES	(n	LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,		
	N. 4.5.	(9)	滿		윽	MINERALOGY, TEXTURE,		SIZE AND DEPTH OF CASING,
FAC	E R OVE	(%) Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,		FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E RE	S E S	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	AND ROCK MASS CHARACTERISTICS		DROPS, TEST RESULTS, ETC.
Δош	0715	ď	шп		S			
					Н	No Recovery 86.0-89.7'		Driller's Remark: 86.0-89.5'
					Ш	_		very soft; possible void, - lost 20 % circulation, no
-				-	┧	_		recovery likely in this zone
_				-	Н	_		-
			NR					
	R5-NQ							
_	5 ft 26%	7		-	Н	_		1
-	20%			-	ш	_		-
-				-	Н	Limestone		_
90						89.7-89.9' - yellowish gray, (5Y 7/2),		
-47.2			>10	89.9' - Discontinuity (sharp) between moderately dense limestone and limestone		 very fine to fine grained, strong HCl reaction, medium strong (R3), 		R5: 3 minutes
_			10	with large percent voids, possible missing	Н	fossiliferous, voids (1/16"-1/8") cover		-
-	91.0			material	H	 15-20% of the surface, trace oval 		-
-			>10	89.9-91.0' - Fracture, rough, irregular		cavities (up to 1/2") (possible fossil	П	
				fractures on 2-4" core pieces, 1"-2" zone of		molds) molds and casts, black	Ш	Clay interbed 91.7-92.2'
				fragments 1/2"-1-1/2" in size (upper weathered/bleached)	1 44	│ infilling in some voids, sharp contact │ with below	Н	i î
-			2	91.0-91.2' - Fracture zone, 3/4"-1-3/45" size	ш	89.9-91.2' - yellowish gray to pale		-
_	DC NO			fragments	ш	- olive, (5Y 7/2 to 10 Y 6/2), medium		-
1 _	R6-NQ 5 ft	15	2	91.6' - Fracture or mechanical break, rough,	Ш	strong (R3), fossiliferous, voids	Ц	_
	70%		_	undulating	ШШ	(1/4"-3/4" solution cavities) cover 25-30% of the surface, smaller	Ш	SC-2 collected at 92.6-
			1	91.7, 92.2' - Fracture, sharp contact between limestone and gravelly lean clay (CL)	Ш	fragments appear weathered or		93.4'
				interbed	H	bleached possible void related, dark	Ш	-
95 <u> </u>				92.7' - Fracture, planar and stepped, parting —	\Box	black (possible lignite) and light gray		R6: 8 minutes
-52.2			NR	surface on end of core piece, fine laminations	Н	fine (silt sized) infilling in some voids		Steady drill rate across run -
	96.0			93.5' - silt interbed (nonplastic)		91.2-91.7' - Same as 89.9-91.2' except yellowish gray, (5Y 7/2), very	Ш	oloddy driir fale deross fair
			0	93.9' - sharp contact with limestone 94.1' - Fracture or mechanical break, vertical,	Н	fine to fine grained, 1/16"-1/8" voids	Ш	Driller's Remark: 100%
-			L	rough, undulating	Н	cover the surface	Ш	loss of circulation at 97.0'
-				-	ш	Lean Clay (CL)		below ground surface
_				_	Н	91.7-92.2 - yellowish gray, (5Y 7/2),		_
						medium plasticity, strong HCl		
-	R7-NQ			-	Ш	reaction, few gravel-sized (1/4"-3/4") limestone fragments at 91.7-91.8',		1
-	5 ft	11		-	Н	25% fine silt		-
-	14%		NR	-	口	92.6-93.5' - yellowish gray, (5Y 7/2),		-
					Н	strong HCl reaction, medium strong		_
100					Ш	to strong (R3 to R4), fine grained silt		
-57.2				_	\mathbb{H}	Limestone 92.2-92.6' - yellowish gray, (5Y 7/2),		R7: 3 minutes
-				-	╁┼┤	fine grained, weak (R2), finely		Driller's Remark: Possible -
-	101.0			-	Ш	- laminated (1/10"-1/4")		void 100.0-102.0' Driller's Remark: Void at
			NR	<u>-</u>	\vdash	_ Silt (ML)		100.0-102.0' based on
			' ' '		Ш	93.5-93.9' - moderate yellowish		barrel advancement ("fell"),
1 7				-	Ш	brown, (10YR 5/4), nonplastic, few gravel-sized (1/16-3/16") limestone		setting temporary casing at
-			0	-	Н	fragments (<10%)		106.0'
-	DO NO			-		Limestone		-
1 _	R8-NQ 5 ft	0			Ш	_ 93.9-94.5' - moderate yellowish		_
	20%				Ш	brown, (10YR 5/4), moderate HCI		
1				-	П	reaction, weak (R2), small voids		1
			NR	-	╁┼┤	cover 20-30% of surface No Recovery 94.5-96.0'		-
105 <u> </u>				_	ш			D9: 4 minutes
-02.2				_	H	_		R8: 4 minutes
	106.0				Н			1



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-06	SHEET	7	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.5	ft bgs	s on 5/	/02/07 START : 5/2/2007 END : 5/-	4/2007	7 LOGGER : C. Sump	
≥∩≘	. (9			DISCONTINUITIES	၂ ဥ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S L	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	074	22	шФ	THIORNEGO, GON AGE GTAINING, AND HOTTNEGO	S	Limestone	
			1	-	H	- 96.0-96.7' - pale yellowish brown,	_
1 4				106.8-107.7' - Fracture zone, limestone	Н	(10YR 6/2), strong HCl reaction, very weak (R1), fossiliferous, up to 1/16"	1
1 4			>10	fragments	Н	voids cover 20-25% of surface,	1
				107.7-108.5' - Bedding plane, horizontal,	П	cavities/molds up to 1/2" cover 5-7%,	_
	R9-NQ 5 ft	39	>10	smooth to slightly rough, planar, 1/2"-1" spacing	Ш	easily broken by hand, punky texture No Recovery 96.7-102.0'	_
	84%				Н	Limestone Fragments	_
			1	109.4, 110.0' - Fracture (2), horizontal, rough,	Н	102.0-103.0' - Same as 96.0-96.7' - except yellowish gray, (5Y 7/2), fine	_
110				undulating	H	grained, moderate HCl reaction,	
-67.2			_1_	_	Н	weak (R2), 1"-2" fragments, medium strong to strong, almost conchoidal	R9: 5 minutes
	111.0		NR		H	fracture	
			>10	111.0-112.0' - Bedding plane, <5 deg, rough, planar, 1/2"-2" spacing, open to 1/8"	Ш	No Recovery 103.0-106.0' Limestone	
					H	106.0-110.2' - grayish orange, (10YR 7/4), strong HCl reaction, very weak	
			0	_		(R1), voids (1/16"-1/8") cover	Driller's Remark: 112.5- 114.0' possible void -
			١	_	Ш	10-15% of the surface, larger	
	R10-NQ 5 ft	0		_	ш	cavities/fossil molds (up to 1/2") cover less than 5% (variably spaced)	_
	42%	Ū		_		but in concentrated in zones, white	_
			ND		Н	chalky carbonate infilling in some cavities/molds, limestone 1-1/2"	_
115_			NR	_		fragments from 107.0-107.7', 1/2"-1"	
-72.2					Ш	horizontal partings (bedding plane) from 107.7-108.5'	R10: 2 minutes
	116.0			_	Н	No Recovery 110.2-111.0'	_
			2	116.0-116.2' - Fracture zone, limestone fragments	Н	_ 111.0-112.0' - Same as 106.0-110.2'	Easily broken by hand "rotten rock" -
				11ŏ.2, 116.7, 117.1, 117.2, 117.6, 118.0,	Щ	except 1/2"-2" horizontal partings Silt (ML)	_
			3	118.5, 118.8, 119.2, 119.3' - Bedding plane (10), horizontal, rough, undulating -	Ш	_ 112.0-112.6' - grayish orange, (6YR	_
				(10), nonzonial, rough, and adding	Ы	7/4), nonplastic, strong HCI reaction	_
	R11-NQ 5 ft	70	3	_		Limestone 112.6-113.1' - Same as 111.0-112.0'	_
	98%				Ħ	No Recovery 113.1-116.0'	
			2	_	H	Limestone 116.0-120.9' - very pale orange,	
120			_	119.7-119.9' - Fracture zone, limestone	Н	(10YR 8/2), medium to coarse	
-77.2			2	fragments 120.2' - Fracture (60), rough, semi planar	P	grained, strong HCl reaction, very weak to weak (R1 to R2), up to 1/16"	R11: 4 minutes
	121.0		NR /	\	Щ	size voids cover 25% of the surface,	
			4	120.9' - Bedding plane, horizontal, slightly rough, planar	Ш	1/4" cavities and fossil molds cover up to 5% surface	
			7	121.3, 121.7, 121.8' - Fracture (3), horizontal,	Н	No Recovery 120.9-121.0'	
			2	rough, undulating 121.9' - Fracture, 30 deg, rough, undulating	Ħ	_ 121.0-126.0' - Same as 116.0-120.9'	
			_	122.2' - Fracture, 45 deg, rough, semi planar 122.6' - Fracture, 45 deg, rough, semi planar	H	except slightly more competent, 123.5-126.0' zone of weak rock (R2)	
	R12-NQ 5 ft	60	0	122.0 - Fracture, 45 deg, rough, Semi planar	Н	- 125.5-120.0 ZOHE OF WEAK TOCK (RZ)	
	100%	00	J	_	\mathbb{H}	_	
			2	104 4 104 7 105 21 Freeture or bodding	Щ	_	
125				124.4, 124.7, 125.3' - Fracture or bedding plane (3), horizontal, slightly rough,	Ш		
-82.2			1	undulating, open to <1/8"	Н	_	R12: 4 minutes
	126.0		1		ဓ		

APPENDIX 2BB-828 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-06	SHEET	8	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

		10 20	<u> </u>	IENT: CME 55 S/N 252345, mud rotary, NQ tools, HW c	asirig		ORIENTATION : Vertical
WATER	LEVELS: 5.5	ft bgs	on 5/	02/07 START : 5/2/2007 END : 5/4	1/2007	LOGGER : C. Sump	
300	~			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUF	COP	RQ	PEF P	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
- - - - - 130	R13-NQ 5 ft 88%	45	3 3	126.5' - Fracture, 45 deg, rough, undulating, non planar, irregular 127.6, 127.8' - Fracture (2), horizontal, rough, irregular 127.9' - Fracture, 60 deg, rough, semi planar, dark gray thin coating on surface (possible pyrite) 128.1, 128.3, 128.4' - Fracture (3), rough, undulating, semi planar parting		Limestone 126.0-130.4' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak (R1), small voids (1/16-1/8") cover variable percent of surface area, cavities up to 1/2" cover less than 5% of surface, easily broken by hand, fossil molds filled with white chalk carbonate material, at 129.9' abrupt color change to very light yellowish gray (5Y 8/1)	SC-3 collected at 126.6- 127.6' -
-87.2	131.0		3 NR	129.0-130.0' - Fractures, vertical, undulating, dark gray coating, 1.3' length		No Recovery 130.4-131.0'	R13: 5 minutes
-			>10	131.0-131.3' - Fracture, limestone fragments - -		Limestone - 131.0-133.3' - Same as 126.0-130.4' -	-
-	R14-NQ 5 ft	33	1 >10	132.9' - Fracture, horizontal, smooth 133.2' - Fracture, horizontal, smooth,		- - - 133.3-134.3' - pale olive gray to	-
-	66%	33	0	limestone fragments		dusky yellow, (10Y 6/2 to 5Y 6/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3),	-
135 <u> </u>	136.0		NR			trace fine lamination (<1/16") No Recovery 134.3-136.0'	R14: 6 minutes
-			>10	136.0' - Dark gray/black fine grained particulate staining/coating on some fracture faces (possible pyrite) 136.4' - Fracture, <10 deg, rough, undulating,		Limestone 136.0-138.0' - very light gray, (N8), strong HCl reaction, weak to medium strong (R2 to R3), cavities lenticular	Driller's Remark: Void 135.0-138.0'
-	R15-NQ		>10	open 136.55' - Fracture or mechanical break, 60 deg and 70 deg, rough, undulating, tight		in shape up to 3/4", fossil casts and molds up to 1/2" (gastropod) No Recovery 138.0-141.0'	-
- - 140	5 ft 40%	0	NR	136.7' - Mechanical break, 10 deg and 20 deg, rough, undulating, tight 137.2-137.4' - Fracture zone, no visible orientation, 1/2" width total core diameter fragments		- - -	-
-97. <u>2</u> -	141.0			-		- Limestone	R15: 5 minutes
-			>10	2" angular to sub angular, fine black particles on fracture faces (possibly pyrite or organics)		 141.0-143.6' - yellowish gray to olive gray, (5Y 7/2 to 5Y 5/2), strong HCI reaction, medium strong (R3), 	-
-	R16-NQ 5 ft	15	>10	141.7-142.3' - Fracture (3), 45 deg and 60 deg, rough, planar, healed 141.8, 142.3' - Fracture (2), 50 deg, rough, planar, open 1/8"		variable zones of voids/cavities (up to 1/2")	-
- 145_ -102.2 -	60% 146.0		NR	142.4, 142.55' - Mechanical break (2), <5 deg, rough, planar, open 142.55-143.8' - Fracture zone, 40 deg and 60 deg, fragments to 3" angular 143.9' - Mechanical break, <5 deg, rough, planar, open (1/4")		143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities (1/4"-3/4"), weak slightly friable medium coarse sand-sized particles No Recovery 144.0-146.0'	R16: 12 minutes

APPENDIX 2BB-829 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-06	SHEET	9	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	INETHOD A	ND EC	JUIPIV	MENT: CIME 55 S/N 252345, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
WATER	LEVELS: 5.5	ft bgs	s on 5	/02/07 START : 5/2/2007 END : 5/	4/200	LOGGER : C. Sump	
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
E H	N.Y.	(9)	FRACTURES PER FOOT		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAE	E SYE	Q D (%)	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F S S	RNA	g	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	⋝	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	OIK	œ	ша		S	CHARACTERISTICS	
				146.0-147.0' - Bedding plane, horizontal,	\vdash	Limestone	
-			>10	planar, numerous partings spaced at	т	- 146.0-147.0' - dark yellowish orange,	-
-				1/2"-1-1/2" apart	ш	_ (10YR 8/6), coarse grained, strong HCl reaction, weak (R2), friable	-
_			2	147.3' - Fracture, 60 deg, rough, undulating,	ш	- disaggregates into medium	_
			_	semi planar fracture	Н	sand-sized particles, numerous small	
	R17-NQ			147.6' - Fracture, 30 deg, rough, semi planar		voids over 30% of surface	
-	5 ft	29	2	148.2' - Fracture, 10 deg, rough, planar	ш	- 147.0-149.4' - medium gray to	SC-4 collected at 148.3-
_	74%			148.3' - Fracture, 50 deg, slightly rough, semi planar	$+ \Box$	yellowish gray, (N5 to 5Y 7/2), very fine to fine grained, mild HCl	149.4'
			3	· ·		reaction, medium strong (R3),	_
150				149.4-149.7' - Bedding plane, horizontal,	Н	1/16"-3/16" size voids concentrated	
-107.2			NID		Ш	in thin (<1/10") horizontal zones	R17: 7 minutes
-			NR		口	spaced at 6"-1.2' apart	-
_	151.0				${\mathbb H}$	149.4-149.7' - moderate yellow	_
				151.1' - Fracture, horizontal, rough,	Ш	brown and yellowish gray, (10YR 5/4), laminated, contorted wavy	
1 7			2	undulating	П	bedding planes	1
-				151.3' - Fracture, vertical, rough, undulating	Н	No Recovery 149.7-151.0'	-
_			3	to non planar, 3" long 152.1' - Fracture or mechanical break, 60	一	Limestone	=
				deg, rough, undulating	Щ	151.0-155.5' - light olive gray to	<u>_</u>
	R18-NQ			152.1, 152.5' - Fracture, horizontal, rough	Н	yellow gray, (5Y 5/2 to 5Y 7/2), moderate HCl reaction, very weak to	
-	5 ft	33	9	153.0, 155.5' - Fractures (2), horizontal,		weak (R1 to R2), sparse voids	-
-	90%			rough, planar to undulating	╀	(1/16"-1/8"), and cavities (up to 1/2")	-
_			4		Н	above 152.5', percent of voids	_
155			_			increase beyond 152.5', 25-30%	
-112.2			3	_	Н	porous by volume, somewhat friable	R18: 5 minutes
-			NR		+	disaggregates into medium sand-sized particles, voids/cavities	-
-	156.0		INIX	450.0.450.41. 5	ш	oriented horizontally, cavities	=
			2	156.0-156.4' - Fracture zone, limestone fragments	Н	increase in size (up to 1-1/4") with	_
			_	156.4, 156.7' - Bedding plane, horizontal,		depth	
_				smooth, planar	Ш	No Recovery 155.5-156.0'	-
-			1	157.5' - Fracture or mechanical break, 15	+	Limestone Fragments 156.0-156.4' - Same as 151.0-155.0'	-
				deg, rough, undulating		- except slough	Redox changes possibly _
	R19-NQ		4	157.7' - Fracture, sharp contact with grayish	Ш	Limestone	
	5 ft 60%	35	1	yellow limestone (surfaces do not match)	\mathbb{H}	156.4-157.7' - very pale orange,	1
-	0070			158.9' - Fracture, horizontal, smooth, planar	口	- (10YR 8/2), fine to medium grained,	-
-					ш	strong HCl reaction, weak (R2), very	_
160_			NR		Н	small voids (1/16"), fossiliferous — (1/16"-1/8")	
-117.2			INIT		Ħ	157.7-159.0' - yellowish gray to	R19: 7 minutes
-	404.0				ш	grayish yellow, mottled with light	-
-	161.0				H	gray, (5Y 7/2 to 5Y 8/2 mottled with	-
_			4	161.3, 161.4, 161.5' - Bedding plane (3),	\Box	N7), very fine to medium grained,	_
			,	horizontal, smooth, planar	Ш	strong HCl reaction, medium strong (R3), sharp contact	
				161.9' - Fracture, horizontal, rough, planar	\mathbb{H}	No Recovery 159.0-161.0']
-			3	162.5-162.6' - Fracture zone, contact with	口	Limestone	Change in redox conditions
_				olive brown limestone, limestone fragments	ш	_ 161.0-162.4' - medium gray, (N 5),	
	R20-NQ	0	>10	162.7' - Fracture or mechanical break,	Н	moderate HCl reaction, medium	
	5 ft 88%	U	/10	vertical	\Box	strong (R3), with thin yellowish gray]
-	0070			162.9' - Fracture, horizontal, rough, non	ш	 lamination zones of small cavities (<3/4"), 6"-8" spacing otherwise tight 	-
-			.40	planar 163.3, 163.4, 163.5, 163.6' - Fracture (4),	H	and dense, sharp contact	-
165_			>10	horizontal, smooth, planar —	口		
-122.2				163.5-163.8' - Fracture zone, limestone	$\vdash \vdash$		R20: 9 minutes
	166.0		NR	fragments	Ш	=	1
-	166.0				$+ \exists$		

APPENDIX 2BB-830 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-06	SHEET	10	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

MATERIE (PURE 5: 58 flower on 50/007 START 5: 50/2007 SPACE 5 SPACE SPACE 5				<u> </u>	TENT . CIVIE 33 3/N 232343, Mud Totally, NQ 10018, HW C	aog		ORIENTATION: Vertical
Section Company Comp	WATER	LEVELS: 5.5	ft bgs	s on 5	/02/07 START : 5/2/2007 END : 5/	4/200	7 LOGGER : C. Sump	
170		_			DISCONTINUITIES	(n	LITHOLOGY	COMMENTS
170	SQ €	5%		S	DESCRIPTION	┫╗╽	DOOK TYPE OOLOD	
170	E P ON	Ã, ₹Š	<u></u>	쀭片	DECOMI HOW	<u></u>		
170	ATI	S.E.S	%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
170	FR	88855 5055	ص ص	AC R	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	
170	SC	822	æ	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROTO, TEOT REGGETO, ETG.
deg, non planar 10 deg, non planar 10 deg, non planar 168.0 - 166.5 - Fracture zone, limestone 168 planar 168.0 - 166.5 - Fracture in mechanical break, 40 deg, 167.1 - 167.4 - Bedding plane, horizontal, smooth 168.5 - Fracture, 167.7 - Bedding plane, horizontal, smooth 168.5 - Fracture, 167.7 - Bedding plane, horizontal, smooth 168.5 - Fracture, 167.7 - Bedding plane, horizontal, smooth 168.5 - Fracture, 167.7 - Bedding plane, horizontal, smooth 168.5 - Fracture, 167.7 - Bedding plane, horizontal, smooth 168.5 - Fracture, 167.7 - Bedding plane, horizontal, smooth 168.5 - Fracture, 167.7 - Bedding plane, horizontal, smooth 168.5 - Fracture, 167.7 - Bedding plane, horizontal, smooth 168.5 - Fracture, 168.5					164.2-165.4' - Fracture, <25 deg and >70		Limestone	
1-10	-			>10	deg, non planar	╂┼┼	 162.4-163.4' - moderate olive brown, 	1
10 166.5 - Fracture or mechanical break, horizontally oriented exiltes (up to 17) in zones, this medium gray limestone fragments simply and the property of the property o						₽		
horizontal, rough, undulating 17-167 - Bedding plane, horizontal, rough 170 - 1272 1710 - 170 -						Н		
167.1-167.4 - Bedding plane, horizontal, rough 168.5 - Fracture 2 horizontal 169.7 - Bedding plane, horizontal 169.7 - Bedding plane, horizontal 169.7 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 169.1 - Bedding plane, horizontal 171.0 - 171.2 - Fracture 171.0 - 171.2 - Fracture 171.0 -	_			>10				1
170	-	D04 N0			norizontal, rough, undulating	₩		1 4
167.7 Bedding plane, horizontal rough 168.4 168.5 Fracture (2), horizontal, rough 168.4 168.5 Fracture (3), horizontal, rough 168.4 168.5 Fracture (3), horizontal 168.4 168.5 Fracture (3), horizontal 168.4 168.5 Fracture (4), horizontal 168.5 Fracture (4), horizontal 168.5 Fracture (4), horizontal 168.5 Fracture (4), horizontal 168.5 Fracture (4), horizontal 168.5 Fracture (4), horizontal 168.5 Fracture (4), horizontal 168.5 Fracture (4), horizontal 168.5 Fracture (4), horizontal 169.5 Fracture (4), h				,		Н		
170 1710 188.4 168.5 - Fracture (2), horizontal, rough 168.4 168.5 - Fracture or mechanical break, 45 deg, smooth 188.9 - Fracture, horizontal, smooth 168.9 - Fracture, horizontal, smooth 168.1 - Bedding plane, horizontal, smooth 168.1 - Bedding plane, horizontal, smooth 1710			40	4		\top		
170 10 168.5 - Fracture or mechanical break, 45 169.5 - Fracture or mechanical break, 45 169.5 - Fracture, horizontal, rough 168.5 - Fracture, horizontal, rough 168.5 - Fracture, horizontal, smooth 168.9 - Fracture, horizontal, mooth 168.9 - Fracture, horizontal, smooth 16	-	0070				ш		1
deg, smoth 186,3" - Fracture, horizontal, rough, undulating 186,1" - Bedding plane, horizontal, smooth 189,4" - Fracture, horizontal, smooth 189,4" - Fracture, horizontal, smooth 189,4" - Fracture, horizontal, smooth 189,4" - Fracture, horizontal, smooth 189,4" - Fracture, horizontal, smooth 189,4" - Fracture for fragments 189,4" - Fracture for fragments 180,4" - Bedding plane, horizontal, signity 170,4" - 172 - Fracture zone, angular limestone fragments 171,2 171,4" - Fracture zone, angular limestone fragments 171,4" - 174 - Fracture zone, angular limestone fragments 171,4" - 174 - Fracture zone, angular limestone fragments 171,4" - 174 - Fracture zone, angular limestone fragments 171,4" - 174 - Fracture zone, angular limestone fragments 171,4" - 174 - Fracture zone, angular limestone fragments 171,4" - 174 - Fracture zone, angular limestone fragments 171,4" - 174 - Fracture zone, angular limestone fragments 171,4" - 174 - Fracture zone, angular limestone fragments 171,4" - 174 - Fracture zone, angular limestone fragments 171,4" - 174 - Fracture zone, angular limestone fragments 171,2 171,4" - Fracture zone, angular limestone fragments 172,1" - Fracture zone, inmestone fragments 173,2" - Fracture, horizontal, rough, 171,8" - Fr	_			>10		╆┼		_
171.0 NR 169.1* Bedding plane, horizontal, smooth 169.4* - Fracture, horizontal, smooth 169.4* - Fracture, horizontal, smooth 169.4* - Fracture, horizontal, smooth, planar, limestone fragments (1/4*-1/2* links) frough, fracture faces indicate partial recystallization 171.0:171.2* - Fracture zone, angular limestone fragments 171.2* - Tracture zone, angular limestone fragments 171.2* - Tracture is on a 5* core piece 171.4* - Tracture, horizontal, smooth, 171.8* - Fracture, horizontal, smooth, 171.8* - Fracture, increased in the fragments 171.8* - Fracture, horizontal, smooth, 171.8* - Fracture, increased in the fragments 171.8* - Fracture, horizontal, smooth, 171.8* - Fracture, horizontal, smooth, 171.8* - Fracture, horizontal, smooth, 171.8* - Fracture, horizontal, smooth, 171.8* - Fracture, horizontal, smooth, 171.8* - Fracture, horizontal, smooth, 171.8* - Fracture, horizontal, smooth, 171.8* - Fracture, horizontal, smooth, 171.8* - Fracture, horizontal, smooth, 171.8* - Fracture, horizontal, smooth, planar, ontact with fine grained limestone 171.0* - Tracture, horizontal, smooth, planar, inmension sarings across the zone, parting interval range from 1/4*-4* with most between 1/2*-2*2* laminated to very thinly bedded limestone 171.0* - Tracture, horizontal, smooth, planar, inmension, planar, inmension, planar, inmension, planar, inmension, planar, inmension, planar, inmension, planar, ontact with fine grained limestone 171.0* - Tracture, portzontal, smooth, planar, inmension, planar, inme	170				deg, smooth	Н		
171.0 NR 169.1* Bedding plane, horizontal, smooth 169.4* - Fracture, norizontal, line grained limestone 169.4* - Fracture, horizontal, smooth, planar, limestone fragments (170.1-170.4* - Fracture, horizontal, sightly rough, fracture faces indicate partial recrystallization 171.0-171.2* - Fracture zone, angular limestone fragments (171.0-171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, rough 171.2* - Fracture, horizontal, smooth, planar, contact with hine grained limestone 171.2* - Fracture horizontal, rough 171.2* - Fracture, horizontal, smooth, planar, limestone 171.2* - Fracture horizontal, smooth, planar, contact with hine grained limestone 171.2* - Fracture horizontal, smooth, planar, limestone 171.2* - Fracture horizontal, smooth, planar, contact with hine grained limestone 171.2* - Fracture horizontal, smooth, planar, contact with hine grained limestone 171.2* - Fracture horizontal, smooth, planar, contact with hine grained limestone 171.2* - Fracture horizontal, s	-127.2			2				R21: 10 minutes
17.0 10 10 10 10 10 10 10	-					+		1
Section Sect		171.0		INIX		┰┼]
16.0 - 170.4 -				امدا		\Box		
smooth, planar, limestone fragments (1/4"-1/2" thick) 170-1-170.4" - Fracture, horizontal, slightly rough, fracture faces indicate partial recrystallization 171.0-171.2" - Fracture zone, angular limestone fragments 171.2.171.2" - Fracture and court in core piece 171.4" - Fracture is on a 6" core piece 171.4" - Fracture is on a 6" core piece 171.8" - Fracture, horizontal, rough 172.1-172.2" - Fracture zone, limestone fragments 172.2-172.4" - Bedding plane, horizontal, smooth, planar, contact with fine grained to strong (R3) R23-NO St 1 42 5 88% 42 5 88% 42 5 88% 42 6 5 71.2", and such as a few contact with fine grained to strong (R3) 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	-			>10				1 1
Section Sect	-			\vdash		╁┷		1 -
R22-NO 5 ft 0 2 10 170.1-170.4 - Fracture, horizontal, slightly rough, fracture faces indicate partial recrystallization 1710.1-17.2 - Fracture zone, angular limestone fragments 1712.17.12 - Fracture zone, angular limestone fragments 1712.17.14 - Fracture zone, angular limestone fragments 1712.17.14 - Fracture zone, angular limestone fragments 1712.17.12 - Fracture zone, angular limestone state in this pedded zones 4".6" thick or 20.3 of intervals, with fine grained zones rock is weak (R2) to medium strong (R3) of intervals, with fine grained zones rock is weak (R2) to medium strong (R3) of intervals, with fine grained zones rock is weak (R2) to medium strong (R3) of intervals, with fine grained zones rock is weak (R2), fine grained zones rock is weak (R2) to medium strong (R3) on intervals, with fine grained zones rock is weak (R2), fine grained zones roc				>10		┰		l J
recrystalization of thick on 2.0-3.0 intensity spacing constitution of thin thing bedded zones with higher void content, thing the device process once voids with higher void content, thing the device process and occur in zones with higher void content, thing the praints, with fine grained investors of thick on 2.0-3.0 intensity thing the device process once voids with fine grained investors of thick on 2.0-3.0 intensity thing t				-10		T		
Figure 1 of the process of the proce	-	R22-NO				ш	zones (1/2"-1-1/2" thick) on 1.0-1.5'	1
171.0.171.2 - Fracture zone, angular limestone fragments or core piece 1714.4.171.8 - Mechanical break, 80 deg, rough undulating, fracture is on a 5" core piece 1714.8 - Fracture, horizontal, rough, 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.9 - Mechanical break, 45 deg, rough 171.0 - 172.4 - grayish yellow grading to yellowish gray, (5Y 8/4 to 5Y 7/2), fine grained, moterate to strong HCI reaction, weak (R2), finer grained in the horizontal and show, voids (1/16"-1/8") concentrate to strong HCI reaction, weak (R2), finer grained in thin horizontal and show, voids (1/16"-1/8") and very thin beds (1/16"-1/8") and v	_			>10		+		1
171.2, 171.4". Fracture or mechanical break, horizontal, smooth, 45 deg fracture on 3" core piece 171.4.171.8" - Mechanical break, 80 deg, rough, undulating, fracture is on a 5" core piece 171.8" - Fracture, horizontal, rough 171.9" - Mechanical break, 45 deg, rough 172.1" - 172.2" - Fracture zone, limestone fragments 172.2-172.4" - Bedding plane, horizontal, smooth, planar, numerous partings across the zone, parting interval range from 1/4" - with most between 1/2"-2", laminated to very thinly bedded limestone 178.3" - Fracture, horizontal, rough, undulating 176.3" - Fracture, horizontal, rough, undulating 177.6, 177.7, 177.8" - Bedding plane (3), horizontal, smooth 178.3", Fracture, horizontal, smooth, planar, contact with fine grained impestone 178.8" - Fracture, horizontal, smooth, planar, contact with fine grained impestone 178.8" - Fracture, horizontal, smooth, planar, contact with fine grained impestone 178.8" - Fracture, horizontal, smooth, planar, contact with fine grained impestone 178.8" - Fracture, horizontal, smooth, planar, contact with fine grained impestone 178.8" - Fracture, horizontal, smooth, planar, contact with fine grained impestone 178.8" - Fracture, horizontal, smooth, planar and undulating 179.9" - Fracture zone, limestone 178.8" - Fracture, horizontal, smooth, planar, contact with void rich limestone below 178.6" - Fracture contact with fine grained impestone 178.8" - Fracture, horizontal, smooth, planar, contact with the above, viold scholar plane, horizontal, smooth, planar, with prograined zones rock is weak (R2) in medium strang dezones rock is weak (R2) to medium strang dezones rock is weak (R2) to medium strang dezones rock is weak (R2) to medium strang dezones rock is weak (R2) to medium strang dezones rock is weak (R2) to medium strang dezones rock is weak (R2) to medium strang dezones rock is weak (R2) to medium strang dezones rock is weak (R2) to medium strang dezones rock is weak (R2) to medium strang dezones rock is weak (R2) to medium strang dezones rock is weak (R2) to me						Н		
horizontal, smooth, 45 deg fracture on 3" core piece 171.4-171.8". Mechanical break, 80 deg, rough, undulating, fracture is on a 5" core piece 171.4-171.8". Mechanical break, 80 deg, rough, undulating, fracture is on a 5" core piece. R23-NO 5ft 88% 42 5 with most between 1/2"-2", laminated to very thinly bedded limestone 2 think bedded limestone 176.3" - Fracture, horizontal, rough undulating 177.6, 177.7, 177.8" - Bedding plane (3), horizontal, smooth, planar, contact with void rich limestone 178.3" - Fracture, horizontal, smooth, planar, contact with fine grained limestone 178.8" - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.8" - Fracture, horizontal, smooth, planar, contact with fine grained limestone 178.8" - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.9" - Fracture void rich simestone 178.8" - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.8" - Fracture or mechanical break, 80 deg, rough 179.0" - Fracture to an a fracture is on a 5" core piece 171.0-174.4" - grayish yellow grading to yellowish grayin, (5° 84/4 to 5 172). If grained, moderate to strong HCI reaction, weak (R2), fine grained in thin horizontal zones along deling plane (1/2"-1.172.2") void rich zones, fine grained laminated zones, high void zones spaced at 1.0" No Recovery 174.4-171.0" (1/16"-1/8") and very thin beds (1/12"-1.172.0") void rich zones, fine grained laminated zones, high void zones spaced at 1.0" No Recovery 174.4-171.0" (1/16"-1/8") and very thin beds (1/12"-1.172.0") void rich zones, fine grained laminated zones, high void zones spaced at 1.0" No Recovery 174.4-171.0" (1/16"-1/8") and very thin beds (1/12"-1.172.0") void rich zones, fine grained laminated zones, high void zones spaced at 1.0" No Recovery 174.4-176.0" Limestone 172.0" void rich zones, fine grained minated zones, high void zones spaced at 1.0" No Recovery 174.4-176.0" Limestone 175.0-176.0" Limestone 175.0-176.0" Limestone 175.0-176.0" Limestone 176.0" Limestone 176.0" Lime				>10		Ш		
redum strong (R3) No Recovery 170.4-171.0' Limestone 171.0-174.4' grayrish yellow grading to yellowish gray, (SY 8/4 to SY 7/2), fine grained, moderate to strong HCI reaction, weak (R2), 2171.2'' - Fracture zone, limestone fragments 172.2-172.8' - Bedding plane (3), horizontal, smooth planar, contact with vide rigaried limestone 178.0' - Fracture, horizontal, mooth, planar, contact with fine grained limestone 178.0' - Fracture, horizontal, smooth, planar, contact with vide rigaried limestone 178.0' - Fracture, horizontal, smooth, planar, contact with vide rigaried limestone 178.0' - Fracture, horizontal, smooth, planar, contact with vide rigaried limestone 178.0' - Fracture, horizontal, smooth, planar, contact with vide rigaried limestone 178.0' - Fracture, horizontal, smooth, planar, contact with vide rigaried limestone 178.0' - Fracture, horizontal, smooth, planar, contact with vide rigaried limestone 178.0' - Fracture, horizontal, smooth, planar, contact with vide rich limestone below 178.0' - Fracture cone, limestone 178.0' - Fracture, horizontal, smooth, planar, contact with vide rich limestone below 178.8' - Fracture cone, limestone 178.0' - Fracture cone, limestone 178.0' - Fracture cone, limestone 178.0' - Fracture, horizontal, smooth, planar, contact with vide rich limestone below 178.8' - Fracture, horizontal, smooth, planar, contact with vide rich limestone below 178.8' - Fracture, rough, non planar and undulating 179.0' - Fracture, forigontal, smooth, planar, contact with vide rich limestone below 178.0' - Fracture, horizontal, smooth, planar, contact with vide rich limestone fragments 179.0' - Fracture, forigontal, smooth, planar, contact with vide rich limestone fragments 179.0' - Fracture, forigontal, smooth, planar, contact with vide and plane (3), horizontal vide fraction, wask (R2), 1716.0' 179.0' - Fracture, forigontal, smooth, planar, ontact with fine grained dimensione fragments in size from 147-1' - 102' void rich zones, fine grained dimensione fragments in size from 147-1' - 102' void ric	-					╁		1
171.4-171.8' - Mechanical break, 80 deg, rough, undulating, fracture is on a 5" core piece 171.8' - Fracture, horizontal, rough 172.1-172.2' - Fracture zone, limestone fragments 172.2-172.4' - Bedding plane, horizontal, smooth, planar, numerous partings across the zone, parting interval range from 1/4"-4" with most between 1/2"-2", laminated to very thinly bedded limestone 176.3' - Fracture, horizontal, rough, undulating 177.6, 177.7, 177.8' - Bedding plane (3), horizontal, smooth 178.3' - Fracture, horizontal, smooth 178.3' - Fracture, horizontal, smooth 178.3' - Fracture, horizontal, smooth 178.3' - Fracture, horizontal, smooth planar, contact with fine grained limestone 178.8' - Fracture, horizontal, smooth 178.3' - Fracture, horizontal, smooth planar, contact with void rich limestone 179.6 - 179.5' - Fracture zone, limestone 176.3' - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.8' - Fracture, horizontal, smooth, planar, contact with wold rich limestone 178.8' - Fracture zone, limestone 176.3' - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.8' - Fracture zone, limestone 176.3' - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.8' - Fracture zone, limestone 178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.6' - Tracture, horizontal partings 1"-2" spacing in 177.3-178.3' 178.3-178.6' - moderate olive brown, (5Y 4/4), strong to strong (R3 to R4), sharp contact with the above, interbed 178.6-180.4' - Same as 178.3-178.6' except olive brown, (5Y 4/4), strong H36.6-180.4' - Same as 178.3-178.6' except olive brown, (5Y 4/4), strong H36.6-180.4' - Same as 178.3-178.6' except olive brown, (5Y 4/4), strong H36.6-180.4' - Same as 178.3-178.6' except olive brown, (5Y 4/4), strong H36.6-180.4' - Same as 178.3-178.6' except olive brown, (5Y 4/4), strong H36.6-180.4' - Same as 178.3-178.6' except olive brown, (5Y 4/4), strong H36.6-180.4' - Same as 178.3-178.6' except olive brown, (5Y 4/4), strong H36.6-18						₽		I
rough, undulating, fracture is on a 5" core piece 171.8' - Fracture, horizontal, rough 171.9' - Hechanical break, 45 deg, rough 172.1-172.2' - Fracture zone, limestone fragments 172.2-172.4' - Bedding plane, horizontal, smooth, planar, contact with five plane; 180 -137.2 181.0 180 -137.3 180 -137.2 181.0 180 -137.3 180 -137.2 181.0 180 -137.3 180 -137.2 181.0 180 -137.3 180 -137.2 181.0 180 -137.3 180 -137.3 180 -137.2 181.0 180 -137.3 180 -137.2 181.0 180 -137.3 180 -137.2 180 -138.4 180 -139 -139 -139 -139 -139 -139 -139 -139	-132.2			NR		Н		
171.8 - Fracture, horizontal, rough 171.9 - Mechanical break, 45 deg, rough 172.172.2 - Fracture zone, limestone fragments 172.2-172.4 - Bedding plane, horizontal, smooth, planar, numerous partings across the zone, parting interval range from 1/4"-4" with most between 1/2"-2", laminated to very tinly bedded limestone 176.3 - Fracture, horizontal, rough, undulating 177.6, 177.7, 177.8 - Bedding plane (3), horizontal, smooth 178.0 - 178.3 - Fracture, horizontal, smooth, planar 2		176.0						Start of Snift 5/4/07
171.9 - Mechanical break, 45 deg, rough 172.1-172.2' - Fracture zone, limestone fragments 172.2-172.4' - Bedding plane, horizontal, smooth, planar, numerous partings across the zone, parting interval range from 1/4"-4" with most between 1/2"-2", laminated to very thinly bedded limestone 176.3' - Fracture, horizontal, rough, undulating 177.6, 177.7, 177.8' - Bedding plane (3), horizontal, smooth 178.0, 178.1, 178.15' - Bedding plane (3), horizontal, smooth 178.8' - Fracture, horizontal, smooth, planar, contact with fine grained limestone 178.8' - Fracture, horizontal, smooth, 180.4' - Seedding plane, horizontal, smooth 180.15' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 181.0 182NQ 181.0 182NQ 182NQ 183.0 184.0 185142.2 185142.2 185142.2 186.180.4' - Bedding plane, horizontal, smooth, planar 187.2-172.4' - Bedding plane, horizontal, strong pring grained, mioderate to strong, weak (R2), finer grained than above, volds (1716"-18") concentrated in thin horizontal zones along bedding plane dath and bove, volds (1716"-18") concentrated in thin horizontal zones along bedding plane dath and bove, volds (1716"-18") concentrated in thin horizontal zones along bedding plane dath and bove, volds (1716"-18") concentrated in thin horizontal zones along bedding plane along bedding plane along bedding plane along bedding plane and undulating 177.6, 177.7, 177.8' - Bedding plane (3), horizontal, smooth 178.0, 178.1, 178.15' - Bedding plane, horizontal, smooth 178.0, 178.1, 178.15' - Bedding plane, horizontal, smooth, 178.0, 178.1, 178.15' - Bedding plane, horizontal, smooth, 178.0, 178.1, 178.15' - Bedding plane, horizontal, smooth, 178.0, 178.1, 178.15' - Bedding plane, horizontal, smooth, 178.0, 178.1, 178.15' - Bedding plane, horizontal, smooth, 178.0, 178.1, 178.15' - Bedding plane, horizontal, smooth, 178.0, 178.1, 178.15' - Bedding plane, horizontal, smooth, 178.0, 178.1, 178.15' - Bedding plane, horizontal, smooth, 178.0, 178.1, 178.15' - Bedding	-	176.0				╂┷┤		1 -
171.9 - Mechanical break, 45 deg, rough 172.1-172.2' - Fracture zone, limestone fragments 172.2-172.4' - Bedding plane, horizontal, smooth, planar, numerous partings across the zone, parting interval range from 1/4"-4" modulating 177.6, 177.7, 177.8' - Bedding plane (3), horizontal, smooth 178.0, 178.1, 178.15' - Bedding plane (3), horizontal, smooth 178.3' - Fracture, horizontal, smooth, planar, contact with fine grained imestone 178.3' - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.6' - Fracture or mechanical break, 75 deg, rough 179.5' - Fracture or mechanical break, 75 deg, rough 180.4' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 4 172.1-172.2' - Fracture zone, limestone 178.6' finer grained than above, voids (1/16"-1/4") concentrated in thin horizontal than above, voids (1/16"-1/4") and very thin beds (1/16"-1/4") and very thin	_			1		╆┯		
R23-NO 5 ft 88% 42				·				
180 -137.2 181.0 181.0 1823-NQ 188% 180 -137.2 181.0						ш		1
smooth, planar, numerous partings across the zone, parting interval range from 1/4"-4" and very thin beds with most between 1/2"-2", laminated to very thinly bedded limestone 176.3' - Fracture, horizontal, rough, undulating 177.6, 177.7, 177.8' - Bedding plane (3), horizontal, smooth 178.0, 178.1, 178.15' - Bedding plane (3), horizontal, smooth 178.3' - Fracture, horizontal, smooth, planar, contact with fine grained limestone 178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone below 178.8-179.0' - Fracture zone, limestone fragments 179.1' - Fracture zone, limestone fragments 179.1' - Fracture rough, non planar and undulating 179.95' - Bedding plane, horizontal, smooth, planar, contact with the above, interbed 179.6, 179.7' - Fracture, rough, non planar and undulating 179.95' - Bedding plane, horizontal, smooth, planar 180.4' - Beddin	-			3	tragments	+		-
the zone, parting interval range from 1/4"-4" with most between 1/2"-2", laminated to very thinly bedded limestone 176.3' - Fracture, horizontal, rough, undulating 177.6, 177.7, 177.8' - Bedding plane (3), horizontal, smooth 178.0, 178.1, 178.15' - Bedding plane (3), horizontal, smooth 178.3' - Fracture, horizontal, smooth, planar, contact with fine grained limestone 178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone 178.8-179.0' - Fracture zone, limestone fragments 179.1' - Fracture or mechanical break, 75 deg, rough 179.95' - Bedding plane, horizontal, smooth, planar and undulating 179.95' - Bedding plane, horizontal, smooth, planar and undulating 179.95' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizont					smooth planar numerous partings across	廾		
with most between 1/2"-2", laminated to very thinly bedded limestone 176.3" - Fracture, horizontal, rough, undulating 177.6, 177.7, 177.8" - Bedding plane (3), horizontal, smooth 178.0, 178.1, 178.15" - Bedding plane (3), horizontal, smooth 178.8" - Fracture, horizontal, smooth, planar, contact with fine grained limestone 178.8" - Fracture, horizontal, smooth, planar, contact with vioid rich limestone below 178.8" - Fracture, horizontal, smooth, planar, contact with vioid rich limestone below 178.8" - Fracture, horizontal, smooth, planar, contact with vioid rich zones, fine grained laminated zones, high void zones spaced at 1.0" No Recovery 174.4-176.0' Limestone 176.0-178.3" - moderate olive brown, (5Y 4/4), weak (R2), cavities ranging in size from 1/4"-1" cover 5-8% of surface, cavities elongated in horizontal direction, horizontal partings 1"-2" spacing in 177.3-178.3" tracture or mechanical break, 75 deg, rough 179.1" - Fracture or mechanical break, 75 deg, rough 179.9" - Fracture, rough, non planar and undulating 179.9" - Fracture, rough, non planar and undulating 179.95" - Bedding plane, horizontal, smooth 180.15" - Bedding plane, horizontal, smooth, planar 180.4" - Bedding plane, horizontal, smooth, planar 180.4" - Bedding plane, horizontal, smooth, planar 180.4" - Bedding plane, horizontal, smooth, planar 180.4" - Bedding plane, horizontal, smooth, planar 180.4" - Bedding plane, horizontal, smooth, planar 180.4" - Bedding plane, horizontal, smooth, planar 180.4" - Bedding plane, horizontal, smooth, planar 180.4" - Bedding plane, horizontal, smooth, planar, contact with the above, interbed 178.6-180.4" - Same as 178.3-178.6" except olive brown, (5Y 4/4), weak (R2), rating laminated 200s provable provabl								
thinly bedded limestone 178.3' - Fracture, horizontal, rough, undulating 177.6, 177.7, 177.8' - Bedding plane (3), horizontal, smooth 178.0, 178.1, 178.15' - Bedding plane (3), horizontal, smooth 178.3' - Fracture, horizontal, smooth, planar, contact with fine grained limestone 178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone below 178.8-179.0' - Fracture zone, limestone fragments 179.0' - Fracture zone, limestone fragments 179.0' - Fracture zone, limestone fragments 179.0' - Fracture zone, limestone fragments 179.0' - Fracture zone, limestone fragments 179.0' - Fracture zone, limestone fragments 179.0' - Fracture zone, limestone fragments 179.0' - Fracture zone, limestone grained laminated zones, high void zones spaced at 1.0' No Recovery 174.4-176.0' Limestone 176.0-178.3' - moderate olive brown, (5Y 4/4), weak (R2), cavities ranging in size from 1/4'-1' cover 5-8% of surface, cavities elongated in horizontal direction, horizontal partings 1"-2" spacing in 177.3-178.3' 178.3-178.6' - moderate yellowish gray, (5Y 7/2), very fine to fine grained laminated zones, high void zones spaced at 1.0' Limestone 176.0-178.3' - moderate olive brown, (5Y 4/4), weak (R2), cavities ranging in size from 1/4'-1' cover 5-8% of surface, cavities elongated in horizontal direction, horizontal partings 1"-2" spacing in 177.3-178.3' 178.3-178.6' - moderate yellowish gray, (5Y 7/2), very fine to fine grained laminated zones, high void zones spaced at 1.0'	-		42	5		\dashv		1 1
180 -137.2 181.0 181.	-	88%		<u> </u>		╂┼┤		1 4
undulating 177.6, 177.7, 177.8' - Bedding plane (3), horizontal, smooth 181.0					176.3' - Fracture, horizontal, rough,	┢┼	zones spaced at 1.0'	
-137.2 181.0 1	180			+				1
181.0 181.0 181.0 178.0, 178.1, 178.15' - Bedding plane (3), horizontal, smooth 178.3' - Fracture, horizontal, smooth, planar, contact with fine grained limestone 178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone below 178.8-179.0' - Fracture zone, limestone fragments 185 - 142.2 185 - 142.2 181.0 178.0, 178.1, 178.15' - Bedding plane (3), horizontal, smooth, planar, contact with fine grained limestone and the planar in size from 1/4"-1" cover 5-8% of surface, cavities elongated in horizontal direction, horizontal direction, horizontal direction, horizontal direction, horizontal direction, horizontal direction, horizontal direction, horizontal direction, horizontal direction, horizontal direction, horizontal direction, horizontal direction, horizontal direction, horizontal direction, horizontal strong to strong (R3 to R4), sharp contact with the above, interbed 178.6-180.4' - Same as 178.3-178.6' except olive brown, (5Y 4/4), strong HCI reaction, weak (R2), 1/16"-1/8" size voids cover 20-30% of surface, porous, laminated No Recovery 180.4-181.0'				2		╁╨		R23: 12 minutes
horizontal, smooth 178.3' - Fracture, horizontal, smooth, planar, contact with fine grained limestone 178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone below 178.8-179.0' - Fracture zone, limestone fragments 179.1' - Fracture or mechanical break, 75 deg, rough 179.6, 179.7' - Fracture, rough, non planar and undulating 179.5' - Bedding plane, horizontal, smooth, planar 185142.2 horizontal, smooth, planar, contact with fine grained limestone below 178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone below 178.8-179.0' - Fracture zone, limestone 178.3-178.6' - moderate yellowish 178.3-178.6' - moderate yellowish 179.1' - Fracture or mechanical break, 75 deg, rough 179.6, 179.7' - Fracture, rough, non planar and undulating 179.5' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar	_					+		-32
178.3' - Fracture, horizontal, smooth, planar, contact with fine grained limestone 178.8' - Fracture, horizontal, smooth, planar, contact with fine grained limestone 178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone below 178.3-178.6' - moderate yellowish gray, (5Y 7/2), very fine to fine grained, mild HCl reaction, medium strong to strong (R3 to R4), sharp contact with the above, interbed 179.6, 179.7' - Fracture, rough, non planar and undulating 179.95' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 4 180.4' - Bedding plane, horizontal, smooth, planar 5 180.4' - Bedding plane, horizontal, smooth, planar 6 180.4' - Bedding plane, horizontal, smooth, planar 7 180.4' - Bedding plane, horizontal, smooth, planar 8 180.4' - Bedding plane, horizontal, smooth, planar 9 180.4' - Bedding plane, ho		181.0		NR				
R24-NQ Tagging 185 185 185 186 187 188 188 188 188 188 188	1 7					Ш		1 1
178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone below 178.8' - Fracture zone, limestone 178.8' - Fracture zone, limestone 178.8' - Fracture zone, limestone 178.3-178.6' - moderate yellowish gray, (5Y 7/2), very fine to fine grained, mild HCl reaction, medium strong to strong (R3 to R4), sharp contact with the above, interbed 179.6, 179.7' - Fracture, rough, non planar and undulating 179.9' - Bedding plane, horizontal, smooth 179.9' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar No Recovery 180.4-181.0'	-			1		+		1 -
contact with void rich limestone below 178.8-179.0' - Fracture zone, limestone fragments 179.1' - Fracture or mechanical break, 75 deg, rough 179.6, 179.7' - Fracture, rough, non planar and undulating 179.95' - Bedding plane, horizontal, smooth 180.15' - Bedding plane, horizontal, smooth, planar 3 contact with void rich limestone below 178.3-178.6' - moderate yellowish gray, (5Y 7/2), very fine to fine grained, mild HCI reaction, medium strong to strong (R3 to R4), sharp contact with the above, interbed 178.6-180.4' - Same as 178.3-178.6' except olive brown, (5Y 4/4), strong HCI reaction, weak (R2), 1/16"-1/8" size voids cover 20-30% of surface, porous, laminated No Recovery 180.4-181.0'							partings 1"-2" spacing in 177.3-178.3']
R24-NQ 5 ft 100% 185 -142.2 R24-NQ 5 ft 100% R24-NQ 5 ft 100% 100% R24-NQ 5 ft 100% 179.1' - Fracture or mechanical break, 75 deg, rough 179.6, 179.7' - Fracture, rough, non planar and undulating 179.95' - Bedding plane, horizontal, smooth 180.15' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 3 180.4' - Bedding plane, horizontal, smooth, planar 4 No Recovery 180.4-181.0'							178.3-178.6' - moderate yellowish	
R24-NQ 5 ft 100% 100%				2		╁┼	gray, (5Y 7/2), very fine to fine	1 1
S ft 100%	-	DO4 NO		\vdash		╂╫		1
179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.7' - Fracture, rough, non planar and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and undulating 179.6, 179.9' - Bedding plane, horizontal, smooth and un				9		\Box]
185 -142.2 185 -142.2 3 180.4' - Bedding plane, horizontal, smooth, planar 180.15' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, porous, laminated 180.4' - Bedding plane, horizontal, smooth, planar 180.4' - Bedding plane, horizontal, smooth, planar 180.5' - Salva &]
185 -142.2 179.95' - Bedding plane, horizontal, smooth 180.15' - Bedding plane, horizontal, smooth, 180.15' - Bedding plane, horizontal, smooth, 180.4' -	-					╁┼┤		1 1
185	-			2		+	HCI reaction, weak (R2) 1/16"-1/8"	-
-142.2 planar planar porous, laminated No Recovery 180.4-181.0'								1
Too.1 Bounding plane, nonzonal, onlocal,	-142.2				planar	Ш		1 7
186.0 planar	-	400.0		3		+	No Recovery 180.4-181.0'	1 1
	-	186.0		-	planar	Ħ		

APPENDIX 2BB-831 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-06	SHEET	11	OF	11

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

WATER	LEVELS : 5.5	ft bgs	s on 5/	/02/07 START : 5/2/2007 END : 5.	4/200	07	LOGGER : C. Sump	
>00	(6			DISCONTINUITIES	G		LITHOLOGY	COMMENTS
N (#	AND ≪≪%		ES T	DESCRIPTION) FO	Γ	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG		MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	COF LEN LEN REG		FRA PER		N/S		Limestone 181.0-186.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, weak to medium strong (R2 to R3), fossiliferous (molds and casts) and voids (1/16-1/8") in horizontal zones 2"-4" thick and 1"-1-1/2" spaced apart, trace cavities (up to 3/4"), fossils and larger voids show preferred orientation (horizontal), fossil and void poor material is finely laminated with dark gray lamination < 1/8" thick, spaced variably throughout the rock, horizontal parting are bedding plane controlled, Inclined laminations in sections, cross bedding possible Bottom of Boring at 186.0 ft bgs on 5/4/2007	DROPS, TEST RESULTS, ETC. R24: 12 minutes Inclined laminations in sections, cross bedding possible Complete coring at 08:50 AM
-					+	╁		-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-07	SHEET	1	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS	: 3.0 ft bo	gs on 6/06	6/07	START : 6/5/2007 END : 6/7/2007 LOGGER : J. E	Burkard, C. Dellaria, B. Ellis
				STANDARD	SOIL DESCRIPTION	COMMENTS
AND A	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	ŌT	
H H H		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION
41.7	0.0				Organic Material (OL)	
-		1.1	SS-1	1-2-2 (4)	\0.0-0.1' - plant roots Poorly Graded Sand (SP)	_
-	1.5			(4)	\setminus 0.1-1.1' - olive gray to light olive gray, (5Y 3/2 to 5Y	-
-					\5/2), moist, loose, no HCl reaction, silica present	_
-					1 1	-
-					1 1	-
-					1 1	_
-					1 1	_
-					1 1	_
5	5.0				1 1	7
36.7					Poorly Graded Sand With Silt (SP-SM) 5.0-6.0' - dusky yellow to yellowish gray, (5Y 6/4 to 5Y	\neg
-		1.0	SS-2	8-8-6 (14)	7/2), wet, loose, no HCl reaction, mottling at 5.6-5.7'	_
-	6.5			(14)		_
-					1 1	
					1 1	
]	
					1 1	
_					1 1	_
-					1 1	_
10	10.0				1 1	_
31.7		0.9	SS-3	25-50/5	Lean Clay (CL)	
-	10.9	0.5	30-3	(75/11")	10.0-10.1' - pale blue, (5BP 6/2), low plasticity Organic Material (OL)	_
_					\\10.1-10.3' - brownish black, (5YR 2/1), contains roots	_
					Silt (ML)	
					moderate to strong HCI reaction	
]	
_]	
					1 1	
]	
15	15.0					
26.7	15.4	0.4	SS-4	50/4.5 (50/4.5")	Silt (ML)	
_				(30/4.3)	15.0-15.4' - grayish yellow, (5Y 8/4), wet, soft to medium stiff, moderate to strong HCl reaction	
_						
]	
]	
] [
_]	
_]	
_]	
20						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-07	SHEET	2	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS	: 3.0 ft bo	gs on 6/06	6/07	START : 6/5/2007	END: 6/7/2007	LOGGE	R : J.	Burkard, C. Dellaria, B. Ellis
				STANDARD		SOIL DESCRIPTION		_ 	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE		PENETRATION TEST RESULTS 6"-6"-6"	MOISTURE	E, USCS GROUP SYMBOI E CONTENT, RELATIVE DE CY, SOIL STRUCTURE, M	ENSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SCE				(N)				SΥ	
21.7 - - - -	20.8	0.0	SS-5	50/3 (50/3")	\ trace voids on	egments yellow, (5Y 8/4), mild HC fragment surfaces, trace y little recovery	I reaction, fossil casts	- - - - -	-
- - 25_ 16.7 -	25.0	1.0	SS-6	18-25-35 (60)	Silt With Sand 25.0-26.0' - gra soft to medium	I (ML) ayish orange, (10YR 7/4), stiff, delayed moderate I	wet to moist, HCI reaction	- - - - -	- - - - - - -
- - - - - 30	26.5							- - - - -	- - - - - -
11.7	31.5	0.9	SS-7	4-13-6 (19)	Silty Sand (SN 30.0-30.9' - dar soft, delayed m	I) rk yellowish orange, (10Y noderate HCl reaction	'R 6/6), wet,	- - - - -	
35 6.7 - - - - -	35:0 35:2	0.0	SS-8	50/2 (50/2")	Limestone Fra 35.0' - few lime chips too small	estone chips recovered in	split spoon,	- - - - - - - -	- - - - - - - - - - - - - - - - - - -
40									_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-07	SHEET	3	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

						END : 0/7/0007			ONIENTATION : VEILICAI
WATER	LEVELS	. 3.U II DQ	ıs on 6/00		START : 6/5/2007	END: 6/7/2007 SOIL DESCRIPTION	LUGGER	i : J.	Burkard, C. Dellaria, B. Ellis COMMENTS
≥□⊋				STANDARD PENETRATION		OUIL DEOCHIPTION		၅	COIVIIVIEN I S
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAN	ME, USCS GROUP SYMBOL,	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BE ATIC		RECOVE	RY (ft)		MOISTUR	RE CONTENT, RELATIVE DEN	ISITY OR	30	DRILLING FLUID LOSS, TESTS, AND
FE			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, MIN	IERALOGY	YME	INSTRUMENTATION
<u> </u>	40.0			(N)	Cila Wiah Lima	estana Francosta (MI)		S	
1.7	40.0			5-11-13	40.0-41.25' - r	estone Fragments (ML) moderate yellowish brown, (10YR 5/4)]	_
I _		1.3	SS-9	(24)	wet, medium s	stiff, moderate to strong HC	I reaction, _		_
	41.5			` ′	gravel size pa	articles up to 1"		Ш	
							_	1	
_							-	1	
-							-	1	-
-							-		-
-							-	•	-
_							_		_
_							_		_
45	45.0 45.3								
-3.3	45.3	0.3	SS-10	50/3	Silt With Lime	estone Fragments (ML) Same as 40.0-41.25'		Ш	
				(50/3")	\45.0-45.25 - 8	Same as 40.0-41.25	/ -		
-							_	1	_
-							-	1	-
-							-	l	-
-							-	ł	Driller's Remark: Lost 100% circulation from
-							-		47.5-48.0'
-							_		11:36 Pump chain broken, repair took 40
-							_		minutes 13:20 Drill crew begins to insert HW casing -
_							_		
50_	50.0								
-8.3					Poorly Grade	ed Sand With Silt (SP)	1		
		0.7	SS-11	8-2-1 (3)	delayed mild H	rayish yellow, (5Y 8/4), wet, HCl reaction	loose, –		1
-	51.5			(3)	(1.7.1.)			1	_
-	01.0						-	1	-
-							-	1	-
-							-		-
-							-		-
-							-		-
-							_		_
							_		_
55	55.0								
-13.3					Silt With Lime	estone Fragments (ML)	G/O) wot		
		1.0	SS-12	4-10-2 (12)	soft, moderate	ale yellowish brown, (10YR) e to strong HCI reaction	∪/∠), wel, =]
-	56.5			(12)		3 2		.	1
-	55.5						_		-
[-							-	1	-
-							-		-
-							-		-
-							-		-
-							-		_
							_		_
60									



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-07	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS	: 3.0 ft b	gs on 6/06	6/07 5	START : 6/5/2007 END : 6/7/2007 LOGGE	ER:	: J. I	Burkard, C. Dellaria, B. Ellis
				STANDARD	SOIL DESCRIPTION			COMMENTS
NO (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		٦	ГОС	
		RECOVE	ERY (ft)	12011120210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	1	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	1	SYMBOLIC LOG	INSTRUMENTATION
-18.3	20.0			(N)	Cila Milab Limontono Fungumento (MIL)	4	Ś	Drillarda Damanda Kana laginar gira dation
-10.3	60.0			9-5-5	Silt With Limestone Fragments (ML) 60.0-61.1' - moderate yellowish brown, (10YR 5/4),	4		Driller's Remark: Keep losing circulation, now advancing casing to 60'
-		1.1	SS-13	(10)	wet, soft, delayed strong HCl reaction, organic black (N1) limestone fragments up to 3/4"	4	Ш	=
_	61.5				(IVT) limestone magnierits up to 3/4	4		_
-						4		-
-						4		-
-						4		-
-						4		-
-						4		-
						+		-
65 <u> </u>	65.0				Silty Limestone Fragments (GM)	١.		_
-		0.9	SS-14	3-10-11	65.0-65.9' - yellowish brown, (10YR 5/4), wet, medium	4	.	-
-		0.5	33-14	(21)	dense, strong HCl reaction, limestone fragments up to	/₹	ш	-
-	66.5					+		-
-						+		-
-						1		-
-						1		-
-						1		-
-						1		-
70	70.0					1		-
-28.3	70.1	0.0	SS-15	50/0.75 (50/0.75")	Limestone Fragments 70.0' - yellowish gray, (5Y 7/2), delayed mild to	7	_	Driller's Remark: Casing set to 70.0', will begin rock coring on 6/6/07
-				(30/0.73)	\moderate HCl reaction, trace fossil casts/molds, few	/1		begin rock coming on 6/6/6/
-					thin fragments 3/4"-1" Begin Rock Coring at 70.0 ft bgs	1		_
_					See the next sheet for the rock core log	1		_
]		
]		
l _						1		_
l _						1		_
_						1		_
75 <u> </u>					-	4		_
-33.3						4		_
_						4		_
_						4		-
-						4		-
-						4		-
-						+		-
-						+		-
-						+		-
						+		=
80						+		-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-07	SHEET	5	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				Detrict D-30 3/N 232, Midd Totally, NQ 1001s, HW			ORIENTATION . Vertical
WATER	LEVELS : 3.0	π bg:	s on 6/		//2007		
≷Q£	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ZAN.	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B C	S F, P	(%) O	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	l j	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF 문항	RSS	Ω	I AC	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
필요리	822	ĸ	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λ	CHARACTERISTICS	bitor 3, rest resours, etc.
-28.3	70.0				Ш	Limestone	Start coring at 08:00 on
_	R1-NQ 1.5 ft	33	0	70.5, 70.8' - Mechanical break (2), <5 deg	Н	- 70.0-70.9' - pale yellowish brown to	6/6/07 -
-	60%	00	NR	and 10-20 deg, rough, undulating, open 1/16"	目	grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, strong HCl	Water level at 3.0' below ground surface
_	71.5		IVIX	and tight, respectively	╀╫	reaction, medium strong (R3), voids	R1: 1 minute -
_			0	71.7, 72.0, 72.4-72.8' - Mechanical break (3)	Ш	(<1/16") over 5-10% of surface	Driller's Remark: Possible
					Н	No Recovery 70.9-71.5' Limestone	sand at bottom of run, could have resulted in loss -
					Ш	71.5-74.5' - pale yellowish brown to	of recovery
-	1		1	73.0' - Fracture, 5 deg, smooth, undulating	Ш	grayish orange, (10YR 6/2 to 10YR	SC-1 collected at 72.9-
-	R2-NQ			-	Н	- 7/4), medium to fine grained, strong	74.0'
_	5 ft	28	0	74.0.74.01.84.1		HCl reaction, medium strong (R3), voids (<1/16") over 5-10% of surface,	_
_	60%			74.0, 74.2' - Mechanical break (2), <10 deg, rough, undulating, open 1/8"	Н	- 10% cavities up to 5/8", black	_
75				rough, unduluting, open no	Ш	organic infill	
-33.3]			_	$\vdash\vdash$	No Recovery 74.5-76.5'	-1
1 -			NR		丗	-	R2: 4 minutes
-	- 1				₩	-	-
_	76.5			70 F 70 71 Frankura	Ш		-
_]		>10	76.5-76.7' - Fracture zone, rough, undulating, no visible orientation	Н	Limestone - 76.5-79.5' - dusky yellow, (5Y 6/4),	_
			10	TIO VISIDIC OTICITATION	Н	medium grained, mild to moderate	
_	1			-	Ш	HCl reaction, medium strong (R3),	1
-	-		0	78.1' - Mechanical break	╁┼	- fossil casts and molds, voids (<1/16")	1
-	R3-NQ			70.1 - Wednamear break	П	over 25-50% of surface, cavities up to 3/8"	-
_	5 ft	87	0		Н	-	-
_	96%			70.4.70.61 Machanical break (2) of day	Ш	_	
80			,	79.4, 79.6' - Mechanical break (2), <5 deg deg, rough, undulating, open	Н	79.5-81.3' - Same as 76.5-79.5'	
-38.3			1	80.1' - Fracture, 5 deg, smooth, undulating	Ш	except voids (<1/16") over 10-30% of surface	
_				· • • • • • • • • • • • • • • • • • • •	Н		R3: 5 minutes
_			0	-	団	_	1
-	81.5		NR.		\vdash	- No Recovery 81.3-81.5'	-
_			4	81.6, 81.8, 82.0, 82.3' - Bedding plane or	Ш	Limestone	_
]			mechanical break (4), <10 deg, rough, undulating, tight to <1/16" open	Щ	81.5-82.6' - dusky yellow, (5Y 6/4), medium grained, mild HCl reaction,	
				82.5-83.0 - Fracture zone, rough, undulating,	Ш	weak to medium strong (R2 to R3),	1
1 -			>10	angles undeterminable	\Box	surface cavities up to 1/2", fossil	1
1 -	R4-NQ			83.4' - Mechanical break or bedding plane,	╁┼╂	 casts and molds 82.6-83.5' - yellowish gray, (5Y 7/2), 	Core barrel got rock
-	5 ft	8		<5 deg, rough, undulating, tight	冏	fine to medium grained, strong HCl	sample jammed in the
-	40%				H	reaction, very strong (R5), trace	barrel causing the lost
85]		NR		口	surface voids	recovery
-43.3			``"`		Н	No Recovery 83.5-86.5'	
]				Ш	_	R4: 3 minutes
-	 			·	╁┼	-	1
-	86.5				口	_ Limestone	-
1 -			>10	86.7' - Mechanical break, 5-10 deg, rough,	₩	- 86.5-90.6' - dusky yellow, (5Y 6/4),	-
-				undulating, tight 87.2-88.1' - Fracture zone, rough, undulating,	Ш	_ medium grained, moderate to strong]
]		>10	angles between 70-90 degrees	Щ	HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over	
			10		Ш	80-75% of surface, surface cavities]
1 -	R5-NQ			88.4' - Mechanical break, <5 deg, rough,	Ш	up to 1", trace amount of fossil casts	1
1 -	5 ft	48	0	stepped, open 1/8"	ш	- and molds	
-	82%			-	\square	-	-
90_					H		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-07	SHEET	6	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 3.0) ft bgs	s on 6	/06/07 START : 6/5/2007 END : 6/	7/200	7 LOGGER : J. Burkard, C. Dellaria	a, B. Ellis
300	· ·			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S .	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
불병	P.H.A.	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F.F.	ORE ING	αD	AC.	PLANARITY, INFILLING MATERIAL AND	/MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	222	ď		THICKNESS, SURFACE STAINING, AND TIGHTNESS	ŝ	CHARACTERISTICS	Brief e, Teet Reedere, Ere.
-48.3			0				
				90.4' - Fracture or mechanical break, <5 deg, rough, undulating, open		No Recovery 90.6-91.5'	R5: 5 minutes
	91.5		NR	Transfer of the state of the st			
1 -					Н	Limestone	1
-			0			- 91.5-94.8' - Same as 86.5-90.6'	1
-			_	92.7' - Fracture or mechanical break, 5-10		-	1
-			0	deg, rough, planar, open	╁	=	1
-	R6-NQ			93.3' - Fracture or mechanical break, 10 deg,	口	-	1
-	5 ft 82%	68	0	rough, undulating, tight		-	-
05 -	02/0			94.5' - Fracture or bedding plane, 5 deg,	\vdash	-	
95 <u> </u>			1	rough, undulating, open —	仁	— 94.8-95.6' - dusky yellow, (5Y 6/4), medium to fine grained, strong HCl	-
-				95.2' - Fracture, 10 deg, smooth, undulating, trace clay infilling	世	reaction, weak to medium strong (R2	R6: 6 minutes
-			NR	95.4' - Mechanical break or fracture	F	 to R3), trace surface voids, organic 	-
-	96.5			96.5-96.7' - Fracture zone	口	staining No Recovery 95.6-96.5'	-
-			4	97.0' - Fracture or mechanical break	$+ \top$	Limestone _	SC-2 collected at 97.0-
-				97.0 - Fracture of Mechanical break	F	96.5-98.4' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR	98.0' -
-			0			_ 7/4), fine grained, moderate HCl	
_				98.4' - Bedding plane, <5 deg, rough,	┵	reaction, medium strong (R3), 15% surface voids	
l -	R7-NQ 5 ft	48	0	undulating, tight	Д	98.4-99.6' - pale yellowish brown to	
l _	62%	.0	"			very pale orange, (10YR 6/2 to 10YR	
100				_	\bot	8/2), medium grained, strong HCl reaction, medium strong to strong	
-58.3						(R3 to R4), voids (<1/16") over	
			NR			20-40% of surface, cavities up to 1/2", fossil casts and molds	R7: 5 minutes
	101.5					No Recovery 99.6-101.5'	
					Ш	Limestone	
-			0	100 0 100 11 5 15 1		 101.5-102.7' - Same as 98.4-99.6' except increase in the number of 	1
1 -				102.3-102.4' - Fracture, <5 deg, rough, undulating, open 1" with 1" fragment	\vdash	surface cavities	1
1 -				,	F	- No Recovery 102.7-106.5'	1
-	R8-NQ				Ľ	-	1
-	5 ft 24%	15				-	1 1
105	27/0		NR		圧	-	1 +
-63.3				_	世		
-					t	-	R8: 3 minutes
-	100 5				仠	-	
-	106.5				片	Limestone	-
-			0	106.9' - Mechanical break, 10-20 deg, rough,	世	 106.5-108.5' - grayish orange, (10YR 	SC-3 collected at 106.9-
-				undulating, tight	Æ	7/4), medium grained, strong HCl reaction, weak (R2), 15-20% surface	107.9'
-			0	107.9' - Mechanical break, <5 deg, rough,	仜	- voids	-
-	R9-NQ			planar, tight	\vdash	-	-
-	5 ft	40	1	108.5' - Fracture, 5-10 deg, rough to smooth, undulating	\vdash	-] -
-	56%					-] -
110					\vdash		



PROJECT NUMBER:	BORING NUMBER:				-	
338884.FL	E-07	SHEET	7	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING	METHOD A	ND EC	QUIPN	1ENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin	g	ORIENTATION : Vertical
WATER	LEVELS: 3.0	ft bgs	s on 6/		7/200		
≷Q£	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-68.3 - - - -	111.5		NR >10	- - 111.6' - Bedding plane or mechanical break, <5 deg, rough, undulating, open		Limestone 108.5-109.3' - pale yellowish brown, (10YR 6/2), medium grained, mild HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 20-40% of surface, no surface cavities	R9: 2 minutes - - -
-			0	111.9-112.2 - Fracture zone, rough, undulating, angle undeterminable		- No Recovery 109.3-111.5' Limestone 111.5-115.0' - Same as 108.5-109.3'	-
-	R10-NQ 5 ft 70%	43	>10	113.3' - Mechanical break, <5 deg, rough, undulating, open <1/16" 113.4-113.8' - Fracture zone, rough,		-	-
115_ -73.3	7078		2	undulating, angle undeterminable 114.2, 114.6' - Bedding plane or mechanical break (2), <5 deg, rough, undulating, open to		- No Recovery 115.0-116.5'	-
_	116.5		NR	1/8" - -		-	R10: 3 minutes
-			1	- - 117.2' - Bedding plane or mechanical break,		Limestone - 116.5-117.5' - Same as 108.5-109.3'	=
- - 120 -78.3	R11-NQ 5 ft 20%	13	NR	<5 deg, rough, planar, open to 1/8"		No Recovery 117.5-121.5'	- - - - - R11: 3 minutes
-	121.5		0	121.6, 121.8-122.0' - Mechanical break (2), vertical, rough, undulating, tight		Limestone - 121.5-123.4' - grayish orange, (10YR 7/4), medium grained, mild HCl	-
- -			2	122.8, 123.0' - Mechanical break or fracture (2), <5 deg, rough, undulating, tight		reaction, weak to medium strong (R2 to R3), trace fossil casts and molds, voids (<1/16") over 15-20% of	- - -
- 425	R12-NQ 5 ft 70%	48	2	123.4-123.7' - Fracture, 5 deg, smooth, planar 124.4' - Bedding plane or mechanical break,		surface, cavities up to 1/4" 123.4-123.7' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, strong (R4), fragmented	-
125_ -83.3 -			NR	<10 deg, rough, undulating, open 1" with 1" fragment -		— 123.7-125.0' - Same as 121.5-123.4' No Recovery 125.0-126.5'	R12: 3 minutes
-	126.5		0	- 126.7, 126.8, 126.9' - Mechanical break (3), 10-20 deg, rough, undulating, open <1/16"		Limestone - 126.5-127.9' - yellowish gray, (5Y	-
- - -	R13-NQ 5 ft	13	0	127.6, 127.8' - Mechanical break (2), <5 deg, rough, undulating, tight to open 1/16"		7/2), medium grained, mild HCI reaction, medium strong (R3), fossil casts and molds, voids (<1/16") over 20-30% of surface No Recovery 127.9-131.5'	- - -
130	28%		NR				-
			L				1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-07	SHEET	8	OF	10	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS: 3.0	ft bgs	s on 6/	06/07 START: 6/5/2007 END: 6	/7/200	7 LOGGER : J. Burkard, C. Dellari	a, B. Ellis
≥∩≘	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
N (#NI	N, AND 3Y (%	_	ŒS T	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-88.3	012				Ű		
-					╁	-	R13: 2 minutes
-	131.5				F	-	-
-	101.0			131.5' - Fracture, 5 deg, rough, planar	Ħ	Limestone	-
-			2	131.6' - Fracture, 5 deg, smooth, planar 132.1' - Bedding plane or mechanical break,	Ħ	131.5-135.5' - dusky yellow to grayish yellow, (5Y 6/4 to 5Y 8/4),	-
-				<5 deg, rough, planar, tight	t	medium grained, mild HCl reaction,	-
-			0	132.5-133.1 - Bedding plane (multiple), <5 deg, rough, planar, open <1/16"	╨	medium strong (R3), organic staining, fossil casts and molds,	-
-	R14-NQ		. 40		Ŧ	voids (<1/16") over 20-40% of	-
-	5 ft 80%	33	>10	133.8' - Mechanical break or fracture 134.0-134.7' - Fracture zone	T	- surface	-
135				134.7-135.3' - Fracture, 80 deg, tight _	\perp	Ī	-
-93.3			3	135.1' - Mechanical break, <5 deg, rough,	Ъ		
			ND	planar, tight	\vdash	No Recovery 135.5-136.5'	R14: 5 minutes
l -	136.5		NR		Ħ	Ţ	
			>10	136.5-137.3' - Fracture zone, rough, undulating, no visible orientation, organic	Ħ	Limestone	
			/10	staining		 136.5-137.1' - dusky yellow, (5Y 6/4), medium grained, weak to medium 	
			6	137.7-138.3' - Fracture zone, rough,	\mathbb{H}	strong (R2 to R3), voids (<1/16") over 30-50% of surface, organic	
			0	undulating, no visible orientation	Ш	staining	
	R15-NQ 5 ft	22	0	1000 100 11 11 1 1 1 1 1 (0)	上	137.1-140.7' - yellowish gray, (5Y 7/2), fine grained, mild to moderate	
_	84%	22		138.9, 139.4' - Mechanical break (2)	上	HCl reaction, voids (<1/16") over	
140_			4.0	139.5-140.5' - Fracture zone, rough, undulating, no visible orientation –	╁╴	10-15% of surface, organic staining, — surface cavities up to 1"	_
-98. 3			>10	and adding, no visible sheritation	F		
_			NR		F	No Recovery 140.7-141.5'	R15: 7 minutes
_	141.5		INIX		Ħ	<u></u>	_
_			>10	141.5-142.5' - Fracture zone, rough, undulating, no visible orientation	H	Limestone - 141.5-142.6' - light olive gray to	_
_					₽	yellowish gray, (5Y 5/2 to 5Y 7/2),	_
_			2	142.7' - Fracture, 5 deg, smooth, undulating	\perp	medium grained, mild HCl reaction, medium strong to strong (R3 to R4),	_
-				143.1' - Mechanical break 143.3' - Fracture, 15 deg, smooth, undulating	口	20-40% voids	SC-4 collected at 143.4-
_	R16-NQ 5 ft	40	0	143.5-145.9' - Mechanical break (4), <5 deg,	上	142.6-144.5' - yellowish brown, - (10YR 6/2), fine to medium grained,	144.5' _
-	90%			rough, undulating, open <1/16"	+	strong HCl reaction, weak to medium strong (R2 to R3), 10% voids on	-
145 <u>-</u> -103.3			0	-	厈	— surface	_
-103.3					Ħ	144.5-146.0' - moderate olive brown, (5Y 4/4), medium grained, mild HCl	P16: 7 minutes
-			0	145.9' - Fracture, 70-80 deg, rough,	岸	reaction, very weak to weak (R1 to	R16: 7 minutes
-	146.5		NR	undulating, tight	世	R2), voids (<1/16") over 40-60% of surface, fossil casts molds	-
_			0	146.9, 147.5, 147.8' - Mechanical break (3),	$+$ \square	No Recovery 146.0-146.5'	-
_				<5 deg, rough, undulating, tight	ፗ	Limestone 146.5-148.1' - dusky yellow to light	-
-			0		世	olive gray, (5Y 6/4 to 5Y 5/2),	-
-	D17 NO				士	medium grained, mild HCl reaction, weak to medium strong (R2 to R3),	-
-	R17-NQ 5 ft	97	0	148.8' - Mechanical break, <10 deg, rough,	F	_ 30-50% voids, trace cavities	-
-	100%			undulating to planar, open to 1/4"	#	-	-
150					╪		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-07	SHEET	9	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				Delicit D-30 3/N 232, Hidd Totally, NQ tools, HW			ORIENTATION . Vertical
WATER	LEVELS : 3.0	π bg:	s on 6		1/2007		
≷Q€	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	<u> </u>	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ZAZ YZ,	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
T E E E	J. H.	(%) _Q	75	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OL I	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F 두 및	888	ο	AC R F	PLANARITY, INFILLING MATERIAL AND	₽B	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		ď	FH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROFO, FEOT REGGETO, ETO.
-108.3			0	150.2' - Mechanical break, <5 deg, rough,	Ш	148.1-150.5' - pale yellowish brown,	SC-5 collected at 149.4-
-				undulating	Н	- (10YR 6/2), fine grained, moderate to	150.3' -
-			1	150.4' - Fracture, 50-60 deg, rough,	⊟	strong HCl reaction, medium strong (R3), 10-15% voids, 10% cavities	R17: 5 minutes
-	151.5			undulating, tight	₽	- 150.5-151.5' - Same as 148.1-150.5'	_
_			2	151.1' - Bedding plane or fracture, 5 deg, smooth, undulating, trace silica sand infill		except yellowish gray, (5Y 7/2),	_
			_	151.6' - Bedding plane or fracture, 5 deg,	Н	20-30% voids - 151.5-154.0' - Same as 148.1-150.5'	
				rough, undulating	Ш	- 151.5-154.0 - Same as 146.1-150.5]
_			0	151.7' - Fracture, <5 deg, rough, undulating	ш	-	-
-	R18-NQ			152.2' - Bedding plane, <5 deg, rough, undulating to planar, tight	+	-	-
_	5 ft	43	0	152.7-153.2' - Fractures, 55-65 deg, rough,	П	- 454 0 455 4L limbt alive array (5)/	-
_	94%			undulating, open <1/16" to partially healed	┟┼┤	154.0-155.4' - light olive gray, (5Y - 5/2), fine grained, mild to moderate	_
155			>10	154.7' - Mechanical break, 5-10 deg, rough,	Ш	HCl reaction, weak (R2), 10-30%	
-113.3			- 10	undulating	H	voids, trace cavities	
1 -			3	155.0-155.9' - Fracture zone, possibly mechanical breaks	口	155.4-155.9' - moderate yellowish	R18: 5 minutes
-				mechanical breaks	Н	brown, (10YR 5/4), medium grained, mild HCl reaction, weak to medium	-
-	156.5		NR	156 5 157 7' Frosture zone dominantly <10	ш	strong (R2 to R3), 20-40% voids	-
_			>10	156.5-157.7' - Fracture zone, dominantly <10 deg, angular to subangular fragments	\vdash	_ 155.9-156.2' - yellowish gray, (5Y	_
_				1"-3-1/2"	片目	7/2), fine grained, moderate HCI	
				157.7-158.2' - Mechanical break (3), rough,	Н	reaction, medium strong to strong (R3 to R4), no voids	
_			0	undulating, open <1/8"	ш	No Recovery 156.2-156.5'	1
-	R19-NQ				H	Limestone	-
-	5 ft	20	0	158.7, 159.0' - Mechanical break (2), <10 deg, rough, undulating to planar, open	ш	_ 156.5-156.8' - Same as 155.9-156.2' 156.8-159.5' - light olive gray, (5Y	-
-	60%			deg, rough, undulating to plantar, open	₽₩	- 5/2), fine to medium grained, mild to	-
160_				_	Ш	moderate HCl reaction, medium	
-118.3			NR		Н	strong to strong (R3 to R4) No Recovery 159.5-161.5'	_
			''''			110 11000 TO 100.0	R19: 4 minutes
	161.5				Н		Ī
1 -				161.5-161.6' - Mechanical break, multiple	ш	Limestone	1
-			0	breaks, no visible orientation, limestone	╂┼┦	- 161.5-165.2' - Same as 156.8-159.5'	-
-				fragments to 1" 161.9' - Mechanical break or fracture	口	except medium grained, mild HCl reaction, 20-40% voids	-
-			>10	162.3-163.2' - Fracture zone, rough,	╂┴┨	-	_
1 _				undulating, angles undeterminable	Ш	_	SC 6 collected at 462.4
	R20-NQ	37	0	163.4, 164.5' - Mechanical break (2)	Н	_	SC-6 collected at 163.4- 164.5'
1	5 ft 74%	31			口		1
165			0		14	=	1
-123.3				_	団		_
-				-	╂┼╂	No Recovery 165.2-166.5'	R20: 5 minutes
1 -			NR	-	口	-	- 125. 6 111110000
-	166.5				₽₩		_
1 _			0		Ш	Limestone - 166.5-175.5' - yellowish gray to	
1				167.0, 167.4' - Mechanical break or fractures	H	dusky yellow, (5Y 7/2 to 5Y 6/4), fine	1
1 -				(2)		grained, moderate to strong HCl	1
-			0	167.8, 167.9, 168.3' - Mechanical break or fractures (3)	╀┼┼	 reaction, weak (R2), 10-20% voids, fossiliferous zone from 167.3-167.6' 	-
-	R21-NQ				団	(molds and casts)	-
-	5 ft	62	4	168.7-169.0' - Fracture, 10-30 deg, rough,	╂┼┦	-	-
-	100%			undulating 169.3, 169.6, 170.0' - Mechanical break (3)	口	_] _
170					Ш		



PROJECT NUMBER:	BORING NUMBER:			
338884.FL	E-07	SHEET	10 OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

THE PROPERTY OF THE PROPERTY O	CORING	NIE I NOD AI	ND EC	JUIPIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin	<u>g</u>	ORIENTATION : Vertical
Section Sect	WATER	LEVELS: 3.0	ft bgs	s on 6	/06/07 START : 6/5/2007 END : 6/	7/200	7 LOGGER : J. Burkard, C. Dellaria	, B. Ellis
171.5	≥∩≘	. (9			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
171.5	H BELOV ACE ANI ATION (ft	RUN, TH, AND VERY (%	(%)	TURES :OOT		OLIC LO	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
171.5		CORE LENG RECC	RQD	FRAC PER F	PLANARITY, INFILLING MATERIAL AND	SYMB	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
171.5	-128.3			1	_	H	_	_
171.7 - Mechanical break 172.1-172.9 - Fracture zone 173.3 - Mechanical break 173.6-175.5 - Fracture zone 173.3 - Mechanical break 173.6-175.5 - Fracture zone 173.3 - Mechanical break 173.6-175.5 - Fracture zone 175.6-176.5 175.6-176.5 - 173.3 176.5-176.5 - Fracture zone 176.5-176.5 - Fracture zone 176.5-176.5 - Fracture zone 177.3 - Fracture zone zone zone zone zone zone zone zon	-	171.5		0		H	-	R21: 5 minutes
173.3 173.5 173.	_			>10	· ·	H	-	-
175	_			>10	470 01 14 1 1 1	Ė	_ _	_
175133.3 176.5 NR 176.5 NR 176.5 176.5 177.4 177.3 178.1' 177.8 178.1' 179.1 178.1' 179.1' 178.1' 188.1' 188.5' 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5 188.0.5	_	5 ft		>10		H	-	- -
176.5 NR 176.5 176.7' - Fracture zone, irregular, angular rock fragments to 1" 177.4' - Fracture, norizontal, rough, planar 177.4' - Fracture zone, irregular angular rock fragments, top and bottom fractures are horizontal, rough, planar 178.6' 179.1' 179.4' - Fracture; 0.0 deg, rough, undulating 180.5, 180.6, 180.85, 180.9' - 0-10 deg, rough, planar 179.5' - Fracture, 30 deg, rough, undulating 181.5 - 182.5' - Fracture, 30 deg, rough, undulating 183.5' - Fracture, 60 deg, rough, undulating 184.1' - Fracture, horizontal, rough, planar 184.4' - Fracture, horizontal, rough, planar 184.4' - Fracture, horizontal, rough, undulating 184.4' - Fracture, horizontal, rough, undulating 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.4' - Fracture, bode, rough, undulating 186.4' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.5' - Fractur		60%		>10		Ħ	_	
180 - 138.3	-	176 E		NR		Ė	No Recovery 175.5-176.5'	R22: 5 minutes
R23-NO 75 ft 18.1.5 NR 18.2.5 - Fracture, 30 deg, rough, undulating 182.9' - Fracture, 20 deg, smooth, planar 182.9' - Fracture, 20 deg, smooth, planar 183.3 - 143.3	-	170.5		3	176.5-176.7' - Fracture zone, irregular, angular rock fragments to 1"	H	 176.5-177.5' - light olive gray, (5Y 	- -
R23-NO 5 ft 90% 178.6, 179.1, 179.4' - Fractures (3), 0-5 deg, rough, planar 178.6, 179.1, 179.4' - Fractures (3), 0-5 deg, rough, planar 179.5' - Fracture, 50 deg, rough, undulating 181.5 NR 181.5 NR 182.5' - Fracture, 30 deg, rough, undulating, possible mechanical break 182.9' - Fracture, 20 deg, smooth, planar 184.1' - Fracture, horizontal, rough, undulating 184.3' - Fracture, horizontal, rough, undulating 184.3' - Fracture, horizontal, smooth, undulating 184.4' - Fracture, horizontal, smooth, undulating 184.5' - Fracture, 50 deg, rough, undulating 185.7' - Fracture, 50 deg, rough, undulating 185.7' - Fracture, horizontal, smooth, undulating 185.7' - Fracture, 50 deg, rough, undulating 185.7' - Fracture, borizontal, smooth, undulating 185.7' - Fracture, 50 deg, rough, undulating 185.7' - Fracture, 50 deg, rough, undulating 185.7' - Fracture, 50 deg, rough, undulating 185.7' - Fracture, 50 deg, rough, undulating 185.7' - Fracture, 50 deg, rough, undulating 185.7' - Fracture, 50 deg, rough, undulating 185.7' - Fracture, 50 deg, rough, undulating 186.4' - Fracture, 50 deg, rough, undulating 186.5' - Fracture, 50 deg, rough, undu	_			2	177.4' - Fracture, horizontal, rough, planar 177.8-178.1' - Fracture zone, irregular		HCl reaction, extremely weak to weak (R0 to R2), 10-30% voids, 10%	- -
rough, planar 179.5' - Fracture, 50 deg, rough, undulating 181.5	-	5 ft		3	fractures are horizontal, rough, planar		177.5-181.0' - moderate yellowish brown, (10YR 5/4), fine grained,	- -
181.5 181.5 No Recovery 181.0-181.5' Limestone 181.5-182.5' - moderate yellowish brown, (10YR 5/4), fine to medium grained, weak to medium strong (R2 to R3), 10-30% voids, trace cavities 182.3' - Fracture, 20 deg, smooth, planar 182.4-NQ 5ft 72 4 183.75' - Fracture, 60 deg, rough, undulating 184.1' - Fracture, horizontal, rough, undulating 184.3' - Fracture, horizontal, smooth, planar 184.8' - Fracture, horizontal, smooth, undulating 184.8' - Fracture, horizontal, smooth, undulating 185.7' - Fracture, 50 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating 186.4' - Fracture, 5 deg, rough, undulating 186.5' - Bottom of Boring at 186.5 ft bgs on or correctly and the strong of t		90%		1		Ħ		- -
Limestone 1 1	-					Ħ	- No Posovony 194 0 194 5'	R23: 5 minutes
Table 1 1 182.9' - Fracture, 20 deg, smooth, planar 182.9' - Fracture, 20 deg, smooth, planar 183.75' - Fracture, 60 deg, rough, undulating 184.1' - Fracture, horizontal, rough, undulating 184.3' - Fracture, horizontal, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.8' - Fracture, horizontal, smooth, undulating 186.5 NR 185.7' - Fracture, 50 deg, rough, undulating 186.4' - Fracture, 50 deg, rough, undulating 186.5' - Fracture, 50 deg, rough, undul	_	181.5			-	Ē	Limestone	<u>-</u> -
R24-NQ 5 ft 94%	-			1	possible mechanical break	Ħ	grained, weak to medium strong (R2	_
184.1' - Fracture, horizontal, rough, undulating 184.3' - Fracture, 10 deg, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.8' - Fracture, horizontal, smooth, planar 184.8' - Fracture, horizontal, smooth, undulating 185.0-186.2' - pale yellowish brown, (10YR 6/2), fine to medium grained, weak to medium strong (R2 to R3), 20-40% voids, 20-30% cavities up to 5/8", fossil casts and molds No Recovery 186.2-186.5' Bottom of Boring at 186.5 ft bgs on end of boring at 09:53, end of boring at 09:53,	_			4	-		(10YR 6/2), fine grained, medium	Used natural break at _
184.8' - Fracture, horizontal, smooth, undulating 185.7' - Fracture, 50 deg, rough, undulating 186.4' - Fracture, 50 deg, rough, undulating 186.4' - Fracture, 50 deg, rough, undulating 186.4' - Fracture, 50 deg, rough, undulating 186.5' - Fracture, 5 deg, rough, undulating		94%		1	undulating	Ħ		
186.5 NR 186.4' - Fracture, 5 deg, rough, undulating 5/8", fossil casts and molds No Recovery 186.2-186.5' Bottom of Boring at 186.5 ft bgs on end of boring at 09:53,	- 143.3			2	184.8' - Fracture, horizontal, smooth, undulating	Ė	(10YR 6/2), fine to medium grained, weak to medium strong (R2 to R3),	R24: 7 minutes
Bottom of Boring at 186.5 ft bgs on end of boring at 09:53,	_	186.5		NR			5/8", fossil casts and molds No Recovery 186.2-186.5'	Bottom of hole at 186.5'.
	_							end of boring at 09:53,
	_						- -	_
	_				_		-	_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-08	SHEET	1	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

					S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 4.41 ft l	ogs on 3/	06/07 S	TART : 2/15/2007 END : 2/23/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart
≷Q£	CAMPIE	INTERVA	1 (4)	STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
BELO CE AN FION (SAMPLE	RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
42.4				, ,	Start drilling at 10:57 AM using 3-7/8" drag bit
-					Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)
- - 	3.5				Silty Sand (SM)
5 37.4	5.0	1.0	SS-1	3-3-4 (7)	3.5-4.5' - dark yellow, (10YR 6/6), wet, loose, fine grained silica sand, 15% nonplastic fines, trace organics
- - - -					Driller's Remark: Silts and sands at 7.0', harder drilling
- - 10	10.0	1.5	SS-2	4-7-6 (13)	Silty Sand With Limestone Fragments (SM) 8.5-10.0' - yellowish gray mottled with light brown, (5Y 8/1 with 5YR 5/6), wet, medium dense, fine to coarse grained, strong HCl reaction, 20% nonplastic fines, 15% fine to coarse gravel sized limestone fragments,
32.4 - - -					carbonate material Driller's Remark: Hard drilling at 11'
- - -	13.5				Silty Sand (SM)
- 15	15.0	1.5	SS-3	10-5-6 (11)	13.5-15.0' - Same as 8.5-10.0' except 40-45% fine to coarse gravel sized, 35% fine to coarse sand sized, 15-20% nonplastic fines
27.4 - - - - -	18.5				- - - - - -
- 20	20.0	1.5	SS-4	4-6-6 (12)	Silty Sand With Limestone Gravel (SM) 18.5-20.0' - Same as 8.5-10.0'



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-08	SHEET	2	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						END : 0/00/06	·			Onientation : Vertical
WATER	LEVELS	. 4.41 1([ogs on 3/0		START : 2/15/2007	END : 2/23/20 SOIL DESCRIPTION		LOGGER		Gomez, R. Bitely, T. Stewart COMMENTS
≥ 5€	SAMDIE	INTERVA	.l (ft)	STANDARD PENETRATION		JOIL DECOMM THE			SYMBOLIC LOG	GOMMENTO .
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAWIFLE		` ,	TEST RESULTS	SOIL NAME	E, USCS GROUP SY	MBOL, COLOR,	,	일	DEPTH OF CASING, DRILLING RATE,
ATI B		RECOVE			MOISTURE	CONTENT, RELATIV	VE DENSITY OF	R	BOL	DRILLING FLUID LOSS, TESTS, AND
E SUR			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTUF	RE, MINERALO	GΥ	SYM	INSTRUMENTATION
22.4		<u> </u>		(14)	 				-	
-								-		-
-								-		-
-								_		-
_								_		-
_										_
										_
	23.5									_
					Silt (ML)	viah avanga (10VD	7/4) mariet be	au al		Driller's Remark: Lost 40% circulation
		1.5	SS-5	4-21-29 (50)	nonplastic, rapi	yish orange, (10YR d dilatancy, modera	ate HCl reaction	n.		_
25	25.0			(50)	5% very fine gra	ained sand-sized, c	arbonate mate	rial		-
17.4	20.0								ш	
-								-		-
-								-		-
-								-		-
-								-		-
-								4		-
-								4		-
_	28.5				C:IA (MIL)					<u>-</u>
_				8-12-11	Silt (ML) 28.5-29.5' - Sar	me as 23.5-25.0' ex	cept 15-20% fi	ne to		-
_		1.0	SS-6	(23)	coarse sand-siz		•		Ш	_
30	30.0									
12.4										_
										_
										_
								1		_
								1		-
-	33.5							1		-
-	55.5				Silt With Sand				Ш	Set 4" HW casing to 35.0'
-		1.0	SS-7	21-18-21	33.5-34.5' - pale	e brown to pale yell 2), dry to moist, hard	owish brown, (5YR -		-
	05.0	,		(39)	dilatancy, mild I	HCI reaction, 20-25	% fine to coars	se /	ш	-
35 7.4	35.0				\sand-sized, trac	ce fine gravel-sized		/—		Stopped at 12:45 PM after setting casing to
-										35.0'
-										Leave casing in at 35.0' until next shift Start drilling 02/20/2007, continue with 3-7/8"
-								4		tri-cone from 35.0' below ground surface -
-								_		4" HW casing at 35.0' below ground surface
-								4		-
-								_		-
	38.5									_
				20-23-19						_
		1.4	SS-8	20-23-19 (42)						_
40	40.0			(- /	L				Ш	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-08	SHEET	3	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

						ary, auto nammer, Avvo rous			ONIENTATION : Vertical
WATER	LEVELS	: 4.41 ft k	ogs on 3/0	06/07 S	START : 2/15/2007	END : 2/23/2007	LOGGEF	} : R.	Gomez, R. Bitely, T. Stewart
>				STANDARD		SOIL DESCRIPTION		စ္က	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
필방		RECOVE	ERY (ft)			E, USCS GROUP SYMBOL, CONTENT, RELATIVE DEN)LIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
T A A			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MIN		MB(INSTRUMENTATION
SUB			"'''	(N)				SY	
2.4					Silt With Sand ((ML)			
_					38.5-39.9' - mod	derate yellowish brown, (19 oplastic, rapid dilatancy, m	0YR 5/4), -	1	-
-					reaction 15-20%	nplastic, rapid dilataricy, m % fine to coarse sand-size	ed carbonate	1	-
-					material	70 IIII0 10 00a100 0a11a 0120	-		-
I _									
							-	1	
-	40 E						-	1	-
-	4 3:ā	0.0	SS-9	50/1.5	No Recovery 43	3 5-43 6'			Driller's Remark: Slow drilling through dense
-				(50/1.5")	(HOTHOGOTOLY IN	5.0 10.0			zone, light chatter –
_							-		_
45									
-2.6									Driller's Remark: Softer drilling, quick drilling,
							-	1	little to no chatter
-							-	1	-
-							-	1	-
-							-		-
_							_		_
							_		
	48.5								
_					Silt (ML)		-	Ш	_
-		1.2	SS-10	30-48-50/5	48.5-49.7' - pale	brown, (5YR 5/2), moist	to wet, hard,	1	-
-	49.9			(98/11")	nonplastic, rapid	d dilatancy, mild to modera % fine to medium sand-siz	ate HCI 	Ш	-
50 -7.6	49.9				carbonate mater		_	l	Driller's Remark: Rapid advancement no
-7.0									chatter -
							_		
							-		_
-							-		-
-							-		-
-							-		_
_	53.5								_
					Silt With Sand	And Limestone (ML) ne as 48.5-49.7' except 20	1-25% fine to		
1 7		1.2	SS-11	18-12-36 (48)	coarse sand-size	ed, 4-8 interbeds of limes	tone up to		
55	55.0			(40)	1/2" thick			Щ]
-12.6	55.0							1	
-							-		-
-							-		-
-							-		_
							_		
1 7							-]]
-	E0 -						-	1	-
-	58.5				Sandy Silt (ML)			Ш	-
-				25-35-41	58.5-59.7' - Sam	ne as 48.5-49.7' except 25		$\ \ \ $	-
-		1.2	SS-12	(76)		ed, 2-4 limestone interbed	ds up to 1/2"		_
60	60.0			. ,	thick			Ш	
						·	 -		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-08	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 4.41 ft l	ogs on 3/0	06/07	START: 2/15/2007 END: 2/23/2007 LO			Gomez, R. Bitely, T. Stewart
				STANDARD	SOIL DESCRIPTION			COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG	
BEL ON ON		RECOVE	RY (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		CIC	DEPTH OF CASING, DRILLING RATE,
TH 3FA(#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		MBC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUI			<i>"</i>	(N)			SΥ	
-17.6								Light chatter to 61.0'
-						1		1
-						1		1
-						- 1		-
-						- 1		Driller's Remark: Rapid advancement, no
-						-		chatter, few cemented silt grains (coarse to
-						-		fine gravel size) in cuttings
-	63.5				Sandy Silt And Limestone (ML)		ш	-
-		, ,	00.40	28-33-21	63.5-64.8' - Same as 58.5-59.7' except 35-40% of			-
_		1.3	SS-13	(54)	sample is limestone fragments	-		-
65 <u> </u>	65.0							Dellanta Danasaha Lishkita mandanata akattan
-22.0						4		Driller's Remark: Light to moderate chatter Steady advancement, cemented silt to
_								limestone fragments in cuttings
l _								Slow advancement from 66.0'-68.0'
								Driller's Remark: Light to no chatter
-	68.5					_		Moderate chatter
-	68.6	0.0	SS-14	50/1 (50/1")	No Recovery 68.5-68.6'	$_/$		Switch to NQ tooling at 68.5'
-				(50/1")	Begin Rock Coring at 68.5 ft bgs See the next sheet for the rock core log	- 1		16:20 PM begin cleaning boring with NQ
70 -					dee the riext sheet for the rook dore log	-		tooling
70 <u> </u>						\dashv		-
-								-
-								-
-						-		-
-						-		-
_						- 4		_
_						4		_
_								_
						J		
]		
75						1		1
-32.6								
-						1		1
_						- 1		1
-						- 1		-
-						-		
-						-		
-								-
-								-
-						4		-
-						_		_
80								



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-08

SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	METHOD AI	ND EC	JUIPN	IENT : CME 550X S/N 340253, mud rotary, NQ tools, H	v casın	19	ORIENTATION : Vertical
WATER	LEVELS: 4.4	1 ft bo	gs on :	3/06/07 START: 2/15/2007 END: 2	/23/200	7 LOGGER: R. Gomez, R. Bitely,	T. Stewart
300	~			DISCONTINUITIES	(J)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱᆼ	A H H	(%	FRACTURES PER FOOT		┫ 일 ┃	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΗÄΑ	#E00	(%) _Q	CT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	B ₀	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		a Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S⊀.	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	68.5				+	Limestone	
-	R1-NQ		4	68.75' - Mechanical break, 10 deg, smooth,	口	- 68.5-69.2' - light olive gray, (5Y 5/2),	68-70' advancement slow -
	1.5 ft 47%	0		undulating	₽	very fine grained, mild HCl reaction,	with heavy chatter 68.5-69',
70	70.0		NR	68.85, 69.0, 69.1, 69.2' - Mechanical break (4), 10 deg, smooth, undulating	Ш	weak to medium strong (R2 to R3), fossiliferous, trace 15% organics	little to no chatter 69.0-
-27.6					Н	No Recovery 69.2-70.0'	R1: No time recorded
1 7			>10	70.55- 70.8' - Fracture zone, rough, stepped,	世	Limestone	1
-				no visible orientation	╁┷╁	- 70.0-73.3' - light olive gray, (5Y 5/2),	1
-			5	70.8-71.15' - Mechanical break, vertical,	廾┼	very fine grained, mild HCl reaction, very weak to weak (R1 to R2),	
				smooth, undulating 71.15' - Mechanical break, 25 deg, rough,	Д	fossiliferous, voids up to 3/16" cover	<u> </u>
	R2-NQ	38	1	undulating	Н	50% of surface	
	5 ft 66%	30	' '	71.3-71.45' - Mechanical break, vertical,	Ш	-	1
			1	smooth, undulating	+	-] 1
				71.5' - Mechanical break 71.75' - Mechanical break, <10 deg, rough,	口	No Recovery 73.3-75.0'	1
			NR	undulating	╁┼┼	-	R2: 6 minutes
			INIT	72.5' - Fracture, 50 deg, smooth, undulating	坷	-	
75_	75.0			_	Щ		2/20/07 Stop drilling for the
-32.6				75.1' - Mechanical break, <10 deg, smooth,	Ш	Limestone	day — Resume drilling 2/21/07 at
			1	undulating	ш	 75.0-78.3' - light olive gray, (5Y 5/2), very fine grained, mild to moderate 	08:13
					$\pm \pm \pm$	HCl reaction, weak to medium strong	SC-1 collected at 76.3-
-			1	76.35' - Fracture, 20 deg, smooth, undulating	+	- (R2 to R3), bedding plane	77.4'
	R3-NQ				╁┼┼	laminations, some with organics	_
			1	77 41 5 1 20 1 11 11 11	Д	(black laminations), voids up to 3/16" cover 25-50% of the surface	
	5 ft 66%	57	'	77.4' - Fracture, 20 deg, smooth, undulating	Н	cover 25 66 /6 of the Surface	
			3	78.05' - Mechanical break, 30 deg, smooth,	Ħ		1
				undulating	╂┼╂	No Recovery 78.3-80.0'	1 1
-			NR	78.15' - Bedding plane, 10 deg, smooth, undulating, intersecting a vertical fracture	┲	-	R3: 6 minutes
1 -				78.35' - Bedding plane, <10 deg, smooth,	╁┰┼	-	-
	80.0			undulating _		_	
-37.6			5	80.1' - Mechanical break, 80 deg, rough,	Щ	Limestone - 80.0-82.8' - light olive gray, (5Y 5/2),	
]				undulating 80.3' - Bedding plane, <10 deg, smooth,	Ш	very fine grained, mild to moderate	1
1 1				80.3 - Bedding plane, <10 deg, smooth, undulating	H	HCl reaction, very weak to medium	1 1
			1	80.55' - Bedding plane, <10 deg, smooth,	廿	strong (R1 to R3), moderately	1 1
-	R4-NQ			undulating	╂┼┼	competent at 80.0-80.55' and 81.2-82.8', voids up to 3/16" over	Driller's Remark: Lost up to
	5 ft	38	2	80.9-81.0 - Fracture zone, <10 deg, rough, undulating, multiple fractures	口	- 50% of surface, fossiliferous, trace	80% circulation at 82.0'
1]	56%			81.2' - Fracture, 15 deg, smooth, undulating	╁┼╀	bedding plane laminations, very	
				82.5' - Mechanical break, <45 deg, rough,	Ш	weak rock (R1) with very fine granular surface at 80.55-81.2'	
1			NR	undulating 82.7' - Fracture, 65 deg, smooth, undulating	H	No Recovery 82.8-85.0'	1
			INE	52.7 - Fracture, 65 deg, smooth, unduidting	丗	-	R4: 6 minutes
					冄	-	-
85_ -42.6	85.0			95 0 95 45' Ergoturo zono rough	ᆂ	Limostono	1 -
72.0			>10	85.0-85.45' - Fracture zone, rough, undulating, multiple fractures, multiple angles	Д	Limestone - 85.0-88.8' - dark yellowish brown to]
				85.45' - Mechanical break, 20 deg, rough,	旪	light olive gray, (10YR 4/2 to 5Y 5/2),]
]			[[undulating		very fine grained, mild to moderate	1
1			>10	85.75' - Fracture, 60 deg, smooth, undulating 86.0' - Mechanical break, 25 deg, rough,	14	 HCl reaction, very weak to medium strong (R1 to R3), voids up to 1/2" 	1 1
	R5-NQ			undulating	口	cover 20-30% of the surface, small	-
1 -	5 ft	43	2	86.0-86.3 - Fracture zone, <20->70 deg,	+	voids (<3/16") cover 60-80% of	1
-	76%			multiple fractures, rock fragments	口	surface, fossiliferous (molds/casts)	1 4
					ш		
						·	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-08

SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				IENT : CIVIE 550X 5/N 540255, ITING TOTALLY, INQ 10015, ITIN			ORIENTATION : Vertical			
WATER	LEVELS : 4.4	1 ft b	gs on 3		23/20					
≥□₽	(%			DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) O D	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.			
Оωш	072	<u>~</u>			S	CHARACTERISTICS	00.0			
90	90.0		NR	86.75, 87.25, 87.55, 88.0, 88.8' - Bedding plane or fracture (5), <10-15 deg, smooth, undulating	Ħ	- No Recovery 88.8-90.0' -	SC-2 collected at 88.1- 88.8' – R5: 5 minutes			
-47.6 -	90.0		1			Limestone 90.0-95.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 6/1), very				
-			4	91.15, 91.4, 91.55, 91.8' - Bedding plane (4), <10 deg, smooth, undulating	Ħ	fine grained, moderate HCl reaction, extremely weak to medium strong (R0 to R3), fossiliferous	-			
_	R6-NQ 5 ft 100%	45	8	92.05, 92.15, 92.25' - Mechanical break (3) 92.4, 92.8' - Bedding plane, <10 deg, smooth,		(casts/molds), trace organics throughout and in thin laminations at 91.0-94.55', voids up to 1/2" from	-			
-	_ 100%		2	undulating 92.7' - Fracture, 75 deg, smooth, undulating 92.9' - Fracture, 75 deg, smooth, undulating,	H	90.65 to 91.8', voids up to 3/16" cover 50-75% of surface at 90.0-91.8' and 92.8-95.0' (decreasing	-			
95	95 95.0		4	mirror of fracture at 92.7 93.0' - Mechanical break, 10 deg, rough, undulating 93.25' - Mechanical break, 50 deg, rough,	Ė	w/depth), extremely weak (R0) rock zone at 91.8-92.8', friable along bedding plane laminations	R6: 3 minutes			
-52.6			1	93.25 - Mechanical break, 50 deg, rough, undulating 93.55, 94.25, 94.45' - Mechanical break (3), <10 deg and 50 deg, rough, undulating	H	Limestone 95.0-97.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very				
_	-		4	94.55' - Bedding plane, smooth, undulating, organics 95.75' - Fracture, 20 deg, rough, undulating,		fine grained, moderate HCl reaction, weak (R2), voids up to 3/16" cover 30-40% of the surface, voids	-			
-	_ R7-NQ - 5 ft _ 40%		NR	low angle 96.25, 96.45, 96.65, 96.75' - Fracture (4), <10 deg, smooth, undulating		increase with depth, fossiliferous with few macrofossils, trace bioturbation indications, trace organics No Recovery 97.0-100.0'	- - -			
-				-	H	-	R7: 7 minutes			
100 -57.6 _	100.0		0			Limestone - 100.0-102.9' - yellowish gray to light	Driller's Remark: Lost 100% circulation at 100.0' -			
_			1	100.85' - Mechanical break	Ė	olive gray, (5Y 7/2 to 5Y 5/2), very fine grained, mild to moderate HCl reaction, weak (R2), voids (3/16") cover 30% of the surface decreasing	SC-3 collected at 100.85- 101.9'			
-	R8-NQ 5 ft 72%	47	3	101.9, 102.15, 102.65, 102.9' - Fracture or bedding plane (4), <10 deg, smooth, undulating	Ė	w/depth to no voids, less than 5% voids from 102.15-102.9', fossiliferous with few small	-			
-	12/0		>10	102.9-103.6' - Fracture zone, rough, stepped, multiple intersecting fractures		macrofossil molds, trace bioturbation and trace organics 102.9-103.6' - yellowish gray to light]			
105	105.0		NR		Ħ	olive gray, (5Y 7/2 to 5Y 5/2), moderate HCl reaction, extremely weak (R0), silt to very fine	R8: 11 minutes			
-62.6 -	100.0		5	405 01 Machanian brook 40 70 days as a		sand-sized grains, bioturbation No Recovery 103.6-105.0'				
_			>10	105.8' - Mechanical break, 40-70 deg, rough, undulating 105.85-106.1' - Fracture zone, multiple intersecting fractures	Ė	-	-			
_	R9-NQ 5 ft 74%	28	>10	106.35' - Fracture, 50 deg, rough, undulating 106.55' - Mechanical break 106.8' - Fracture, 75 deg, smooth, undulating		-	_			
			6		Ш					



PROJECT NUMBER:

33884.FL BORING NUMBER:

E-08 SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

CORING	I WE I HOD AI	ND EC	JUIPIV	IENT: CME 550X S/N 340253, mud rotary, NQ tools, HV	v Casii	<u>ıg</u>	ORIENTATION : Vertical
WATER	LEVELS: 4.4	1 ft b	gs on	3/06/07 START : 2/15/2007 END : 2/	23/200	D7 LOGGER : R. Gomez, R. Bitely,	T. Stewart
>00	<u> </u>			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
NA (£)			S	DESCRIPTION	Ĭ	ROCK TYPE, COLOR,	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%	FRACTURES PER FOOT	DEDTH TVDE ODJENE TO TO TO THE TOTAL THE TOTAL TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO T	SYMBOLIC LOG	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΤΫ́ΕΫ́Ε	SEF SOV	(%) O	CTI	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SHOR RESOLUTION	a Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				106.9-107.4' - Fracture zone, rough, stepped,	+-	Limestone	
-				multiple intersecting fractures	\blacksquare	- 105.0-108.7' - yellowish gray to light	DO: 5 minutos
1 4			NR	107.4, 107.7' - Fractures, 60 deg and 70 deg,	ш	olive gray, (5Y 7/2 to 5Y 3/2), very	R9: 5 minutes
110	110.0			rough, undulating 107.7-108.0' - Fracture zone, rough, stepped, —		fine grained, moderate HCl reaction, — extremely weak to weak (R0 to R2),	
-67.6				gravel-sized rock fragments	ТН	rock strength varies along length of	
1 -			7	108.35-108.7' - Fracture zone, rough,		core, voids up to 3/16" cover 30-60%	1
1 -				stepped	ш	of the surface, cavities up to 1/4"	1 -
-			3	110.0-110.65' - Fracture zone, smooth,	₽Π	rare, fossiliferous, few macrofossil	
			,	undulating, bedding plane and other intersecting fractures		casts and molds, trace bioturbation and organics	
	R10-NQ		1	111.25' - Fracture, 60 deg, smooth,	\vdash	No Recovery 108.7-110.0'	
1 1	5 ft 48%	20		undulating	ш	Limestone	1 1
-	70/0			111.5' - Fracture, 60 deg, smooth, undulating 111.75' - Bedding plane, <10 deg, smooth,	+	 110.0-112.4' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 3/2), very 	1
			NR	undulating	H	fine grained, moderate HCl reaction,] -
1 4			INIK	112.0' - Fracture, 70 deg, smooth, undulating	Щ	extremely weak to weak (R0 to R2),	P40: 5 :::::::::::::::
				-	Ш	rock strength variable with depth,	R10: 5 minutes
115	115.0					voids up to 1/2" rare, decreasing with depth, voids up to 3/16" over 80% of	1
-72.6				– 115.1, 115.3, 115.45, 115.6' - Bedding plane	14	surface, fossiliferous with few	
1 -			5	(4), <10 deg, smooth, stepped	ш	macrofossils (casts/molds), trace	1 -
-				116.0' Fracture 50 deg emosth stepped	+	_ organics	-
_			3	116.0' - Fracture, 50 deg, smooth, stepped 116.3, 116.45, 116.9, 117.05' - Bedding plane		No Recovery 112.4-115.0' Limestone	_
			,	(4), <10 deg, smooth, undulating	Щ	_ 115.0-118.7' - yellowish gray to light	
	R11-NQ			117.2' - Mechanical break, 20 deg, rough,		olive gray, (5Y 7/2 to 5Y 3/2), very	
1 1	5 ft 74%	38	4	stepped, open 1"	\Box	fine grained, mild HCl reaction, very	1
1 -	7470		_	117.3, 117.55' - Mechanical break (2), <10	Н	weak to weak (R1 to R2), voids up to 1/2" is rare, voids up to 3/16" cover	1
-			2	deg, smooth, undulating 118.1, 118.4' - Fracture (2), 40 deg and 70	-Ш	70% of surface, fossiliferous with	-
1 4				deg, smooth, undulating, trace staining on	+	_ minor macro fossils (casts/molds),	1
			NR	fracture at 118.4'		variable competence with rock weakness at breaks/ discontinuities	R11: 8 minutes
120	120.0					No Recovery 118.7-120.0'	
-77.6				120.0-120.35' - Fracture zone, multiple	Ш	Limestone	
1 -			8	intersecting fractures including a 60 deg	+	- 120.0-121.2' - yellowish gray to light	1 1
-			1	fracture with trace staining 120.65, 120.75, 121.05' - Mechanical break	口	olive gray, (5Y 7/2 to 5Y 3/2), very fine grained, mild HCl reaction, very] -
1 4			\ <u>'</u>	(3), 0-20 deg, rough, undulating	H	- weak to weak (R1 to R2), cavities up	1 4
					Ш	to 1/2", voids up to 3/16" cover	l J
]	R12-NQ					30-80% of surface, fossiliferous, with	1
1 1	5 ft 24%	0			Ш	 macrofossils prevalent at 120.35-121.2' 	1 1
1 -	2-7/0		NR		Ш	No Recovery 121.2-125.0'	1 1
-					+	_] -
1 4					П	_	1,540,5 1 1
					Н		R12: 5 minutes
125	125.0						1
-82.6				125.0-125.2' - Fracture zone, rough,	\square	Limestone	
			>10	undulating, multiple intersecting fractures	Ш	- 125.0-126.1' - yellowish gray to light	-
			0 /	125.6' - Mechanical break, horizontal, rough, undulating	Ш	olive gray, (5Y 7/2 to 5Y 3/2), very fine grained, mild HCl reaction, weak	-
				undulating 125.8' - Fracture or mechanical break, 40	H	tine grained, mild HCI reaction, weak to medium strong (R2 to R3), cavities]
				deg, rough, undulating	口	up to 1" cover 10-15% of surface,	
1 7	R13-NQ			125.95' - Mechanical break, horizontal,	Ш	voids up to 3/16" cover 60-90% of	1
	5 ft	7		rough, undulating	Ш	 surface, macrofossils (molds/casts) No Recovery 126.1-130.0' 	1 1
-	22%		NR		+	- 140 Necovery 120.1-130.0	1
-					+		ļI



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-08	SHEET	8	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMINC	I WILL IT IOD A	ND L	ZUIFIV	MENT: CME 550X S/N 340253, mud rotary, NQ tools, HV	v cas	ng	ORIENTATION: Vertical
WATER	LEVELS: 4.4	1 ft b	gs on 3	3/06/07 START : 2/15/2007 END : 2/	23/20	07 LOGGER : R. Gomez, R. Bitely, 1	. Stewart
>00	(9)			DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	907	ROCK TYPE, COLOR,	
뿝병은	RUN H, 4 ÆR	Q D (%)	물인	DEDTIL TYPE OPIENTATION POLICINESS	SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A S	RE I	۵.	Z Z	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SEE	COI LEN RE(A O	PEF P	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-					\vdash	-	R13: 9 minutes
-						-	14:00-15:00 PM HW
130_	130.0				ш		casing unscrewed at 10.0', —
-87.6			4	130.05' - Fracture, rough, undulating, open	Н	Limestone - 130.0-131.5' - light olive gray, (5Y	removed NQ to retrieve
			4	130.4' - Fracture, smooth, undulating, open 130.75' - Fracture or mechanical break, 20 .		5/2), very fine grained, mild HCl	HW
_			1	deg, smooth, undulating	₩	reaction, weak to medium strong (R2	15:00-16:30 PM Advanced - HW casing from 35.0'-70.0'
-			H	131.0' - Fracture or mechanical break, <10		 to R3), voids up to 3/16" cover 50% 	17:30-18:30 PM NQ tooling
-	DAANO			deg, smooth, undulating	╁┯	of surface, few cavities up to 1/4" diameter, few macrofossil molds,	locked in slough at 100'
_	R14-NQ 5 ft	18		131.3' - Fracture, rough, undulating, open		 potential gaps from fines washing out 	below ground surface,
	30%				╨	at 130.05', 130.4', and 131.3', 3/4"	back hammering to retrieve 18:00-18:30 PM little to no
			NR			iron cemented sand (no HCl reaction,	movement, stop for the day
-					1—	 very fine grained, medium strong [R3]) at 130.0-130.05' 	2/21/07 Stop drilling for the
1 -					世	No Recovery 131.5-135.0'	day - 2/22/07, 07:00-12:30 PM
-					₩	- -	Retrieved tooling and
135	135.0			405 0 405 0L Franklin (0) 40 L	仜	L	cleaned out boring from
-92.6				undulating - 135.0-135.2' - pale yellowis			85.0-130.0'
				dildulating	H	to olive gray, (10YR 6/2 to 5Y 4/1),	Advanced HW casing to 85.0'
-				-	ш	very fine grained, mild HCl reaction,	R14: 10 minutes
-			NR		╁┰	- weak to medium strong (R2 to R3),	Very fine sand-sized grains
-	R15-NQ					voids up to 1/16" cover 30% of surface, possible worm burrows at	in drilling mud (identified by
-	5 ft	0			₽	- 135.0-135.2'	grit between fingers), black grains (possibly heavy
I _	24%					No Recovery 135.2-138.0'	minerals) present in grit
			0	138.15, 138.25' - Mechanical break, variable	Н	Limestone	only, not sample
I -				angles, variably open		- 138.0-138.8' - light olive gray to olive gray, (5Y 6/1 to 5Y 4/1), fine grained,	Continuous slow advancement through
-			١ ا	138.25-138.65' - Fracture zone, coarse gravel-size rock fragments, visible signs of	₽	moderate HCl reaction, weak to	interval, no void
			NR	mechanical wear		 medium strong (R2 to R3), crystalline 	R15: 13 minutes
140 -97.6	140.0				╁	surfaces visible to naked eye, macrofossil molds up to 3/4"x1/4"	15:15 PM 0.8'-long section
-97.0			>10	140.0-140.25' - Fracture zone, rough, stepped, infilling		- (spiral gastropod), voids up to 3/4 x 1/4	of core retrieved from cutting shoe of core barrel,
			'	140.45' - Bedding plane, horizontal, rough,		variable 0-30% over surface, bedding	logged as R15 core from
				undulating, 1/4" open	\vdash	plane laminations rare, trace	138.0-138.8'
-			10	140.9-141.6' - Fractures or bedding plane, 70-90 deg, rough, undulating	戶	organicsNo Recovery 138.8-140.0'	2/22/07 Stop drilling for the day at 140.0'
-	R16-NQ			141.9' - Mechanical break, 10 deg, rough,	╁	Limestone	Begin drilling 2/27/07 at
-	5 ft	23	6	undulating	⇇	 140.0-140.45' - dark yellowish brown 	08:45 -
_	74%			141.95-142.1' - Fracture zone, 50-70 deg,	╁┼	to light olive gray, (10YR 4/2 to 5Y 5/2), fine to medium grained,	-
			3	smooth, undulating 142.2' - Bedding plane, horizontal, smooth,	片	moderate to strong HCl reaction,	_
1				undulating	\vdash	extremely weak (R0), poorly]
-				142.4' - Fracture, 70 deg, rough, undulating	ш	 competent with some silty sand and 	R16: 10 minutes
<u>,</u> -			NR	142.6, 143.0, 143.2, 143.55' - Fractures (4),	╁	gravel, angular grains up to gravel size, trace bedding plane laminations	-
145 -102.6	145.0			rough, stepped, variably open (<1/8")		and organics	
			>10	break, rough, undulating	\vdash	- -	-
1 _				145.8, 146.1, 146.26, 146.35, 146.5, 146.6,	口	_] _
1			[146.7' - Bedding plane (7), <10 deg, smooth,	H]
1 -			8	undulating	Ľ]
-	R17-NQ	!		146.7-148.0' - Fracture, 70-90 deg, smooth to rough, undulating to stepped, with multiple	仜	-	·
-	5 ft	13	>10	intersecting bedding plane and subhorizontal	+	-	-
_	70%			fractures		-	-
			5	148.1' - Fracture, 50 deg, smooth, undulating	尸		
					1		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-08

SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMING	METHODA	ND L	VIII IV	IENT: CME 550X S/N 340253, mud rotary, NQ tools, HV	v casi	ng .	ORIENTATION: Vertical
WATER	LEVELS: 4.4	1 ft b	gs on :	3/06/07 START : 2/15/2007 END : 2/2	23/20	D7 LOGGER: R. Gomez, R. Bitely,	. Stewart
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	LOG	DOOK TYPE, OOLOD	
EEL ON	Ã.Ϋ́ς.	<u></u>	FRACTURES PER FOOT	DESCRI TION	힐	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH	E E	Q D (%)	ĮΣŏ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF 문	NG SCC	a D	AC R F	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	SHR	Ř	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROLO, TEOL REGGETO, ETC.
				148.3' - Bedding plane, <10 deg, smooth,		140.45-143.7' - dark yellowish brown	
-			l	undulating to stepped, <1/4" open -	Ш	 to grayish olive with light gray 	R17: 17 minutes
I _			NR	_	Н	mottling, (10YR 4/2 to 10Y 4/2 with	K17. 17 Illillutes
150	150.0				Ш	N7), very fine grained, moderate HCI	
-107.6	100.0			450.45L Daddian along 440.dag asset		— reaction, weak to medium strong (R2	_
I -			6	150.15' - Bedding plane, <10 deg, rough, undulating	₽	to R3), voids over 30-40% of surface and vesicles over 60-80% of the	-
I _				150.3, 150.55, 150.6' - Bedding plane (3),	Н	- surface, unfilled voids/cavities up to	_
				<10 deg, rough, undulating		1"x1/2" especially at 143.5-143.7',	
-			5	150.7' - Mechanical break, 50-90 deg, rough,	ш	heavy bioturbation and secondary	-
I -				stepped -	+	infill of voids	-
	R18-NC		١	151.05, 151.25, 151.5, 151.8, 152.05' -	Н	No Recovery 143.7-145.0'	
1 7	5 ft 84%	30	8	Bedding plane (5), rough, undulating	Ш	Limestone	·
-	O-7/0			151.95' - Mechanical break, vertical, rough,	+	- 145.0-145.45' - Same as	-
-			5	stepped	Н	140.45-143.7'	-
				152.05-152.25' - Fracture, vertical, smooth, undulating, with 3 horizontal intersecting	Ш	145.45-146.7' - light olive gray, (5Y 5/2), very fine grained, moderate to	
1 7			1	fractures	Ы	strong HCl reaction, weak to medium	R18: 9 minutes
			NR	152.5' - Fracture, 40 deg and 60 deg, rough,	Н	strong (R2 to R3), voids up to 3/16"	-
	155.0		L	stepped	H	cover 20% of the surface, few macro	_
-112.6			_	152.85' - Fracture, 10-70 deg, smooth,		fossils, laminated subhorizontal	
			5	undulating	ш	bedding with organics, minor	155-156' Slow
-				152.95' - Fracture, 75 deg, smooth,	+	bioturbation decreasing with depth	advancement -
l _			3	undulating		146.7-148.5' - Same as	_
				153.1' - Mechanical break 153.4-153.65' - Fractures (4), 20-70 deg,		145.45-146.7' except rare laminations, no to trace organics	
I -	R19-NC			smooth, undulating	Н	No Recovery 148.5-150.0	156-158' Slightly faster
-	5 ft	23	5	154.0' - Bedding plane, rough, undulating,	+	Limestone	advancement -
_	72%			<1/4" open		_ 150.0-152.05' - dark yellowish brown	_
			2	155.15, 155.45, 155.5' - Bedding plane (3),	Н	to light olive gray, (10YR 4/2 to 5Y	
_				<10 deg, smooth to rough, undulating	╁╫	- 5/2), very fine to fine grained, mild to	-
_				156.0' - Mechanical break, 20 deg, rough,		moderate HCl reaction, weak to	B10: 7 minutos
			NR	undulating 156.15, 156.4' - Bedding plane, <10 deg,	Ы	medium strong (R2 to R3), voids - (<1/16") over 80-100% of surface,	R19: 7 minutes
160	160.0			smooth, undulating	Н	cavities up to 1/8" present	158-160' Slow
-117.6	.00.0			157.0' - Fracture, 75 deg, rough, undulating		152.05-154.2' - very light gray to light	advancement —
-			4	157.2, 157.4, 157.6, 157.8, 157.9, 158.0' -	╁	 olive gray, (N8 to 5Y 6/1), very fine 	Lost circulation at 160.0'
				Bedding plane (6), <10 deg, smooth,	Н	grained, moderate to strong HCl	_
				undulating	Н	reaction, weak to medium strong (R2	
-			8	158.15, 158.3' - Bedding plane (2), smooth,	口	- to R3), voids cover 0-30% of the	·
-	D00 1:0		0	undulating 160.35' - Fracture, 20 deg, rough, undulating	₽Ч	surface increasing with depth, fossiliferous, bioturbation and	-
	R20-NC 5 ft	7	\vdash	160.65' - Bedding plane, horizontal, smooth,	Н	 secondary infill, iron staining rare 	_
	44%	'		undulating		No Recovery 154.2-155.0'	Very slow, continuous
-	,			160.85' - Fracture, 65 deg, rough, undulating	ш	Limestone	advancement -
-			NR	161.0' - Fracture, 15 deg, rough, undulating -	\vdash	 155.0-155.5' - dark yellowish brown 	-
			` ` `	161.25 - Mechanicai break, 45 deg, rough,		to light olive gray, (10YR 4/2 to 5Y	_
				undulating	Ш	5/2), very fine to fine grained, weak	R20: 20 minutes
405	1050			161.25-161.5' - Fracture zone, rough,	+	(R2), 10-20% organic laminations on	·
165 -122.6	165.0			undulating, multiple intersecting fractures 161.7' - Fracture, 15 deg, smooth, undulating	廾	bedding plane, fractures in poorly competent seams and laminae	CC 4 cellected = ± 405.0
-122.0			5	161.95' - Fracture, 65 deg, smooth,	Ш	_ 155.5-158.0' - dark yellowish brown	SC-4 collected at 165.2- 165.75'
				undulating	\vdash	to light olive gray, (10YR 4/2 to 5Y	103.73
-				165.0-165.2' - Fracture zone, rough, stepped	╁┤	5/2), very fine grained, mild to	·
-			>10	to undulating	Ш	 moderate HCl reaction, weak (R2), 	-
			[165.75-165.95' - Bedding plane, horizontal,		voids cover 10-40% of the surface	
1 7	R21-NC		3	smooth, undulating	Ш		·
-	5 ft	12		165.95-166.65' - Fracture zone, smooth to	Н	-	-
-	48%			rough, undulating 166.85' - Fracture or mechanical break, 60		 	-
				deg, rough, stepped	Ш		
			I		1		I .



FRACTURES PER FOOT

NR

2

>10

2

NR

4

5

2

NR

10

NR

RQD(%)

WATER LEVELS: 4.41 ft bgs on 3/06/07

CORE RUN, LENGTH, AND RECOVERY (%)

DEPTH BELOW SURFACE AND ELEVATION (ft)

170

-127.6

175

-132<u>6</u>

180

137.6

185 185.0

142.6

180.0

175.0

170.0

R22-NQ

5 ft

96%

R23-NQ

5 ft 22

56%

R24-NO

5 ft 20% 38 8 PROJECT NUMBER: BORING NUMBER: 338884.FL E-08 SHEET 10 OF 10

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722897.6 N, 458228.0 E (NAD83)

START: 2/15/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

DISCONTINUITIES

166.95' - Fracture, horizontal, rough,

ELEVATION: 42.4 ft (NAVD88) ${\tt DRILLIN} \underline{{\tt NG CONTRACTOR}}: {\tt Universal Engineering Sciences}, {\tt Orlando, FL}; {\tt Driller: D. Patten, T. Williams}$

END: 2/23/2007

90

surface

Limestone

Limestone

No Recovery 158.6-160.0'

no voids at 160.4-160.65' No Recovery 162.2-165.0'

160.0-162.2' - very light gray to light brownish gray, (N7 to 5YR 6/1), very

fine grained, moderate to strong HCI

reaction, weak to medium strong (R2

to R3), voids cover 0-80% of surface,

165.0-167.4' - very light gray to light

olive gray, (N8 to 5Y 6/1), very fine

weak to medium strong (R2 to R3),

grained, moderate HCI reaction.

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

LOGGER: R. Gomez, R. Bitely, T. Stewart LITHOLOGY COMMENTS ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 158.0-158.6' - very light gray to yellowish gray, (N8 to 5Y 8/1), R21: 7 minutes moderate HCI reaction, weak to medium strong (R2 to R3), minor to trace voids, minor iron staining on

ORIENTATION: Vertical

undulating 167.1' - Fracture, vertical, rough, undulating 167.3' - Bedding plane, horizontal, smooth, undulating 170.1' - Bedding plane, horizontal, smooth, undulating, 1/2" open 170.6' - Fracture, 60 deg, rough, undulating 170.7' - Bedding plane, horizontal, rough, undulating 171.0, 171.3, 171.85' - Fractures (3), 40 deg and 30 deg, rough, undulating, <1/4" open 172.15' - Bedding plane, horizontal, rough, undulating 172.35-172.7' - Fracture zone, rough, undulating, intersecting fractures at varying 173.05' - Fracture, 20 deg, rough, undulating 173.15-173.3' - Fracture zone, intersecting fractures at varying angles 173.55, 173.75, 173.95, 174.3, 174.6' -Bedding plane or fracture (5), <10 deg, rough to smooth, undulating, <1/2" open 175.1' - Fracture, 70 deg, smooth, undulating 175.2, 175.5, 175.9, 176.05, 176.25, 176.35, 176.6, 176.8, 177.4, 177.65, 177.8' - Bedding plane (11), <10 deg, smooth, undulating, <1/8" open to tight

180.1, 180.25, 180.6, 180.7, 180.85, 180.9' -

Bedding plane (6), <10 deg, rough,

undulating to stepped

voids cover 30-60% of surface No Recovery 167.4-170.0' Limestone 170.0-170.1' - Same as 165.0-167.4' except few voids on surface 170.1-170.6' - moderate yellowish brown, (10YR 5/4), very fine to medium grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), trace laminated bedding with few infill features 170.6-174.8' - very light gray to light olive gray, (N8 to 5Y 6/1), very fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids cover 50-80% surface. cavities and dissolution features up to 1/4" cover 20% surface from

lithologies at 170.1', 170.6', and 172.15-172.2 No Recovery 174.8-175.0' Limestone 175.0-177.8' - very light gray to light olive gray, (N8 to 5Y 6/1), very fine to

170.9-171.8', bedding plane

laminations at 178.6-178.9', contacts

from very fine to medium grained

medium grained, moderate HCI reaction, weak to medium strong (R2 to R3), voids cover 10-30% of surface, voids up to 1/2" rare No Recovery 177.8-180.0' Limestone 180.0-181.0' - light olive gray, (5Y

6/1), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids cover 30% of surface, bedding plane laminations, trace fossils No Recovery 181.0-185.0' Bottom of Boring at 185.0 ft bgs on

R22: 8 minutes

R23: 8 minutes Core not retained in

from core barrel

sample barrel; NQ tooling

2.5' of slough or sand in

borehole from apparent

flow zone at 177.5': hole

cleaned out to 180.0'

removed to retreive sample

R24: 6 minutes Drill stem sand-locked at 185.0'; back hammered 3 hours to free tooling Sand flow zone likely at 180.0-183.0



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01

SHEET 1 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone bit ORIENTATION : Vertical

SAMPLE INTERVAL (ft) RECOVERY (ft) #TYPE 6"-6"-6" (N) 1.3 SS-1 1.5 SS-1 1.5 SS-1 1.5 SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY Topsoil 0.0-0.3' - very dusky red, (10R 2/2), moist, 20-30% fine to coarse rootlets Poorly Graded Sand With Organics (SP) 0.3-1.3' - very light gray, (N8), moist, very loose, very fine to fine grained, trace nonplastic fines, 10% organics, decreasing with depth, silica sand Topsoil 0.0-0.3' - very light gray, (N8), moist, very loose, very fine to fine grained, trace nonplastic fines, 10% organics, decreasing with depth, silica sand Poorly Graded Sand With Silt (SP-SM) 5.0-5.9' - very pale orange, (10YR 8/2), wet, loose, very fine to fine silica sand, 10-15% nonplastic fines, trace very fine black particles, clayey sand in last 0.2' SS-2 is wet so wate	- - - - s -
SAMPLE INTERVAL (ft) RECOVERY (ft) #TYPE 6"-6"-6" (N) 1.3 SS-1 1.5 SS-1 1.5 SS-1 1.5 SS-2 1.5 SS-2 1.5 SS-2 1.5 SS-2 1.5 SS-2 1.5 SS-2 1.5 SS-2 1.5 SS-2 1.5 SS-2 1.5 SS-2 1.5 SS-2 1.5 SS-3 SS-2 1.5 SS-3 SS-2 1.5 SS-3 SS-2 1.5 SS-3 SS-2 1.5 SS-3 SS-2 1.5 SS-3 SS-2 1.5 SS-3 SS-2 1.5 SS-3 SS-3 SS-3 SS-3 SS-3 SS-3 SS-3 SS-	NG, DRILLING RATE, LOSS, TESTS, AND MENTATION 3:45 s - s -
Topsoil 1.3 SS-1 1.5 1.5 1.6 1.7 1.8 1.9 1.9 1.9 1.9 1.9 1.9 1.9	CLOSS, TESTS, AND MENTATION 3:45 s - sit
Topsoil 1.3 SS-1 1.5 SS-2 1.5 SS-3 1.5 SS-	CLOSS, TESTS, AND MENTATION 3:45 s - sit
Topsoil 1.3 SS-1 1.5 SS-2 1.5 SS-3 1.5 SS-	s - s -
Topsoil 1.3 SS-1 1.5 SS-2 1.5 SS-3 1.5 SS-	- - - - s - it
1.3 SS-1 2-2-2 (4) 1.5	- - - - s - it
1.5 1.3 SS-1 (4) Vifine to coarse rootlets Poorly Graded Sand With Organics (SP) 0.3-1.3' - very light gray, (N8), moist, very loose, very fine to fine grained, trace nonplastic fines, 10% organics, decreasing with depth, silica sand 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat Added 1/8 52-lb bag mud vat SS-2 collected at 09 SS-2 (6) Very fine to fine silica sand, 10-15% nonplastic fines, trace very fine black particles, clayey sand in last 0.2' SS-2 is wet so wate	it _
0.3-1.3' - very light gray, (N8), moist, very loose, very fine to fine grained, trace nonplastic fines, 10% organics, decreasing with depth, silica sand 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat	it _
fine to fine grained, trace nonplastic fines, 10% organics, decreasing with depth, silica sand 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat 140-lb hammer NW rod 5.0' section 4.75" tricone roller by Added 1/8 52-lb bag mud vat	it _
language language	it _
4.75" tricone roller by Added 1/8 52-lb bag mud vat SS-2 collected at 09 very fine to fine silica sand, 10-15% nonplastic fines, trace very fine black particles, clayey sand in last 0.2' 4.75" tricone roller by Added 1/8 52-lb bag mud vat SS-2 collected at 09 very fine to fine silica sand, 10-15% nonplastic fines, trace very fine black particles, clayey sand in last 0.2' SS-2 is wet so wate	it _
Added 1/8 52-lb bac mud vat SS-2 collected at 09 SS-2 (6) Poorly Graded Sand With Silt (SP-SM) 5.0-5.9' - very pale orange, (10YR 8/2), wet, loose, very fine to fine silica sand, 10-15% nonplastic fines, trace very fine black particles, clayey sand in last 0.2' SS-2 is wet so wate	
SS-2 collected at 09 SS-2 2-3-3	- -
38.1 Output	-
38.1 Output	<u>l</u>
38.1 Output	7
0.9 SS-2 2-3-3 (6) 5.0-5.9' - very pale orange, (10YR 8/2), wet, loose, very fine to fine silica sand, 10-15% nonplastic fines, trace very fine black particles, clayey sand in last 0.2' SS-2 is wet so wate	ı:07
very fine to fine silica sand, 10-15% nonplastic fines, trace very fine black particles, clayey sand in last 0.2'	
\ofeanof sample \dag{-1} \dag{bgs}	r level is placed at 3.0"
	7
	=
	-
	7
10 10.0	ı:1 <i>4</i>
7-8-7 10.0-11.0' - very pale orange, (10YR 8/2), wet,	- 17
1.0 55-3 (15) medium dense, fine silica sand, 5% nonplastic fines,	-
trace very fine black particles	-
	_
	7
]	†
	+
1 45 1 45 1 1 1 1 1 1 1	+
15 15.0 Silty Sand (SM) SS-4 collected at 09	r23
0.9 SS-4 (20) medium dense, fine silica sand, 20% nonplastic fines, trace very fine black particles	-
16.5 \ \text{Trace very line black particles}	_
	_
]]]]]	7
]]]]]	7
	†
	+
20	



WATER LEVELS: 4.5 ft bgs on 4/5/2007

SAMPLE INTERVAL (ft)

1.0

1.1

1.3

1.3

RECOVERY (ft)

#TYPE

SS-5

SS-6

SS-7

SS-8

DEPTH BELOW SURFACE AND ELEVATION (#)

23.1

25_ 18.1

30

13.1

35

40

20.0

21.5

25.0

26.5

30.0

31.3

35.0

36.5

PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01	SHEET	2	OF	6	

SOIL BORING LOG

Pog

SYMBOLIC

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

START: 4/4/2007

Silty Sand (SM)

Silty Sand (SM)

Silty Sand (SM)

STANDARD

PENETRATION TEST RESULTS

6"-6"-6" (N)

11-19-24

(43)

20-35-50

(85)

23-48-50/4

(98/10")

24-43-50

(93)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

END: 4/5/2007

SOIL DESCRIPTION

SOIL NAME, USCS GROUP SYMBOL, COLOR,

MOISTURE CONTENT, RELATIVE DENSITY OR

CONSISTENCY, SOIL STRUCTURE, MINERALOGY

Silty Sand (SM) 20.0-21.0' - Same as 15.0-15.9' except dense

25.0-26.1' - Same as 20.0-21.0' except very dense

30.0-31.3' - pale yellowish orange, (10YR 6/2), wet, very dense, fine silica sand, 20% nonplastic fines, trace very fine black particles, 5% medium to coarse

sand-sized concretions in the upper 0.3' of sample

35.0-36.3' - pale yellowish orange, (10YR 6/2), wet, very dense, fine silica sand, 20% nonplastic fines,

5-10% very fine black particles, trace medium

grain-sized concretions, trace organics

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone bit ORIENTATION: Vertical

> LOGGER: T. Stewart COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION SS-5 collected at 09:32 SS-6 collected at 09:47 SS-7 collected at 10:08 SS-8 collected at 10:22



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01	SHEET	3	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone bit

ORIENTATION : Vertical

						iry, cathead, NW rods, 4				ORIENTATION : Vertical	
WATER	LEVELS	: 4.5 ft bo	gs on 4/5/	2007	START : 4/4/2007	END : 4/5/2007		<u>-R∶</u> I	. Stev		$\overline{}$
30₽				STANDARD PENETRATION		SOIL DESCRIPTION		۲ 🗕	\vdash	COMMENTS	
N (1	SAMPLE	INTERVA	` ,	TEST RESULTS	SOIL NAME	E, USCS GROUP SYMI	BOL COLOR	<u>-</u>	: 	DEPTH OF CASING, DRILLING RATE,	
A A C E		RECOVE	ERY (ft)		MOISTURE	CONTENT, RELATIVE	DENSITY OR	Ş	! 	DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE	, MINERALOGY	- OLICI ORANAS		INSTRUMENTATION	
оош 3.1	40.0			(N)	Silty Sand (SM	1		11		S-9 collected at 10:38	
-		1.0	SS-9	30-50/6 (80/12")	40.0-41.0' - pale	e yellowish brown, (10	YR 5/4), wet,	4	\parallel $^{\circ}$	5 5 conceted at 10.00	- 4
-	41.0			(00/12)	very dense, fine to trace very fine to	e silica sand, 15-20%	nonplastic fines,	H	1		-
_					\tace very line i	Diack particles	/	4			-
_								1			4
-								1			4
_											4
_								1			
_											
								1			
45	45.0										
-1.9		0.9	SS-10	34-50/4.5	Silty Sand (SM) ne as 40.0-41.0' exce	nt very nale		SS	S-10 collected at 10:57	
	45.9	J.5	33 10	(84/10.5")	orange, (10YR	5/4), wet, very dense,	dark yellowish	Щ	4]
					orange (10YR 6	6/6) mottling in upper grades to pale yellov	portion of				1
					6/2) from 45.5-4	46.1', fine silica sand,	15-20% `			riller's Remark: 11:05 added 1/2 50-lb bag QuikGel bentonite after removing sand	
						, trace very fine to me medium sand-sized of		1		uttings from tub and refilling with clean	
					similar to above		oncretions,	1		ater; maintained circulation since start	1
-								1			
-								1			
-								1			- 1
50	50.0							1			- 1
-6.9	00.0				Silty Sand (SM		-	1	∏ ss	S-11 collected at 11:35	
-		1.2	SS-11	28-44-50		t olive gray, (5Y 5/2), 20-25% nonplastic fi		1			- 1
-	51.5			(94)	fine black partic		rico, trace very	#	Ц		-
-	31.3				1			1			- 1
-								1			- 1
-								1			-
-								1			-
-								+			- 1
-								+			\dashv
	^							+			+
55 <u> </u>	55.0				Silty Sand (SM)		+	T ss	S-12 collected at 13:54	\dashv
-		1.2	SS-12	22-34-44	55.0-56.2' - Sar	ne as 50.0-51.2' exce	pt trace coarse	-	Ŭ		\dashv
-		1.2	33-12	(78)	sand-sized con	cretions over first 0.1	(slough)	-			-
-	56.5				1			+			-
-								+			-
-								+			4
-								+			4
-								+			4
-								+			-
-								4			4
60								\bot	1		
					l						



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01 SHEET 4 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 4.5 ft b	gs on 4/5/	2007 S	START : 4/4/2007 END : 4/5/2007 LOGGE	R:1	Γ. Stewart
				STANDARD	SOIL DESCRIPTION	,	COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIOOS OBOUR OVANDOL OOLOR	-	DEDTIL OF CACING PRILLING PATE
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	2	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SVMBOLICIOS	INSTRUMENTATION
-16.9	60.0			(14)	Silty Sand (SM)	Η̈́	SS-13 collected at 14:13
-		1.2	SS-13	25-43-50	60.0-61.2 - Same as 55.0-56.2' except no concretions and color changes from yellowish gray (5Y 7/2) in	1	-
-	61.5			(93)	upper 0.25' to light olive gray (5Y 5/2) from	111	4 - 1
-	01.0				60.25-61.2'	1	1
-						1	1
-						1	1
]	
_						1	_
65 <u> </u>	65.0				Silty Sand (SM)	-	SS-14 collected at 14:39
-21.9	65.0	0.9	SS-14	32-50/4.5 (82/10.5")	65.0-65.9' - light olive gray, (5Y 5/2), wet, very dense,	4	- 33-14 collected at 14.39
-	65.9			(======================================	fine silica sand, 15-20% nonplastic fines, trace very fine black particles	╨	<u>-</u>
-						1	-
-						1	-
-						1	1
-						1	1
-						1	1
-						1	1
70	70.0					1	_]
-26.9		0.9	SS-15	35-50/6	Silty Sand (SM) 70.0-70.9' - yellowish gray, (5Y 7/2), wet, very dense,		SS-15 collected at 15:00
_	71.0	0.0	00 10	(85/12")	ine silica sand, 15-20% nonplastic fines, trace very	Ш	4
_					fine black particles	-	Added water and 1/4 bag QuikGel bentonite
_						-	-
-						-	-
-						1	-
-						1	-
-						1	-
75	75.0					1	1
-31.9		0.8	SS-16	33-50/5	Silty Sand (SM)	1	SS-16 collected at 15:25
	75.9	0.0	33-10	(83/11")	75.0-75.8' - Same as 70.0-70.9'	Ш	14
_						1	
_						1	1
-						1	-
-						+	-
-						+	-
						+	-
80						+	+



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01	SHEET	5	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073. mud rotary, cathead, NW rods, 4-3/4" tri-cone bit

ORIENTATION · Vertical

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone bit ORIENTATION: Vertical												
WATER LEVELS : 4.5 ft bgs on 4/5/2007 START : 4/4/2007 END : 4/5/2007 LOGGER : T. Stewart STANDARD SOIL DESCRIPTION 0 COMMENTS												
				STANDARD	SOIL DESCRIPTION (2)	COMMENTS						
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY							
표 등 등		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND						
TRF4			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION						
ESE ESE				(N)								
-36.9	80.0			18-32-44	Silty Sand (SM) 80.0-81.4' - yellowish gray, (5Y 7/2), wet, very dense,	SS-17 collected at 15:50						
_		1.4	SS-17	(76)	grayish blue (5PB 5/2) mottling/staining of sand from	_						
l _	81.5				80.7-81.0', medium light gray (N6) staining from ↑ 81.0-81.4', fine silica sand, 20-25% nonplastic fines,	Added 1/4 50-lb bag of QuikGel bentonite						
l _					trace very fine black particles							
l _					_							
_					_							
_												
_												
_												
85_	85.0											
-41. 9				45.40.40	Silty Sand (SM) 85.0-86.1' - Same as 80.0-81.4' except medium	SS-18 collected at 16:15						
		1.1	SS-18	15-12-12 (24)	dense, 1" thick grayish blue seam near the top and							
	86.5			(= -7	very bottom of sample, 25-30% nonplastic fines							
					1							
					1							
_					1							
-					1							
90	90.0											
-46.9					Silty Sand (SM) 90.0-91.3' - grayish yellow, (5Y 8/4), wet, medium	SS-19 collected at 16:39						
		1.3	SS-19	11-11-10 (21)	dense, very fine to fine silica sand, 20-25% nonplastic							
	91.5			(21)	fines, trace very fine sand-sized black particles, 1/2"							
					thick seam of medium dark gray to dark gray (N4 to N3) sand at 90.3' with 1/4"-3/8" subrounded							
_					gravel-sized sand concretions, possible pyrite							
_					1							
-					1	_						
					1]						
-					1]						
95	95.0				1]						
-51.9					Silty Sand (SM)							
-		0.7	SS-20	6-7-8 (15)	95.0-95.7' - pale yellowish brown, (10YR 6/2), wet,	SS-20 collected at 17:05						
-	96.5			(10)	\trace fine sand-sized angular black particles, 1"	1						
-					concretion with a hollowed out section]						
-					1]						
-					1]						
-					1]						
-					1	_						
-					1]						
100					1	1						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01	SHEET	6	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone bit

ORIENTATION : Vertical

\A/ATED		4500	4/5/	2007	TADT 4/4/0007	END 4/5/0007	100055	, ₊	011
WATER	LEVELS	. 4.5 π છ	ıs on 4/5/		START : 4/4/2007	END: 4/5/2007 SOIL DESCRIPTION	LOGGER	(; I.	Stewart COMMENTS
ŞQæ	SAMPLE INTERVAL (ft) SAMPLE INTERVAL (ft) RECOVERY (ft) #TYPE 6"-6"-6" (N)			STANDARD PENETRATION		JOIL DEJUNIF HUN		90	COIVIIVILINIO
N S N	SAMPLE INTERVAL (π) RECOVERY (ft) TEST RESULTS		TEST RESULTS	SOIL NAME, USCS GROUP STMBOL, COLOR,			SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,	
H BI ATIC		RECOVE			MOISTURI	E CONTENT, RELATIVE DE	NSITY OR	30L	DRILLING FLUID LOSS, TESTS, AND
T H H			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, M	NERALOGY	ΥMI	INSTRUMENTATION
-56.9	100.0			(N)	Silty Sand (SI	M)		111	SS-21 collected at 17:39
00.0	100.0		00.04	10-24-49	100.0-101.5' -	Same as 90.0-91.2' except	ot very dense, -		18:03 Driller tape measures hole
_		1.5	SS-21	(73)	no seams, trad	ce angular dark gray (N3)	concretions _		Total depth at 97.0'
	101.5				D 11 (D)		-	111	Water level at 4.5' below ground surface
]					Bottom of Bori	ing at 101.5 ft bgs on 4/5/2	2007		4/05/07 07:36 Water level at 3.5' bgs
							_		Grouted to surface with three 92 lb bags of
							_		Holcim brand Portland cement and two 47-lb bags of Quikrete brand Portland cement
									bags of Quikiete brand Fortand cement
7									
]							_		1
105							_		1
-61.9								1	
							_	1	1
							-		1
+							-	1	1
+							_		-
-							_		-
-							_		-
-							-		-
-							-		-
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110 <u> </u>									-
00.5							-		-
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							_		4
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]							_		_
]							_		_
]							_		_
]							_		_
115_									
-71.9									
1 7							_		1
]							_		1
1 7							-	1	1
7							-	1	1
							-	1	1
							-	1	1
							-	1	1
+							-	1	
120							-	1	-
120									-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01A SHEET 1 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone and 3-7/8" drag bit ORIENTATION : Vertical

					START: 4/5/2007	END : 4/6/2007	LOGGEF			
WATER	LEVELS	. 3.0 11 0	45 OH 4/0/		31AR1 . 4/3/2007	SOIL DESCRIPTION	LOGGER		COMMENTS	
중위원	SAMPLE	INTERVA	J (ft)	STANDARD PENETRATION TEST RESULTS				LOG		
BEL SE A	RECOVERY (ft)				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR				DEPTH OF CASING, DRILLING RATE,	
YFAC		I TALLOOVI	#TYPE	6"-6"-6"		E CONTENT, RELATIVE D ICY, SOIL STRUCTURE, N		SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
SUF			#11171	(N)				SYI		
42.9	0.0					d Sand With Organics (S light gray, (N8), moist, ve			SS-1 collected at 10:12	
		1.5	SS-1	1-2-2 (4)	fine to fine grai	ined silica sand, trace no	onplastic fines,			
	1.5			(.)	15% organics	0.11(01)		333	Glen Davis is cathead operator	
					Sandy Organi 1.0-1.5' - brow	c Soil (OL) nish black and medium t	orown. (5YR		140-lb hammer	
					3/1, 5YR 3/4),	moist, soft, low plasticity	, 30-40% very		24" split spoon (SS)	
					fine silica sand	1, 100tS			5.0' sections of NW rod	
									4.75" tricone roller drill bit	
							-		1/2 50-lb bag QuikGel bentonite added to	
							-		mud vat	
5	5.0						-	1	_	
37.9					Clayey Sand (SC) wish gray, (5Y 7/2), wet,	modium donos		SS-2 collected at 10:39	
		0.9	SS-2	3-6-8 (14)	no HCl reaction	n, very fine to fine silica	sand, 30% low		_	
-	6.5			(,		0-15% rootlets		1	_	
					Poorly Graded	d Sand (SP) pale orange, (6YR 8/2), v	wet, medium			
					dense, fine sili	ca sand, trace nonplastic	cfines			
							_			
l _							_		_	
10_	10.0									
32.9				0 - 0	Silty Sand (SN	//) ht olive gray, (5Y 6/1), w	ot modium		SS-3 collected at 10:46	
		1.3	SS-3	6-7-9 (16)	dense, fine sili	ca sand, 30-35% nonpla				
_	11.5			(- 7	very fine black	particles				
l _							_		_	
l _							_		_	
l _							_		_	
l _							_		_	
-							_	1		
1 -							-]		
15	15.0									
27.9				0.40.40	Silty Sand (SN	//) ame as 10.0-11.3' except	very nale		SS-4 collected at 10:52	
1 -		1.1	SS-4	8-10-13 (23)	orange, (10YR	R 8/2), 25% nonplastic fin	es _		_	
1 -	16.5			, ,			-		_	
_							_		_	
_							_		_	
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1 -							-		_	
1 -							-]	_	
-							-	1	_	
20								Ш		
1										



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01A	SHEET	2	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone and 3-7/8" drag bit ORIENTATION: Vertical

						FND: 4/6/2007			
WATER	LEVELS	. J.U II DO	yo UN 4/0/	STANDARD	START : 4/5/2007	END: 4/6/2007 SOIL DESCRIPTION	LOGGER		Stewart COMMENTS
≩Qæ I	S9€ CAMBLE INTERVAL (#) PE					JOIL DEJUNIF HON		90	CONTINUENTO
ELC ON (SAMPLE		. ,	PENETRATION TEST RESULTS	SOIL NAN	ME, USCS GROUP SYMBOL	_, COLOR.	IC L	DEPTH OF CASING, DRILLING RATE,
TH B		RECOVE	<u> </u>		MOISTUR	E CONTENT, RELATIVE DE	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
E SURF			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, M	INERALOGY	SYMBOLIC LOG	INSTRUMENTATION
22.9	20.0			(11)	Silty Sand (SI	M)		111	SS-5 collected at 11:00
-		1.1	SS-5	16-22-31	20.0-21.1' - Sa	ame as 15.0-16.1' except	very dense, -		-
-		'.'	33-3	(53)	slight nue cha	inge at bottom 4" toward p 6/2), 20-25% nonplastic fil	ale yellowish nes	Ш	-
_	21.5				(3.0(10111)	5/2), 20 20 /0 Helipidedie III		-	-
-							-		-
-							-		-
_							=		_
_							-		_
_							_		_
_							_		_
25	25.0								
17.9				20.20.55	Silty Sand (SI 25.0-26.2' - Sa	M) ame as 15.0-16.1' except [,]	verv nale -		SS-6 collected at 11:07
		1.2	SS-6	20-38-55 (93)	orange to pale	e yellowish brown, (10YR 8	3/2 to 10YR _		
	26.5			(,	6/2), 20% high	h plasticity fines			
					1		_		
							_		
							-		1
-							-		-
-							-		1
-							-	1	1
30	30.0						-		1
12.9	30.0				Silty Sand (SI				SS-7 collected at 11:17
-		1.2	SS-7	21-31-41		ame as 25.0-26.2' except tale yellowish orange (10YF			-
-	31.5			(72)		e coarse sand-sized concr		Ш	-
-	31.3								-
-							-	1	-
-							-		-
-							-		-
-							-		-
-							-		-
-							-		-
35 7.9	35.0				Silty Sand (SI	M		7171	SS-8 collected at 11:26
'. 8				12-18-20	35.0-36.5' - pa	ale yellowish brown, (10YF	R 6/2), wet,		- 33-0 collected at 11.20
-		1.5	SS-8	(38)	dense, fine sil	lica sand, 30-35% nonplas of sands in a 1/4" thick sea	tic fines, black		_
-	36.5				similar to abov	of sands in a 1/4" thick sea ve (30.0-31.2')	am at 35.75°,	Ш	_
						. ,			
_							_		Driller's Remark: 12:50 empty mud vat, remove sandy cuttings, refill, add 1/4 50-lb
_							_		bag of QuikGel bentonite
_							_		13:15 Resume drilling to 40.0'
							_		
40									
									-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01A SHEET 3 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone and 3-7/8" drag bit ORIENTATION: Vertical

						END: 4/6/2007			
WATER	LEVELS	. ა.υ π b	gs on 4/6/		START : 4/5/2007	END : 4/6/2007 SOIL DESCRIPTION	LOGGEF		Stewart COMMENTS
SURFINE INTERVAL (ft) RECOVERY (ft) RECOVERY (ft) RECOVERY (ft) RECOVERY (ft)				STANDARD PENETRATION		JOIL DEGUNIF HON		90	CONTINUENTO
N (SAMPLE INTERVAL (π) TEST RESI RECOVERY (ft)				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR				DEPTH OF CASING, DRILLING RATE,
H B ATIO		RECOVE	ERY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR,		BOL	DRILLING FLUID LOSS, TESTS, AND		
ERRE			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, MIN	NERALOGY	SYMBOLIC LOG	INSTRUMENTATION
2.9	40.0			(14)	Silty Sand (SI	M)		111	SS-9 collected at 13:24
	40.0	1	000	16-21-19	40.0-41.2' - Sa	ame as 35.0-36.5' except ra			-
-		1.2	SS-9	(40)	mottling of a g	grayish black to black sand	in 1/8"-1/4" _		-
-	41.5				Scarris				=
_							_		_
l _							_		_
l _							_		_
							_		
_							-		_
45	45.0						-	1	=
-2.1	10.0				Silty Sand (SI			Ш	SS-10 collected at 13:36
-		1.2	SS-10	15-18-19	45.0-46.2' - pa	ale yellowish brown, (10YR lica sand, 30% low plasticity	6/2), wet, -		-
-	46.5		5	(37)	mottling, samp	ple relatively homogenous	/ III ICO, IIU _	Ш	-
-	46.5					· · · · · · · · · · · · · · · · · · ·			Driller's Remark: Change out rope on
-							-		hammer after noticing a weakened/frayed -
-							-		zone in it
_							-		-
-							_		=
_							_		_
l _							_		_
50	50.0								
-7.1					Fat Clay (CH)) redominantly dusky yellow <u>c</u>	roon (ECV		SS-11 collected at 14:00
		1.5	SS-11	5-6-9 (15)	5/2), moist, sti	iff, high plasticity, no dilatar	cv. mottled		
	51.5			(10)	with dusky blu	ue and very pale orange (5F	PB 3/2, 10YR		_
_					flat. rounded of	clasts throughout sample in coarse sand to fine gravel-s	sized clasts.		_
_					√ 5% concretion	ns near bottom of sample, to	race medium		_
_					sand-sized an	ngular shaped black particle is to 1/8", low to mild HCl re	es, trace -		-
-					very pale oran		-		-
-									-
-							-	1	-
-							-		-
55 <u> </u>	55.0				Sandy Fat Cla	av (CH)			SS-12 collected at 14:22
- '2.'		, _	00	4-5-5	55.0-56.5' - pr	redominantly yellowish gray	, (5Y 7/2), -		- 12 CONCOLCU AL 14.22
-		1.5	SS-12	(10)	moist, stiff, hig	gh plasticity, no dilatancy, n	nottled with		_
_	56.5				25-30% verv f	grayish green (N3 and 100 grayish green (N3 and 100 grayish green)	פו סו∠), enses, trace		_
l -					\ to 5% fine car	rbonate sand, mild HCl read	ction in /_		_
_					carbonate par	rticies			
I -							_		
							-		7
							_	1	7
60							=	1	-
									-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-01A	SHEET	4	OF	6

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone and 3-7/8" drag bit ORIENTATION: Vertical WATER LEVELS: 3.0 ft bgs on 4/6/07 START: 4/5/2007 END: 4/6/2007 LOGGER: T. Stewart SOIL DESCRIPTION COMMENTS STANDARD DEPTH BELOW SURFACE AND ELEVATION (#) PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SYMBOLIC SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND CONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION #TYPE 6"-6"-6" (N) Fat Clay With Sand (CH) SS-13 collected at 14:53 60.0 60.0-61.5' - Same as 55.0-56.5' except no dark gray 3-5-5 1.5 SS-13 mottling, 10% very fine silica sand and 10-15% (10)medium sand-sized very pale orange (10YR 8/2) 61.5 carbonate particles throughout, mild HCI reaction in carbonates 65 65.0 -22 1 Fat Clay (CH) SS-14 collected at 15:25 65.0-66.5' - grayish green, (10GY 5/2), moist, stiff, 3-5-7 1.5 SS-14 high plasticity, no dilatancy, no HCl reaction, mottled with pale yellowish green (10GY 7/2) throughout, (12)66.5 1/2"-3/4" pocket of a white fat clay with 5-10% fine to Driller's Remark: Will switch to a 3-7/8" drag medium sand-sized particles bit to help drilling rate through clay Driller's Remark: NW rod (5 sections) 70 70.0 -27.1 Fat Clay (CH) SS-15 collected at 16:10 70.0-71.5' - pale blue, (5B 6/2), moist, very stiff, high plasticity, no dilatancy, no HCl reaction, trace mottling with yellowish gray (5Y 8/1), trace yellowish gray 5-8-10 1.5 SS-15 (18)71.5 medium sand-sized particles, fine gravel-sized pyrite at 70.2', silty sand (SM) seam in bottom 1-3/16" of 75 75.0 Silty Sand (SM) SS-16 collected at 16:37 75.0-76.4' - pale yellowish brown, (10YR 6/2), wet, 19-21-23 SS-16 1.4 dense, no HCl reaction, fine silica sand, 20-30% (44)nonplastic fines, trace very fine sand-sized black 76.5 particles 80



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01A SHEET 5 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone and 3-7/8" drag bit ORIENTATION: Vertical

						END : 4/6/2007			
WATER	LEVELS	: 3.0 ft bo	15 UH 4/0/		START : 4/5/2007	END: 4/6/2007 SOIL DESCRIPTION	LUGGE	<u>.r</u>	Stewart COMMENTS
종무윤	SAMDIE	INTERVA	I (ft)	STANDARD PENETRATION		JOIL BLOOKII HOW		- 8	COMMENTO
SELC ON	SAMPLL	RECOVE	• •	TEST RESULTS		ME, USCS GROUP SYMBOL		SYMBOLICLOG	DEPTH OF CASING, DRILLING RATE,
TH E		RECOVE		011 011 011		E CONTENT, RELATIVE DE NCY, SOIL STRUCTURE, MI		J G	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	0011010121	VOT, COIL OTTOOTOTE, IVII	INCIO ILOGI	X.	INCHASIMENTATION
-37.1	80.0				Silty Sand (SI	M)			SS-17 collected at 17:01
-		1.2	SS-17	24-41-50 (91)	fine silica sand	edium dark gray, (N4), we ds, trace very fine black pa	t, very dense, articles. 20%	111	1
-	81.5			(31)	nonplastic fine	es, first 4-13/16" of sample	is irregularly	711	1
-						and (SM) from 75.0-76.4' and (SM) from 75.0-76.4' a		1	1
-								1	1
-								1	1
-								1	1
-								1	1
-								1	1
85	85.0							1	1
-42.1					Silty Sand (SI		. 0.(0)	1	SS-18 collected at 17:28
-		1.2	SS-18	26-48-50/5.5 (98/11.5")		ale yellowish brown, (10YR nedium dark gray (N4) staii		111	1
-	86.5			(96/11.5)		5-30% nonplastic fines, tra	ce medium	711	4
-					\sand-sized co	ncretions	/	1	Driller's Remark: 04/05/07 Stop drilling for
-								1	the day at 17:34
-								1	1
-								1	1
-								1	1
-								1	1
90	90.0							1	1
-47.1					Silty Sand (SI				SS-19 taken at 09:24
-		1.5	SS-19	14-9-9 (18)		ale yellowish brown, (10YR e, fine silica sand, 30-40%		111	1
-	91.5			(10)	fines including	7-10% very fine sand-size	ed black	111	1
						e medium dark gray (N4) s ravel-sized pyrite at top of			Driller's Remark: Glen Davis is cathead
					(possibly slough	gh)		1	operator on 04/06/07 N-rod (5.0' sections NW)
								1	3-7/8" drag bit
								1	140-lb cathead hammer
]	50-lb bags of QuikGel brand bentonite in use
]	08:15 water level at 3.0' below ground
95	95.0								surface – 08:50 pump not circulating
-52.1					Silty Sand (SI	M) ale yellowish brown, (10YR	16/2) wat		(Rods/pump?) Clogged with sand
		1.5	SS-20	15-8-7 (15)	medium dense	e, fine silica sand, 25% lov	v plastic fines,		Rods broke out, cleared, re-assembled
	96.5			(.0)	trace very fine	sand-sized black particles	s		Mud vat mixed 1/2 bag bentonite for drilling
		·					·]
]
]
								1	Driller's Remark: 09:35 sand clogs rods again during installation into borehole
									again duning installation lifto poreliole
]
100								L	
							<u> </u>		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01A	SHEET	6	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone and 3-7/8" drag bit ORIENTATION : Vertical

WATER	LEVELS	: 3.0 ft b	gs on 4/6/	07 8	START : 4/5/2007 END : 4/6/2007 LOGGER	R : T.	Stewart
				STANDARD	SOIL DESCRIPTION	G	COMMENTS
LOW AND (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		Ω̈́	
A BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	30LIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
-57.1	100.0			(14)	Silty Sand (SM)	Ш	SS-21 collected at 10:46
-		1.2	SS-21	3-4-3	100.0-101.2' - pale yellowish brown, (10YR 6/2), wet, very loose, fine silica sand, 20% nonplastic fines,		Driller's Remark: Circulation has been
-	101.5		00 2	(7)	trace fine to coarse gravel-sized pyrite	Ш	maintained at all times during drilling, No - casing was installed
-	101.5				Bottom of Boring at 101.5 ft bgs on 4/6/2007		10:46 End of drilling for GSC-01A (20.0)
_					-		offset for sand delineation from GSC-01)
-					_	1	_
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105_							_
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120						\vdash	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01B

SHEET 1 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

WATER	LEVELS	: 3.0 ft bo	gs on 03/	10/07 S	START : 4/6/2007 END : 4/9/2007 LOGGEF	R : T.	Stewart
				STANDARD	SOIL DESCRIPTION	_(j)	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
4 BE		RECOVE	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT LEV			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ΥMΕ	INSTRUMENTATION
<u> 42.8</u>	0.0			(N)	Poorly Graded Sand (SP)	0)	SS-1 taken at 15:26
-	0.0	1.3	SS-1	1-2-2	0.0-1.3' - very light gray, (N8), moist, very loose, very fine to fine silica sand, 5% nonplastic fines, trace very	1	-
-	1.5	1.0	00 1	(4)	fine sand-sized black particles, trace organics and		24" split spoon (SS)
-	1.5				brown mottling	ł	50-lb bags of QuikGel brand bentonite - Added 1/4 bag bentonite to full mud vat
-					-	1	Added 174 bag bentonite to fail find vat
_						1	_
_					_	1	_
_					_		Water level at 3.0' below ground surface at 15:35 based on moist SS-1, wet SS-2
5	5.0						samples
37.8				7-9-8	Poorly Graded Sand (SP) 5.0-5.9' - yellowish gray, (5Y 8/1), wet, medium dense,		SS-2 taken at 15:49
_		0.9	SS-2	(17)	fine grained, silica sand, trace nonplastic fines including trace sand-sized black particles		-
-	6.5				Including trace sariu-sized black particles	ł	-
-					-	ł	-
-					-	ł	-
-					-	ł	-
-					-	1	-
-					-	1	1
10	10.0				-	1	1
32.8					Silty Sand (SM)	Ш	SS-3 taken at 15:54
		1.3	SS-3	8-11-12 (23)	10.0-11.3' - verý light gray to yellowish gray, (N8 to 5Y 8/1), wet, medium dense, fine grained, low plasticity,	$\ \ $]
_	11.5			(==)	silica sand, 25-35% low plastic fines including trace very fine sand-sized black particles, trace fine	Ш	
_					gravel-sized concretions		_
_					<u>-</u>		_
-					-	l	_
-					-	ł	-
-					-	ł	-
[45.0				-	1	-
15 <u> </u>	15.0				Silty Sand (SM)		SS-4 taken at 15:59 —
-		1.2	SS-4	12-15-13	15.0-16.2' - very light gray to yellowish gray, (N8 to 5Y 8/1), wet, medium dense, fine grained, nonplastic,	1	-
-	16.5			(28)	silica sand, 20-25% nonplastic fines, trace very fine		-
-	. 5.5				grain black particles / -	1	1
-					-	1	
] _]
-							
_					_	1	_
-					<u>-</u>	-	-
20						-	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01B	SHEET	2	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

DRILLING ME I HOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tn-cone bit ORIENTATION: Vertical WATER LEVELS: 3.0 ft bgs on 03/10/07 START: 4/6/2007 END: 4/9/2007 LOGGER: T. Stewart										
WATER	LEVELS	: 3.0 π ος	gs on 03/		START: 4/6/2007	SOIL DESCRIPTION	LUGGE	₹: <u>1.</u>	Stewart COMMENTS	
종무 <i>章</i>	CAMPIE	INTERVA	I /#\	STANDARD PENETRATION		GOIL DEGORIF HON		90.	GOIVIIVILINIG	
ELC ON (SAMPLE		` ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,				DEPTH OF CASING, DRILLING RATE,	
FAC ATI		RECOVE	<u> </u>		MOISTURE	CONTENT, RELATIVE DE	ENSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENC	ST, SOIL STRUCTURE, IVI	INERALOGY	SYMBOLIC LOG	INSTRUMENTATION	
22.8	20.0			,	Silty Sand (SM))		Ш	SS-5 taken at 16:04	
-		1.1	SS-5	12-15-14	20.0-21.1' - San	ne as 15.0-16.2'		1	1	
-	21.5			(29)					1	
-	21.5							1	-	
-								1		
-								1	-	
-								1	-	
-								1	-	
-								1	-	
25	25.0							1	-	
25 <u> </u>	20.0				Silty Sand (SM))				
-		1.0	SS-6	12-75-72	25.0-26.0' - San	ne as 20.0-21.1'		1]	
-	26.5			(147)				1	1	
-	20.0							1	-	
_								1		
_								1		
_								1		
_								1	1	
-								1	1	
30	30.0							1	1	
12.8					Fat Clay (CH)				SS-7 taken at 16:21	
_		1.5	SS-7	5-7-6 (13)		ed CH materials in irreg			_	
	31.5			(13)	with medium gra	ay to dark gray mottling	(N3 to N4),		1	
					is grayish green	ry pale orange (10YR 8/2 n (10GY 5/2) with very pa	2), 31.1-31.5 ale orange	1	1	
					mottling (10YR	8/2), moist to wet (30.4-3) no HCl reaction, trace me	31.1'), stiff,	1	1	
					sand-sized very	pale orange (10YR 8/2)	and dark gray			
]					(N1) clasts]	
]]	
									Driller's Remark: change to tricone roller bit 3-7/8" at 34.0', hit hard rock	
35	35.0								5-770 at 54.0 , filt flatu 100k	
7.8				45 40 40		one Gravel With Sand (Cowish gray with light oliver)			SS-8 taken at 16:44	
		0.8	SS-8	15-13-13 (26)		1 with 5Y 5/6), wet, med	lium dense,	1//]	
	36.5			(/	strong HCl reac	ction, angular gravel-size coarse sand-sized, 20%	ed limestone,			
						es, carbonate materials				
								1		
								1		
								1		
40							_	lacksquare		
								1	l	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01B SHEET 3 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND FOLIPMENT: CMF 550 S/N 186073 mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

DRILLIN	DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical											
WATER	LEVELS	: 3.0 ft bo	s on 03/	10/07	START : 4/6/2007 END : 4/9/2007 LOGGE	R:	T. S	Stewart				
				STANDARD	SOIL DESCRIPTION	╛	ی	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		1	SYMBOLIC LOG					
1 BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	1	5	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
TPT PRF/			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	1	ΥMB	INSTRUMENTATION				
SE				(N)								
2.8	40.0			11-8-9	Clayey Sand (SC)	Æ	<u> </u>	SS-9 taken at 16:54				
_		0.4	SS-9	(17)	\ moist, medium dense, fine to medium grained, low to \	4	١	_				
_	41.5				medium plasticity, very strong HCl reaction, 25% low to medium plastic fines, carbonate materials	1	١	_				
_						1	١					
_						1	١	Driller's Remark: 17:02 43.5' hard drilling, loss of circulation (LOC) up to 100%				
_						1	١	- 1000 of the constitution (200) ap to 100%				
						1	١	_				
						1	١					
						J	١					
45	45.0					_]	[1				
-2.2				_,_	Clayey Sand With Limestone Fragments (SC)			SS-10 taken at 17:06				
]		1.0	SS-10	7-9-8 (17)	45.0-46.0' - Same as 40.0-40.4' except 25% fine to coarse gravel-sized limestone fragments, fossiliferous	7		Installed 40.0' HW casing -				
	46.5			(17)		T	-1	1				
-						1	١	1				
-						1	١	1				
_						1	١	1				
-						1	١	-				
-						1	١	1				
-						1	١	1				
50	50.0					1	١	1				
-7.2	50.0				Clayey Sand With Limestone Fragments (SC)			-				
-		1.5	SS-11	20-14-11	50.0-51.5' - Same as 45.0-46.0' except staining over	+		-				
-	54 5	1.0	00 11	(25)	upper most 4.0', 40% fine to coarse gravel-sized limestone, trace moderate brown to dusky brown			-				
-	51.5				(5YR 3/4 to 5YR 2/2) concretions	¥	44	-				
-						+	١	8:22 water level at 18.0' below ground				
-						+	١	surface on 4/7/07				
-						+	١	N-rod (5.0' sections) 45.0' HW casing in hole				
-						+	١	1/8 50-lb bag of QuikGel brand bentonite -				
-						+		added to mud vat 3-7/8" tricone roller drill bit				
-						+	١	SS-11 taken at 09:42 –				
55 <u> </u>	55.0				Clayey Gravel With Sand (GC)	1	,	100% circulation loss; refill vat, add 1/2 bag				
-12.2				22-15-14	55.0-56.2' - Same as 50.0-51.5' except 60% fine to	1		bentonite				
_		1.2	SS-12	(29)	coarse gravel-sized, 20-25% sand-sized, highly fossiliferous	1		11:02 Drillor's Domorks board at 52.01 light to				
-	56.5				IOSSIIIEIOUS	T	~_	11:02 Driller's Remark: hard at 53.0', light to moderate chatter, soft from 54.0'-55.0', hole				
-						1		collapse at bottom so that split spoon resting				
-						1		on 1.5' of cave-in material 11:15 N-rod pulled out to install NW casing –				
						1		with advancer and tricone roller drill bit				
_						1		wireline accessory (Serial Number: 83963- CN)				
						1		Refill mud vat, add 1/4 bag bentonite				
						1		SS-12 taken at 13:55				
60												
							١					



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01B

SHEET 4 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND FOLIPMENT: CMF 550 S/N 186073 mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

DRILLIN	DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical											
WATER	LEVELS	: 3.0 ft bo	s on 03/	10/07 S	START : 4/6/2007 END : 4/9/2007 LOGGE	R:	Г. Stewart					
				STANDARD	SOIL DESCRIPTION	,	COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		٦ <u>۶</u>	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION					
BEI CE.		RECOVE	RY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	2	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND					
PTH RFA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	Ì	INSTRUMENTATION					
DE SU ELE				(N)		3	5					
-17.2	60.0			00 00 00	Silty Limestone Gravel With Sand (GM) 60.0-61.0' - Same as 55.0-56.2' except low plasticity	_•	Driller's Remark: 14:05 switch to N-rod (5.0' sections)					
		1.0	SS-13	30-22-23 (45)	fines, 50% fine to coarse gravel-sized, 35% fine to	<u>Ji</u>	2-7/8" tricone roller bit due to continued					
	61.5			(12)	coarse sand-sized, 15% fines, highly fossiliferous		down-hole cave-in SS-13 taken at 14:32					
						1	55-15 taken at 14.52					
						1	Switch back to NW casing advancer tricone					
-						1	roller drill bit, maintaining some circulation - through HW set to 45.0' below ground					
-						1	surface					
-							1					
-						1	1					
65	65.0					1	1					
-22.2	00.0				Clayey Sand With Limestone Fragments (SC)	1/	SS-14 taken at 16:02					
-		1.2	SS-14	19-16-10	65.0-66.2' - Same as 60.0-61.0' except white to very light gray, (N9 to N8), low plasticity, medium light gray		1					
-	66.5		33	(26)	(N6) staining over bottom half of sample, fine to	#//	Last run of 4/7/07					
-	66.5				coarse sand-sized, 35% fine to coarse gravel, 20-25%	1	-					
-					\fines, highly fossiliferous	+	-					
-						-	-					
-						+	-					
-						+	-					
-						+	-					
-						-	-					
70 <u> </u>	70.0				Sandy Fat Clay (CH)		08:35 water level at 3.0' below ground					
-21.2			00.4=	6-7-8	70.0-71.5' - pale green with pale olive gray sands, (6G		surface on 4/8/07					
_		1.5	SS-15	(15)	6/2 with 5Y 5/2), moist, stiff, high plasticity, no dilatancy, trace dusky blue (5PB 3/2) mottling, 30%	-1/2	65 0' NW installed					
_	71.5				very fine to fine silica sand, 5% carbonate sand in		65.0' NW installed Using NW casing advancer with wireline -					
_					irregular pockets, carbonate clasts with mild HCI /reaction	4	tricone drill bit accessory					
_					reaction	1	N-rod (5.0' sections) 140-lb hammer via cathead					
_						1						
_						1	SS-15 taken at 09:02					
						1	5 013 114 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					
_						1	5.0' NW casing added to advance boring					
75	75.0					<u> </u>	<u></u>					
-32.2				12-17-15	Clayey Sand With Limestone Fragments (SC) 75.0-76.5' - white to bluish white, (N9 to 5B 9/1), wet,		Driller's Remark: 09:20 he'll have to switch back to 2-7/8" tricone drag bit to get through -					
_		1.5	SS-16	(32)	dense, fine to coarse grained, very strong HCI		clay - will no longer be advancing NW casing					
	76.5			` '	reaction, trace dark gray (N3) mottling or staining, 25-30% low to medium plastic fines, 15-20% fine		70.0' NW currently installed Driller's Remark: 09:40 good circulation -					
					│ \ gravel-sized, 1-1/2" silty sand (SM) seam and fat clay /		through NW casing					
					(CH) seam, highly fossiliferous		Two irregular blows in SS-16 SPT					
]							1					
]							SS-16 taken at 09:58					
]							1					
]							Driller's Remark: adding another 5.0' section					
80						1	of NW casing, losing depth to cave-in					
						T						



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01B SHEET 5 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

DRILLIN	G METH	<u>OD AND</u>	EQUIPM	ENT : CME 550 S	/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 3.0 ft b	gs on 03/	10/07	START : 4/6/2007 END : 4/9/2007 LOGGER : T. Stewart
I				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL JSF/		RECOVI	ERY (ft)	TEGT REGOETS	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE,
YHY YAT VAT			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR ONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION
SUF			#1175	(N)	\(\sigma \)
-37.2	80.0				Clayey Sand With Limestone Gravel (SC) SS-17 taken at 10:42
_		1.5	SS-17	4-6-11	80.0-81.5' - Same as 75.0-76.5' except white to bluish white, (N9 to 5B 9/1), wet, medium dense, fine to
-			00	(17)	coarse grained, strong HCl reaction, low to medium
-	81.5				├_ plastic fines, trace medium dark gray (N4) staining,
-					\35-40% plastic fines, 15% fine gravel-sized limestone, / _
-					-
_					
_]
					1
85 -	85.0				1
-42.2	00.0				Interbedded Sands And Clays, Silty Sand (SM) SS-18 taken at 11:19
-		1.5	SS-18	4-5-12	│ 85.0-85.2' - yellowish gray, (5Y 7/2), wet, medium
-	0.5 -	'		(17)	dense, nonplastic, mild HCl reaction, silica sand, trace Driller's Remark: 75% circulation loss at
-	86.5				reaction in carbonate sand 85.0'
-					Fat Clay (CH)
_					85.2-85.3' - grayish green, (5Y 5/2), moist, stiff, high plasticity, no dilatancy, no HCl reaction, trace dusky
_					blue (5PB 5/2) mottling lense of yellowish gray (5Y
_					8/1) silt/clay, trace white (N9) fine sand-sized particles, trace flat subrounded pyrite 1/8"-1/4" -
					fragments
					Clayey Sand (SC)
90	90.0				85.3-86.5' - moderate yellowish brown, (10YR 5/4), moist, medium dense, fine silica sand, trace fine
-47.2	00.0				carbonate sand, 40-45% medium plastic fines, mild SS-19 taken at 11:27
-		1.5	SS-19	5-14-22	HCI reaction in carbonate grains
-	04.5		00.0	(36)	Interbedded Silty Sand And Fat Clay, And Clayey
-	91.5				90.0-91.5' - Same as 85.0-86.5'
_					
_					4 1
_					_
_					
] [
]] [
95	95.0				11
-52.2					Fat Clay (CH) SS-20 taken at 11:55
-		1.4	SS-20	5-12-15	95.0-95.9' - Same as 85.0-86.5' except no yellowish gray lens, white fine sand-sized particles in pockets
_	06.5			(27)	Clayey Sand (SC)
-	96.5				│ 95.9-96.4' - Sàmé as 85.0-86.5' except 35-40% low to / ┤
-					\medium plastic fines / _
-					
_					
_					
_]]
] [
100] [



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01B	SHEET	6	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						FND : 4/0/2007			T (ONLINIATION : Vertical
WATER	LEVELS	. 3.U π bo	us on 03/1		TART : 4/6/2007	END: 4/9/2007 SOIL DESCRIPTION	LOGGI	Т		COMMENTS
≥ 9€	SAMDLE	INTERVA	J (#)	STANDARD PENETRATION		COL DECOMI HON		\dashv	SYMBOLIC LOG	OUNIVIENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAIVIPLE			TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL, O	COLOR,	-	일	DEPTH OF CASING, DRILLING RATE,
AFAC		RECOVE			MOISTURE C	CONTENT, RELATIVE DENS Y, SOIL STRUCTURE, MINE	SITY OR		1801	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
OEP. SURI			#TYPE	6"-6"-6" (N)	CONSISTENC	T, SOIL STRUCTURE, WIINE	ERALUGI		SYN	INSTRUMENTATION
-57.2	100.0			()	Silty Sand (SM)			1	П	SS-21 taken at 12:22
-	-	1.5	SS-21	7-8-8	100.0-101.5' - ye	ellowish gray, (5Y 7/2), wei led, no HCl reaction, silica	t, medium	-11		SS-21 (100.0-101.5') is the last sample for
-	404.5	1.0	00 2.	(16)	15-20% nonplast	tic fines, trace very fine sa	ind-sized	-		GSC-01B, end of drilling
-	101.5				→ black particles, tr	race black staining near b	ottom of	∕╬	41	Hole abandoned on 4/9/07 with 50-55 gallons of grout mix, 12 bags of 47-lb each of
-	-				\sample Bottom of Boring	at 101.5 ft bgs on 4/9/200	/ 07	1		Quick Portland cement Type I/II
-	1				201.0111 01 2011119	, at 10110 1, 290 011 110/200	•	+		-
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-	-							+		-
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105 <u> </u>	-							4		
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110_ -67.2	-							4		
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115 <u> </u>	1									
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120							-	+		-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-02	SHEET	1	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 1.4 ft bo	gs on 5/16	6/07	START : 5/15/2007 END : 5/17/2007 LOGGER : R. Bitely, D. Whitaker
				STANDARD	SOIL DESCRIPTION COMMENTS
LOW (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
40.4	0.0			(11)	_ Topsoil (OL)
_		1.1	SS-1	1-2-3	\ 0.0-0.3' - brownish black, (5YR 2/1), moist, very soft, 60% organic no fines, <40% roots/vegetative detritus
-	1.5			(5)	Poorly Graded Sand With Some Limestone
_					Fragments (SP)
					\loose, very fine to fine grained, nonplastic, trace /
					nonplastic fines, 10-15% organics, silica sand
_					
_					.
_					
5 35.4	5.0				Sandy Clay And Organic Wood Debris (SC) Driller's Remark: Wood from 5.0-8.5' below
-		0.4	SS-2	5-18-10	↑ 5.0-5.4' - light gray to yellowish gray, (N/7, 5Y81), 「¬【**** surface,
-		0.4	33-2	(28)	moist, very stiff, medium plasticity, no to mild HCl several scoops of wood chips removed from mud pit
-	6.5				carbonate sands, 50% of sample is wood debris
-					Driller's Remark: Smooth, easy drilling, light
_					chatter at 7.0' and 9.5'
_					1
]
] [
10	10.0		20.0	50//	
30.4	10.3	0.3	SS-3	50/4 (50/4") /	Silt (ML)
_					hard, nonplastic, rapid dilatancy, mild HCl reaction, 5-10% very fine sand, 5-10% limestone fragments
-					<1/4" diameter, carbonate materials
-					
_					
-					
-					
-					
15	15.0				1
25.4				40.00	Silt (ML) 15.0-15.5' - grayish yellow with moderate yellow
		0.5	SS-4	13-3-8 (11)	lenses, (5Y 8/4 with 5Y 7/6), moist to wet, stiff,
_	16.5			` ′	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					materials
-					
-					
-					
-					-
					-
20					++



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	GSC-02	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLIN	DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit ORIENTATION : Vertical									
WATER	LEVELS	: 1.4 ft bo	gs on 5/16	6/07 S		? : R.	Bitely, D. Whitaker			
≷Q₽	04451 =	INTERV	1 (6)	STANDARD PENETRATION	SOIL DESCRIPTION	8	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,			
YFAC VATI		RECOVE	#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MBOI	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
SUF				(N)						
20.4	20.4	0.2	SS-5	50/5 (50/5") /	Sandy Silt (ML) 20.0-20.2' - grayish yellow, (5Y 8/4), moist to wet,		_			
-					hard, nonplastic, rapid dilatancy, moderate HCl reaction, 30-35% fine to coarse sand-sized limestone		-			
-					fragments, lenses <1/4" thick, carbonate materials		-			
-					-		-			
-					-		-			
-					_	1	-			
					_					
_					_		_			
25_ 15.4	25.0				Sandy Silt With Limestone Lenses (ML)		_			
- "		1.2	SS-6	35-40-35	25.0-26.2' - grayish yellow, (5Y 8/4), moist to wet,		-			
-	26.5	1.2	33-0	(75)	hard, nonplastic, rapid dilatancy, moderate HCl reaction, 25% fine to medium sand, <30% limestone	Ш	-			
-	20.5				lenses <1/4" thick, carbonate materials		-			
-					_	1	1			
					_					
_					_		_			
-					-		-			
					-		-			
30 <u> </u>	30.0				Silt With Limestone Lenses (ML)	Ш	Stop drilling for the day at 17:30,			
-		1.0	SS-7	15-15-40	30.0-31.0' - Same as 25.0-26.2' except dark yellowish - orange, (10YR 6/6)	l	resume drilling 5/16/07 08:00, water level at 1.4' below ground surface			
-	31.5			(55)	orange, (1011(6/0)	ľ				
_					_		_			
-					-		-			
-					-		-			
-					-		-			
35	35.0				-		-			
5.4		0.5	SS-8	35-50/2	Silty Sand (SM)		Driller's Remark: Moderate to light chatter			
	35.7			(85/8")	35.0-35.5' - yellowish gray, (5Y 7/2), moist, very dense, moderate HCl reaction, fine to coarse sand,		from 35.0-39.0'			
_					\30% nonplastic fines, carbonate materials		_			
_					-		_			
-					-		-			
-					-		-			
-					-		-			
-					-		Driller's Remark: 39.0-40.0' rapid smooth			
40							drilling -			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-02	SHEET	3	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit

WATER	LEVELS	: 1.4 ft b	gs on 5/16	6/07	START : 5/15/2007	END : 5/17/2007	LOGGEF	? : R.	Bitely, D. Whitaker
300				STANDARD		SOIL DESCRIPTION		ق	COMMENTS
AND S	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBOL, (SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BE ACE		RECOVE	ERY (ft)		MOISTURE	CONTENT, RELATIVE DEN	SITY OR	BOLI	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE, MINE	ERALOGY	SYM	INSTRUMENTATION
0.4	40.6	0.3	SS-9	50/3.5	Silty Sand And	Limestone Fragments (S	M)	Ш	Driller's Remark: Smooth drilling with
				(50/3.5")	gravel-sized lim	ne as 35.0-35.5' except 35 estone fragments	-40% line / -		moderate to fast movement, intermittent light - chatter
_									_
_							-		_
-							-		-
-							-		-
-							-		-
-							-	i	1
45_	45.0						_		_]
-4.6				18-20-35	Sandy Silt And 45.0-46.3' - San	Limestone Lenses/fragm ne as 40.0-40.3' except 25'	ents (ML) % -		
_		1.3	SS-10	(55)	nonplastic fines	, 35% fine gravel-sized lim	estone _		_
-	46.5				fragments in len	1562		╫	-
-							-	1	-
-							-	l	-
-							-		1
							_		
_							-		_
50 -9.6	50.0				Limestone And	I Silty Sand		H	-
-	50.9	0.8	SS-11	50-50/5 (100/11")	50.0-50.8' - San	ne as 45.0-46.3' except 60	% fine to -	Ħ	-
-	00.0				\to coarse sand,	ized limestone fragments, 15-20% of nonplastic fines	30-35% fine		-
-					Begin Rock Cor See the next sh	ring at 51.0 ft bgs leet for the rock core log	-	1	1
					ood are next on	oction the rook core log	_]
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-02	SHEET	4	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				MENT . Diethan D-50 5/N 252, mud totally, NQ tools, HW	000		ORIENTATION: Vertical
WATER	LEVELS: 1.4	ft bg	s on 5	/16/07 START : 5/15/2007 END : 5/	17/20	DOT LOGGER: R. Bitely, D. Whitaker	·
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		<i>(</i> 0	<u> </u>	SYMBOLIC LOG		-
N E E	ÄA≻	_	# ⊢	DESCRIPTION	J	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
무성분	J Z Ŧ,Ā	(%) _Q	28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF.	#\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	۵	A G	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCIE	SEES	S O	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
<u> </u>	51.0	_	_		╫	Limestone	Establish rock contact at
_	01.0		2	51.2' - Bedding plane, horizontal, smooth,	Н	- 51.0-55.45' - pale yellow brown,	51.0' below ground
			-	undulating, open <1/4"		(10YR 6/2), fine to medium grained,	surface,
-				51.7' - Fracture or mechanical break, 30 deg,	Ш	moderate to high HCl reaction,	set HW casing to 51.0'
_			0	rough, undulating, open <1/4"	Н	- extremely weak to weak (R0 to R2),	below ground surface
				52.35' - Mechanical break	Н	voids <1/16" diameter over 50% of	Begin rock coring using
_	R1-NQ			53.05' - Fracture or mechanical break, 30	1	surface, trace fossil molds <1/2"	NQ wireline tooling
_	5 ft	58	6	deg, rough, undulating, open <1/4"	ш	 diameter, trace cavities <1/2" 	from 51.0' below ground -
	89%			53.25, 53.6, 53.85' - Bedding plane or	Н	diameter, trace crystallized limestone	surface
1 1				mechanical break (3), horizontal, smooth,	Н	infill	1
-			3	undulating, open <1/4"-1/2"	Н	-	R1:2 minutes
55				53.5' - Mechanical break		<u></u>	
-14.6			1	53.9' - Fracture or mechanical break, 20 deg	Ш		1
-			NR	and 40 deg, rough, undulating, open <1/4"	\vdash	No Recovery 55.45-56.0'	1 1
-	56.0		141	54.3' - Bedding plane or mechanical break,	Н	_	-
			ا م	horizontal, smooth, undulating, open <1/4"-1/2"	Ш	Limestone	
1 7			2	<1/4"-1/2" 54.5' - Fracture or mechanical break, 20 deg	Ш	 56.0-61.0' - pale yellowish brown, (10YR 6/2), fine to medium grained, 	1
-				and 40 deg, rough, undulating, open <1/4"	Н	high HCl reaction, very weak to weak	-
_			2	54.6, 54.7' - Mechanical break (2)	H	- (R1 to R2), voids (<1/16") over]
			_	54.75' - Fracture or mechanical break, 20	Ľ	40-50% of surface, trace fossil molds	1
-	R2-NQ			deg and 40 deg, rough, undulating, open	Ш	_ 12 30 /0 0. 00.1000, 11000 100011 110100	1
-	5 ft	92	1	<1/4"	+	=	4
	100%			55.15, 55.4' - Bedding plane or mechanical	\vdash		j
1 7				break (2), horizontal, smooth, undulating,	\Box	=	1
-			1	open <1/4"-1/2"	口	_] -
60				56.4, 56.8, 57.1, 57.7, 58.7, 59.2' - Bedding	Ш		
-19.6			.	plane or mechanical break (6), <10 deg,	Н		R2:3 minutes
-			1	rough, undulating, open <1/4"	Ľ	-	1 -
-	61.0		-	60.1' - Fracture or mechanical break, 65 deg, smooth, undulating, tight to open <1/4"	Ш	- C4 0 C4 El polo vellevidele lecever (-
			3	Smooth, undulating, tight to open 1/4	Н	61.0-64.5' - pale yellowish brown to	
1 7			3	61.5' - Bedding plane or mechanical break,	Н	 light gray, (10YR 6/2 to N7), very fine to medium grained, strong HCl 	1
-			 	<10 deg, smooth to rough, undulating, open	Ш	reaction, 61.0-62.0' and 62.45-63.0'	1 -
_			2	<1/2"-1/4"	П	very weak to weak (R1 to R2) rock,]
			_	61.7' - Mechanical break or fractures, 20 deg,	Ш	62.0-62.45' extremely weak (R0)	1
-	R3-NQ			rough, undulating, tight to open <1/2"	H	rock, 63.0-64.5' medium strong to	1
-	5 ft	44	2	62.0' - Bedding plane or mechanical break,	\vdash	strong (R3 to R4) rock, voids	1,500 - 1
	70%		-	<10 deg, smooth to rough, undulating, open <1/2"-1/4"		(<1/16") over 30-50% surface except	R3:3 minutes
1 7			2	62.7' - Mechanical break or fractures, 20 deg,	Ш	trace voids from 62.0-62.45', trace	1
-			É	rough, undulating, tight to open <1/2"	₽₽	fossil molds <1/2"diameter, trace	-
65				62.95' - Bedding plane or mechanical break, —	H	cavities <1/2" diameter from	
-24.6			NR	<10 deg, smooth to rough, undulating, open		61.0-62.0', trace organics	1
-				<1/2-1/4"	Ш	No Recovery 64.5-66.0'	1
-	66.0				\vdash		1 4
			ارا	deg, rough, undulating, tight to open <1/2"	Н	Limestone	
1 7			1	63.35' - Mechanical break or fractures, 10	Ш	- 66.0-70.9' - pale yellow brown to	1
-			-	deg, rough, undulating, tight to open <1/2"	口	moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine] -
			3	63.5' - Mechanical break	Щ	- grained, strong HCl reaction, very	ı J
				64.25' - Bedding plane or mechanical break, <10 deg, smooth to rough, undulating, open	H	weak to weak (R1 to R2), except	1
-	R4-NQ			<10 deg, smooth to rough, undulating, open <1/2-1/4"	ш	67.5-67.9' that is extremely weak	-
-	5 ft	88	0	<1/2-1/4"64.4' - Mechanical break or fractures, 50 deg,	Ш	- (R0) to very weak (R1) rock, voids	1 4
	98%	20		rough, undulating, tight to open <1/2"	Н	(<1/16") over 30-50% of surface,	1
]				66.5, 67.45' - Fractures or mechanical break	14	10-20% fossil molds <1/4" diameter,	1 1
-			1	(2), 20 deg and 30 deg, rough, undulating,	H	 trace cavities <3/4" by 1/2", trace 	-
70				open <1/4"	Д	organics]
-29.6				67.7, 68.85' - Bedding plane or mechanical	ш		R4:5 minutes
-			2	break (2), <10 deg, rough, undulating, open	Н	_	1
	71.0		<u> </u>	<1/2"	H		
							1
			<u>L</u> _				
	_	_					

APPENDIX 2BB-874 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-02	SHEET	5	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				IENT : Dietrich D-30 3/N 232, Hidd Totaly, NQ tools, HW			
WATER	LEVELS : 1.4	ft bgs	on 5		17/200		· · · · · · · · · · · · · · · · · · ·
>00				DISCONTINUITIES	ပ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BHO	NA'R	(%	로		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H, A, A, A, A, A, A, A, A, A, A, A, A, A,	H F S	D (%)	F.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P.S.E.	E E E	S S	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Z	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ΔОШ	0716	Ľ			S		
			\ <u>NR</u> / 2	69.1, 70.1, 70.5' - Bedding plane or	\perp	No Recovery 70.9-71.0'	
				mechanical break (3), <10 deg, smooth to rough, undulating, open <1/4"		 Limestone 71.0-76.0' - pale yellowish brown to 	1
-				71.5, 71.55, 73.6, 73.65, 73.9, 74.25' -	┧	light gray, (10YR 6/2 to N7), very fine	1
-			0	Bedding plane or mechanical break (6), <10	₽₩	- to medium grained, strong HCI	-
				deg, smooth to rough, undulating, tight to		reaction, weak to medium strong (R2	_
	R5-NQ		_	open <1/2"		to R3), grain size increases with	
1 7	5 ft	84	3		Н	 depth, except 73.5-74.7' extremely weak to very weak (R0 to R1) rock, 	1
-	100%					voids (<1/16") over <20-50% of	-
1 _			2		\perp	- surface-variable, no cavities, few	
75			_	74.65' - Fracture or mechanical break, 30	\vdash	fossil molds <1/4" diameter, stong	
-34.6				deg, rough, undulating, open <1/4"		rock zone from 72.4-72.85'	R5:4 minutes
-			2		\vdash	<u>-</u>	-
-	76.0			75.7, 75.8' - Bedding plane or mechanical	╀┤		-
			3	break (2), <10 deg, smooth to rough,		76.0-79.65' - pale yellowish brown to - light gray, (10YR 6/2 to N7), very fine	
			3	undulating, open <1/2" 76.1, 76.3' - Fractures or mechanical break	\vdash	to medium grained, strong HCl	1
1 -				(2), <10 deg, rough, undulating, tight to open	+	reaction, 76.0-77.8' and 78.7-78.9'	1
-			>10	<3/4"	ш	 very weak (R1) to weak (R2) rock, 	-
1 _				76.9' - Fracture or mechanical break, 40 deg,	\vdash	77.8-78.7' and 78.9-79.65' medium	
	R6-NQ			rough, undulating, open <1/2"		strong (R3) to strong (R4) rock, voids	
	5 ft 73%	18	>10	77.3' - Fracture or mechanical break, <10 deg, rough, undulating, tight to open <3/4"		 (<1/16") over 20-30% of surface, trace fossil molds <1/4" diameter, 	1
-	7570			77.5-78.8' - Fracture zone, rough, undulating,	\vdash	about 10-20% cavities <1/2"	-
-			3	gravel-sized fragment, <2" diameter		diameter especially from 77.8-78.7'	1
80				79.0, 79.15' - Fractures (2), rough,		. ,	
-39.6			NR	undulating, intersecting fractures at 90, 60,	\vdash	No Recovery 79.65-81.0'	R6:8 minutes
1 7	04.0			and 80 degrees, tight to open <1/4"		_	1
-	81.0			79.25' - Fracture or mechanical break, <10 deg, rough, undulating, tight to open <3/4"	ш	_ Limestone	Stop drilling for the day at
-			>10	81.0-81.6' - Fracture zone, smooth to rough,	\vdash	- 81.0-85.9' - pale yellowish brown to	18:00
				undulating, gravel-sized fragments <1"-1/2"		light olive gray, (10YR 6/2 to 5YR	10.00
				diameter	Ш	5/2), very fine to medium grained,	Resume drilling 5/17/07
-			3	81.6' - Bedding plane, <10 deg, smooth,	ш	 moderate to strong HCl reaction, 	07:30, water level at 3.0'
-	5-110			undulating, unknown open thickness, adjacent to fragments above		weak to strong (R2 to R4), voids	below ground surface
	R7-NQ 5 ft	60	0	82.1, 82.3, 82.4' - Fractures or mechanical	ш	(<1/16") over 40-60% of surface, moderately fossiliferous, many fossil	_
	98%	00	U	break (3), rough, undulating, 3 intersecting		molds/casts up to 2" diameter, trace	
1 7				fractures at 60, 60, and 50 degrees		cavities <1" diameter possible void	1
1 -			1	respectively, open <3/4"	╀┤	- space/cavity in fracture zone at	-
85				83.5' - Mechanical break	\Box	81.0-81.5', crystal infill, trace over surface except 82.0-82.5' over 50%	D7:5it
-44.6			>10	85.0-85.2' - Fracture zone, rough, undulating, gravel-sized fragments <1" diameter	$oxed{\square}$	of surface, trace organic lamintations	R7:5 minutes
1 7	86.0			85.5, 85.6' - Fractures (2), 30 deg and 40	\vdash	especially at 81.8'	1
1 -	55.5		NR.	deg, rough, undulating, 2 intersecting	ш	No Recovery 85.9-86.0'	-
] -			2	fractures, tight to open <3/4"	+	_ Limestone	-
				86.7, 86.8' - Fractures or mechanical break	\vdash	86.0-89.5' - moderate yellowish]
			,	(2), 80 deg and 40 deg, rough, undulating, 2		brown, (10YR 5/4), very fine to fine grained, moderate to stong HCI	
			1	intersecting fractures or mechanical breaks,	1-1	reaction, weak to medium strong (R2	1
-	R8-NQ			tight to open <1/2" 87.25' - Fracture or mechanical break, 50		to R3), voids (<1/16") over 20-40% of	-
-	5 ft	56	0	deg, rough, undulating, tight	Ш	_ surface, highly fossiliferous with	-
	70%			87.45, 87.9, 88.2, 88.45, 88.65' - Mechanical	\vdash	fossil molds/casts <1/2" diameter,]
1 7			>10	break (5)		trace cavities <1" diameter]
00				89.0-89.5' - Fracture zone, rough, undulating,	Ш	No Recovery 89.5-91.0'	Driller's Remark: Light
90 <u> </u>			NIC	gravel-sized fragments <1"-1/2" diameter	+	_	chatter (89.5-91.0') —
			NR			_	R8:7 minutes
	91.0				\vdash		
					_		

APPENDIX 2BB-875 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-02	SHEET	6	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

				MENT . Diethon D-30 3/N 232, mud rotary, NQ tools, HW			ORIENTATION: Vertical
WATER	LEVELS: 1.4	ft bg	s on 5	/16/07 START : 5/15/2007 END : 5/	17/20	7 LOGGER : R. Bitely, D. Whitaker	
300	<u></u>			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
	N. A.R.	(9)	FRACTURES PER FOOT		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAC	E R STF OVE	(%) Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F R F	ON ECC	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Z	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	038	ď		THICKNESS, SURFACE STAINING, AND HIGHTNESS	Ś		
					ш	Limestone	
-			0	•	1	- 91.0-95.5' - pale yellowish brown to	1
_						moderate yellowish brown transitioning to yellowish gray beyond	-
_			2	92.1, 91.65, 93.45' - Bedding plane or	ш	- 94.0', (10YR 6/2 to 10YR 5/4 to 5Y	
			-	mechanical break (3), <10 deg, rough, undulating, open <1/4"	Н	8/1), fine to very fine grained, grain	
_	R9-NQ			undulating, open < 1/4		size fining with depth, weak to	1
-	5 ft	64	>10	93.45-93.85' - Fracture zone, rough,	Ш	 medium strong (R2 to R3) rock to 	-
_	90%			undulating, organic zone, gravel-sized	Н	94.3', 93.46-93.05' and 94.3-94.7'	
				fragments <1" diameter		extremely weak (R0) rock with red	
05			>10	94.1-94.7 - 1 lacture zone, smooth to rough,		 organic soils, 94.7-95.5' very weak to weak (R0 to R2) rock, 93.45-93.85' 	1
95 <u> </u>			_	undulating, silt horizon, gravel-sized	+	fracture zone with interbedded	R9:8 minutes
			0	fragments <2" diameter	H	organic silts up to 3/4" in the beds,	1.0.0 IIIIIIules
	96.0		NR		Ш	93.45-93.85' fracture zone with	
1 7					\mathbb{H}	poorly competent silts to no	1
-			0		+	competent elastic silts (MH) up to 2"	-
_					Ш	thick as beds, 91.0-93.45' voids (<1/16") over 50-60% of surface,	_
			1	97.05' - Mechanical break or bedding plane,	Н	highly fossiliferous with molds/casts	
			'	horizontal and 70 deg, rough, undulating,	\vdash	<1" diameter, few cavities <3/4"	
-	R10-NQ			tight	\blacksquare	diameter, moderate to stong HCI	-
-	5 ft	92	0		+	reaction, 93.45-93.85' fragments with	_
_	100%					organics interbedded, 93.85-94.3' no	
				99.0, 99.15' - Fractures (2), undulating,		voids, no cavities, very fine grained medium strong (R3) rock; 94.3-94.7'	
100			3	intersecting fractures, tight to open <1/4"	Н	fragments with silt/elastic silt	1
100 <u> </u>				99.5' - Mechanical break		interbedded; 94.7-95.5' voids	R10:3 minutes
- 00.0			1 1	horizontal, rough, undulating, tight	ш	_ (<1/16") over 10-50% of surface, few	-
	101.0				Н	cavities <1/4" diameter, poorly	
				100.85' - Mechanical break or bedding plane, horizontal, smooth, undulating, open <1/4"		fossiliferous No Recovery 95.5-96.0'	
-			5	101.0, 101.1, 100.3, 101.6, 102.0' - Bedding	ш	Limestone	-
-				plane or mechanical break (5), smooth,	+	96.0-101.0' - pale yellowish brown to	_
			0	undulating, open <1/4"		yellowish brown, (10YR 6/2 to 5YR	
			"		ш	5/2), very fine to fine grained, strong	
-	R11-NQ			103.0' - Fractures (>5), smooth, undulating, 5	1	 HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over <20-50% 	7
-	5 ft	73	10	plus intersecting fractures from one main		of surface (variable), trace organics,	-
-	99%			fracture, 70 degrees with 0 degree minor,	₽₩	 trace infill, trace laminated bedding, 	
			0	open <1/4" 103.6.105.75' Redding plane or mechanical	Н	moderately fossiliferous with fossil	
105			"	103.6, 105.75' - Bedding plane or mechanical break (2), smooth, undulating, open <1/4"		molds/casts <1" diameter, trace	1
-64.6					Ш	— cavities	R11:5 minutes
-			1			101.0-105.95' - yellowish gray, (5Y 7/2), very fine to fine grained, strong	-
_	106.0				口	- HCl reaction, weak (R2), voids	<u>_</u>
			NR)		$\vdash\vdash$	(<1/16") over 30% of surface,	
1 7			3	106.3, 106.6, 106.9, 107.1, 107.5, 107.9, 108.25, 108.7, 109.05' - Bedding plane or	ш	moderately fossiliferous with	1
-				mechanical break (9), 40 deg, smooth to	\Box	molds/casts <1/2" diameter, trace	
-			3	rough, undulating, tight to open <1/4"	₽₩	organics No Recovery 105.95-106.0'	_
			Ľ		Ш	Limestone	
1 7	R12-NQ				\square	106.0-111.1' - yellowish gray, (5Y	1
-	5 ft	70	2		╁┼	7/2), very fine to fine grained, strong	-
-	100%				Ш	HCl reaction, weak (R2), voids	_
			2		Щ	(<1/16") over <20% of surface,	
110			-	109.5' - Mechanical break	H	moderately fossiliferous with molds/casts <1/2" diameter	1
-69.6				_	Ш	molus/casts > 1/2 ulametel	R12:4 minutes
-			4		╂┼┤	-	
	111.0				H		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-02	SHEET	7	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.4	ft bgs	s on 5/	16/07 START : 5/15/2007 END : 5/	17/20	07 LOGGER : R. Bitely, D. Whitaker	
₹ □ <i>⊋</i>	(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
N C	Ä, ANC (°	(ZES T	DESCRIPTION	CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			>10	109.55, 110.05, 110.65, 110.85, 111.0' - Bedding plane or mechanical break (5), 40 deg, smooth to rough, undulating, tight to open <1/4" 111.0-111.8' - Bedding plane (>10),		111.0-115.9' - yellowish gray, (5Y - 7/2), very fine to fine grained, strong HCI reaction, weak (R2), voids (<1/16") over <10% of surface, poorly fossiliferous, laminated	-
	R13-NQ 5 ft	80	1	horizontal, smooth, undulating, tight to open <1/4" 113.0' - Bedding plane, horizontal, smooth,		bedding from 111.0-111.3']
-	98%	00	2	undulating, tight to open <1/4" 113.5' - Mechanical break 114.3' - Fracture or mechanical break, 80	F	_	-
115 -74.6			0	deg, rough, undulating, tight to open <1/4"	Ħ	-	R13:7 minutes
+	116.0		NR) 2	116.4, 116.8, 117.55, 117.65, 117.7, 117.8,		No Recovery 115.9-116.0' Limestone 116.0-120.95' - yellowish gray, (5Y	-
_			4	118.2' - Bedding plane or mechanical break (7), rough, undulating, tight to open <1/4"		7/2), very fine to medium grained, strong HCl reaction, weak (R2), voids (<1/16") over 30% of surface	-
-	R14-NQ 5 ft 99%	70	3	118.6' - Mechanical break 118.85, 119.1, 119.2, 119.3, 119.4, 119.5,		increasing with depth, grain size and recrystallized texture increasing with depth, moderately fossiliferous with molds/casts <1/2" diameter, trace	_
120 -79.6			6	119.6' - Bedding plane or mechanical break (7), rough, undulating, tight to open <1/4"	Ė	_ laminated organics, 10-20% cavities <1/2" diameter 	R14:3 minutes
-	121.0		1 (NR)	120.2' - Mechanical break 120.5' - Bedding plane or mechanical break, rough, undulating, tight to open <1/4"		No Recovery 120.95-121.0'	-
- - - -	R15-NQ 5 ft	65	3	122.15, 122.25, 122.6' - Bedding plane or mechanical break (3), smooth to rough, undulating, tight to open <1/2" 123.1, 123.6, 123.8' - Mechanical break		Limestone 121.0-125.85' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak to medium strong (R1 to R3), rock strength increasing with depth, highly fossiliferous from 122.8-125.7' with molds/casts and shells <1" diameter	- - - -
- 125_ -84.6	97%		4	124.4, 124.55, 124.7, 124.9, 125.1, 125.4' - Bedding plane or mechanical break (6), smooth to rough, undulating, tight to open		otherwise moderately fossiliferous, voids (<1/16") variable over surface from <10-20%, trace cavities <1/2" diameter	- - R15:3 minutes
	126.0		NR) 0	<1/2"		 No Recovery 125.85-126.0' Limestone 126.0-131.0' - yellowish gray to 	-
-	D46 NO		0	127.3, 128.5, 129.6, 130.8' - Mechanical break (4)		moderate yellowish brown, (5Y 7/2 to 10YR 5/4), very fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids	-
-	R16-NQ 5 ft 100%	100	0			(<1/16") over 30-50% of surface, few cavities <1" diameter, moderately fossiliferous with molds/casts <3/4" in diameter	-
130_ -89.6			0	<u>-</u>		-	R16:3 minutes
	131.0						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-02	SHEET	8	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.4	l ft bgs	s on 5	/16/07 START : 5/15/2007 END : 5/	17/200	D7 LOGGER : R. Bitely, D. Whitaker	
>∩ ∵	(9)			DISCONTINUITIES	ပ္	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - 135	Ö∃₩ R17-NQ 5 ft 100%	<u> </u>	3 1 1 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS 131.5, 131.7, 131.9, 132.1' - Bedding plane or mechanical break (4), <10 deg and horizontal, smooth to rough, undulating, tight to open <1/4" 133.5' - Mechanical break 134.0, 134.25, 134.3, 134.4, 134.45, 135.05' - Bedding plane or mechanical break (6), <10 deg and horizontal, smooth to rough,		Limestone 131.0-136.0' - yellowish gray to medium light gray, (5Y 7/2 to N6), very fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), rock strength increasing with depth, voids <1/16" over 0-30% of surface, variable, <20% of core with laminated bedding, poorly fossiliferous with few fossil molds/casts <1/2" diameter, trace cavities <1/4" diameter	- - - - - -
-94. 6	136.0		1	undulating, tight to open <1/4"			R17:4 minutes
-			2	136.3, 136.45, 137.1, 137.35, 138.1' - Bedding plane or mechanical break (5), <10 deg, smooth to rough, undulating, tight to		136.0-140.65' - pale yellowish brown to yellowish gray, (10YR 6/2, 5Y 7/2), very fine to medium grained, strong HCl reaction, very weak (R1) to weak	- -
-	R18-NQ 5 ft	44	3	open <1/4" - - - 138.5' - Mechanical break		- (R2) rock from 136.0-138.6', extremely weak to very weak (R0 to R1) rock from 138.6-139.5', weak to strong (R3 to R4) rock from	- - -
140	93%		>10	138.6, 138.95, 139.1, 139.3' - Bedding plane or mechanical break (4), <10 deg, smooth to rough, undulating, tight to open <1/4"		139.5-140.65', voids <1/16" over <20% of surface to 138.6', trace - voids 138.6-140.65', moderately fossiliferous with fossil molds/casts <1/2" diameter, trace infill of cavities	-
-99. 6	141.0		1 NR	-		- 136.0-138.6', many cavities up to 2" diameter some with infill No Recovery 140.65-141.0'	R18:4 minutes - -
- -			4 >10	141.1' - Fracture or mechanical break, vertical and 0-3 deg, rough, undulating, intersecting fractures, tight to open <1/4" 141.8' - Bedding plane, <10 deg, rough, undulating, tight to open <1/4"		Limestone 141.0-145.7' - pale yellowish brown to yellowish gray, (10YR 6/2, 5Y 7/2), very fine to medium grained, strong HCl reaction, medium strong to	- - -
-	R19-NQ 5 ft 94%	62	>10	142.3, 142.45, 142.55' - Fracture or mechanical break (3), <10 deg and 70 deg, rough, undulating, variable orientation, open <1/2" 142.9-143.2' - Fracture zone, rough,		strong (R3 to R4), voids <1/16" over <10-30% of surface, cavities 2" diameter over 20-40% of surface, few cavities with infill and subhedral	- - -
145 <u></u> -104.6	146.0		0	undulating, gravel-sized fragments <1" diameter 143.25' - Bedding plane or mechanical break, <10 deg and 10 deg, rough, undulating, open		crystal faces, highly fossiliferous with fossil molds/casts to 1" diameter, trace laminated bedding especially 144.45-144.7"	R19:5 minutes
-	146.0		NR 3	<1/2"		No Recovery 145.7-146.0' Limestone 146.0-151.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong	- -
-	D00 N0		3	mechanical break (3), <10 deg and 10 deg, rough, undulating, open <1/2" - 146.35, 146.5, 146.55, 147.2, 147.3, 147.7' -		HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over <10% of surface, few fossils <1/2" diameter, laminated bedding over	-
-	R20-NQ 5 ft 100%	92	0	Bedding plane or mechanical break (6), <10 deg, smooth to rough, undulating, tight to open <1/2" 148.5' - Mechanical break		- <15% of surface, trace infill	Drilling completed 5/17/07 - 12:30 -
150 -109.6			1	150.25' - Bedding plane or mechanical break, <10 deg, smooth to rough, undulating, tight to — open <1/2"		- _ _	R20:4 minutes
	151.0		'			Bottom of Boring at 151.0 ft bgs on 5/17/2007	

APPENDIX 2BB-878 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-03 SHEET 1 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 0.1 ft bo	s on 6/3/	07 S	TART : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker		
				STANDARD	SOIL DESCRIPTION COMMENTS		
LOW AND N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			
ACE ATIO	RECOVERY (ft)				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
DEPTH BELOW SURFACE AND ELEVATION (ft)		#TYPE 6		#TYPE		6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
40.5	0.0			(14)	↑ Topsoil (OL) SS-1: first 6" = weight of hammer		
-		0.4	SS-1	0-1-1	0.0-0.1' - brownish black, (5YR 2/1), wet, very soft, 60% organic nonplastic fines, 40% roots/vegetative		
-	1.5	0		(2)	\\detritus \\ -		
-	1.5				Poorly Graded Sand (SP) 0.1-0.4' - moderate yellowish brown, (10YR 5/4), wet,		
-					very loose, fine silica sand, 15% organics decreasing		
-					with depth		
_					1		
-					11		
5	5.0						
35.5				0.5.5	Poorly Graded Sand (SP) 5.0-6.0' - yellowish gray grades to pale yellowish -		
_		1.0	SS-2	2-5-5 (10)	brown, (5Y 8/1 to 10YR 6/2), wet, very fine to fine		
_	6.5				grained, color grades at 5.6', silica sand with trace nonplastic fines increasing to 30% high plastic fines in / -		
_					brown material		
-							
-					- 		
-							
-					- 		
					- 		
10 30.5	10.0				Silty Sand (SM) SS-3: first 6" = weight of hammer		
-		1.3	SS-3	0-6-7	10.ó-11.8' - grades from grayish orange (10.0-10.5') to pale yellowish brown (10.5-10.8') to very pale orange		
-	11.5			(13)	(10.8-11.3'), (10YR 7/4 to 10YR 6/2 to 10YR 8/2), wet,		
-	11.5				medium dense, very fine to fine grained, iron staining - (orangish red) from 10.0-10.8', silica sand, 30%		
-					\nonplastic fines \		
_					1		
-					11		
]		
] [
15	15.0						
25.5				4-6-6	Silty Sand (SM) 15.0-16.0' - pale yellowish brown, (10YR 6/2), wet,		
_		1.3	SS-4	4-6-6 (12)	medium dense, very fine to fine grained, silica sand		
-	16.5				with 20% nonplastic fines Sandy Fat Clay (CH)		
-					\ 16.0-16.25' - pale yellowish brown, (10YR 6/2), wet, \ \ \ \ \		
-					stiff, medium plasticity, no to slow dilatancy, 30-35% very fine silica sand		
-							
-							
-					- 		
							
20							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-03	SHEET	2	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 0.1 ft b	gs on 6/3/	/07 5	START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker	
				STANDARD	SOIL DESCRIPTION COMMENTS	8
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRI DRILLING FLUID LOSS, INSTRUMENTA	
		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRI D	
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
				(N)		
20.5	20.0			0-2-3	Fat Clay (CH) 20.0-20.45' - wet, stiff, no dilatancy, pale blue from	ımmer -
-		1.3	SS-5	(5)	L\ 20.0-20.2'. light olive gray from 20.2-20.45'. (5G 6/2.	_
-	21.5				5Y 6/1), high plasticity fines, mild HCl reaction possibly from interbedded silt, one limestone fragment	_
-					or concretion, no HCl reaction	_
_						-
-					nonplastic, rapid dilatancy, mild HCl reaction, 5-10%	-
-					very fine to fine sand-sized, carbonate materials Fat Clay (CH)	-
-					20.9-21.3' - Same as 20.2-20.45'	-
-					1 - 1	=
25 <u> </u>	25.0				Silt (ML)	
		1.5	SS-6	2-5-13	25.0-26.5' - grayish yellow, (5Y 8/4), wet, very stiff,	-
-		1.5	33-0	(18)	nonplastic, rapid dilatancy, moderate HCl reaction, coarse sand to fine gravel-sized limestone fragments	-
-	26.5				from 26.2-26.5', carbonate materials	-
-					†	-
-					1 1	-
-					1 1	-
-					1 1	
-					1 1	7
30	30.0				1 1	
10.5					Silty Sand (SM) 30.0-31.0' - grayish orange to dark yellowish orange,	
		1.0	SS-7	5-12-13 (25)	(10YR 7/4 to 10YR 6/6), moist to wet, medium dense,	
_	31.5			(- /	mild HCl reaction, fine to coarse grained sand-sized, 20-25% nonplastic fines, fine gravel-sized limestone	
_					fragments, carbonate materials	_
_]]	
-					1 1	_
_						-
-					1 1	-
-					1 1	-
35 5.5	35.0				Silty Sand And Limestone Fragments (SM)	
- 3.5		1.0	SS-8	19-50/6 (69/12")	35.0-36.0' - light olive gray, (5Y 5/2), wet, very dense, 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-
-	36.0			(55, 12)	moderate HCl reaction, very fine to coarse sand-sized	-
-					\coarse gravel-sized limestone fragments, carbonate \ \ -	-
-					\materials \	-
-					1 1	-
-					1 1	-
-					1 1	-
-					1 1	-
40					1 1	-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-03	SHEET	3	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 0.1 ft bo	gs on 6/3/	07 S	START : 6/3/2007 END : 6/6/2007 LOGG	ER :	D.	Whitaker
	STANDARD SOIL DESCRIPTION						G	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	IEST NESULT		SOIL NAME, USCS GROUP SYMBOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BE ACE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR		BOLI	DRILLING FLUID LOSS, TESTS, AND
DEPT SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYM	INSTRUMENTATION
0.5	40.0	0.7	SS-9	16-50/4	Silty Sand And Limestone Fragments (SM)	1	П	
	40.8	0		(66/10")	40.0-40.7' - yellowish gray, (5Y 7/2), wet, very dense, fine to coarse sand-sized, 35% low plastic fines, 40%	/#	11.	
_					of sample is limestone fragments from 40.0-40.2', mild HCl reaction from 40.2-40.7'	/]		_
-						4		-
-						+		-
-						1		-
-						1		-
-						1		-
45	45.0 45.2							_
-4.5 -	45.2	0.2	SS-10	50/2.5 (50/2.5")	Limestone Fragments	<u>/</u> ‡		_
-					\reaction, coarse sand to fine gravel-sized material	/ ┨		-
-						+		-
-						+		-
-						1		-
-						1		-
						1		
_						4		_
50 -9.5	50.0				Silty Sand (SM)	4	111	SS-11: first 6" = weight of hammer
-5.5		1.4	SS-11	0-3-2	50.0-51.4' - yellowish gray, (5Y 7/2), wet, loose, fine to coarse grained, mild HCl reaction, 30% nonplastic	-		- weight of Hammer
-	51.5	1.4	33-11	(5)	coarse grained, mild HCI reaction, 30% nonplastic fines, all carbonate	4		-
-	31.3					Ť	-	-
-						1		-
]		
_						4		_
-						4		-
						+		-
55 <u> </u>	55.0 55.3	0.3	SS-12	50/4	_ Limestone Fragments	士	Ι	_
-				(50/4")	55.0-55.3' - yellowish gray, (5Y 7/2), mild HCl reaction, coarse sand to fine to coarse gravel-sized	/1		-
-					fragments	1		-
]		
_						1		_
-						+		-
-						+		-
-						+		-
60 60						1		-
						\dagger		
						- 1		



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	GSC-03	CHEET	4 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

STANDARD PENETRATION TEST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY -19.5 -60.0 -60.8 -60.	STS, AND N d surface at sing to 60.0', - vater gushing
-19.5 60.8 0.8 SS-13 10-50/4 (60/10") Limestone And Silt 60.0-60.8' - yellowish gray, (5Y 7/2), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction, coarse sand to fine to coarse gravel-sized limestone out top of casing above ground continue setting casing, 10:08 fragments from 60.0-60.3' and 60.75-61.0', carbonate	STS, AND N d surface at sing to 60.0', - vater gushing
-19.5 60.8 0.8 SS-13 10-50/4 (60/10") Limestone And Silt 60.0-60.8' - yellowish gray, (5Y 7/2), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction, coarse sand to fine to coarse gravel-sized limestone out top of casing above ground continue setting casing, 10:08 fragments from 60.0-60.3' and 60.75-61.0', carbonate	STS, AND N d surface at sing to 60.0', - vater gushing
-19.5 60.8 0.8 SS-13 10-50/4 (60/10") Limestone And Silt 60.0-60.8' - yellowish gray, (5Y 7/2), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction, coarse sand to fine to coarse gravel-sized limestone out top of casing above ground continue setting casing, 10:08 fragments from 60.0-60.3' and 60.75-61.0', carbonate	d surface at sing to 60.0', – vater gushing
-19.5	sing to 60.0',
blasticity, rapid dilatancy, mild HCl reaction, coarse plasticity, rapid dilatancy, mild HCl reaction, coarse sand to fine to coarse gravel-sized limestone out top of casing above ground fragments from 60.0-60.3' and 60.75-61.0', carbonate continue setting casing, 10:08 h	vater gushing
	surface- hole caving
	j in
	-
	-
	+
	-
65 65.0	-
-24.5 65.3 0.3 SS-14 50/3 Limestone Fragments - (50/3") \[\begin{align*} Limestone Fragments \\ (50/3") \\ (55.0-65.3' - yellowish gray, (5Y 7/2), mild HCl \end{align*} \] Begin SS sampling again at 65.	.0' at 16:30
\reaction, coarse sand to fine to coarse gravel-sized /]
\fragments \fragments	_
	-
	-
	-
	-
70.0 70.1 0.0 SS-15 50/1 No Recovery 70.0-70.1'	7
70 (50/1")	1
Begin Rock Coring at 70.0 ft bgs See the next sheet for the rock core log	
	_
	-
	-
	+
	†
	1
]
	_
-34 <u>.</u> 5_	-
	-
	-
	+
	+
	1
]
]
80	



FRACTURES PER FOOT

1

2

0

NR

4

>10

>10

NR

>10

>10

NR

>10

>10

>10

NR

14

71.3'

80 deg, tight

RQD(%)

67 1

WATER LEVELS: 0.1 ft bgs on 6/3/07

CORE RUN, LENGTH, AND RECOVERY (%)

R1-NQ

5 ft

72%

R2-NO

5 ft 44%

R3-NQ

5 ft

25%

R4-NQ

5 ft

64%

22 >10

0

DEPTH BELOW SURFACE AND ELEVATION (ft)

-29.5 70.0

75

-34 5

80

-39 5

85<u>85.0</u> -44.5

90

90.0

80.0

75.0

PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-03 SHEET 5 OF 10

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

END: 6/6/2007

90

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

DISCONTINUITIES

START: 6/3/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

70.05, 71.3, 71.8, 72.7' - Bedding plane or mechanical break (4), <10 deg, smooth to

fine-sized gravel infill except in fracture at

72.4-72.5' - Mechanical break, horizontal and

75.0-75.05' - Fracture zone, angular fine

75.2, 76.2, 76.3, 75.35' - Bedding plane or

undulating, 76.2' smooth and fine angular

gravel in fracture (15 deg at 75.35') open

75.3' - Fracture or mechanical break, vertical,

76.45-77.2' - Fracture zone, smooth to rough,

undulating, fine to coarse <2" diameter

80.1, 80.8, 80.95' - Bedding plane (3), <10

80.25-80.4, 80.55-80.7' - Fracture zone (2), very fine to coarse angular to subangular

81.0-81.35' - Fracture zone, very fine to

coarse angular to subangular gravel-sized

85.0-85.05' - Fracture zone, very fine angular

gravel and coarse sand-sized material and

85.6-85.8' - Fracture zone, angular to

subangular rock crush, fine to coarse gravel-sized, trace silt infill

coarse-sized subangular to subrounded

mechanical break (3), <10 deg, smooth to

rough, undulating, tight except open <1/2" at

86.3-86.5' - Fracture zone, fine to

86.8, 87.0, 87.2' - Bedding plane or

deg, smooth to rough, undulating to stepped,

mechanical break (4), <10 deg, rough,

smooth, undulating, tight 75.5' - Mechanical break

open <1/2", eroded surfaces

gravel-sized limestone

limestone

silt, possible infill

fragments

gravel, subangular

rough, undulating, open <1/2" with very

ORIENTATION: Vertical LOGGER: D. Whitaker LITHOLOGY COMMENTS ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 08:30 Install 0.0-70.0' NW Limestone 70.0-73.6' - pale yellowish brown to casing, 10:46 water level = moderate yellowish brown, (10YR 6/2 0.2', Depth = 70.0', 12:00 to 10YR 5/4), fine grained, strong Begin Rock Coring HCI reaction, weak to medium strong (R2 to R3), voids (<1/16") over 40% of surface, trace cavities >1/16", Driller's Remark: 72.0-72.5' fossil molds and 73.0-74.5' soft No Recovery 73.6-75.0' R1: 6 minutes Limestone 75.0-77.2' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), strong HCI reaction Driller's Remark: 76.0-77.0' 75.0-76.1' - very fine grained, medium strong (R3), voids (<1/16") over 5% of surface 76.1-77.2' - fine grained, very weak to extremely weak (R1 to R0), voids (<1/16") over 30% of surface, cavities throughout from fossil molds up to 1/2", 10% voids have recrystallization infill R2: 6 minutes No Řecovery 77.2-80.0' Driller's Remark: 80.0-82.0' Limestone 80.0-81.25' - moderate yellowish brown, (10YR 5/4), fine to medium void. 82.0-83.0' soft. 83.0-84.0' rock, 84.0-85.0' void, at top of 85.0' felt rock grained, strong HCl reaction, strong (R4), voids (>1/16") over 40% of (84.9-85.0') surface, up to 35% of core is cavity infill, trace cavities up to 1/4", fossil No Recovery 81.25-85.0' R3: 4 minutes Driller's Remark: various Limestone 85.0-85.6' - very pale orange, (10YR 8/2), fine grained, strong HCI soft spots throughout, could be silt or soft rock reaction, extremely weak (R0), voids (<1/16") over 15-25% of surface, few cavities up to 3/16" diameter, trace fossils up to 1/16"x1/8" 85.6-88.2' - Same as 80.0-81.25' except very weak (R1) probably due to less recrystallization in voids and more cavities up to 3/4"

R4: 6 minutes

No Recovery 88.2-90.0'



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-03 SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

CORING	NIETHODA	ND EC	אורוע	IENT: CME 55 S/N 299205, mud rotary, NQ tools, NW/F	ivv ca	Sirig	ORIENTATION : Vertical
WATER	LEVELS: 0.1	ft bgs	s on 6	/3/07 START : 6/3/2007 END : 6/	6/2007	7 LOGGER : D. Whitaker	
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		တ္	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BH	Z, Z E, A	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A K	GE F	Q D (%)	P.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	lBO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SHOW SHOW	S S	F.F.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λ×	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-49.5	014			87.4-87.5, 87.85-88.2' - Fracture zone (2),	1 "	Limestone	Driller's Remark: lost
			8	fine to coarse-sized subangular to		- 90.0-90.35' - grayish orange, (10YR	circulation at 90.0-110.0',
				subrounded fragments	ш	7/4), fine grained, strong HCI	94.5-94.8' void
				90.1, 90.2, 90.3, 90.4, 90.55, 90.7, 90.8, 91.0	\Box	reaction, extremely weak (R0), voids	
_			3	 Bedding plane or mechanical break (8), <10 deg, smooth, undulating, tight to open <1/2", 		 (<1/16") over 15% of surface, 25% of rock has infilled molds or black 	1 1
-	R5-NQ			90.3' and 91.0' have fractured gravel-sized		organic material	1 1
_	5 ft	46	1	fragments in the fractures	-	- 90.35-91.3' - Same as 85.0-85.6'	1 -
_	79%			91.35-91.45' - Fracture zone	\vdash	except 20-30% cavities up to 1-1/4"	1 -
			2	91.5, 92.5, 93.8' - Bedding plane or mechanical break (3), <10 deg, smooth,		91.3-93.95' - Same as 86.6-88.2' - except cavities up to 1"	
			-	undulating, tight to open <1/2", 91.5' tight	Ш	except duvides up to 1	
_						No Recovery 93.95-95.0'	R5: 5 minutes
	0.7.0		NR		╂┼┦	<u></u>	1
95 <u> </u>	95.0			95.0-95.1' - Bedding plane, 10 deg, rough,		 Limestone	Driller's Remark: 95.0-95.5'
			6	undulating, tight, eroded subrounded gravel	Щ	- 95.0-96.3' - grayish orange, (10YR	soft
				fragments	Н	7/4), very fine to fine grained, strong]
			2	95.25, 95.4' - Bedding plane or mechanical		HCl reaction, weak (R2), voids	
				break (2), <10 deg, rough, planar to undulating, tight, open <1/4" with fine gravel	╁┼	 (<1/16") over 5% of surface, trace cavities up to 1/4", light olive gray 	1 1
-	R6-NQ			at 95.4'		(5Y 5/2) clay/silty clay infill from	1 1
_	5 ft	0		95.6' - Bedding plane, <10 deg, smooth,	+	– 95.45-95.65 [']	1 -
_	26%		ND	planar to undulating, 1" of infill, clay and fine		No Recovery 96.3-100.0'	1 -
			NR	to very fine gravel-sized fragments 95.75, 95.9' - Bedding plane or mechanical	Ш		
				break (2), <10 deg, rough, planar to			
-				undulating, tight	\vdash		R6: 5 minutes
400	400.0			96.1-96.2 - Fracture zone		_	1 1
100 -59.5	100.0		>10		₩	Limestone	1
-			>10	staining, subangular to subrounded, very fine	\perp	- 100.0-100.5' - very pale orange to	1 -
_				to coarse-sized gravel	\perp	grayish orange, (10YR 8/2 to 10YR	1
				100.25' - Fracture, vertical and 70 deg,		7/4), very fine grained, strong HCl	
				rough, undulating, black staining, trace (thin layer) silt/clay infill <1/16", tight <1/16"	Ш	 reaction, very weak (R1), voids (<1/16") over 40% of surface, black 	1
_	R7-NQ			100.4-100.5' - Fracture zone, trace black	+	organic staining, cavities up to 3/16",	1 1
-	5 ft	0	ND.	staining, very fine to coarse-sized subangular		fossil molds, trace fossils <1/8"	1 -
_	10%		NR	to subrounded gravel	₩	No Recovery 100.5-105.0'	-
					ш	_]
					\vdash		
]							R7: 3 minutes
105	105.0				14	_	1
-64.5	100.0			105 1 105 4' Fracture 7000 engular to	団	 Limestone	⊢
_			>10	105.1-105.4' - Fracture zone, angular to subangular, very fine to coarse gravel-sized	+	 105.0-106.5' - yellowish gray to]
				fragments	世	grayish yellow, (5Y 7/2 to 5Y 8/4),]
			>10	105.4-106.5' - Bedding plane, smooth,	Ш	very fine to fine grained, very strong HCl reaction, extremely weak (R0),]
				undulating, open 1/4"-1", tight	Ш	voids (<1/16") over 30-40% of	1
	R8-NQ					surface, many recrystallized fossil] 1
-	5 ft	0			╁┼┤	- casts up to 3/16", few black possibly]
-	30%		N.D.		Ш	carbon or organic material up to 1/8", fossiliferous] -
_			NR		HH	- No Recovery 106.5-110.0'] -
_						_]
					\vdash		R8: 2 minutes
110	110.0				ш		1
110	110.0			-	1 1		
					4		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-03 SHEET 7 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS : 0.1	ft bas	s on 6	/3/07 START : 6/3/2007 END : 6/6	6/2007	Z LOGGER : D. Whitaker	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASINO
A BE	RUN TH, / VER	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
EPTI URF, LEV/	ORE ENG ECO	Ø	ZAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-69.5	038	ď		, , ,	Ś		
-69.5			2	110.05' - Bedding plane, <10 deg, smooth, planar, open <1/16"		Limestone - 110.0-112.25' - grayish yellow to	16:10 core barrel retriever is boud and is pulling -
_				110.2' - Bedding plane, <10 deg, smooth to	Н	yellowish gray, (5Y 8/4 to 5Y7/2),	casing with it, 16:14 got it
_			>10	rough, undulating, trace gravel fragments in fracture, open 1/2"-3/4"	Щ	very fine to fine grained, strong HCl reaction, extremely weak (R0),	out but have to pull out all core barrel - tip is blocked -
_				111.4-111.9' - Fracture zone, medium sand		111.5-111.8' silt and sand-sized	_
_	R9-NQ - 5 ft		_3_	to fine gravel-sized fragments, trace wet silt infill	Ш	material, voids (<1/16") over 50% of surface, 5+ cavities up to 9/16", few	
_	45%	23		112.1' - Bedding plane. <10 deg. rough.	\vdash	_ fossil molds	
_			ND	undulating, open 3/4" with rock fragments, eroded planes/surfaces		_	
_			NR	112.2' - Bedding plane, <10 deg, rough,		_	
_				undulating, open <1/4", eroded planes/surfaces	Н	_	R9: 3 minutes
115	115.0				Щ	-	l
-74. 5				_	Щ	No Recovery 112.25-120.0'	When core barrel was brought out after a
				_	Ш	_	struggle, there was not any
_				_	Н	_	recovery. May have dropped into borehole on
_				_	H	_	way up.
	R10-NG 5 ft	0	NR	_		_	
	0%			_		_	
				_	Щ	_	
_				_	П	_	
_				_		_	R10: 3 minutes
120_	120.0						
-79.5			>10	120.1, 120.2, 120.25, 120.6, 120.4, 120.9,	Н	Limestone - 120.0-123.0' - very pale orange to	
_				121.0' - Bedding plane or mechanical break (6), <10 deg, smooth, planar to undulating,	H	grayish orange, (10YR 8/2 to 10YR	
_			1	tight to 3/4" at 120.4', sand-sized material to fine gravel-sized in most fractures due to soft		7/4), fine to medium grained, very - strong HCl reaction, extremely weak	
_				core, breaks easily		(R0), voids (<1/16") over 25% of	
	R11-NQ 5 ft	0	>10	122.15-122.5, 122.8-123.0' - Bedding plane	Щ	surface, trace cavities up to 3/16", 5% black organic material up to 1/2",	
	60%		. 10	(2), <10 deg, smooth, planar to undulating, tight to 1/4", partings closely spaced	Ш	many fossil molds, moderately to]
				122.5-122.8' - Fracture zone, fine angular to	Ш	highly fossiliferous - 121.1-121.9' - Same as 120.0-123.0'	
			NR	subangular gravel-sized fragments	H	except loose material, wet, 70% silt,	
				_	F	30% fine to coarse sand No Recovery 123.0-125.0'	R11: 4 minutes
125_	125.0				岸		
-84.5			>10	125.0-125.2' - Fracture zone, fine to coarse-sized gravel and coarse sand-sized -	Ш	Limestone - 125.0-125.1' - Same as 120.0-123.0'	Driller's Remark: 125.5- 126.0' void. 127.5-128.0'
			. 10	fragments, angular to subrounded	dash	_ 125.1-125.8' - light brownish gray,	soft, lost circulation at
			>10	125.3, 125.7, 125.8, 126.1, 126.2' - Bedding plane (5), horizontal, smooth to rough,	Щ	(5YR 6/1), fine to medium grained, - strong HCl reaction, very weak (R1),	127.0', 08:04 lots of chatter at 128.0'
	R12-NQ 5 ft 1 66%		- 10	planar, tight	Щ	voids (<1/16") over 50% of surface,	at 120.0
			>10	125.85-126.0' - Fracture zone, fine to coarse-sized gravel and coarse sand-sized -		cavities up to 3/8", highly fossiliferous, casts, molds, fossils	
				fragments, angular to subrounded	\vdash	125.8-128.3' - Same as 120.0-123.0']
			2	126.1, 126.2' - Bedding plane (2), horizontal, smooth to rough, planar, tight	岸	except weak rock (R2) No Recovery 128.3-130.0'	
				126.4-126.5, 126.75-126.95' - Fracture zone,	片]
			NR	fine to coarse-sized gravel and coarse sand-sized fragments, angular to subrounded	Ш	_	R12: 5 minutes
130	130.0						



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-03 SHEET 8 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

			<u> </u>	icht . Givic 33 3/N 299203, mad rotary, NQ tools, NVV/			ONLINIATION: Vertical
WATER	LEVELS: 0.1	ft bg	s on 6		6/200		
≥O.⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B B B B B B B B B B B B B B B B B B	SH	(%) Q	F.00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLI I	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E E E	NG:	Oρ	RAC:	PLANARITY, INFILLING MATERIAL AND	ΜB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	SHR	R	FB	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	BROI 6, 1201 1200210, 210.
-89.5				126.95-127.75' - Bedding plane, horizontal,	Ш	Limestone	
_			4	smooth to rough, planar, tight, partings (127.05-127.25'), 127.35-127.75' rock is	ш	 130.0-133.05' - yellowish gray, (5Y 8/1), very fine to fine grained, strong 	1
-	1			eroded and rounded openings are up to	Н	HCl reaction, very weak (R1), voids	1
-	-		>10	<1-1/2" from rock's outer diameter to	H	 (<1/16") over 40% of surface, many 	1
-	R13-NQ			adjacent rock 128.2-128.3' - Bedding plane, horizontal and	ш	have infill, cavities up to 3/8", casts/molds, moderately fossiliferous	-
-	5 ft	20	>10	86 deg, smooth, undulating		-	_
l _	64%			130.0-130.1' - Bedding plane, horizontal,	Н	_	_
			1	smooth, undulating, limestone fragments, very fine to coarse gravel-sized from		133.05-133.2' - Same as	
				130.0-130.1'	Н	130.0-133.05' except fine to medium grained, more fossiliferous	
-	1		NR	130.8, 131.0, 131.35' - Bedding plane or	ш	No Recovery 133.2-135.0'	R13: 5 minutes
125	125.0			mechanical break (3), <10 deg, smooth, undulating, tight to open 1/4"	$\vdash \vdash$	-	1
135 <u> </u>	135.0			131.46-131.75' - Bedding plane, <10 deg,	口	 Limestone	-
-	-		>10	smooth, undulating, tight	₩	 135.0-135.3' - yellowish gray, (5Y 	-
-	4			131.75-131.9, 132.1-132.15,132.6-133.05' - Fracture zone (3), angular to subangular	Ш	8/1), fine grained, strong HCI	-
l _			>10	gravel-sized limestone fragments	Н	reaction, weak (R2), voids over 5% of surface, poorly fossiliferous	
			. 10	132.35' - Fracture, 35 deg, smooth,		135.3-135.5' - Same as 135.0-135.3'	
	R14-NQ		>10	undulating, limestone fragments in fracture, open 1/2"-1"	Н	except very fine grained	
-	5 ft 54%	0		135.0-135.2, 135.75-136.05' - Fracture zone	Ш	- 135.5-135.8' - Same as 120.0-123.0' 135.8-135.95' - Same as	1
-	1			(2), very fine to coarse angular to	ш	130.0-133.05'	1
-	-			subrounded gravel sized limestone fragments and coarse sand sized material		- 135.95-136.5' - Same as	-
-	-		NR	135.35, 135.45, 135.55, 135.7' - Bedding	H	120.0-127.0' 136.5-137.7' - yellowish gray, (5Y	R14: 4 minutes
-	-			plane or mechanical break (4), <10 deg,	ш	 7/2), very fine to fine grained, \u00ed 	- Trial 4 minutes
140 -99.5	140.0			smooth to rough, undulating, tight to 1/4" 135.9' - Fracture, 75 deg, smooth to rough, —	ш	extremely weak (R0), 50% limestone, 50% silt with sand-sized fragments,	
-99.5			2	undulating, eroding fracture planes, gravel in	Н	poorly fossiliferous, voids over 0-5%	_
			_	fracture 136.0' - Bedding plane or mechanical break,		of surface	
				130.0 - Beduing plane of mechanical break, <10 deg, smooth to rough, undulating, open	\vdash	No Recovery 137.7-140.0' Limestone	
_			8	1/2" with fine gravel sand in fracture	Ш	140.0-143.65' - grayish orange,	1
-	R15-NQ			136.05' - Fracture, 65 deg, smooth to rough, undulating, eroding fracture planes, gravel in	Н	(10YR 7/4), fine to medium grained,	-
-	5 ft	38	>10	fracture	H	 strong HCl reaction, weak (R2), voids (<1/16") over 5-10% of surface, 	1
-	90%			136.3, 136.6, 136.75' - Bedding plane or	Ш	fossiliferous with several	-
-	-		>10	mechanical break (3), <10 deg, smooth to rough, undulating, tight to open 1/4" except at	H	_ molds/casts, cavities up to 1/2"	-
-	4			136.6', open 1/2" with fine gravel sand in	Ш	143.65-144.5" - very light gray, (N8),	D45: 6 minutes
_]		>10	fracture	H	very fine grained, strong HCl reaction, strong (R4), moderately	R15: 6 minutes
	145.0		NR	136.75-138.3' - rock has fissures/fractures — vertically	Ħ	fossiliferous, trace small voids, few	
-104.5			. 40	137.25' - Fracture, 85 deg, smooth to rough,	Н	cavities, fossil molds up to 3/4"	
-]		>10	undulating, eroding fracture planes, gravel in	Ш	 No Recovery 144.5-145.0' Limestone 	1
-	1			fracture 140.45, 140.5, 141.4, 141.6-141.85, 142.06,	Н	145.0-145.2' - Same as 143.0-144.5'	1
-	1		>10	143.5, 143.7' - Bedding plane or mechanical	口	 145.2-147.0' - pale yellowish brown, (10YR 6/2), fine to medium grained, 	-
-	R16-NQ			break (8), <10 deg, smooth, planar to undulating, tight to open 1/4"	H	weak to medium strong (R2 to R3),	-
-	5 ft	45	3	undulating, tight to open 1/4" 142.6-142.8' - Bedding plane, <10 deg,	\Box	voids (<1/16") over 25% of surface,	-
-	86%			smooth, undulating, tight	Ш	60-70% recrystallized surface/voids, cavities up to 1"x3/8", trace black	-
_]		2	143.5-143.7, 143.8-144.2' - Fracture zone (2), 75 deg, rough, undulating, limestone	H	organic material, poorly fossiliferous	
I _]			fragments between the two fractures	H		
			1	145.0-145.2, 146.25-146.65' - Fracture zone	Н		R16: 9 minutes
150	150.0		NR	(2), angular to subrounded fine to coarse-sized gravel limestone fragments	Ш		1
				COURSE SIZON GRAVET INTESSORIE TRAGITICITIS			
1			1		1		

APPENDIX 2BB-886 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-03 SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

CORING	I WE I HOD A	AD EC	ZUIFIV	IENT: CME 55 S/N 299205, mud rotary, NQ tools, NW/F	W Ca	sing	ORIENTATION : Vertical
WATER	LEVELS: 0.1	ft bgs	s on 6	/3/07 START : 6/3/2007 END : 6/	3/2007	7 LOGGER : D. Whitaker	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
ĕ9£	(%) _			<u> </u>	SYMBOLIC LOG		
N A	ΑAΝ	_	ZES T	DESCRIPTION	CL	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
E S S S S S S S S S S S S S S S S S S S	S F, A	(%) Q	128	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F.F.	R 60	Ω	PAC R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S≺	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-109.5				145.35' - Fracture, 30-35 deg, rough,	Н	Limestone	Driller's Remark: 153.0-
			5	undulating, open <1/4" with limestone		- 147.0-149.0' - very fine grained, very	153.5' void –
				fragments in fracture		strong (R5), black organic lineations,	100.0 10.0
_				145.75, 145.85, 146.0, 148.5, 148.95, 149.0' -	Н	voids over <5% of surface, 90%	1
-			2	Bedding plane (6), <10 deg, rough,	H	 recrystallized surfaces, many cavities 	-
_				undulating to stepped, tight to 1/2", most with		_ up to 3/8"	
	R17-NQ			sand to fine gravel-sized limestone fragments	\vdash	148.0-149.3' - Same as 125.8-128.3'	
_	5 ft	60	2	in fractures 146.95, 147.05' - Fractures (2), 25 deg,	Н	 No Recovery 149.3-150.0' Limestone 	
-	96%			rough, undulating, open <1/2" with limestone		150.0-151.8' - pale yellowish brown	-
_			3	fragments in fractures		- to moderate yellowish brown, (10YR	_
			٦	147.2, 147.5, 148.15' - Mechanical break (3)	Ш	6/2 to 10YR 5/4), fine to medium	
I -				150.3, 150.4, 150.45, 150.55, 150.85, 151.2,	H	grained, strong HCl reaction, weak	R17: 6 minutes
-			1	151.75, 152.35, 152.55, 153.2, 154.4' -	口	 (R2), highly fossiliferous with molds 	-
155_	155.0		NR.	Bedding plane or mechanical break (11), <10	Ш	and casts (3/8"), voids (<1/16") over	
-114.5			igcup	deg, smooth, planar to undulating, tight to <a>	\vdash	40% of surface, strong rock (R4)	
-			7	<1/4" 150.75-150.9, 151.42-151.6, 154.2-154.5' -	ш	from 158.5-154.8' No Recovery 154.8-155.0'	-
-				Fracture zone (3)	Ш	Limestone	-
			>10	450 05 454 01 `É +	Н	_ 155.0-159.7' - Same as 150.0-154.8'	
			/10	gravel-sized	-	except 155.0-156.4' strong rock (R4),	
-	R18-NQ			151.1' - Fracture, 60 deg, rough, planar		157.0-158.2' and 158.2-159.9'	-
_	5 ft	22	2	152.4' - Mechanical break	\vdash	extremely weak rock (R0)	-
	94%			152.55, 153.0' - Bedding plane or mechanical			
				break (2), <10 deg, smooth, planar to			
-			>10	undulating, tight to <1/4" 152.9-153.65' - Bedding plane, <10 deg,	Ы	-	-
_				smooth to rough, undulating, tight	₽₩	_	-
			>10	153.1' - Fracture, 75 deg, smooth, undulating,		_	R18: 8 minutes
160	160.0		NR	2 bedding plane fractures perpendicular at	\vdash	No Recovery 159.7-160.0'	
-119.5	100.0		IVIX	153.05', rough, planar open <1/4" —	╁	Limestone	_
_			1	155.25, 153.4, 155.6, 155.75, 155.9, 156.2,		160.0-164.8' - Same as 150.0-154.8'	-
				156.28, 156.3, 156.4, 156.42, 156.6, 156.7, 156.8, 156.85, 156.9, 156.95, 156.97, 157.05,		and 155.0-159.2' except medium	_
				157.9, 159.2, 159.5' - Bedding plane or	Н	strong to strong (R3 to R4),	
-			8	mechanical break (21), <15 deg, smooth to	hП	- 160.0-160.3' and other zones of	-
-	D40 1:0			rough, undulating, tight to <1/4"	ш	recrystallized surface voids and	-
	R19-NQ 5 ft	58	1	160.3, 161.25, 161.5, 161.65, 161.7, 161.8,	Н	limestone]
	96%	50	'	161.95, 162.05, 162.2' - Bedding plane or	Ш]
_				mechanical break (9), <10 deg, smooth to	口	-	-
-			2	rough, undulating, open up to <1/2", most open <1/4" or tight	ш	-	-
				162.25, 162.5' - Mechanical break (2)	Н	_	
			2	163.1, 163.6, 164.3, 164.5' - Bedding plane	口		R19: 11 minutes
40-	405.0			or mechanical break (4), <10 deg, smooth to	ш	_	-
165_	165.0		NR	rough, undulating, open up to <1/2", most —	$\vdash\vdash\vdash$	— No Recovery 164.8-165.0'	-
-124.5			3	open <1/4" or tight		Limestone]
			ا	165.0-165.1, 166.07-166.15, 166.5-166.6,	Ш	165.0-169.7' - Same as 150.0-165.0']
-				166.9-166.95' - Fracture zone (4) 165.75, 165.85, 166.07, 166.15, 166.35,	$\vdash \vdash$	 except very fine grained and strong rock (P4) from 166.0 166.5! 	-
_			6	166.5, 166.6, 166.9' - Bedding plane or		rock (R4) from 166.0-166.5'	-
_				mechanical break (8), <10 deg, smooth to	Ш	_	
	R20-NQ			rough, planar to undulating, few are partings,	\vdash]
_	5 ft	21	5	tight to open 1/2", sand to fine gravel-sized	т	_	-
-	94%			limestone fragments in fracture	Ш	_	-
			5		Щ		
]			ادا		$\vdash\vdash$		1
-				-	Ш	F	R20: 10 minutes
-			6	-	Щ	No Recovery 169.7-170.0'	-
170	170.0		NR		Н		
					•		•



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-03	SHEET	10	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

				IENT : CIVIE 33 3/IN 299203, ITINU TOTALY, INQ 10015, INW/F			ORIENTATION: Vertical
WATER	LEVELS : 0.1	ft bg	s on 6		6/200		I
≥□≎	(%)			DISCONTINUITIES	ပ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUTE AND DEDTH OF GARNING
ᆱᇰᇋ	AUN H, A	(%	NE	DEDTIL TYPE OBJECTATION BOLIOURIES	1 2	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	RE FIGE	D (%)	SCT FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COF	a Q	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-129.5				166.95, 167.2, 167.4, 167.6, 167.7, 167.85,	+	Limestone	<u> </u>
			>10		亡	- 170.0-172.0' - light olive gray, (5Y	_
				169.05, 169.15, 169.17, 169.24, 169.3,	┵	5/2), weak (R2), voids (<1/16") over	_
				169.44' - Bedding plane or mechanical break	Н	25% of surface, few cavities up to	
-			>10	(18), <10 deg, smooth to rough, planar to undulating, few are partings, tight to open		 3/8", poorly fossiliferous, secondary infill in voids over 10-20% of surface 	-
-	R21-NQ			1/2", sand to fine gravel-sized limestone	╁┴	No Recovery 172.0-175.0'	-
-	5 ft	0		fragments in fracture	仜	-	-
_	40%			170.0-170.6, 171.0-171.2, 171.55-172.0' -	\bot	_	_
			NR	Fracture zone (3), fine to coarse angular to subangular limestone fragments, 2% sand			
			INK	170.7, 170.95, 171.2, 171.3, 171.4, 171.55' -	Ш		_
_				Bedding plane or mechanical break (6), <10	T	-	R21: 7 minutes
-				deg, smooth, planar to undulating, open	匚	-	-
175	175.0			<1/̄2", sand in fractures 171.35' - Fracture, vertical, rough, planar	₽	<u></u>	
-134.5			>10	175.0-175.1, 175.2-175.4, 176.55-176.81,		Limestone - 175.0-177.8' - Same as 170.0-172.0'	_
			10	177.1-177.5' - Fracture zone (4), fine to	\vdash	except weak to medium strong rock	
-				coarse angular to subangular gravel-sized	Ľ	(R2-R3)	-
-			>10	limestone fragments 175.1, 175.2, 175.4, 175.85, 175.9, 175.55,	₩	-	-
_	D00 N0			175.1, 175.2, 175.4, 175.65, 175.9, 175.55, 176.8, 177.3, 177.5' - Bedding plane (9),	+	_	-
_	R22-NQ 5 ft	8	>10	rough, undulating, sand/fine gravel in		_	_
	56%			fractures, open up to 1"		No Booyen, 477 9 490 0'	
				176.2, 176.3' - Bedding plane (2), rough, undulating, little sand in fractures, open <1/4"		- No Recovery 177.8-180.0'	
_				undulating, little sand in fractures, open < 1/4	1	-	-
-			NR		世	-	R22: 5 minutes
_					$oxed{\bot}$	-	TVZZ. 5 minutes
180_	180.0			_	т		
-139.5				180.0-180.91' - Fracture zone, fine to coarse		Limestone	
-			>10	gravel-sized angular to subrounded gravel	╁	 180.0-181.4' - Same as 170.0-180.0' except from 180.9-181.4' 	1
-			0			fossiliferous with many molds and	-
_			١Ů		+	casts, voids (<1/16") over 50-60% of	-
_					世	surface, many cavities up to 1"x1/2"	_
	R23-NQ	9				No Recovery 181.4-185.0'	
	5 ft 28%	9			\vdash		_
_			NR	•		<u> </u>	-
-					+	-	-
-					口	-	R23: Runtime not recorded
					+	<u>-</u>	_
	185.0	L					12:00 Last rock core
-144.5						Bottom of Boring at 185.0 ft bgs on	completed, total depth is — \ 185.0' below ground
1 -					1	- 6/6/2007	\surface
-					1	-	
-					4	-	-
1 _					1	_	I _
1							1
1 7					1		-
-					1	-	-
-					-	-	-
					1	<u>-</u>	l -
1 7					1		1
				-	1		
			ı		1		I .



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-04	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

						END: 0/4/0007		-D . D	Macarah
WATER	LEVELS	. 5.∠ II DO	us on 5/3		START : 5/31/2007	END: 6/1/2007 SOIL DESCRIPTION	LOGGE	<u> </u>	. McComb COMMENTS
30⊋				STANDARD PENETRATION		SOIL DESCRIPTION		– 8	COMMEN 12
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR				DEPTH OF CASING, DRILLING RATE,
ACE ACE		RECOVE	ERY (ft)		MOISTURE	CONTENT. RELATIVE DE	NSITY OR	Į,	DRILLING FLUID LOSS, TESTS, AND
EV.			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, MI	NERALOGY	SYMBOLIC LOG	INSTRUMENTATION
40.0	2.2			(N)	T!! (OL)			ν ₁ / γ	
40.0	0.0			2-4-5	Topsoil (OL) 0.0-0.6' - dark d	gray to grayish black, (N2	to N3), trace		_
I _		0.6	SS-1	(9)	fine silica sand,	, abundant organic mater	ial	J' '	
	1.5			` ,				711	:
									1
-								1	1
-								1	1
-								1	1
-								1	-
-								4	-
-								4	-
5 35.0	5.0				Clayov Cand (C	201		-//	,
35.0				6-7-6	Clayey Sand (S 5.0-5.9' - moder	rate vellowish brown and	dark	-1//	-
_		0.9	SS-2	(13)	vellowish brown	n. (10YR 5/1 and 10YR 4/	moist.	-1//	_
_	6.5				medium dense,	, very fine to fine grained, medium plastic fines, trac	silica sand, se root		_
					fragments	modiam piaotio imoo, trat	/	′]	_
								1	
-									1
-								1	1
-								1	1
-								1	-
10 30.0	10.0				Silty Sand (SM))		111	<u> </u>
-			SS-3	7-9-12	10.0-11.05' - pa	ale yellowish brown, (10Y	R 6/2), wet,	-]
-		1.1	55-3	(21)	medium dense, fine silica sand	, 20% nonplastic to low p	lastic fines,	411	-
_	11.5				iiile silica saria			411	4
_								4	-
_								1	_
_								1	_
]
									1
1 7								1	1
15	15.0							1	1
25.0	10.0				Silty Sand (SM))			1 -1
-		1.4	SS-4	6-8-10	15.0-16.4' - San	ne as 10.0-11.05'		111	.]
-	10.5		55 .	(18)				1	1
-	16.5							441	4
-								-	-
-								4	-
-								4	-
-								4]
								1]
]]
20								\perp	



DEPTH BELOW SURFACE AND ELEVATION (#)

20.0

25_ 15.0

30

10.0

35

40

20.0

21.5

25.0

26.5

30.0

31.5

35.0

36.5

PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-04	SHEET	2	OF	9	

SOIL BORING LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION: Vertical WATER LEVELS: 5.2 ft bgs on 5/31/2007 START: 5/31/2007 LOGGER: R. McComb END: 6/1/2007 SOIL DESCRIPTION COMMENTS STANDARD SYMBOLIC LOG PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY #TYPE 6"-6"-6" (N) Silt Sand (SM) 20.0-21.2' - Same as 15.0-16.4' 11-12-12 SS-5 1.2 (24)Silty Sand (SM) 25.0-25.9' - Same as 20.0-21.2' 5-4-5 SS-6 0.9 (9) Silty Sand (SM) 30.0-31.5' - Same as 25.0-25.9' 2-3-2 1.5 SS-7 (5)Sandy Lean Clay Or Sandy Organic Soil (CL-OL) 35.0-35.7' appears organic rich 35.0-35.7' - dark gray to grayish black, (N3 to N2), moist, stiff, low to medium plasticity, slow dilatancy, 5-8-7 SS-8 1.4 (15) 30% very fine silica sand Silty Sand (SM) 35.7-36.4' - pale yellowish brown mottled with dark yellowish brown, (10YR 6/2 mottled with 10YR 4/2), wet, medium dense, very fine to fine silica sand, 30-35% low plastic fines



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	GSC-04	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

					TART - E/04/0007 FND - C/1/0007 LOCCED - D. McComb	_
WATER	LEVELS.	. J.Z II DQ	5 011 3/3		TART : 5/31/2007	٦
≩Q≆ I	CAMPIE	INTERVA	I /ft\	STANDARD PENETRATION	G CONVINIENTS	\dashv
N (SAMPLE			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	
H B		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
0.0	40.0			(14)	Sandy Organic Soil And Sandy Lean Clay (OL-CL)	ᅥ
-		0.8	SS-9	3-3-4	40.0-40.8' - Same as 35.0-35.7' except grayish black, -	Ⅎ
-		0.6	33-9	(7)	(N2), moist, medium stiff, low to medium plasticity, slow dilatancy, 30% very fine to fine silica sand	\exists
-	41.5					\exists
-					-	┨
-					-	4
_					4 1	4
-					4 1	4
_					4 1	4
_						4
45	45.0					
-5.0				3-2-4	Silt And Sandy Organic Soil (ML-OL) 45.0-45.6' - moderate yellowish brown, (10YR 5/4),	1
_		1.5	SS-10	(6)	moist, medium stiff, nonplastic to low plasticity, rapid	4
_	46.5				dilatancy, contact between lithologies abrupt and inclined: 70% ML, 30% OL, trace very fine silica sand.	4
					OL is gravish black (N2), moist, medium stiff, low to	1
					medium plastic, slow to rapid dilatancy, 20% very fine to fine silica sand	
					Clayey Sand (SC)	J
					45.6-46.5' - grayish black, (N2), wet, loose, very fine to fine grained silica sand, 25-30% low to medium	1
					plastic fines	1
						1
50	50.0				1	1
-10.0	00.0				Silt (ML)	٦
-		1.2	SS-11	30-40-45	50.0-51.2' - moderate yellowish brown, (10Y 5/4), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction,	1
_	51.5			(85)	trace fine grained sand, carbonate material	1
-	01.0					1
-					1	1
-					1	1
-					Driller's Remark: hard drilling at 53.5'	1
-					1	\exists
-					1 1	\exists
	FF ^				1 1	\exists
55 <u> </u>	55.0				Silty Sand With Limestone (SM)	\dashv
-		1.1	SS-12	8-5-12	55.0-56.1' - moderate yellowish brown, (10YR 5/4),	\exists
-		1.1	30-12	(17)	wet, medium dense, fine to coarse grained, mild HCl reaction, 20-25% low plastic fines, 25% fine	\exists
-	56.5				√ gravel-sized limestone fragments, carbonate	\exists
-					\materials _ _	+
-					-	+
-					-	+
-					-	+
-					-	4
-					4 1	4
60						4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-04	SHEET	4	OF	9	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

WATER	LEVELS	: 5.2 ft bg	as on 5/3	/2007	START : 5/31/2007 END : 6/1/2007 LOGGEF	R : F	R. McComb
>00				STANDARD	SOIL DESCRIPTION	نِ	COMMENTS
ANE (ft)	SAMPLE	INTERVA	` '	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		DEPTH OF CASING, DRILLING RATE,
H BE ACE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR	2 2	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLICLOG	INSTRUMENTATION
-20.0	60.0			25-50/5.5	Silty Sand With Limestone (SM)	П	Driller's Remark: Depth to water 5.2' below
_	61.0	0.9	SS-13	(75/11.5")	60.0-60.9' - Same as 50.0-51.2' except 35-40% fine gravel-sized limestone fragments		ground surface -
					<u> </u>	1	1
					_	1	1
					_		
_					-	1	_
-					-		-
_					-	-	-
65 <u> </u>	65.0 65.3	0.1	SS-14	50/3	☐ Limestone Fragments	L	╡
-		<u> </u>	00 11	(50/3")	65.0-65.1' - dark yellowish brown, (10YR 4/2), mild	┨	-
-					HCl reaction, some black organic staining on bedding planes	┨	Driller's Remark: soft drilling at 66.67',
-					_	1	1
_					-	1	Rig chatter at 67.0' harder drilling
_					-	1	1
					_	1	1
70	70.0					1	_
-30.0	70.8	0.7	SS-15	26-50/3 (76/9")	Sandy Silt And Limestone Fragments (ML) 70.0-70.7' - pale yellowish brown, (10YR 6/2), wet, -	Ш	-
-	70.0			(1 0, 0)	hard, low plasticity, rapid dilatancy, mild HCl reaction, 40% ML and 60% limestone, 25-30% fine to coarse	Т	-
_					\sand-sized; fine to coarse gravel-sized limestone -	ł	-
-					fragments, carbonate materials	ł	-
-					-	ł	-
-					-	1	1
-					-	1	1
-					-	1	1
75	75.0						_]
-35.0				50-37-27	Silty Sand With Limestone (SM) 75.0-75.75' - moderate yellowish brown, (10YR 5/4),	П	_
_		0.8	SS-16	(64)	moist, very dense, fine to coarse grained, mild HCl		_
_	76.5				reaction, 35-40% low plastic fines, 15% fine gravel-sized limestone fragments, carbonate	Ш	4
-					materials	-	
-					-	\mathbf{I}	-
-	00.0				-	\mathbf{I}	-
-	80.0 80.1	0.0	\SS-17/	50/1	No Recovery 80.0-80.1'	⊨	╡ ┤
-				(50/1")		1	1
80					-	1	
					Begin Rock Coring at 80.0 ft bgs	T	
					See the next sheet for the rock core log		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-04	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

ORIENTATION : Vertical CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing WATER LEVELS : 5.2 ft bgs on 5/31/2007 START: 5/31/2007 END: 6/1/2007 LOGGER: R. McComb DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -40.0 Limestone Fragments Switching over to NQ 80.0 80.15' - Bedding plane, horizontal, smooth, 3 80.0-81.35' - light olive gray, (5Y coring at 80.0' open 5/2), moderate HCI reaction, very 80.35' - Fracture, 30 deg, rough, stepped, weak to weak (R1 to R2), black organic film over 15-20%, tight fossiliferous (voids, casts, molds), 4 80.6' - Fracture, 50-60 deg, rough, voids up to 1/16", some cavities undulating, tight generally <6/16"x6/16" 10 R1-NQ 81.03' - Fracture, 0-80 deg, rough, stepped, 8 Limestone 5 ft 81.35-82.3' - pale greenish yellow, 46% 81.35' - Bedding plane, horizontal, smooth, (10Y 8/2), fine to very fine grained, stepped, open strong HCl reaction, weak to medium NR 81.67, 81.8' - Bedding plane, horizontal, strong (R2 to R3), <2% voids and smooth, open cavities, variegated color with contact R1:7 minutes 82.2' - Bedding plane, horizontal, smooth, at 81.9' open No Recovery 82.3-85.0' 85 85.0 -45 0 Limestone 1 85.0-90.0' - yellowish gray with pale greenish yellow mottling, (5Y 7/2 with 85.9' - Fracture or mechanical break, 10Y 8/2), fine grained, mild HCI Core fell out upon retrieval, horizontal, rough, undulating, tight reaction, very weak to weak (R1 to 1 had to make multiple trips 86.6-87.75' - Fracture zone, vertical, rough, R2), lithoclasts like fractures at to get rock out of outer undulating, tight 86.0-86.4' and 87.0-87.4' (light barrel R2-NO 2 colored limestone with few voids); 5 ft 44 fossiliferous (casts and molds), voids 100% and cavities up to 3/8"-3/4"x3/8" over No circulation below 80.0' 3 40-50% of surface 88.4-88.8' - Fracture zone, 0-<5 deg, rough, undulating, tight to open R2:5 minutes 89.15-89.3' - Fracture zone, 0-90 deg, 3 Undulating to stepped, tight to open 90 90.0 89.6' - Fracture, 0-90 deg, rough, Undulating 90.0-90.9' - mottled yellowish gray to light olive brown, (5Y 7/2 to 5Y 5/6), -50.0 to stepped, open 1 fine to very fine grained, mild to 90.7' - Fracture, <5 deg, rough, undulating, moderate HCI reaction, very weak tight 0 (R1), fossiliferous (molds/casts) with very fine grained yellowish gray possible intraclasts in the structure, R3-NQ 0 voids and cavities up to 3/16"-3/8" 5 ft 90 100% over 50-60% of surface 90.9-92.0' - very light gray mottled medium gray with dusky yellow to moderate olive brown, (N8 mottled 1 93.4' - Bedding plane, horizontal, rough, undulating, tight with N6 with 5Y 6/4 to 5Y 4/4), very R3:9 minutes fine grained, strong HCI reaction, 2 weak (R2), <2% cavities, voids up to 3/16" over 15-20% of rock surface 94.6' - Fracture, horizontal, rough, undulating, 95.0 -55.0 tight 92.0-93.4' - Same as 90.9-92.0' 94.9' - Fracture, horizontal, rough, undulating, 1 except pale yellowish brown to light tight olive brown, (10YR 6/2 to 5Y 5/6), 95.2' - Bedding plane, horizontal, smooth, undulating, open mottled, very fine grained, mild to 0 moderate HCl reaction, cavities and voids more common than above with R4-NQ some cavity infilling (strong HCI 74 1 5 ft 97.5' - Bedding plane, <5 deg, rough, reaction), cavities and voids up to 90% undulating, open 20-25% 93.4-95.0' - Same as 90.9-92.0' 2 98.5' - Bedding plane, horizontal, smooth, except voids up to 20-25% undulating, open, organic material R4.9 minutes 10 98.8' - Fracture, 20 deg, rough, undulating, tight NR 100 100.0



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-04	SHEET	6	OF	9	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

			<u> </u>	TENT : ONE 330 3/N 100073, Midd Totally, NQ 10013, NVV	00.0	3	ORIENTATION: Vertical
WATER	LEVELS: 5.2	2 ft bgs	s on 5	/31/2007 START : 5/31/2007 END : 6/	1/200	7 LOGGER : R. McComb	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		တ္ပ	DESCRIPTION	99	ROCK TYPE, COLOR,	
표원한	CA, A	(%	FRACTURES PER FOOT		SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
TH VAT	A TO SEE	(%) Q	LD G	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
	S S S S S S S S S S S S S S S S S S S	RQ	ZERA ZER	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΣΥM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-60.0	014	-		99.35' - Fracture zone, 0-90 deg, rough,	+ +	Limestone	
30.0			10	Undulating to stepped, open	上	- 95.0-98.4' - variegated light olive	1 4
				100.0-100.3' - Fracture zone, 0-90 deg,	Щ	brown to yellowish gray, (5Y 5/6 to]
]			_	smooth, open	Ш	5Y 7/2), fine grained, mild to	1
			4	100.7-100.9' - Fracture, 70 deg, rough, undulating, tight	F	moderate HCl reaction, very weak to weak (R1 to R2), fossiliferous	1
	R5-NQ		\vdash	101.2, 101.3' - Bedding plane (2), horizontal,	╁	(mold/casts) with some organic	1
-	5 ft	37	4	smooth, undulating, open, black organic	仜	- fossiliferous particles at 95.4-95.7';	1 -
1 4	88%			staining over 35%	┢	becoming interspaced with very fine	
			1	101.8-102.5' - Fracture zone, 0-90 deg, rough, Stepped to undulating, open to tight	上	grained limestone with depth, voids (up to 1/16") and cavities (up to	l J
]				102.65, 102.8, 102.98, 103.17' - Bedding	H	3/8"-3/4"x3/8") over 20-25% of	1
7			10	plane (4), 0-<5 deg, rough, undulating, open	Ш	surface	R5:6 minutes
105	405.0		NR	104.1-104.4' - Fracture zone, 0-90 deg, open	╁	- Clay (CL)	1 1
105 -65.0	105.0		· " `		世	98.4-98.45' - dark gray, (N3), strong HCl reaction, platy	-
-03.0			4	105.12' - Bedding plane, 0-<5 deg, smooth,	ш	Limestone	_
			Ĺ	Planar to stepped, open 105.3-105.95' - Fracture zone, 0-<5 deg,	\perp	_ 98.45-99.5' - very light gray, (N8),	l J
]				smooth, planar, open, fracture extending total	F	very fine grained, strong HCI	1
]]			4	length, extends from one side of contacts to	╁	reaction, weak (R2), some fossil voids and casts over 10% of surface	1
	R6-NQ			the other side 105.95' - Bedding plane, horizontal, smooth,	口	No Recovery 99.5-100.0'	1 +
-	5 ft	33	1	planar, tight to open	+	Limestone	1
	74%			106.3' - Fracture, 30-40 deg, rough, stepped,	广	100.0-104.4' - yellowish gray, (5Y	1 4
			10	tight	$oldsymbol{oldsymbol{eta}}$	8/1), fine to very fine grained, - moderate to strong HCl reaction,	l J
]				106.5, 106.7, 106.95' - Bedding plane (3), horizontal, smooth, undulating, tight to open		very weak to weak (R1 to R2), trace	1
1			NR	107.85' - Fracture, 0-90 deg, rough, stepped,	1—	fossils as molds and casts, voids	R6:6 minutes
110	110.0			tight	世	 3/8"x3/4" over 10-15% of surface, cavities <2% less than 3/8"x3/8", 	1 1
110 -70.0	110.0			108.2' - Bedding plane, <5 deg, rough, stepped, open	╨	chalk-like texture, becoming very	⊢
			0	экоррец, орен	仜	 soft, extremely weak (R0) at 104.0', 	1 4
					\vdash	thick, laminated from 101.2-101.3'	_
			0		片	with some black organic material No Recovery 104.4-105.0'	
]			ا ا			Limestone	1
]	R7-NQ				+	105.0-108.7' - yellowish gray, (5Y	1 1
	5 ft	78	0		F	- 8/1), very fine grained, strong HCl	1 -
	98%		<u> </u>		╀	reaction, very weak to weak (R1 to R2), fossiliferous (molds and casts),	-
			1		\perp	transition from trace to 20%	_
			الل	440 OL Daddian plans I i i i i i	\vdash	increasing with depth, void and	
]			10	113.9' - Bedding plane, horizontal, rough, undulating, open		cavities ranging from <5% to 15-20% with depth, some original fossil	R7:7 minutes
115	115.0		10	113.9-114.1' - Fracture, vertical, rough,	+	material (echinoids) at 108.4-108.7'	1
-75.0	110.0		NR.	undulating, open —	世	No Recovery 108.7-110.0'	⊢
-			2	114.1' - Bedding plane, 0-30 deg and 30 deg,	+	Limestone	1
				rough, undulating, open 114.5' - Bedding plane, horizontal, rough,	Ľ	110.0-113.3' - yellowish gray, (5Y 8/1 to 5Y 7/2), very fine grained, strong	1
			0	planar, open		L HCl reaction, very weak to weak (R1	
]				114.6-114.9' - Fracture zone, horizontal,	\vdash	to R2), color transition at 112.2',	1
1	R8-NQ			rough, planar, limestone fragments, open 115.1' - Fracture zone, smooth, planar and	F	voids (up to 1/16") over 5-10% of surface, fossiliferous casts/molds of	1 1
	5 ft	74	1	undulating, limestone fragments	╁	original material (echinoids)	1 1
-	86%			115.25, 117.55, 118.18, 118.53, 118.55,	匚	suspended in matrix	-
] 4				119.3' - Bedding plane (6), smooth,	╁	_ 113.3-114.9' - Same as 110.0-113.3'	1 4
			3	undulating to planar, open	片	except cavities and voids more common covering 30-40% of	l J
					\vdash	surface, echinoids rare to absent	R8:8 minutes
120	120.0		NR			No Recovery 114.9-115.0'	1
120	120.0				1		
			1		1		

APPENDIX 2BB-894 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-04	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

WATER	LEVELS : 5.2	2 ft bgs	s on 5/	31/2007 START : 5/31/2007 END : 6/	1/200	7 LOGGER : R. McComb	_
£□≨	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FACI ATI	E RU 3TH, OVE	%) ⊂	FOC	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SURI ELE\	COR LEN(REC(R Q D (%)	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-80.0				120-120.35' - Fracture, vertical, smooth,	Ė	Limestone	
_			4	planar 120.35' - Fracture, 40 deg, rough, undulating,	+	 115.0-119.3' - yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2), 	-
_				tight	F	very fine grained, strong HCl	-
_			2	120.55' - Fracture, 0-60 deg, smooth, planar, open	Ħ	 reaction, very weak to weak (R1 to R2), "chalk-like" texture, zones 	-
_	R9-NQ			120.75' - Bedding plane, horizontal,	L	where voids and cavities are nearly	-
_	5 ft 88%	24	7	undulating, open 121.35' - Bedding plane, horizontal, smooth,	₩	 absent grades to zones/thin beds with voids up to 1/16" covering 	-
_	0070			stepped, tight		20-30% (e.g. 116.1-116.2') cavities,	-
_			8	121.97, 122.25, 122.37, 122.7, 122.77, 122.87, 123.0, 123.15, 123.4, 123.5, 123.55,	扛	 - <2% (more abundant near beginning of run, up to 3/8"x3/8"); fossil void to 	-
_			4	123.63, 123.7, 123.82, 123.88, 123.9, 140.1,		rate, becoming slightly more	R9:5 minutes
125	125.0		NR	140.2, 140.3, 140.45' - Bedding plane (20), horizontal, rough, undulating to stepped,	Ь	common at base of runNo Recovery 119.3-120.0'	
-85.0	120.0			open	F	Limestone	
-			6	125.3, 125.47, 125.57, 125.67, 125.82, 125.96, 126.05, 126.12, 126.27, 126.32,	Ħ	L 120.0-122.7' - Same as 115.0-119.3' 122.7-124.4' - Same as 120.0-122.7'	
_				126.51, 126.65, 126.72, 126.90, 127.15,	t	except more voids/cavities up to	1
_			8	127.25, 127.35, 127.48, 127.7, 127.78, 127.92, 128.0, 128.07' - Bedding plane or	╁	75-80% of surface covered with voids 1/16", cavities up to	1
_	R10-NQ			mechanical break (23), horizontal, rough,	F	3/8"-3/4"x3/8"-3/4", fossiliferous	1
_	5 ft 90%	25	8	undulating to stepped, open		_ (molds/casts) No Recovery 124.4-125.0'	1
_				-		Limestone 125.0-129.3' - Same as 122.7-124.4'	-
_			1	-		except some thin laminations at base	1
_			2		F	of interval	R10:7 minutes
130	130.0		NR	129.3' - Bedding plane, 10-15 deg, smooth, planar, tight	Ħ	 129.3-129.5' - yellowish gray, (5Y 7/2), fine grained, strong HCl 	1
-90.0				129.48' - Bedding plane, <5 deg, smooth,	Ľ	reaction, medium strong (R3),	
_			3	stepped, open 130.25, 130.58, 130.9, 131.2, 131.28, 131.5,	L	 laminated bedding, thick, laminae incline 10-15 deg, 1 cavity 	1
_				131.55, 131.64, 131.78, 131.97, 132.13, 132.35, 132.42, 132.47, 132.68, 132.92,	₽	3/8"x3-7/8", voids less than 1/16" over 10-15% of surface, dense	1
_			7	132.97, 133.05' - Bedding plane (18),	Н	limestone	1
_	R11-NQ		7	horizontal, smooth, undulating to planar, open	ш	No Recovery 129.5-130.0' Limestone	1
	5 ft 70%	8	′	open -	Ш	130.0-133.5' - yellowish gray, (5Y	
			2		Ь	8/1), strong HCl reaction, weak to very weak (R2 to R1), voids up to]
					F	1/16" or less over 5-10% of surface,	
			NR		F	rare cavities (3/16"x3/16"), trace fossil molds/casts; thin lamination in	R11:7 minutes
	135.0				片	upper 0.1-0.2' of section	
-95.0 _			5	135.1, 135.2' - Bedding plane (2), horizontal,	H	── No Recovery 133.5-135.0' Limestone	
				smooth, undulating, open 135.3' - Bedding plane or fracture, 0-60 deg,	\vdash	135.0-139.5' - Same as 130.0-133.5' except cavities and voids more	
			7	rough, stepped to undulating, open	F	frequent becoming fine to medium	
_			,	135.5-136.65' - Fracture zone, 0-90 deg, smooth, undulating, gravel	口	grained at 166.67 with some fossils, cavities becoming common with	
_	R12-NQ 5 ft	0	5	136.72,136.82, 136.92, 137.05, 137.27,	Ь	_ depth up to 3/8"-3/4"x3/8", some	
_	90%			137.5' - Bedding plane (6), horizontal, rough, undulating, open	\vdash	mottling (coating of limestone matrix) becoming extremely weak rock (R0)	
_			>10	137.6' - Bedding plane or fracture, 0-50 deg, smooth, undulating, open	F	at 138.4' to 139.0', thick laminated ^	
				138.04, 138.25, 138.4' - Bedding plane (3),	L	from 138.0-139.5', few voids	
_			2	horizontal, rough, undulating, open 138.4-139.0' - Fracture zone, 0-90 deg,	片	- 11 - 100 - 110 - 1	R12:7 minutes
140	140.0		NR	smooth to rough, undulating to stepped, open	\vdash	No Recovery 139.5-140.0'	_
					1		

APPENDIX 2BB-895 Rev. 4



WATER LEVELS : 5.2 ft bgs on 5/31/2007

PROJECT NUMBER: BORING NUMBER: 338884.FL **GSC-04** SHEET 8 OF 9

ROCK CORE LOG

LOGGER: R. McComb

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

END: 6/1/2007

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing START: 5/31/2007

AIER	LEVELS : 5.2	ft bgs	s on 5/		1/2007	LOGGER : R. McComb	
⋧⋳⋦	<u> </u>			DISCONTINUITIES	ا پر ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
100.0			5	139.25' - Bedding plane, horizontal, rough, stepped to undulating, open 140.3, 140.42, 140.6, 140.75, 140.95' -	Ħ	Limestone 140.0-144.2' - variegated yellowish gray with gray laminae, (5Y 8/1 to 5Y	
-			6	Bedding plane or mechanical break (5), horizontal, smooth, planar to undulating 141.18, 141.28, 141.33, 141.39, 141.5, 141.8'	目	9/2), very fine to fine grained, strong HCl reaction, weak to very weak (R2 to R1), voids and cavities, 3-5%	
-	R13-NQ 5 ft 84%	10	6	- Bedding plane or mechanical break (6), horizontal, smooth, planar to undulating 142.0, 142.08, 142.18, 142.46, 142.75, 142.9'	Ħ	becoming 10-15% with depth, fossiliferous with trace echinoids in top portion, molds and casts increase	
-	01%		6	- Bedding plane or mechanical break (6), horizontal, smooth, planar to undulating 143.05, 143.13, 143.65, 143.88, 143.95,		with depth (5-10%), thick laminated 133.9-134.0'	
- 145	145.0		2 NR	143.98' - Bedding plane or mechanical break (6), horizontal, rough, planar to undulating 144.08, 144.18' - Bedding plane or	Ħ	No Recovery 144.2-145.0'	R13:6 minutes
105.0	1+0.0		>10	mechanical break (2), horizontal, rough, planar to undulating 145.0-147.25' - Fracture zone, 0-90 deg,		Limestone - 145.0-147.1' - light gray to medium gray, (N7 to N6), very fine grained,	
-			>10	limestone gravel, stepped, undulating, smooth to rough, open	Ħ	gray, (N7 to No), very fine grained, strong HCl reaction, medium strong - (R3), fossiliferous (molds and casts) over 3-5%, voids up to 1/16" over	
-	R14-NQ 5 ft 84%	10	10	147.25' - Bedding plane, horizontal, rough, undulating, open		3-5% of surface 147.1-149.2' - yellowish gray grading to medium gray with depth, (5Y 7/2 to	
-	31,70		7	147.3, 147.45, 147.52, 147.92, 148.0, 148.05, 148.24, 148.65' - Bedding plane (8), 0-<5 deg, undulating to planar, rough to smooth,	Ħ	N5), fine grained, mild to moderate HCl reaction, thinly laminated in upper 0.5', trace fossil molds/casts, 1	
- 150	150.0		1 NR	some organic black coating over 70-80% of surfaces 148.65-148.90' - Fracture zone	目	cavity 3/8"x2", voids up to 1/16" over 15-20% of surface, some dissolution features (cavities) at 148.2' as	R14:6 minutes
10.0	150.0		1	-	Ħ	discontinuous bedding plane voids No Recovery 149.2-150.0' Limestone	
_			0	150.9' - Bedding plane, horizontal, rough, undulating	Ħ	150.0-150.9' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, moderate to mild HCl	
	R15-NQ 5 ft 100%	90	1	152.55' - Bedding plane, horizontal, rough,	Ħ	reaction, medium strong (R3), becomes thinly laminated with depth, voids up to 1/16" over 30-40% of	
-	.5576		14	undulating, tight 153.25-153.4' - Fracture zone, 0-90 deg, rough		surface with trace thin laminae of very fine limestone with few voids 150.9-151.8' - variegated yellowish	
- - 55	155.0		1	153.5' - Bedding plane or fracture, horizontal, rough, planar, open 153.5-153.85' - Fracture, 80-90 deg, rough,		gray, dusky yellow to light olive brown, (5Y 7/2, 5Y 6/4 to 5Y 5/6), coarse grained, strong HCl reaction,	R15:6 minutes
15.0	. 30.0		0	undulating, tight —		weak (R2), abundant possible lithoclasts (possible conglomeratic)	
-			1	156.4, 157.15, 157.25, 157.33, 157.52, 157.65, 157.73, 157.96' - Bedding plane (8), 0-<5 deg, rough, undulating, open to tight	Ħ	151.8-153.3' - dusky yellow to yellowish gray, (5Y 6/4 to 5Y 7/2), medium grained, weak (R2)	
-	R16-NQ 5 ft 98%	76	7			153.3-155.0' - Same as 150.0-150.9' except thinly laminated, voids up to 1/16" over 5-10%, mild to strong HCI	
			3	158.0, 158.15, 158.22' - Bedding plane (3), horizontal, smooth, undulating, open 159.1' - Bedding plane, 0-<5 deg, rough,	H	reaction with depth, some early fracture development/dissolution at 154.7'	R16:8 minutes
				undulating, open			



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-04	SHEET	9	OF	9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing START: 5/31/2007

WATER	LEVELS : 5.2	2 ft bas	s on 5/	/31/2007 START : 5/31/2007 END : 6/	/200	7 LOGGER : R. McComb	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
SELOW SE AND ION (ft)	UN, I, AND ERY (%	(9)	JRES OT	DESCRIPTION	IC LO	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
						Limestone 155.0-157.25' - variegated yellowish gray to light gray brownish gray, (5Y 7/2 to N7), fine grained, mild to moderate HCl reaction, medium strong to weak (R3 to R2), competent, becoming thinly laminated with depth, fossil casts and molds over 5-10%, voids 10-15%, cavities 1/16"x3/16" showing alteration coloring, transitioned to lithology below, becoming light olive brown in color 157.25-158.2' - variegated yellowish gray to light olive brown to moderate brown, (5Y 7/2 to 5Y 5/2 to 5Y 4/4), fine to medium grained, mild to moderate HCl reaction, weak (R2), competent, very thinly laminated with possibly organic material, trace fossils, some voids and cavities over 10-15% of surface 158.2-159.1' - yellowish gray, (5Y 7/2), some medium gray (n7-n8) mottling, fine grained, mild HCl reaction, weak to medium strong (R2 to R3), competent, voids up to 1/16" over 2-3%, several cavities 3/16"x3/8" over <1%, fossiliferous (<1%), casts/molds (echinoids) 159.1-159.9' - yellowish gray to light olive brown, (5Y 7/1 to 5Y 8/1), fine to medium grained, moderate to strong HCl reaction, weak (R2), fossiliferous, voids/cavities over 10-15% of surface No Recovery 159.9-160.0' Bottom of Boring at 160.0 ft bgs on 6/1/2007	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-05	SHEET	1	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 5-7/8" tri-cone bit ORIENTATION : Vertical

						ary, cathead, NWJ ro				ORIENTATION : Vertical		
WATER	LEVELS	: 1.2 π D	gs on 5/5/		START : 5/4/2007	END : 5/6/20 SOIL DESCRIPTION		OGGER		Jarzyniecki COMMENTS		
<u></u>	SAMPI F	INTERVA	AL (ft)	STANDARD PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR,				F00	Sommer To		
BELC SE AI	O WIII EE	RECOVI	, ,	TEST RESULTS	SOIL NAM	IE, USCS GROUP SY	MBOL, COLOR,		I DIT	DEPTH OF CASING, DRILLING RATE,		
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)		E CONTENT, RELATI ICY, SOIL STRUCTU			SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
41.3	0.0	1.2	SS-1	1-2-3 (5)	Poorly Graded	black, (5Y 2/1), roo d Sand With Organ yellowish brown gra	ics (SP) ding to moderate	/- e	41	10:59 Begin drilling Driller's Remark: Hammer by M. Craus		
- - - - -					yellowish brow moist, loose, v	n at 0.95', (10YR 6/ ery fine to fine silica s, 15% organics der	2 to 10YR 5/4), a sand, trace			(manual with NWJ rod) -		
536.3	6.5	0.9	SS-2	3-2-2 (4)	(10YR 6/2 to 5	yellowish brown to l Y 6/1), moist to wet a sand, 25% nonpla	, very loose, very	y =				
- 10 31.3 - - -	10.0	0.9	SS-3	8-14-18 (32)	nonplastic, rap	rayish orange, (10Y oid dilatancy, modera e sand-sized, carbo	ate HCI reaction,	d, -		- - - - - -		
 1526.3 	15.0 15.3	0.2	SS-4	50/3 (50/3")	15.0-15.2' - gra	y Limestone Fragm ayish orange, (10YF ragments up to 1/2"	R 5/4), moderate	- - - - - - - - - -	+	- - - - - - - - - - - - -		
20								-		-		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-05	SHEET	2 OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 5-7/8" tri-cone bit ORIENTATION : Vertical

DRILLIN	G METH	<u>OD AND</u>	EQUIPM	ENT : Dietrich D-5	50 S/N 232, mud rotary, cathead, NWJ rods, 5-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 1.2 ft b	gs on 5/5/	/07 5	START : 5/4/2007 END : 5/6/2007 LOGGER : N. Jarzyniecki
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BE A		RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
F F F F		I KLOOVI	<u> </u>		MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SKP			#TYPE	6"-6"-6" (N)	CONSISTENCE, SOIL STRUCTURE, INITIALIZATION 2 INSTRUMENTATION 5
21.3	20.0			(* -)	Silt (ML)
-	20.0	1.2	00.5	28-42-36	20.0-21.2' - dusky yellow to grayish orange, (5Y 6/4 to
-		1.2	SS-5	(78)	10YR 7/4), wet, nonplastic, rapid dilatancy, moderate HCl reaction, 10-15% very fine to medium sand-sized,
-	21.5				Carbonate materials
l _					
<u> </u>]
_					1
-					
-					
					-
25 <u> </u>	25.0				Silty Sand (SM)
10.5 -				32-30-25	25.0-26.0' - grayish yellow, (5Y 8/4), wet, very dense,
_		1.0	SS-6	(55)	moderate HCl reaction, fine to coarse sand-sized,
l _	26.5				30% nonplastic fines, 10-15% fine gravel-sized / Ilimestone, carbonate materials
					intestone, carbonate materials
]
-					1
-					1
-					
-					
-					-
30 <u> </u>	30.0				Silty Sand (SM)
-				33-28-23	30.0-31.0' - Same as 25.0-26.0'
_		1.0	SS-7	(51)	<u></u>
_	31.5]
					1
-					1
-					1 1
-					
-					-
-					
35 6.3	35.0				Cilly Cond With Limestons (CM)
0.3				28-30-50/5	Silty Sand With Limestone (SM) 35.0-35.85' - Same as 30.0-31.0' except dark
l _		0.9	SS-8	(80/11")	yellowish orange to gravish orange, (10YR 6/6 to
	36.4				\(10YR 7/4), mild HCl reaction, 30% fine to coarse \(\) \(
-					Yeaver-sized intestorie nagination
-					11
-					1 1
-					Driller's Remark: 14:55 remove NWJ rod
-					
-					Driller's Remark: Casing set to 40.0'
-					- I briller's Nerriank. Sasing Set to 40.0
40					
I		ı	ı		1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-05	SHEET	3	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 5-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 1.2 ft bo	gs on 5/5/	07 8	START : 5/4/2007 END : 5/6/2007 LOGGE	R : N	Jarzyniecki
				STANDARD	SOIL DESCRIPTION	ڻ ا	COMMENTS
AND N (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCO CROUD CVAROU COLOR	C LO	DEDTIL OF CASING POULTING DATE
DEPTH BELOW SURFACE AND ELEVATION (#)		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPT SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION
1.3	40.0	0.8	SS-9	30-50/4	Sandy Silt With Limestone (ML) 40.0-40.85' - grayish olive mottled with olive gray,	Ш	Driller's Remark: 15:55 insert AWJ rod to
	40.8	0.0		(96")	— (10Y 4/3 with 5Y 3/2), wet, hard, low plasticity, rapid — ¬	Ш	clear out hole (with bit)
_					dilatancy, mild HCl reaction, 35-40% fine to coarse sand-sized, 20-25% of sample is fine to coarse	4	
-					\limestone fragments, carbonate materials Begin Rock Coring at 41.0 ft bgs	-	-
-					See the next sheet for the rock core log	┨	-
-						1	1
-						1	1
]
45 -3.7					_	-	-
-5.7						┨	-
-						┨	-
-						1	1
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-						┨	-
50 -						1	1
-8.7					_		1
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60						1	1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-05	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

CORING	NIE I HOD AI	ND E	אורוע	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS: 1.2	ft bg	s on 5	/5/07 START : 5/4/2007 END : 5/	6/2007	7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
N H N N N N N N N N N N N N N N N N N N	N, A, Y		FRACTURES PER FOOT	BECOM HOW	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H H	# F F F F	%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	ORI ECCENT	Q D (%)	¥ H K	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΣW	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		ď	ᇤ립	THICKNESS, SORFACE STAINING, AND HIGHTNESS	Ś	CHARACTERISTICS	
	41.0			41.05' - Bedding plane, 10-25 deg, rough,	Ш	Limestone	5/5/07 08:07 begin coring
_			2	undulating, open up to 1/2"	т	- 41.0-45.6' - moderate yellowish	08:00 water level = 1.2'
-				41.7' - Bedding plane or mechanical break, 25 deg, rough, undulating		brown, (10YR 5/4), very fine to fine grained, moderate HCl reaction,	below ground surface
-			>5	25 deg, rough, undulating	ш	- voids (up to 1/8") over <5-30% of	1
			•			surface with interclasts at 41.0-41.9'	
I -	R1-NQ			42.95-43.1' - Fracture zone, intersecting		and 44.5-45.6', from 41.0-44.5' trace	1
-	5 ft	87	1	fractures, fragments to 1" 43.5' - Mechanical break	ш	- fossils up to 1/8" and 44.5-45.6'	1 1
-	92%			43.6' - Bedding plane or mechanical break,	$+\pi$	moderately fossiliferous, casts and molds up to 1" from 43.3-45.6' infill of	1 -
_			2	15-20 deg, rough, undulating		 highly voided and moderately 	
45			-	44.5' - Bedding plane, <10 deg, rough,		fossiliferous material of the same	
45 -3.7			1	undulating, open up to 1/4"		color, with infill increasing to more	R1:6 minutes
-				44.8' - Bedding plane or mechanical break, 15-20 deg, rough, undulating	+	- than 70% of surface at 44.5',	1
-	46.0		NR	45.25' - Bedding plane or mechanical break,		41.0-43.1' very weak (R1), 43.1-44.4' medium strong (R3), 44.4-45.6' weak	-
1 -			>10	<5 deg, rough, undulating	Ш	(R2)]
			'	46.0-46.9' - Fracture zone, multiple	H	No Recovery 45.6-46.0'	
				intersecting fractures, fragments up to 4"		Limestone	1 1
-			2	47.4, 47.6' - Bedding plane or mechanical	ш	46.0-49.05' - moderate yellowish brown, (10YR 5/4), fine grained,	1 -
-	DO NO			break (2), <5 deg, rough, undulating	Н	moderate HCl reaction, very weak to	1 -
l _	R2-NQ 5 ft	38	>10	48.05' - Bedding plane or mechanical break, <5 deg, rough, undulating, open up to 1/8"		weak (R1 to R2), poorly competent,	
	98%	00	''	48.5-48.7' - Fracture zone, multiple		friable, organic laminar features	
_				intersecting fractures, fragments up to 4"		(discontinuous) from 46.0-46.5',	1
			0	48.95' - Bedding plane or mechanical break,		 some (<5%) dissolution features up to 1/4" poorly fossiliferous, extremely 	-
50 -8.7				<5 deg, rough, undulating, broken on edges	₽	weak (R0) voids up to 1/16" over	
-0.7			0	of fractures open up to 1/2" 49.7' - Mechanical break		_ <5% of surface	R2:3 minutes
	51.0			49.7 - Wechanical Dreak	Н	49.05-50.9' - moderate HCI reaction,	
-			NR.	51.15' - Bedding plane, 10 deg, rough,	\top	very weak to weak (R1 to R2),	1
-			2	undulating, open up to 1/4"	ш	moderate to highly fossiliferous, casts up to 1"x1/2", voids to 1/16"	1
-				51.75' - Bedding plane, with missing pieces	+	over 15% of surface	1 -
l _			0	(could be associated with dissolutions), open		No Recovery 50.9-51.0'	
			"	1"	ш	51.0-54.5' - Same as 49.0-50.9'	
-	R3-NQ				т	 except fossils are moderate and up to 1/4", <1/16" voids over 20-30% of 	1
-	5 ft	66	0	53.5' - Mechanical break	\blacksquare	surface, infill of medium light gray	1
-	91%			monamon si out	╀┤	 (N6) and medium gray (N5) up to 	-
I _			>10		Ш	1/8"x1/4", possibly breccia]
55			'	54.5-54.6' - Fracture zone, multiple	H	54.5-55.55' - Same as 46.0-49.05'	
-13.7			1	intersecting fractures, 1" fragments — 54.95' - Bedding plane, 25 deg, rough,	Ш	 except no organics, infill clasts at 51.0-54.5', dissolution feature at 	R3:3 minutes
-			NR	undulating, open up to 1", associated	Ш	54.95' (1-1/4"x3/4")	-
-	56.0		INK	dissolution and in softer material	+	- No Recovery 55.55-56.0'	-
_			3	55.4' - Bedding plane, <5 deg, rough,		Limestone	_
				undulating 56.3' - Fracture, 50 deg, rough, undulating,	H	56.0-58.5' - moderate yellowish	
-				with silt-sized fragments	Ш	 brown, (10YR 5/4), fine grained, very mild HCl reaction, extremely weak 	1
-			>5	56.5' - Bedding plane or mechanical break,	口	(R0), voids (1/16") over 5-10% of	-
-	DANO		<u> </u>	<5 deg, rough, undulating, open	₽₩	 surface with increasing voids and 	-
-	R4-NQ 5 ft	30	>5	56.75' - Bedding plane, 10 deg, rough,	Ш	hardness with depth to 20% of]
	78%			undulating, open up to 1/8" 57.1-57.3' - Fracture zone, intersecting	H	surface, trace cavities <1/4" and weak rock (R2) below 57.3'	
1 -				fractures, up to 2" fragments	H	- WOUN 100N (112) DOIOW 31.3	1
-			4	58.7-59.0' - Fracture zone, intersecting	Ш	-	1
60 -18.7				fractures, up to 2" fragments, associated	++		B4:4 minutes
-10.7			NR	laminar organics		_	R4:4 minutes
	61.0				Ш		
					1	-	
	•		-	-	_		-



PROJECT NUMBER: BORING NUMBER: 338884.FL GSC-05 SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

\\\\\	LEVELO : 4.0			ENT : Dietrich D-50 5/N 252, mud totaly, NQ totals, TW		-	
WATER	LEVELS : 1.2	πbgs	s on 5/	<u>'5/07 START : 5/4/2007 END : 5/</u> DISCONTINUITIES	6/2007	7 LOGGER : N. Jarzyniecki LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)				SYMBOLIC LOG		COMMENTS
N S	ŽAŽ VŽŠ		FRACTURES PER FOOT	DESCRIPTION	J C	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	S F.岸	(%) Q	58	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E 문문	# 9 8 8 8	οD	AC.	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SS	잉필盟	8	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				59.15' - Bedding plane, 10 deg, rough,		Limestone	1
-			>10	undulating, open up to 1/4"	+	- 58.5-59.9' - moderate yellowish	-
l -				59.25' - Bedding plane, 10 deg, rough,	\vdash	brown, (10YR 5/4), fine grained,	-
			3	undulating, open up to 1/8", very thin infill of silt		moderate HCl reaction, very weak to	
I -			3	59.35' - Bedding plane, 10 deg, rough,	\mathbb{H}	 weak (R1 to R2), voids (1/16"-1/8") over 30-40% of surface, few cavities 	1
-	R5-NQ			undulating, open up to 1/8"	+	<1/2" (one 1"x1/2"), black bedding	-
-	5 ft	9	>10	59.65' - Bedding plane, 10 deg, rough,	$-\Box$	 plane laminations between 58.7-59.9' 	-
I _	98%			undulating, open up to 1/8"	+	No Recovery 59.9-61.0'	_
				61.3-61.5 - Fracture zone, intersecting fractures, fragments to <1/16" to 2"		Limestone – 61.0-65.9' - moderate olive brown to	
65			>5	61.9' - Bedding plane, <5 deg, rough,	ш	moderate yellowish brown, (5Y 4/4 to	1
-23.7				undulating, open up to 1/4"	+	10YR 5/4), very fine to fine grained,	R5:4 minutes
-			2	62.3' - Fracture, 60 deg, rough, undulating		 mild HCl reaction, very weak to weak 	-
-	66.0		NR	62.5' - Bedding plane, <5 deg, rough,	₽₩	(R1 to R2), occasional sections of]
			$\overline{}$	undulating, open up to 1/4" 62.6' - Fracture, 60 deg, rough, undulating,		extremely weak (R0), moderately competent and friable (variably),	
			0	opposite direction and possibly associated		voids (1/16") over 5-10% of surface,] 1
-				63.1' - Fracture, 60 deg, rough, undulating	╁┼	sections with intermittent voids	-
-			1	63.15' - Bedding plane, <5 deg, rough,	ш	_ (1/16") over 25-30% of surface	-
l _				undulating, open up to 1/4" 63.3' - Bedding plane, <5 deg, rough,	\vdash	(secondary infill of 1"-2" cavities),	_
	R6-NQ		2	undulating, open up to 1/4"		very fine (<1/16" thick) black laminations decrease with depth	
_	5 ft 100%	57	2	63.9-63.95' - Fracture zone, intersecting		No Recovery 65.9-66.0'	1
-	10070			fractures, fragments to 1/2"	+	Limestone	-
-			4	64.5' - Mechanical break		_ 66.0-67.2' - moderate yellowish	-
70				64.7-64.9' - Fractures, 40-85 deg, rough, undulating, intersecting high angle	Щ	brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2),	
-28.7			_	65.1' - Fracture, 80-85 deg, rough,	Н	voids (1/16"-1/8") over 20-30% of	R6:6 minutes
I -	71.0		3	undulating, continuation of a fracture in		surface, trace shallow cavities up to	1
-	7 1.0			64.7-64.9'	┰	1/4", trace organic inclusion	1
-			2	65.7' - Bedding plane, rough to smooth, undulating, bottom has fragments to 30 deg	$+\Box\Box$	_ (spheroid and laminar) 67.2-67.6' - moderate olive brown,	-
-				angle, top is <5 deg angle	\vdash	- (10YR 5/4), mild to moderate HCl	1
			1	67.25' - Bedding plane, <10 deg, rough to		reaction, weak to very weak (R2 to	
			'	smooth, undulating, along organic bedding		R1), voids (1/16") over 5% of	1
-	R7-NQ			plane	т	- surface, 10% having 2" infill with	1
-	5 ft	50	0	68.3' - Bedding plane, <10 deg, smooth, undulating to planar		voids (1/16") over 25-30% of surface, fine darker laminations increasing	-
-	96%			68.5, 68.6' - Mechanical break (2)	₽₽	- with depth	1
			3	68.9' - Bedding plane, <10 deg, smooth,	₽П	67.6-68.3' - Same as 66.0-67.2'	
75			٥	undulating, along organic bedding plane		68.3-71.0' - Same as 67.2-67.6']
-33.7				69.0' - Bedding plane, <10 deg, smooth, — undulating, along organic bedding plane	╁┼	— 71.0-75.8' - moderate yellowish brown, (10YR 5/4), fine grained, mild	R7:2 minutes
-			1	69.15, 69.2' - Bedding plane (2), <10 deg,	口	to moderate HCl reaction, 71.5-72.0'	-
1 -	76.0		NR	smooth, undulating, along organic bedding	+	 and 75.0-75.8' extremely weak (R0),] -
I _			>5	plane		weak to medium strong (R2-R3),]
			-0	69.17' - Bedding plane, >85 deg, smooth,		moderately fossiliferous, casts up to]
-				undulating 70.0' - Bedding plane, <10 deg, smooth,	\Box	1/4", organic inclusions over <5% up to 1/2"x1/8", <1/16" voids over	1
-			3	undulating, along organic bedding plane		30-40% of surface, competent	-
I -				70.6, 70.62' - Bedding plane, <10 deg,	+	No Recovery 75.8-76.0'	-
I _	R8-NQ 5 ft	23	3	smooth, undulating, along organic bedding	Ш	_]
	70%	23	٥	plane 71.05' - Bedding plane, <5 deg, rough,]
-	,		>10	undulating, associated with organic fractures,	111	-	1
-			- 10	open to 1/4"	田	_	-
80				71.6' - Bedding plane or mechanical break,	\Box		I ₂₀ ,
-38.7			NR	30 deg, rough, undulating	H	_	R8:4 minutes
	81.0					-]
	01.0				1 1		1
Щ					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-05	SHEET	6	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

				IENT . Diethon D-30 3/N 232, mud rotary, NQ tools, HVV			ORIENTATION: Vertical
WATER	LEVELS: 1.2	2 ft bg	s on 5	/5/07 START : 5/4/2007 END : 5/	6/200	Z LOGGER : N. Jarzyniecki	
	_			DISCONTINUITIES	(n	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
ON PER	Z Z Z	<u></u>	쀭片	DECORN HOW	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH	N.E.S	(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	፬	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF 문	NG NG S	οD	AC R	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	SHR	ď	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROTO, TEOT REGGETO, ETG.
				72.5' - Bedding plane, top is <5 deg, bottom		Limestone	
_			3	is 30 deg, piece missing, open to 1"	╁	 76.0-76.3' - very pale orange with 	-
I _				associated with softer zone at bottom	Н	medium light gray mottling, (10YR	
				72.85, 73.4, 73.5' - Mechanical break (3)	Ш	8/2 with N5), very fine grained,	
I -			>5	74.01' - Bedding plane, top is <5 deg, bottom		- moderate HCl reaction, medium	-
_				is 30 deg, piece missing, open up to 1/2"	ш	strong to strong (R3 to R4), voids	1
	R9-NQ		4	associated with softer zone at bottom 74.15' - Fracture, 50 deg, rough, undulating,	\vdash	(1/16") over 5-10% of surface, some cavities up to 2"x1/2" some are	
	5 ft 90%	28	1	open up to 1/4"	\top	infilled, transitions gradually above	
-	3070			74.2' - Bedding plane, top is <5 deg, bottom		and below to 76.3-77.0'	
_			1	is 30 deg, piece missing, open to 1"	\bot	- Limestone	
85			·	associated with softer zone at bottom	Н	76.3-77.0' - grayish orange, (10YR	
-43.7			1	75.0' - Bedding plane or mechanical break,	T	7/4), fine grained, mild to moderate	R9:8 minutes
-				<5 deg, rough, undulating	\blacksquare	 HCl reaction, weak to medium strong 	-
I _	86.0		NR	75.4, 75.5' - Mechanical break (2)	Щ	(R2 to R3), voids (<1/16") over	l J
			.	76.6' - Bedding plane, <5 deg, rough,	H	20-30% of surface, trace cavities	Water level = 3.0' below
-			1	undulating, open up to 1/4" 76.6-76.9' - Fracture zone, intersecting		- <1/4", trace fine (1/16") black inclusions	ground surface
-			<u> </u>	fractures, fragments to 2"	ДП	inclusions 77.0-77.7' - Same as 76.0-76.3'	-
			1	77.2' - Bedding plane, <5 deg, rough,	\vdash	_ 77.7-78.8' - Same as 76.0-76.3	
			'	undulating, open up to 1", associated with	\mathbb{H}	78.8-79.5' - Same as 77.0-77.7'	
-	R10-NQ	l		dissolution	$\pm \Box$	No Recovery 79.5-81.0'	
_	5 ft	53		77.5' - Bedding plane, <5 deg, rough,	\perp	Limestone	
	40%			undulating, open up to 1", associated with	Ш	81.0-85.1' - moderate brown, (10YR	
I -				dissolution	T	5/4), very fine grained, strong HCl	1
-			NR	77.65' - Bedding plane, 30 deg, rough,		_ reaction, medium strong to strong	-
90				undulating, open up to 1", associated with	Щ	(R3 to R4), voids up to 1/16" over	
-48.7				dissolution, lithologic change up to 1/2" open 77.95' - Bedding plane, <5 deg, rough,	\vdash	20-40% of surface, moderately fossiliferous, casts to 1/2", organic	R10:5 minutes
_				undulating, associated with soft material	11	bedding features at 82.0', very pale	1
_	91.0			78.1' - Bedding plane, <5 deg, rough,	Щ	orange (10YR 8/2) infill up to 4"x2"	
			>10	undulating, open up to 1", associated with	Н	from 10-40% of surface (infilling	
			1/10	soft material	Н	poorly fossiliferous, trace voids to	
-				78.5' - Bedding plane, <5 deg, rough,		- 1/16")	1
-			>10	undulating, associated with soft material	\perp	_ 85.1-85.25' - dark yellowish brown,	1 4
				78.7' - Bedding plane, <5 deg, rough,	$\vdash \vdash$	(10YR 4/2), strong HCl reaction, clay	
1 7	R11-NQ			undulating, open up to 1/4", associated with soft material	1 H	- lens 85.25.85.5' veny pale orange to light	1 1
-	5 ft	18	>5	79.3' - Bedding plane, <5 deg, rough,		85.25-85.5' - very pale orange to light gray, (10YR 5/4 to N7), fine grained,	1
_	82%			undulating	щ	- strong HCl reaction, medium strong]
				79.4-79.5' - Fracture zone, intersecting	Н	to strong (R3 to R4), trace voids to	į J
			0	fractures, fragments up to 1"		1/16"	1 1
95 <u> </u>			\>10 <i>/</i>	81.3' - Bedding plane, <5 deg, rough, —	-Ш	— No Recovery 85.5-86.0'	R11:5 minutes
-33.7			_	undulating, <1/8" open	\mathbf{H}	Limestone	IX11.5 Hilliutes
	96.0		NR	81.5' - Bedding plane, rough, undulating, top	Н	86.0-88.0' - Same as 85.25-85.5']
1 -				<5 deg, bottom 30 deg 81.95' - Bedding plane, <5 deg, rough,	ш	 except 86.0-86.9' is highly fossiliferous, casts to 1/2", light olive 	1 1
-			1	undulating, open up to 1/2"	+	gray (5Y 5/2) silt infill, from	1 -
				82.6' - Fracture or fracture zone, 85 deg,	Н	86.9-86.95' moderate yellowish]
				rough, undulating, pieces missing		brown color (10YR 5/4), dissolution	1 1
-			0	83.3' - Bedding plane, <5 deg, rough,	Ш	cavities to 2" and some infill of	1 1
-			<u> </u>	undulating, open up to 1/2"	$+\!\!\!\!+\!\!\!\!\!+$	 moderate yellowish brown (10YR 	-
	R12-NQ			83.5, 83.75, 84.05' - Mechanical break (3)	H	5/4)	
1 7	5 ft 98%	95	0	84.75' - Bedding plane, <5 deg, rough,	Ш	No Recovery 88.0-91.0'	1 1
-	30 /0		H	undulating, mostly not open, missing	ш	_	1 -
-			>5	fragments on small part of fracture (1/2") 85.2' - Bedding plane, <5 deg, rough,	+	_]
100				undulating, open up to 1"	+		
-58.7				86.92' - Bedding plane, 20 deg, rough,	Ш		R12:5 minutes
-			0	undulating, silt infill described in lithology, no	╂┼┤	_	1
	101.0		\vdash	stain, open up to 6"	Н		
					_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-05	SHEET	7	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.2	ft bgs	on 5/	5/07 START : 5/4/2007 END : 5/6	6/200	7 LOGGER : N. Jarzyniecki	
≥∩≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELEV	COR	RQ	(NR)	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 87.75' - Bedding plane, 20 deg, rough,	SYM	AND ROCK MASS CHARACTERISTICS Limestone	DROPS, TEST RESULTS, ETC.
-			0	undulating, open up to 1-1/2", no infill, associated with dissolution features	Ė	91.0-92.9' - very fine grained, trace voids (1/16") over 30% of surface increasing with depth, dusky	-
-	D42 NO		>10	91.4-91.5' - Fracture zone, fragments to 1/2"x3/4" intersecting fractures - 91.9' - Bedding plane, zone indurated with softer organic silt material	Ħ	yellowish brown (10YR 2/2), friable, 5-30% fossils increasing with depth, 92.3-92.8' clay infill very pale orange	-
-	R13-NQ 5 ft 86%	18	>10	92.11 - Bedding plane, <5 deg, rough, undulating, open up to 1/8" 92.3, 92.5, 92.6' - Bedding plane (3), <5-20		92.9-95.1' - yellowish gray, (5Y 7/2), very weak to medium strong (R1 to	-
105 -63.7			>10	deg, rough, undulating, infill (associated with infill of dissolution) described in lithology open up to 1/4"	Ħ	R3), highly fossiliferous casts to 1/2", voids over 20% of surface up to 1/16", dissolution features to 3"x1"	- D43:2 minutes
-03.7	106.0		NR	92.8-93.05' - Fracture zone, fragments to 1/2"x3/4" intersecting fractures 93.5' - Mechanical break	Ħ	No Recovery 95.1-96.0' Limestone 96.0-100.9' - yellowish gray, (5Y 7/2),	R13:2 minutes –
-			0	93.95' - Bedding plane, <5 deg, rough, undulating, open up to 1/4" 95.0-95.01' - Fracture zone	Ħ	very fine grained, extremely weak to medium strong (R0 to R3), yellowish gray (5Y 8/1) to moderate yellowish	-
-	R14-NQ		0	96.1' - Bedding plane, <10 deg, rough, undulating, open <1/4" 97.8' - 85-90 deg, rough, undulating, open up		brown (10YR 5/4) infill, voids up to 1/16" over 25% of surface, highly fossiliferous, casts and molds to 1/4",	-
-	5 ft 99%	95	0	to 1/8" 97.95' - Bedding plane, <5 deg, rough, undulating, up to 1/8" open	Ħ	shallow dissolution features up to 2"x1-1/2" No Recovery 100.9-101.0'	-
110 -68.7			0	98.1-98.2 - Fracture zone, fragments to 1", intersecting fractures 99.45 - Bedding plane, <10 deg, rough,	Ē	Limestone 101.0-101.9' - yellowish gray mottled with pale yellowish brown, (5Y 7/2	- R14:3 minutes
-	111.0		0 \ NR /	undulating, open 1/8" 102.0-102.5' - Fracture zone, associated with soft material and organic features,	Ħ	with 10YR 6/2), very weak to extremely weak (R1 to R0), voids up to 1/16" over 15% of surface,	-
-			0	intersecting fractures up to 2" 102.5-103.25' - Bedding plane or fracture zone (10+), rough, undulating, up to 1/4"	Ħ	fossiliferous casts and molds to 1/4", becomes softer with depth 101.9-105.3' - very fine to fine	-
-	R15-NQ		2	open 103.4-104.1' - Fracture zone, associated with soft material and organic features,	Ħ	grained, competent, 5% trace organics, fossil molds up to 1/2", trace fossils, trace voids to 1/16",	-
-	5 ft 100%	78	1	intersecting fractures up to 2", fragments up to 2", highly fossiliferous with fossil molds (trace) same size as fragments	Ħ	very weak (R1) at 105.1' No Recovery 105.3-106.0' Limestone	-
115 -73.7			2	104.45' - Bedding plane, <5 deg, rough, undulating, up to 1/4" open 104.7-105.1' - Fracture zone, some bedding, —		106.0-110.95' - Same as 101.0-101.9' except very weak to — weak (R1 to R2), highly fossiliferous,	- R15:5 minutes
-	116.0		2	some intersecting, fragments to 2" 105.3' - Bedding plane, <5 deg, rough, undulating, up to 1/8" open 106.65, 108.1, 108.3, 108.5' - Mechanical	Ħ	fossil casts and molds, trace to 15% <1/16" sized infill of very pale orange - (10YR 8/2) decreasing with depth,	-
-			0	break (4) 112.4, 112.7, 113.0, 114.2, 114.4, 115.8, 115.85' - Bedding plane (7), <5 deg. rough,	Ħ	trace organic features No Recovery 110.95-111.0' Limestone 111.0-116.0' - Same as 96.0-100.9'	-
-	R16-NQ		2	undulating, <1/8" open - 113.5' - Mechanical break - 117.4' - Bedding plane, <5 deg, rough,	Ė	except (5Y 8/1), yellowish gray (5Y 7/2) is mottled with yellowish gray infill, (5Y8/1), very weak (R1), infill	-
-	5 ft 100%	62	2	undulating 117.75' - Mechanical break 117.75' - Bedding plane, <5 deg, rough,	Ħ	poorly fossiliferous, trace (<5%) voids up to 1/16", infill is over 70-100% of surface at 111.0'	-
- 120 -78.7			0	undulating 118.5' - Bedding plane, <5 deg, rough, undulating undulating undulating			- R16:7 minutes
-	121.0		0	118.8' - Bedding plane, <5 deg, rough, undulating, 1/4" open		-	_

APPENDIX 2BB-904 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-05

SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.2	ft bg	s on 5/	/5/07 START : 5/4/2007 END : 5/	6/200	7 LOGGER : N. Jarzyniecki	
≥∩ ∷	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
HAR	RUI YER VER	(%) _Q	IN IN	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 5	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
PTF/	NG]	OΘ	AC R	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
吕Տ급	SHR	A O	꿈	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λS	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
				119.4' - Mechanical break	Ш	116.0-121.0' - Same as 111.0-116.0'	
_			0		Н	 except from 116.0-118.1' highly fossiliferous and fine grained fossil 	1
_					Н	casts and molds to 1/2", medium	1
-			1	122.5' - Fracture, 45 deg, rough, undulating	ш	 light gray (N6) infill over <10%, voids 	-
-	R17-NQ				ш	up to 1/16" over 20% of surface and 118.1-121.0' fine grained to very fine	-
-	5 ft	20	1	123.15' - Bedding plane, <5 deg, rough, undulating, up to 1/4" open	ш	 grained, size decreasing with depth 	-
_	100%			undulating, up to 1/4 open	Н	Limestone 121.0-126.0' - Same as 111.0-116.0'	-
_			>10		П	except 124.4-124.75' is mottled with	_
125			0	124.8-124.95' - Fracture zone, intersecting —	Н	pale orange (10YR 8/2)	
-83.7				fractures, 1-1/2" fragments	Ш		R17:2 minutes
_	126.0		3		Н	_	1
_	120.0			125.8-126.0' - Fracture zone, intersecting fractures, 1-1/2" fragments	Н	126.0-131.0' - yellowish gray, (5Y	1
-			1	nactures, 1-1/2 nagments	ш	7/2), very fine to fine grained, very	-
-				126.75' - 80 deg, rough, undulating, open	ш	weak to weak (R1 to R2), grain size increasing with depth, <10-25% voids	-
_			0	1/8" to tight (missing very small fragments in part of fracture)	ш	to 1/16", voids increasing with depth,	-
_				,	Н	moderately fossiliferous, fossils to	_
	R18-NQ 5 ft	85	1	128.0' - Bedding plane, <5 deg, rough, undulating, up to 1/4" open	岸	1/4", fossil size increasing with depth, trace dissolution zones to 1/2",	_
	100%	00	'	undulating, up to 174 open	Н	129.1-129.8' very fine to fine grained	
			10	129.1-129.8' - Bedding plane or mechanical	ш		1
130			>10	break, <5 deg, rough to smooth, planar to	Н	=	1
-88.7				undulating, tight, some have <1/8" open	П		R18:5 minutes
-			1	130.3' - Bedding plane, <5-30 deg, rough to	Н	-	-
-	131.0			smooth, planar to undulating, (break changes in middle of fracture, smoothness and planar	ш	- 131.0-136.0' - Same as 126.0-131.0'	-
_			0	change with angle), <1/8" open	ш	- except from 132.2-132.7' fine and	-
_				131.8' - Mechanical break	\vdash	very fine grained, trace organic	_
			1			content, moderate to highly fossiliferous (casts and molds).	_
			'	132.7' - Bedding plane, <10 deg, smooth to	Н	133.35' 1/4" bedding plane of very	
	R19-NQ			rough, undulating, up to 1/8" open	Ш	light gray (N8)	Ī
_	5 ft 100%	85	0	133.2, 133.5, 133.6' - Mechanical break (3)	Н	=	1
_	10070			134.05' - Bedding plane, 15-20 deg, rough,	Ħ	-	1
			1	undulating, could be mechanical break due to	₽	-	-
135_ -93.7				drilling	Ш		R19:8 minutes
-			1		Ш	_	-
_	136.0			135.8' - Bedding plane, <5 deg, smooth,	뮈	- 400 0 407 71 0 404 0 400 0	-
			0	undulating, rock fragments	Ш	136.0-137.7' - Same as 131.0-136.0' - except grades from moderate	
				136.2, 136.3, 137.4 - Mechanical break (3)	Н	_ yellowish brown to yellowish gray	
]					Ш	(10YR 5/4 to 5Y 7/2), fine to very fine]
			2	137.7' - Bedding plane, <5 deg, rough,	1 + 1	 grained, extremely weak to weak (R0 to R1), very fine at 137.4', 1.2" thick] 1
-	R20-NQ			undulating, 1/2" open	П	moderate olive brown (5Y 4/4), trace	1
-	5 ft	44	>5	137.95-138.3' - Bedding plane, <5 deg,	╁┼	- voids to 1/16"	-
-	98%			smooth to rough, planar, <1/8" open except for 138.3' with up to 1/4" open	口	-	-
-			1	138.5' - Mechanical break, along bedding	\vdash	_	-
140				plane	口		Dog 40
-98.7			0	138.6' - Bedding plane, <5 deg, rough, undulating, 1/4" open	Ш	_	R20:10 minutes
	141.0		Ĺ	andalating, 174 Open	Ш		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-05	SHEET	9	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

				IENT . Dietrich D-30 3/N 232, mud rotary, NQ tools, HW				
WATER	LEVELS: 1.2	ft bgs	s on 5	/5/07 START : 5/4/2007 END : 5/	6/20	07	LOGGER : N. Jarzyniecki	
	_			DISCONTINUITIES	(D	, [LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG		DOOK TYPE OOLOD	
D A P	₹₹ <u>₩</u>	<u> </u>	ÄΥ	BEGGINI HOIV	ੂ		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ASE		(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	١ď		WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무주짓	8880	οD	AC R F	PLANARITY, INFILLING MATERIAL AND	Ĭ,		AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	898	ă.	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š		CHARACTERISTICS	BROI 6, TEOT REGGETO, ETC.
			NR/	139.3' - Bedding plane, <5 deg, rough,	П	╈	Limestone	
-	-		>10	undulating, open	┺	ᅪ	137.7-138.3' - moderate olive brown,	-
l _]			140.15' - Fracture, 45 deg, rough, undulating,	\vdash	┸	(5Y 4/4), very fine grained, medium	_
				open	Н	1	strong (R3), voids (up to 1/16") over	
-	1		5	141.0-141.25' - Fracture zone, intersecting		⇉	20% of surface, moderate fossils	1
-				fractures, fragments 1", organic stain	\perp	+	(casts) to 1/4"; interbedded with	_
	R21-NQ		>10	141.6, 141.8' - Bedding plane (2), 10-20 deg, rough, undulating, organic stain, up to 1/4"	\vdash	-	medium light gray (N6) with trace voids to 1/16", poorly fossiliferous	
	5 ft 82%	30	>10	open associated dissolution features	1	十	138.3-140.9' - Same as 131.0-136.0'	Ī
-	02/0			141.7' - Fracture, 85 deg, rough, undulating,	\Box	┲	except grades from poorly	-
_			>10	organic stain, open to 1/8"	ᅪ	4	fossiliferous to moderate to high	_
145			0	142.1' - Bedding plane, <5 deg, rough,	Н	-	fossils, fossils up to 1/4" grades from	
-103.7	1		-	undulating, organic stain	T	T	trace voids (<1/16") to voids (1/16")	R21:11 minutes
-	{		NR	142.4, 142.5, 142.6' - Bedding plane (3), <5	匚	4	over 10% of surface, interbeds of	-
1 -	146.0			deg, rough, undulating, up to 1/8" open	₽	1	light olive gray (5Y 5/2) up to 1/2"	
				142.9' - Bedding plane, <5 deg, rough,	\vdash	1	thick, interbed (discontinuous or could be infill) at 138.75' very light	
1 -	j		1	undulating, up to 1/2" open 143.1-143.4' - Fracture zone, intersecting	匚	士	gray (N8) and infill of same material	1
-	{			fractures, fragments to 1-1/2", organic stain	╨	+	seen in interbeds of light olive gray	-
I _]		1	144.0-144.2' - Fracture zone, intersecting	\vdash	1	(5Y 5/2) at 140.15' that is 2" thick	
			'	fractures, pieces to 1-1/2", organic stain		T	No Recovery 140.9-141.0'	
-	R22-NQ			144.4' - Bedding plane, <5 deg, rough,	П	┰	Limestone	1
-	5 ft	62	1	undulating, up to 1/2"	₽,	+	141.0-144.2' - light gray to light olive	_
	96%	-		144.7' - Bedding plane, <5 deg, rough,	Н	1	gray, (N7 to 5Y 6/1), very fine	
	1			undulating, organic stain		T	grained, weak to medium strong (R2	Ī
-	-		4	144.9' - Bedding plane, 5 deg, rough, undulating, up to 1/4" open	╁	ᅪ	to R3), voids (up to 1/16") over 10-15% of surface, fossils up to 1/4",	-
150_				146.35' - Bedding plane, <5 deg, smooth to	\vdash	┸	dissolution features up to 2"x1/2",	
-108.7			>10	rough, undulating, up to 1-1/2" open	Н	1	dusky yellow (5Y 6/2) infill very fine	R22:11 minutes
-	1,540			147.1' - Fracture, 60 deg, rough, undulating		1	grained, voids over 25%, few	1
-	151.0		NR)	148.5' - Bedding plane, 10 deg, rough,	╨	ᅪ	1/4"-1/2" dissolution features	-
l -]		>10	undulating, up to 1/2" open	┢	╁	144.2-145.1' - moderate yellowish	_
			10	149.3, 149.45' - Fractures (2), 75-80 deg,			brown with wavy light olive gray	
-	1			rough, undulating	ш	ᅪ	beds, (10YR 5/4 with 5Y 5/2), up to	1
-	-		>5	149.65' - Bedding plane, 20 deg, rough,	╁	+	1/2" thick and a 1-1/2" thick medium	-
l _				undulating, open <1/8" 149.9' - Bedding plane, <5 deg, rough,	\bot	L	light gray (N6) bed, dusky yellow and light olive gray has 20-30% voids up	_
	R23-NQ			undulating			to 1/16", fossils to 1/8"	
-	5 ft	56	1	150.25-150.4' - Fracture zone, intersecting	1	ᅪ	No Recovery 145.1-146.0'	1
-	90%			fractures, 1" fragment	╀	╬	Limestone	-
	j l		ر ا	150.6-150.8' - Fracture zone, intersecting	Н	1	146.0-150.8' - moderate yellowish	
155]		2	fractures, 1" fragment	Г	丁	brown to yellowish gray, (10YR 5/4 to]
-113.7			_	151.15-151.3' - Fracture zone, intersecting —	╨	十	- 5Y 7/2), fine to very fine grained,	R23:8 minutes
	ļ l		2	fractures up to 1"	一	╁	grain size increasing with depth,	- 125.0 11101.00
	156.0		NR	151.4, 151.6' - Bedding plane, <5 deg, rough, undulating, open up to 1/2"		1	appears to have breccia clasts, yellowish gray (5Y 7/2), pale olive	
1				151.8' - Bedding plane, <5 deg, rough,	T	T	(10YR 6/2) and light gray (N7),	11:10 water level 3.0'
-	 			undulating, up to 1/8" open	1	F	moderately fossiliferous up to 1/4", at	-
-	ļ l			151.9-152.2' - Fracture zone, fragments to 2"	4	L	148.9' abrupt change to light olive	
				152.5' - Fracture, 65-70 deg, smooth,	1		gray (5Y 6/1), very fine grained,	11:11 grout hole, used 31
1 -	1			undulating, organic stain	1	r	strong to very strong (R4 to R5),	bags of grout -
-	{			152.6' - Bedding plane, <5 deg, rough,	-	F	trace voids to 20%, voids increase	-
Ι.	j l			undulating, organic stain, <1/8" open	1	L	with depth, poorly fossiliferous with	
				152.8' - Bedding plane, <5 deg, rough, undulating, associated with dissolution zone	1		bedding features at 150.05-150.35' yellowish gray (5Y 8/1), olive gray	
1 -	1			153.3' - Fracture, 65-70 deg, smooth,	1	上	(5Y 3/2) and pale yellowish brown	1
-	Į			undulating	-	F	(10YR 6/2)	-
	j l			154.4' - Fracture, 65-70 deg, smooth,	_		No Recovery 150.8-151.0'	
				undulating	1	Г	Limestone	
-	†			154.8' - Fracture, 65-70 deg, smooth,	1	F	151.0-152.8' - Same as 137.7-138.3'	-
				undulating	+	+		
I					1	1		
1								



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-05	SHEET	10	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.2	2 ft bgs	s on 5/	/5/07 START : 5/4/2007 END : 5/6	6/200	007 LOGGER : N. Jarzyniecki
				DISCONTINUITIES	၅	LITHOLOGY COMMENTS
ELO E ANI	N, AND ۲۲ (%		ZES T	DESCRIPTION	CLO	ROCK TYPE, COLOR, MINERAL OCY, TEXTURE SIZE AND DEPTH OF CASING,
TH B FACE	ie RL GTH, OVEF	[%) O	CTUF F00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, MOOTHNESS, CORING RADE SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR LEN REC	RQ	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS DROPS, TEST RESULTS, ETC.
DEPTH BELOW SURFACE AND SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND	SAMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS Limestone 152.8-154.4' - yellowish gray mottled with pale olive, (5Y 7/2 with 10Y 6/2), very fine grained, organic laminations at 153.55', dissolution features to 1/2"x1/4", moderately fossiliferous, fossils to 1/4", voids (1/16") over < 10% of surface 154.4-155.5' - Same as 137.7-138.3' except weak to strong (R2 to R4), beds up to 5" thick No Recovery 155.5-156.0' Bottom of Boring at 156.0 ft bgs on 5/6/2007
_						



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-06 SHEET 1 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

						y, cathead, NW rods, 3-7/8"			ORIENTATION : Vertical
WATER	LEVELS	: 2.5 ft b	gs on 4/17		START : 4/17/2007	END: 4/19/2007 SOIL DESCRIPTION	LOGGE	≺ : C. T	Wallestad COMMENTS
≩Q∉ I	041451	INITED	1 (4)	STANDARD PENETRATION		JOIL DEJURIPTION		8	CONTINUEN 13
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	` '	TEST RESULTS	SOIL NAME.	USCS GROUP SYMBOL, C	OLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE	ERY (ft)		MOISTURE C	CONTENT, RELATIVE DENS	SITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MINE	RALOGY	SYM	INSTRUMENTATION
42.5	0.0			\··/	Poorly Graded S	Sand (SP)			
-		1.1	SS-1	1-2-2	0.0-0.8' - very ligh	ht gray to brownish gray, (ay mottling, moist, soft, ve	N8 to 5YR		-
-	1 5			(4)	∫ fine grained, no H	HCl reaction, silica sand, o	lark ∫	₩	=
-	1.5				mottling (organics)	s) and 5% organics as roo	ots and	1	=
-					Sandy Organic S			1	-
-						sh black, (5YR 2/1), moist, matter and/or nonplastic		1	Encountered water between 0.8' and 5.0',
-					fine silica sand, c		SIII, 20%	1	water level at 2.5' below ground surface at -14:15
-						•		1	14.10
_								1	-
5	5.0							1	-
37.5	0.0				Silty Sand (SM)			m	_
-		1.2	SS-2	1-3-4		te yellowish brown, yellow 1), wet, loose, fine grained		1	-
-	6.5			(7)	nonplastic, mode	erate yellowish brown trans	sitioning to _		-
-	0.0				∖yellowish gray, fir	ne silica sand with 20-30%	6 fines	1	-
-								1	-
-								1	-
-								1	-
-								1	-
-								1	_
10	10.0							1	_
32.5					Silty Sand (SM)	(5)(5)	[
-		0.8	SS-3	2-4-14 (18)	h∖dense, fine grain	wish brown, (5Y 7/2), wet, ed, no HCl reaction, fine s			_
	11.5			(10)	with 20% plastic	fines			
-					Clayey Sand (SC 10.2-10.75' - vello	5) owish gray, (5Y 8/1), wet,	medium		Driller's Remark:11.5-15.0' heavy chattering
					dense, fine to coa	arse grained, low to mediu	ım /	1	
						ate HCl reaction, 30% low coarse gravel-sized limes		1	
						c lens from 10.55-10.6'			
15	15.9								
27.5		0.1	SS-4	50/1.5 (50/1.5")	Silt (ML)	sh vellow (5V 9/4) moist	nonplactic	Г	Driller's Remark:15.2-16.0' heavy chattering
				(30/1.5)	∖ rapid dilatancy, n	sh yellow, (5Y 8/4), moist, noderate HCl reaction, (5-	10%) very		
]					fine sand-sized li	mestone fragments with one gravel-sized, carbonate	oarse		
					Sailu-Sizeu (U IIII)	c graver-sizeu, carboriale	matchals		1
]									
20									
								<u> </u>	



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	GSC-06	CHEET	2 OF 11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS	: 2.5 ft bo	gs on 4/17	7/07	START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPT SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY UNSTRUMENTATION
22.5	20.0	0.2	SS-5	50/2	Limestone Fragments
-	•			(50/2")	\20.0-20.2' - grayish yellow, (5Y 8/4), strong HCl /- reaction, fragments to 3/16" in size
] [
_					
_	_				. .
-	-				
-					
-	05.0				
25_ 17.5	25.0				Silty Sand (SM)
-	-	1.1	SS-6	28-30-45	25.0-26.1' - grayish orange, (10YR 7/4), moist, very dense, mild to moderate HCl reaction, fine to coarse
-	26.5			(75)	├∖ sand-sized and trace gravel-sized, 35% nonplastic / ☐───────────────────────────────────
-	20.0				fines
] [
_					
_					
-					. .
-					
30 <u> </u>	30.0				Silty Sand (SM)
-	-	0.9	SS-7	20-13-8	30.0-30.85' - Same as 25.0-26.1' except moderate to
-	31.5	0.5	00-7	(21)	strong HCl reaction, grayish yellow limestone (10YR /7/4), from 30.7-30.85' and very stiff, not hard
-	31.3				<u> </u>
-	1				1 1
] [
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_					
-					
35 7.5	35.0 35.2	0.2	SS-8 /	50/2.5	Silty Sand (SM)
'	-			(50/2.5")	Silty Sand (SM) 35.0-35.15' - Same as 25.0-26.1'
-	-				
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-06	SHEET	3	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS	: 2.5 ft bo	s on 4/17	7/07	START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad
>00				STANDARD	SOIL DESCRIPTION g COMMENTS
ANC (#	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
TH BE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FULL DLOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
2.5	40.0	0.1	SS-9	50/1	Limestone Fragments Driller's Remark: Heavy chatter throughout
-				(50/1")	\dagged 40.0-40.1' - pale yellowish brown, (10YR 6/2), /- except no chatter at 41.0-41.5'
_					
-					-
-					-
-					-
-					-
45	45.0 45.2				†
-2.5	45.2	0.2	SS-10	50/2 (50/2")	Silty Sand And Limestone (SM) 45.0-45.2' - light olive gray, (5Y 5/2), wet, very dense,
				(30/2)	\fine to coarse grained, moderate HCl reaction, fine to \
_					\coarse sand-sized, 20-25% fines, 40% of sample is \coarse sand to fine gravel-sized limestone fragments \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					
-					
-					-
-					1
-					1
50	50.0				
-7.5				45-25-40	Silty Sand And Limestone (SM) 50.0-51.25' - moderate yellowish brown, (10YR 5/4),
-		1.3	SS-11	(65)	wet, very dense, fine grained, moderate HCl reaction, 20-25% low plastic fines, 35-40% of sample is coarse
-	51.5				sand to fine gravel-sized limestone fragments
-					-
-					†
]
_]]
55 <u> </u>	55.0				Limestone And Silty Sand (SM) Driller's Remark: During SPT for SS-12.
-				7/4 //0 /	\55.0-55.2' - Same as 50.0-51.25' except 60% of spoon fell 2.0' after 7 blows over 1 inch,
-		0.2	SS-12	7/1-1/24 (8/25")	\sample is ilmestone, 40% or sample is silty sand/ _ possible 2' void at 55.1'
	57.1				1
	51.1]
] -					
-					
-					
60					
60					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-06	SHEET	4	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

						END: 4/40/2007			ORIENTATION : Vertical
WATER	LEVELS	. ∠.ɔ π bo	ıs on 4/1		START : 4/17/2007	END : 4/19/2007 SOIL DESCRIPTION	LUGGER	(: U.	Wallestad COMMENTS
≥ <u>0</u> €			. (6)	STANDARD PENETRATION TEST RESULTS		JUIL DEJUKIP HUN		8	COMMEN 19
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOII NAME	E, USCS GROUP SYMBOL	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
A S S S S S S S S S S S S S S S S S S S		RECOVE	RY (ft)		MOISTURE	CONTENT, RELATIVE DE	NSITY OR	Ω	DRILLING FLUID LOSS, TESTS, AND
ER 등			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, MI	NERALOGY	Y ME	INSTRUMENTATION
17 E				(N)	Olife Count And	1 L i 4 (OM)		S	Finish ad delling at 47,40 are 4/47/07, and the re-
-17.5	60.0			42-32-50/4.5	60 0-61 2' - Sar	d Limestone (SM) me as 50.0-51.25' except	45-50% fine -		Finished drilling at 17:48 on 4/17/07, setting HW casing to 61.0' below ground surface
l _		1.2	SS-13	(82/10.5)	to coarse limes	stone fragments, 30% fine	to coarse		
	61.4				sand-sized, 20-	-25% low plastic fines			1
I -					Begin Rock Co	ring at 61.5 ft bgs		1	
-					See the next sh	neet for the rock core log	-	1	1
-							-	l	1
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_							-		-
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-22.5							_]
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l _							_		
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-06	SHEET	5	OF	11	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.5	ft ba	s on 4	/17/07 START : 4/17/2007 END : 4/	19/200	LOGGER : C. Wallestad	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	907C	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, SVEF	(%) 🛭	TUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	SOR	R Q	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	61.5			C4 7! Mashaniaal braak		Limestone	Resume drilling at 07:45 at
-			2	61.7' - Mechanical break 62.0, 62.1, 62.65, 62.85, 63.15, 63.3, 63.75,	Ш	- 61.5-65.8' - moderate yellowish brown, (10YR 5/4), fine grained,	4/18/07 with rock coring Water level is 2.5' below
-				64.15, 65.4, 65.55' - Bedding plane or mechanical break (10), horizontal, smooth,	Ш	moderate HCl reaction, extremely weak to weak (R0 to R2), rock	ground surface
			4	undulating, tight to 1/8" open 62.35' - Mechanical break	\mathbb{H}	strength increasing with depth, voids,	
_	R1-NQ 5 ft	32	2	02.33 - Mechanical break	\Box	to 3/16" over 20-30% of surface, moderately fossiliferous with casts to	_
_	86%	02			H	1/4"-1/2", dissolution cavities to	_
65 <u> </u>			1	_	\blacksquare	1/2"x1" over 5-15% of surface, (dark possibly organic) material over	
-22.5			1		\Box	5-10% as of surface from 61.5-62.3'	R1:2 minutes
-			NR		甘井	No Recovery 65.8-66.5'	K1.2 minutes
-	66.5			66.5-66.8' - Fracture zone		Limestone	-
-			10	67.1, 68.4, 68.9, 69.6, 70.5' - Bedding plane	丗	- 66.5-71.05' - Same as 61.5-65.8'	Driller's Remark: Driller
-				or mechanical break (5), smooth, undulating,		 except very weak to weak (R1 to R2), no dark/organic material, and all very 	runs in 2nd gear at 350 psi -
-			1	tight to 1/8" open	╁	weak to weak rock (R1 to R2)	-
-	R2-NQ		_		\mathbb{H}	-	-
	5 ft 91%	52	3	69.1, 69.2, 69.85, 69.95, 70.4' - Bedding	Н	_	
70			6	plane or mechanical break (5), rough, undulating, tight to 1/2" open —	Ш		
-27. 5				70.15, 72.5, 72.75, 73.0, 75.05, 75.55' -	川	_	
_			1	Bedding plane or mechanical break (6), horizontal, smooth, undulating, tight	Ш		R2:3 minutes
-	71.5		NR	70.35' - Fracture or mechanical break, rough, undulating	口	No Recovery 71.05-71.5' Limestone	_
-			1	undulating	丗	- 71.5-76.4' - Same as 61.5-65.8'	-
-					丗	except no dark, possibly organic material, dissolution cavities to	-
_			4		Ш	- 1"x1/2" over 5% surface, extremely weak rock (R0) from 72.2-72.6' and	-
-	R3-NQ			73.25, 73.6, 73.75' - Bedding plane or mechanical break (3), <10 deg, rough,	\Box	72.9-73.4' and increasing to	-
-	5 ft 98%	66	2	undulating, tight, 1/2" open 74.0' - Mechanical break		 moderately strong rock (R3) with depth 	-
75			_	74.0 - Mechanical Dreak	Ħ		-
-32.5			1		H	-	
			1		口	_	R3:9 minutes
_	76.5		NR /		H	No Recovery 76.4-76.5'	_
-			2	76.6, 77.35, 77.55, 77.8, 78.4, 78.9, 79.9' - Bedding plane (7), horizontal, smooth,	H	Limestone	-
-				undulating, tight to 1/8" open	╂╣	76.5-77.35' - moderately yellowish brown to grayish orange, (10YR 5/4	-
-			10	77.8-78.15' - Fracture zone, fragments to	丗	to 10YR 7/4), medium grained, moderate HCl reaction, very weak to	Driller's Remark: 50% loss
-	R4-NQ			1"x2" 78.25' - Fracture, 80 deg, smooth, undulating,	丗	medium strong (R1 to R3), voids to	of circulation at 78'
-	5 ft 64%	25	3	open 79.0' - Bedding plane or mechanical break,	出	1/8" over 15-30% of rock, poorly fossiliferous with trace casts to 1/16"	-
80	04/0		1	<10 deg, rough, undulating, 1/2"-1" open	幵	x3/16", trace dissolution cavities to 2"x1"	-
-37.5				79.5' - Fracture, 80 deg, smooth, undulating, — tight	囯		_
-			NR		囯	-	R4:7 minute
	81.5				Ш		

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-06	SHEET	6	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bgs	s on 4/	/17/07 START : 4/17/2007 END : 4/	19/20	07 LOGGER : C. Wallestad	
≥∩≎	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
DE SU ELI	CO LEI RE	RO	3 FR	THICKNESS, SURFACE STAINING, AND TIGHTNESS 81.55,82.55,83.3,84.0' - Bedding plane or mechanical break (4), horizontal, rough,	SY	CHARACTERISTICS Limestone 77.35-79.1' - grayish orange to pale	
-			10	undulating, 1/4" open to open 81.95, 82.4, 83.15' - Bedding plane or mechanical break (3), 10-20 deg, rough,		yellowish brown, (10YR 7/4 to 10YR 6/2), fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 5-20%	Driller's Remark: Void at 81.5-82.0 (dropped stem), - 100% loss of circulation
_	R5-NQ 5 ft 76%	28	4	undulating, tight to 1/2" open 82.4-83.8, 83.3-83.8' - Fracture zone (2), fragments to 1"x3"	Ħ	of surface, poorly fossiliferous with trace fossil casts to 1/8"x1/8", dissolution cavities to 1"x1/2" (trace) 79.1-79.7' - Same as 76.5-77.35' No Recovery 79.7-81.5' Limestone	-
85 -42.5	70%		10	34.1' - rough, 2 intersecting near vertical ractures, undulating 34.7-85.3' - Fracture zone, fragments to – 1-1/2"x3", fractures at 70-90 deg			_
_	86.5		NR	i-1/2 x3 , ilactules at 70-90 deg	1	81.5-85.3' - Same as 79.1-79.7' - No Recovery 85.3-86.5'	R5:5 minutes
_			_10_/	86.5-86.65' - only recovered rock		Limestone - 86.5-86.65' - Same as 79.1-79.7' No Recovery 86.65-91.5']
90 -47.5	R6-NQ 5 ft 3% 91.5	0	NR			- , , , , , , , , , , , , , , , , , , ,	Driller's Remark: Core blockage caused no recovery for core run R6 R6:25 minutes
- -			10	91.65, 92.9, 94.05, 94.5' - Bedding plane (4), horizontal, smooth, undulating to planar, tight to 1/2" open 91.65-92.0' - Fracture zone, fragments to		Limestone 91.5-94.1' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCI reaction, medium strong (R3), voids to 1/16" over 5-10% of surface, trace	
_	R7-NQ 5 ft 94%	44	10	1-1/2"x2", some silt infill 92.5-92.8' - Fracture zone, fragments to 1-1/2"x1-1/2", silt and coarse sand infill, 92.5-92.65' 93.25, 93.3, 93.55' - Fracture zone or		fossil casts to 3/16", trace cavities to 1-1/2"x1/16", with poorly competent infill, sitly layer at 91.9-92.0' and 92.5-92.65' 94.1-96.2' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), fine to medium grained, strong	-
95_ -52.5			1	mechanical break (3), 70 deg, undulating to stepped, smooth to rough 93.5' - Fracture, 80 deg, smooth, undulating, -			
-	96.5		0 NR	dark staining, tight 93.75' - Fracture, as above at 93.5' except 20 deg 94.1-94.25' - Fracture zone		HCl reaction, very weak to weak (R1 to R2), voids to 1/16" over 25% of surface, trace fossil casts to 1/4"x1/8", no visible cavities, silt layer	R7:21 minutes -
-			0	95.7' - Fracture, 40 deg, smooth, planar, silty infill, tight 96.55, 96.6' - Bedding plane (2), 0-10 deg, smooth, undulating to stepped, dark staining		 (low plasticity) from 94.1-94.5' No Recovery 96.2-96.5' Limestone 96.5-101.5' - Same as 94.1-96.2' 	
-	R8-NQ 5 ft	97	1	(possibly organics), infill, tight		except trace cavities with light colored infill to 1"x1-1/2"	-
- 100 -57.5 -	100%		1	99.4' - Mechanical break or fracture, 30 deg, rough, undulating, tight to 1/4" open 100.1' - Fracture, at 99.4' except very rough and undulating		- -	
	101.5						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-06	SHEET	7	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

DISCONTINUTIES PROCESS	WATER	LEVELS : 2.5	ft bg	s on 4	/17/07 START : 4/17/2007 END : 4/	19/20	07 LOGGER : C. Wallestad	
1	300	()			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
1	ANE ANE	A', AND ?Y (%		ES	DESCRIPTION	3.50		SIZE AND DEPTH OF CASING
1	H BE	E RU STH,	(%)	TUR FOOT] Soci		FLUID LOSS, CORING RATE AND
1	DEPT SURF	CORE	Ø	-RAC		3Y.ME		
1	20,2	011			101 = 1 = 1 = 1 = 1 = 1 = 1		Limestone	
10	-			1		╁		1
105.65, 105.75 Fracture (2), 0-20 deg, 105.65, 105.75 Fracture zone, fragments to 105.65, 105.75 Fracture zone, fragments to 102.47 103.45	-					H	with no infill and trace fossil casts to	1
105 106 107 108 108 107 108 108 107 108	-			10		F	- 3/4"x1/4"	1
105 105 107 108 107 108 108 107 108 108 107 108				0	, , , ,	H	-	1
1			09	3	103.25-103.3' - Fracture zone, fragments to	F	_	
106.5				1	1/2"x1" 	Ħ	_	
106.5	-62.5					H	-	D0:7
100.5 100.	_					岸	No Posovory 106 0 106 5'	R9:7 minutes
107.1, 108.4, 108.7, 109.25, 109.65, 109.8, 110.3°. Bedding plane or mechanical break (7), horizontal, smooth, undulating, tight to 1/4" open 110.45-111.25′- Fracture zone, fragments to 2°×2", many horizontal bedding planes 111.5 112.5 113.5´- Bedding plane, horizontal, smooth, undulating, tight 111.5 112.5 113.5´- Bedding plane, horizontal, smooth, undulating, tight 111.5 112.5 113.5´- Bedding plane, horizontal, smooth, undulating, tight 111.5 112.5 113.5´- Bedding plane, horizontal, smooth, undulating, tight 111.5-112.5° 112.5 113.5´- Bedding plane, horizontal, smooth, undulating, tight to 1/4 "open, to 1/2 "youth, undulating, tight to 1/4" open, to 1/2 "youth, undulating, tight to 1/4" open, to 1/2 "youth, undulating, tight to 1/4" open, to 1/2 "youth, undulating, tight to 1/4" open, to 1/2 "youth, undulating, tight to 1/4" open, to 1/2 "youth, undulating, tight to 1/4" open, to 1/2 "youth, undulating, tight to 1/4" open, to 1/2 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open, to 1/4 "youth, undulating, tight to 1/4" open	-	106.5		NK		世	_	-
1	-			1	107 1 108 4 108 7 109 25 109 65 109 9	H	 106.6-111.5' - Same as 101.5-106.0' 	-
110	-				110.3' - Bedding plane or mechanical break	L		-
110	-			1		╫	-	1
110.67.5	_				•	₽	=	1
111.5			68	3				
111.5				4	_			
111.5	-67.5				110 45 111 25' Fracture zone fragmente to	Щ	-]
11.6-112.5' - Fracture zone, fragments to 2"x2", many horizontal bedding planes	_			10			-	R10:6 minutes
10 2"x2", many horizontal bedding planes 7/4), fine to medium grained, strong HCI reaction, extremely weak to very weak (R0 to R1), voids to 1/16" over 5-20% of rock increasing in coverage with depth, trace fossil casts to 1/4"x1/8", wavy bedding planes from 111.5-112.6 114.7-114.9" - Fracture zone, fragments to 1-1/2"x2" 115.8" - Fracture or mechanical break, 10 deg, rough, undulating, tight to 1/4" open 116.5-116.6, 116.8-5-116.95, 117.45-117.85, 119.3-119.5" - Fracture zone (4), fragment to 1-1/2"x	_	111.5			444.0.440.51.5	ፗ	111 5-116 5' - gravish orange (10YR	-
1	-			>10		世	 7/4), fine to medium grained, strong 	-
R11-NQ 5ft 46 1	_					仜	weak (R0 to R1), voids to 1/16" over	
R11-NQ 5 ft 46 1 113.5' - Bedding plane, horizontal, smooth, undulating, tight 115.5-112.6' 114.7-114.9' - Fracture zone, fragments to 1-1/2"X2" 2 115.8' - Fracture or mechanical break, 10 deg, rough, undulating, tight to 1/4" open 116.5-116.6, 116.85-116.95, 117.45-117.65, 119.3-119.5' - Fracture zone (4), fragment to 1-1/2"x1-1/2" 116.6, 116.85, 116.95, 117.1, 117.3, 117.45, 117.65, 119.3, 119.5, 119.8, 120.5' - Bedding plane from 111.5-112.6' No Recovery 116.1-116.5' R11:6 minutes Finish drilling on 4/18/07 at 17:00, at 116.5' Resume drilling at 07:20 on 10YR 6/2), medium to coarse grained, strong HCI reaction, extremely weak to weak (R0 to R2), voids to 3/16" over 5-25% of rock, fossil casts to 1/2" diameter over 5% surface, trace cavities filled with dark material No Recovery 120.7-121.5' R12:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 minutes R13:8 m	-			1				1
115	_					┢	1/4"x1/8", wavy bedding planes from	1
772.5 10 1-1/2"x2" 2 115.8' - Fracture or mechanical break, 10 deg, rough, undulating, tight to 1/4" open 116.5-116.6, 116.85-116.95, 117.45-117.65, 119.3-119.5' - Fracture zone (4), fragment to 1-1/2"x1-1/2" 10 116.6, 116.85, 116.95, 117.1, 117.3, 117.45, 117.65, 116.85, 116.95, 117.1, 117.3, 117.45, 117.65, 119.3, 119.5, 119.8, 120.5' - Bedding plane or mechanical break (11), all rough to smooth, undulating, open to 1/4" open, except 120.5' <10 deg 120 -77.5 10 11 NR R11:6 minutes Finish drilling on 4/18/07 at 17:00, at 116.5' Limestone 116.5-120.7' - pale yellowish orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), medium to coarse grained, strong HCI reaction, extremely weak to weak (R0 to R2), voids to 3/16" over 5-25% of rock, fossil casts to 1/2" diameter over 5% surface, trace cavities filled with dark material No Recovery 120.7-121.5' R12:8 minutes	_		46	1	undulating, tight		- 111.5-112.6°	1
1-1/2"x2" 2	115			10	114.7-114.9' - Fracture zone, fragments to _	h	_	
115.8' - Fracture or mechanical break, 10 deg, rough, undulating, tight to 1/4" open 116.5-116.6, 116.85-116.95, 117.45-117.65, 119.3-119.5' - Fracture zone (4), fragment to 1-1/2"x1-1/2" 110 110.6, 116.85, 116.95, 117.1, 117.3, 117.45, 117.65, 119.3, 119.5, 119.8, 120.5' - Bedding plane or mechanical break (11), all rough to smooth, undulating, open to 1/4" open, except 120.5' <10 deg 120 -77.5 10 10 10 - R12-NQ	-72.5			10			_	
10 116.5-116.6, 116.85-116.95, 117.45-117.65, 119.3-119.5' - Fracture zone (4), fragment to 1-1/2"x1-1/2" 116.6, 116.85, 116.95, 117.1, 117.3, 117.45, 117.65, 119.3, 119.5, 119.8, 120.5' - Bedding plane or mechanical break (11), all rough to smooth, undulating, open to 1/4" open, except 120.5' <10 deg 10	-					$ar{\Box}$		_
10 119.3-119.5' - Fracture zone (4), fragment to 1-1/2"x1-1/2" 116.6, 116.95, 117.1, 117.3, 117.45, 116.95, 119.3, 119.5, 119.8, 120.5' - Bedding plane or mechanical break (11), all rough to smooth, undulating, open to 1/4" open, except 120.5' <10 deg 120 -77.5	-	116.5		NR		\vdash	_	
1-1/2 x1-1/2 1-1/	-			10	119.3-119.5' - Fracture zone (4), fragment to	F	 116.5-120.7' - pale yellowish orange 	Resume drilling at 07:20 on
R12-NQ plane or mechanical break (11), all rough to smooth, undulating, open to 1/4" open, except 120.5' <10 deg 120	-					F	10YR 6/2), medium to coarse	
R12-NQ smooth, undulating, open to 1/4" open, open	-			10	117.65, 119.3, 119.5, 119.8, 120.5' - Bedding	F	 grained, strong HCl reaction, 	-
surface, trace cavities filled with dark material 10 No Recovery 120.7-121.5' R12:8 minutes	-			40	smooth, undulating, open to 1/4" open,	Ħ	voids to 3/16" over 5-25% of rock,	
120 -77.5 1 10 No Recovery 120.7-121.5'			46	10	except 120.5 < 10 deg	Ħ		1
No Recovery 120.7-121.5'				10	_]#	material]
No Recovery 120.7-121.5'	-77.5					片	_	
	-			igwedge		片	No Recovery 120.7-121.5'	R12:8 minutes
		121.5		1411		\vdash		-

APPENDIX 2BB-914 Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	GSC-06	SHEET	8	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

00111110	WETTIOD / II	ND LC	אורוע	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HVV	Casiii	3	ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bgs	s on 4	/17/07 START : 4/17/2007 END : 4/	19/20	D7 LOGGER : C. Wallestad	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
교실	L'A ER'A	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
F F A	E R GTF OVE	<u>د</u>	CTL FO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E S E	SOR	R Q D (%)	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ПОШ	0716	Ľ	шш	,	0)		
l _			4	121.7-121.9' - Bedding plane, horizontal,	Н	Limestone - 121.5-126.2' - Same as 116.5-120.7'	_
			7	smooth, planar to stepped, tight	Ш	except voids decreasing to 5%	
I -				122.65,122.7, 122.85, 123.0, 125.25' -	Н	coverage with depth, highly	1
-			4	Bedding plane or mechanical break (5), 0-5	世	fossiliferous from 121.5-124.4 with	-
-	D40 NO			deg, smooth, undulating, tight	Ш	casts to 1/4"-1/2" over 15% of surface, solution cavities to 1/4"-1/2"	-
_	R13-NQ 5 ft	48	2		Н	over 5-7%, interval of fine grained	_
	94%	40	_			moderately strong (R3) rock with	
125				124.4' - Fracture zone or mechanical break,	Н	distinct lamination and trace voids	_
-82.5			10	20 deg, smooth, undulating, tight 124.5' - Fracture, 80 deg, smooth, planar,		— (up to 1/16") at 121.7-121.9'	
_				tight	╂	-	R13:5 minutes
_			10	124.95' - Fracture, 30 deg, smooth, planar,	\vdash	<u>-</u>	K 13.5 Hillidles
	126.5		NR	tight	Д	No Recovery 126.2-126.5'	
Ι -				125.25-125.6' - Fracture zone, fragments to 3"x1"	H	Limestone	1
-			10	125.6' - Fracture, 65 deg, smooth, planar,		126.5-131.0' - very pale orange,	1
-				open	₩	(10YR 8/2), fine to coarse grained, strong HCl reaction, extremely weak	-
-			4	125.9-126.0' - Fracture zone, fragments to	Ш	to very weak (R0 to R1), grain size	-
I _				1"x1-1/2" 126.5-127.0' - Fracture zone, some dark		becoming more coarse with depth,]
	R14-NQ		40	staining, fragments to 2"x1"	\vdash	voids to 1/8" over 5-25% of surface,	
_	5 ft 90%	26	10	127.0, 127.3, 127.45, 128.0, 128.2, 128.35,	Ш	 trace cavities to 1/2"x1" filled with light colored infill, poorly fossiliferous 	
-	3070			129.25, 129.4, 130.7, 130.8' - Bedding plane	╂┼┤	with trace casts to 1/4"	-
130_ -87.5			4	or mechanical break (10), 0-5 deg, smooth, planar to undulating, tight			
-07.5				129.55, 129.95, 130.2' - Fractures, 50 deg,	ш	=	_
			2	smooth, undulating to planar, tight to 1/4"	П		R14:4 minutes
I -	131.5		NR	open	Н	No Recovery 131.0-131.5'	
-	101.0			129.7' - Fracture, rough, undulating, near vertical, open	╁┼	Limestone	1
-			10	131.75, 131.8, 131.95, 132.0, 132.35, 132.45'	ш	- 131.5-135.05' - Same as	-
_				- Bedding plane (6), horizontal, smooth,	╆┼┤	126.5-131.0' except laminated at	-
l _			2	planar, tight		134.25-134.9' -	_
			_	131.85' - Fracture, vertical, smooth, planar 132.55, 132.95, 134.45, 135.15, 135.35' -	Н		
-	R15-NQ			Bedding plane (5), horizontal, smooth,	т	=	
-	5 ft	34	10	planar, tight	口	-	-
-	84%			133.85, 134.25' - Bedding plane or	╂╫	_	-
135_			5	mechanical break (2), 0-10 deg, rough, undulating, 1/4" open	Ш	<u> </u>	I
-92.5				134.35-134.55' - Fracture zone, fragments to	\mathbf{H}	135.05-135.7' - pale yellowish brown,	
Ι -			_1_	1"x2"		(10YR 6/2), coarse grained, strong HCl reaction, voids to 1/8" over	R15:10 minutes
-	126 5		NR	134.65' - Fracture, 30 deg, smooth, planar,	14	5-30% of rock (variable), trace fossil	1
-	136.5			open	団	casts and molds to 1/4"x1/8", trace	-
-			>10	136.6' - Fracture or mechanical break, vertical, smooth, undulating, tight	\Box	_ dark laminations	-
I _				136.75, 137.15, 137.55, 132.6, 138.05,' -	H	No Recovery 135.7-136.5' Limestone]
			.40	Bedding plane (5), horizontal, rough to	Ш	136.5-138.4' - Same as	
_			>10	smooth, undulating, many open (next to	H	135.05-135.7' except 10% fossil	1
-	R16-NQ			fracture zone) 137.15-137.55, 138.2-138.75, 139.65-139.8' -	Ш	casts and molds to 1/2" diameter,	-
-	5 ft	38	>10	Fracture zone (3), fragment to 1-1/2"x1/2"	ш	and color darkens to moderate yellowish brown with depth (10YR	-
_	78%			138.2, 138.25, 138.4. 138.85, 139.25, 139.65'	H	yellowish brown with depth (101R - 5/4)]
140			10	- Bedding plane (6), horizontal, rough to		138.4-138.85' - Same as	1
-97.5			10	smooth, undulating, many open (next to	Н	121.7-121.9' except pale yellowish	
-				fracture zone) 138.4-138.7' - Fracture zone, many bedding	団	- brown, (10YR 6/2)	R16:7 minutes
-			NR	planes horizontal	H	138.85-139.65' - Same as 136.5-138.4'	-
	141.5				H		
					1		I

APPENDIX 2BB-915 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-06 SHEET 9 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bgs	s on 4	/17/07 START : 4/17/2007 END : 4/	19/20	D7 LOGGER : C. Wallestad	
>00	(i			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			2	140.2' - Mechanical break or bedding plane, 5 deg, rough, undulating, 1/4" open 141.7, 141.95, 142.65, 142.8, 143.2, 143.35,		Limestone 139.65-140.4' - yellowish gray with moderate yellowish brown infill, (5Y	-
-			4	143.6' - Fractures or mechanical break (7), 0-20 deg, rough, undulating, horizontal-MB, tight to 1/2" open		7/2 with 10YR 5/4), fine grained, strong HCl reaction, medium strong (R3), voids to 1/8" over 5-15%	_
-	R17-NG 5 ft 88%	36	>10	143.65' - Fracture zone, as 141.7' except dark stain and tight 143.85-144.25' - Bedding plane, horizontal,		surface, cavities to 2"x1" over 20-30% of rock with infill material, trace fossil casts and molds to 1/2"x1/16", infill is coarse grained	-
145 -102.5 -			10	smooth, undulating, open 144.4, 144.8, 144.9, 145.0, 145.8' - Bedding plane (5), horizontal, smooth		— weak rock (R2) with voids to 1/8" over 25-30% surface and moderate HCl reaction	 R17:11 minutes
-			NR	144.4-144.9' - Fracture zone, fragments to 1"x1/2"	Ħ	No Recovery 140.4-141.5'	-
-	146.5		10	146.5-146.55' - Fracture zone, fragments to 1"x1/2"		Limestone 141.5-144.25' - Same as 139.65-140.4' 144.25-145.9' - pale yellowish brown,	-
-			10	146.55, 147.5, 148.6, 148.7, 149.1, 149.3, 149.35, 149.45, 149.7, 148.75, 150.5, 150.7' 147.7' - Bedding plane, 10 deg, smooth, undulating, 1/2" open		(10YR 6/2), fine grained, moderate HCl reaction, medium strong (R3), voids to 1/8" over 0-15% surface.	-
_	R18-NC 5 ft 88%	50	6	undulating, 1/2 open		 dark 1/16" thick laminations over 20% of rock, voids increasing in percentage with depth 	-
150 -107.5			4			No Recovery 145.9-146.5' Limestone 146.5-150.9' - pale yellowish brown	_
-	151.5		3 NR	150.7' - Fracture, vertical, rough, undulating, tight	H	to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), coarse grained, mild to strong HCI reaction, extremely weak to medium strong	R18:8 minutes
-			>10			(R0 to R3), (weaker rock from 147.7-149.5'), voids to 3/16" over 20-40% of rock, moderately	_
_	D40 NO		>10		Ė	fossiliferous with casts and molds to 1/4"x1/2" (many echinoderm casts), three 1" thick light colored, fine	-
-	R19-NG 5 ft 84%	46	10			grained, medium strong (R3) layers at 146.65', 147.0', and 150.8' No Recovery 150.9-151.5'	-
15 <u>5</u> -112.5 -			1			Limestone 151.5-155.7' - light olive gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), fine to coarse grained, mild to	R19:7 minutes
-	156.5		NR	156.5-156.8,159.1-159.3' - Fracture zone (2),		moderate HCI reaction, weak to medium strong (R2 to R3), voids to 1/16" over 5-20% of surface]
_			10	fragments to 2"x1" 156.8, 157.05, 157.2, 157.4, 158.2, 159.1' - Bedding plane, horizontal, smooth, planar to		(variable), trace fossil casts, dark thick laminations from 153.8-154.25' No Recovery 155.7-156.5']
-	R20-NQ 5 ft	33	1 10	undulating, tight except adjacent to fracture zone		Limestone 156.5-159.4' - Same as 146.5-150.9' except moderate yellowish brown,]
160 147 F	58%	55				(10YR 5/4), and a 4"-thick, light colored, fine grained, medium strong (R3) rock layer at 157.05' No Recovery 159.4-161.5'	_
-117 <u>.5</u> - -			NR			-	R20:5 minutes
	161.5				\vdash		



PR	OJECT NUMBER:	BORING NUMBER:					_
3	38884.FL	GSC-06	SHEET	10	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bgs	on 4/	/17/07 START : 4/17/2007 END : 4/	19/20	D7 LOGGER : C. Wallestad	
≥∩≘	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		LES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	I.R.U.	(%) Q	70	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEV.	ORE ENG ECC	ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	Olk	ď	шп	161.5-161.7' - Fracture zone, dark staining,	S	Limestone	
-			10	fragments to 1/2" thick, all bedding planes at	Ħ	- 161.5-162.5' - Same as 156.5-159.3'	-
-				horizontal 162.25, 163.15, 163.4, 163.55, 165.05, 165.4'	Ш	and 146.5-150.9' except pale yellowish brown, (10YR 6/2), fine	-
_			10	 Bedding plane (6), horizontal, smooth, 	Н	 grained, moderate HCl reaction, 	-
_	D24 NO			undulating to planar, some with dark staining, tight except next to fracture zone	Ш	medium strong to weak (R3 to R2), 5-15% voids <1/16", trace cavities	1
_	R21-NQ 5 ft	19	10	162.45' - Fracture or mechanical break, <10	ш	- <1/4"	1
_	80%			deg, rough, undulating, 1/2" open 162.6-162.85' - Fracture zone, some dark	Н	162.5-165.5' - Same as 144.25-145.9' except grayish orange	
165 -122.5			10	staining, parallel 45 deg fractures, tight —	H	— to pale yellowish brown, (10YR 7/4 o	_
-122.5				162.7' - Fracture, 70 deg, smooth, undulating, dark staining, tight		10YR 6/2), very fine to fine grained, moderate HCl reaction, strong (R4),	D24:0 minutes
-			NR	163.65' - Fracture, 70 deg, smooth, planar,	Ш	 5% coverage of voids (<1/16"), 	R21:8 minutes
-	166.5			dark staining, tight 164.0-165.05' - Fracture zone, fragments to	H	increasing to 15% with depth No Recovery 165.5-166.5'	-
-			>10	3"x1"	Ш	_ Limestone	
-				166.5-167.5, 168.2-168.5, 169.2-164.65, 170.35-170.55' - Fracture zone (4),	ш	166.5-168.5' - Same as 161.5-162.5'	-
_			>10	fragments to 4"x1-1/2"	ш	_	1
_	R22-NQ			167.65,168.65' - Fractures (2), rough, undulating, no stain or infill, tight	Н	 168.5-171.0' - Same as 162.5-165.5'	1
_	5 ft	17	>10	168.2, 168.5, 168.85, 169.2, 169.8, 170.35,	\Box	 except voids to 1/8" over 5-30% of 	-
_	90%			178.55' - Bedding plane (7), horizontal, rough to smooth, undulating to planar, no stain or		surface (variable) and laminations throughout	-
170 -127.5			>10	infill, tight except next to fracture zone	H		_
-			_	smooth, undulating, little dark staining, open	H	_	R22:6 minutes
-			1	and tight respectively	Н	No Recovery 171.0-171.5'	-
-	171.5		NR		田	Limestone	-
-			3	173.5, 173.9, 175.55, 176.0, 176.1, 176.35' -	ш	- 171.5-176.4' - grayish orange, (10YR	-
-				Bedding plane (12), horizontal, smooth, undulating to planar, some with dark staining,	ш	7/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3),	-
-			3	tight except by fracture zone	Н	voids to 3/16" over 5-20% surface	1
-	R23-NQ			173.5-173.9, 176.35-176.4' - Fracture zone	\vdash	(variable), trace fossil casts to 1/4"x1/2", trace cavities to 1"x1/2"	-
-	5 ft	72	>10	(2), fragments to 2"x2"	Ħ	-	-
175	98%			-	Ħ	-	-
175 -132.5			0	-	Ш	_	
				-	Н	-	R23:7 minutes
	176.5		4	-	囯	-	
†	170.5		NR)	173.5-173.9, 170.35-176.4, 176.6, 176.9,	口	No Recovery 176.4-176.5'	
			7	177.0, 177.3, 177.4, 177.6, 178.6, 178.65,	Ш	_ Limestone 176.5-181.15' - Same as	
				179.5, 179.8, 179.85, 180.25, 180.35, 180.75' - Bedding plane (15), horizontal, smooth,	Н	171.5-176.4' except trace dark	
			2	undulating to planar, few with dark stains,	H	laminations at 177.4-177.7' and cavities to 1/2" diameter over 10% of	1
1 1	R24-NQ			tight except on fracture zones 176.95' - Fracture, vertical, smooth,	Ħ	rock from 180.5-180.95'	1
	5 ft 93%	36	3	undulating, tight 177.1' - Fracture, 80 deg, smooth, undulating,	Ħ	_	1
180			4.0	open	Ш		1
-137.5			10	177.9' - Fracture, 25 deg, rough, undulating, — tight	Н	_	
			2	178.85' - Fracture, horizontal, same as 177.9'	П		R24:8 minutes
	181.5		NR	except horizontal 179.65' - same as 177.1' except rough	П	No Recovery 181.15-181.5'	1
						-	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-06	SHEET	11	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

ORIENTATION: Vertical CORING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing WATER LEVELS: 2.5 ft bgs on 4/17/07 START: 4/17/2007 END: 4/19/2007 LOGGER: C. Wallestad LITHOLOGY DISCONTINUITIES COMMENTS DEPTH BELOW SURFACE AND ELEVATION (#) CORE RUN, LENGTH, AND RECOVERY (%) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 180.3' - Fracture, same as 179.65 3 180.4-180.8' - Fracture zone, fragments to 181.5-185.0' - Same as 176.5-181.15' except layer of 2"x2" 182.15' - Fracture, 20 deg, smooth, medium strong (R3) rock at undulating, tight 182.3, 182.35, 182.6, 182.65, 183.05, 183.15, 183.65, 184.6, 184.7, 184.8' - Bedding plane 5 183.1-183.65' R25-NQ (10), horizontal, smooth, undulating to planar, 5 ft 62 1 100% some dark staining, tight except by fracture zone 185 10 183.0' - Fracture, 80 deg, rough, undulating, -142.5 185.0-186.5' - pale yellowish brown, open (10YR 6/2), coarse grained, 184.6-184.85' - Fracture zone, fragments to R25:9 minutes moderate HCI reaction, medium 1-1/2"x2" 0 strong (R3), voids to 1/16" over Total depth of boring is 185.3, 185.4' - Fractures (2), 30 deg and 20 186.5 15-25% of surface, fossil casts to 186.5' deg, rough, undulating 3/4"x1/2" over 20% of surface Bottom of Boring at 186.5 ft bgs on 4/19/2007



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07	SHEET	1	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

						ary, carriedu, AVVJ 1005, 3-7/		D . /	ORIENTATION : VEItical
WATER	LEVELS	: 1.25 ft b	yys on 4/2		START : 4/20/2007	END : 4/20/2007 SOIL DESCRIPTION	LUGGE		C. Wallestad COMMENTS
중무륜	SAMPLE	INTERVA	l (ft)	STANDARD PENETRATION		COL DECOM HON		1	O COMMILIATO
DEPTH BELOW SURFACE AND ELEVATION (#)	OMIVIFLE	RECOVE		TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMBOL	, COLOR,		DEPTH OF CASING, DRILLING RATE,
TH E		RECOVE		011 011 011		E CONTENT, RELATIVE DE ICY, SOIL STRUCTURE, MII		Q	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUR			#TYPE	6"-6"-6" (N)	CONCIONEN	ior, cole orroorore, wiii	VEI VIEOGI	2)
42.7	0.0				→ Topsoil (OL)	(10)	/	'1	Began at 8:37 on 4/20/07
_		1.1	SS-1	1-3-4	0-0.2' - grayish 20% fine silica	black, (N2), moist, organi sand	ic matter with	1	:1
-	1.5			(7)	Poorly Graded	d Sand With Organics (SF	?) [†	-
-	1.0				0.2-1.1' - brown	nish gray to grayish black, se, fine silica sand with 40	(5YR 4/1 to	1	1
-					fines, decreasi	ng to 10% with depth	770 Organic	1	1
_								1	1
_								1	1
_								1	1
_								1	1
5	5.0							1	1
37.7	0.0				Silty Sand (SM	M)		1	N T
-		1.2	SS-2	2-1-1 (2)	5.0-6.2' - pale y brown (10YR 6	, yellowish brown to modera 6/2 to 10YR 5/4), wet, very	ate yellowish / loose_no	11	1
-	6.5			(2)	⊢ HCl reaction, fi	ine silica sand with 30% n	onplastic	#	4
-	0.0				∖fines		/	1	1
-								1	1
								1	1
_								1	1
_								1	1
-								1	1
10	10.0							1	1
32.7					Fat Clay (CH)	: I I I (5DD 5(0)		1	Z
-		0.4	SS-3	0-0-0 (0)		rayish blue, (5PB 5/2), mo no dilatancy, no HCl react		1	1
	11.5			(0)	silica sand			1	1
								1	1
								1	1
								1	1
]	
1 7]	1
]]	1
15	15.0							\mathbf{L}	_]
27.7					Silt (ML)	ayish yellow, (5YR 8/4), we	at modium	brack	∏
		0.8	SS-4	4-5-3 (8)		c, rapid dilatancy, moderat	e HCl /	\perp	4 1
	16.5			(3)	\ reaction, 5-10%	% very fine sand, carbonat , 1/16" thick gray layer at 1	te materials,]
					u acc organics,	, 1710 tillok gray layer at 1	0.2]
]
]
								1]
]
]]
20								L	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07	SHEET	2	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

						ary, carriedu, AVVJ 1008, 3-			ORIENTATION: Vertical
WAIER	LEVELS	: 1.25 ft l	ogs on 4/2		START : 4/20/2007	END: 4/20/2007 SOIL DESCRIPTION	LUGGEI	₹ : U. 	Wallestad COMMENTS
≥ 9€	SAMDIF	INTERVA	J (#)	STANDARD PENETRATION TEST RESULTS		JOIL DESCRIPTION		9	CONTRICTO
ON ON C	SAMPLE		` ,	TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMBO	L, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ATE ATE		RECOVE			MOISTURE	E CONTENT, RELATIVE D ICY, SOIL STRUCTURE, N	ENSITY OR	IBOI	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTEN	ICT, SOIL STRUCTURE, IN	IINERALOGI	SYN	INSTRUMENTATION
22.7	20.0			, ,	Silt (ML)			lШ	
-	1	1.3	SS-5	3-3-3	20.0-21.3' - Sa	me as 10.0-10.35' excep medium stiff, no HCl rea	ot greenish	1	<u>-</u>
-	21.5			(6)	light olive yello	w mottling (5Y 5/6) in 15	-20% of silt,	Ш	-
-	21.0				\three concretio	ons to 1"x1/4" between 20	0.0-20.5'	1	-
-	1							1	-
-	1							1	-
-	1							1	-
-	1							1	-
-	-							┨	-
-	05.0							1	-
25 <u> </u>	25.0				Sandy Fat Clay	v (CH)		111	-
-	-	1.3	SS-6	2-2-2	25.0-26.3' - ligh	ht olive gray, (5YR 6/1),	with mottling	///	-
-	·	1.5	00-0	(4)		', moist, soft, high plastic ICI reaction, 30% fine sili		///	-
-	26.5				coarse gravel-s	sized silica sand concret	ion	1	-
-	1							1	-
-	1							1	-
-	-							┨	-
-	-							-	-
-	-							┨	-
-								┨	-
30 <u> </u>	30.0				Organic Soil (OH)))))	_
'2.' -		, _	00.7	2-4-7	30.0-31.5' - oliv	ve black, (5Y 2/1), moist		- }}}}	-
-	-	1.5	SS-7	(11)	to high plasticit	ty, slow dilatancy, no HC ca sand, fine silica sand	l reaction, lens from	- {}}	-
-	31.5				30.45-30.55'			K	-
-								-	-
-	-							-	-
-								┨	-
-	-							┨	-
-	-							-	-
-	-							-	-
35 7.7	35.0				Organic Soil (0	OH)))))	_
'	_	1 40	SS-8	3-5-3	35.0-36.0' - oliv	ve gray, (5Y 4/1), wet, m	edium stiff,	- }}}	-
-	-	1.0	33-8	(8)	medium to high reaction, 40% f	h plasticity, slow dilatanc fine silica sand	y, no HCl	P >>>	-
-	36.5				10000011, 40 70 1	iiric silica saria		-	-
-	-						,	-	-
-	-						,	-	-
-	-							+	-
-								-	-
-								-	-
-								-	-
40							_	1	-
1									
		1			1			1	1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07	SHEET	3	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

			ogs on 4/2		50 5/N 232, Mud Total) START : 4/20/2007	<u>√, cathead, AWJ rods, 3-7/8</u> END : 4/20/2007	LOGGER		ORIENTATION : Vertical
WATER	LEVELS	. 1.25 1(ogs on 4/2		START . 4/20/2007	SOIL DESCRIPTION	LOGGER		COMMENTS
중무윤 [SAMPI F	INTERVA	AL (ft)	STANDARD PENETRATION				SYMBOLIC LOG	2 2
DEPTH BELOW SURFACE AND ELEVATION (ft)	O/ WIII EE	RECOVI		TEST RESULTS		USCS GROUP SYMBOL,		일	DEPTH OF CASING, DRILLING RATE,
YTH I		INLOOVI	#TYPE	6"-6"-6"		CONTENT, RELATIVE DEN Y, SOIL STRUCTURE, MINI		MBO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUF			#ITPE	(N)	00.10.012.10	.,		SYI	
2.7	40.0				Sandy Organic S	Soil (OH) e as 35.0-36.0' except 30	400/ fine	? ??{	
		1.1	SS-9	6-6-7 (13)	silica sand	e as 55.0-56.0 except 50	-40% iiile -	333	
	41.5			(10)				α	
					1				
45	45.0								
-2.3				2.5.6	Sandy Organic S	Soil (OH) e as 40.0-41.1' except gra	avish -	333	_
		1.4	SS-10	3-5-6 (11)	orange, (10YR 7	/4), mottled, silt stringers		}}}	_
_	46.5							2222	_
_							_		<u>.</u>
_							_		_
_							_		<u>.</u>
							_		<u>.</u>
_							_		
_							_		
50 -7.3	50.0				lusta ula a dala di Oua	rania Cail Mith Cilt (OLI)		,,,,	_
-7.3				6-16-20	50.0-51.2' - Orga	ganic Soil With Silt (OH) anic Soil (OH) is same as	30.0-31.5' -	333	
_		1.2	SS-11	(36)	except olive blac	k (5Y 2/1), moist, hard, 10 Silt (ML) is same as 15.0-1	0-15% fine	\$ \$\$	<u>-</u>
-	51.5					lasticity, no organics	15.6 except /-		-
-							-		-
_							-		-
-							-		<u>-</u>
-							-		-
-							-		
							-		-
55 <u> </u>	55.0				Silt (ML)			Ш	_
-		1.3	SS-12	18-28-50/3 (78/9")	55.0-56.3' - pale	yellowish brown to moder (10YR 6/2 to 10YR 5/4),	rate -		-
-	56.3			(16/9)	low plasticity, rap	oid dilatancy, moderate to	strong HCI		-
1 -					\ reaction, 1/4"-1"	thick organic layers at 55 y, 5-10% fine sand	.25' and /-		-
-					Jos.o respectively	y, 5-10 /0 IIIIE Saliu			-
-							=		
-							-		
-							-		-
1 1							7		
60							7		
								╡	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07	SHEET	4	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

WATER	LEVELS	: 1.25 ft I	ogs on 4/2	20/07	START : 4/20/2007 END : 4/20/2007 LOGGE	R : C	:. Wallestad
				STANDARD	SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BE ATIC		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR	BOLI	DRILLING FLUID LOSS, TESTS, AND
SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION
-17.3	60.0				Silt (ML)	Т	
_		1.0	SS-13	17-42-50/5 (92/11")	60.0-61.0' - Same as 55.0-56.3' except trace dark mottling, 1/16" thick organic soil layer at 60.1', trace	111	1
	61.4			(fine sand-sized and gravel-sized limestone fragments	T	
]	
_						1	_
_						4	_
-						4	-
-						-	-
65	65.0					1	-
-22.3	05.0				Silt (ML)	ΤП	T
-		1.5	SS-14	5-10-14 (24)	65.0-66.5' - olive gray with grayish orange mottling, (5Y 4/1 with 10YR 7/4), wet, very stiff, low plasticity,	111	1
	66.5			(24)	rapid dilatancy, moderate HCl reaction, 5-10% fine sand, trace gravel-sized limestone fragments,	Ш]
_					carbonate materials, 10% organic lamination		
-						4	_
-						-	_
-						+	-
-						+	-
70	70.0					1	-
-27.3	70.0				Interbedded Organic Soil And Silt (OH)	257	At 13:35 water level is 1.25' below ground
		1.5	SS-15	6-6-5 (11)	70.0-71.5' - Same as 50.0-51.2' except stiff, with irregular bedding and pockets of material	333	surface -
	71.5			(,			
_						1	_
_						4	_
-						+	-
-						+	-
-						1	-
75	75.0					1	-
-32.3	70.0				Organic Soil With Sand (OH)	1 22	
		1.1	SS-16	2-4-10 (14)	75.0-76.1' - olive gray, (5Ŷ 3/2), wet, stiff, medium to high plasticity, slow dilatancy, no HCl reaction, 20%	355	
_	76.5			(· · · /	very fine silica sand, fine silica sand layer from /75.05-75.75'	T	
-					(2.2.2.0.00	1	
-						1	
-						+	-
-						+	-
-						1	-
80						1	1
						\top	
						1	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07	SHEET	5	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

WATER	LEVELS	: 1.25 ft b	gs on 4/2	20/07	START : 4/20/2007 END : 4/20/2007 LOGGER	R : C.	Wallestad
300				STANDARD	SOIL DESCRIPTION	Ō	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	` '	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR	BOLI	DRILLING FLUID LOSS, TESTS, AND
DEPT SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION
-37.3	80.0				Silt (ML)	Ш	
		1.0	SS-17	10-28-16 (44)	80.0-81.0' - grayish orange, (10YR 7/4), wet, hard, low plasticity, rapid dilatancy, moderate HCl reaction,	$\ \ $	
	81.5			(,	trace coarse gravel-sized limestone fragment, carbonate materials, 1/8" thick dark layer at 80.3'		
_					Carbonate materials, 170 trilox dark layer at 66.6	1	_
_						1	
_					-	1	-
-						1	-
-					-	┨	-
85 85	85.0				-	1	-
-42.3	00.0				Sandy Organic Soil (OH)	? ???	1
		1.2	SS-18	0-0-0 (0)	85.0-86.2' - olive black, (5Y 2/1), wet, very soft, medium to high plasticity, slow dilatancy, no HCl	}	
_	86.5			. ,	reaction, 30-40% fine silica sand	1,,,,	_
_						4	-
-					-	┨	-
-						┨	-
-					-	1	-
-					·	1	1
90	90.0				-		_]
-47.3				0-0-0	Sandy Organic Soil (OH) 90.0-91.3' - Same as 85.0-86.2' except 5-50% sand	.	_
_		1.3	SS-19	(0)	decreasing with depth	. ???	-
-	91.5				-	1	-
-					-	┨	-
-					-	1	-
-					-	1	1
-					-	1	1
						1]
95 <u> </u>	95.0				Cilé Mitéle Limentone France (ARL)	 	
-52.3	05.0	0.6	SS-20	25-50/5 (75/11")		Ш	-
-	95.9			(· -· · · /	hard, nonplastic, rapid dilatancy, moderate HCl reaction, carbonate, 1/16"-3/16" thick silt/limestone	1	-
-					interbeds	1	-
-					·	1	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07	SHEET	6	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

SOIL DESCRIPTION SOIL DESCRIPTION RECOVERY RI WITHE 6-4-4-5 SOIR MAINE, USCS GROUP SYMBOLC, COLOR, MOISTURE CONTENT, RELATIVE DEFINITION OF CONSISTENCT ON INSTRUMENTATION OF CONSISTENCY, SOIL STRUCTURE, MINISTRUMENTATION INSTRUMENTATION OF CONSISTENCY SOIL STRUCTURE, MINISTRUMENTATION OF CONSISTENCY SOIL STRUCTURE, MINISTRUMENTATION OF CONSISTENCY SOIL STRUCTURE, MINISTRUMENTATION INSTRUMENTATION OF CONSISTENCY SOIL STRUCTURE, MINISTRUMENTATION OF CONSISTENCY SOIL STRUCTURE, MINISTRUCTURE, MINISTRUCTURE, MINISTRUCTURE, MINISTRUCTURE, MINISTRUCT	WATER	LEVELS	: 1.25 ft l	ogs on 4/2	20/07	START : 4/20/2007 END : 4/20/2007	LOGGER	C.	Wallestad
105 105 105 107					STANDARD			₀	COMMENTS
105 105 105 107	LOW AND	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			2	
105 105 105 107	# 30E		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, C	COLOR, SITY OR		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
105 105 105 107	PTF EVA			#TYPE	6"-6"-6"		RALOGY	/MB	INSTRUMENTATION
10.0-10.0 4 graysh orange. (10 YR 7/4), moist. And, low plasticly, solv to rapid distancy, modester HC1 reardion, carbonate material, organic soil layers Variable AT 10.0 5 ft bys on 4/20/2007 105 105 107 110 110 110 110 1110 11	BS E				(N)			Ś	
hard, low plasticity, slow to repid dilatancy, moderate	-57.3	100:9	0.4	SS-21	50/6 (50/6")	Silt (ML) 100 0-100 4' - gravish grange (10YR 7/4)	moist /=	Ш	
106 - 62.3 110 - 47.3 115 - 72.3 1.5 1.7 1.5 1.7 1.5 1.7 1.5 1.7 1.5 1.7 1.5 1.7 1.5 1.7	_				(00.0)	hard low plasticity slow to rapid dilatancy	moderate /		Total depth of boring 100.5'
Bottom of Boring at 100.5 ft bgs on 4/20/2007 105 -62.3 -110 -67.3 -15 -72.3						HCl reaction, carbonate material, organic s	soil layers		Surface collapse; filled with grout
105 62.3 110 47.3 115 7.2.3							007		
110 -67.3 -115 -72.3									
110 -67.3 -115 -72.3							1		
110 -67.3 -115 -72.3							1		
110 -67.3 -115 -72.3							1		_
110 -67.3 -115 -72.3							1		_
110 -67.3 -115 -72.3	105						1		
-67.3 -115 -72.3	-62.3								
-67.3 -115 -72.3	-						1		-
-67.3 -115 -72.3	-						1		-
-67.3 -115 -72.3	-						1		-
-67.3 -115 -72.3	-						1		-
-67.3 -115 -72.3	-						1		-
-67.3 -115 -72.3	-						1		-
-67.3 -115 -72.3	-						1		-
-67.3 -115 -72.3	-						-		-
-67.3 -115 -72.3	110						- 1		-
	-67.3						-		
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120	-						-		-
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	120								



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07A	SHEET	1	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

START 42 12 12 12 13 14 12 13 14 14 14 14 14 14 14	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY oorly Graded Sand With Organics (SP) 0-1.1' - brownish black to brownish gray, (5YR 2/1 to YR 4/1), moist, loose, fine silica sand, 20% organic laterial decreasing with depth iity Sand (SM) 0-6.1' - moderate yellowish brown to grayish orange, 10% nonplastic fines, trace organics as roots iit (ML) 0.0-1.1' - grayish orange, (5YR 7/4), wet, very stiff, -
SAMPLE INTERVAL (II)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY oorly Graded Sand With Organics (SP) 0-1.1' - brownish black to brownish gray, (5YR 2/1 to YR 4/1), moist, loose, fine silica sand, 20% organic laterial decreasing with depth iity Sand (SM) 0-6.1' - moderate yellowish brown to grayish orange, 10% nonplastic fines, trace organics as roots iit (ML) 0.0-1.1' - grayish orange, (5YR 7/4), wet, very stiff, ———————————————————————————————————
1.1 SS-1 1.2-3 1.2-3 (5) 2.2-3 (5) 38.1 1.1 SS-2 2.2-3 (5) 38.1 1.1 SS-2 3.0 1.1 SS-3 3.8-1 1.1 SS-3 3.8-1 1.1 SS-3 3.8-1 1.1 SS-3 3.8-1 3.1	oorly Graded Sand With Organics (SP) .0-1.1' - brownish black to brownish gray, (5YR 2/1 to YR 4/1), moist, loose, fine silica sand, 20% organic laterial decreasing with depth iity Sand (SM) .0-6.1' - moderate yellowish brown to grayish orange, 10YR 5/4 to 10YR 7/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots iit (ML) iit (ML)
1.1 SS-1 1.2-3 1.2-3 (5) 2.2-3 (5) 38.1 1.1 SS-2 2.2-3 (5) 38.1 1.1 SS-2 3.0 1.1 SS-3 3.8-1 1.1 SS-3 3.8-1 1.1 SS-3 3.8-1 1.1 SS-3 3.8-1 3.1	oorly Graded Sand With Organics (SP) .0-1.1' - brownish black to brownish gray, (5YR 2/1 to YR 4/1), moist, loose, fine silica sand, 20% organic laterial decreasing with depth iity Sand (SM) .0-6.1' - moderate yellowish brown to grayish orange, 10YR 5/4 to 10YR 7/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots iit (ML) iit (ML)
1.1 SS-1 1.2-3 1.2-3 (5) 2.2-3 (5) 38.1 1.1 SS-2 2.2-3 (5) 38.1 1.1 SS-2 3.0 1.1 SS-3 3.8-1 1.1 SS-3 3.8-1 1.1 SS-3 3.8-1 1.1 SS-3 3.8-1 3.1	oorly Graded Sand With Organics (SP) .0-1.1' - brownish black to brownish gray, (5YR 2/1 to YR 4/1), moist, loose, fine silica sand, 20% organic laterial decreasing with depth iity Sand (SM) .0-6.1' - moderate yellowish brown to grayish orange, 10YR 5/4 to 10YR 7/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots iit (ML) iit (ML)
1.1 SS-1 1.2-3 (5) 2.2-3 (5) 2.2-3 (5) 38.1 1.1 SS-2 2.2-3 (5) 38.1 1.1 SS-2 3.8-1 1.1 SS-3 3.8-1 1.1 SS-3 3.8-1 3.1 3.1 1.1 SS-3 3.8-1 3.1	oorly Graded Sand With Organics (SP) 01.1' - brownish black to brownish gray, (5YR 2/1 to YR 4/1), moist, loose, fine silica sand, 20% organic laterial decreasing with depth iity Sand (SM) 06.1' - moderate yellowish brown to grayish orange, 10YR 5/4 to 10YR 7/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots iit (ML) 0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange, (5YR 7/4), wet, very stiff, 1978 1.11' - grayish orange,
43.1	ilt (ML) iit (ML) ose, fine silica sand, 20% organic laterial decreasing with depth iit (ML) one of the standard sand, 20% organic laterial decreasing with depth iit (ML) one of the standard sand, 20% organic laterial decreasing with depth iit (ML) one of the standard sand, 20% organic laterial decreasing with depth iit (ML) one of the standard sand, 20% organic laterial decreasing with depth iit (ML) one of the standard sand, 20% organic laterial decreasing with depth iit (ML) one of the standard sand, 20% organic laterial decreasing with depth iit (ML) one of the standard s
1.1 SS-1 (5) 57R 4/1), moist, loose, fine silica sand, 20% organic material decreasing with depth 5 5.0 38.T 1.1 SS-2 2.2-3 (5) 5.0-6.1 - moderate yellowish brown to grayish orange, (10787/4) wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots 5ilt (ML) 10.0-11.1 - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate	ilt (ML) iit (ML) iit (ML) iit (ML) iiterial decreasing with depth iiterial decreasing with decreasing wi
1.1 SS-2 2-2-3 (5) Silty Sand (SM) 5.0-6.1* noderate yellowish brown to grayish orange, 10/94 5/4 to 10/94 5/	ilty Sand (SM) .0-6.1' - moderate yellowish brown to grayish orange, 10YR 5/4 to 10YR 7/4), wet, loose, fine silica sand, 10% nonplastic fines, trace organics as roots
Sity Sand (SM) 5.0-6.1" - moderate yellowish brown to grayish orange, (10YR 7/4), wet, loose, fine silica sand, (20% nonplastic fines, trace organics as roots 1.1 SS-3 3-8-10 (18) 11.5 15.0 (18) 15.4 0.3 SS-4 50/5 Silit (ML) 1.1 SS-3 SIIt (ML) 1.1 SS-3 SIIt (ML) 1.1 SS-3 SIIt (ML) 1.1 SS-3 SIIt (ML) 1.1 SS-3 SIIt (ML) 1.1 SS-3 SIIt (ML) 1.1 SS-3 SIIt (ML) 1.1 SS-3 SIIt (ML) 1.1 SS-3 SIIt (ML) 1.1 SS-3 SIIt (ML) SIIt	ilt (ML) .0-6.1' - moderate yellowish brown to grayish orange, 10YR 5/4 to 10YR 7/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots iit (ML) .0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, -
38.1 1.1 SS-2 2.2-3 (5) Silty Sand (SM) 5.0-6.1' - moderate yellowish brown to grayish orange, (10YR 7/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots Silt (ML) 33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate	ilt (ML) .0-6.1' - moderate yellowish brown to grayish orange,
38.1 1.1 SS-2 2.2-3 (5) Silty Sand (SM) 5.0-6.1' - moderate yellowish brown to grayish orange, (10YR 7/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots Silt (ML) 33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate	ilt (ML) .0-6.1' - moderate yellowish brown to grayish orange,
38.1 1.1 SS-2 2.2-3 (5) Silty Sand (SM) 5.0-6.1' - moderate yellowish brown to grayish orange, (10YR 7/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots Silt (ML) 33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate	ilt (ML) .0-6.1' - moderate yellowish brown to grayish orange,
38.1 1.1 SS-2 2.2-3 (5) Silty Sand (SM) 5.0-6.1' - moderate yellowish brown to grayish orange, (10YR 7/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots Silt (ML) 33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate	ilt (ML) .0-6.1' - moderate yellowish brown to grayish orange,
38.1 1.1 SS-2 2.2-3 (5) 5.0-6.1' - moderate yellowish brown to grayish orange, (10/R 5/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots Silt (ML) 1.1 SS-3 3.8-10 (18) 1.1.5 1.5.0 2.1.6 Silt (ML) 1.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate Silt (ML) 1.0% very fine sand-sized, all carbonate	ilt (ML) .0-6.1' - moderate yellowish brown to grayish orange,
38.1 1.1 SS-2 2.2-3 (5) 5.0-6.1' - moderate yellowish brown to grayish orange, (10/R 5/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots Silt (ML) 1.1 SS-3 3.8-10 (18) 1.1.5 1.5.0 2.1.6 Silt (ML) 1.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate Silt (ML) 1.0% very fine sand-sized, all carbonate	ilt (ML) .0-6.1' - moderate yellowish brown to grayish orange,
38.1 1.1 SS-2 2.2-3 (5) 5.0-6.1' - moderate yellowish brown to grayish orange, (10/R 5/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots Silt (ML) 1.1 SS-3 3.8-10 (18) 1.1.5 1.5.0 2.1.6 Silt (ML) 1.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate Silt (ML) 1.0% very fine sand-sized, all carbonate	ilt (ML) .0-6.1' - moderate yellowish brown to grayish orange,
38.1 1.1 SS-2 2.2-3 (5) 5.0-6.1' - moderate yellowish brown to grayish orange, (10/R 5/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots Silt (ML) 1.1 SS-3 3.8-10 (18) 1.1.5 1.5.0 2.1.6 Silt (ML) 1.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate Silt (ML) 1.0% very fine sand-sized, all carbonate	ilt (ML) .0-6.1' - moderate yellowish brown to grayish orange,
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6.5 10 10.0 33.1 1.1 SS-3 3-8-10 (18) 11.5 15 15.0 28.1 15.4 0.3 SS-4 50/5 Silt (ML) 20% nonplastic fines, trace organics as roots Silt (ML) 10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate	ilt (ML)
10 10.0 33.1 1.1 SS-3 3-8-10 (18) 11.5 15.0 28.1 15.4 0.3 SS-4 50/5 Silt (ML) 28.1 15.4 0.3 SS-4 50/5 Silt (ML)	ilt (ML) 0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, -
33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate 15 15.0 28.1 15.4 0.3 SS-4 50/5 Silt (ML)	0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, -┃┃┃┃ -
33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate 15 15.0 28.1 15.4 0.3 SS-4 50/5 Silt (ML)	0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, -┃┃┃┃ -
33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate 15 15.0 28.1 15.4 0.3 SS-4 50/5 Silt (ML)	0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, -┃┃┃┃ -
33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate 15 15.0 28.1 15.4 0.3 SS-4 50/5 Silt (ML)	0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, -┃┃┃┃ -
33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate 15 15.0 28.1 15.4 0.3 SS-4 50/5 Silt (ML)	0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, -┃┃┃┃ -
33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate 15 15.0 28.1 15.4 0.3 SS-4 50/5 Silt (ML)	0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, -┃┃┃┃ -
33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate 15 15.0 28.1 15.4 0.3 SS-4 50/5 Silt (ML)	0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, -┃┃┃┃ -
33.1 1.1 SS-3 3-8-10 (18) Silt (ML) 10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate 15 15.0 28.1 15.4 0.3 SS-4 50/5 Silt (ML)	0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, -┃┃┃┃ -
1.1 SS-3 3-8-10 (18) 10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate	0.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, -┃┃┃┃ -
nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate	onplastic, rapid dilatancy, moderate HCI reaction.
11.5 10% very fine sand-sized, all carbonate	- - - - - - - - - -
28.1 15.4 0.3 SS-4 50/5 Silt (ML)	0% very fine sand-sized, all carbonate
28.1 15.4 0.3 SS-4 50/5 Silt (ML)	11
28.1 15.4 0.3 SS-4 50/5 Silt (ML)	1
28.1 15.4 0.3 SS-4 50/5 Silt (ML)	†
28.1 15.4 0.3 SS-4 50/5 Silt (ML)	
28.1 15.4 0.3 SS-4 50/5 Silt (ML)	
28.1 15.4 0.3 SS-4 50/5 Silt (ML)	4 1
28.1 15.4 0.3 SS-4 50/5 Silt (ML)]]
28.1 15.4 0.3 SS-4 50/5 Silt (ML)	
(30/3) \ \(\begin{align*} \lambda \text{15.0-15.3 - Same as 10.0-11.1' except nard} \\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\	ilt (ML)
	2.0-13.3 - Same as 10.0-11.1° except nard / 1
	11
-	11
1 1 1	4 1
1 1 1 1	4 1
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	1 1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07A	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

WATER LEVELS : 5.0 ft bgs on 4/21/07									ONIENTATION : Vertical
WATER	LEVELS	: 5.0 ft bo	gs on 4/2	1/07 •	START : 4/21/2007	END : 4/26/2007	LOGGE	<u>₹:C.</u>	Wallestad, R. McComb
300				STANDARD PENETRATION		SOIL DESCRIPTION		ğ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBOL, (COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
A SE		RECOVE	ERY (ft)			CONTENT, RELATIVE DEN		Ö	DRILLING FLUID LOSS, TESTS, AND
EV.			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, MINE	ERALOGY	₩	INSTRUMENTATION
				(N)				Ś	
23.1	20.0			E 40.4E	Silt (ML) 20 0-20 9' - Sar	me as 10.0-11.1' except da	rk vellowish		_
		0.9	SS-5	5-10-15 (25)	¬ orange (10YR 6	6/6), 1/8" thick layer at 20.5	ر, very stiff, ہے	Ш	
	21.5			(=5)		and-sized limestone fragm	ents at		
					\20.0-20.3' and 2	20.75-20.9		1	1
-							•	1	-
-								1	-
-							-	┨	-
-							-	-	-
_							-	4	_
_									_
25	25.0							<u> </u>	_
18.1					Sandy Silt (ML)) yish orange, (10YR 7/4), w	ot hard	$\ \ $	
		0.9	SS-6	10-20-23 (43)	nonplastic. rapid	d dilatancy, moderate HCI	et, nard, reaction.	Ш]
-	26.5			(43)		arse sand-sized, carbonate		1	1
-	20.5						•	1	
-							-	1	-
-							-	1	-
-							-	1	-
-							-	4	_
_								1	_
_									
30	30.0								
13.1	30.3	0.2	SS-7	50/4	Silty Sand (SM)		. Г		
-				(50/4")	dense moderat	yish orange, (10YR 7/4), we te HCl reaction, fine to coal	et, very		1
-					sand-sized, 35%	% nonplastic fines, 10% fine	e '	1	1
-						nestone fragments, carbona	ate -	1	-
-					materials			1	-
-							-	1	-
-								1	-
_								1	_
_								1	
_									
35	35.0]
8.1	35.3	0.3	SS-8	50/4	Silty Sand (SM)	, , ,	Ш	HW casing set at 35 ft below ground surface
_				(50/4")	35.0-35.3' - mod	derate olive brown, (5Y 4/4 te HCl reaction, fine to coal), wet, very	1	1
-					\sand-sized, 25%	% nonplastic fines, trace fin	ne i	1	-
-					gravel-sized lim	nestone, carbonate materia	ls -	1	-
-								1	-
-								1	
-								1]
	40.0							<u> </u>]
	40.2	0.1	SS-9	50/2 (50/2")	Limestone Frag	gments oderate yellowish brown, (1	10VR 5/4\	†]
				(50/2)		eaction, coarse sand-sized		1]
40								1]
					Begin Rock Cor	ring at 40.0 ft bgs		1	
					See the next sh	neet for the rock core log		L	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-07A

SHEET 3 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

				IENT : Dietrich D-50 5/N 252; Hidd rotary, NQ tools, HW			
WATER	LEVELS : 5.0	ft bgs	s on 4		26/20	· · · · · · · · · · · · · · · · · · ·	
≥∩ <i>⊋</i>	<u> </u>			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	SER	(%) O	150 100 100 100 100 100 100 100 100 100	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ ا	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF.F.	S S S	Ω	AC.	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
吕S급	8백분	R O	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
3.1	40.0 R1-NQ		4			Limestone	R1:2 minutes
-	1 ft 41.0 85%	0	1	40.6' - Fracture, 70 deg, smooth, undulating	╁	- 40.0-40.85' - light olive gray, (5Y	1
-	41.0 05%		NR.	to stepped, tight	亡	5/2), medium to coarse grained, strong HCl reaction, weak (R2),	1
-			>10	41.0-41.4' - Fracture zone, fragments to 2"x1"	₽	 mottled with gravish orange (10YR 	-
l _				41.75' - Bedding plane or mechanical break,		7/4), voids to 1/8" over 15-25% of	
				horizontal, smooth, undulating, tight		surface, trace cavities to 1"x1/4",	
-			0		╁	 trace fossils to 1/2"x1/4" No Recovery 40.85-41.0' 	1
-	R2-NQ		_		ш	Limestone	1
-	5 ft	0	0		+	 41.0-43.7' - light olive gray, (5Y 5/2), 	-
_	54%					fine to coarse grained, weak to	_
_					╟	moderate HCl reaction, extremely weak (R0), poorly competent, trace	
45			NR			voids to 1/16", unconsolidated sandy	
-1.9			' ' '	_	1_	silt from 42.5-43.55'	R2:2 minutes
-						No Recovery 43.7-46.0'	1
-	46.0				₩	Sandy Silt (ML)	-
-			N/A		4	- 46.0-48.25' - moderate yellowish	1 4
<u> </u>						brown, (10YR 5/4), wet, medium	
						grained, strong HCl reaction,	
-			N/A		1	 carbonate silt with 20-50% carbonate 	1
-	R3-NQ				Ш]
-	5 ft	24	>10		₩	_ Limestone	-
-	94%			49.05.40.05' Rodding plane or mechanical		48.25-50.7' - moderate yellowish brown, (10YR 5/4), medium to	
I _			4	48.95, 49.05' - Bedding plane or mechanical break (2), horizontal, smooth, planar, tight to	\Box	_ coarse grained, moderate HCl	
50				1/4" open		reaction, highly competent, voids to	
-6.9			3	49.0' - Fracture or mechanical break, vertical,	Ш	1/8" over 15-45% of rock, trace fossil	R3:3 minutes
-				smooth, planar, open 49.8, 50.1' - Fractures (2), 60 deg, rough,	╁╌	_ casts to 3/16" diameter	1
-	51.0		NR	undulating, tight		No Recovery 50.7-51.0' Limestone	l -
_			0	50.15' - Fracture, 30 deg, rough, undulating,	╀┼	51.0-56.0' - grayish orange, (10YR	-
l _				tight		7/4), fine to coarse grained,	<u> </u>
			ا م	50.4' - Fracture, 80 deg, rough, undulating, tight		moderate to weak HCl reaction,	
_			3	50.5' - Fracture, 50 deg, rough, undulating,		 extremely weak to weak (R0 to R2), voids to 1/8" over 10-40% of rock, 	1
-	R4-NQ			tight	╀	trace fossils to 1/8" diameter,	-
1 -	5 ft	11	1	52.1, 52.5, 52.85, 53.98, 54.2, 54.75, 55.4' - Bedding plane or mechanical break (7),	世	 extremely weak, fine grained rock at 	-
-	100%			horizontal and 10 deg, smooth, undulating,	1	53.5-54.2' and 55.4-55.6', voids over 10-15% of surface, 25-30% dark	R4:4 minutes
_			2	tight	世	- laminations 1/16"-3/16" thick	N4.4 IIIIIIules
55				_	$oldsymbol{oldsymbol{oldsymbol{\square}}}$		
-11.9							
	56.0		1		\Box]
-	50.0				1	_ 56.0-56.3' - Same as 51.0-56.0']
-			N/A		\prod	Silt (ML)] -
-					4	_ 56.3-57.7' - grayish orange, (10YR	-
I _			1	E7.4 F0.4Fl. Dodding along a super-land	. [[]	7/4), fine grained, strong HCl reaction, extremely weak (R0),	
				57.4, 59.15' - Bedding plane or mechanical break (2), horizontal, smooth, undulating,	 	grading to extremely weak (R0),	1
I -	R5-NQ			tight to 1/4" open		limestone, thinly bedded with 1/16"	1
-	5 ft 98%	34	0	· · · · · · · · · · · · · · · · · · ·	╁┼	thick, dark laminations (possible	1
-	9070				仜	organics) over 25% of surface Limestone	-
-			1		+	□ Limestone □ 57.7-59.7' - Same as 51.0-56.0'	-
60				_	Щ		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-07A

SHEET 4 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

START: 4/21/2007 END: 4/26/2007 LOGGER; C. Wallestad, R. McComb	/ertical
DESCRIPTION ROCK TYPE, COLOR, MIRRALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	
-16.9 N/A 61.0 N/R 61.0 N/R 61.5, 65.8' - Bedding plane or mechanical break (2), 20 deg, smooth, undulating to planar 62.3' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 10 No Recovery 60.9-64.0' Limestone 61.0-61.4' - pale yellowish brown, (10YR 6/2), fine to coarse grained, moderate HCI reaction, extremely weak to weak (R1 to R2), competent, voids to 1/8" over 5-15% of rock, trace cavities to 1.0' diameter most filled with extremely weak rock (R0), few open, trace dark laminations Sitt (ML) 61.4-62.6' - poorly competent as 56.3-57.7' Limestone 62.6-64.8' - pale yellowish brown, (10YR 6/2), fine to coarse grained, moderate HCI reaction, very weak to weak (R1 to R2), competent, voids to 4/0" wea	ITS
-16.9 N/A 61.0 N/R 61.0 N/R 61.5, 65.8' - Bedding plane or mechanical break (2), 20 deg, smooth, undulating to planar 62.3' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 10 No Recovery 60.9-64.0' Limestone 61.0-61.4' - pale yellowish brown, (10YR 6/2), fine to coarse grained, moderate HCI reaction, extremely weak to weak (R1 to R2), competent, voids to 1/8" over 5-15% of rock, trace cavities to 1.0' diameter most filled with extremely weak rock (R0), few open, trace dark laminations Sitt (ML) 61.4-62.6' - poorly competent as 56.3-57.7' Limestone 62.6-64.8' - pale yellowish brown, (10YR 6/2), fine to coarse grained, moderate HCI reaction, very weak to weak (R1 to R2), competent, voids to 4/0" wea	NG RATE AND AVING ROD
R6-NQ 5ft 98% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	
Silt (ML) R7-NQ 5 ft 100% R7-NQ 68.85' - Fracture or mechanical break, 20 deg, rough, undulating to bianal R7-NQ 68.85' - Fracture or mechanical break, 20 deg, rough, undulating to stepped, tight	
2 66.15, 66.8' - Bedding plane or mechanical break (2), horizontal, smooth, undulating, tight to 1/4" open 1 R7-NQ 5 ft 100% 5 ft 100% 68.85' - Fracture or mechanical break, 20 deg, rough, undulating to stepped, tight 1 deg, rough, undulating to stepped, tight	- -
68.85' - Fracture or mechanical break, 20 moderate HCl reaction, very weak to deg, rough, undulating to stepped, tight	-
70	- -
71.1, 73.55, 73.8' - Bedding plane or mechanical break (3), horizontal, smooth, undulating to planar, 1/16" thick infill of fines infill, tight 72.05' - Fracture, 55 deg, rough, undulating, tight 72.55' - Fracture, 70 deg, rough, undulating, tight 73.8-74.3' - Fracture zone 71.1, 73.55, 73.8' - Bedding plane or mechanical break (3), horizontal, smooth, undulating, following fines infill, tight 72.05' - Fracture, 70 deg, rough, undulating, tight 73.8-74.3' - Fracture zone 71.1, 73.55, 73.8' - Bedding plane or mechanical break (3), horizontal, smooth, undulating, following fines infill (bl.) 64.8-65.9' - poorly competent as 56.3-57.7' No Recovery 65.9-66.0' Limestone 66.0-71.0' - moderate yellowish brown, (10YR 5/4), moderate to strong HCI reaction, extremely weak to weak (R0 to R2), voids to 1/16" over 0-25% of rock, trace fossil	
75 -31.9 10 74.9' - Fracture, 85 deg, smooth, undulating 75.05' - Fracture, 60 deg, smooth, undulating 75.4' - Fracture, 50 deg, smooth, undulating 76.0 0 R8:6 minutes 77.0-72.6' - Same as 66.0-71.0' except extremely weak (R0) 72.6-73.5' - moderate yellowish brown, (10YR 5/4), coarse grained,	- - -
R9-NQ 76 77 2 96% 77 2 78.7' - Fracture, 30 deg, rough, undulating, tight 79.25-79.85' - Fracture zone, fragments to 1" moderate HCI reaction, weak to medium strong (R2 to R3), competent, voids to 3/16" over 15-30% of rock, fossil casts to 3/16"x3/8" over 5-15% of rock, trace cavities to 1/4"x1.5', trace dark material (possible organics) 73.5-74.4' - Same as 71.0-72.6'	
80 diameter	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-07A

SHEET 5 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

-				VICENT : DIEUTICH D-30 S/N 232, HIND TOTALLY, NQ TOOLS, HW		-	ORIENTATION . Vertical
WATER	LEVELS : 5.0	πbg	s on 4		26/20		
30₽	(%			DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표병은	8. H	(%) Q	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	7	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₽₩	#P.00		PA.	PLANARITY, INFILLING MATERIAL AND	₩ WBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SHR	S O	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-36.9				79.75, 79.85' - Mechanical break or fractures	Н	Limestone	R9:8 minutes
-			>10	(2), horizontal, rough, undulating, associated		- 74.4-76.0' - moderate yellowish	-
l -	81.0		NR.	with dissolution cavity, open	Н	brown, (10YR 5/4), coarse grained,	
			\vdash	80.4' - Fracture, 75 deg, rough, associated	т	moderate HCl reaction, weak to	
_			>10	with dissolution cavity, open 80.4-80.8' - Fracture zone, fragments 1.5"x2"	П	 medium strong (R2 to R3), competent, voids to 3/16" over 	1
-				81.0-81.05, 81.55-81.95' - Fracture zone (2),	Н	15-30% of rock, fossil casts to	1
l -			2	fragments 1.5"x2"	ш	- 3/16"x3/8" over 5-15% of rock, trace	1
				81.05, 81.55, 81.95' - Bedding plane or	Щ	cavities to 1/4"x1.5", trace dark	
	R10-NQ			mechanical break (3), horizontal, rough,	Н	material (possible organics)	
-	5 ft	43	3	undulating, open by fracture zones 81.45' - Fracture or mechanical break, 40	ш	 76.0-77.25' - Same as 74.4-76.0' except voids decreasing with depth 	1
-	85%			deg, rough, undulating, tight to 1/4" open	Н	77.25-78.1' - Same as 56.3-57.7'	-
_			4	82.1, 83.6' - Bedding plane or mechanical	Н	 except trace dark laminations 	
85				break (2), rough, undulating, tight to 1/4"	Ш	(possible organics)	
-41.9			0	open	\mathbb{H}	78.1-79.6' - dark yellow orange to	R10:7 minutes
-			NR	82.8' - Fracture or mechanical break, 30 deg,	Ш	moderate yellowish brown, (10YR 6/6	1 +
-	86.0		<u> </u>	smooth, planar, tight 83.45' - Fracture or joint, 60 deg, undulating,	ш	to 10YR 5/4), fine grained, strong HCl reaction, weak to medium strong	-
l _			2	as 81.5'	Н	(R2 to R3), voids to 1/8" over	
			_	84.25' - Bedding plane, <10 deg, smooth,		20-45% of rock, trace fossil casts	
-				undulating, apparently along possible organic	ш	1/4" diameter, trace cavities to 1"x2"	1
-			10	layer, tight	Н	with competent, medium strong rock	1
_				84.85' - Fracture or mechanical break, 40 deg, rough, undulating, 1/4" open		(R3) infill □ 79.6-80.8' - grayish orange to pale	
	R11-NQ		١	85.0' - 20 deg	Ш	_ yellowish brown, (10YR 7/4 to 10YR	
	5 ft 87%	51	2	86.2, 87.35, 88.9, 89.7' - Bedding plane or	Н	6/2), moderate HCl reaction, medium	1
-	0.70			mechanical break (4), horizontal, smooth,		strong (R3), competent, voids to	1
-			10	undulating to planar, tight except for fracture	Н	3/16" over 0-35% of rock, cavities to	-
90			L	zone 86.45, 86.65' - Fractures or mechanical break —	ш	3"x1" over 25-30% of rock, cavities partially filled with weak rock infill,	
-46.9			10	(2), 50 deg, rough, undulating, tight to 1"	Н	trace fossil casts to 1/2"x1/4"	R11:8 minutes
1 -	91.0		NR	open	Н	No Recovery 80.8-81.0'	1
-	31.0			87.2' - Fracture or mechanical break, 20 deg,	ш	- Limestone	1
-			2	smooth, undulating, open by fracture zone	Н	81.0-81.7' - Same as 78.1-79.6'	-
_				87.2-87.35, 89.7-90.35' - Fracture zone (2), 20 deg, up to 2"x3" diameter	╨	81.7-82.1' - Same as 79.6-80.8' - 82.1-83.3' - Same as 77.25-78.1'	
				88.75' - Fracture, 85 deg, smooth, undulating		83.3-85.25' - Same as 81.0-81.7'	
			2	89.0' - Fracture, 50 deg, smooth, undulating	\mathbb{H}	except trace 1/16"-3/16" thick dark	1
-	R12-NQ	l)		91.6' - Fracture, 20 deg, smooth, planar, tight	世	- laminations (possible organics)	1 +
-	5 ft	28	10	91.65' - Fracture, 70 deg, smooth, undulating, tight	₽₽	No Recovery 85.25-86.0' Limestone	-
I -	74%			92.55' - Fracture, 35 deg, smooth, planar,	Н	- 86.0-90.35' - pale yellowish brown to]
			10	tight	П	moderate yellowish brown, (10YR 6/2	
95			<u> </u>	92.65' - Fracture, 60 deg, smooth, planar,	Ш	to 10YR 5/4), medium grained,	1
-51.9			l	tight —	ш	— moderate HCl reaction, very weak to	R12:11 minutes —
-			NR	93.05' - Fracture, 60 deg, smooth, undulating, tight	口	medium strong (R1 to R3), competent, voids to 3/16" over	
	96.0			93.2' - Fracture, 80 deg, smooth, undulating,	Н	20-30% of rock, trace fossil casts to]
				tight	Ш	3/16" diameter, trace light gray infill	1
-			>10	93.55' - Fracture or mechanical break, 20	\vdash	material (medium strong)	1
1 -				deg, rough, undulating, 1/16"-3/16" open	Н	No Recovery 90.35-91.0'	1
-			10	93.55-94.25' - Fracture zone, fragments to 1.5"x2.5", infill in cavities	ш	Limestone - 91.0-93.55' - Same as 86.0-90.35'	1
			L	94.25' - Bedding plane, horizontal, smooth,	Н	except less voids (10-25%) than at	
1	R13-NQ			planar, open	Ľ	92.0-92.5'	1
1 -	5 ft	15	3	96.0-96.75' - Fracture zone, dark, fragments	ш	-	1
-	70%		-	to 3"x1", stain on many faces	H	-	-
_			4	96.75' - Bedding plane, horizontal, smooth, planar, tight		-]
100				pianai, tigrit	Ш		
					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-07A SHEET 6 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

Rev. 4

				DATES A MONTH OF THE PROPERTY			ORIENTATION . Vertical
WATER	LEVELS : 5.0	πpg	s on 4/	21/07	20/20	· ·	COMMENTS
≷Q£	CORE RUN, LENGTH, AND RECOVERY (%)				ဗ္ဂ	LITHOLOGY	COMMENTS
N AN	ANI YANI		LES L	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
18 H	S F F	(%) _Q	58	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦š	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FR	# <u>P</u>	Ω	AC R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	SHR	S.	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-56.9			NR	97.1' - Fracture, 85 deg, smooth, undulating,		93.55-94.7' - grayish orange, (10YR	R13:9 minutes
-				dark, tight	╁	 7/4), fine grained, strong HCI 	-
_	101.0			97.15-97.25' - Bedding plane, horizontal,	+-	reaction, medium strong (R3),	07:55
				smooth, planar, 1" thick silt, tight 97.35' - Fracture, 75 deg, smooth, undulating,	\Box	competent, voids to 1/8" over 0-15% of surface, trace cavities to 1/4"	07:55 water level = 2.5' below ground surface -
				dark, tight		diameter, tight plastic clay infilling in	NW casing set at 101 ft
				97.6-97.7' - Fracture zone, fragments to		some cavities	below ground surface
-			NR	1"x3/4" -	ш	- No Recovery 94.7-96.0'	No recovery at 101.0-104.3 -
_				98.5' - Fracture, 20 deg, rough, undulating, tight	H	Limestone 96.0-97.2' - very pale orange, (10YR	due to core barrel blockage
	R14-NQ 5 ft	9		98.85' - Fracture, 70 deg, smooth, undulating,		- 8/2), fine grained, moderate HCl	_
	34%	5		dark, tight	Н	reaction, medium strong (R3), voids	
				98.9, 99.0' - Bedding plane or mechanical		to 1/16" over 0-10% of surface, dark	_
			>10	break (2), horizontal, smooth, planar, tight	┢	staining on broken face	-
105 <u> </u>				99.15' - Fracture, 20 deg, rough, undulating,	ᡛ	97.2-97.7' - very pale orange, (10YR 8/2), fine grained, strong HCl	D14:10 minutes
-01.8			3	99.3' - Fracture, 40 deg, smooth, undulating,		reaction, extremely weak to weak	R14:10 minutes
	106.0			dark, tight		(R0 to R2), competent, voids to 1/16"	
				99.8' - Fracture, 75 deg, smooth, undulating,		over 10-20% of rock, moderately fossiliferous with casts and molds to	_
-			>10	open 104.3-104.7' - Fracture zone, dark staining on	╨	3/16"x3/8", trace dark inclusions	1
-				some faces, fragments to 3/4"x1.5"	\pm	97.7-98.9' - dark yellow orange to	-
_			>10	104.7, 104.9, 105.0, 105.15' - Mechanical	╁	 moderate yellowish brown, (10YR 6/6 	_
				break (4), horizontal, smooth, undulating		to 10YR 5/4), fine grained, moderate	
	R15-NQ		. 40	104.95' - Fracture or mechanical break, 40 deg, smooth, planar, dark, tight		HCI reaction, medium strong (R3), competent, voids between 1/16"-1/8"	
	5 ft 66%	0	>10	105.2' - Bedding plane, horizontal, smooth,	Т	over 30%, few secondary cavity	1
-	0070		0	planar, dark, open		infilling up to 1/2", strong HCl	1
-				105.4, 105.75' - Mechanical break (2) 105.7' - Bedding plane, horizontal, smooth,	₩	reaction on infilling (similar to 78.1-79.6')	
110 -66.9			ND	undulating, tight to 1/2" open —	┰	98.9-99.5' - Same as 96.0-97.2'	DAFA minutes
-00.9			NR	106.25, 107.2, 109.2' - Fractures (3), 80 deg,	┢	No Recovery 99.5-104.3'	R15:4 minutes
	111.0			smooth, undulating, dark, open (missing		Limestone	
				opposite face) 106.4-107.1, 107.5-109.0' - Fracture zone	Ш	- 104.3-105.7' - grayish orange, (10YR 7/4), fine grained, moderate to strong	1
_			10	(2), fragments to 3"x2", some dark staining		HCl reaction, medium strong (R3),	1
-				on faces in lower interval	╁	 medium strong (R3) at 105.4', voids 	-
_			0	109.0' - Fracture, 20 deg, smooth, undulating,	╀	up to 1/16" over 0-30% (mostly	_
				dark, missing opposite face 111.0-111.15' - Fracture zone, fragments to		0-5%) of surface, trace dark laminations 3/16" thick	
	R16-NQ		4.0	1"x1/4"	\vdash	105.7-106.0' - fine to medium]
1 -	5 ft 94%	46	10	111.15' - Mechanical break or bedding plane,	Ľ	grained, moderate to strong HCl	1
-	3 -1 /0			horizontal, rough, undulating, open (missing	╙	- reaction, extremely weak to very	-
-			3	opposite face) 111.35' - Fracture, 80 deg, rough, undulating,	仜	weak (R0 to R1), very weak rock at 105.75', voids up to 1/16" over 5-15%	-
115				tight —	\vdash	— of rock, trace dark inclusions	
-71.9			>10	113.25-113.6' - Fracture zone, fragments up	H	106.0-109.3' - grayish orange, (10YR	R16:3 minutes
1 7	116.0		NR	to 2" in diameter		7/4), medium to coarse grained,]
				113.25, 113.6' - Bedding plane or mechanical break (2), smooth, undulating, open (missing	\vdash	 weak to strong HCl reaction, extremely weak to weak (R0 to R2), 	1
-			10	opposite face)	匚	poorly competent, voids to 1/8" over	-
-				113.95, 114.1 - Fractures (2), 45 deg and 35	\vdash	25% of surface, fossil casts to	-
			0	deg, tight to 1" open 114.6' - Bedding plane or mechanical break,	\Box	3/4"x1/4" over 3-12% of surface, trace dark mottling]
1 _				smooth, undulating, tight to 1/4" open	\vdash	No Recovery 109.3-111.0'	
	R17-NQ			114.85' - Fracture, 80 deg, rough, undulating,	Ė	Limestone	
1 7	5 ft 100%	90	1	dark, stain	╙	111.0-115.7' - Same as 106.0-109.3'	1
-	100 /0			115.35-115.7' - Fracture zone, fragments to 2"x2"	仜	No Recovery 115.7-116.0' Limestone	-
-			1	116.6' - Fractures (2), 80 deg, smooth,	╁	116.0-119.1' - Same as 106.0-109.3'	-
120				undulating, intersecting, tight	+		
					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-07A SHEET 7 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

				IENT : Dietrich D-50 5/N 252, midd fotary, NQ tools, HW			ORIENTATION . Vertical
WATER	LEVELS : 5.0	πbg	s on 4		26/200		
ĕ9£	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	8	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ZAZ ZZZ		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE	J. H. H. H. H. H. H. H. H. H. H. H. H. H.	(%) Q	150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ö	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
- - - - - - - - - -	SING	ØΒ	SAC ER F	PLANARITY, INFILLING MATERIAL AND	J MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	222	ď	F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
-76.9				116.75' - Bedding plane or mechanical break,	Ш	Limestone	R17:5 minutes
_	121.0		0	<10 deg, smooth, undulating, tight 116.9' - Fracture or mechanical break, 60	ш	 119.1-119.5' - yellowish gray, (5Y 7/2), weak HCl reaction, weak to 	1
-	121.0			deg, smooth, undulating, tight	Ш	medium strong (R2 to R3), voids to	1
-			1	118.95' - Bedding plane or fracture, 20 deg,	╂╵┨	 1/8" over 0-20% of surface, trace 	-
_				smooth, undulating, tight	Ш	cavities to 1.5'x1/4" with no infilling	_
			1	119.5' - Bedding plane, horizontal, smooth, undulating, tight	Н	119.5-121.0' - Same as 106.0-109.3' - 121.0-123.55' - Same as	_
			'	121.6, 122.6, 125.5' - Bedding plane (3),		116.0-121.0' except increased fossil	1
-	R18-NQ			horizontal, smooth, undulating, tight	ш	casts with depth, voids up to	1
-	5 ft	99	0		$+ \Box$	- 1/2"x1/4" over 5-10% of rock	-
_	99%					123.55-123.85' - Same as 119.1-119.5' except fossil	-
_			0		H	- casts/molds to 1/2"-1/4" over 5% of	_
125					Ш	rock, trace cavities filled with clay,	
-81.9				_	H	tight, many voids infilled	R18:11 minutes
-	4000		1		Ш	 123.85-125.95' - moderate yellowish brown, (10YR 5/4), medium to 	1
-	126.0				₩	coarse grained, moderate HCl	1
_			2	126.3, 126.9, 127.1 127.65, 127.7, 127.95,	廾┤	reaction, weak (R2), voids to 1/16"	_
_				128.0, 128.4, 128.45, 129.65' - Bedding plane	Н	over 30-40% of rock, no visible	_
				(10), horizontal, smooth, undulating to planar,	Н	fossils or cavities No Recovery 125.95-126.0'	
-			10	mostly tight except at fracture zones	ш	Limestone	1
-	R19-NQ			127.65-127.7, 128.4-128.95' - Fracture zone or bedding plane (2), horizontal, fragments to	╁┼┼	126.0-127.7' - Same as	1
_	5 ft	58	10	1/2"x1/4"		_ 123.85-123.95' except extremely	-
_	90%				ш	weak to medium strong rock (R0 to R3), mostly weak rock, moderately	
					Ш	fossiliferous with echinoderm molds	
130			>10	129.65-129.95' - Bedding plane, horizontal,	Ш	to 1/2"x1/4" at 126.3-127.7', trace	1
-86.9			0	smooth, undulating to planar, mostly tight	╁┼╁	fossil molds throughout entire run	R19:10 minutes
-			NR	except by fracture zones	ш	_ 127.7-128.0' - Same as 104.3-105.7' 128.0-130.5' - Same as 126.0-127.7'	1
-	131.0		INIX	404.05.400.4.400.0.400.0.400.05.404.0	╂┼┤	No Recovery 130.5-131.0'	07:30 water level = 3.0'
_			1	131.05, 132.1, 132.3, 133.8, 133.95, 134.2, 134.3, 134.4, 134.65' - Bedding plane (9),	П	Limestone	below ground surface
				horizontal, smooth to rough, undulating to	Н	131.0-134.9' - Same as 126.0-130.5' - except moderately fossiliferous from	
				planar, tight except by fracture zones and	Ш	132.6-133.8' with casts to 1/2"x1/4"	
-			10	where missing opposite face	Н	over 5-10% of rock, bigger voids	1
-	R20-NQ			132.05, 134.65' - Fractures (2), 60 deg, rough to smooth, undulating to planar	世	and coarser texture with depth, thick	1
-	5 ft	42	10	132.5-132.65. 133.8-133.95, 134.2-134.3,	╀┦	rock as at 104.3-105.7' and 134.0-134.8'	-
-	78%			134.65-134.8' - Fracture zone (4), fragments	Ш	-	
			>10	to 1.25"x1/2" 134.2' - Bedding plane, horizontal, smooth to	Щ		
135			L	rough, undulating to planar, tight except by	Ш		1
-91.9			l	fracture zones where missing opposite face	П	No Recovery 134.9-136.0'	R20:6 minutes
I -			NR	-	╂┼┤	<u></u>	
-	136.0			136.0-136.75' - Fracture zone or bedding	口	Limestone	-
-			>10	plane, horizontal, fragments up to 1"x2"	₽₩	- 136.0-137.0' - pale olive, (10YR 6/2),	
				136.75, 136.95, 137.0, 137.2, 137.45, 137.55,	Ш	fine to medium grained, weak HCI	
				137.75, 138.1' - Bedding plane (8),	Н	reaction, medium strong (R3),	1
-			5	horizontal, smooth, planar, tight	Ш	 competent, trace voids to 1/16", trace cavities on interbeds to 1/2" thick 	1
-	R21-NQ			137.3, 138.5' - Mechanical break (2)	Ш	with increased percentage of voids to	-
-	5 ft	42	1		++	- 3/16" over 30-60% infill	-
1 -	82%				口	_]
					Н		
140			1		Ш		1
· · · · ·					1 1		
					•		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-07A

SHEET 8 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

				IENT . Diethon D-50 3/N 232, mud rotary, NQ tools, HW			ORIENTATION: Vertical
WATER	LEVELS : 5.0	ft bgs	s on 4	/21/07 START : 4/21/2007 END : 4	26/20	D7 LOGGER : C. Wallestad, R. McC	omb
	_			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
Ä N N	N. A. Y.		문	BEGOTAL HOLY	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH	E E E	(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF 문	N S S S S S S S S S S S S S S S S S S S	g	AC R	PLANARITY, INFILLING MATERIAL AND	J. ME	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	822	Ř	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROI O, ILOT REGOLTO, ETO.
-96.9				139.85' - Fracture, 70 deg, rough, undulating,	\mathbf{T}	Limestone	R21:8 minutes
-			NR	tight	╁	 137.0-138.1' - grayish orange, (10YR 	-
I _	141.0				\vdash	_ 7/4), medium to coarse grained,	
					Н	weak HCl reaction, weak to medium	
_			10	141.3' - Fracture, 80 deg, smooth, undulating,		- strong (R2 to R3), voids to 3/16" over	1
_				tight	\perp	15-40% of surface, trace fossil casts	-
			اررا	141.35' - Bedding plane or mechanical break, horizontal, smooth, undulating, machine/rock	\mathbf{H}	138.1-140.1' - moderate yellowish	
			>10	grinding, so not tight	T	 brown, (10YR 5/4), medium grained, weak HCl reaction, medium strong 	
I -	Bas NO			141.75' - Fracture, 80 deg, rough, undulating,	$-\Box$	(R3), competent, voids to 1/8" over	1
I _	R22-NQ 5 ft	8	10	tight and no grind mark	\perp	- 20-25% surface, trace fossil casts to	
	84%	0	'	141.75-143.3' - Fracture zone, associated	Н	1/2"x1/4"	
I -				with cavities, some staining (dark), fragments	T	No Recovery 140.1-141.0'	1
-			>10		口	_ Limestone	1 -
145			L_	143.3 - Fracture, 70 deg, smooth, undulating,	Щ	141.0-141.75' - Same as]
-101.9			10	open, missing opposite face	H	138.1-140.1'	R22:11 minutes
-			NR	143.7' - Fracture or mechanical break, rough, undulating, dark, 1/4" open	╁┤	141.75-145.2' - light olive gray with	1 +
_	146.0			144.0' - Fracture, 80 deg, rough, undulating,	ш	pale orange mottling, (5Y 6/1 with	
				open	\vdash	10YR 8/2), fine grained, strong HCl reaction, medium strong (R3),	
_			>10	144.0-145.2' - Fracture zone, as	₩	(possible preferential flow path,	1
-				141.75-142.3'	╁┯	oxidation/reduction), competent,	-
			2	146.0-146.7' - Fracture zone, fragments to 2"		voids to 3/16" over 10% of surface,	
			-	diameter	ш	fossil casts to 1" diameter over 5%	
I -	R23-NQ			146.7' - 20 deg, rough, undulating, dark,	+	surface, dissolution cavities to 1"x2"	
_	5 ft	42	3	open, missing opposite face	┸	over 10% surface, 1/2" cavities	_
	82%		-	146.85' - Fracture, 70 deg, rough, undulating,		without infilling, voids to 3/16" over	
				dark, tight	Ъ	30-40% of infilling, decreased	
-			3	146.95' - Fracture, 30 deg, smooth, planar 147.05, 148.45' - Fractures (2), 40 deg,	+	_ mottling with depth	-
150_				smooth, undulating	┸	No Recovery 145.2-146.0' Limestone	
-106.9			0	147.8, 148.15, 148.25' - Bedding plane (3),		146.0-149.25' - dark yellowish	R23:6 minutes
_			NR	<5 deg, rough, undulating, tight to 1/4", low	ш	orange, (10YR 6/6), fine to medium	1
-	151.0			angle fracture	╁┯╢	grained, moderate HCl reaction,	Note: offer freetures were
			1	149.35' - Bedding plane or mechanical break,		medium strong (R3), competent,	Note: after fractures were measured, it was noticed
			'	<5 deg, rough, undulating, open, missing	ш	voids to 1/8" over 5-20% of rock,	that the beginning of this
I -				opposite face	Н	- fossil casts to 1" diameter over	run is the end of R23,
-			10	149.35-149.55' - Fracture zone, fragments up	+	0-10% surface, infilling or	therefore subtract 0.9' from
				to 2"x1"		interbedded material 1"-4" thick at	all depths.
1 7	R24-NQ			149.55' - Fracture, 40 deg, smooth, planar 149.68' - Fracture, <5 deg, rough, undulating,	\square	 147.5', 148.3', 148.8', and 149.15', infilling consists of light olive gray (5Y) 	1
-	5 ft	62	>10	open, missing opposite face	╁┼┤	5/6), fine grained limestone, strong	1 -
-	100%			151.2' - Fracture, 65 deg, smooth, undulating		 HCl reaction, trace voids to 1/16".]
				to stepped, possible stain, tight		trace cavities to 3/4" diameter, dark]
1,55			2	152.25' - Fracture, 20 deg, smooth,	Ш	laminations at 149.25'	1 1
155 <u></u> -111.9			\vdash	undulating to stepped, open by fracture zone _	+	— 149.25-150.1' - Same as	R24:6 minutes —
-111.8			4	152.45' - Fracture, 40 deg, smooth,	世	138.1-140.1' except weak to medium	N24.0 Hilliules
	156.0			undulating	Ш	strong (R2 to R3), trace organics	1
-	100.0			152.45-153.05, 153.45-154.0' - Fracture zone (2), fragments 2" diameter	╂┼┤	No Recovery 150.1-151.0'	1 1
-			3	152.75' - Fracture, 20 deg, smooth,	╀┤	Limestone ☐ 151.0-155.5' - Same as] 4
			L	undulating to stepped, open		131.0-133.5 - Same as 146.0-149.25' except trace dark,]
1 7				153.3' - Fracture, 65 deg, smooth, planar,	\Box	wavy laminations at 154.5'	1
-			2	possible stain, tight	╁┼┤	156.0-158.5' - pale yellowish brown,	1 -
-				153.45' - Fracture, 85 deg, smooth, planar,	H	(10YR 6/2), fine grained, strong HCl	
	R25-NQ			open		reaction, medium strong (R3), trace]
1 7	5 ft	68	1	154.0' - Fracture, 75 deg, smooth, planar	Ш	voids and fossil casts to 1/4"	1 1
-	98%		<u> </u>	154.05' - Mechanical break	+	_ diameter	1 -
			3	154.6, 155.6, 155.8, 156.05' - Bedding plane			l J
160				(4), horizontal, smooth, undulating, tight 1/4" open			1
100				<u> </u>	1		
							1
							1



PROJECT NUMBER: BORING NUMBER: 338884.FL GSC-07A

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

SHEET 9 OF 14

				ICA/OZ		•					
WATER	LEVELS : 5.0	πbg	s on 4		26/20	·					
≷Q₽	CORE RUN, LENGTH, AND RECOVERY (%)		_	DISCONTINUITIES	<u>8</u>	LITHOLOGY	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	ANE ₹	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,				
A A B B B B B B B B B B B B B B B B B B	J. H.	(%) Q	128	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND				
FFF	NG S	ØΒ	AC.	PLANARITY, INFILLING MATERIAL AND	ΜB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.				
223	SHR	ď	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	BROI G, TEOT REGGETG, ETG.				
-116.9				156.45' - 50 deg and 80 deg, smooth, planar,	П	158.5-160.9' - interbedded rock as	R25:9 minutes				
_	404.0		10	open, missing opposite face	\top	- 156.0-158.5' with rock as	1				
-	161.0		NR)	156.5' - Fracture, 50 deg, smooth, undulating, tight	E	138.1-140.0' in layers 2"-4" thick, dark, wavy laminations (1/8") at	-				
-			1	156.65' - Fracture, 65 deg, smooth, planar,	₽	- 158.85'	-				
l _				tight		No Recovery 160.9-161.0'					
				156.7, 159.05, 159.15,159.5, 160.35, 160.5' -	\vdash	Limestone					
_			10	Bedding plane (6), horizontal, smooth, undulating, tight, some planar	╁	 161.0-163.5' - Same as 138.1-140.1' except moderate yellowish brown to 	1				
-	R26-NQ			157.15' - Fracture, 50 deg, smooth,		dark yellowish brown (10YR 4/2 to	1				
-	5 ft	23	>10	undulating, tight	╁╌	 10YR 5/4) mottling from 161.7-163.5' 	_				
_	70%			157.7' - Fractures (2), 70 deg and 5 deg,		163.5-164.5' - pale yellowish brown,					
			>10	smooth, undulating, open, missing opposite face	╨	(10YR 6/2), fine to medium grained, strong HCl reaction, medium strong					
165				158.95' - Fracture, 65 deg, smooth,		(R3), voids to 1/8" over 10-20% of	1				
-121.9			NR	undulating, tight	1	rock, fossil cavities to 1/2"-1/4" over	R26:8 minutes				
-				160.35-160.5' - Fracture zone, fragments up	╁	_ 5-10% of rock, possible high	-				
-	166.0			to 1"x2' 161.85' - Fracture, 45 deg, smooth,		percentage of dissolution cavities as evidence by fracture zone breakage	-				
l -			NR	undulating, tight	┢┰	pattern					
			>10	162.15' - Fracture or mechanical break,		No Recovery 164.5-166.6'					
-				smooth, undulating, tight to 1/4" open	₽	Limestone					
-			>10	162.5' - Bedding plane, <10 deg, smooth, undulating, tight		_ 166.6-168.7' - Same as 163.5-164.5'					
-	R27-NQ			162.0-164.5' - Fracture zone, fractures	╂-	-	Moderate chatter at 168.0-				
_	5 ft	42	>10	associated with dissolution cavities	╁	_ -	168.5'				
l _	88%			166.6-168.7' - Fracture zone, fragments to	\perp	_ 168.7-171.0' - Same as 163.5-164.5'					
				3"x2", average 1/4" diameter, associated with possible dissolutions cavities	\vdash	except pale yellowish brown to dark					
170			2	168.7, 169.8, 169.85, 170.2, 170.35' -	L	yellowish orange, (10YR 6/6 to 10YR 6/2), fine grained, voids to 1/16" over					
-126.9				Bedding plane (5), horizontal and 10 deg, —	╁┴	5-20% of surface, few cavities to	R27:7 minutes				
-							2	smooth, planar, dark, tight except next to fracture zone		 1/8"-3/4", medium strong (R3), 	-
_	171.0			iracture zone	╁┼	moderate HCl reaction	_				
			5			171.0-171.5' - Same as 168.7-171.0'					
				171.55, 173.55' - Fractures (2), 60 deg,	\vdash	171.5-172.2' - light olive gray, (5Y					
_				rough, undulating, tight		 5/2), very fine grained, mild HCl reaction, very strong (R5), voids to 	1				
-			10	171.65, 171.75, 171.85, 172.3' - Bedding plane (4), horizontal, smooth, undulating,	1	3/16" over 5% of surface, weak HCl	-				
-	R28-NQ			tight	ᡛ	 reaction, 1" thick, fine grained 	1				
-	5 ft	55	10		\Box	section at 171.7' 172.2-173.6' - dark yellowish orange,	1 4				
I -	100%			173.55' - Bedding plane, 10 deg, smooth, undulating, tight	\bot	- (10YR 6/6), fine to medium grained,]				
			10	173.65' - Fracture, 45 deg, rough, undulating,		mild HCl reaction, weak (R2), with					
175			10	tight	\vdash	light olive gray, moderate to coarse	1				
-131.9				174.9-174.95' - Bedding plane, 10 deg,	仜	— grained (80% orange, 20% gray, bimodal), 1/16" voids over 40%,	R28:7 minutes				
-			10	smooth, undulating, associated with	╂┯	trace larger voids/cavities (<3/16")	1				
-	176.0			lamination surfaces, tight 174.95-175.55' - Fracture zone, fragments to		 173.6-176.0' - pale yellowish brown 	-				
I -			10	3"x1"	₽	to dark yellowish orange, (10YR 6/2					
			Ľ	175.55' - Fracture, 30 deg, smooth, planar,		to 10YR 6/6), very fine grained, 5-10% voids (1/16"), 5% cavities					
1 -				tight 175.7' - Fracture, 70 deg, smooth, planar,	\vdash	from round 1/4" to 1/4"x1/2"	1				
-			10	tight	1	elongate, fossiliferous, strong (R4)	1 1				
-	R29-NQ			175.85' - Fracture, 20 deg, smooth, planar,	\coprod	_ dropping to weak to medium (R2 to	1 -				
l -	R29-NQ 5 ft	45	10	tight	╁┼	R3) below 174.8', HCl reaction similar to 163.5-164.5'	1				
	100%	.	L	176.0-176.25' - Fracture zone, fragments to 1"x2"	广	_ 176.0-181.0' - Same as 173.6-176.0'					
				1 1 1	\vdash	except weak to medium strong (R2 to	1				
180			2		\Box	- R3)	1				
100					1						
					1						
					1		1				



PROJECT NUMBER: BORING NUMBER: 338884.FL

GSC-07A

SHEET 10 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.0	ft bgs	on 4/	21/07 START : 4/21/2007 END : 4/	26/20	07 LOGGER : C. Wallestad, R. McC	comb											
≥∩≘	_ (ŷ			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS											
ANI (#)	AND % %		ŒS T	DESCRIPTION	O LC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,											
TH BI	E RU	(%) Q	FOOF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD											
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	ROI	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.											
-136.9				176.25' - Fractures (2), 70 deg and 40 deg,	Ë		R29:10 minutes											
-	181.0		10	smooth, planar, open, intersecting fractures, fracture zone		-	1											
-	101.0			176.55' - Bedding plane, horizontal, smooth,	H	Limestone	1											
_			>10	undulating, tight to 1/4" open 176.9, 177.0' - Fractures (2), horizontal,	F	 181.0-185.2' - pale yellowish brown to dark yellowish orange, (10YR 6/2 	1											
				. 40	smooth, undulating, fragments to 1"x1/4" 177.8' - Fracture, 75 deg, smooth, undulating,	H	to 10YR 6/6), fine to very fine	1										
			>10	open by fracture zone		 grained, strong HCl reaction, medium strong to very strong (R3 to]											
	R30-NQ 5 ft	8	>10	177.8-178.2' - Fracture zone, fragments to 2" diameter	H	R5)												
	84%		- 10	178.2' - Fracture, 75 deg, smooth, undulating,	H	_												
_			>10	dark, open 178.35' - Fracture, 55 deg, smooth, planar,	L	-												
185 <u>-</u> -141.9			1 ,	dark, tight 178.45, 178.7' - Fractures (2), 55 deg, —	₽	_												
-141.9			NR	smooth, undulating, tight		_ No Recovery 185.2-186.0'	R30:9 minutes											
_	186.0			178.85-179.1' - Fracture zone, fragments to 1" diameter		Limestone	-											
-			>10	179.9' - Fracture, 20 deg and 55 deg, smooth, planar, tight	I	- 186.0-189.4' - Same as 181.0-185.2'	1											
-			H		180.0' - Fracture, 30 deg, smooth, planar,	仜	except strong to very strong (R4 to R5)											
-			>10	dark, tight 180.75-181.0' - Fracture zone, fragments to	仜	-	1											
-	R31-NQ			1"x2"		-												
-	5 ft 68%	0	>10	(2), fragments to 2"x2", some staining	\vdash	-	1											
-			>10	181.45' - Fracture, 20 deg, smooth, planar, open by fracture zone	\vdash	-	1											
190															181.65' - 10 deg and 75 deg, smooth,	F	No Recovery 189.4-191.0'	Core blockage
-146.9			NR	undulating to planar, tight 181.85, 181.9' - Fractures (2), 75 deg,	F		R31:6 minutes											
	191.0			smooth, planar, tight 184.35' - Fracture, 85 deg, smooth,	F													
_			10	undulating, dark, open by fracture zone		Limestone - 191.0-191.4' - Same as 186.0-189.4'												
_				184.65' - Bedding plane, <5 deg, smooth, undulating, tight	H	191.4-195.9' - moderate yellowish												
_			>10	185.0' - Fracture, 85 deg, smooth, undulating, open by fracture zone	H	brown, (10YR 5/4), fine grained, - moderate HCl reaction, medium												
-	R32-NQ			186.0-189.4' - Fracture zone, fragments to	₽	strong (R3), voids to 1/8" over 10-25% of rock, fossil casts to 1/4"	-											
-	5 ft	65	3	5"x2", dark staining on many faces 191.0-191.3' - Fracture zone, fragments to 3"	₽	 diameter over 5-10% of rock, trace 	1											
-	98%			x 1"		dissolution cavities filled with lighter colored porous rock; 193.1-193.2'	-											
195		. [0	191.3' - Fracture, 40 deg, smooth, undulating, dark, some staining, open to fracture zone	仜	 same as 191.0-191.4' and 181.0-189.4' 	1					
-151.9				192.2' - Fracture, 60 deg, rough, undulating, — tight	仜		R32: Run time not											
-	196.0		1	192.5' - Fracture, 70 deg, rough, undulating,	口	-	recorded -											
	. 55.5		NR)	tight	世	No Recovery 195.9-196.0' Limestone	1											
1			8	in diameter 192.8' - Bedding plane, 10 deg, rough,	Ь	196.0-198.9' - pale yellowish brown	1											
			>10	undulating, low angle fracture, tight	Ь	to grayish orange, (10YR 6/2 to 10YR 7/4), very fine grained, strong]											
	_		- 10	193.15' - Bedding plane, <10 deg, smooth, planar, tight	\vdash	HCl reaction, strong to very strong (R4 to R5), 5-10% voids (1/16"),]											
	R33-NQ 5 ft	60	2	193.25' - Fracture, 50 deg, smooth, planar, tight	F	trace cavities from 1/4" round to]											
-	97%			193.75' - Fracture, 30 deg, smooth, planar,	F	1/4"x1/2"	-											
-			0	tight 195.7' - Bedding plane, horizontal, smooth,	H	-	-											
200				planar, tight to 1/4" open	H		-											
					_		-											



PROJECT NUMBER: BORING NUMBER: 338884.FL

GSC-07A

SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 5.0	ft bgs	s on 4/	21/07 START : 4/21/2007 END : 4/2	26/200	7 LOGGER : C. Wallestad, R. McC	omb
\$ D €	(%)			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BI	E RU 3TH, OVEF	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR!	COR	RQ	-RA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×MI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-156.9	014			196.45, 196.6' - Bedding plane (2),		Limestone	R33: Run time not
_	204.0		>10	horizontal, smooth, planar to undulating,	╁┼	- 198.9-200.85' - pale yellowish brown	recorded -
-	201.0		NR)	dark, some staining, tight to 1/8" open 196.8' - Fracture, 80 deg, smooth, undulating,	Ħ	to grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, moderate	1
-			1	dark, some staining, tight to 1/16" open - 197.0' - Fracture, 50 deg, smooth, undulating,	Ħ	 HCl reaction, strong (R4), 2" infilling of elongate cavities 1/8"-1/2" wide 	-
-				tight	Ш	and up to 1" long with dark gray	1
_			10	197.05' - Fracture, 10 deg, smooth,	╁┼╂	 infilling, 10% voids (1/16"), trace cavities predominantly round up to 	1
_	R34-NQ			197.2' - Fracture, 75 deg, rough, undulating,	Ш	1/2"	1
_	5 ft 100%	58	>10	open - 197.2-197.7' - Fracture zone, fragments	ш	No Recovery 200.85-201.0' Limestone	1
_	10070			2-1/2"x 1", some dark staining	ш	201.0-201.3' - pale yellowish brown,	1
205			5	198.3' - Fractures (2), 65 deg and 25 deg, smooth, planar, tight, intersecting	\Box	 (10YR 6/2), fine grained, moderate to strong HCl reaction, medium strong 	1
-161.9				200.35' - Bedding plane, horizontal, smooth,	뮈	(R3), competent	R34: Run time not
_	206.0		3	planar to undulating, dark, some staining, tight to 1/16" open	Ħ	201.3-206.0' - pale yellowish brown to grayish orange, (10YR 6/2 to	recorded -
-				200.35-200.85' - Fracture zone, fragments 1"x2"	丗	10YR 7/4), fine grained, strong HCI	1
-			>10	201.5' - Fracture, 40 deg, smooth, undulating,	Ш	reaction, medium strong (R3), competent, voids to 3/16", trace	1
				tight	Н	fossil cavities, trace dark laminations to 3/16" thick, yellowish orange,	1
			3	undulating, tight	Ш	porous inclusions to 1"x1/2" over	1
	R35-NQ		. 40	202.8' - Fractures (2), 60 deg, smooth, undulating, 2 parallel fractures, tight	Ш	5-10% of rock from 201.3-203.5' 206.0-207.2' - Same as 201.0-201.3'	1
	5 ft 98%	48	>10	202.9-203.7' - Fracture zone, fragments to		except trace laminations (3/8" thick)	1
			. 10	3-1/2"x1"	Н	with high void % and one cavity 1"x1/8"	1
210			>10	undulating, tight	H	207.2-210.9' - moderate yellowish	1
-166.9			3	204.0, 204.5, 204.75. 205.3' - Bedding plane (4), horizontal, smooth, planar to undulating,	H	brown to light olive gray, (10YR 5/4 to 5Y 5/2), fine grained, moderate	R35: Run time not
	211.0			tight to 1/4" open	Щ	HCl reaction, weak to medium strong (R2 to R3), voids to 3/16" over 30%	recorded
	·		(<u>NR</u>) 1	204.15' - Fracture, 20 deg, smooth, undulating, tight to 1/4" open	Ш	of rock, trace fossil casts to	
			'	205.4' - Fracture, 80 deg, smooth, undulating, tight	Н	1/2"x1/4", suspected dissolution in fracture zones, secondary infilling]
			10	206.0-206.3' - Fracture zone, fragments to	円	with light olive gray, medium strong]
				1.5"x1" 206.3' - Bedding plane, horizontal, smooth,	川	rock (R3) to 2"x1/2" in brown rock, - moderate HCl reaction]
_	R36-NQ 5 ft	52	>10	planar to stepped, open to fracture zone	Ш	No Recovery 210.9-211.0']
	99%			207.05' - Bedding plane, horizontal, smooth, planar, tight -	団	Limestone - 211.0-211.4' - Same as 207.2-210.9'	
-			2	207.2' - Fracture, 70 deg, smooth, planar,	\square	211.4-212.9' - yellowish gray to	
215_ -171.9				tight 207.85' - Fracture, 40 deg, rough, undulating, —	郉	grayish orange, (5Y 7/2 to 10YR 7/4), — very fine grained, very strong HCl	P26: Pun time not
-171.9			2	tight 208.35' - Fracture, vertical and 40 deg,	H	reaction, strong (R4), no voids, trace 1/4" cavities, HCl reaction similar to	R36: Run time not recorded -
-	216.0		NR/	rough, undulating, open, missing opposite	坩	_ 201.0-201.3	-
-			0	face 208.6-208.95' - Fracture zone, fragments to	出	212.9-215.95' - pale yellowish brown to moderate yellowish brown, (10YR	-
-				1.5"x1"	₽₽	6/2 to 10YR 5/4), fine grained,	-
-			0	209.0' - Bedding plane, horizontal, smooth, planar, tight	Ш	moderate to strong HCl reaction, medium strong to strong (R3 to R4),	-
-	R37-NQ			209.5-210.0' - Fracture zone, fragments to	団	voids to <1/16" from 10-30%, a few	-
-	5 ft	80	1	1.5"x1" 210.25' - Fracture, 30 deg, smooth,	団	to many cavities up to 1/2" No Recovery 215.95-216.0'	-
-	98%			undulating, tight to 1" open 210.6' - Fracture, 30 deg, smooth, undulating,		-	-
-			3	tight to 1/2" open	\Box	-	-
220					目	-	
					_		•



BORING NUMBER: PROJECT NUMBER: 338884.FL

GSC-07A

SHEET 12 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.0	ft bgs	s on 4/	21/07 START : 4/21/2007 END : 4/	26/200	D7 LOGGER : C. Wallestad, R. McC	Comb
>00	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SLOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TRU STH,	D (%)	T.00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	3OLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF SURF SLEV	SECO	RQD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-176.9	076	ш.	44	211.8, 212.1, 212.25, 212.3, 212.4, 212.65' -	0)	Limestone	R37: Run time not
-			2	Bedding plane (6), 25 deg, smooth, planar,	H	- 216.0-216.5' - Same as 201.0-201.3'	recorded -
_	221.0		NR)	tight except by fracture zone 212.35' - Fracture, 25 deg, smooth, planar,	Ħ	and 211.4-212.9', 216.5-218.6' except trace voids to 1/16" and layers	-
-			5	open, missing opposite face -	H	 1/4"-1/8" thick with infill materials as 	-
-				212.65-213.6 - Bedding plane, 25 deg, smooth, planar, tight except by fracture zone	Ш	216.5-218.6' 216.5-218.6' - yellowish gray, (5Y	-
_			>10	213.6' - Fracture, 25 deg, smooth, planar,	Н	 7/2), medium to coarse grained, weak to moderate HCl reaction, 	-
_	R38-NQ			214.0' - Fracture, 60 deg, smooth, undulating,	ш	weak to medium strong (R2 to R3),	
_	5 ft 68%	23	10	tight - 214.6' - Fracture, 45 deg, rough, undulating,	ш	 voids to 1/8" over 20-30% of rock, fossil casts to 1/2" diameter over 5% 	-
_	0070		10	tight	ш	of rock, trace inclusions of dusky	1
225				215.6' - Fractures (2), 60 deg and 40 deg, smooth, undulating, intersecting fractures,	Н	 yellow (5Y 7/4), low percentage of voids, infill to 4"x2" 	=
-181.9			NR	tight to 1/8" open 215.75' - Fracture, 30 deg, smooth, planar,	${\mathbb H}$	218.6-220.5' - Same as 201.0-201.3'	R38: Run time not
_	226.0			tight to 1/8" open	H	 and 211.4-212.9' except trace voids to 1/16" and layers 1/4"-1/8" thick 	recorded -
_				218.6' - Fractures or bedding plane (2), 35 deg and horizontal, smooth, planar to	Ħ	with infill materials as 216.5-218.6' 220.5-220.9' - yellowish gray, (5Y	1
_			10	stepped, intersecting fractures, open, missing	Ш	7/2), medium to coarse grained,	1
			10	opposite face 219.0, 219.3, 219.75' - Bedding plane (3), <5	Н	weak to moderate HCl reaction, weak to medium strong (R2 to R3),	
_			10	deg, rough, undulating, tight to 1/4" open	Ш	voids to 1/8" over 20-30% of rock,	1
	R39-NQ 5 ft	35	4	219.9-220.0' - Fractures (3), 0,90,50 deg, smooth, planar, intersecting fractures, tight to	Ш	fossil casts to 1/2" diameter over 5% of rock, trace inclusions of dusky	
	92%	33	4	1" open, missing opposite face	Ш	yellow (5Y 7/4), low percentage	
_			>10	220.5-220.55' - Fracture zone, fragments to 1/2" diameter	M	voids, infill to 4"x2" No Recovery 220.9-221.0'	Chattering (moderate) at 229.0'
230			- 10	221.5, 221.65, 221.9, 223.3, 223,4, 223,55, 223.65, 223.9, 224.1' - Bedding plane (9), —	1411	Limestone 221.0-221.6' - moderate yellowish	
-186.9 -			10	horizontal and 5 deg, smooth, planar, tight	Ħ	brown, (10YR 5/4), fine grained,	R39: Run time not recorded -
_	231.0		NR	except by fracture zone 221.6, 223.35' - Fractures (2), 80 deg,	H	moderate to strong HCl reaction, strong to very strong (R4 to R5),	_
_			10	smooth, undulating, tight 221.95' - 50 deg, smooth, undulating, tight	Н	15-20% <1/16" voids, laminar appearance in both color and void	R. McComb begins logging
_				222.55-222.9' - Fracture zone, fragments to	Ш	percentage, transitions from above	R. McComb begins logging -
-			10	2"x1/2", mostly 1" diameter 223.0' - Bedding plane, 5 deg, rough,	Н	and below gradual 221.6-221.75' - yellowish gray, (5Y	-
-	R40-NQ			undulating, tight to 1/2" open -	Н	- 7/2), fine grained, strong HCl	-
_	5 ft	30	>10	223.55' - Bedding plane, horizontal and 5 deg, smooth, planar, tight except by fracture	Ш	reaction, strong to very strong (R4 to R5), no voids as 201-201.3' and	-
-	92%			zone -	囯	- 211.4-212.9', gradual transitions above and below	-
225			>10	223.65-223.9' - Fracture zone, fragments to 2"x1/2", mostly 1" diameter	団	221.75-223.7' - grayish orange to	
235 <u>-</u> -191.9			>10	223.9' - Bedding plane, horizontal and 5 deg, — smooth, planar, tight except by fracture zone	Ш	yellowish orange, (10YR 7/4 to 5Y 7/2), fine grained, strong HCl	R40: Run time not
-	236.0		NR	224.1-224.15' - Fracture zone, fragments	Ы	reaction, very weak to weak (R1 to	recorded -
-	_00.0			1/2"x1/4" 226.0-226.2, 227.65-227.8, 230.1-230.15,	\mathbb{H}	R2), voids to 1/16" over 5-25% of surface, many cavities up to 3/4"	1
-			>10	230.4-230.45' - Fracture zone (4), fragments to 2"x1"	Ħ	some of which infilled with 25% void rock, strong HCl reaction throughout	1
			. 40	226.7' - Mechanical break	\parallel	223.7-224.2' - Same as	1
			>10	227.25' - Mechanical break 227.6, 227.65, 227.8, 228.2, 228.45, 228.5,	$\parallel \parallel$	221.6-221.75' 224.2-224.4' - Same as	1
	R41-NQ		>10	228.9, 229.15, 230.3' - Bedding plane (9),	Н	221.75-223.7'	1
	5 ft 70%	10	>10	horizontal, smooth, undulating to planar, tight except by fracture zones	Н	No Recovery 224.4-226.0']
			>10	230.3' - Bedding plane, horizontal, smooth, undulating, tight except by fracture zone	H]
240				undulating, tignt except by fracture zone	Д		
ldot							



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-07A

SHEET 13 OF 14

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER LEVELS : 5	0 ft bg	s on 4	/21/07 START : 4/21/2007 END : 4/	26/20	007 LOGGER : C. Wallestad, R. McComb
≥∩ ⊕ - ⊚			DISCONTINUITIES	ပ္ခ	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ff) CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS RIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-196.9	1	NR	231.1' - Fracture, <10 deg, rough, stepped,		Limestone R41: Run time not
241.0 	2 0	>10	rough, undulating, open 232.9-233.4' - Fracture, 80 deg, rough, undulating, open 233.4-234.5, 234.8-235.6' - Fracture zone (2), <10 to horizontal deg, rough, stepped to undulating, open 236.0-237.0, 237.0-238.0' - Fracture zone (2), horizontal to 90 deg, rough, stepped to undulating, open 238.0-239.5' - Fracture zone, various orientations, predominantly limestone gravel 241.0-241.9' - Fracture zone, various		226.0-277.65' - yellowish gray, (5Y 7/2), medium grained, strong HCI reaction, weak to medium strong (R2 to R3), voids to 1/8" over 5-25% of rock decreasing with depth, fossil casts to 2"x 1" over 5-10% of rock Limestone 227.65-229.15' - yellowish gray, (5Y 7/2), medium grained, strong HCI reaction, extremely weak to weak (R0 to R2), trace voids to 1/16", trace cavities to 1"x2", dark laminations to 1/8" thick over 10-20% of surface Clay With Silt (CL-ML) 229.15-229.85' - medium plasticity, poorly competent, clay and silt with
246.0		>10	gravel-sized to fine cobble-sized limestone fragments		limestone fragments to 1/4", strong pungent sulfur or petroleum odor (fetid) 229.85-230.6' - Same as 227.65-229.15'
R43-N - 843-N - 5 ft - 48%) 0	>10	247.0' - Mechanical break - - - -		No Recovery 230.6-231.0' Limestone 231.0-235.2' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids up to 1/16" over 15-20%; 4/26/07 11:35 total depth at
250 -206.9 -251.0		NR			 <3-5% from 232.8-233.8', where limestone appears to become conglomerate (harder fragments — within matrix), cavities up to 3/4"-1-3/16"x3/8"-3/4", penetrate into
251.0					core surface, becomes thickly laminated and less fragmented with depth with voids and cavities 235.2-235.6' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, extremely weak (R0), poorly competent, somewhat friable; crumbles to silt and sand-sized material (5-10%) No Recovery 235.6-236.0' Limestone 236.0-239.1' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak (R1), poorly competent to competent, somewhat friable, voids up to 1/16" over 50-60% of surface, cavities >5, 2"x2", trace fossil molds/casts 239.1-239.5' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, strong (R4), competent, voids covering 3-10% of surface No Recovery 239.5-241.0'



WATER LEVELS: 5.0 ft bgs on 4/21/07

PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07A	SHEET	14	OF	14	

ROCK CORE LOG

LOGGER: C. Wallestad, R. McComb

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

START: 4/21/2007

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

END: 4/26/2007

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

	LLVLLS . J.	l	3 011 4		0,20		
ĕ₽£	<u> </u>			DISCONTINUITIES	၁၉	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B C C C C C C C C C C C C C C C C C	SF휴	(%) Q	TUR 00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	S I	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
FEV.	NG NG	οD	AC.	PLANARITY. INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
BSH	응끸뿞	8	FR	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ς	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
						Limestone	1
-				-		- 241.0-241.9' - yellowish gray, (5Y	-
-				-		7/2), mild HCl reaction, very weak (R1), competent, broken into	_
_				_		gravel-sized fragments, voids <1% to	_
						over 30-40%, cavities up to 1" and	
						penetrating 10% of rock	_
_				-	1	No Recovery 241.9-246.0' Limestone	-
-				-		246.0-248.4' - yellowish gray, (5Y	-
-				-		7/2), fine grained, weak to moderate	_
_				<u>-</u>		HCl reaction, extremely weak to	_
						weak (R0 to R2), competent, become friable at depth, voids and cavities	_
]				_		over 20-30% of surface >10%,	1
-					1	limestone at 248.0' becomes	_
-				-	1	 extremely weak, friable, trace fossil casts and molds 	-
-				-		Casts and moids No Recovery 248.4-251.0'	-
_				<u>-</u>		- Bottom of Boring at 251.0 ft bgs on	_
						4/26/2007	
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-08	SHEET	1	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

WATER	LEVELS	: 13.8 ft k	ogs on 04	/22/07	START : 4/21/2007 END : 4/23/2007 LOGGE	R : C.	Dougherty
				STANDARD	SOIL DESCRIPTION	g	COMMENTS
AND N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICOS OPOLID CVARDOL COLOR	O LO	DEDTIL OF CACING DOULING DATE
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION
43.2	0.0				Poorly Graded Sand With Organics (SP)		Began drilling at 16:30, 4/21/07
		1.2	SS-1	2-2-2 (4)	0.0-0.9' - medium light gray, (Ñ6), moist, loose, fine بر silica sand, organic material, trace nonplastic fines,	1	
	1.5			(' '	plant roots Silty Sand (SM)		
_					\0.9-1.2' - grayish brown, (5Y 3/2), moist, loose, fine	1	_
-					silica sand, 25% nonplastic fines, organic material	-	-
-						-	-
-							-
-						1	-
5	5.0				,	1	_
38.2					Poorly Graded Sand With Silt (SP-SM) 5.0-5.9' - grayish yellow, (5Y 8/4), wet, loose, fine		
		0.9	SS-2	2-3-3 (6)	silica sand, 5-10% nonplastic fines, some plant roots		
-	6.5			` ,		1	_
-						-	-
-						1	-
-						1	-
-						1	-
-						1	1
10	10.0						
33.2				3-4-4	Silty Sand (SM) 10.0-11.0' - yellowish gray, (5Y 7/2), wet, loose, fine		_
-		1.0	SS-3	(8)	grained, fine silica sand, 25% low plastic fines		-
-	11.5					-	-
-						1	-
-						1	-
-						1	
_						1]
15	15.0				City Cond (CM)	1	_
28.2		1.0	00.4	3-2-3	Silty Sand (SM) 15.0-15.95' - Same as 10.0-11.0'	-	-
-	10.5	1.0	SS-4	(5)		1111	-
-	16.5					1	-
-						1	-
-						1]
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20						1	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-08	SHEET	2	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

	WATER LEVELS : 13.8 ft bgs on 04/22/07 START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty									
WATER	LEVELS	: 13.8 ft k	ogs on 04	l/22/07 S	START : 4/21/2007	END : 4/23/2007	LOGGEF	: C.	Dougherty	
≥ ∩ ⊕				STANDARD PENETRATION		SOIL DESCRIPTION		ဗ္ဂ	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NIVANI	E, USCS GROUP SYMBOL, (COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,	
H H H H H H H H H H H H H H H H H H H		RECOVE	ERY (ft)			E, USCS GNOUP STWIBOL, V E CONTENT, RELATIVE DEN		OLI	DRILLING FLUID LOSS, TESTS, AND	
F.F.F.			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MIN	ERALOGY	ΥME	INSTRUMENTATION	
				(N)	0:11 0 1/014	*		Ś		
23.2	20.0			2-2-3	Silty Sand (SM 20.0-21.3' - Sar	1) me as 15.0-15.95'	_		_	
l _		1.3	SS-5	(5)	20.0 2.10 04.	45 1010 10100	_			
	21.5			(-)				4.14.		
-							_	1	1	
-							_	1	1	
-							_		-	
-							_		-	
-							_		-	
-							-		-	
-							_		-	
25 <u> </u>	25.0				Ciller Cond /CM	4 \		7-17-	-	
10.2				2-2-3	Silty Sand (SM 25.0-25.5' - Sar	") me as 15.0-15.95' and 20.0)-21.3'	Щ	_	
-		1.0	SS-6	(5)	Clavey Sand (S	SC)			_	
l _	26.5				\ 25.5-26.0' - yell	lowish gray, (5Y 7/2), moist % medium plastic fines	t, loose, fine $/$		_	
<u> </u>					Silica Saliu, 307	76 Medium piastic ililes				
							_			
-							-	1	1	
-							_		1	
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-							-		-	
30 <u> </u>	30.0				Silty Sand (SM	1)		111	Driller's Remark: Weight of hammer drove	
-		۱.,	00.7	0-0-1	√ 30.0-30.35' - da	ark yellowish orange, (10YF	R 6/6), wet,		sampler through top 12 inches of sample -	
-		1.4	SS-7	(1)		e grained, silica sand, 30% s s, 30.35' abrupt contact in r			Stop work for the day, drilled to 30.0' below ground surface, collected 30.0-35.35',	
_	31.5					fat clay (CH) seam	Tialeriais,	7//	stopped at 17:35	
_					Clayey Sand (S	SC)			Drilling resumes 08:40, 4/22/07	
l _					30.35-31.35' - y	yellowish gray with medium /2 with N5), moist, very loos	gray		Water level 13' 10" below ground surface at 08:30	
l _						sand, 35% medium to high				
					<u>e</u>	•				
-							_			
-							-		1	
35	35.0						-		1	
8.2	JJ.U				Sandy Fat Clay	y (CH)			Slough at top of 35.0-36.5' has silty sand	
-		1.5	SS-8	2-5-8	35.0-36.5' - me	edium gray with yellowish gr	ay mottling, -		with iron oxide modules up to 1/4" (most -	
-		'.5	00-0	(13)		7/2), moist, medium stiff, hig sand increasing with depth	gn plasticity, _ _ mottling		about 1/16")	
-	36.5				increasing with		,eg	///	-	
-									-	
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PROJECT NUMBER:	BORING NUMBER:
338884.FL	GSC-08

SHEET 3 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

	WATER LEVELS: 13.8 ft bgs on 04/22/07 START: 4/21/2007 END: 4/23/2007 LOGGER: C. Dougherty									
WATER	LEVELS	. ।उ.४ ॥ १	ys on U4			UGGEF	ւ : Մ. 	Dougnerty COMMENTS		
≥□⊋				STANDARD PENETRATION	SOIL DESCRIPTION		SG	COIVIIVIEN I S		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,		
A B B C C C C C C C C C C C C C C C C C		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR		l log	DRILLING FLUID LOSS, TESTS, AND		
THE A			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOG	Y	YME	INSTRUMENTATION		
<u> </u>	40.0			(N)	Cilly Cond (CM)		S			
3.2	40.0			1-2-1	Silty Sand (SM) 40.0-41.2' - light olive gray with medium dark gray	_		_		
I _		1.2	SS-9	(3)	mottling, (5Y 5/2 with N4), wet, loose, fine silica sa	nd, _		_		
	41.5			` ,	25% nonplastic fines		Ш			
						_	1	1		
-						_	1	1		
-						_	1	1		
-						-	ı	1		
-						-	ł	-		
-						-	-	-		
-						_		-		
45 -1.8	45.0				Fet Oleve With Orand (OLI)			Managha ha annania siah		
-1.8				3-4-3	Fat Clay With Sand (CH) 45.0-45.5' - light olive gray with medium dark gray	_		May also be organic rich		
I _		1.5	SS-10	(7)	mottling, (5Y 5/2 with N4), moist, medium stiff, high		K			
	46.5			` ,	plasticity, no dilatancy, 20% fine silica sand	/	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
					Organic Soil With Sand (OH) 45.5-46.4' - grayish black, (N2), moist, medium stif	f. /				
					high plasticity, slow dilatancy, interfingered with fin	e -	1			
					sand, medium gray (N5) Silty Sand (SM)		1	1		
-					46.4-46.5' - Same as 40.0-41.2' except light olive	-	1	1		
-					gray, (5Y 5/2)			1		
-						-	l	1		
						-	ł	-		
50 -6.8	50.0				Silty Sand (SM)		П			
-		4.5	00.44	2-2-2	50.0-50.3' - yellowish gray, (5Y 7/2), wet, loose, fin	e /-	222	-		
-		1.5	SS-11	(4)	silica sand, 25% low plastic fines	/ -	$\langle \langle			
_	51.5				Organic Soil With Sand (OH) 50.3-51.5' - Same as 45.5-46.4'	_		_		
-								_		
_						_		_		
1 7						_	1	1		
-						-	1	1		
55	55.0					-	1			
-11.8	55.0				Organic Soil With Sand (OH)		7777	⊣		
-		1.5	SS-12	2-3-2	55.0-56.5' - Same as 45.5-46.4' except 30% sand	-	$\langle \langle \rangle \rangle$	-		
-		1.0	00-12	(5)		-	$\langle \langle			
-	56.5					_	K(((-		
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1	PROJECT NUMBER:	BORING NUMBER:					
	338884.FL	GSC-08	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

						otary, auto naminer, Avvo roo			ONIENTATION : Vertical
WATER	LEVELS	: 13.8 ft l	ogs on 04	/22/07 S	START : 4/21/2007	END : 4/23/2007	LOGGE	₹ : C.	Dougherty
200				STANDARD PENETRATION		SOIL DESCRIPTION		ă	COMMENTS
A ANE	SAMPLE	INTERVA	L (ft)	TEST RESULTS	0011 11414	45 LIGOS ODOLID OVA 4001	001.00	13	DEDTIL OF CACING DRILLING DATE
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	RY (ft)			1E, USCS GROUP SYMBOL, E CONTENT, RELATIVE DEN		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTA A			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MIN		MB	INSTRUMENTATION
SU ELE			,,,,,,	(N)				Sγ	
-16.8	60.0	0.0	SS-13	25-50/5	Silt (ML)	II ' I (5)(7(0) '		Ш	
_	60.9	0.9	55-13	(75/11")	60.0-60.9' - yel	llowish gray, (5Y 7/2), mois d dilatancy, moderate HCl r	st, hard, low	1	
-						" sandy organic soil (OH) s		T	-
-					of sample			1	-
-							-	ł	-
_								4	_
							-	1	_
							•	1	
-							-	1	-
-								1	-
65 <u> </u>	<u>65</u> .9	0.0	\SS-14 /	50/1.5	No Recovery 6	65 N-65 1'		\vdash	Driller's Remark: Not sure if drilling
			00-14	(50/1.5")	No necovery t	00.0°00.1		1	resistance, while increasing, is indicative of
_								1	rock.
									Only minor amount of sand (probably slough material) in sampler
									We will drill to 70.0' and try another split
-							·	1	spoon.
-							-	1	Driller's Remark: Chatter while drilling, some - rock fragments in cuttings
-							-	1	Tock fragments in cuttings
-							-	-	-
_								4	_
l _									_
70	70.0								
-26.8					Silt With Sand				
_		1.5	SS-15	31-41-49	/0.0-/1.5' - yel	llowish gray, (5Y 7/2), mois dilatancy, moderate HCl re	st, hard, fine	1	
-	71.5			(90)	15-20% fine to	coarse sand-sized, trace f	ine	1	=
-	71.5				gravel-sized lin	mestone fragments, carbor	nate	╫	-
-							-	1	-
_							-	4	_
_								1	
							•	1]
-								1	1
	75.0 75.2						<u> </u>	L	-
75 <u> </u>	75.2	0.2	SS-16	50/2	Silt (ML)		00/ cases T	Ш	-
-				(50/2")	\	ame as 70.0-71.5' except 2	u% coarse	1	-
-						oring at 75.0 ft bgs		1	_
_					See the next sl	heet for the rock core log		1	_
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80								$oxed{oxed}$	
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08

SHEET 5 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

WATER	LEVELS: 13	.8 ft b	gs on (04/22/07 START : 4/21/2007 END : 4/	23/20	D7 LOGGER : C. Dougherty	-
≥0 <i>€</i>	(%)			DISCONTINUITIES	JG	LITHOLOGY	COMMENTS
ELO N (f	JN, AND RY (9	•	ZES	DESCRIPTION	CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B	IE RU GTH, OVE	QD(%)	CTU	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	75.0				ш	No Recovery 75.0-77.5'	13:50, 4/22/07, soil split
_					ш	_	spoon sampling is halted Will set casing and begin
			NR		」	_	rock coring T. Williams becomes -
_					Ш	_	operator
_	R1-HQ 5 ft	7		77 5 70 0 70 5 70 0 00 2 00 7 00 0	뮵	- 1:	Driller's Remark: Little resistance to drilling until -
_	30%		>10	77.5-78.0, 78.5-79.0, 80.2, 80.7, 80.8' - Mechanical break (5), fragments too irregular	Ш	Limestone - 77.5-79.0' - yellowish gray, (5Y 7/2),	about 77.5'
_			2	to determine fit	Н	fine grained, moderate HCl reaction, weak (R2), voids abundant, only	-
-					╁	- 78.0-78.5 (75% of surface)	R1: Run time not recorded
80	80.0		NR		H	No Recovery 79.0-80.0'	-
-36.8	00.0			_	Ħ	Limestone	
			3		H	 80.0-81.9' - Same as 77.5-79.0 except laminated bedding below 	-
			4	81.0, 81.3' - Joint (2), horizontal, smooth, planar, some organic material	H	80.4', trace organics along bedding - 80.5-81.4', voids (<1/16") >5% of	
_				81.3-81.9' - Fracture, vertical, rough,	F	surface, along bedding plane	_
_	R2-HQ 5 ft	15	4	undulating, black, staining on 75% of surface 81.9, 85.5, 85.9, 86.2, 86.9, 87.3, 87.5, 88.6,	H	81.9-84.2' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction,	-
_	84%			90.3-90.9, 91.7, 92.1' - Mechanical break (11)	H	weak (R2), voids (1/16") over 75% of surface (1/16" or larger) over 5%,	-
-			0		H	- laminated bedding at 87.2-87.5', 88.1-88.3', and 88.9-94.1'	-
-			0		世	-	R2: 7 minutes
85	85.0		NR		Ħ	No Recovery 84.2-85.0'	-
-41.8	00.0			_	Ħ	Limestone	_
			2		H	 85.0-90.0' - Same as 81.9-84.2' except laminated uneven bedding at 	
_			2		H	85.1-85.3', and 86.2-86.9', trace large (3/8") voids, weakly competent	_
_	D0 110				H	interval 88.6-89.4', trace organics 87.5-88.0'	-
-	R3-HQ 5 ft	65	0		世	- -	-
-	100%				世	-	-
-			1		Ш	_	-
-					世	-	R3: 6 minutes
	90.0		>10		\mathbb{H}		_
-46. 8			>10		\vdash	90.0-92.3' - Same as 81.9-84.2' - except from 91.0-91.8' has 75% area	
_			- 10		H	as very few voids, abundant voids	-
_			1		H	<1/16" of surface, larger voids (3/16"x 3/4" and smaller) are present 	-
-	R4-HQ				oxdot	91.4-92.2' (5% of area)	-
-	5 ft 66%	38	>10	92.5-93.0' - Fracture zone	Ш	- Silt (ML) ¬ 92.3-92.7' - light olive brown, (5Y	-
-	0070		2	93.0, 93.15' - Mechanical break (2)	H	5/2), moderate HCl reaction,	-
-					世	- carbonate derived, limestone fragments at bottom of zone	-
-			NR		\square		R4: 6 minutes
95	95.0				H		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08

SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

MATER_EVELS_13 & Busing on de/2007 START 4.07(2007 SND - 4232007 LOGGER - C Doughery	CORING	INETHOD AL	ND E	אורוע	IENT: CME 550X S/N 340253, mud rotary, HQ tools, H	/v cas	ng	ORIENTATION : Vertical
Section Company Comp	WATER	LEVELS: 13.	8 ft b	gs on	04/22/07 START : 4/21/2007 END : 4	/23/20	07 LOGGER : C. Dougherty	
10	300	<u></u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
10	ANC (ft	78. 20% 20%		ES	DESCRIPTION			CIZE AND DEDTH OF CACING
10	ᆱᇬ은	P. F. R.	(%)	20	DEPTH TYPE OPIENTATION POLICHNESS	7 5		
10	FYF.	A POS	Q	ACI R F	PLANARITY, INFILLING MATERIAL AND	MB(AND ROCK MASS	
210 95.8, 96.1' - Mechanical break (2) 95.8, 96.1' - Mechanical break (2) 96.6-97.6' - Fracture, vertical 97.6-98.0' - Mechanical break (3) 97.6-98.0' - Mechanical break (3) 98.0-98.3' - Fracture zone No. Recovery 93.3-95.0' 98.0-98.3' - Fracture zone No. State of the control of the co	무용되	S교뿐	A O	유립	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λS	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
Packed P	-51.8				95.0-95.4' - Fracture zone			
Pack Pack	-			>10		+		
R5-HO St R6 R6 R6 R6 R6 R6 R6 R	-				95.8, 96.1' - Mechanical break (2)	F		-
R5-HO 5 ft 47 3 97.5-98.0' - Mechanical break (3) 97.5-98.0' - Mechanical break (3) 98.0-98.3' - Fracture zone 98.0-	-			2	OC C O7 CL Fracture vertical	士		-
Sft 47 3 97.6-98.0" - Mechanical break (3) 98.0-98.3" - Fracture zone 98.0-98.3" - Fracture	-	DE HO			96.6-97.6 - Fracture, vertical	+		-
98.0-98.3' - Fracture zone 98.4-98.3' - Fracture zone 98.4-98.7' - yellowish gray, (5Y 772) strong HCl reaction, very weak (R1), voids (1/16') over 85% of surface 95.7-98.1' - Same as 95.4-95.7' see. 79.4' same as 95.4-95.7' see. 79.4' same as 95.4-95.7' same as 95.4-9	_		47	3		-		-
Strong HCI reaction, very weak RCI Control	_	68%			. ,	\perp		<u> </u>
NR 100 100.0 1				>10	98.0-98.3' - Fracture zone			
100 100.0 -56.8 -10 -56.8 -56.8 -57.2 -57.2 -57.2 -57.2 -57.2 -57.2 -57.2 -57.2 -57.2 -57.2 -57.2 -57.2 -57.2 -57.2 -57						Н		circulation at 90.0
100 100.0				NR		\Box		R5: 10 minutes
1	100	100.0				\top		-
10.9-101.4" - Fracture or mechanical break, 79 deg, rough, undulating 101.4-101.9" - Fracture zone, some fragments have slight dark staining 102.3, 102.8, 103.0, 103.2, 103.5 - Mechanical break (5) 105.0 NR 105		100.0			100.0-100.8' - Fracture zone, also organics	111	T zone from 96.5-97.4' has	1 -
1	-			>10	and carbonate derived silt			-
10.1.4-10.1.9' - Fracture zone, some fragments have slight dark staining 102.3, 102.8, 103.0, 103.2, 103.5' - Mechanical break (5) 105.0 NR	_				100.9-101.4' - Fracture or mechanical break,	+++		-
R6-H0 5 ft 94% 60 2 102.3, 102.8, 103.0, 103.2, 103.5 '- Mechanical break (5) 4 103.5 - 103.9 '- Fracture, 70 deg, tight 105.0 105.0 NR NR 105.0 NR NR NR NR NR NR NR N	-			1		丰		-
105 105 0 105 0 105 0 105 0 107 10	_	D0.110				_		-
Mechanical break (5) 4	_		60	2		\perp		_
105 105.0 105.0 NR 103.5-103.9' - Fracture, 70 deg, tight 103.5-10					Mechanical break (5)	\perp		_
105.0 105.0 NR -61.8				1		\bot		_
105 105.0				-	103.5-103.9' - Fracture, 70 deg, tight		Fat Clay (CH)	
105.0				0		+	100.4-100.6' - black, (N1), strong HCl	R6:5 minutes
10.6-101.0" - light olive gray, (5Y 5/2), strong HCl reaction, carbonate derived Limestone 101.0-104.2" - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16") over 75% of surface, large voids (up to 3/8" x 3/4") over <5%, very fossiliferous 104.2-104.7" - Same as 101.0-104.2' except light olive gray, (5Y 7/2), moderate HCl reaction No Recovery 104.7-110.0' Limestone 110.0-11.9" - yellowish gray with medium gray mottling, (5Y 7/2 with N5), very fine grained, strong HCl reaction, very weak to weak (R1 to R8-HQ S ft 37 38% NR R8-HQ NR NR R8-HO S ft 37 38% NR NR R8-HO S ft 38% NR R8-HO S ft 38% NR R8-HO S ft 38% NR R8-HO S ft 38% NR R8-HO S ft 38% NR R8-HO S ft 38% NR R8-HO S ft 38% NR R8-HO S ft 38% NR R8-HO S ft 38% NR R8-HO S ft 38% R8-HO S ft 38% NR R8-HO S ft 38% R8-HO S ft 38% NR R8-HO S ft 38% R8-HO S ft 38% NR R8-HO S ft 38% R8-HO S ft 38	105	105.0		NR		\top		<u> </u>
derived Limestone 101.0-104.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16") over 75% of surface, large voids (up to 3/8" x 3/4") over 75% of surface, large voids (up to 3/8" x 3/4") over 75% of surface, large voids (up to 3/8" x 3/4") over 75% very fossiliferous 104.2-104.7' - Same as 101.0-104.2' except light olive gray, (5Y 7/2), moderate HCl reaction No Recovery 104.7-110.0' R7: 2 minutes Limestone		.00.0		<u> </u>	-		100.6-101.0' - light olive gray, (5Y	_
Limestone 101.0-104.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16") over 75% of surface, large voids (up to 3/8" x 3/4") over 55%, very fossiliferous 104.2-104.7' - Same as 101.0-104.2' except light olive gray, (5Y 7/2), moderate HCl reaction No Recovery 104.7-110.0' Limestone 110.0-104.2' except light olive gray, (5Y 7/2), moderate HCl reaction No Recovery 104.7-110.0' Limestone 110.0-104.2' except light olive gray, (5Y 7/2), moderate HCl reaction No Recovery 104.7-110.0' Limestone 110.0-104.2' except light olive gray, (5Y 7/2), moderate HCl reaction No Recovery 104.7-110.0' Limestone 110.0-111.9' - yellowish gray with medium gray mottling, (5Y 7/2 with N5), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16" or less) over 85% of surface, moderately fossiliferous (casts and molds) No Recovery 111.9-115.0' R8: 1 minute	-					+		-
101.0-104.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16") over 75% of surface, large voids (up to 3/8" x 3/4") over 45%, very fossiliferous 104.2-104.7' - Same as 101.0-104.2' except light olive gray, (5Y 7/2), moderate HCl reaction No Recovery 104.7-110.0'	-					亡	_	-
R7-HQ 5 ft 0% NR 0	-					\pm	− 101.0-104.2' - yellowish gray, (5Y	-
R2), voids (1/16") over 75% of surface, large voids (up to 3/8" x 3/4") over 75%, very fossiliferous 104.2-104.7' - Same as 101.0-104.2' except light olive gray, (5Y 7/2), moderate HCl reaction No Recovery 104.7-110.0' Limestone 110.0-111.9' - yellowish gray with medium gray mottling, (5Y 7/2 with N5), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16") lover 75% of surface, large voids (up to 3/8" x 3/4") over 55%, very finesiliferous (casts and molds) No Recovery 111.9-115.0' R8: 1 minute	_	D7 H0				+		-
3/4") over <5%, very fossiliferous 2 except light olive gray, (5Y 7/2), 3 moderate HCl reaction 3 noderate HCl reaction 3 feet at 110.0' Limestone 110.0-111.9' - yellowish gray with 3 medium gray mottling, (5Y 7/2 with N5), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16" or less) over 85% of surface, moderately fossiliferous (casts and molds) No Recovery 111.9-115.0' R8: 1 minute	_		0	NR		$-\Box$	 R2), voids (1/16") over 75% of 	-
104.2-104.7' - Same as 101.0-104.2' except light olive gray, (5Y 7/2), moderate HCI reaction No Recovery 104.7-110.0' Limestone 110.0-111.9' - yellowish gray with medium gray mottling, (5Y 7/2 with N5), very fine grained, strong HCI reaction, very weak to weak (R1 to R2), voids (1/16" or less) over 85% of surface, moderately fossiliferous (casts and molds) No Recovery 111.9-115.0' R8: 1 minute	_	0%				\perp	surface, large voids (up to 3/8" x	_
except light olive gray, (5Y 7/2), moderate HCl reaction No Recovery 104.7-110.0¹ Limestone 110.0-111.9¹ - yellowish gray with medium gray mottling, (5Y 7/2 with N5), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16" or less) over 85% of surface, moderately fossiliferous (casts and molds) No Recovery 111.9-115.0¹ R8: 1 minute R7: 2 minutes Driller's Remark: rod drop 3 feet at 110.0¹ below ground surface Driller's Remark: rod drop 3 feet at 110.0¹ below ground surface No Recovery 111.9-115.0¹ R8: 1 minute	_					片		_
No Recovery 104.7-110.0' Limestone 110.0-111.9' - yellowish gray with medium gray mottling, (5Y 7/2 with N5), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16" or less) over 85% of surface, moderately fossiliferous (casts and molds) No Recovery 111.9-115.0' No Recovery 104.7-110.0' Limestone 110.0-111.9' - yellowish gray with medium gray mottling, (5Y 7/2 with N5), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16" or less) over 85% of surface, moderately fossiliferous (casts and molds) No Recovery 111.9-115.0' R8: 1 minute						\bot	except light olive gray, (5Y 7/2),	_
110 110.0 110.0 1 110.0 1 1 1 1 1 1 1 1								R7: 2 minutes
-66.8 - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	110	110.0				Ш	140 14600 Very 104.7-110.0	·
R8-HQ 5 ft 38% NR 110.7, 111.2' - Mechanical break (2) medium gray mottling, (5Y 7/2 with N5), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16" or less) over 85% of surface, moderately fossiliferous (casts and molds) No Recovery 111.9-115.0' R8: 1 minute	000				_	1		
R8-HQ 5 ft 38% NR NR R8-HQ 5 ft 38% NR R8-HQ 5 ft 38% NR R8-HQ 5 ft 38% NR R8-HQ 5 ft 38% NR R8-HQ 5 ft 38% NR R8-HQ 5 ft 38% NR R8-HQ 5 ft 38% NR R8-HQ 5 ft 38% R8-HQ 5 ft 38% R8-HQ 5 ft 38% R8-HQ 5 ft 38% R8-HQ 5 ft 38% R8-HQ 5 ft 7 fine grained, strong HCI reaction, very weak to weak (R1 to R2), voids (1/16" or less) over 85% of surface, moderately fossiliferous (casts and molds) No Recovery 111.9-115.0' R8: 1 minute	-			1	110.7. 111.21. Mochanical break (2)			
R8-HQ 5 ft 38% NR NR NR NR R8: 1 minute	-				110.7, 111.2 - Mechanical Dreak (2)	+		ground surface
R8-HQ 5 ft 38% NR NR R8: 1 minute	-			3	111 6 111 9' loint (2) harizantal tight	\perp	 reaction, very weak to weak (R1 to 	-
1	-	р∞ ⊔∩			111.0, 111.0 - Julii (2), Hunzuntai, tignt	士		-
NR NR R8: 1 minute	-	5 ft	37			+-	– (casts and molds)	-
R8: 1 minute	_	38%				#	No Recovery 111.9-115.0'	-
│ ┤	-			NR		+	<u>-</u>	-
│ ┤	_					\perp	_	
115 115.0						\bot		R8: 1 minute
	115	115.0						
						T		
						\bot		



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	GSC-08	SHEET	7	OF	10	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 13.	8 ft bo	gs on (04/22/07 START : 4/21/2007 END : 4/	23/200	07 LOGGER: C. Dougherty	
≳D⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H B	E RU STH, OVEI	(%) Q	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	SOR	ROI	-RA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3YMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-71.8	0	_			*.*.	_ Sand (SW) _	
-			1	115.5' - Mechanical break	Ш	115.0-115.3' - yellowish gray and olive gray, (5Y 7/2 and 5Y 3/2), fine	-
-					ш	to coarse grained, strong HCl	-
-					ш	- \reaction	-
-	R9-HQ					Limestone 115.3-116.0' - Same as 110.0-111.9'	-
-	5 ft 20%	10			\Box	 except yellowish gray, (5Y 7/2) No Recovery 116.0-120.0' 	-
_	2070		NR		Ħ	_ No Recovery 110.0-120.0	-
_					Ħ	-	-
_						=	R9: 3 minutes
120	120.0					-	-
-76.8			NI/A	_		Sandy Silt (ML)	Driller's Remark: 120.0-
			N/A			 120.0-121.5" - ýellowish gray, (5Y 7/2), soft, strong HCl reaction, 	125.0' rod dropped entire - interval
			N/A			weakly competent limestone fragments at bottom of section,	·
					Ш	carbonate derived	
	R10-HQ 5 ft	0				No Recovery 121.5-125.0'	
_	30%	١				_	
_			NR			_	_
_					Н	_	
_						_	R10: Runtime not recorded
125_	125.0			-	H	_	_
-81.8			>10	125.0-128.3, 125.8-126.2' - Fractures or mechanical break (2), no visible orientation		Limestone - 125.0-126.4' - Same as 110.0-111.9'	
_				· ·	Ш	except poorly competent, trace black,	_
_			>10	126.4, 126.6, 127.5' - Mechanical break (3)	Н	staining throughout core 126.4-128.5' - light gray, (N7), strong	-
_	D44 110				Щ	 HCl reaction, very weak (R1), voids 	
_	R11-HQ 5 ft	52	1		ш	(1/16") over 70% of surface, cavities (up to 3/4"x1-9/16") over 5% of	
-	70%				Ш	_ surface, very fossiliferous (mold and	
-			0		Ш	casts) - No Recovery 128.5-130.0'	-
-			ND		${f H}$	- 110 Necovery 120.0-100.0	R11: 4 minutes
-			NR		Ħ	-	-
130 <u> </u>	130.0			_	╂╫	Sandy Silt (ML)	-
-			>10		-	- 130.0-131.3' - grayish orange to light	
-					-	olive gray, (10ŸR 7/6 to 5Y 5/2), strong HCl reaction, fine sand-sized	-
-			>10		Щ	- particles about 25%, carbonate] -
-	 R12-HQ			131.7-132.0' - Fracture zone	団	derived, abrupt transition to \\131.3-132.2'	-
-	5 ft 92%	8	>10	132.4-134.6' - Fracture zone, most are	団	Limestone	-
-	9270			probable mechanical breaks	Ш	131.3-132.2' - very pale orange to light olive gray, (10YR 8/2 to 5Y 5/2),	-
-			>10		$oxed{H}$	 fine grained, strong HCl reaction, medium strong (R3), laminated 	-
-			>10		Ħ	bedding (<1/16" thick) below 131.8',	R12: 7 minutes
135	135.0		NR		Ħ	transitions gradually to 132.2-134.6'	-
100	100.0			_	11	-	
1							



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08

SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

		ND EC	<u> </u>				
WATER	LEVELS: 13	.8 ft b	gs on	04/22/07 START : 4/21/2007 END : 4	23/200	7 LOGGER : C. Dougherty	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	YUN H.A ER)	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T ¥ ₹ ₹	GTF SOV	(%) O	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	<u>B</u>	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
	SEN	a Q	-RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-91.8	014	ш.		135.0-136.0' - Fracture zone, fragments	1 "	Limestone	
-51.0			>10	133.0-130.0 - Fracture Zone, fragments	廿	132.3-134.6' - very pale orange to	_
l _					Щ	vellowish grav. (10YR 8/2 to 5Y 7/2).	
				400 0 400 0 400 0FL M	Н	fine grained, extremely weak to very	
-			3	136.3, 136.6, 136.95' - Mechanical break (3)	口	weak (R0 to R1), trace intervals of laminated bedding	1
-	R13-HQ				╂┼╂	No Recovery 134.6-135.0'	-
-	5 ft	47	1	137.4-137.7' - Fracture zone or mechanical	┲	Limestone	_
_	82%			break	╁┼	135.0-137.9' - Same as 132.3-134.6'	_
			>10	138.2-138.5' - Fractures (5), smooth, planar,	ᄇ	except zone of light olive gray (5YR 5/2)	
			/10	fractures along bedding planes, probably	Н	137.9-139.1' - light olive gray, (5YR	
_				mechanical breaks	丗	5/2), fine grained, strong HCl	R13: 5 minutes
			NR		卄	reaction, weak (R2), voids (1/16")	-
140 <u> </u>	140.0			_	廿	over 60% of surface, oriented along bedding planes (laminated bedding),	
-90.6			2	140.4' - Mechanical break	甲	zone of medium gray (N5) limestone,	
			_	140.4 - Mechanical break 140.6-140.9' - Fracture zone, no visible	\mathbf{H}	medium strong (R3) from	
-				orientation	\Box	137.9-138.1' No Recovery 139.1-140.0'	
_			>10	142.2-142.3' - Fracture zone or mechanical	╂┴╂	Limestone	
_	R14-HQ			break, rough, undulating	丗	140.0-143.0' - Same as 137.9-139.1'	-
-	5 ft	13	>10		╁┼┼	laminated bedding only in top foot of	_
_	66%		/10			core	
						143.0-143.3' - Same as 140-143.0'	
						except mottled medium gray (n5), with few voids	
_			NR		\Box	No Recovery 143.3-145.0'	R14: 5 minutes
					╁┼┼		-
145_ -101.8	145.0			_	┯	Limestone	
-			0		╁┼┼	145.0-147.8' - medium light gray to	_
_					П	yellowish gray, (N6 to 5Y 7/2), fine	
				146.1-146.5' - Fracture zone	Н	grained, strong to moderate HCl	
_			>10	146.6' - Mechanical break	ш	reaction, strong to very strong (R4 to R5), voids over 25% of surface, one	
-	R15-HQ			147' - Fracture, horizontal, rough, undulating,	╁┼	cavity (3/4"x3/4") passes through	-
_	5 ft	68	3	black staining on surface	믑	core at 145.5'	-
-	86%			147.3' - Mechanical break	╀┼┼	147.8-149.3' - yellowish gray, (5Y	_
I _			2	147.6' - Fracture, horizontal, smooth, undulating, black staining on surfaces	ш	7/2), very fine grained, strong to very	
				148.3' - Mechanical break	H	strong HCl reaction, very strong (R5), laminated to thinly bedded, voids	
-			0		世	(1/16") occur in some bedding planes	R15: 9 minutes
150	150.0		NR		╁┼┼	but not others, overall in about 20%	
150_ -106.8	U.UC1			150.0-150.3' - Fracture zone	╁┼	of surface	-
-			1	100.0 1100.0 1100.010	冄	No Recovery 149.3-150.0' Limestone	-
_					┲	150.0-150.4' - dusky vellow. (5Y 6/4).	
1			4	151.1, 151.2' - Fractures (2), horizontal,	Ш	fine to medium grained, moderately	
			4	rough, undulating, probable mechanical	╁	HCl reaction, very weak (R1), voids	1
				breaks but surfaces don't match 151.3, 151.6' - Mechanical break (2)	\Box	(1/16") over 90% of surface 150.4-151.0' - very pale orange to	-
-	R16-HQ		3	152.1' - Fracture, horizontal, smooth,	╂┴╂	yellowish brown, (10YR 8/2 to 10YR	
-	5 ft	45	ા		-	6/2), fine grained, strong HCl	I
-			3	undulating, probable mechanical breaks, but	╁┷╁╴		-
-	5 ft		1	undulating, probable mechanical breaks, but surfaces don't match	泔	reaction, very strong (R5)	
-	5 ft			undulating, probable mechanical breaks, but surfaces don't match 152.2-153.8' - Fracture, horizontal, smooth,		reaction, very strong (R5) 151.0-152.2' - Same as 150-150.4'	-
-	5 ft		1	undulating, probable mechanical breaks, but surfaces don't match		reaction, very strong (R5) 151.0-152.2' - Same as 150-150.4' 152.2-153.8' - Same as 150.4-151' except with slight increase in voids	R16: Runtime not recorded
- - - - -	5 ft 76%			undulating, probable mechanical breaks, but surfaces don't match 152.2-153.8' - Fracture, horizontal, smooth, undulating, black, probable mechanical		reaction, very strong (R5) 151.0-152.2' - Same as 150-150.4' 152.2-153.8' - Same as 150.4-151' except with slight increase in voids (1/16") over 5-10% (mostly in	R16: Runtime not recorded
- - - - - 155	5 ft 76%		1	undulating, probable mechanical breaks, but surfaces don't match 152.2-153.8' - Fracture, horizontal, smooth, undulating, black, probable mechanical		reaction, very strong (R5) 151.0-152.2' - Same as 150-150.4' 152.2-153.8' - Same as 150.4-151' except with slight increase in voids	R16: Runtime not recorded
- - - - - 155	5 ft 76%		1	undulating, probable mechanical breaks, but surfaces don't match 152.2-153.8' - Fracture, horizontal, smooth, undulating, black, probable mechanical		reaction, very strong (R5) 151.0-152.2' - Same as 150-150.4' 152.2-153.8' - Same as 150.4-151' except with slight increase in voids (1/16") over 5-10% (mostly in	R16: Runtime not recorded



PROJECT NUMBER: BORING NUMBER: 338884.FL **GSC-08** SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

	METHOD A			IENT : CME 550X S/N 340253, mud rotary, HQ tools, HV			ORIENTATION : Vertical
							ORIENTATION . Vertical
WATER	LEVELS : 13	.8 ft b	gs on (23/20	07 LOGGER : C. Dougherty LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DISCONTINUITIES DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	COMMENTS SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-111.8 - -			3	155.1' - Fracture or mechanical break 155.1-155.7' - Fracture, vertical, rough, undulating, some staining on surface 155.7' - Fracture, 5 deg, smooth, planar,		No Recovery 153.8-155.0' Limestone 155.0-156.1' - Same as 152.2-153.8' 156.1-157.3' - yellowish gray, (5Y	-
_	R17-HC] }	2	coating of olive gray (5 Y 3/2), carbonate derived silt and fine sand on faces 156.1' - Fracture, horizontal, smooth,		7/2), fine grained, strong HCl reaction, weak (R2), voids (1/16") over 35% of surface	-
-	5 ft 78%	47	2	undulating, probable mechanical break, but faces don't match up 156.8' - Mechanical break		157.3-158.9' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), voids	-
- -			1	156.8-157.2' - Fracture, 70 deg, rough, planar, some black staining on surface 157.2' - Mechanical break	H	(1/16") of over 85% of surface, large (3/8") voids over 5%	R17: 9 minutes
160 -116.8	160.0		NR	157.5' - Fracture or mechanical break, rough, undulating	Ë	No Recovery 158.9-160.0'	
-110.8			>10	160.0-160.8' - Fracture zone	H	Limestone - 160.0-160.4' - Same as 157.3-158.9' - 160.4-160.7' - yellowish gray, (5Y	-
- - - -	R18-HC 5 ft 16%	0	NR			7/2), fine grained, strong HCI reaction, very weak (R1), voids (1/16") over 80% of surface No Recovery 160.8-165.0'	- - - - -
-					Ħ	-	R18: 2 minutes
165 -121.8	165.0			_		Limestone	
_			2	165.4-165.7' - Fracture or mechanical break, 60 deg, rough, undulating 165.9' - Fracture, 30 deg, rough, undulating	Ħ	- 165.0-168.7' - light olive gray, (5YR 5/2), fine grained, strong HCl reaction, weak (R2), trace laminated	-
_	R19-HC		4	166.1-166.5' - Fracture or mechanical break, 70 deg, rough, undulating 166.6, 166.8' - Mechanical break (2)	H	 bedding 166.7-167.5', voids (1/16"-3/16") over 5% of surface 165.0-166.0' 	-
_	5 ft 78%	47	>10	167.3-167.8' - Fracture zone 168.2' - Fracture, horizontal, smooth, planar,	F	-	-
- - 170	170.0		NR	iron oxide 168.3-168.9' - Fracture zone, probable mechanical break, but faces don't match up		168.7-168.9' - moderate olive brown, (5Y 4/4), fine to medium grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), voids	R19: 8 minutes
-126.8 -	- 1		2	170.0-175.0' - Fracture, vertical, rough, undulating, black, staining on 10% of surface 170.2' - Fracture, horizontal, probable		(1/16") over 80% of surface. No Recovery 168.9-170.0 Limestone	-
_			>10	mechanical break but faces don't match up 171.4-171.9' - Mechanical break		170.0-170.3' - Same as 168.7-168.9' - 170.3-174.7' - light olive gray, (5YR 5/2), fine grained, strong HCl	-
-	R20-HC 5 ft 94%	52	4	171.9-172.9' - Fracture, vertical, rough, undulating 172.2' - Mechanical break 172.2-172.6' - Fractures or mechanical break		reaction, weak (R2) - -	-
-			4	(2), rough, undulating 172.6' - Mechanical break 173' - Fracture, horizontal, smooth, planar,		-	
175	175.0		1 NR	slight black staining on surfaces	Ė	 No Recovery 174.7-175.0'	R20: 9 minutes
I		1			1		



PROJECT NUMBER:	BORING NUMBER:		
338884.FL	GSC-08	SHEET	10 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

LEVELS : 13	8 ft b	as on	04/22/07 START : 4/21/2007 END : 4/2	23/20	007	LOGGER : C. Dougherty	
			DISCONTINUITIES		Ť	LITHOLOGY	COMMENTS
CORE RUN, LENGTH, AND RECOVERY (%	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOC		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
R21-HQ 5 ft 100% 180.0 R22-HQ 5 ft 100%	555	2 2 1 >10 >10 2 3 2 2	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SAMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS Limestone 175.0-180.0' - Same as 170.3-174.7' except laminated bedding from 175.9-176.5' and 179.3-180.0' 180.0-181.8' - dusky yellow, (5Y 6/4), moderate HCl reaction, weak (R2), voids over 75% of surface. Below 180.6', limestone appears to interfinger (possible infilling) and then laminated bedding as in 175.0-180.0' 181.8-185.0' - Same as 175-180.0' except zone from 182.5-183.5' with voids (3/8"x3/4") <5% of surface	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
			- - - - - -		- - - - -		- - - - - -
	CORE RUN. 180.0 180.0 180.0 180.0 180.0 180.0 180.0 180.0 180.0	R21-HQ 5 ft 100% 55 ft 100% 57	R21-HQ S S Q Q Q Q Q Q Q	DISCONTINUITIES DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 173.4-173.9' - Fractures or mechanical break (2), horizontal and 50 deg, rough, undulating 173.9, 174.3' - Fractures (2), horizontal, smooth, undulating, some dark staining on surface 175.6' - Fracture, horizontal, smooth, planar, coating of carbonate derived silt 177' - Fracture or mechanical break, horizontal, rough, undulating 178.3' - Fracture or mechanical break, 70 deg, rough, undulating 178.3' - Fracture, horizontal, smooth, undulating, coating of carbonate derived silt 178.5-179.5' - Fracture zone 179.6, 179.7' - Mechanical break (2) 180.3' - Fracture, horizontal, rough, undulating, dark staining 180.9' - Mechanical break (2) 180.3' - Fracture, horizontal, rough, undulating, dark staining 182.5' - Fracture, horizontal, smooth, undulating, coating of carbonate derived silt, trace of dark staining 183.7, 183.9, 184.0' - Fracture or mechanical break, vertical, rough, undulating, coating of carbonate derived silt, trace of dark staining 183.7, 183.9, 184.0' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or mechanical break, 45 deg, rough, undulating 244.4' - Fracture or m	DISCONTINUITIES DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 173.4-173.9' - Fractures or mechanical break (2), horizontal and 50 deg, rough, undulating 173.9, 174.3' - Fractures (2), horizontal, smooth, undulating, some dark staining on surface 176.4' - Fracture, horizontal, smooth, planar, coating of carbonate derived silt 177' - Fracture or mechanical break, horizontal, rough, undulating 178.3' - Fracture or mechanical break, 70 deg, rough, undulating 178.3' - Fracture or mechanical break, 70 deg, rough, undulating 178.5 - Tracture or mechanical break (2) 180.3' - Fracture, horizontal, rough, undulating 180.9' - Mechanical break (2) 180.9' - Mechanical break (3), 45 deg, rough, undulating 183.7, 183.9, 184.0' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Fracture or mechanical break, 45 deg, rough, undulating 184.4' - Frac	DISCONTINUITIES DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 173.4-173.9' - Fractures or mechanical break (2), horizontal and 50 deg, rough, undulating 173.9, 174.3' - Fractures (2), horizontal, smooth, undulating, some dark staining on surface 175.6' - Fracture, horizontal, smooth, planar, coating of carbonate derived silt 177' - Fracture or mechanical break, horizontal, rough, undulating 177.0-177.3' - Fracture or mechanical break, horizontal, rough, undulating 178.3' - Fracture, horizontal, smooth, undulating, coating of carbonate derived silt 178.5-179.5' - Fracture zone 179.6, 179.7' - Mechanical break (2) 180.3' - Fracture, horizontal, rough, undulating, dark staining 180.9' - Mechanical break R22-HQ 5 ft 100% R22-HQ 5 ft 100% R22-HQ 5 ft 100% R22-HQ 5 ft 100% R23-HQ 5 ft 100% R24-HQ 5 ft 100% R24-HQ 5 ft 100% R24-HQ 5 ft 100% R25-HQ 5 ft 100% R26-HQ 5 ft 100% R27-HQ 5 ft 100% R27-HQ 5 ft 100% R27-HQ 5 ft 100% R28-HQ 5 ft 100% R29-HQ 5 ft 100% R29-HQ 5 ft 100% R20-182-4' - Fracture or mechanical break, vertical, rough, undulating 180.9' - Mechanical break R21-HQ 5 ft 100% R2	DISCONTINUITIES DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THE CHARACTERISTICS 173.4-173.9' - Fractures or mechanical break (2), horizontal and 50 deg, rough, undulating 373.9, 174.3' - Fractures (2), horizontal, smooth, undulating, some dark staining on surface 175.6' - Fracture, horizontal, smooth, planar, coating of carbonate derived silt 177 Fracture or mechanical break, horizontal, rough, undulating 177.0-177.3' - Fracture rome mechanical break, horizontal, rough, undulating 177.0-177.3' - Fracture or mechanical break, horizontal, rough, undulating 177.0-177.3' - Fracture or mechanical break, horizontal, rough, undulating, coating of carbonate derived silt 178.5-179.5' - Fracture come mechanical break (2) 180.3' - Fracture come mechanical break (2) 180.3' - Fracture horizontal, rough, undulating, coating of carbonate derived silt 178.5-179.5' - Fracture come mechanical break (2) 180.9' - Mechanical break (2) 180.9' - Mechanical break (2) 180.9' - Mechanical break (3) 181.8' - dusky yellow, (5Y 6/4), moderate HCI reaction, weak (R2), voids over 75% of surface. Below 180.6', limestone 175.0-180.0' 175.0-180.0' 181.8' - dusky yellow, (5Y 6/4), moderate HCI reaction, weak (R2), voids over 75% of surface 180.6' - Same as 175-180.0' 181.8' - Same as 175-180.0' 181.8' - Same as 175-180.0' 181.8' - Gusky yellow, (5Y 6/4), moderate HCI reaction, weak (R2), voids over 75% of surface 180.6' - Same as 175-180.0' 181.8' - Sa



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-08A	SHEET	1	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

WATER					START : 6/14/2007	END : 6/16/2007		: J. \$	Schaeffer, D. Thomas
						SOIL DESCRIPTION			COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION TEST RESULTS				SYMBOLIC LOG	
		RECOVE	ERY (ft)	TEOTINEOUETO	SOIL NAMI	E, USCS GROUP SYMBOL, CONTENT, RELATIVE DEN	, COLOR,	ЭГІС	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH EVA			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MIN	NERALOGY	'MB(INSTRUMENTATION
SUI			<u>-</u>	(N)				SΥ	
43.1							_		Blind drill to 25.0' to begin split spoon sampling -
							_		
							_		Boring GSC-08A is 5.0' offset from GSC-08 toward E-6 (southeast)
-							_		toward E-6 (southeast)
_							-		-
-							_		-
-							_		-
-							_		-
-							_		-
							-		-
5 38.1									Cuttings from 5.0-10.0' appear to be fine
-							-		sands -
-							-		-
-							-		-
-							-		-
-							-		-
_							_		-
_							_		_
_							_		_
_							_		_
10									
33.1							_		Cuttings from 10.0-15.0' appear to be sand and clayey sands -
_							_		and diayey durido
_							_		
							_		
							_		
_							_		1
-							_		
-							_		1
15							_		1
28.1									Drilling mud is Quick Gel bentonite
-							_		
-							-		
-							_		-
-							_		
-							-		-
-							-		-
-							-		-
-							_		-
-							_		-
20									
L	l	l							



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-08A	SHEET	2	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

					N 252437, Muu 10tar					ORIENTATION : VEILICAL
	LEVELS	: 4.9 ft bo	15 0110/T		START : 6/14/2007	END : 6/16 SOIL DESCRIPT		LUGGER		Schaeffer, D. Thomas COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	J (ft)	STANDARD PENETRATION TEST RESULTS		33.2 3230. (III)			SYMBOLIC LOG	
ON ON	SAMPLE	RECOVE	• • •	TEST RESULTS	SOIL NAME	E, USCS GROUP S	SYMBOL, COLC	OR,	10I-	DEPTH OF CASING, DRILLING RATE,
FAC		RECOVE			MOISTURE	CONTENT, RELACY, SOIL STRUCT	TIVE DENSITY	OR	/BOI	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUR			#TYPE	6"-6"-6" (N)	CONSISTEN	C1, 30IL 31R0C1	ONE, WIINENAL	.001	SYN	INSTRUMENTATION
23.1				, ,						
-	1							-		-
-								_		-
-								-		-
-								-		-
-								=		-
-	1							-		-
-								-		-
-								-		-
	05.0							_		-
25 <u> </u>	25.0				Silty Sand (SM	1)			TIT	_
-		1.1	SS-1	2-2-2	25.0-26.1' - ligh	nt brownish gray, ((5YR 6/1), wet,	, very -		-
-		'	00-1	(4)	grained sand, 2	tic, no HCl reaction 25% fines, silica s	n, very fine to a	Tine /=	111	-
-	26.5				,	,				-
-	-							-		-
-	-							-		-
-								-		-
-								_		-
-								-		-
-								-		-
30 <u> </u>	30.0				Silty Sand (SM	N			717	
-		,,	SS-2	5-5-6	30.0-31.1' - Sar	me as 25.0-26.1' (except mediun	n dense -		-
-		1.1	33-2	(11)				_	Ш	-
-	31.5				-			_		-
_								_		-
_								_		-
-								-		-
-								-		-
-								-		-
-								-		-
35 8.1	35.0				Fat Clay With S	Sand (CH)				
-		, _	000	2-3-5	35.0-36.5' - bro	wnish gray and ol	live gray, (5YR	R 4/1 -		-
-		1.5	SS-3	(8)	and 5Y 4/1), mo	ottled, moist, no F city, 20% very fine	HCl reaction, m	nedium _		-
-	36.5				Juli, mgm pidati	5.1, 20 /5 VOLY IIII	c to mile omod t	-		-
-								-		-
-								-		-
-								-		-
-								-		-
-								-		-
-								-		-
40										
L				I	1					



PROJECT NUMBER: BORING NUMBER: 338884.FL GSC-08A

SOIL BORING LOG

SHEET 3 OF 8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

WATED			EQUIPIVI		TADT - 6/44/2007
WATER	LEVELS	: 4.9 ft bo	19 011 0/1		TART : 6/14/2007 END : 6/16/2007 LOGGER : J. Schaeffer, D. Thomas SOIL DESCRIPTION COMMENTS
<u></u> ≩9€	CAMPIE	INTERVA	1 (#)	STANDARD PENETRATION	O O O O O O O O O O O O O O O O O O O
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
H B		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
ERE			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
3.1	40.0			(14)	Fat Clay With Sand (CH) Finish drilling for the day 6/14/07, at 18:00
-	40.0	4.5	00.4	3-5-2	40.0-40.8' - pale yellowish brown, (10YR 6/2), mottled, -
-		1.5	SS-4	(7)	noist, no HCl reaction, medium stiff, 15-25% fine sand, 10-15% coarse rounded sand, medium HW casing from 15' to 40' Resume drilling 07:45 on 6/15/07; advance HW casing from 15' to 40'
_	41.5				Salid, 10-13 % coalse founded salid, medium
l _					Fat Clay With Sand (CH)
_					40.8-41.0' - Same as 35.0-36.5'
_					Fat Clay (CH) 41.0-41.05' - medium dark gray, (N4), medium stiff,
					high plasticity, 10% fine sand, 20% coarse sand-sized
_					gray material (possible pyrite), angular
-					Silty Sand (SM) 41.05-41.5' - moderate yellowish brown, (10YR 5/4),
45	45.0				mottled, wet, loose, very fine to fine grained, no HCl
-1.9	40.0				reaction, 25% nonplastic fines Clayey Sand (SC)
-		1 5	SC E	0-2-4	\uparrow 45.0-45.5' - pale yellowish brown, (10YR 6/2), wet, \uparrow \uparrow \uparrow \uparrow
-		1.5	SS-5	(6)	_∖ very loose, no HĆl reaction, mottled and streaked with / _ ∐ ∐
-	46.5				\medium dark gray (N4), very fine to fine grained sand, /
_					Silty Sand (SM)
_					45.5-46.1' - pale yellowish brown, (10YR 6/3), wet,
l _					very loose, very fine to fine sand, 20-25% low plastic
					Clayey Sand (SC)
					46.1-46.5' - Same as 45.0-45.5' except no HCl
_					reaction, more clay with depth, with organic soil and 1/2" peat lenses 46.3' and 1.5" thick lens of organic
50	50.0				soil/peat from 46.4-46.5', organic soil/peat is grayish
-6.9	30.0				black (N2), moist, medium stiff, very high plasticity, no
-		1.4	SS-6	6-5-7	\dilatancy, appears to be pyrite grains to sand-sized \/ Clayey Sand (SC)
-		'	00-0	(12)	50.0-51.4' - similar to 40.5-45.5' and 46.1-46.6',
-	51.5				moderate yellowish brown with gray streaking, (10YR 5/4), wet, medium dense, very fine to fine grained, no
-					\ HCl reaction, very fine to fine grained sand, 30-35% / - I
_					high plastic fines, 1/4" thick organic soil/peat (OH/PT)
_					lens at 50.0', same as 46.1-46.5'
_					
I -					11
_					1
55	55.0				†
-11.9	55.0				Silty Sand With Organic Soil/ Peat Lenses (SM) Driller's Remark: 25% circulation loss
-		1.5	SS-7	0-1-1	55.0-56.5' - pale yellowish brown to moderate -
-		1.5	33-1	(2)	yellowish brown, (10YR 6/2 to 10YR 5/4), mottled, wet, very loose, no HCl reaction, very fine to fine
-	56.5				√ grained sand, 20-25% low plastic fines, organic -
I -					\soil/peat (OH/PT) lenses at 55.0-55.1', 56.1-56.15', \ \and 56.3-56.5'; same as 50.0-51.4'
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08A

SHEET 4 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

					ORIENTATION . VE	rtiour
WATER	LEVELS	. 4.9 π bg	gs on 6/17		START: 6/14/2007 END: 6/16/2007 LOGGER: J. Schaeffer, D. Thomas SOIL DESCRIPTION COMMENTS	
중무(#)	CAMPIE	INTERV	1 (6)	STANDARD PENETRATION	O COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ΤE,
H B		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AN	
SUR!			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
-16.9	60.0			(14)	Silty To Clayey Sand (SM-SC)	
-		1.5	SS-8	4-4-5	60.0-61.5' - Same as 55.0-56.5' except no HCl -	-
-		1.5	33-0	(9)	reaction, interbedded peat/organic soil (PT/OH), interbedded in lenses 1/16"-2" thick, mostly irregular,	-
_	61.5				slickenside appearance in organic soil/peat, sample is	-
-					\\delta organic soil/peat and 40% silty to clayey sand \\ _	-
-						-
_					1 -1 1	-
_					1 1	4
_					-	4
_					Driller's Remark: Harder at 64.0'	_
65	65.0				Driller's Remark: Circulation loss cont	tinues
-21. 9 -				7-4-9	Silt (ML) 65.0-65.2' - yellowish gray, (5Y 8/1), moist, medium - 1 1 1 Driller's Remark: Material from 64.0-7	70.0'
_		1.3	SS-9	7-4-9 (13)	stiff, nonplastic, rapid dilatancy, moderate HCl	
	66.5			` /	reaction, carbonate material, organic soil/peat lenses Will switch to rock coring after 70.0' s at top and bottom, 1/4" thick, laminated, same as	ample
					above	
					Poorly Graded Sand With Silt To Silty Sand	
					(SP-SM) 65.2-66.25' - pale yellowish brown, (10YR 6/2), wet,	
					medium dense, no HCl reaction, fine sand, 10-15%	1
_					nonplastic fines Silt (ML)	
-					66.25-66.3' - Same as 65.0-65.2'	-
70	70.0					_
-26.9	70.0	0.0	00.40	39-50/4	Silty Sand (SM)	
-	70.8	0.8	SS-10	(89/10")	70.0-70.8' - pale yellowish brown, (10YR 6/2), wet, very dense, mild to moderate HCl reaction, fine to	-
-					\coarse sand, 35% nonplastic fines, trace fine	-
-					\gravel-sized limestone, carbonate materials	+
-					Begin Rock Coring at 72.0 ft bgs	
-					See the next sheet for the rock core log	+
-					1 1	-
-					1 1	+
-						-
-						-
75 <u> </u>					-	_
- 01.5						4
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BORING NUMBER: PROJECT NUMBER: 338884.FL

GSC-08A

SHEET 5 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

WATER	LEVELS : 4.9	ft bgs	s on 6/	17/07 START : 6/14/2007 END : 6/	16/200	7 LOGGER: J. Schaeffer, D. Thom	nas
£□≲	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_	72.0		N/A			Poorly Graded Sand With Silt (SP-SM)	-
- - -	R1-HQ		4	73.2, 73.5, 74.0' - Fractures (3), rough, undulating, horizontal 73.3' - Fractures (2), 50 deg, rough, undulating, between two horizontal fractures		72.0-72.7' - yellowish gray, (5Y 7/2), wet, mild HCl reaction, 85% fine grained subangular silica sand, 5% coarse silica sand, 10% silt-sized carbonate material	- - -
75	5 ft 100%	15	1	74.4' - Fracture, 75 deg, rough, undulating	目	Organic Soil (OL) 72.7-72.8' - olive black, (5Y 2/1),	Box break at 74.5', just below or at near-vertical
-31.9 - -			>10	75.0-76.1' - multiple Fractures to fragments, many vertical fractures with 3-4" fragments, banded at top by 40 deg rough, undulating fracture, at bottom by 20 deg rough		medium stiff, medium plasticity, mild HCl reaction Limestone 72.8-77.0' - light olive gray to	fracture
-	77.0		3	undulating fracture 76.9-77.0' - Fractures or mechanical break	Ħ	moderate olive brown, (5Y 5/2 to 5Y 4/4), fine grained, extremely weak (R)0 from 72.8-74.2', weak to	-
- -			1	77.15' - Fracture, smooth, planar, horizontal .	Ħ	medium strong elsewhere (R2 to R3) 77.0-81.2' - light olive gray, (5Y 5/2),	- Driller's Remark: Drilling
-	DO LIO		1	78.4' - Fracture, 20 deg, rough, undulating, at zone of increased voids and cavities from		fine grained, mild to moderate HCI reaction, weak (R2), with trace darker gray banding variably	soft intermittently at about - 78'
80 -36.9	R2-HQ 5 ft 84%	83	0	78.3-78.5'	崮	throughout, several 1/2"-1" cavities, voids (1/16 to 1/8") varying 5-20% coverage, increased voids and	-
-30.9 - -			1	80.6' - Fracture, 20 deg, rough, some crumble, open, gray infill at cavity included in		cavities near 77.7, 78.4, 80.4, 80.7, 81.2', subtle organic band at 81.25' with slight darker color shift and less voids below (20% above, 5% below),	R2:5 minutes
-	82.0		NR	fracture -	Ħ	gray cavity infill at 80.4' with strong HCl reaction No Recovery 81.2-82.0'	-
- -			2	82.1, 82.8, 83.3, 83.9, 84.3, 86.1, 86.6' - Fractures (7), open to tight, mostly horizontal fractures, substantial voids, gray infill at fracture, possible drilling mud, possibly	目	Limestone 82.0-86.8' - Same as 77.0-81.2' except weak to medium strong (R2 to	-
_	R3-HQ	67	1	healed 83.9-84.5' - softer, bounded by fractures, infill of clay to silt		R3), increased voids to 25% and numerous cavities and dissolutions up to 2" with gray infill at 82.0-83.3 and 85.8-86.8, very weak (R1) at	-
85 -41.9	5 ft 96%	67		85.3' - Fracture, 45 deg, rough, undulating,		83.9-84.5', some cavities reach almost across the core	
_			1	healed or mechanical break	目	-	R3:4 minutes
_	87.0		NR.	87.1' - Fracture, open, horizontal fracture to	Ħ	- No Recovery 86.8-87.0' Limestone	-
_			3	small fragments with two 1" fragments 87.5' - Fracture, 45 deg, roughly stepped, also a discontinuity, overlying and underlying		87.0-87.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, weak (R2),	-
_	R4-HQ 5 ft	58	2	rock are different, though fracture mostly in underlying rock 87.8' - Fracture, open, horizontal, roughly		40% small (1/16") voids, several cavities up to 1/2" (fossils), friable 87.3-88.25' - pale yellowish brown,	_
90 -46.9	80%	50	1	stepped, several small 1/2" fragments 88.6' - similar to fracture at 87.8', but in different material with additional voids and	H	(10YR 6/2), fine grained, mild to moderate HCl reaction, weak (R2), <3% voids, several fossil cavities up	_
- -			NR	cavities 89.9, 90.0' - Mechanical break (2), 0-20 deg 90.9' - Fracture, 50 deg, rough, undulating, at end of core		to 1/2", less friable than above - -	R4:5 minutes
	92.0				H		
							I.



PROJECT NUMBER: BORING NUMBER:

338884.FL GSC-08A

SHEET 6 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 4.9	ft bgs	s on 6	/17/07 START : 6/14/2007 END : 6/	16/20	2007 LOGGER : J. Schaeffer, D. Thomas
				DISCONTINUITIES	U	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS RIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
95 -51.9	R5-HQ 5 ft 54%	13	<10 3 2	92.0-92.4' - Fracture zone, angular 1/4"-1" of over and underlying material 92.5' - Fracture, rough, undulating, horizontal, end of rock fragments 92.6' - Fracture, 70 deg, rough, undulating, joins with horizontal fracture at 92.5' 93.0' - rough, planar, discontinuity, horizontal, open, faces do not match 93.15' - Fracture, 45 deg, planar, healed, <1/16" relief 93.9, 94.0' - Fracture (2), rough, undulating, horizontal, more open at 93.9', healed at		Limestone 88.25-91.0' - Same as 87.0-87.3' except with 20% voids and increased elongate fossils, transition from overlying paler-colored material, material has several filled voids, thin (up to 1/4" thick) layers of silt-sized material at 89.5' with moderate HCl reaction, organics at 90.8' No Recovery 91.0-92.0' Limestone 92.0-92.4' - Same as 87.3-88.25'
-	97.0		NR	94.4, 94.5' - Fracture (2), 0-30 deg, rough, stepped, open, fragments		except pale yellowish brown and moderate yellowish brown, (10YR 6/2 and 10YR 5/4), up to 2" angular color blocks co-mingled R5:5 minutes Driller's Remark: No circulation while drilling 92-
-			1	97.6' - discontinuity between overlying unconsolidated material and underlying rock, some rock fragments above		92.4-92.7' - Same as 87.3-88.25' 92.7-93.0' - Same as 87.0-87.3' 93.0-93.3' - Same as 87.3-88.25' except transitions to material below
100	R6-HQ 5 ft 100%	73	1	98.3' - Fracture, 40 deg, rough, undulating, healed -		at 70 degree angle 93.3-94.1' - Same as 87.0-87.3' 94.1-94.6' - Same as 87.3-88.25' except becoming softer with depth,
-56.9 -	.55%		2	99.8, 100.2' - Fractures (2), 10 deg, rough, undulating, transition from overlying limestone with voids to yellow limestone at 99.8', then to weaker limestone, both have silt-sized infill		very weak rock (R1) in the last 2" of interval, fractures at 94.5' and 94.6' in very weak rock 94.6-94.7' - unconsolidated pale yellowish brown and black organics
_	102.0		2 NR	100.7' - Fracture, 70 deg, rough, undulating 101.3' - Mechanical break, or fracture, healed 101.7' - Fracture, 40 deg, rough, undulating,		No Recovery 94.7-97.0' Limestone 97.0-97.6' - dark yellowish gray Core loss interpreted to be
_			<10 <10	fragments 102.6-103.4' - fragments, unconsolidated 103.4-103.8' - Fracture zone		grading to pale greenish yellow with depth, (10YR 4/2 to 10YR 8/2), fine grained, strong HCl reaction, angular blocks of color
105_ -61.9	R7-HQ 5 ft 88%	60	0	104.3, 107.35' - Fractures (2), horizontal, infill, upper fracture is open, lower is tight and similar in color, calcareous infill, silt-sized		97.6-99.8' - pale yellowish brown, (10YR 6/2), strong HCI reaction, weak (R2), fossil cavities up to 1/4" and up to 1" elongated 99.8-100.7' - pale greenish yellow,
- -			0	104.5' - horizontal discontinuity 105.2' - 10 deg, healed or mechanical break -		107 8/2), strong HCI reaction, medium strong to very weak (R3 to R1), <5% voids on core surface, friable R7:4 minutes
- -	107.0		2	- -		- 100.7-102.0' - Same as 97.6-99.8' except with fragments at the last 0.2' of interval - No Recovery 102.0-102.6'
-	R8-HQ	90	1	108.1' - Fracture, tight, horizontal or mechanical break -		Silt (ML) 102.6-103.6' - light olive gray, (5Y 5/2), very soft, fine grained, moderate HCl reaction, carbonate
110 -66.9	5 ft 100%	90	2	110.1' - Fracture, 10 deg, mechanical, healed		derived 103.6-104.0' - Same as 102.6-103.6' except with a 1" thick fragment of limestone (yellowish gray (5Y 7/2),
- -	112.0		1	110.9, 111.0' - Fractures (2), horizontal, very similar to fractures and zone at 107.3', calcareous infill, open		very weak [R1], 10% coverage of [R8:4 minutes]



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08A

SHEET 7 OF 8

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing

WATER	LEVELS: 4.9	ft bg	s on 6	/17/07 START : 6/14/2007 END : 6	/16/2	200	7 LOGGER: J. Schaeffer, D. Thom	as
<0₽	(%			DISCONTINUITIES	_ g	. L	LITHOLOGY	COMMENTS
ELO ON (#	AND RY (9	_	ZES JT	DESCRIPTION			ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG		MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 115 -71.9 -	R9-HQ 5 ft 6% 117.0	0	NR	112.15' - Fracture, 10 deg, open, unconsolidated sediments beneath	- - - - - -		Limestone 104.0-107.0' - pale greenish yellow, (10Y 8/2), fine grained, strong HCI reaction, weak (R2), 20% voids, fossils 1/4"-1" size Limestone 107.0-112.0' - Same as 104.0-107.0' except extremely weak (R0) at fracture zones (intervals 1"-2" in length) at 107.3' and 110.0', very consistent color, texture and voids Limestone 112.0-112.15' - Same as 107.0-112.0' Silt (ML) 112.15-112.3' - pale greenish yellow,	- Driller's Remark: 3.5' of void at 113.5-117'
- - - 120 -76.9 -	R10-HQ 5 ft 0%	0	NR	-	- - - - - - - -		(10Y 8/2), fine grained, strong HCl reaction, carbonate derived No Recovery 112.3-123.5'	Driller's Remark: Rods lowered without drilling to 120' (about 3 feet) R10:1 minute Driller's Remark: Felt like drilling sediment at 120-
- - - 125 -81.9	R11-HQ 5 ft i 58%	0	NR N/A N/A A	123.5' - interpret no recovery before due to R10, drill rates, and competent material at 126.0' - 126.0, 126.15, 126.2' - Fractures (3), smooth,	- - - -		Elastic Silt (MH) 123.5-126.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), wet, soft to medium stiff, low plasticity, no to slow dilatancy, strong HCl reaction, trace organics (1/16" fragments and one 1" chunk) Limestone	122'; drilling fluid was coffee color Driller's Remark: Rods pushed 122.0-123.0', definitely sediments, not a void; then troubles getting core barrel to set R11:3 minutes
- -	127.0		NR 5	planar, horizontal, numerous other planes every 1/16" 126.3' - Fractures, above horizontal fractures and with partial vertical fractures 126.4' - no recovery			126.0-126.4' - light olive gray, (5Y 5/2), fine to very fine grained, strong (R4), horizontal laminations and fractures, no voids No Recovery 126.4-127.0'	Last foot had slow and fast sections (likely 6" of void)
- 130 -86.9	R12-HQ 5 ft i 96%	45	>10	127.1' - Fracture, overlying large fragment to horizontal fracture, with debris 127.1-128.6' - Fracture, vertical, open to tight, gray discolorations along fracture faces, other vertical and horizontal fractures starting from main fracture, but most are short and tight 128.6-128.9' - fragment, terminated below by a 60 deg rough and undulating fracture at 129.0'			Limestone 127.0-131.8' - yellowish gray to grayish orange, (5Y 7/2 to 10YR 7/4), fine grained, strong HCI reaction, weak (R2), 3% coverage of voids (1/16"), several fossils (casts/molds [elongate (1/4"-1/2")]), shallow (1/4") cavities though very intact looking, at 131.4-131.8' increased voids and cavities, infilled elongate cavities with	- - - - - - R12:4 minutes
_	132.0		3	130.1' - Fracture, rough, undulating, horizontal, open	Ħ	1	hard gray limestone	_



PROJECT NUMBER:

338884.FL BORING NUMBER:

GSC-08A SHEET 8 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 4.9	ft bg	s on 6	/17/07 START : 6/14/2007 END : 6/	16/20	07	LOGGER : J. Schaeffer, D. Thom	as
				DISCONTINUITIES			LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	3 Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
135 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	R13-HC 5 ft 76%	A A	INLOVAL R 3 NR S NR NR NR NR NR NR NR NR NR NR NR NR NR	PLANARITY, INFILLING MATERIAL AND	INDOMESTIC SAMBOR		WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
						-		- - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-09	SHEET	1	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

						otary, auto nammer, AVVJ rou			ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft bo	gs on 04/0	U5/U/ S	START : 4/5/2007	END : 4/7/2007	LOGGE	₹ : R.	McComb COMMENTS
≥∩≎				STANDARD		SOIL DESCRIPTION		1 8	COMMENTS
A A N	SAMPLE INTERVAL (ft) PENETRATI			PENETRATION TEST RESULTS	COU NAM	AE LICOS ODOLID OVADOL	O LC	DEDTIL OF CACINO DDILLING DATE	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR			SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FF F			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MIN		MB	INSTRUMENTATION
밀S급				(N)					
41.3	0.0				Topsoil	ah blask (NO) maiat aaft		11,	
		1.2	SS-1	1-2-3	15-20% fine sil	sh black, (N2), moist, soft, lica sand	organics,		1
-	4.5			(5)		d Sand With Organics (SP	<u>')</u>		1
-	1.5				\ 0.2-1.2' - medii	um gray to medium dark gr	ray, (N5 to	1	-
-					N4), moist, loo	se, fine silica sand, trace n fine organics, increasing to	nonplastic / .	1	Water level at 2.0'
-					111103, 10-1370	inc organics, increasing to		1	-
_							-		_
_									_
_							·		1
5	5.0							1	
36.3	3.0				Silty Sand (SN	M)		1111	-
-		1.1	SS-2	1-2-2	5.0-6.1' - light o	olive brown to moderate oli		-	-
-		'.'	33-2	(4)	(5Y 5/6 to 5Y 4	 4/1), wet, very loose, very fi nonplastic fines, trace orga 	ine silica		-
_	6.5				Suria, 10 2070	Tioripiastic lines, trace orge		-	-
_								1	_
_									
_							-		Driller's Remark: Light chattering at 8.0'
-							-		1
-								1	-
-								1	-
10 31.3	10.0				Silt (ML)			Ι	-
- 31.3			000	10-22-50/3		rayish yellow to moderate	vellow. (5Y	4111	_
l _		0.8	SS-3	(72/9")	8/4 to 5Y 7/6),	wet, hard, nonplastic, rapid	d dilatancy, Г	##	_
	11.3					reaction, carbonate materisand (SC) at top of sample			
					fine silica sand	d, medium plastic fines	s, bluisii gray,		
_									1
-							-	1	-
-								1	-
-								1	-
_								1	Drillor's Domark: Vary slaw rate of
_								1	Driller's Remark: Very slow rate of penetration (27 minutes)
15	15.0							1	
26.3		0.8	SS-4	42-50/3	Silt (ML)	mo oo 10 0 10 751 ayaa	arovioh		
1 -	15.8			(92/9")	ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا	ame as 10.0-10.75' except of l), mild HCl reaction	grayisii -	Ш	1
_					, , , , , , , , , , , , , , , , , , ,	,,		1	1
-							-	1	
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20							-		1
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-09

SHEET 2 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 2.0 ft bo	s on 04/0	05/07	START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb
≥∩≘				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
TH B		RECOVE		011 011 011	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEP SUR ELE			#TYPE	6"-6"-6" (N)	CONSISTENCT, SOIL STRUCTURE, WINNELVALOST
21.3	20.0	1.0	SS-5	32-50	Silt (ML) 20.0-21.0' - Same as 15.0-15.8' except 5-10% very
_	21.0	1.0		(82")	fine to fine sand
-					-
-					-
-					-
_					- I
-					-
-					-
25	25.0				
16.3				45-47-50/4	Silt (ML) 25.0-26.2' - Same as 20.0-21.0' except very fine to
_	00.0	1.2	SS-6	(97/10")	medium sand-sized material increasing to 15% with
-	26.3				depth
-					-
-					-
-					
_					†
_					Driller's Remark: Hard drilling at 29.0'
30	30.0				1
11.3	30.3	0.2	SS-7	50/4 (50/4") /	Silt And Limestone Fragments (ML) 30.0-30.2' - Same as 25.0-26.2' except 30% coarse
-				(55.1)	\sand-sized limestone fragments, dark gray (N3)
-					material on some surfaces
_					-
-					- I
-					-
-					1
]
35	35.0				
6.3				42-27-40	Sandy Silt (ML) 35.0-36.4' - light olive gray, (5Y 5/2), wet, hard,
_		1.4	SS-8	(67)	nonplastic, rapid dilatancy, mild HCl reaction, 30-35% Ifine to coarse sand-sized limestone fragments, trace
-	36.5				fine gravel-sized limestone fragments, carbonate
-					\(\text{material}\)
-					
_					1
]
]
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PROJECT NUMBER: BORING NUMBER:

338884.FL GSC-09

SOIL BORING LOG

SHEET 3 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 2.0 ft bo	gs on 04/0	05/07	START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb
300				STANDARD PENETRATION	SOIL DESCRIPTION g COMMENTS
N N N	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE		RECOVE			MOISTURE CONTENT, TELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
1.3	40.0				Silty Sand (SM) Driller's Remark: Lost circulation at 40.0'
-		1.5	SS-9	1-2-4 (6)	40.0-41.5' - light olive gray to olive gray, (5Y 5/2 to 5Y 3/2), wet, loose, mild HCl reaction, fine to coarse
	41.5			(0)	sand-sized limestone fragments, 30% low plastic fines, 5% fine gravel-sized limestone fragments,
					carbonate materials
_					
-	_				-
-	-				-
-	-				-
45	44.7	0.3	SS-10	50/4	Limestone Fragments And Silt Split spoon sample SS-10 actually advanced
-3.7		0.3	33-10	(50/4")	√ 45.0-45.3' - yellowish gray, (5Y 7/2), mild HCl
-	1				reaction, carbonate material, 80% fine to coarse gravel-sized limestone fragments; 20% Silt (ML): wet,
-					\(\nonplastic, rapid dilatancy\) Begin Rock Coring at 45.0 ft bgs
					See the next sheet for the rock core log
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-13.7					
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60_					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-09	SHEET	4	OF	10	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 04	4/05/07 START : 4/5/2007 END : 4/5	7/200	7 LOGGER : R. McComb	
				DISCONTINUITIES	Ŋ	LITHOLOGY	COMMENTS
AND N (#)			ES	DESCRIPTION] ĭ	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACINO
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
EV.	ORE	Ø	ZAC.	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		ď	E 6	THICKNESS, SURFACE STAINING, AND HIGHTINESS	Ś		Descen reals coring at 45 O
-3.7	45.0			-		No Recovery 45.0-49.0'	Began rock coring at 45.0'
_				-		_	-
_				_		<u>-</u>	_
_			NR	<u>-</u>	1	-	_
_	R1-HQ 5 ft	0		<u>-</u>	1	-	_
_	20%	-		_		_	_
_				<u>-</u>		_	_
_				-	Ш		<u> </u>
_			>10	49.0-50.0' - Fracture zone, various orientations -	H	Limestone - 49.0-49.5' - yellowish gray, (5Y 7/2),	R1:4 minutes
50	50.0			49.5' - 0-60 deg, smooth, planar, open	dash	fine grained, mild HCl reaction,	
-8.7			0	50.0' - Fracture, 60 deg, rough, undulating	Щ	extremely weak (R0), friable, voids over 50-60% of surface	Driller's Remark: Last 1.0' is harder than above; no
_					Щ	49.5-50.0' - yellowish gray to light	circulation
_			2	51.05' - Fracture, 60 deg, rough, stepped, tight	\Box	olive gray, (5Y 7/2 to 5Y 8/2), very fine grained, mild to moderate HCl	
-				51.75' - Fracture, horizontal, rough,	\vdash	reaction, very weak (R1), presence of micro fractures inclined 60-70 deg,	Dallada Daniad V
_	R2-HQ 5 ft	35		undulating, open	F	voids over less than 1% of surface,	Driller's Remark: Very soft from 52.0-55.0'
_	43%		NR	<u>-</u>	H	3/4"-1-3/16" size cavities over less than 9% of the surface	_
_				<u>-</u>	H	 50.0-51.75' - yellowish gray, (5Y 7/2), 	_
_				_	\square	very fine grained, moderate HCI	
_			2	-	Щ	reaction, very weak to weak (R1 to R2), voids over 1-3% of surface,	R2:7 minutes
55	55.0			54.6' - Fracture, <5 deg, rough, undulating,	Ш	3/4"-3/16" cavities over up to 10% of the surface, trace fossil cast and	_
-13. 7 -			>1	54.8' - Fracture, 80 deg, rough, stepped	団	molds, trace cavity infilling	
-				<u>-</u>	$\vdash \vdash$	No Recovery 51.75-54.6' ⊏ Limestone	-
-				<u>-</u>	F	_ 54.6-55.0' - Same as 50.0-51.75'	-
-	DO LIG			56.8' - Fracture, 60 deg, rough, stepped to -	H	except yellowish gray, (5Y 7/2), voids over less than 3% of the surface, few	-
-	R3-HQ 5 ft	14		undulating, open	世	_ cavities	-
-	26%		NR	-	Н	Limestone 55.0-56.3' - dusky yellow to light olive	-
-				-	\Box	gray, (5Y 6/4 to 5Y 6/1), fine grained,	-
-				-	H	mild HCl reaction, very weak (R1), voids over 15-30% of surface,	R3:7 minutes
-				-	H	cavities are 3/4"-1-3/16" long and 1/8"-3/16" wide, fossiliferous	- 1.0.7 minutes
60 -18.7	60.0		- 40		Ы	(molds/casts)	-
			>10	-	\Box	No Recovery 56.3-60.0' Limestone	-
-				-	Ħ	 60.0-60.4' - light olive brown, (5Y 	Driller's Remark: Very soft
-				-	H	5/6), fine grained, mild HCl reaction, extremely weak (R0), voids over 25%	from 61.0-64.0'
-	R4-HQ		ND	-	버	 of the surface, fossiliferous (possible 	-
-	5 ft	20	NR	-	H	shark tooth), molds and casts No Recovery 60.4-64.0'	-
-	30%			-	Ш		-
-				-	団	_	-
-				64.0' - Fracture, 0-50 deg, rough, stepped	╁	_	R4:7 minutes
- [1		\vdash	-	-
65	65.0				Ħ		_
					•		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-09

SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 2.0	ft bgs	s on 04	4/05/07 START : 4/5/2007 END : 4/	7/200	7 LOGGER : R. McComb	
≷O⊋	(%			DISCONTINUITIES	၅၉	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	·	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B	RE RI GTH SOVE	(%) O	CTU	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	1BOL	WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	COF	a Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-23.7			NI/A			Limestone	
			N/A			- 64.0-65.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine	
_			N/A			grained, mild HCl reaction, extremely weak (R0), voids up to 1/16" over	_
_						40-50% of surface, 3/4"-1-3/16" size cavities over 1-3% of surface,	
_	R5-HQ 5 ft	16	N/A			- fossiliferous (molds/casts)	Driller's Remark: Hard spot at 67.0'
-	100%				-	Carbonate Sand (SP) 65.0-69.2' - moderately yellowish	-
-			N/A		1	 brown to pale yellowish brown, 	-
-				00 01 Faratura 40 day awardh ataward ta		(10YR 5/4 to 10YR 6/2), wet, loose, fine to very fine grained, moderate	R5:4 minutes
70	70.0		>1	69.2' - Fracture, 40 deg, smooth, stepped to undulating, black coating over 5% of the joint	H	- HCl reaction	-
-28.7				surface —	H	Limestone 69.2-70.0' - yellowish gray to dusky	
_			0		H	yellow, (5Y 7/2 to 5Y 6/4), fine grained, mild HCl reaction, very weak	-
			>3	71.1' - Fracture, 0-60 deg, rough, stepped,	Ш	(R1), voids up to 1/16" over 15-20% of the surface, 1/16-1/8" size voids]
_				open 71.35' - Fracture, horizontal, rough, stepped,	H	becoming more abundant with depth,	
_	R6-HQ 5 ft	22		open 71.4' - Fracture, horizontal, smooth, stepped,	Н	slightly fossiliferous (molds and - casts)	Driller's Remark: No return of circulation continues -
_	36%		NR	open	H	_ 70.0-71.55' - Same as 69.2-70.0' except mottled	ever since 45.0'
_			' ' '		Н	- No Recovery 71.55-74.75'	-
-					仠	-	R6:9 minutes
- 75	75.0		>1	74.751 Facetone 50 described and deletion	H	- 	-
-33.7	70.0			74.75' - Fracture, 50 deg, rough, undulating, — open	Ħ	Limestone 74.75-75.0' - moderate yellow, (5Y	
					Ш	7/6), fine to very fine grained, moderate HCl reaction, extremely	
			NR		Д	weak (R0), friable, slightly fossiliferous (molds/casts), mottled	_
_					Щ	with very fine grained lamination with	_
_	R7-HQ 5 ft	36			H	fewer voids, few cavities up to - 3/16"x3/16"	_
-	44%				H	No Recovery 75.0-77.8'	Driller's Remark: Recovery
-			1		団	77.8-79.0' - yellowish gray, (5Y 7/2),	from bottom (77.8-80.0')
-				78.8' - Fracture, 30 deg, smooth, undulating, black stain over 5% of surface	囯	_ mottled, very fine grained, mild HCl reaction, weak (R2), voids up to	R7:8 minutes
80 80	80.0		2	79.0' - Fracture, <5 deg, smooth, undulating,	${f f f eta}$	 1/16" over 15-25% of surface, few cavities up to 3/16", slightly 	-
-38.7			2	tight — 79.35' - Fracture, <5-30 deg, rough, stepped	\Box	fossiliferous (casts and molds), up to	_
			3	to undulating, open 80.4' - Fracture, <5 deg and 50 deg, rough,	Ы	 1" cavities with secondary infill of limestone with voids (1/16") over]
_			1	undulating, open 80.8' - Fracture, <5 deg, smooth, undulating,	${f f eta}$	40% of surface - 79.0-80.0' - yellowish gray, (5Y 7/2),	_
-	Do Lio		·	open	Ы	very fine grained, moderate HCl reaction, weak (R2), voids up to	-
-	R8-HQ 5 ft	38	4	81.0' - Fracture, 0-70 deg, rough, stepped, open	oxdot	 1/16" over 3% of surface, 	-
-	68%			81.1' - Fracture, 40 deg, rough, undulating, open	igorplus	interspaced with cavities with 2% infill of very weak lamination with	-
-				82.05' - Fracture, <5-50 deg, rough, stepped	Ħ	voids over 50-60%, trace fossil (mold/cast)	-
-			NR	to undulating, open 82.3' - Fracture, 40 deg, rough, stepped,	Ħ	_ (molureast)	R8:Runtime not recorded
85	85.0			open	Ħ	-	-
					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-09

SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				TENT : CIVIE 350X 3/N 340253, Muu Tolary, Fig tools, Fiv		·9	ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bgs	on 0	4/05/07 START : 4/5/2007 END : 4/	7/2007	LOGGER : R. McComb	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		. 0	DESCRIPTION	SYMBOLIC LOG		
N A	Z,A,∑	_	FRACTURES PER FOOT	DESCRIPTION	_ <u>_</u>	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
# # # # # # # # # # # # # # # # # # #	N F. I	(%) Q	58	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS CORING RATE AND
E F S	#\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	οD	AC-	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD
		8	FR.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S≺	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-43.7				82.5' - Fracture, 40 deg, rough, stepped,	+	Limestone	On 4/5/07 at 85.0',
				open	\Box	- 80.0-83.4' - yellowish gray, (5Y 7/2),	advanced HW casing to
				82.6' - Fracture, <5-70 deg, rough, stepped,		fine to very fine grained, mild to	86.0' from 45.0' due to
-				open	┧	moderate HCl reaction, very weak to	sand interval above a
-					₽	weak (R1 to R2), voids (up to 1/16")	slipping casing, very soft at -
					Ш	over 15-25% of surface, many	86.0', able to hammer
	R9-HQ					3/16"x1/16" cavities, few cavities up	casing easily several feet,
-	5 ft	0	NR		ш	to 3/8"x3/16", fossiliferous	able to get the circulation -
_	0%				Н	(molds/casts)	back
						No Recovery 83.4-90.0'	Lost circulation at 87.0'
-				•	ш	-	1
-				-	\vdash	-	D0.5
					Н		R9:5 minutes
90	90.0				Ш		Driller's Remark: Pulled
-48.7	30.0		0	90' - limestone fragments of 6" core		Limestone Fragments	core barrel but no —
-			U		₽₽	 90.0-90.5' - light olive gray, (5Y 5/2), 	recovery, tagged the
					\mathbf{H}	fine grained, moderate HCl reaction,	bottom of borehole at 90.0',
						very weak (R1), voids over 50-60%	suspect 85.0-90.0' is sand - 90.0-90.5' firm drilling
-					ш	of surface with cavities up to 3/16",	90.5-93.0' very soft
_			NR		Н	fossiliferous (infill/casts)	93.0-94.0' some what
	R10-HQ					No Recovery 90.5-93.0'	harder
-	5 ft	0		-	ш	-	94.0-95.0 very soft
-	20%		_		╁┼	Limestone	l
			0		Н	- 93.0-93.5' - yellowish gray, (5Y 7/2),	
						very fine grained, mild HCl reaction,	
-			NR		Ш	weak (R2), voids over up to 5-10% of	R10: No run time recorded
-			1411		₽₽	- surface, carbonate black coating on	-
95	95.0			_	ш	_ 5% of the surface, cavities	
-53.7			0			No Recovery 93.5-95.0'	Driller's Remark: HW
-			U	•	ш	 Limestone 95.0-95.8' - light olive gray, (5Y 5/2), 	casing continue to drop,
-				-	廾甫	very fine grained, mild HCl reaction,	advancing HW to 95.0'
_						- weak (R2), voids over 13% of	
					Ш	surface, with sand and silt-sized	SPT from 95.0-96.5 to
-	R11-HQ		NR	-	╁┼	carbonate grains, clayey	determine the lithology,
_	5 ft	36			\vdash	No Recovery 95.8-98.2	recorded 0.8' limestone
	52%						gravel; will switch back to HW coring (17, 50/3', -
I -					H	Limestone	67/9")
I -			1	98.5' - Fracture, 60 deg, rough, stepped,	╅	Limestone 98.2-100.0' - yellowish gray, (5Y 7/2),	1 **** /
-				tight, inclined	口	fine to very fine grained, mild HCl	D44.0 min.4
			4	99.0' - Fracture, horizontal, rough, undulating,		reaction, weak (R2), up to 1/16"	R11:8 minutes
100	100.0		1	tight	╨	voids over 15-20% of surface, few	1
-58.7	100.0			100.0-100.3' - Fracture zone, <5 deg and 60	╆	cavities up to 9/16"x3/4"on the	⊣
			>10		\Box	surface, mottled, interspaced with	-
				100.75-101.0' - Fracture zone, <5 deg, rough,	Ш	very fine grained limestone with	
I -				undulating, open	1 + 1	 fewer voids, fossiliferous (molds and casts) 	1
-			4	101.3-101.55' - Fracture zone, <5-60 deg,	口	100.0-101.4' - moderate olive brown.	-
I -				rough, stepped, open		[7] (5Y 4/4), fine grained, mild HCl	1 _
	R12-HQ		~10	101.9' - Fracture, horizontal, smooth, planar,	144	reaction, weak (R2), gravel-sized	1 1
I -	5 ft	20	>10	Clay irilling	ш	fragments, voids up to 1/8" over	1
-	58%			102.05' - Fracture, <5 deg, rough, undulating,	╨	25-30% of surface, few 3/8"x3/16"	-
I -				open	H	cavities on surface, fossiliferous	
			ND	102.5-102.9' - Fracture zone, 0-90 deg, rough, stepped, open	Н	(molds/casts)	1
I -			NR	Tough, stepped, open	口	-	R12:11 minutes
-				-	+	-	
105	105.0				Н		
					_		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-09 SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 04	4/05/07 START : 4/5/2007 END : 4/	7/2 <u>00</u> 7	7 LOGGER : R. McComb	
				DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-63.7 _			10	105.0-106.0' - Fracture zone, 0 to inclined 60-70 deg, rough, undulating, open		Limestone 101.4-101.9' - pale greenish yellow to yellowish gray, (10Y 8/2 to 5Y 7/2),	-
_			10	106.45' - Fracture, <5 deg, rough, undulating, open		very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3)]
-	R13-HQ 5 ft 48%	23	>10	106.45-107.4' - Fracture zone, rough, stepped, various orientations, open		Clay With Limestone (CL) 101.9-102.2' - black to very dark gray, (N1 to N3), wet, soft, black carbonate coated gravel-sized	-
110			NR		except yellowish gray to grayish	Limestone 102.2-102.9' - Same as 100.0-101.4'	R13:7 minutes
-68. 7			4	110.2' - Fracture, 70 deg, rough, stepped, open		infilling up to 1-3/16"-3/4", fossil molds and casts No Recovery 102.9-105.0'	
_	R14-HQ 5 ft		>10	110.5' - Fracture, 0-90 deg, rough, stepped, open 110.6' - Fracture, 70 deg, rough, stepped 110.8' - Fracture, <5 deg, rough, stepped,		Limestone 105.0-107.4' - yellowish gray, (5Y 7/2), fine to very fine grained, mild to]
_		23	1	joins with fracture at 110.6' 111.3- 111.9' - Fracture zone, various	H	moderate HCl reaction, weak to medium strong (R2 to R3), fossil	-
- - -	49%		NR	orientations - 112.45' - Fracture zone, 0-90 deg, rough, stepped, open		molds and casts, voids up to 1/16" over 30-40% of surface, few cavities up to 3/16"x3/16" exist on the rock surface No Recovery 107.4-110.0'	- - R14:4 minutes
115	115.0			-	H	 Limestone 110.0-112.45' - Same as 	-
-73. 7 -			3	115.2' - Fracture, 0-60 deg, rough, undulating to stepped, open		105.0-107.4' No Recovery 112.45-115.0' Limestone	
-	R15-HQ 5 ft	7		115.4 - Fracture, 40 deg, rough, undulating, tight 115.85' - Fracture, 50 deg, rough, undulating, open		115.0-116.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak (R1), friable, voids up to 1/16" over 25-30% of surface, 3/4"-1-3/16" cavities rarely exist on	
-	20%	,	NR	-		surface, rare fossiliferous (casts/molds) No Recovery 116.0-125.0'	-
120_	120.0			_		-	R15:4 minutes
-78.7 - -					H	-	-
- - -	R16-HQ 5 ft 0%	0	NR			- - - -	Driller's Remark: Retrieved a handful of material – consisting of loose sand, carbonate material, moderate to high HCl reaction, silty to sandy, light gray
- - 125	125.0			<u>.</u>		-	R16:3 minutes
120	120.0						



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-09

SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATERL	_EVELS : 2.0	ft bgs	on 04	4/05/07 START : 4/5/2007 END : 4/	7/200	7 LOGGER : R. McComb	
≥∩≘	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B	SE RU GTH, SOVE	(%) _Q	CTUI	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY. INFILLING MATERIAL AND	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
ESE ESE	REN	a Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-83.7			>10	125.0-126.0' - Fracture (>10), <5 deg and	111	Carbonate Sand With Silt (SP-SM)	Stop drilling 04/06/2007
			710	horizontal, rough, undulàting to stepped, inclined (40-50 deg), open	Е	125.0-125.5' - pale olive to yellowish gray, (10Y 6/2 to 5Y 7/2), wet, loose,	Resume on 04/07/07; – water level 6.0' below _
			>10	126.0-127.0' - Fracture (>10)	\Box	fine grained, rapid dilatancy, moderate HCl reaction, trace	ground surface
	D47.110			-	戸	_ limestone fragments	_
-	R17-HQ 5 ft	0		-	П	Limestone 125.5-126.5' - yellowish gray, (5Y	-
-	34%			-	፱	7/2), fine grained, mild to moderate HCl reaction, extremely weak (R0),	-
-			NR	-	世	voids over 10-15% of surface	-
-				-	丗	126.5-126.7' - light olive gray, (5Y 5/2), mild HCl reaction, very weak	R17:3 minutes
130 1	130.0			-		 (R1), voids up to 1/16" over 5-10% of surface, cavities up to 3/16"x3/16" 	-
-88.7	100.0			130.0-131.0' - Fracture (>10), vertical and	┢	No Recovery 126.7-130.0'	_
			>10	horizontal, rough, stepped to undulating, open	Н	- Limestone 130.0-131.0' - pale yellowish brown	_
				·	\Box	to yellowish gray, (10YR 6/2 to 5Y 7/2), fine to very fine grained, mild	1
					F	HCl reaction, very weak (R1), voids	
	R18-HQ 5 ft	0		_	F	up to 1/16" over 10-15% of surface, fossil molds and cast are rare, some	_
4	20%		NR	-	F	solution cavities up to 1"x3/16" No Recovery 131.0-135.0'	_
-	-			-	H	No Recovery 131.0-135.0	-
-				-	F	}-	R18:7 minutes
125	105.0			-	Ħ	}-	-
135 <u>1</u> -93.7	135.0			_	Ħ	Limestone	_
			3	135.4' - Fracture, 30 deg, smooth, undulating,	H	- 135.0-136.75' - yellowish gray, (5Y 7/2), very fine grained, moderate to	-
1 7			>10	open 135.6' - Fracture, 0-90 deg, smooth, stepped,	L	strong HCl reaction, very weak to weak (R1 to R2), 1/16" voids over	_
				open 2"-3" 135.95' - Fracture, rough, planar to stepped,	H	1-3% of surface, many	
	R19-HQ 5 ft	35		open	H	2"-2-3/8"x3/4"-1-3/16" cavities on rock surface, fossil molds and casts	_
	64%		NR	-	₽	No Recovery 136.75-138.6'	_
-				-	₽	}	-
-			>1	138.6' - Fracture, horizontal, smooth, planar, open, tan to black stain over 100% of surface	Н	Limestone 138.6-139.05' - light olive gray, (5Y	R19:10 minutes
140	1400		2	(20% black, 1/16" thick) 139.05' - Fracture, <5 deg, rough, stepped to	F	5/2), very fine grained, moderate HCl reaction, weak (R2), voids up to	-
140 <u>1</u> -98.7	140.0		10	undulating, open	Ħ	1/16" over 1-3% of surface	-
-				139.15' - Fracture, <5 deg, rough, undulating, open	Ħ	 139.05-139.15' - yellowish gray, (5Y 7/2), very fine grained, very weak 	-
			NR	140.2' - Fracture, horizontal, smooth, planar, open	Ħ	(R1), voids up to 1/16" over 10% of surface, trace fossil casts and molds	-
			>10	140.5' - Fracture, horizontal, smooth,	口	139.15-140.0' - Same as	
	R20-HQ 5 ft	29	3	undulating, open 141.5-141.9' - Fracture zone, 0-90 deg,	H	138.6-139.05' except mottled with brownish limestone	
	78%			rough, undulating to stepped, various orientations	口	1	_
			3	141.9-142.3' - Fracture, vertical, rough,	廿	<u> </u>	-
-	4			undulating, tight 142.3' - Fracture, <5 deg, rough, stepped,	士	}-	R20:11 minutes
445	445.0		2	open	\perp	}-	-
145 1	145.0		\vdash		\mathbf{f}		
i l							
í I							



PROJECT NUMBER: BORING NUMBER: 338884.FL

GSC-09

SHEET 9 OF 10

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams ELEVATION: 41.3 ft (NAVD88)

WATER LEVELS : 2.0 ft bgs on 04/05/07 START: 4/5/2007 END: 4/7/2007 LOGGER: R. McComb DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -103.7 142.9' - Fracture, horizontal, rough, stepped, Limestone 2 140.0-140.5' - light olive gray, (5Y open 143.2' - Fracture, horizontal, smooth, planar, 5/2), very fine grained, moderate HCI reaction, weak (R2), voids up to open 1/16" over 1% of surface 3 143.3' - Fracture, 15 deg, smooth, planar, (concentrated along break), open 1-3/16"x3/8" cavity, some infilling in 143.9' - Fracture, <5 deg, rough, undulating, R21-HQ 60 4 open cavity 5 ft No Recovery 140.5-141.5' 144.1' - Fracture, <5 deg, rough, undulating, 94% open Limestone 141.5-144.1' - light olive gray, (5Y 0 144.25' - Fracture, 60 deg, rough, stepped, 5/2), very fine grained, mild HCl tiaht 145.5' - Fracture, 20 deg, rough, undulating, reaction, very weak to weak (R1 to R21:7 minutes 1 R2), friable from 141.5-142.5' tight 145.65' - Fracture, 60 deg, rough, stepped, cavities up to 1/8"-3/16" over 40-50% 150 150.0 NR of surface, 3/8"x3/16" cavities over tight -108 7 1-3% of surface, cavities and voids 145.45' - Fracture, 10 deg, rough, planar, 2 open mostly present in 142.3-143.2', 146.5' - Fractures, horizontal, rough, laminated with very fine grained undulating, open limestone, less than 1% voids from 3 146.85' - Fracture, 10 deg, smooth, 143 6-143 8 undulating, tight 144.1-144.5' - light olive gray, (5Y R22-H0 147.0' - Fracture, vertical, rough, undulating, 5/2), very fine grained, mild to 2 5 ft 72 tight moderate HCI reaction, weak (R2), 100% 147.1' - Fracture, horizontal, rough, planar, voids up to 3/16" over less than 1% surface, two 3/16"x3/16" cavities, open 2 147.4' - Fracture, 15 deg, smooth, planar, trace fossil casts and molds open, silt/clay lens (<1/16" thick) No Recovery 144.5-146.1' R22:7 minutes 147.55' - Fracture, 10 deg, rough, stepped, Limestone 1 146.1-147.1' - light olive gray with <1/16" thick silty clay lenses 155 155.0 149.6' - Fracture, 0-50 deg, rough, stepped vellowish gray mottling, (5Y 5/2 with 113.7150.45' - Fracture, <5 deg, rough, undulating, 5Y 7/2), fine grained, mild to moderate HCI reaction, weak (R2). open 150.75' - Fracture, horizontal, rough, planar, voids over 5-15% of the surface. several 3/16"x3/16" cavities, trace open fossil molds and casts 151.35' - Fracture, <5 deg, rough, stepped, 147.0-146.1' - Same as 144.1-144.5' 147.1-147.4' - light olive gray with open 151.7' - Fracture, horizontal, smooth, planar, yellowish gray mottling, (5Y 5/2 with open 151.85' - Fracture, horizontal, rough, 5Y 7/2), fine grained, mild HCI reaction, very weak (R1), thinly cemented, 1-3/16"-1-9/16"x1/8' stepped, open 152.6' - Fracture, <5 deg, rough, undulating, open cavities, occasional clay bedding parallel to bedding plane, voids up to 153.0' - Fracture, smooth, planar, 1/16" silty clay liner covers 100% of surface 1/16" over 1-3% of the surface 147.4-147.6' - dark yellowish brown, 153.3' - Fracture, <5 deg, rough, undulating, (10YR 4/2), fine grained, mild HCI open reaction, extremely weak (R0), small voids over 40-50% of surface, friable 153.55' - Fracture, rough, undulating, open 154.15' - Fracture, horizontal, smooth, planar, with depth tight 147.6-149.7' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCI reaction, weak (R2), voids over 5-10% of surface, cavities (3/16"x3/8") over 1-2% of the surface, trace fossil molds and casts, cavities No Recovery 149.7-150.0'



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-09	SHEET	10	OF	10	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

CORING	NETHODA	IND EC	אורוע	MENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v casi	casing ORIENTATION: Vertical
WATER	LEVELS : 2.0) ft has	e on O	4/05/07 START : 4/5/2007 END : 4/	7/200	2007 LOGGER: R. McComb
WAILK	v _ L O . Z.(it by:	<i>5</i> 011 04		11200	
> ^ ~	<u></u>	L		DISCONTINUITIES	ڻ ا	US LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	O BOCK TYPE COLOR
E F	Z Z Z	<u> </u>	FRACTURES PER FOOT	52001 11011	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, SIZE AND DEPTH OF CASING,
#SE	동도씨	(%) Q	28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	占	WEATHERING, HARDNESS, FLUID LOSS, CORING RATE AN
분분	문호		당당	PLANARITY, INFILLING MATERIAL AND	AB.	MEATHERING, HARDNESS, SMOOTHNESS, CAVING ROD SMOOTHNESS, CAVING ROD SPORT FOR FOUR TO FEE
	걸린ਲ	a Q	F.P.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ϋ́	AND ROCK MASS CHARACTERISTICS DROPS, TEST RESULTS, ETC.
	014				٠,	
						Limestone
I -						- 150.0-154.15' - moderate yellowish
I -					1	brown, (10YR 5/4), fine grained, mild
						to moderate HCl reaction, weak to
-					1	 extremely weak (R2 to R0), voids up
I _					1	to 1/16" over 25-30% of surface,
						cavities (3/8"x3/16" and up to
-					1	- 3/4"x3/8") over 1-2% of surface,
l _					1	slightly fossiliferous, fossil casts and
						molds with some original fossil
-					1	- material from 152.0153.0'
l _					1	154.15-155.0' - very light gray to
						white, (N8 to N9), very fine grained,
-					1	- strong HCl reaction, very weak to
-				_	1	extremely weak (R1 to R0), small
						voids over 25-30% of surface, voids
-					1	more prominent in the lower half of the limestone (chalk-like material)
_					4	
						Bottom of Boring at 155.0 ft bgs on
I -					1	- 4/7/2007
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PROJECT NUMBER:	BORING NUMBER:	
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GSC-10

SHEET 1 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS				START : 4/19/2007	END: 4/22/2007		R : A.	Erickson		
				STANDARD		SOIL DESCRIPTION			COMMENTS		
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS) io			
DEPTH BELOW SURFACE AND ELEVATION (#)		RECOVE	ERY (ft)		SOIL NAME MOISTURE	E, USCS GROUP SYMBOL, (CONTENT, RELATIVE DEN	COLOR, SITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
EPT JRF/			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MINE		YMB	INSTRUMENTATION		
□ あ iii 42.3	0.0			(N)	Tonsoil Gradin	ng To Poorly Graded Sand	With	S			
	0.0	1.3	SS-1	1-2-2	Organics (SP)	•		-	-		
-		1.3	33-1	(4)	0.0-1.3' - grayisl grained. silica s	sh black, (N2), moist, very losand, 50% organics decrea	oose, tine sina with	-	Water level is based on Ground Water		
-	1.5				depth, trace nor	nplastic fines		Ħ	Monitoring at LNP site (FSAR Table -		
-								1	2.4.12.08) Water levels not recorded during drilling		
-								1	-		
-							-	1	-		
-							•	1	-		
_							•	1	-		
5	5.0							1	-		
37.3	0.0				Silty Sand (SM)	(5) (5 (2)		Ш	_		
-		0.9	SS-2	3-3-3 (6)	5.0-5.9' - light bi — sand. 15-20% n	prown, (5Y 5/6), moist, loos nonplastic fines, trace organ	e, tine silica nics	Ш	_		
-	6.5			(0)	<u> </u>	р.шенее., и исе е ди		1	-		
-								1	_		
							•				
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_											
_									_		
10	10.0										
32.3				0-0-1	Silty Sand (SM) 10.0-10.7' - pale	l) e orange, (10YR 8/2), wet,	loose fine		Weight of hammer enough to drive of SS-3 first 12"		
_		0.7	SS-3	(1)	\bigcap to medium grair	ned, strong HCl reaction, 2	0% low	1	_		
-	11.5				\piastic fines, fos	ssiliferous, carbonate mate	riai /	1	_		
_								1	-		
_								1	-		
-								-	-		
_								┨	-		
-								1	-		
								1	-		
15 <u> </u>	15.0			40-50/3	Silt (ML)			\prod	Driller's Remark: Feels like hard material		
-	15.8	0.8	SS-4	(90/9")	15.0-15.8' - grav	yish orange, (10YR 7/4), m d dilatancy, mild HCl reacti	oist, hard,		-		
-					very fine sand-s	sized, carbonate materials	011, 5-10%	Ħ	-		
-								1	-		
-								1	-		
-								1	7		
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-								1	7		
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20								1	_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-10	SHEET	2	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	VATER LEVELS: 1.61 ft bgs on 6/14/07 START: 4/19/2007 END: 4/22/2007 LOGGER: A. Erickson										
				STANDARD	SOIL DESCRIPTION			COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		7	SYMBOLIC LOG				
		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	1	200	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND			
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	1	WB	INSTRUMENTATION			
S S S				(N)	0''' (MI)	4	တ်				
22.3	20.0			28-45-43	Silt (ML) 20.0-21.4' - Same as 15.0-15.9'	\parallel		<u>-</u>			
-		1.4	SS-5	(88)		\parallel		-			
_	21.5					╝	Ш	_			
_						1		-			
-						1		-			
_						4		-			
_						4		-			
_						4		-			
_						4		-			
25 <u> </u>	25.0				0:14 (881.)	4	П				
17.3				35-44-33	Silt (ML) 25.0-26.5' - Same as 15.0-15.9'	\parallel		-			
-		1.5	SS-6	(77)		\parallel		-			
_	26.5					4	Ш	-			
_						4		-			
_						4		-			
_						4		Driller's Remark: Water loss at 28.0'			
_						4		Driller's Hernark: Water loss at 28.0			
-						4		-			
-						4		-			
30 <u> </u>	30.0				Const. Cit /MI	4	П				
12.3				17-32-32	Sandy Silt (ML) 30.0-31.3' - Same as 15.0-15.9' except grayish	\parallel		-			
-		1.3	SS-7	(64)	orange, 20-25% fine to coarse sand-sized, trace fine gravel-sized limestone, carbonate materials	\parallel		-			
-	31.5				graver-sized inflestorie, carbonate materials	†		-			
-						+		-			
-						+		Driller's Remark: Hard drilling at 32.5'			
-						+		- Driller's Heritark. Hard drilling at 32.5			
-						+		-			
-						+		-			
-						+		-			
35 7.3	35.0				Silt With Sand (ML)	+	П				
		1.0	SS-8	31-26-24	35.0-36.2' - yellowish gray, (5Y 7/2), moist, hard,	\parallel		-			
-		1.2	აა- _წ	(50)	nonplastic, rapid dilatancy, mild HCl reaction, very fine to fine sand-sized, 10% fine to coarse sand-sized,	\mathbb{H}		-			
-	36.5				carbonate	4		-			
-						+		-			
-						+		-			
-						+		-			
-						+		-			
-						+		-			
						+		-			
40						+					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-10	SHEET	3	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS	: 1.61 ft k	ogs on 6/1	14/07 S	START : 4/19/2007 END : 4/22/2007 LOGGEF	R : A.	Erickson
				STANDARD	SOIL DESCRIPTION	g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCO CROUR CVARROL COLOR	SYMBOLIC LOG	DEDTIL OF CACING DOULING DATE
H BE ACE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	BOLI	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION
2.3	40.0				Sandy Silt (ML)	Ш	
-		1.5	SS-9	10-17-27 (44)	40.0-41.5 - Same as 35.0-36.2' except 30-35% fine to coarse sand-sized and trace organics	1	1
	41.5			(11)	, and the second		
_					_	1	_
_					-	1	_
-					-	-	-
-					-	1	-
-					-		-
45_	45.0				-	1	-
-2.7	10.0				Silty Sand (SM)	Ш	Driller's Remark: Will set casing to 45.0'
		1.1	SS-10	23-52-50 (102)	45.0-46.1' - Same as 40.0-41.5' -	$\ \ $	below ground surface
_	46.5			(- /	_	Г	_
_					-	1	Drillaria Damaniki Hard drilling at 47.0
-					-	-	Driller's Remark: Hard drilling at 47.0', sample was slough in sand-sized limestone
-					-	1	fragments
-					-	ł	-
-					-	1	-
50	50.0 50.2	0.0	SS-11	50/2	No Decoupy 50 0 50 0	1_	1
-7.7	50.2		(33-11)	(50/2")	No Recovery 50.0-50.2' Begin Rock Coring at 50.0 ft bgs		
_					See the next sheet for the rock core log		_
_					-	1	_
-					-	-	-
-					-	ł	-
-					-	1	-
-					-	1	-
-					-	1]
55 <u> </u>					_		
-12.7					<u>-</u>	1	_
-					-	-	_
-					-	1	-
-					-	1	-
-					-	1	-
-					-	1	-
-					-	1]
					_		
60						lacksquare	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-10	SHEET	4 0	F 10	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING METHOD AND EQUIPMENT: CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION: Vertical								
WATER LEVELS: 1.61 ft bgs on 6/14/07								
300	<u> </u>			DISCONTINUITIES	ני	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,		
교병은	N H H	(%	URE		- 일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND	
A A A	Sov	(%) □	ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	JBC BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD	
	SHE S	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.	
-7.7	50.0 R1-NQ		2			Limestone	R1:3 minutes	
-	1 ft	0	NR	50.2' - Fracture, 80 deg, smooth, undulating, second face of fracture has been fragmented	╁┼┤	- 50.0-50.4' - light olive gray, (5Y 5/2),	-	
-	51.0 40%			into at least two subangular to subrounded	七二	fine grained, mild to moderate HCl reaction, medium strong (R3), voids	-	
-				elongate fragments, trace coatings/infill on all	₽₩	- (1/16") over 10-40% of surface, thin	_	
l -				fragments	ш	elongate fossil molds mostly 1/4" and	_	
					┸	up to 1/2", moderately fossiliferous No Recovery 50.4-56.0'		
						140 Recovery 30.4-30.0	1	
_	R2-NQ				Ш	-	1	
-	5 ft 0%	0	NR		ш	-	-	
-	076				+	-	-	
-					口	_	-	
55 <u> </u>				_	₽		D0:0	
-12./					Щ	-	R2:8 minutes	
	56.0				Щ	_		
			0			Limestone]	
_					Ш	 56.0-56.3' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, 	1	
-					Ш	weak to medium strong (R2 to R3),	Core stuck in HW casing	
-					$\pm \Box$	- voids (1/16") over 25% of surface,		
_	R3-NQ				+	1/8" thin elongate fossil molds some larger 1/4"-1/2" cavities and fossil	-	
_	5 ft	7	NR		Ш	- molds	-	
_	7%		INK		Щ	No Recovery 56.3-61.0'	_	
_					Ш	_	_	
60					Н			
-17.7				_	\top		R3: Run time not recorded	
_	61.0				┰╫	-	1	
-	01.0				Ш	Limestone	1	
-			>10	61.35' - Fracture, horizontal, rough,	+	- 61.0-62.45' - moderate yellowish	-	
-				undulating, tight to healed 61.5-61.7' - Fractures, horizontal, multiple	H	brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, very weak	-	
_			>10	fractures with fine bedding planes and	+	to weak (R1 to R2), numerous	_	
_				organic laminations, nearly crush, very open	4111	_\ 1/16"-3/16" voids, thick black	_	
l _	R4-NQ 5 ft	13	1	62.0, 62.2, 62.35' - Fractures (3), horizontal, smooth, planar, open		horizontal bedding plane laminations, elongate 1/4" long fossil molds and	_	
	70%	10	'	62.7-63.8' - Fracture, angular black sediment		¬ \casts throughout, moderately		
I -			0	63.8' - Fracture, 10 deg, rough, undulating	\Box	fossiliferous]	
65					14	Silty Sand (SM) 62.45-63.8' - moderate yellowish	-	
-22.7			NR	_	ш	brown, (10YR 5/4), nonplastic, mild	R4:7 minutes	
I -			````		+	to moderate HCl reaction, 60% fine	-	
-	66.0				口	sand, 30% fines, 10% limestone fragments, non-cohesive, massive,	-	
_			1		₽	- easily friable and ground to fine	-	
-				66.6' - Fracture, horizontal, rough, planar,	Щ	sand, calcareous	_	
_			0	followed by non to weak sediment/rock 66.6-70.5' - Fractures, 0-20 deg, occasionally	Н	Limestone		
				more of a fracture zone, silt-sized fragments		63.8-64.5' - moderate yellowish brown, (10YR 5/4), fine grained,	1	
I -	R5-NQ			-	Ш	moderate HCI reaction, medium	1	
-	5 ft 90%	10	0		田	strong (R3), voids (1/16") over	-	
-	9070				Ш	20-25% of surface, trace larger up to 3/16" voids and fossil molds, trace	-	
I			0		뮈	organic black beds	-	
70					+	No Recovery 64.5-66.0'		
Щ								



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-10 SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.6	1 ft bo	gs on (6/14/07 START : 4/19/2007 END : 4/	22/20	D7 LOGGER : A. Erickson	
>00	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC		D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
THE	ENGE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-27.7	Olk	2		THORACOC, COTA NOL CIVILIANO, PARE HOLLING	S	Limestone	R5:6 minutes
-21.1			0	-	H	- 66.0-66.6' - moderate yellowish	R5.6 minutes
_	71.0		NR	71.0-72.9' - Fractures, several horizontal	Н	brown, (10YR 5/4), fine grained, extremely weak to medium strong	-
_	_		0	breaks	щ	- (R0 to R3), no voids where extremely	-
_					П	weak rock (R0), voids (1/16") over 5% of surface where medium strong	-
_			1	-	ш	- (R3), trace organics, strong HCl	1
_	D0.110			72.9' - Fracture, horizontal, rough, undulating	╁┼	reaction where extremely weak rock (R0) at the top, moderate HCI reaction where medium strong (R3)	_
_	R6-NQ 5 ft	18	2		F		-
_	78%		1	73.5, 73.6' - Fractures (2), horizontal, smooth to rough, planar, open	Ħ	at the bottom 66.6-70.5' - dark yellowish orange,	-
_				74.1' - Fracture, horizontal, smooth, planar,	Ш	- (10YR 6/6), fine grained, strong HCl	_
75				open —	Н	reaction, very weak (R1), fine voids over 0-3% of surface, friable	End of core at 74.9',
-32.7			NR		Д	 No Recovery 70.5-71.0' 	matches/mates with next _
-	76.0			-	Ш	Limestone 71.0-72.9' - dark yellowish orange to	core at 76.0' R6:6 minutes
_			0	<u>-</u>	Н	grayish orange, (10YR 6/6 to 10YR	-
_				<u>-</u>	F	7/4), fine grained, strong HCl reaction, extremely weak to very	_
_			3	77.05' - Fracture, 10 deg, rough, undulating 77.2' - Fracture, horizontal, rough, planar,	H	weak (R0 to R1), friable	_
_				healed	Ш	72.9-74.1' - Same as 71.0-72.9' - except very weak (R1)	_
_	R7-NQ 5 ft	60	>10	77.65, 77.9' - Fractures (2), horizontal, smooth, planar, tight to open	Н	_ 74.1-74.9' - moderate yellowish	_
_	96%			78.0-78.8' - Fractures, horizontal, multiple	Ш	brown, (10YR 5/4), fine grained, moderate to strong HCl reaction,	
_			2	breaks 79.05' - Mechanical break, 10 deg, rough,	ш	weak to medium strong (R2 to R3),	_
80				undulating	Н	voids (1/16"-1/8") over 25-30% of surface, trace organics, 1/16"	
-37.7 -			1	79.5' - Fracture, horizontal, rough, stepped, open, missing portion of fracture	Н	fossils/molds, highly fossiliferous	R7:7 minutes
_	81.0		NR.	80.05' - Fracture, 10 deg, rough, planar, tight	F	No Recovery 74.9-76.0' Limestone	
_			2	81.25' - Fracture, 10 deg, rough, planar,	H	_ 76.0-77.05' - moderate yellowish	Core essentially alternates between the two rock types -
_			2	healed 81.75' - Fracture, 10 deg, rough, planar, open	Ш	brown, (10YR 5/4), fine grained, – moderate HCl reaction, medium	in 81.0-81.75' and 81.75-
_				82.35' - Fracture, horizontal, rough, planar,	Н	strong (R3), voids (1/16"-1/8") over	84.2'
-				open with 1/4" infill on each face (coating is	П	25% at top reducing to 0% voids with depth (transition sharpest at 76.6')]
-	R8-NQ 5 ft	67	0	same as lithology described for 81.0-81.75')	П	77.05-79.55' - moderate yellowish]
-	100%	-		83.75' - Fracture, horizontal, rough,	H	brown, (10YR 5/4), fine grained, moderate to strong HCl reaction,]
-			3	undulating, tight 84.2-84.4' - Fractures, horizontal, rough,	H	very weak to extremely weak (R1 to] _
85				undulating, filled with material as described	Ħ	R0), 0% to trace voids, friable — 79.55-80.8' - moderate yellowish	D0:45 minutes
-42.7 -			>10	for 81.0-81.75' 84.75' - Fracture, 10 deg, rough, planar, tight	H	brown, (10YR 5/4), moderate to strong HCl reaction, medium strong	R8:15 minutes
-	86.0			to open with fine coating of infill similar to	Н	to very weak (R3 to R1), voids]
-		13	5	82.35' 85.2' - Fracture, horizontal, rough, stepped,	円	(1/16"-3/8") over 30% of surface from 76.0'-77.05', decrease in voids] _
-			8	very open, with fragments	П	_ (1/16") to 3% of surface]
-				85.3' - Fracture, horizontal, smooth, planar 85.3-86.0' - Fractures, several horizontal and	Ш	No Recovery 80.8-81.0' Limestone]
-	R9-NQ 5 ft 78%			vertical, angular (1/2"-3") fragments	H	81.0-81.75' - moderate yellowish]
-			>10	86.1' - Fracture, 10 deg, smooth, stepped, tight to open, subangular to subrounded	\vdash	brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), fine grained,] _
-				fragments	Ħ	strong HCl reaction, very weak (R1)] _
-			>10	86.25, 86.35, 86.4, 86.5' - Fractures (4), horizontal, rough, planar to undulating, tight	H	- -] _
90					H		

APPENDIX 2BB-971 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-10

SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING INETHOU AND EQUIPMENT. CIVIE 33 3/N 232343, HILLI TOLATY, INQ LOOIS, HW CASHING CONTROL OF C									
WATER	WATER LEVELS : 1.61 ft bgs on 6/14/07 START : 4/19/2007 END : 4/22/2007 LOGGER : A. Erickson								
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR			
OH HE	2 <u>4 6 </u>	÷	FRACTURES PER FOOT	52001 W 11011	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,		
H W W		(%) Q	ΙŠĞ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD		
뜨쥬핑		Ø	N N	PLANARITY, INFILLING MATERIAL AND	Ĭ	AND ROCK MASS	DROPS, TEST RESULTS, ETC.		
SE		ď	뜐풉	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	Brior o, reor reodero, ero.		
-47.7				87.15' - Fracture, horizontal and 30 deg,		Limestone	R9:9 minutes		
-			NR	rough, planar, open	╁	- 81.75-84.2' - moderate yellowish	-		
-	91.0			87.3, 87.4, 87.55' - Fractures (3), horizontal,	ш	brown, (10YR 5/4), fine grained,			
				smooth, rounded rock fragments	Н	moderate to strong HCl reaction,			
-			5	87.9, 88.25, 88.35, 88.6, 88.8, 89.2, 89.4' -		- strong (R4), voids (<1/16") over	1		
I -				Fractures (7), horizontal, significant		5-15% of surface, except for 1"			
				fragmentation in places		interval at 83.4' with 25% voids on			
-			3	89.45-89.9' - Fracture zone, 30 deg 91.0-91.4' - Fracture zone, several large	╁	 surface 84.2-84.4' - Same as 81.0-81.75' 	1		
-	D40 NO			subangular fragments with weathered	$-\Box$	except extremely weak (R0)	-		
_	R10-NQ 5 ft	38	5	appearance, very open		- 84.4-85.3' - Same as 81.75-84.2'			
	88%			91.7' - Fracture, 20 deg, rough, planar, tight	Н	except weak (R2), voids over 3% of			
_				92.5' - Fracture, horizontal, rough, undulating,	T	surface, this material more of a	-		
_			1 1	fragmentation	\Box	transition between the two types from	_		
95				92.6' - Fracture, 60 deg, rough, undulating,		81.0-84.2'			
-52.7			0	tight	1—	85.3-86.0' - Same as 81.0-81.75'	R10:8 minutes		
-			ND	92.8' - Fracture, 60 deg, rough, planar, tight	╀┤	 except strong HCl reaction, very 	-		
_	96.0		NR	93.3' - Fracture, 45 deg, rough, planar, tight		weak (R1)			
				93.7' - Fracture, horizontal, rough, planar,		86.0-86.5' - moderately yellowish			
-			0	very open, material beneath is discontinuous	ш	 brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, 	1		
_				and somewhat fragmented 93.9' - Fracture, horizontal, rough, stepped,	╆┯╢	weak (R2), fine organic inclusions,	_		
			_	very open with fragmentation, subangular		no voids			
-			0	95.0' - Fracture, horizontal, rough, stepped,		86.5-87.1' - Same as 86.0-86.5'	1		
-	D44 NO			with missing fragments	╂┼┼	except fine (<1/16") voids over 30%	-		
	R11-NQ 5 ft	78	1		┵	of surface (up to 40% at 86.6'), few			
	94%	70	'	00.751 Faratura basinantal assarb atauna		larger 1/4" cavities/fossil molds			
-	0.70			98.75' - Fracture, horizontal, rough, stepped,		87.1-88.9' - Same as 86.0-86.5'	-		
-			4	tight 99.05, 99.15' - Fractures (2), horizontal,	ш	except very weak to weak (R1 to R2),	-		
100				rough, undulating, very open with weathered _	Н	voids vary over 10-30% of surface			
-57.7			0	appearance in zone of increased	1		R11:7 minutes		
-			0	voids/cavities	ш	except weak to medium strong (R2 to R3), 10% voids (<1/16"), few larger	1		
l -	101.0		NR	99.75' - Fracture, horizontal, rough,	┢┼┤	- (1/4") cavities/fossil molds	_		
		Q 47		undulating, tight	\vdash	No Recovery 89.9-91.0'			
-			6	99.95' - Fracture, horizontal, smooth, planar,	tп	Limestone			
_				very open with apparent change of rock type		- 91.0-91.4' - dark yellowish orange,	-		
			5	abruptly at fracture	Ш	(10YR 6/6), fine grained, moderate to			
1 -			၂၁	100.0-103.5' - 3 to 4 large 1-1/2" fragments,	\vdash	strong HCl reaction, very weak (R1),	1		
-			\vdash	primarily horizontal breaks along lignite lamination	╀┤	fine voids over 10% of surface, 1/4"	Driller's Remark: 20%		
1 -	R12-NQ 5 ft 74%		1	100.55' - Fracture, horizontal, planar, black		rounded gray inclusions	water loss at 103.0'		
				bedding plane/lamination, tight	\square	91.4-95.4 - moderate yellowish			
1 -			<u>-</u>	101.8' - Fracture, horizontal, rough, stepped,	111	- brown, (10YR 5/4), moderate to			
1 -			5	open to fragments beneath	\vdash	strong HCl reaction, weak to medium	4		
105				101.8-102.0' - subangular rock crush 1" in	\Box	strong (R2 to R3), no voids — 91.5-91.8', voids (1/16") over 10-20%			
-62.7			NR	size	Ш	of surface elsewhere, some fossil	R12:7 minutes		
-			INK	102.15' - Fracture, 70 deg, rough, undulating,	+	cavities/molds variably up to 1/2",	-		
1 -	106.0			open to overlying fragments and terminating	\Box	though most smaller, poorly			
			ا ۔ ا	at 101.8' horizontal fracture and at 102.3'		fossiliferous			
1 -			2	102.7, 102.75' - Fractures, horizontal,	\square	No Recovery 95.4-96.0'	1		
I -			<u> </u>	smooth, stepped, tight	$\vdash\vdash$	_ Limestone	4		
1			ا م ا	103.0' - Fracture or mechanical break, 30 deg, rough, undulating, tight	\vdash	96.0-98.75' - moderate yellowish			
1 -			0	104.1' - Fracture, horizontal, rough, planar,		brown, (10YR 5/4), fine grained,	1		
-	R13-NQ 5 ft 76%	48	\vdash	followed by fragments	ш	moderate to strong HCl reaction,			
I -			48 >10	l	H	medium strong (R3), voids (1/16")			
1			10	3" fragment but some subangular vertical and	$\vdash\vdash\vdash$	over 3-10% of surface, few	1		
1 -				horizontal fragments	Ш	_ cavities/molds up to 1/2", but most are 1/4"	-		
-			2			- aic 1/4	4		
110					Ш				
1									
			1		1				

APPENDIX 2BB-972 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-10

SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

	, <u>.</u>	10 -	<u> </u>	MENT : CIVIE 33 3/N 232343, Mud Totally, NQ tools, HW C	-aog		ORIENTATION : Vertical
WATER	LEVELS: 1.6	1 ft b	gs on	6/14/07 START : 4/19/2007 END : 4/	22/20	D7 LOGGER : A. Erickson	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
≷9€	_6%			DECODIDATION	SYMBOLIC LOG		
N N N	ĭÃ≿	_	₩.	DESCRIPTION	J	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
E SE	L 독표	(%) _Q	28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E F S	#58	Oρ	AC.	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	8	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S≺	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-67.7				106.35, 106.55' - Fractures (2), 10 deg,	+	98.75-99.95' - Same as 96.0-98.75'	R13:5 minutes
- 07.7			NR	rough, undulating, open, fine calcareous		- except weak (R2), voids from	10.5 minutes
	111.0			infill/coating		15-40% of surface, increased voids	
-	1111.0			108.25, 108.6' - Fractures (2), 20 deg, rough,	╁—	and cavities at 98.75-99.2', with	1
-			0	stepped, very open, with dissolved	₽	- fractures	
				appearance	Н	Limestone	
_	1			108.6-109.1' - Fracture zone, subangular,		99.95-100.7' - Same as 96.0-98.75'	1
-	-		2	primarily 1/2"-3/4" with a few larger fragments	╨	 except weak to medium strong (R2 to 	-
_]			109.1' - Fracture, horizontal, rough, stepped,	ᅪ	R3), voids decrease with depth from	
	R14-NQ			terminates fracture zone	\vdash	5% to 0% of surface where black	
-	5 ft	80	4	112.45' - Fracture, 45 deg, rough, stepped,	+	laminations (<1/16" thick each)	-
_	100%			nearly healed		become darker brown/gray banded	_
				112.8' - Fracture, horizontal, rough, stepped,	ш	organics	
	1		2	open 113.5' - Fracture, 30 deg, rough, stepped,	╁	No Recovery 100.7-101.0' Limestone	1
115_				open – Tacture, 30 deg, rough, stepped,	╁	101.0-101.8' - dark yellowish brown,	But 0 1 -
-72.7			8	113.7, 114.0' - Fractures (2), horizontal,		(10YR 4/2), fine grained, moderate to	R14:6 minutes
_	116.0		Ö	rough, planar, open to tight	1_	strong HCl reaction, strong (R4),	1
-	116.0			113.85' - Fracture, vertical, rough, undulating,	╨	voids over 3% of surface, few 1/4"	-
_			2	tight, bounded by overlying and underlying	ь	elongated fossil casts, banded black	
				horizontal fractures	\vdash	organics (lignite) in upper portion	
-	-			114.2' - Fracture, 10 deg, smooth, undulating,	-	turning to minor with depth	-
l -]		4	very open		_ 101.8-104.7' - moderate yellowish	_
			7	114.95-115.1' - Fractures, rough, stepped,	Н	brown, (10YR 5/4), fine grained,	
-	R15-NQ			subangular rock fragments bounded by	╁	moderate to strong HCl reaction,	1 -
-	5 ft	13	>10	horizontal fractures	╀"	_ strong (R4), voids (1/16") over 25%	1 -
	72%			115.3, 115.5' - Fractures (2), 20-30 deg,		of surface, thin elongated 1/4"-1/2"	
_	1		2	rough, undulating, tight to open	1_	fossil molds, few larger cavities up to	1 7
-			3	116.85, 116.95, 117.05, 117.1' - Fractures	₩	_ 3/4", small casts (1/4"), fossiliferous	-
120				(4), 0-10 deg, rough to smooth, planar to	Н	No Recovery 104.7-106.0'	
-77.7	1		NR	undulating, along bedding planes –	7	Limestone	R15:7 minutes
-	- 1		INIX	117.35' - Fracture, horizontal, rough,	-	106.0-109.8' - moderate yellowish	-
_	121.0			stepped, open 117.6' - Fracture, horizontal, rough, stepped		brown, (10YR 5/4), fine grained, moderate to strong HCl reaction,	
				117.6 - Fracture, horizontal, rough, stepped 118.3' - Fracture, horizontal, rough, stepped,	ш	strong (R4), some short, weaker	Driller's Remark: 100%
-	1		>10	terminates the fragments	+	fracture zones, voids (1/16") over	water loss at 120.0'
_				118.45-119.1' - Fracture zone, rock		- 25% of surface, many round to oval	_
				fragments, grayer subangular rock fragments		1/4" fossil molds, increased size and	Quite possible no recovery
-	1		4	from 1/2"-1"	┺	frequency of cavities (up to 1/2") at	is from fracture zone of -
l -				119.75' - Fracture, vertical, rough, undulating,	╨	- 108.25-109.1'	118.0' (which would shift
	R16-NQ		ا ہا	from overlying rock fragments to end core at	\vdash	No Recovery 109.8-111.0'	down to 119.6')
I -	5 ft	32	0	119.6' some fragmentation/splitting	†	Limestone	1
I -	70%			121.0-121.9' - Fractures (12), horizontal,		 111.0-116.0' - moderate yellowish 	-
			2	every 1/2"-1", all tight to open with rounding		brown, (10YR 5/4), fine grained,	
405	1			122.05, 122.2, 122.25, 122.3' - Fractures (4),	╨	moderate HCl reaction, weak to	1
125_ -82.7	{		ا ـ ا	horizontal, smooth, undulating, open to tight –	+	— medium strong (R2 to R3), voids	R16:5 minutes
-02.7	j l		NR			(1/16") over 25-40% of surface,	K 10:5 Minutes
I -	1260			deg, rough, undulating, healed		1/4"-1" areas of lighter-colored infill	1
-	126.0		-	124.3' - Fracture, horizontal, rough,	+	 with strong HCl reaction; infill is 	-
]		8	undulating, tight	┷	clayey in texture often not at	
I -			١	126.6' - Fracture, horizontal, smooth,	\vdash	fractures	1
_	1			stepped, open to fragments/fracture zone	+-	_ 116.0-118.0' - moderate yellowish	1
l -	ļ l		>10	below	ш	brown, (10YR 5/4), fine grained,	
1			ا	126.6-127.5' - Fracture zone, subangular and		moderate HCl reaction, weak (R2),	
I -	R17-NQ			angular fragments 1/2"-2", browner at top,	╨	voids (1/16") voids over 5% of	
I -	5 ft	53	7	grayer at bottom	╆	surface, fine bedding planes particularly from 116.65-117.1',	
	78%	00	'	127.5' - Fracture, horizontal, rough, stepped,		except at 117.6-118.0' where rock is	
I -	1			fracture terminates fracture zone, gray	ш	friable and extremely weak (R0)	1
-	Į		0	fragments above, brown limestone beneath,	\perp	- Habic and caucinely weak (110)	-
130				abrupt transition at fracture	\vdash		
					1		

APPENDIX 2BB-973 Rev. 4



PROJECT NUMBER:	BORING NUMBER:				
338884 FI	GSC-10	CHEET	Ω	ΩE	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	I WIL I I IOD AI	ND LC	ZUIFIV	/IENT: CME 55 S/N 252345, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 1.6	1 ft b	qs on	6/14/07 START: 4/19/2007 END: 4/	22/20	D7 LOGGER : A. Erickson	
	_			DISCONTINUITIES	Ι	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			DECODIDATION	SYMBOLIC LOG		
N E	ÄA≻	_	₩.	DESCRIPTION	J	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
# # # # # # # # # # # # # # # # # # #	Z, Ŧ, Ē	(%) O	28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E F ∑	# ₂ 50	Ω <	AC.	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SU	SHR	S Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S≺	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-87.7				128.2-128.5' - Fracture, horizontal, rough,	+-	118.0-119.6' - light olive gray, (5Y	R17:6 minutes
			NR	stepped, leads into several inches of angular		- 3/2), fine grained, moderate to strong	TV17.0 minutes
	131.0			(1/4"-1/2") fragments		HCl reaction, medium strong (R3),	
-				128.75' - Fracture, horizontal, rough, planar,	Ъ—	voids (1/16") over 5-10% of surface	-
-			1	tight -	╀╴	- No Recovery 119.6-121.0'	-
l _				131.8' - Fracture, horizontal, rough, planar,		Limestone	
				tight		121.0-124.5' - yellowish gray, (5Y	
-			4	ugin.	₩	 8/1), very fine grained, strong HCI 	-
-				132.7' - Fracture, horizontal, smooth, planar,	+	reaction, weak (R2), voids (1/16")	_
	R18-NQ			open		over 5% of surface, trace fossil	
_	5 ft	57	7	132.7-133.5' - Fractures, smooth, planar,		 imprints (mostly on fracture faces), after 122.05' inclusion of gray very 	1
-	86%			rock fragments (fragments broken in	+	fine to fine grained particles	-
I _			1	horizontal plane, then broken again)	╀	 beginning as very fine particles 	
135			'	104015 1 1 1 1 1 1 1 1 1 1 1 1		transition to fine to medium grained]
-92.7			5	134.8' - Fracture, horizontal, smooth, planar, —	Ĺ.	and yellowish gray (5Y 7/2) after	R18:8 minutes
				open 135.1' Fracture horizontal smooth planar	₽	_ 122.5', less friable `	-
	136.0		NR	135.1' - Fracture, horizontal, smooth, planar, smooth to planar lower face, open	\vdash	No Recovery 124.5-126.0'	
1 -	,			135.2, 135.25, 135.3' - Fractures (3),	Ľ	Limestone	1
-			>10	horizontal, smooth, planar	ш	_ 126.0-127.5' - moderate yellowish	-
l _				135.1-135.3' - Fracture zone, horizontal,	\vdash	brown to dark yellowish orange,	_
				planar		(10YR 5/4 to 10YR 6/6), moderate HCl reaction, medium strong (R3),	
-				136.0-136.6' - Fractures, horizontal, smooth,		some subtle change in color with	-
_				planar, angular fragments	┺	olive gray (5Y 3/2) fragments,	=
	R19-NQ	7		136.6' - Fracture, horizontal, smooth, planar,	\vdash	127.0-127.5' voids over 5% of	
-	5 ft 22%	'		terminates fragments	Ъ	surface, few 1/4" cavities	
-	22 /0		NR	136.8' - Fracture, horizontal, rough, planar,		127.5-129.9' - moderate yellowish	-
l _				open to tight		brown, (10YR 5/4), moderate HCl	_
140					Н	reaction, medium strong (R3), voids	
-97.7				_	╁	— (1/16"-3/8") over 15% of surface,	R19:4 minutes
-						many 1/8"-1/4" cavities	-
_	141.0				Ь,	No Recovery 129.9-131.0' - Limestone	
				141.0-141.9' - Fracture zone, with angular	Н	131.0-132.7' - moderate yellowish	
-			>10		t	brown, (10YR 5/4), moderate HCl	-
_				141.2' - Fracture, 10 deg, rough, stepped,		reaction, medium strong (R3), voids	_
				open to fragmented	ш	(1/16"), many 1/4" cavities (elongate	
_			>10	141.4' - Fracture, 10 deg, rough to smooth, stepped to undulating, open to fragmented	1—	and round up to 3/4")	1
I -	D00 N0			141.7, 141.9' - Fracture (2), 20 deg, rough,	╀	 132.7-135.3' - moderate yellowish 	-
I _	R20-NQ 5 ft	25	3	stepped, open with cavities/fragmentations	\Box	brown to dusky yellow, (10YR 5/4 to	
	60%	20	١	142.15' - Fracture, 20 deg, rough, stepped,		5Y 6/4), moderate to strong HCl]
I -	00,0			very open	╙	- reaction, medium strong (R3), voids	-
-				142.6' - Fracture, 10 deg, rough, stepped,	+	over 3% of surface with occasional	-
145			ND	open to fragmented	广	zones of 15% coverage, no to few cavities except at zones with more	
-102.7			NR	142.6, 143.05 - Fractures (2), 10 deg, 10dgii,	ш	voids, HCl reaction is strongest in	R20:10 minutes
-				stepped, open	╁	zones with few voids	-
I -	146.0			142.6-142.8' - 1/2"-3/4" angular fragments	╆	No Recovery 135.3-136.0'	
				143.1' - Fracture, vertical, rough, stepped, 1"		Limestone	
I -			4	long 143.15' - Fracture, horizontal, rough,	1	136.0-137.1' - moderate yellowish	
-				stepped, discontinuity, smooth on upper side,	₽	brown, (10YR 5/4), fine grained,	-
			ر ا	rough to planar on low side	\vdash	moderate HCI reaction, medium	
I -			2	143.8' - Fracture, horizontal, rough, planar to		strong (R3), voids over 0-5% of	1
-	D24 NO			undulating, open	L	_ surface with occasional band of	-
I -	R21-NQ 5 ft	48	1	146.6, 146.7, 146.8, 146.9' - Fractures (4),	┰	increased voids (and small cavities),	
	72%	70	'	horizontal, rough, planar, open, concurrent	1	generally no cavities, harder where no voids, weaker where voids are	
I -	. = , 3		>40	with increasing voids (described in lithology)	L	present	
-			>10	147.33 - Fracture, 0-00 deg, rough,	£.	Present ■ No Recovery 137.1-141.0'	-
150				undulating, tight, with infill	$oldsymbol{L}$		
					1		
					1		

APPENDIX 2BB-974 Rev. 4



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-10

SHEET 9 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

00.1		10 2	X O	IENT . CIVIE 33 3/N 232343, Muu Totary, NQ tools, HW C		9		ORIENTATION . Vertical
WATER	LEVELS: 1.6	31 ft b	gs on (6/14/07 START : 4/19/2007 END : 4/	22/20	007	LOGGER : A. Erickson	
				DISCONTINUITIES		Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)				SYMBOLIC LOG	\vdash		
N S S	ŽAN, V		FRACTURES PER FOOT	DESCRIPTION	5		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표일은	S.H.A	(%) Q	120	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ž		MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
Ļ₩.	유민		YCT F	PLANARITY, INFILLING MATERIAL AND	Æ		WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	S(=)S	S S	7R/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	\ <u>\frac{1}{2}</u>		CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-107.7	014			447.051	+ "	+	Limenton	D04:0it
-107.7			NR	147.65' - Fracture, horizontal, smooth,	Н	Ł	Limestone 141.0-144.0' - light olive gray	R21:6 minutes
	151.0			rounded on upper grayer surface, sharp, smooth to planar, 0 deg on bottom			transitioning to pale yellowish brown	
-	101.0			148.75' - Fracture, 30 deg, smooth, planar,	┺	ᅪ	to grayish orange, (5Y 5/2 to 10YR	-
_			0	tight to healed	╨	4	6/2 to 10YR 7/4), fine to very fine	_
				149.25' - Fracture, horizontal, rough, planar,	Н	1	grained, moderate HCl reaction,	
_				tight to open		士	strong (R4), 141.0-143.15' voids over	-
_			0	149.95-149.6' - Fracture zone, subangular	┰	1	5% of surface, several 1/4" long and	-
				fragments	┸	4	some larger cavities, 143.15-144.0'	
	R22-NQ			153.0' - Fracture, horizontal, rough, planar,	Н	-	no voids, no cavities, more brown in	
-	5 ft	58	7	zone of increased voids with some bedding	+T	╁	color with turbid-looking laminations,	=
_	84%			planes and laminar features		1	black organic inclusions and	_
			,	153.25, 153.3' - Fractures (2), horizontal,	ш	4	laminations (milky/blurred	
1 455			1	rough, undulating, open with some very minor	┰	十	laminations) No Recovery 144.0-146.0'	
155_				fragmentation	╀	╁	No Recovery 144.0-146.0 Limestone	D20:0 minutes
-112.7			0	153.5' - Bedding plane, horizontal, rough to smooth, planar, open 1/8"		1	146.0-147.65' - light olive gray, (5Y	R22:8 minutes
1 7	156.0		NR	153.7, 153.8, 153.9' - Bedding plane (3),	—	-[5/2), fine to very fine grained,	1
-	130.0			horizontal, rough, planar, open, bedding	╁	+	moderate HCl reaction, medium	-
_			1	planes ridged and 1/8"-1/4" thick, no bedding	+	1	strong to strong (R3 to R4), voids	
			'	planes after last fracture		1	(1/16") over 0-3% of surface but 1"	
-				154.8' - Fracture, horizontal, rough,	仜	ᅪ	bands of 10% with 1/4" elongate	-
-			2	undulating, open	╁╌	+	fossil molds	_
				156.85' - Fracture, horizontal, rough, planar,	Н	1	Limestone	
1 7	R23-NQ			open	T	T	147.65-149.6' - dark yellowish	Ī
-	5 ft	53	4	157.25' - Fracture, horizontal, smooth, planar,	匸	₽	orange, (10YR 6/6), moderate HCI reaction, medium strong (R3), voids	-
_	76%			tight	ш	4		_
			3	157.8' - Fracture, 70 deg, rough, planar,	Н	-	(1/16") over 30% of surface at top to voids (1/16"-3/8") increasing	
			၂ ၁	completely healed, closed, but broken open by load testing, surface is nearly 100% dark	†	+	gradually by end of core to 50% of	-
160_				gray —	╨	┺	surface, very few larger cavities,	
-117.7			NR	158.65, 158.75, 158.85' - Fractures (3),	\vdash	4	though few elongated very thin up to	R23:8 minutes
	161.0			horizontal, smooth, planar, tight to open,	┰	┨	1/2" long, some organic inclusions	1
-	161.0			weathered ,	十一	Ħ	and secondary recrystallization	Total depth of boring is
l _				159.1' - Fracture, horizontal, rough to	4	L	No Recovery 149.6-151.0'	161.0'
				smooth, stepped to planar, open		П	Limestone	101.0
_				\159.4, 159.5' - Fractures, 10 deg, rough,	1	F	151.0-152.6' - moderate yellowish	
-				undulating, tight, weathered	4	F	brown to light olive gray, (10YR 5/4	-
							to 5Y 5/2), fine to very fine grained, moderate HCl reaction, strong (R4),	
1 7					1	Γ	voids (1/16") over 3% of surface,	1
-					1	F	inclusion of fine (1/16") black	-
_					1	L	organics, few 1/4" infilled cavities	
					1		152.6-155.2' - moderate yellowish	
-					1	H	brown, (10YR 5/4), fine grained, mild	-
-				_	-	\vdash	to moderate HCl reaction, medium	
							strong to strong (R3 to R4), voids	
1					1	Γ	(1/16") over 5-10% of surface, but	1
-					-	F	some variability along core, few 1/4"	-
					_	L	cavities, trace organic inclusions, few	
]					1	Γ	laminar features at 153.0-153.9'	1
-					1	F	No Recovery 155.2-156.0'	
_					1	L	Limestone	
					1		156.0-157.65' - moderate yellowish	
-					1	F	brown, (10YR 5/4), fine grained, moderate HCl reaction, medium	-
-					1	F	strong (R3), voids over 5% of surface	1
					1		to 156.9' increasing to 10-30% to	
					1	r	157.65', few 1/4" cavities increasing	1
-					-	F	at 156.8-157.2'	-
						\perp		
					1			
								•



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-10	SHEET	10	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.6	31 ft bo	gs on (6/14/07 START : 4/19/2007	END : 4/2	2/200	D7 LOGGER : A. Erickson	
≥□₽	6 %	L.,		DISCONTINUITIES		၅	LITHOLOGY	COMMENTS
ELO N (F	ANE 37 (3		ZES T	DESCRIPTION		CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING.
TH B TACE	E RL 3TH, OVEF	(%)	STUF F00	DEPTH, TYPE, ORIENTATION, ROUG	GHNESS,	BOLI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
SUR	SOR!	۵۲	-RAC	PLANARITY, INFILLING MATERIA THICKNESS, SURFACE STAINING, AND	L AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
DEPTH BELOW SURFACE AND SURFACE AND ELEVATION (ft)	CORE RUN. LENGTH, AND RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGE PLANARITY, INFILLING MATERIA THICKNESS, SURFACE STAINING, AND	L AND	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
-					-		_	-
					-		_	-
					_		_	-
					=		_	-



PROJECT NUMBER:	BORING NUMBER:
338884.FL	GSC-11

SHEET 1 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" drag bit ORIENTATION: Vertical

WATER	LEVELS	: 1.7 ft bo	s on 2/1	1/07 S	START : 2/7/2007 END : 2/12/2007 LO	GGER	: T.	Stewart, C. Sump
<u> </u>				STANDARD	SOIL DESCRIPTION		В	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			PENETRATION TEST RESULTS	COIL NAME LICCS CROUD SYMBOL COLOR		SYMBOLIC LOG	DEDTH OF CARING DOULING DATE
H BE ACE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	.	BOLI	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMI	INSTRUMENTATION
42.9				(,		\dashv		Begin drilling at 15:00
_						1		-
]		24" split spoon
_]		
-						4		_
_						4		_
-	3.5				Silty Sand (SM)	-	111	-
-		0.8	SS-1	1-2-1	3.5-4.25' - grayish orange, (10YR 7/4), wet, very loose, 20% nonplastic fines, fine gravel fragment,			-
	5.0	0.0	00-1	(3)	\ non-calcareous, very fine grained to cemented silt,	/-		-
5 37.9	3.0				\silica sand	_/		_
-						1		
]		
_						_		_
-						_		_
_						4		-
-	8.5				Poorly Graded Sand With Organics (SP)		in in	-
-		1.1	SS-2	1-1-3	Poorly Graded Sand With Organics (SP) 8.5-9.6' - dusky yellowish brown, (10YR 2/2), wet, voloose, 15-20% fine organics, fine silica sand	ery -		-
10	10.0		002	(4)	100se, 15-20 % liftle organics, liftle silica sand			-
32.9	10.0							
_								_
-						4		-
-						-		-
-	10.5							-
-	13.5				Silty Sand (SM)		П	SS-3 taken at 15:12
-		1.1	SS-3	5-6-8 (14)	13.5-14.6' - pale yellowish brown, (10YR 6/2), wet, medium dense, 20-25% nonplastic fines, trace very	, 1		-
15	15.0			(14)	fine sand-sized black particles, fine silica sand		TII	
27.9								
_						_		_
-						_		-
-						-		-
-						-		-
-	18.5					-		-
-	10.0					1	П	SS-4 taken at 15:11
-		1.5	SS-4	7-10-9 (19)		1]
20	20.0			(10)				
1	l							



PROJECT NUMBER:	BORING NUMBER:

338884.FL GSC-11

SOIL BORING LOG

SHEET 2 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" drag bit ORIENTATION : Vertical

WATER	LEVELS	: 1.7 ft bo	s on 2/1	1/07 S	TART : 2/7/2007 END : 2/12/2007 LOGGE	R :	T. Stewart, C. Sump
				STANDARD	SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	AMPLE INTERVAL (ft) PENETRATION TEST RESULTS			COIL NAME LICOS OPOLID CVARDOL COLOS		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT URF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		INSTRUMENTATION
22.9				(14)	Silty Sand (SM)	Τ,	
-					18.5-20.0' - medium dark gray mottled with pale yellowish brown, (N4 with 10YR 6/2), wet, medium	1	-
-					dense, trace fine sand-sized black particles, 15-20%	1	-
-					nonplastic fines, fine silica sand	1	1
-						1	1
						1	
	23.5					1	
				555	Silty Sand (SM) 23.5-25.0' - pale yellowish brown, (10YR 6/2), wet,		SS-5 taken at 15:25
_		1.5	SS-5	5-5-5 (10)	loose, 20-25% nonplastic fines, trace very fine		_
25 <u> </u>	25.0				sand-sized black particles, fine silica sand	4	<u></u>
17.9						+	-
_						+	-
-						┨	-
_						1	-
-						1	-
_	28.5					1	-
-	20.0				Silty Sand (SM)	1	SS-6 taken at 15:43
-		1.5	SS-6	6-5-3 (8)	28.5-30.0' - Same as 23.5-25.0' except trace black laminae	1	
30	30.0			(0)			
12.9							
_						1	_
_						1	-
-						+	-
_						+	-
-	00.5					+	-
-	33.5				Silty Sand (SM)	1	SS-7 taken at 15:49
-		1.5	SS-7	3-2-2	33.5-35.0' - pale yellowish brown, (10YR 6/2), wet, very loose, 20% nonplastic fines, fine silica sand,	1	
35	35.0			(4)	trace fine black particles	1	
7.9						Ţ	
-						1	_
-						1	-
-						+	-
-	38.5				Silty Sand (SM)	+	SS-8 taken at 15:54
-		1.5	SS-8	4-5-3	38.5-40.0' - Same as 33.5-35.0' except loose	-	-
	40.0	1.5	33-0	(8)		+	- [1]
40	40.0					+	- IT



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-11 SHEET 3 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" drag bit ORIENTATION : Vertical

WATER	LEVELS	: 1.7 ft bo	s on 2/1	1/07 S	TART : 2/7/2007 END : 2/12/2007 LOGGE	R:	T. Stewart, C. Sump
				STANDARD	SOIL DESCRIPTION	\int_{0}^{∞}	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	EINTERVAL (ft) PENETRATION TEST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR,					DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE ACE ATIO		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT URF LEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		INSTRUMENTATION
<u>2.9</u>				(14)		+	
-						1	1
_						1	1
-						1	1
-						1	1
]	
	43.5					1	
				6-6-8	Clayey Sand (SC) 43.5-44.5' - light bluish gray to light gray mottled with		SS-9 taken at 16:01
_		1.0	SS-9	(14)	yellowish gray, (5B 7/1 to N7 with 5Y 8/1), wet,		
45 -2.1	45.0				medium dense, 35-40% high plastic fines, trace fine black particles, very fine to fine silica sand	4	_
-2.1						┨	-
_						┨	-
-						┨	
-						1	1
-						1	1
-	48.5					1	1
					Silty Sand (SM)	1	SS-10 taken at 16:09
		1.3	SS-10	2-2-3 (5)	\ very loose, 30% low plastic fines, very fine to fine		
50	50.0			(-)	\silica sand \classification Clayey Sand (SC)	₽	
-7.1					\49.0-49.75' - dark gray, (N3), wet, loose, 30-35%	1	_
_					medium plastic fines, very fine to fine silica sand	4	-
-						4	-
_						+	1
_						1	Driller's Remark: 16:15 - 52.5' light rig
-	53.5					1	chatter of drag bit -
	. 50.5				Silty Gravel With Sand (GM)	•	S-11 taken at 16:19
		1.3	SS-11	8-13-11 (24)	53.5-54.8' - medium dark gray, (N4), wet, medium dense, no HCl reaction, fine to coarse angular gravel,]	
55	55.0			(►7)	appears to be calcite cemented, fine silica sands, 10-15% nonplastic fines, 20% very fine to fine silica	4	
-12.1					sand	1	Driller's Remark: 16:27 switch to 3-7/8" tricone roller bit to continue drilling
-						1	-
-						+	1
-						+	-
-						+	-
-	-c-					+	1
-	58.5					+	SS-12 taken at 16:35
-		1.5	SS-12	3-2-3		1	-
60	60.0			(5)		1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	- 55.5				-	†	"
						┸	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-11	SHEET	4	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" drag bit ORIENTATION: Vertical

WATER	LEVELS	: 1.7 ft bo	s on 2/11	1/07	START : 2/7/2007 END : 2/12/2007 LOG	GER	: T. :	Stewart, C. Sump
				STANDARD	SOIL DESCRIPTION		G	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LIGOS OPOLID OVARDOL COLOR		SYMBOLIC LOG	DEDTILOF CACING DOULING DATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		30LI(DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT URF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYME	INSTRUMENTATION
-17.1				(14)	Silty Sand (SM)	\neg	0,	
-					58.5-60.0' - grayish black to black, (N2 to N1), wet, loose, 15-20% low plastic fines, organic soil (OH)	/-		1
-					lenses 9/16" thick (black [N1] high plasticity, slow	/1		1
-					dilatancy), very fine to fine silica sands	J 1		1
]		
_								_
_	63.5				Interior and and Other County And County in Call (OM OLI)		70.1713	_
_			00.40	2-2-2	Interbedded Silty Sand And Organic Soil (SM-OH) 63.5-64.8' - Same as 58.5-60' except 80% silty sand	-		-
		1.3	SS-13	(4)	and 20% organics	-		-
65 <u> </u>	65.0					\exists		End drilling for 2/07/07 at 17:12 at 65.0'
-						-		below ground surface -
-						-		-
-						1		1
]		
_	68.5							Start drilling on 2/8/07 at 08:30
_				8-18-35	Organic Soil (OH) ¬ 68.5-69.0' - brownish black, (5YR 2/1), wet, stiff,	,		Driller's Remark: slightly firmer, but no chatter -
-		1.5	SS-14	(53)	medium plasticity, slow dilatancy, laminated in sharp contact with silt below	/-		-
70 <u> </u>	70.0				¬ Silt (ML)	$^{\prime\prime}H$	Ш	-
-					69.0-70.0' - grayish orange, (10YR 7/4), wet, hard, nonplastic to low plasticity, moderate HCl reaction,	/1		-
-					laminated over entire interval with black organic beds (up to 1/16" thick), carbonate	\$ 		-
-					(up to 1710 tillox), carbonate	-/		1
_	73.5				O:lk /MI	_		00.45 talon at 00.55
-			00 :-	28-26-42	Silt (ML) 73.5-75.0' - Same as 69.0-70.0' except yellowish gray	y, -		SS-15 taken at 08:55
		1.5	SS-15	(68)	(5Y 7/2), wet, hard, low plasticity, rapid dilatancy, miló HCl reaction, 5-10% thinly bedded (3/16"-1-3/16"),	d -		
75 <u> </u>	75.0				black (N1) organic layers, trace fine black (N1)	7	Ш	-
-					organic particles in slit, carbonate	_/		
-						-		
-						1		
]]
]
-	78.5						7.17.	CC 10 taken at 00:10
-	79.3	0.8	SS-16	24-50/3 (74/9")		4		SS-16 taken at 09:13 -
	7 3.3					F	ш	-
80								



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	GSC-11	CHEET	5 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" drag bit ORIENTATION: Vertical

						Totally, auto hammer, Avvo for			ON LOGO
WATER	LEVELS	: 1./ ft b	gs on 2/1		START : 2/7/2007	END : 2/12/2007 SOIL DESCRIPTION	LOGGEF	(: l.	Stewart, C. Sump COMMENTS
≥ Ω€	OANED! -	INITEDIT	1 (4)	STANDARD PENETRATION		JOIL DEJUNIF HUN		9G	CONINIENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL	COLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B ATIC		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OF			BOL	DRILLING FLUID LOSS, TESTS, AND
ERE			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, MI	NERALOGY	3YM	INSTRUMENTATION
-37.1	<u> </u>			(14)	∖ Siltv Sand Wi	ith Limestone (SM)		0,	
-	-				\ 78.5-79.3' - ye	ellowish gray, (5Y 7/2), wet	, very dense,	┨	-
-					mild HCl react	tion, fine to coarse sand-si 25% fine to coarse gravel-s	zed, 25% low _ sized	1	-
-					limestone frag	gments, 5% organics, carb	onate -	1	-
-									=
-							-		_
_							-		_
_	83. <u>5</u> 83.7						_	L	
_	00.7	0.0	SS-17	50/2 (50/2")	Limestone Fra	r agments noderate yellowish brown, (10VR 5/4)	┢	SS-17 taken at 09:33
_				(50/2)	\mild to modera	rate HCI reaction, two 1/4"	thick		Driller's Remark: Advised driller to begin coring, will use HQ coring assembly -
85	85.0				limestone frag	gments recovered			09:44 begin setting casing using 'devils head'
-42.1					No Recovery	85.0-90.0'			bit for 4" casing
-	1						-	1	Resume drilling at 16:40
-	1						-	1	-
-	1						-	1	-
-			D4 110				-	1	-
-		0.0	R1-HQ				-	1	R1: No run time recorded _
-	1						-	1	-
-							-	1	-
-							-	1	-
	90.0						-	1	-
90 <u> </u>	90.0 90.2	0.2	SS-18	50/2	→ Limestone Fra	ragments		F	SS-18 taken at 16:45
'''-				(50/2")	\ 90.0-90.2' - ye	ellowish gray to moderate y ld HCl reaction	ellow, (5Y 7/2 $/$ _	-	-
-					Begin Rock Co	Coring at 90.0 ft bgs		1	-
-					See the next s	sheet for the rock core log	-	1	-
_							-		_
_							_	4	_
-							-		_
_							-	1	_
-							-	1	
I -							_		
95									
-52.1									
							_		
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I -	1						-	1	
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-							-	1	-
100							-	1	-
100								\vdash	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-11 SHEET 6 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing ORIENTATION : Vertical

CORING	METHOD A	ND EC	UIPM	ENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools	, HW (asing	ORIENTATION : Vertical
WATER	LEVELS: 1.7	ft bgs	on 2/	11/07 START : 2/7/2007 END : 2/	12/200	7 LOGGER: T. Stewart, C. Sump	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SCIE	SAR	RQ	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	90.0		>10	-		Limestone And Limestone Fragments 90.0-91.0' - dusky yellow to light olive	Start drilling R2-HQ with core barrel at 18:00
- - - - - - - 95_	R2-HQ 5 ft 20% 95.0	0	NR	- - - - -		gray, (5Y 6/4 to 5Y 5/2), medium grained, weak to medium strong (R2 to R3), 40-50% voids (<1/16") over surface up to 1/16", unfilled dissolution cavities up to 3/8", highly competent, up to 15% black (N1) organic laminations and coarse-sized particles, limestone gravel is the same as the larger (2-1/2") fragments, strong HCl reaction on pulverized fragments No Recovery 91.0-95.0'	Driller will flush hole, then attempt to core again, the next core run will be R2-HQ The order of samples is as follows: SS-17, R1-HQ, SS-18, R2-HQ Driller's Remark: Very little, if any circulation loss R2:3 minutes 18:15, last run of 2/8/07
-52. 1 -			>10		Ш	Limestone - 95.0-95.7' - yellowish gray to light	Start coring with NQ assembly at 15:50 on -
- - -	R3-NQ 4 ft 18%	0	NR	· · ·		olive gray, (ŚY 7/2 to ŚY Ś/2), fine grained, weak to medium strong (R2 to R3), strong HCl reaction where pulverized, voids up to 1/16" over 50-70% of surface, strongly competent, fossiliferous (casts, molds up to 10%), trace medium grained black organics with moderate	2/9/07 Driller's Remark: Hard drilling over 95.0-96.0' interval Recovery for R3-NQ is only limestone core fragments from 1-1/2"-2-1/2", last core run of 2/9/07, end
_	99.0			-	Ш	- HCl reaction No Recovery 95.7-99.0'	drilling for 2/9/07 at 16:45 – R3:15 minutes
100	99.0		>10	_		Limestone 99.0-100.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2),	Start coring R4-NQ at 09:05 on 2/10/07
-57.1 - - - - -	R4-NQ 5 ft 20%	0	NR			moderate HCl reaction, weak to medium strong (R2 to R3), 20-30% voids up to 1/16" over surface, trace dissolution cavities up to 3/16" on surface, fragments up to 3-1/2", mostly fine to coarse gravel-sized fragments, trace organic (black) fragments as medium grained and 1/16"-sized laminations No Recovery 100.0-104.0'	Initial recovery from R4-NQ sample barrel is one 1" core fragment, recovery from NQ drill bit and casing is two larger fragments of core and gravel-sized pieces of limestone Driller's Remark: Switch of drill bit to NQ wireline bit Driller's Remark: It was discovered that a conventional NQ drill bit
-	104.0			-	H	- 104.0-105.5' - yellowish gray to light	had been in use for the
-05_ -62.1 			1	104.5' - Fracture or bedding plane, horizontal, rough, undulating, tight — 104.85, 105.0' - Mechanical break (2) 105.5' - Fracture, 30 deg, rough, undulating, dissolution cavities on the surface		 olive gray, mottled slightly darker, (5Y 7/2 to 5Y 5/2), medium grained, strong HCl reaction, weak to medium strong (R2 to R3), highly competent rock, voids up to 1/8" over 25-35% of 	previous runs – R4:10 minutes – – – – – – – – – – – – – – – – – – –
- - -	R5-NQ 5 ft 40%	28	NR			surface, few increasing with depth, many dissolution cavities up to 3/8"x3/4", oval-shaped, filled cavities with a very pale orange (10YR 8/2) filling, fossiliferous (moderately) molds and casts, trace organics as medium grained black particles	Driller's Remark: Soft zone at 107.0' for 1.0-1.5'
-			_	108.3' - Fracture, 20 deg, rough, undulating,	H	No Recovery 105.5-108.3'	R5:11 minutes
-	109.0		3	open, assumed not a mechanical break	H	- -] _
_			1	108.45' - Fracture, horizontal, rough, undulating	Ш	-]
110				108.5' - Fracture, 20 deg, rough, undulating	Ш		



PROJECT NUMBER:

33884.FL BORING NUMBER:

GSC-11 SHEET 7 OF 11

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing

WATER	LEVELS: 1.7	ft bg	s on 2/	11/07 START : 2/7/2007 END : 2	/12/20	07 LOGGER : T. Stewart, C. Sump	
≥0 <i>≎</i>	- ©			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	L R. L	(%) _Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ω	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEV.	SORE	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	√ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-67.1	0716	œ	шп	109.15' - Fracture, horizontal, smooth,	0	Limestone	
-07.1			>10	undulating, open 1/2"		- 109.0-113.1' - Same as 104.0-109.0'	-
_	DO NO			110.0-110.3' - Fracture zone, vertical and	₽	except many dissolution cavities	Drillaria Damaniu Lagga
_	R6-NQ 5 ft	56	>10	horizontal, tight 110.55' - Fracture, <5 deg, rough, undulating,	\mathbf{F}	1/8"x3/8", 15% voids <1/16" over - surface, light olive color (5Y 5/2)	Driller's Remark: Loose drilling at 111.0'
_	82%			tight	\perp	transitions to dusky yellow gray (5Y	_
_			1	111.0-111.4' - Fracture zone, rock fragments 111.9' - Fracture, 20 deg, black stain, tight	\perp	6/4) mottled with light olive gray (5Y – 5/2)	_
_			'	112.85' - Fracture, 10 deg, smooth,	\perp		
_			NR	undulating, no infill, black staining	片	No Recovery 113.1-114.0'	R6:4 minutes
_	114.0		INIX		\perp		_
_			3		\mathbf{H}	Limestone - 114.0-119.0' - mottled pale yellowish	
115			J	114.5' - Mechanical break, horizontal,		orange and light olive gray, (10YR	
-72.1			>10	smooth, undulating, tight 114.6' - Fracture, <5 deg, smooth,		8/6 and 5Y 5/2), fine to medium grained, moderate HCl reaction,	
			>10	undulating, black staining, open 1/2"	\perp	weak to medium strong (R2 to R3),	1
	R7-NQ			114.8' - Fracture, 40 deg, rough, undulating, no staining, open, top of fractured zone at	\perp	strongly cemented, 40-50% voids up to 1/16" over rock surface, poorly	1
	5 ft 100%	30	3	114.8-115.7'	1	fossiliferous (casts), <1% fine to	1
_				116.0' - Mechanical break, horizontal, rough, undulating, tight	1	medium grained black particles	1
_			4	116.2' - Fracture, vertical, rough, undulating,	\blacksquare	<u>†</u>	1
_				black staining, open 116.55' - Fracture, <5 deg, rough, undulating,		Ţ	R7:6 minutes
_	119.0		1	stains over 1/4"	Ъ	Ī	1
-				116.8' - Mechanical break, horizontal, smooth, planar, open 1/8"	1	119.0-121.4' - mottled pale yellowish	1
120			1	117.0, 117.25, 117.45' - Mechanical break (3)	\perp	orange and medium gray and light olive gray, (10YR 8/6 and N5 and 5Y	1
-77.1				117.85' - Fracture, 70 deg, rough, undulating _ 118.1' - Fracture, horizontal, smooth,	1	5/2), fine to medium grained, weak to	_
_			>10	undulating, open 118.2' - Fracture, <5 deg, rough, undulating,	1	medium strong (R2 to R3), strong HCl reaction on light colored areas,	1
_	R8-NQ			open 3/8"	\perp	moderate HCl reaction on darker	Driller's Remark: 121.0-
_	5 ft 48%	20		118.6-118.7' - Fracture zone or mechanical break	T	colored areas, strongly competent, 20-30% voids 1/16"x1/16", 5-10%	122.5' soft -
_				119.1' - Mechanical break, along bedding	\perp	dissolution cavities 1/8"x1/16", poorly	1
-			NR	plane from drilling 119.5, 119.6' - Fracture (2), horizontal, rough,	1	to moderately fossiliferous, casts, 1" section at top is moderate olive	Driller's Remark: Slightly
-				undulating, open	#	brown (5Y 4/4) and moderately to	harder drilling at 122.5' - R8:6 minutes
-	124.0			119.9' - Fracture, horizontal, rough, planar,	#	highly fossiliferous (casts) No Recovery 121.4-124.0'	Driller's Remark: 123.5'
-	127.0			open 120.05-121.0' - Fracture zone, rough,	1	Limestone	slipped down - Started R9-NQ at 14:27
125			>10	undulating, open 124.0-124.6' - Fracture zone	Ŧ	- 124.0-124.6' - yellowish gray, (5Y 7/2), medium grained, strong HCl	
-82.1				124.6' - Mechanical break, horizontal	ፗ	reaction, very weak (R1), weakly to	Driller's Remark: Soft at
-			1	125.1' - Fracture, <5 deg, rough, undulating,	\pm	moderately competent, voids (<1/16") over 75% of surface, 40%	124.0-127.0' -
-	R9-NQ		3	open 126.15' - Bedding plane, rough, stepped,	+	fine to medium grained black (N1)	-
-	5 ft 48%	31		open 1/4"	#	– particles 124.6-126.4' - light olive brown and	
-	40%			126.25' - Fracture, horizontal, rough,	廿	moderate olive brown, (5Y 5/6 and	-
-			NR	undulating, open 1/4" 126.4' - Fracture, horizontal, rough,	+	5Y 4/4), fine grained, moderate HCl	
-			` ` `	undulating, open	+	reaction, weak to medium strong (R2 to R3), moderately to highly	R9:3 minutes
-					士	fossiliferous (many casts, trace	-
-	129.0			129.0-130.8' - Fracture zone	+	molds), white crystal as partial infill in cavities (with mild to moderate HCl	-
-			>10		+	reaction)	-
130					╫	No Recovery 126.4-129.0'	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-11 SHEET 8 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.7	ft bg	s on 2	/11/07 START : 2/7/2007 END : 2/	12/20	D7 LOGGER : T. Stewart, C. Sump	
≥∩ ::	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, SVEF	(%) _Q	TUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	SORI	RO	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-87.1	034					Limestone	Consistent medium drilling
-			>10		╁┼	- 129.0-132.7' - Same as 124.6-126.4'	,
-	R10-NQ			130.8' - Fracture, horizontal, rough, undulating, tight	Ħ	-	-
-	5 ft 74%	26	0	131.0' - Fracture, 60 deg, rough, undulating,	Ħ	-	-
-	7470		0	tight 131.65' - Fracture, 40 deg, rough, undulating,	Ħ	_	R10:4 minutes
-				tight	Ш	No Recovery 132.72-134.0'	-
-			NR	132.3' - Fracture, <5 deg, rough, undulating, open, fractured from 132.3-132.7'	╙	_ No Recovery 132.72-134.0	-
-	134.0				H		_
_			4	134.1' - Fracture, <5 deg, rough, undulating,	Ш	Limestone	_
135			1	open 1-1/2"	Ш	 134.0-137.3' - Same as 124.6-126.4' except 25% oblong-shaped 	_
-92.1			>10	135.0' - Fracture, horizontal, rough, undulating, open		dissolution cavities (up to 1/4"x1/8"), stronger rock at 135.0-135.5' and	
			/10	undulating, open	Н	136.3-137.3'	
_	R11-NQ 5 ft	30	>10	135.0-135.4' - Mechanical break 136.15' - Fracture, <5 deg, rough, undulating,	F	_	_
_	66%	30		top of fractured zone 136.15-136.8',	F	_	
_			0	mechanical breaks to 1-1/2" fragments 136.8' - Mechanical break, horizontal	H	- No Recovery 137.3-139.0'	Driller's Remark: Soft at 137.0-138.0'
_			ND	136.9' - Mechanical break	世	-	_
_			NR	137.05' - Fracture, vertical, slickensided, stepped	Н	<u>-</u>	R11:4 minutes
-	139.0			137.3' - Fracture, <5 deg, rough, undulating, open	\vdash		-
-			>10	139.25' - Bedding plane, horizontal, rough,	Щ	Limestone - 139.0-139.9' - dusky yellow to light	-
140 <u> </u>				planar, open 1/8", top of fractured zone of more friable material, 139.25-139.9'	口	olive gray, (5Y 6/4 to 5Y 5/2), fine grained, mild to moderate HCl	Driller's Remark: Very soft
-			1	mechanical breaks	Ш	 reaction, medium strong (R3), trace 	from 141.5-143.5'
-	R12-NQ			139.25, 139.9' - Mechanical break (2) 140.1' - Fracture, 50 deg, smooth, undulating	Ш	bedding, voids <1/16" over 10-15% surface on stronger intervals, up to	=
-	5 ft	0		140.3' - Fracture, <5 deg, rough, undulating	+	 45% on more friable intervals, 	-
-	30%		NR		F	10-15% black possible organics 139.9-140.5' - very pale orange	-
-			IVIX		Ħ	 mottled medium gray, (10YR 8/2 mottled N5), very fine grained, strong 	=
-					Ħ	HCl reaction, weak to medium strong	R12:3 minutes
-	144.0				H	 (R2 to R3), bioturbated, moderately to highly fossiliferous (mostly casts, 	-
-	1-77.0				世	many molds) up to 1-3/8"	Start R13-NQ at 16:09,
145			3	144.4' - Fracture, 10 deg, rough, undulating,	\mathbb{H}	 No Recovery 140.5-144.0' Limestone 	ended at 16:14 -
-102.1				open 144.6, 144.9' - Fracture (2), <5 deg, rough,	Ħ	144.0-146.2' - Same as 139.9-140.5' except less mottling, highly	Driller's Remark: 146.5-
-			>10	undulating, open 145.2, 145.4' - Fracture (2), horizontal, rough,	Ħ	bioturbated, trace very fine to fine	147.5' were alternating soft - to medium drilling
	R13-NQ		A	undulating, open 1/4"	Ш	organic particles in bioturbated zones 146.2-148.3' - yellowish gray, (5Y	
	5 ft 86%	40	4	145.6' - Fracture, <5 deg, grayish brown (5YR 3/2) stain, tight, 1/8"	\blacksquare	7/2), very fine grained, strong HCI	1
			2	145.75-146.2' - Fracture zone, limestone	\mathbb{H}	reaction, weak to medium strong (R2 to R3), laminated light olive gray (5Y	1
				gravel up to 1"x1/2" 146.2' - Mechanical break, tight	Ħ	5/2), bioturbated zone at 147.2' (1/2"	Driller's Remark: Hard at 147.5' -
			2	146.4' - Bedding plane, horizontal, smooth, undulating, organic infill, tight	H	thick) with voids <1/16" No Recovery 148.3-149.0'	R13:5 minutes
_	149.0		NR	146.65, 146.8' - Mechanical break (2)	H	_	
_			>10	147.1, 147.35' - Fracture (2), horizontal, smooth, planar, open 1/2"	Н	Limestone - 149.0-149.5' - Same as 146.2-148.3'	_
150					H		
I	i l		1		1		

APPENDIX 2BB-984 Rev. 4



PROJECT NUMBER: BORING NUMBER:

338884.FL GSC-11

SHEET 9 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.7	ft bg	s on 2/	11/07 START : 2/7/2007 END : 2/	12/20	D7 LOGGER : T. Stewart, C. Sump	
≥0£	<u>(</u> %			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
FH B FACE	E RU STH, OVEI	(%) _Q	E S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SURI ELE\	COR	R Q	FRA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-107.1				148.3' - Fracture, horizontal, rough,	Ë	Limestone	Measured depth of water at
_			3	undulating, open 149.0-149.35' - Fracture zone, limestone	Н	 149.5-151.9' - light olive brown to light olive gray, (5Y 5/6 to 5Y 5/2), 	1.7' below ground surface - on 2/11/07 at 08:30
_	R14-NQ			gravel-sized fragments to 3/4"x1"	Ħ	fine grained, moderate HCl reaction,	011 27 1 1707 at 00.30
_	5 ft 86%	37	5	149.35' - Fracture, horizontal, rough, undulating, open	Ħ	 weak to medium strong (R2 to R3), poorly fossiliferous (casts), trace 	-
_	0070			149.5' - Fracture, horizontal, rough,	Ш	voids up to 1/8"	-
_			0	undulating, open 3/16" 149.75' - Fracture, horizontal, rough,	Н	- 151.9-153.3' - Same as 146.2-148.3'	-
_			1	undulating, tight	Ш	-	R14:7 minutes
_	154.0		NR	149.9' - Fracture, horizontal, rough, undulating, open, top of fracture zone	ш	- No Recovery 153.3-154.0'	=
-	104.0			149.9-150.2' - Fracture zone, rock fragments	Ш	Limestone	
155			1	to 1"x 1" 150.2' - Fracture, horizontal, rough,	Ш	 154.0-157.2' - moderate yellow to dusky yellow, (5Y 7/6 to 5Y 6/4), fine 	
-112.1				undulating, tight to open 1/8" 150.3, 150.35, 150.72, 151.0, 151.25, 151.6,	${\mathbb H}$	to medium grained, strong HCI	-
_			1	151.75, 151.9' - Fractures (8), horizontal,	H	 reaction, weak to medium strong (R2 to R3), ripple laminated in light olive 	_
_	R15-NQ			rough, undulating, tight 153.3' - Fracture, horizontal, rough,	Ħ	gray (5Y 5/2), alternating parallel intervals of bioturbation, voids up to	_
_	5 ft 76%	18	1	undulating	Ш	1/16" over 5-10% of surface	_
_			2	154.5' - Fracture, horizontal, rough, planar, tight	Н	157.2-157.8' - olive gray, (5Y 3/2),	
			_	154.6-155.1' - Fracture zone	Ш	medium grained, moderate HCI	
			NR	155.5' - Fracture, 80 deg, slickensided, stepped, brown staining, tight	Щ	reaction, weak to medium strong (R2 to R3), voids <1/16" on 50-70% of	R15:5 minutes
	159.0			156.85, 157.0, 157.6' - Fractures (3),	Ш	surface, trace dusky yellow (5Y 6/4) discoloration	
_			2	horizontal, rough, undulating, open	Ш	No Recovery 157.8-159.0'	
160				159.4, 159.5' - Fractures (2), rough, undulating, open 1/8"	Ш	Limestone — 159.0-162.5' - dusky yellow to	
-117 <u>.1</u> -			1		Н	moderate olive brown, (5Y 6/4 to 5Y	_
_				160.9, 161.0, 161.1' - Bedding plane (3), <5	H	4/4), fine to medium grained, moderate to strong HCl reaction,	_
_	R16-NQ 5 ft	56	7	deg, rough, undulating, tight	H	weak to medium strong (R2 to R3), voids (<1/16") over 30-40% of	-
_	92%			161.2, 161.3' - Fracture or mechanical break (2), horizontal, rough, undulating, tight	H	 surface, dissolution cavities up to 	_
_			5	161.5, 161.6, 161.7, 162.0, 162.1, 162.2' -	Ш	3/8"x3/4" on 5% of surface, white mineral infill, some cavities	-
-				Bedding plane (4), horizontal, rough, planar, tight	\mathbb{H}	 162.5-163.6' - very pale orange and 	R16: No run time recorded
-			0	162.6' - Bedding plane, horizontal, rough, undulating	П	mottled medium light gray, (10YR 8/2 and N6), strong HCl reaction, weak	- 10. No full time recolded
-	164.0		NR	162.7, 163.0' - Mechanical break (2)	口	 to medium strong (R2 to R3), highly 	Driller's Remark: Driller
	R17-HQ			163.45' - Fracture, horizontal, rough, undulating, tight, open 1/8"	口	fossiliferous (very small <1/16" molds/casts)	switch to HQ core -
165_ -122.1	2 ft	0	NR		丗	No Recovery 163.6-164.0' No Recovery 164.0-166.0'	assembly and used a 2.0' stake on core run
-	0%				\Box		R17:1 minute -
-	166.0				Ħ	_ Limestone	-
-			2	166 65' Padding plans, harizantal raugh	Ħ	 166.0-166.9' - moderate olive brown and light olive gray, (5Y 4/4 and 5Y 	-
-				166.65' - Bedding plane, horizontal, rough, undulating, open	H	6/1), fine grained, strong HCl	-
_			>10	166.9' - Bedding plane, horizontal, smooth, planar, open	Ш	 reaction, strong (R4), 30-40% medium grained medium gray (N5) 	-
-	R18-HQ			166.9-171.0' - Mechanical break, horizontal,	oxdot	particles, poorly fossiliferous (few	
-		16	>10	smooth, planar, highly competent limestone intervals, related to drilling	囯	 casts), laminations at 166.0' 	
_			>10		囯	-	
170					Ш	<u>-</u>]



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	GSC-11	SH

SHEET 10 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 1.7	ft bgs	s on 2/	11/07 START : 2/7/2007 END : 2/	12/20	07 LOGGER : T. Stewart, C. Sump	
>∩ ∵	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	D (%)	TUR 100-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
URF	ECC	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ചഗച -127.1	074	22		THIORNEGO, GOTT AGE GTAINING, AND HOTTINEGO	S	Limestone	R18: No run time recorded
-127.1			NR	<u>-</u>	Ė	- 166.9-169.5' - moderate olive brown,	To: No full time recorded
_	171.0			-	Ľ	(5Y 4/4), medium to coarse grained, strong HCl reaction, weak (R2),	-
_			1	-	₽	- 5-10% powder white mineral infill in	1
_				171.7' - Mechanical break, horizontal,		voids and cavities, 166.9-167.2' and 167.6-168.0' is olive gray (5Y 6/1),	1
_			3	undulating, 1/4" x 5/16" relief, fossil molds exposed on surface		fine matrix, microlaminated	1
_	D.40.110			172.2' - Fracture, horizontal, smooth,	┢	No Recovery 169.5-171.0'	1
_	R19-HQ 5 ft	56	2	undulating 172.4' - Fracture or mechanical break, <5	F	171.0-171.9' - yellowish gray, (5Y	1
_	100%			deg	Ė	7/2), medium to coarse grained, strong HCl reaction, weak to medium	1
_			2	172.5, 172.9, 173.6' - Bedding plane (3), horizontal, rough, undulating, open 3/16" -	L	strong (R2 to R3), 10-20%	1
175				174.1' - Mechanical break or fracture, 70 deg,	\vdash	dissolution cavities up to 9/16"x3/8", up to 35% medium gray (N5)	D40:0 minutes
-132.1			2	rough, undulating 175.1' - Mechanical break, horizontal, rough, -	口	coarse-sized grains, poorly	R19:8 minutes
	176.0			undulating, irregular	口	fossiliferous (trace casts), sharp contact]
_			2	175.3' - Mechanical break, horizontal, rough, undulating	H	_ 171.9-176.0' - yellowish gray, (5Y	_
				175.4' - Bedding plane, horizontal, rough,	F	7/2), fine to medium grained, moderate HCl reaction, weak to	_
_			4	undulating, open 1/8"x3/16" 176.4-176.6' - Fracture, horizontal, rough,	Ļ	_ medium strong (R2 to R3), very	_
_			·	clay/gravel interbed, clay infill	L	poorly fossiliferous (trace casts), fine bedding laminations (1/16"x3/16")	_
1 _	R20-HQ 5 ft	32	1	177.0, 177.1' - Fractures (2), horizontal, rough, undulating, clay infill	₽	visible on fresh broken face	_
	96%	-	·	177.8' - Fracture or mechanical break, 70	Ш	176.0-180.8' - Same as 171.9-176.0' except rippled laminations are visible	
			7	deg, rough, undulating, closely spaced fracture	Ш	over 179.0-180.5'	
180_				178.6' - Fracture, 45 deg, rough, undulating	Н		
-137.1			5	179.0' - Mechanical break, horizontal, rough, undulating	F		R20: No run time recorded
	181.0		NR	179.2, 179.3, 179.35' - Bedding plane (3), horizontal, rough, planar to undulating	F	No Recovery 180.8-181.0'	
_			4	179.6' - Mechanical break, 10-15 deg, clean,	H	Limestone	
_				tight 179.7, 179.85' - Fracture (2), horizontal,	L	181.0-185.0' - Same as 171.9-176.0'	
_			3	rough, planar, dark brown staining	₽		_
_				180.0' - Mechanical break, 0-5 deg, undulating, clean		 -	
	R21-HQ 5 ft	48	0	180.1, 180.3' - Bedding plane (2), horizontal,	口	1]
	90%			rough, brown staining 180.6, 180.7' - Fractures (2), horizontal,	┢	<u> </u> -]
			6	rough, undulating, slight staining, no infill	F	ļ -]
185_				181.2' - Fracture, fragmented limestone 181.5, 181.6, 181.7' - Fracture (3), —	F	_	
-142.1			5	fragmented limestone, horizontal planar	Ľ	Limestone	R21: No run time recorded
	186.0		NR	breaks ☐ 182.0' - Bedding plane, horizontal, rough, ☐	\vdash	185.3-185.5' - dark brown,	
				planar, slight brown staining on fracture	1	fossiliferous surface, voids on >60% of surface, molds and casts]
				182.5' - Fracture, rough, horizontal partings, cavity-rich limestone breaks (fragmented)	1	No Recovery 185.5-186.0']
				182.7' - Fracture, rough, irregular break	1	Bottom of Boring at 186.0 ft bgs on - 2/12/2007]
				184.0' - Bedding plane, horizontal, smooth 184.05, 184.45, 184.50, 184.6' - Bedding	1]
				plane (4), horizontal, smooth	1]
				184.95, 185.0, 185.05, 185.1' - Bedding plane (4), horizontal, smooth, fine spaced	1	L]
				(3/8"x7/8")	1]
					1		
					<u> </u>		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-11	SHEET	11	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing ORIENTATION : Vertical

CORING	METHODA	ND EC	JUIPIV	IENT : CME 550X S/N 340253, mud rotary, HQ/N0) tools,	HW	casing		ORIENTATION : Vertical
W/ATER	LEVELS: 1.7	7 ft has	on 2	/11/07 START : 2/7/2007 EN	ND : 2/1	2/20	77	LOGGER: T. Stewart, C. Sump	
WAILK		it bys	, UII Z/		ا / 2 . ب	<u> </u>	<i>-</i> 1		COMMENTO
≥o≎	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES		ည		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	, NP (3		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG		ROCK TYPE, COLOR,	
ᆱ႘ᅙ	₹,¥ E,¥	(%	보인			PI PI		MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΗĂΕ	E F OVI	R Q D (%)	FS	DEPTH, TYPE, ORIENTATION, ROUGHNES: PLANARITY, INFILLING MATERIAL AND	3,	ВО		WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
989	RNIG	ō	RA ER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHT	IESS	ΥM		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	C LE R	Ж	⊞□		NESS	S		CHARACTERISTICS	·
				185.3' - discontinuity with much more					
-				void/fossil-rich limestone, dark brown/yello	w -		-		-
				color	_				_
				185.5' - end of run					
1 -							-		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-12	SHEET	1	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 3.5 ft bo	gs on 05/	17/2007	START : 5/16/2007 END : 5/19/2007	LOGGER	: C.	Wallested		
				STANDARD	SOIL DESCRIPTION		ى ق	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR	R	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,		
TH BI		RECOVE	<u> </u>		MOISTURE CONTENT, RELATIVE DENSITY (OR	BOL	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
DEP SURI ELE\			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALC	JGY	SYM	INSTRUMENTATION		
41.0	0.0				Topsoil 0.0-0.2'		17			
_		1.2	SS-1	1-3-3 (6)	Poorly Graded Sand (SP)	/]		_		
_	1.5			. ,	0.2-1.15' - grayish orange to moderate yellowish brown, (10YR 7/4 to 10YR 5/4), moist, loose, 5%			_		
-					nonplastic fines, trace organics, fine silica sand			=		
-						_		-		
-						-		Driller's Remark: Material at 5.0-5.65' started		
-						-		at 3.0' below ground surface		
-						-		-		
5	5.0					_				
36.0				200	Clayey Sand (SC) 5.0-5.65' - light olive gray, (5Y 6/1), moist, loose	e. verv -		_		
_		0.7	SS-2	3-3-3 (6)	fine to fine silica sand, 40-45% high plastic fines trace fine gravel (possible concretion)	s, 75. y		_		
-	6.5				trace fine gravei (possible concretion)	/ _		-		
-						-		-		
-						-		-		
-						-		-		
-						_		-		
-						_	İ			
10	10.0						<u> </u>			
31.0				3-13-6	Silty Limestone Gravel With Sand (GM) 10.0-10.4' - yellowish gray, (5Y 8/4), wet, mediui	m Г=		Driller's Remark: Lost circulation at 10.0' below ground surface		
-		0.4	SS-3	(19)	dense, strong HCl reaction, fine to coarse gravel-sized limestone, composed of mostly (<7			Driller mixed thick mud, regain circulation		
-	11.5				fossil cast and molds (possible shell hash coqui	ina), –		-		
-					35-40% fine to coarse sand sized (similar to limestone), 15% nonplastic to low plastic fines,	-		-		
-					carbonate material			-		
-						-		1		
_						_]		
-						_				
15 26.0	15.0				Cilty Limostone Croycl Mitch Cond (CN)			_		
Z0.U -	15.0	0.8	SS-4	32-50/4.5 (82/10.5")	Silty Limestone Gravel With Sand (GM) 15.0-15.8' - Same as 10.0-10.4' except moderat	tely -		-		
-	15.9			(= : 0:0)	fossiliferous with 3/4"x3/16" size casts over 10-1 the rock surface, light olive brown (5Y 5/6) stain	13/001 /		Driller's Remark: Light chattering at 15.8'		
-					some face			below ground surface		
-						-		-		
-						-]		
_						_				
-						-		_		
20							\vdash			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-12	SHEET	2	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

ORIENTATION : Vertical

						y, cathead, NW rods, 4-7/8"			ORIENTATION: Vertical
WATER	LEVELS	: 3.5 ft bg	gs on 05/1	7/2007	START : 5/16/2007	END : 5/19/2007	LOGGE	R : C	. Wallested
302				STANDARD PENETRATION		SOIL DESCRIPTION		چ ا	COMMENTS
A A N	SAMPLE	INTERVA	L (ft)	TEST RESULTS	COIL NAME	LICCO CDOLID CVMDOL () o	DEDTH OF CACING DRILLING DATE
H H H H H		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTRIBUTION OF MINISTUR							DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY	Y, SOIL STRUCTURE, MINI	ERALOGY	SYMBOLIC LOG	INSTRUMENTATION
21.0	00.0			(N)	Ciller Cond (CM)			S	
21.0	20.0			8-12-12	Silty Sand (SM) 20.0-21.15' - yell	owish gray, (5Y 8/1), wet,	medium	4	_
_		1.2	SS-5	(24)	dense, very fine	to fine silica sand, trace fi	ine	4	_
_	21.5					20% nonplastic fines, mo		1] _
_					fat clay at bottom			1	_
								J	
]
25	25.0							1	1
16.0	2.19				Sandy Silt (ML)	(=)(=)(=)		111	1 7
1 -		1.5	SS-6	5-4-19 (23)		owish gray, (5Y 8/1), wet, old dilatancy, strong HCl r		111	1
-	26.5			(23)	\neg 25% fine to coars	se carbonate sand, 1" thic	ck dark 💢 🗸	₩	H 1
-	20.0					GY 4/1) and 2-1/2" thick o (10YR 6/6) fat clay lense		1''	1
-					and 25.95' respe	ectively	35 dt 25.0	1	1
-					Silt (ML)			1	1
-						y pale orange, (10YR 8/2) y, rapid dilatancy, modera		1	-
-					HCl reaction, car		3	1	-
-								1	-
-								1	-
30 11.0	30.0			10 50/5 5	Sandy Silt With	Limestone Fragments (M	ML)	╁	┨
-		0.7	SS-7	46-50/5.5 (96/11.5")	30.0-30.7' - grayi	ish orange, (10YR 7/4), w	et, hard,	Ш	∐ -
-	31.0			(00,1110)	nonplastic, rapid	dilatancy, moderate HCl se sand sized, 10-15% fin	reaction, ne gravel	-	-
-						fragments, carbonate mat		-	-
-								-	-
-								4	-
-								1	-
-								-	-
_								1	
_								1	
35	35.0				Complete City As 11	Limentone (BEL)		-	4 -
6.0				5-9-16	Sandy Silt And I 35.0-35.8' - Sam	e as 30.0-30.7' except ye	llowish arav.	411	
		0.8	SS-8	(25)	(5Y 7/2), very stil	ff, 1-1/4" limestone fragm	ents	╫	4
	36.5							1	
								1	Driller's Remark: 36.5' below ground surface: hard rock
								1	
								1	
]
]
]	1
40									



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-12

SHEET 3 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

ORIENTATION : Vertical

DITILLIN	G IVIL II I	JD AND	LQUIFIVII			y, cathead, NW rods, 4-7/8			ORIENTATION: Vertical
WATER	LEVELS	: 3.5 ft bg	gs on 05/ ⁻	17/2007	START : 5/16/2007	END: 5/19/2007	LOGGE	R : C	C. Wallested
>				STANDARD		SOIL DESCRIPTION		ن 🌡	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 114145		001.00	SYMBOLICLOG	DEDTIL OF CACING DRIVENIC DATE
		RECOVE	ERY (ft)			, USCS GROUP SYMBOL, CONTENT, RELATIVE DEI			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EVA EV			#TYPE	6"-6"-6"		Y, SOIL STRUCTURE, MI		MB	INSTRUMENTATION
				(N)				Ś	
1.0	40.0			15 00 41		And Limestone (ML) xy yellow, (5Y 6/4), moist	hard	Ш	Driller's Remark: Lost 100 % circulation at 40.0' below ground surface; mixed thick mud -
I _		0.9	SS-9	15-22-41 (63)	nonplastic, rapid	I dilatancy, moderate HC	I reaction,	Щ	and regained circulation
	41.5			` /		oarse sand-sized, 10% festone fragments, carbo			
					dark (possible or	rganic) 1/4" thick layer at	t 40.45',		
					\vellowish grav (5	5Ÿ 8/1) limestone frågme to SS-3 and SS-4)	ent at top of	1	1
-					sample (similar t	10 55-3 and 55-4)		1	-
_								1	-
-								1	-
-								1	-
15	4E 0							1	-
45 -4.0	45.0				Silt With Sand (ML)	_	+	П —
-		1.2	SS-10	14-15-26	45.0-46.2' - yellò	wish gray, (5Y 7/2), wet,			-
-		1.2	33-10	(41)	plasticity, rapid of reaction, 20% fin	dilatancy, moderate to str ne to coarse sand-sized,	rong HCl trace fine	Ш	<u> </u>
-	46.5					estone fragments, carbo		-	-
-								┨	-
-								4	-
_								4	-
_								4	-
-								1	_
-								1	_
50	50.0						_	1	_
-9.0				00.10.00	Limestone Frag	l ments Ierate yellowish brown, (*	10VR 5/4)	力	∏
_		1.3	SS-11	22-18-23 (41)	moderate HCl re		10111 3/4/,]	
l _	51.5			. ,	Silt With Sand (10VD E(4)	╨	!!
					wet, hard, low pla	lerate yellowish brown, (⁻ asticity, rapid dilatancy, s	strong HCl		
					reaction, 20% fin	ne to coarse sand-sized,	trace fine	1	
_					organic), 1/4" thi	estone fragments, dark (ck laver at 50.8'	possible	1	1
					<u> </u>	.,		1	1
								1	-
1 -								1	1
55	55.0							1	-
-14.0	55.0				Silt With Sand (\dagger	П
-		1.5	SS-12	34-39-49	55.0-56.5' - Sam	ne as 50.2-51.3' except in I limestone with depth to	ncrease in	1	
-	EG F			(88)	dark (possible or		10 /o, 11 dUC	1	
-	56.5				<u>"</u>	<u> </u>		╁	Driller's Remark: End of drilling at 56.5'
-								-	below ground surface on 5/16/07 at 17:00
-								1	On 5/17/07 at 08:03, water level is at 3.5' below ground surface; at 08:15, begin
-								1	cleaning hole and circulating mud
-								-	-
-								4	-
-								-	-
60								4	
									1



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	GSC-12	SHEET	4 OF 10

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

					·	ary, cameau, rvv rous, 4-7/0 th			Official Vertical		
WATER	LEVELS	: 3.5 ft bo	gs on 05/ ⁻	1//2007 S	START : 5/16/2007	END : 5/19/2007	LOGGEF	: C.	Wallested		
>				STANDARD				g	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG			
표현		RECOVE	RY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR,		SOIL NAME, USCS GROUP SYMBOL, COLOR,			吕	DEPTH OF CASING, DRILLING RATE,
L H H A				011 011 011	MOISTURE	E CONTENT, RELATIVE DENSI CY, SOIL STRUCTURE, MINER	I Y OR	8	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
			#TYPE	6"-6"-6" (N)	OCNOICTEN	or, cole orricororie, wiinver	I LOGI	S⊀	INGTHOMENTATION		
-19.0	60.0			(1.1)	Silt With Sand	L(ML)		Ш			
_	00.0			24-27-38	60.0-61.4' - Sa	me as 50.2-51.3' except dark	yellowish -	!	=		
I _		1.4	SS-13	(65)	orange, (10YR	6/6), dark organic layers at 6	0.8', _	!!!!	_		
	61.5			` ,	61.15', and 61.	25'		Ш			
-							_	1	_		
-							-	l	=		
-							-	ł	-		
-							_		_		
							_				
								l			
_							-	1			
							-	ł	-		
65 <u> </u>	65.0				Condy Cill /MI	1			-		
-24.0				41-47-45	Sandy Silt (ML 65.0-66.3' - Sa	-) .me as 50.2-51.3' except grayi	sh -		_		
		1.3	SS-14	41-47-45 (92)	orange, (10YR	7/4), 30-35% fine to coarse s	and-sized				
1 7	66.5			(/	limestone, trac	e dark (possible organic) mot	tling _	Ш]		
_	00.0				throughout		/ -	1	-		
-							-	ł	-		
-							-		-		
_							_				
									Driller's Remark: Increase in hardness of material at 68.0' below ground surface		
							_	1	material at 66.0 below ground surface		
-							_	1	-		
							-	l	-		
70 <u> </u>	70.0 70.3	0.1	SS-15	50/3	Limestone Fra	amonte		<u> </u>	_		
-25.0		\	33-13	(50/3") /	70.0-70.1' - mc	oderate yellowish brown, (10Y	R 5/4). /-		_		
l _				(====,	moderate HCI	reaction	/ _		_		
					,		<u> </u>	l			
-							_	1	_		
-							-	ł	-		
-							-	ł	-		
_							-		_		
							_	1			
							-	1	1		
	75.0							L	-		
75 <u> </u>	75.1	0.1	SS-16	50/2	Limestone Fra		7	Н			
57.5				(50/2")	\\\/5.0-75.05' - S	ame as 70.0-70.1'		l	_		
					Begin Rock Co	oring at 75.0 ft bgs heet for the rock core log	_		_		
					OCC THE HEAT SI	noot for the rook core log					
1 7							_	1]		
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80								-			
								l			



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	GSC-12	SHEET	5 OF 10

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

				1211 . CIVIL 330 3/11 1000/3, mud rotary, mg tools, mv			ONLIVIATION: Vertical
WATER	LEVELS: 3.5	ft bg	s on 0	5/17/2007 START : 5/16/2007 END : 5/	19/200	D7 LOGGER : C. Wallested	, , , , , , , , , , , , , , , , , , , ,
>00	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
표일은 기업	PAGE F.A.	(%) Q	JUR DO	DEDTH TYPE OPIENTATION POLICHNESS	7 5 1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
₽₽₩	AZE COO	αD	ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MB(WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SSE	San	R	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-34.0				75.15, 78.15, 78.55, 78.65, 78.8' - Bedding	ш	Limestone	Begin rock coring at 75'
-			4	plane (5), horizontal, smooth, undulating,	╁┼	- 75.0-79.4' - moderate yellowish	1 1
-				tight		brown, (10YR 5/4), fine to medium grained, moderate to strong HCl	1 -
-			3	75.6' - Bedding plane or mechanical break, 10 deg, smooth, undulating, open 1/2"	₽	reaction, extremely weak to weak	1 -
l -				75.7' - Fracture, 80 deg, smooth, undulating,		(R0 to R2), up to 1/8" voids cover	1 -
l _	R1-NQ 5 ft	43	2	tight	\bot	15-40% of surface, up to 3/16"x3/8" – fossil casts, up to 3/16" thick dark	
	88%	43		75.95' - Bedding plane, horizontal, smooth,		(possible organic) lamination, voids	1
-	1			planar, tight 76.1' - Fracture, vertical, smooth, undulating,	₩	cover 40% of surface below 78.3'	1 1
-	-		4	tight, vertical from 75.6-76.55'		 with trace grayish hard infill to 9/16" diameter, trace <9/16" cavities 	1 1
-			0	76.55' - Bedding plane, horizontal, smooth,	+	throughout the core	R1:7 minutes
-	-			undulating, tight 76.85' - Mechanical break or fracture, 40 deg,		No Recovery 79.4-80.0'	-
80	80.0		NR	smooth, undulating, tight	₽₩		_
-39.0			>10	77.2' - Fracture, 70 deg, smooth, undulating,		Limestone - 80.0-81.25' - Same as 75.0-79.4']
			10	tight 77.35' - Fracture, 30 deg, smooth, undulating,	\vdash	except 3/4" thick brownish black	1
-			>1	tight		(5YR 2/1) fat clay at 80.25-80.3'	1 1
-				80.0-80.25' - Fracture zone, fragments to	╁┼	- No Recovery 81.25-85.0'	1 1
-	R2-NQ			1"x1-1/2" 80.25-80.3' - Clay seam, clay layer or infill	世	-	1 -
-	5 ft	10		80.3' - Bedding plane, horizontal, smooth,	+	-	1 -
_	25%		ND	planar, in contact with clay layer or infill		_	1 -
_			NR	80.55' - Mechanical break or bedding plane, horizontal, smooth, stepped, tight	\blacksquare	_]
				81.0-81.25' - Fracture zone, fragments to			
-				1-3/4"x2"	\vdash	_	R2:3 minutes
85	85.0					-	1 1
-44.0	00.0			_	₩	 Limestone	-
-			2	85.4, 85.6, 86.3, 86.6, 86.8, 87.0' -	\perp	- 85.0-88.7' - moderate yellowish	1 -
-				Mechanical break (6), rough, undulating,	+	brown, (10YR 5/4), medium to coarse grained, moderate to strong	1 -
_			3	associated with cavities, open 1/4"-2"		HCl reaction, extremely weak to	1 -
l _					\perp	weak (R0 to R2), voids (up to 1/8")]
	R3-NQ	70	1			cover 25% of surface, moderately	
I -	5 ft 100%	73	1		\Box	 fossiliferous (casts and molds up to 3/16"-3/8"), 2"x1-3/8" cavities over 	1
-						10% of surface, percentage of voids	1
-	1		0			- coverage decreases with depth	-
-	-				Ш	88.7-90.0' - moderate yellowish brown, (10YR 5/4), medium to	R3:6 minutes
-			1		丗	coarse grained, strong HCl reaction,	- 13.5 1113155
	90.0			89.8' - Fracture, 60 deg, smooth, undulating, —	+	weak to medium strong (R2 to R3),	_
-49.0			0	tight		up to 1/8" voids cover 15% of surface, up to 3/8"x3/16" trace fossil]
					Ш	casts, trace organic matter	
I -						90.0-92.5' - Same as 88.7-90.0'	1
-	1		1	91.65' - Bedding plane, horizontal, smooth,	\vdash	 except trace cavities up to 1-3/16"x2", fossiliferous material with 	1
-	R4-NQ			planar to stepped, tight		casts up to 3/8"x3/4", up to 2"x2-3/4"	1
-	5 ft	85	2	92.05' - Mechanical break, 10 deg, smooth,	╀┼	- trace infill]
-	97%			undulating, tight 92.8' - Fracture (2), 85 deg, smooth,	\Box	92.5-94.85' - grayish orange, (10YR 7/4), fine to medium grained, strong	-
-			1	undulating, intersecting, tight	+	- HCl reaction, weak to medium strong]
l _				93.5' - Fracture or mechanical break, 10 deg,		(R2 to R3), voids (up to 1/16") cover]
			>3	smooth, undulating, tight 94.2' - Fracture, 70 deg, smooth, undulating,	\mathbb{H}	5-15% of surface, trace dark (possible organic) material,	R4:11 minutes
95	95.0		_ ّا	tight	Ш	carbonate material	1
				-			1
I					1 1		

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-12	SHEET	6	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

			XOII IV	IENT: CME 550 S/N 186073, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bgs	s on 0	5/17/2007 START : 5/16/2007 END : 5/	19/200	7 LOGGER : C. Wallested	
~ -				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표성인	ER'A	(%	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A A	R TPO	D (%)	CTL F0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
955		a	RA ER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-54.0	014	ш.	NR/		0,		
-54.0			1	94.5-94.55' - Fracture zone 95.05' - Bedding plane or mechanical break,	H	No Recovery 94.85-95.0' - Limestone	_
			Ċ	<10 deg, rough, undulating, tight		95.0-99.1' - grayish orange, (10YR	
I -					Н	7/4), fine to medium grained, mild to	
-			0	-	口	moderate HCl reaction, weak (R2), voids (up to 3/16") cover 5-25% of	1
-	R5-NQ			97.0' - Fracture, 80 deg, smooth, undulating,	╁┼┼	the surface, trace dark (possible	Driller's Remark: Very
-	5 ft	60	>3	tight -	ш	 organic) mottling, extremely weak 	crumbly feeling between -
_	82%			97.2' - Bedding plane, horizontal, smooth,	₽₽₽	(R0) at 97.4-98.05', fossil casts (up	97.0-98.5' below ground _
			4	planar, tight 97.75-97.85' - Fracture zone, fragments to 2" -		to 3/8") over 5-10% of surface	surface; soft
			4	98.0' - Fracture or mechanical break, 45 deg,	ш	-	
_			0 /	rough, undulating, open to fracture zone	ш	No Recovery 99.1-100.0'	R5:7 minutes
-			NR	98.15' - Bedding plane, <10 deg, smooth,	╁┼	-	-
100 <u> </u>	100.0			undulating, dark stain on one face, open 1/2" 98.45' - Bedding plane or mechanical break,	世	Limestone	_
-55.0			2	<10 deg, smooth, undulating, tight	Щ	- 100.0-104.9' - Same as 95.0-99.1'	_
I _				98.8' - Fracture, 50 deg, rough, undulating	Н	except no extremely weak (R0) zone	
				100.85' - Fracture, 20 deg, smooth, undulating to planar, tight			
I -			3	100.95' - Fracture, 70 deg, smooth,	H	-	1
-	R6-NQ			undulating to planar, tight, intersects fracture	団	-	1
-	5 ft	68	2	at 108.5'	╂┼┼	-	-
_	98%			101.8' - Fracture, 40 deg, smooth, undulating, tight		-	_
_			3	101.9' - Fracture, 70 deg, smooth, undulating,	\mathbb{H}	_	_
			3	tight			
-				102.0' - Fracture, 20 deg, smooth, undulating,	Н	-	R6:8 minutes
105	105.0		>2	tight 102.35' - Bedding plane, horizontal, smooth,	Ħ	-	1
105 -64.0	105.0		NR)	undulating, tight —	₩	No Recovery 104.9-105.0'	_
-			>10	103.1' - Fracture, 65 deg, smooth, undulating,	ш	Limestone	Driller's Remark: Soft
_				tight 103.45' - Fracture, 10 deg, smooth,	╀	105.0-108.75' - Same as 95.0-99.1 except moderate HCl reaction,	between 105.5-106.5' and
l _			>2	undulating, tight		extremely weak (R0) zone at	107.0-108.0'
			-2	103.7' - Fracture, 20 deg, smooth, undulating,	ш	105.3-105.65' and 106.85-107.35'	
_	R7-NQ			tight 104.4-104.55' - Fracture zone, fragments to	ш	-	1
-	5 ft	26	>3	1"x2"	H	-	1
-	75%			104.55' - Fracture, 30 deg, smooth,	ᡛ╣	-	-
-			3	undulating, tight, open to fracture zone	口	-	-
-				104.8' - Fracture, 80 deg, rough, undulating, tight	₽	No Recovery 108.75-110.0'	
			NR	105.0-105.4' - Fracture zone, fragments to	口	-	R7:6 minutes
110	110.0			1-1/2"	Щ		End of day on 05/17/2007
-69.0				105.4' - Bedding plane or mechanical break, — 20 deg, smooth, undulating, open to fracture	囯	Limestone	at 17:10 — Begin coring on 05/18/2007
-			2	zone	╁┼┼	- 110.0-115.0' - Same as 95.0-99.1'	at 08:28
-				105.8' - Fracture, 20 deg, smooth, undulating,	口	except extremely weak (R0) zone at 110.8-111.3', 103.6-104.8' depth	-
_			2	tight	₽₽	intervals, trace dark (possible	_
_				105.9' - Fracture, 30 deg, smooth, undulating, tight to open 1/2"	Ш	organic) lamination, mild HCl	
I -	R8-NQ			106.45' - Fracture, 20 deg, smooth,	Н	reaction in weak (R2) zone, moderate HCl reaction in extremely	
I -	5 ft 100%	60	1	undulating, tight to open	口	 moderate HCI reaction in extremely weak (R0) zone 	1
-	100 /0			106.55' - Fracture, 60 deg, rough, undulating, tight to open	╂┴╂		-
-			3	106.85-107.35' - Fracture zone, fragments to	丗	-	Driller's Remark: Soft
-				1/2"	幵	-	between 113.5-114.5' -
_			2	107.75-107.95' - Fracture zone, fragments to	Н	_	R8:7 minutes
115	115.0			1"x2"	Ш		
1						<u> </u>	

Rev. 4



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-12	SHEET	7	OF	10	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, HW casing

				112141 : OIVIE 330 3/14 100073, Midd Totally, 14Q (0013, 1144)			ORIENTATION: Vertical
WATER	LEVELS: 3.5	ft bg	s on 0	5/17/2007 START : 5/16/2007 END : 5/1	19/200	7 LOGGER : C. Wallested	
				DISCONTINUITIES	Ι "Τ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			†	F0G		-
Π₹Z	z¥≿		FRACTURES PER FOOT	DESCRIPTION	5	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
풉병은	칠구	(%) Q	N S	DEDTIL TYPE OPIENTATION BOLIOUNESS	SYMBOLIC	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
±₹.₹	9GE) <u> </u>	P.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
유유교	유밀리	Ø	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0 1 22	ď	Ь	THICKNESS, CONTROL CITAINING, THE HEITINESS	S	CHAIGACTERIOTICS	
-74.0				108.4' - Fracture, 20 deg, smooth, undulating,	Ш	Limestone	
-			3	tight -	Н	- 115.0-117.6' - moderate yellowish	-
				108.6' - Fracture, 80 deg, smooth, undulating,	Н	brown, (10YR 5/4), fine grained, mild	
				tight, intersects fracture at 108.4'	Н	to moderate HCl reaction, medium	
-			>3	110.05' - Fracture, 80 deg, smooth,	Н	 strong (R3) rock becoming weak 	1
				undulating, tight, continues same fracture at		(R2) rock below 117.0', voids (up to	
	R9-NQ		>10	108.6'		1/16") cover 10% of the surface,	
-	5 ft	10	, 10	110.85' - Bedding plane, horizontal, smooth, -	ш	 trace cavities up to 1/4", similar to 	1
	52%			undulating, tight	Н	95.0-99.1'	
				111.15' - Mechanical break	Ш	No Recovery 117.6-120.0'	
-				111.2' - Fracture, 10 deg, smooth, undulating, -	Н	-	-
			NR	tight	ГΠ		
]				111.25' - Fracture, 50 deg, smooth,	Ш		R9:7 minutes
-				undulating, tight, intersects fracture at 111.2' -	Щ	-	-
	120.0			112.4' - Fracture or mechanical break, 65	Щ		
-79.0				deg, rough, undulating, tight	Н	Limestone	
-			3	113.35' - Fracture, 30 deg, smooth, -	╁┼┤	- 120.0-121.5' - Same as 115.0-117.6'	1 -
				undulating, tight	μН	except extremely weak (R0) zone at	
1 7				113.4' - Fracture, 75 deg, smooth, undulating,		120.4-120.55'	1
-			>3	tight, intersects fracture at 113.35'	╓Д	121.5-122.35' - moderate yellowish	Drillor's Romark: At 121 5
				113.8' - Bedding plane or mechanical break,	Н		Driller's Remark: At 121.5',
	R10-NQ			10 deg, smooth, undulating, tight, top of	Ш	brown, (10YR 5/4), fine to medium	100% loss of circulation
_	5 ft	40	1	extremely weak (R0) zone	Н	grained, moderate HCl reaction, medium strong (R3), voids (up to	-
	68%			114.2' - Bedding plane or mechanical break,	ΙТ	- 1/16") cover 5-20% of surface,	
			3	10 deg, smooth, undulating, tight, middle of	Ш	moderately fossiliferous with up to	
_				extremely weak (R0) zone		3/16"x3/8" echinoid casts, harder fine	-
				114.7-114.8' - Fracture zone, extremely weak	ш	grained light colored infill, trace voids	
1 7			NR	(R0) zone	Ы	in 121.95-122.0' and 122.2-122.35'	R10:9 minutes
-				115.55' - Fracture, 70 deg, smooth,	Н	122.35-123.4' - moderate yellowish	-
	125.0			undulating, tight	Ш	— brown, (10YR 5/4), medium grained,	
-84.0				115.6' - Fracture, 20 deg, smooth, undulating, —		moderate HCl reaction, weak to	
-			>10	tight, intersects fracture at 115.55'	◫	medium strong (R2 to R3), voids (up	1
				115.9' - Fracture, 15 deg, smooth, undulating,	Щ	to 3/16") cover 15% of surface, trace	
				tight 116.2' - Fracture, 80 deg, smooth, undulating,	Ш	cavities up to 3/8"x2", 3/8"x2" trace	
-			>10	tight	Н	fossil casts	-
				116.4-116.6' - Fracture zone, fragments to -	ГΗ	No Recovery 123.4-125.0'	
	R11-NQ		2	1"x1-1/2"		Limestone]
-	5 ft	0		116.75' - Fracture, 20 deg, smooth,	ш	125.0-125.6' - Same as 95.0-99.1'	-
	46%			undulating, tight -	ш	except mild HCl reaction, no	
1 7				117.05-117.6' - Fracture zone, fragments to	Щ	extremely weak (R0) zone	1
-			NR	1"x1-1/2"	┞┴┤	125.6-126.4' - Same as 121.5-122.35	1 -
			' ' '	120.4' - Bedding plane or mechanical break, -	Н	except interbedded with hard light	
1 7				10 deg, rough, undulating, tight to open 1/4"	口口	colored fine grained rock	R11:6 minutes
-				120.55' - Fracture, 35 deg, smooth,	Ш	126.4-127.3' - Same as 122.35-123.4	-
	130.0			undulating tight —	Щ	except weak to medium strong (R2 to	
-89.0			>10	120.6' - Fracture, 10 deg, smooth, undulating,	Щ	R3)	
-				tight	Н	No Recovery 127.3-130.0'	-
I _				121.2' - Bedding plane, horizontal, smooth,	广州	Limestone	
				undulating, tight		130.0-130.5' - Same as 121.5-122.35	
-				121.2-121.5' - Fracture zone, fragments to		 except interbedded 	Driller's Remark: Very soft
				1"x2"	ш	No Recovery 130.5-135.0'	between 131.5-134.0'
	R12-NQ			121.8-121.9' - Fracture zone, 1" fragments	Н		55tW6611 10 1.0-104.0
-	5 ft	0		122.35' - Bedding plane, horizontal, smooth,	┞┴┤	-	-
	10%		NR	undulating, tight _	Н	_	
				123.05' - Fracture, 35 deg, smooth,	ГТ]
-				undulating, tight to open 1/4"		-	-
				123.15' - Fracture, 45 deg, smooth, planar,	Щ	_	
				tight	Щ		R12:3 minutes
-				-	├ ┤	-	-
135	135.0				ш		
					ı I		l l
					l l		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-12

SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				TENT . CIVIE 330 3/N 1800/3, HILLI TOLATY, NQ 10018, HW	000	-	ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bg	s on 0	5/17/2007 START : 5/16/2007 END : 5/	19/20	D7 LOGGER : C. Wallested	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
SS (£)	₽%)		S	DESCRIPTION	7 ŏ	DOCK TYPE COLOR	
E A	N. A. Y.	(9	뿐능	52001 III 11011	익	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F R F	RNA	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	074	ď	╙┺		S		
-94.0				123.3' - Bedding plane, horizontal, smooth,		Limestone	
_			>10	undulating, tight, voids and cast parallel to break	1	- 135.0-137.8' - dark yellowish orange	1
-				125.0-125.3, 125.6-125.7' - Fracture zone	┰	to moderate yellowish brown, (10YR 6/6 to 10YR 5/4), medium grained,	1
_			>10	(2), fragments to 3/4"x1-1/2"	₽	- weak to medium strong (R2 to R3),	1
				126.1-126.4' - Fracture zone, fragments to	\mathbf{H}	voids (up to 3/16") over 5-15% of	
	R13-NQ		$\overline{}$	1"x2", many parallel horizontal bedding plane		surface, casts (up to 3/16"x3/8")	1
-	5 ft	8	2	breaks	₩	- cover 5% of surface, 1" thick trace	1
_	56%			126.65' - Bedding plane, horizontal, smooth, undulating, tight	╂┲	light gray fine grained infill at the end of run, no voids visible at	-
				126.75' - Fracture, 70 deg, smooth,		- 136.85-136.95']
			NR	undulating, tight	Н	No Recovery 137.8-140.0'	
-			INIX	127.0, 127.15' - Fracture (2), 10 deg, smooth,	1	F	R13:6 minutes
-				undulating, tight	匚	-	-
140	140.0			130130.5' - Fracture zone, fragments to 1"x2" parallel to horizontal bedding planes in	╨	L., ,	
-99.0				many places		Limestone	
			>10	135.0-137.0' - Fracture zone, fragments to	1_	 140.0-143.3' - pale yellowish brown with grayish orange mottling, (10YR 	1
-				2"x3"	╁┷	6/2 with 10YR 7/4), fine to medium	1
_			2	137.4' - Fracture, 20 deg, smooth, undulating	\pm	grained, moderate HCl reaction,	1
				137.65' - Bedding plane, horizontal, smooth,	厂	medium strong (R3), voids (up to	
	R14-NQ			undulating, open 1/4"	ጕ	1/8") cover 5-15% of surface, cavities	1
-	5 ft	27	>10	140.0-140.75' - Fracture zone, fragments to 2"x2"	ш	(up to 3/4"x9/16") over 5% of	1
-	66%		>1	141.85' - Fracture, 80 deg, smooth,	╂	surface, casts (up to 1-3/16" size) cover 5-10% of surface, cavities filled	-
_			<u> </u>	undulating, tight	┵	- with pale yellowish brown infill with]
				142.0' - Fracture, 10 deg, smooth, undulating,		voids over 30% of the infill; at	
			NR	dark stain, tight	1_	140.0-140.3' darker coarse grained	R14:17 minutes
-				142.05-142.5' - Fracture zone, fragments to 1"x2"	+-	and high percentage of void	1
145	145.0			142.85-142.95' - Fracture zone, 1" fragments —	╨	coverage No Recovery 143.3-145.0'	
-104.0			>10	143.1-143.3' - Fracture zone, fragments to	ᅪ	Limestone	
			10	1"x2"		145.0-147.6' - grayish orange, (10YR	
-				145.0-145.25' - Fracture zone, fragments to	ш	7/4), fine grained, strong HCl	1
-			8	1-1/2"x2" 145.35, 145.6, 146.15, 146.2, 146.3, 146.5,	+	reaction, medium strong (R3), trace	1
_				146.7, 147.1, 147.35, 147.5, 147.5' - Bedding		voids (up to 1/16"), trace fossil casts	
	R15-NQ		>2	plane (10), horizontal, smooth, planar, tight	ш	(up to 1/8"x3/16"), trace dark Iaminations	
	5 ft 52%	0		145.4' - Fracture, 45 deg, smooth, planar,	\vdash	No Recovery 147.6-150.0'	1
-	JZ /0			tight			-
-				145.85-146.2' - Fracture zone, fragments to	$oldsymbol{\Box}$	-	-
			NR	2"x2-1/2", multiple high angle fractures and bedding planes	┰		Driller's Remark: Regained -
				146.7' - Fracture, 65 deg, smooth, undulating,			circulation at 149.0'
150	150.0			tight	╨	-	R15:12 minutes
150_ -109.0	U.UC1			147.35-147.6' - Fracture zone, fragments to —	+	L limestone	Driller's Remark: Regained —
100.0			>4	2"x2-1/2"	\Box	Limestone − 150.0-151.3' - moderate yellowish	100% circulation at 150.0';
				150.1, 150.45, 150.65, 151.3, 151.7, 152.5, 152.6, 153.4, 153.55, 153.7, 153.8' - Bedding	\vdash	brown, (10YR 5/4), coarse grained,	water level 4.0' below
1 7				plane (11), horizontal, smooth, planar to	Т	mild HCl reaction, weak (R2), voids	ground surface at 13:30
-			>2	undulating, tight to open 1/4"	二	 (up to 1/8") cover 30-35% of surface, 	Driller's Remark: At 151.0',
-	5	l	<u> </u>	150.8-151.3' - Fracture zone, fragments to	╨	no visible fossil or cavities	circulation drops to 25%
	R16-NQ 5 ft	48	2	1"x2"	┢	151.3-153.9' - Same as 145.0-147.6' - except mild HCl reaction, voids cover	
	78%	+0	-			5-10% of surface and increase	1
-					╨	abruptly to 15-30% at 153.4', trace	-
-			>4		-	fossil casts (up to 3/16"x3/8"), rock	-
			-		\Box	strength decreases to weak rock	1
			NR		\vdash	(R2) at 153.4' and coverage by dark wavy laminations increases to 10%	R16:10 minutes
155	155.0		INIC		\Box	after 153.4'	1
100	100.0			-	+		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-12	SHEET	9	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

00111110	WETTIOD / II	ID LO	ZOII IV	1ENT: CME 550 S/N 186073, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bgs	on 0	5/17/2007 START : 5/16/2007 END : 5/	19/200	7 LOGGER : C. Wallested	
300	~			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱ핑흔	ER, A	(%	URE		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΪΫ́ΕΫ́ΕΫ́Ε	E F F S C C C C C C C C C C C C C C C C C	Q D (%)	CTI	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	RESO	R Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-114.0		_			H	No Recovery 153.9-155.0'	
_			3	155.15, 155.4, 155.8, 156.0, 156.4, 157.2, 157.25, 157.45, 157.6, 157.9, 158.1, 158.6,		- Limestone	-
l -				158.7' - Bedding plane, horizontal, smooth,	Н	155.0-157.9' - grayish orange to	_
			6	planar to undulating, tight to open 1/4"	Ш	moderate yellowish brown, (10YR 7/4 to 10YR 5/4), fine grained, moderate	
I -			0	156.1' - Fracture, 45 deg, rough, undulating,	Н	HCl reaction, weak to medium strong	1
-	R17-NQ			tight	Ш	(R2 to R3), voids (up to 1/16") cover	1
-	5 ft	34	>7	open	₩	- 5-15% of surface, trace cavities (up	1
-	95%			156.8' - Mechanical break or bedding plane,	団	to 3/8") 157.9-158.5' - grayish orange to pale	-
_			2	horizontal, rough, undulating, tight	\square	yellowish brown, (10YR 7/4 to 10YR	l
				156.9, 156.95' - Fracture (2), 75 deg, rough, undulating, tight	Н	6/2), very fine grained, strong HCl	Driller's Remark: Soft drilling at 158.5-159.0'
			3	157.6-157.8' - Fracture zone, fragments to 2"	Ш	reaction, strong to very strong (R4 to	R17:6 minutes
160	160.0			158.85' - Fracture, 30 deg, smooth,	H	 R5), no voids or cavities 158.5-158.7' - Same as 155.0-157.9' 	1
-119.0	100.0		NR	undulating, tight — 159.0-159.2' - Fracture zone, fragments to	口	158.7-159.4' - Same as 157.9-158.5'	I
-			>2	3/4"x2" - 1 racture 2011e, fragments to	╁┼┤	159.4-159.75' - Same as	1 -
-				160.0-160.4' - Fracture zone, fragments to	Ш	155.0-157.9' except voids (up to 1/16") coverage increasing to 25%	Drillorlo Demark Variate
I -			>4	2"x1"	Н	No Recovery 159.75-160.0'	Driller's Remark: Very soft at 161.0-162.0'
				160.8, 161.3, 161.35, 161.55, 161.6, 161.7, 162.05, 162.95, 163.3' - Bedding plane,	Ш	Limestone	dt 101.0 102.0
	R18-NQ			horizontal, smooth, planar, tight to open 1/4"	Н	160.0-161.4' - Same as 155.0-157.9' except fossil casts to 3/8"x3/4" and	1
-	5 ft 74%	52	2	160.9' - Fracture, 70 deg, smooth, undulating,	ш	voids cover 5-30% of surface	1
-	1470			tight 161.3-161.35' - Fracture zone, fragments to	╁┼	161.4-161.6' - Same as 157.9-158.5'	1
_			1	1/4"x2", mostly planar bedding plane		161.6-162.5' - Same as 160.0-161.4	-
l -				-	Н	162.5-163.7' - Same as 157.9-158.5' No Recovery 163.7-165.0'	1
l _			NR	_	Ш	-	R18:5 minutes
165	165.0				Н		End of day on 5/18/07 at
-124.0				40501.5 1 00 1 11 1	Ш	Limestone	17:35 — Begin coring on 5/19/07 at
-			>6	165.3' - Fracture, 80 deg, smooth, planar,	H	 165.0-167.8' - repeated alternating transitions between moderate 	08:05
-				165.35, 165.4, 165.55, 165.7, 165.85, 166.45,	団	yellowish brown and pale yellowish	1
-			>4	166.55, 166.65, 166.95, 167.1, 167.4, 167.6,	\vdash	- brown, (10YR 5/4 and 10YR 6/2),	-
_				167.75' - Bedding plane (13), horizontal,	Ħ	moderate HCl reaction, medium	_
_	R19-NQ 5 ft	28	5	smooth, planar, tight 166.55-166.65' - Fracture zone, fragments to	Щ	strong to strong (R3 to R4), pale yellowish brown material is very fine	_
	96%	20	3	1/4"x1", mostly planar, horizontal bedding		grained and stronger, with no voids,	
-				plane	H	moderate yellowish brown material is	1 1
-			2	168.0, 168.1' - Fracture (2), 10 deg, smooth, planar, tight	Ш	fine grained with 20-30% voids, 5% medium grained gray limestone	1 1
-				168.35' - Fracture, 45 deg, smooth,	₩	imbedded in the matrix of the	R19:10 minutes
-			4	undulating, tight	団	moderate yellowish brown material	
170	170.0		NR	169.1' - Fracture, 35 deg, smooth, undulating, tight	\vdash	(possible infill), gradual transition to limestone at 167.8-169.8'	
-129.0			5	169.3' - Fracture, 60 deg, smooth, undulating,	Ш	167.8-169.8' - yellowish brown to	
			٦	tight	Ш	grayish orange, (10YR 6/2 to 10YR	
				169.55' - Fracture, 60 deg, smooth,	Ш	7/4), fine to medium grained,	1
-			>3	undulating, tight 169.6' - Fracture, 10 deg, smooth, undulating,	口	moderate HCl reaction, medium strong (R3), voids (up to 1/8") over	1
-	R20-NQ			tight	Ш	5-25% of surface, fossil casts (up to	-
-	5 ft	69	2	170.35, 170.75, 170.85, 170.9, 171.1, 171.55,	Ш	3/16"x3/8") over 10% of surface,	-
-	100%			174.05' - Bedding plane (7), horizontal, smooth, planar, tight except by fracture zone	H	trace dark grey infill (to 1/8"x1"), delayed HCl reaction]
I _			1	170.7' - Fracture, 80 deg, smooth, undulating,	口	No Recovery 169.8-170.0'	
I -			'	tight	Н	•	1
I -				171.55-171.9' - Fracture zone, fragments to 1"x2-1/2"	口	-	R20:7 minutes
475	475.0		4	1 75 1/5	++	-	1
175	175.0				\Box	-	
1							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-12	SHEET	10	OF	10	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

WATER	NATER LEVELS: 3.5 ft bgs on 05/17/2007 START: 5/16/2007 END: 5/19/2007 LOGGER: C. Wallested											
30€	(%			DISCONTINUITIES	90	LITHOLOGY	COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY. INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD					
	COF	A Q	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.					
-134.0 - - - -	R21-NQ		3	171.9' - Fracture, rough, undulating, open by fracture zone - 172.25' - Fracture, 30 deg, smooth, undulating, tight 172.7' - Fracture, 20 deg, smooth, undulating, tight 173.7' - Bedding plane, <5 deg, smooth,		Limestone 170.0-175.0' - Same as 167.8-169.8' except trace cavities up to 1-9/16" with grayish orange very weak (R1) infill, voids (up to 1/16") cover 20% of infill, laminated layers of very weak rock (R1) at 170.9-171.15' and	- - -					
-	5 ft 80%	55	>7	undulating, dark stain, tight - 174.6, 174.65' - Fracture (2), 50 deg, smooth, undulating, tight		- 173.95-174.1' 175.0-176.4' - Same as 167.8-169.8' except trace cavities up to	- -					
-			10 NR	175.4, 176.35, 176.38, 176.4, 177.05, 177.15, 177.25, 177.55, 177.6, 177.85, 178.3, 178.32, 170.4, 178.45, 178.49, 178.5, 178.51, 178.53' Bedding plane (18), horizontal, smooth,		3/16"x1-9/16" lying parallel to bedding 176.4-179.0' - sequences of interbedded limestone that begins as	R21:7 minutes					
180 <u> </u>	180.0		3	planar, tight 177.2' - Fracture, vertical, smooth, undulating, missing opposite faces -		similar to 145.0-147.6' then grades into material similar to 167.8-169.8', except trace cavities to						
-	R22-NG 5 ft 100%		1	177.55-177.6' - Fracture zone, fragments to 1/4"x1/2" - 178.9, 178.95' - Fracture (2), 75 deg, smooth, undulating, tight		3/16"x1-9/16", cavities are mostly parallel to bedding, sequences run 176.4-177.25', 177.25-177.7', 177.7-178.55', and 178.55-179.0'	-					
-		80	2	180.05, 181.7, 182.55, 182.75' - Bedding plane, horizontal, smooth, planar to undulating, tight to open 1/4" 180.4' - Fracture, 70 deg, smooth, undulating,		No Recovery 179.0-180.0' Limestone 180.0-182.2' - Same as 167.8-169.8' except trace fossil casts and trace	- -					
-			0	missing face 180.75' - Fracture, 60 deg, smooth, undulating, tight to open 1/2"		dark laminations 182.2-184.6' - Same as 165.0-167.8' except poorly competent, extremely	R22:9 minutes					
- 185 -144.0	185.0		1	184.65' - Fracture, 25 deg, smooth, undulating, dark stain, tight		weak (R0) at 182.55-182.75' 184.6-185.0' - Same as 165.0-167.8' Bottom of Boring at 185.0 ft bgs on	-					
						- 5/19/2007 	- - - - - - - - - - - - - - - - - - -					



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-01	SHEET	1	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLIN	G METH	OD AND	EQUIPM	ENT : Rotosonic S	S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION: Vertical
WATER	LEVELS	: 3.65 bg	s on 3/6/0)7 5	TART : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez
>				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SOMMENTO DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H H H		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
THE AVE			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
				(N)	
42.5 - -	0.0				Poorly Graded Sand (SP) 0.0-1.3' - gray, (N3), moist to wet, fine grained, silica sand, trace nonplastic fines "Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Silty Sand (SM) 1.3-3.0' - moderate yellowish brown grading to dark
-		6.0	R1-SN		yellowish orange, (10YR 5/4 to 10YR 6/6), moist to wet, fine grained, poorly graded, with nonplastic fines Silty Sand (SM) Water levels were not recorded for I-01
5					3.0-4.0' - dark yellowish orange, (10YR 6/6), wet, fine grained, silica sand, with nonplastic to low plasticity fines Sandy Silt/sandy Lean Clay (CL-ML) 4.0-4.5' - yellowish gray, (5Y 7/2), moist, low to
37.5 - -	6.0				medium plasticity, blocky, with fine grained silica sand Fat Clay With Sand (CH) 4.5-5.0' - medium light gray, (N6), moist to wet, medium to high plasticity, with fine grained silica sand
- - - -					Silt (ML) 5.0-13.0' - very pale orange, (10YR 8/2), moist, nonplastic to low plasticity, carbonate materials
10 32.5 - -		10.0	R2-SN		- - - - -
- - - - 15					Silt With Limestone Fragments (ML) 13.0-16.0' - very pale orange, (10YR 8/2), moist, nonplastic to low plasticity, with sand to gravel-sized limestone fragments, sample is about 50% silt and 50% limestone fragments, all carbonate materials
27.5					4
-	16.0				16.0.10.0'. Same as 13.0.16.0' except greater.
- - -					16.0-19.0' - Same as 13.0-16.0' except greater percentage of silt (up to 60%)
-	1				1
20					Limestone 19.0-19.5' - very pale orange, (10YR 8/2), full core-diameter (4") fragments 1" thick



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-01	SHEET	2	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS	: 3.65 bg	s on 3/6/0)7 S	START : 2/20/2007	
				STANDARD	SOIL DESCRIPTION O COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE		PENETRATION TEST RESULTS	I SOIL NAME, USCS GROUP SYMBOL, COLOR. I ≃ I DEPTH OF CASING, DRILLING RATE	
DEPTH SURFA(#TYPE	6"-6"-6" (N)	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)
22.5 - - - - - -		10.0	R3-SN		Sandy Silt (ML) 19.5-24.5' - pale yellowish brown, (10YR 6/2), moist to wet, nonplastic to low plasticity, blocky, all carbonate materials	- - - - -
25_ 17.5					Limestone Fragments 24.5-26.0' - very pale orange, (10YR 8/2), fossiliferous, fragments up to 3"-4" Top of rock estimated to be approximated as a process of the plant of the process of the plant of t	tely
					20.0 below ground surface	
- - - - - 30_ 12.5_					Begin Rock Coring at 26.0 ft bgs See the next sheet for the rock core log	- - - - - -
-						-
-						-
- 35						-
7.5						-
-						-
-						- -
40						_



PROJECT NUMBER:	BORING NUMBER:					-
338884.FL	I-01	SHEET	3	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	5 bgs	on 3/6	5/07 START : 2/20/2007 END : 2/2	22/200	COMPANY OF THE LOGGER : R. Gomez	
30€	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 30 12.5 - -	26.0 R4-SN 10 ft 70%	NA	NA	26.0-36.0' - NA		Limestone 26.0-29.7' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCI reaction, fossiliferous, fine to coarse sand and fine to coarse gravel-size limestone fragments, all carbonate materials Limestone Fragments 29.7-33.0' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), mild to strong HCI reaction, non fossiliferous, full core-diameter fragments up to 2" thick	Set 8" casing to 28" with bentonite around between 8" to 6" casing NA = Not Applicable NR = No Recovery Coring run times not recorded for I-01
35_ 7.5	36.0		NR	- - - - -		No Recovery 33.0-36.0'	- - - - -
- - - 40 2.5 - - - - - - - - - - - - - - - - - - -	R5-SN 10 ft 75%	NA	NA NR	36.0-46.0' - NA		Limestone Fragments 41.0-42.0' - limestone fragments from sand to fine gravel-sized, fossiliferous Limestone Fragments 41.0-42.0' - limestone fragments from sand to fine gravel-sized, fossiliferous Limestone Fragments 41.0-42.0' - limestone fragments from sand to fine gravel-sized, fossiliferous Limestone Fragments 42.0-43.5' - dark yellowish brown, gravel-sized limestone fragments from sand to fine gravel-sized, fossiliferous 42.0-43.5' - dark yellowish brown, moderate HCl reaction, silt to fine gravel-sized limestone fragments No Recovery 43.5-46.0'	SC-1 collected at 36.0- 37.3'
-2.5 -	46.0					_	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-01	SHEET	4	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	5 bgs	on 3/6	6/07 START : 2/20/2007 END : 2/2	22/20	07 LOGGER : R. Gomez	
> O ::	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R6-SN 10 ft 100%	NA	NA	46.0-56.0' - NA		Limestone - 46.0-47.0' - Same as 36.0-38.0' except medium to coarse grained, voids (<1/16") over <40% of surface at 46.0-46.7', fossiliferous Limestone Fragments 47.0-51.0' - mild to moderate HCI reaction, fossiliferous, limestone fragments sand to gravel-sized and up to 2-1/2" - 51.0-53.0' - fine grained, medium strong to strong (R3 to R4), 10-20% fossils (casts/molds), sand to gravel-sized fragments up to 2-1/2" - Silt (ML) - 53.0-56.0' - moderate yellowish brown, (10YR 5/4), nonplastic, mild to moderate HCI reaction	SC-2 collected at 46.0-46.7' -
	R7-SN 10 ft 93%	NA	NA RR	56.0-66.0' - NA		Limestone Fragments 56.0-57.0' - limestone fragments <3-1/2" in size, fossiliferous Clay (CL) 57.0-58.8' - dark yellowish orange, (10YR 6/6), low to medium plasticity, moderate HCl reaction, unconsolidated material, <20% silt at 58.8' Limestone Fragments 58.8-61.0' - Same as 56.0-57.0' Clayey Silt (CL-ML) 61.0-61.7' - light brown to moderate yellowish brown, (5YR 5/6 to 10YR 5/4) Limestone Fragments 61.7-65.3' - dark yellowish brown, (10YR 4/2), moderate HCl reaction, very weak to weak (R1 to R2), 50-70% voids <1/16", cavities to 3/8" over 10-15% of surface, fossiliferous No Recovery 65.3-66.0'	SC-3 collected at 63.0-63.9' End drilling for the day; R8 is down-hole, will retrieve in morning
	66.0		NK		H	,	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-01	SHEET	5	OF	15	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	5 bgs	on 3/6	S/07 START : 2/20/2007 END : 2/	22/200	D7 LOGGER : R. Gomez	
30€	<u>(</u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 70 -27.5 -	R8-SN 10 ft 100%	NA	NA	66.0-76.0' - NA		Limestone 66.0-71.5' - moderate yellowish brown, (10YR 5/4), weak to medium strong (R2 to R3), <10% cavities across surface, fossiliferous Clay (CH) 71.5-72.3' - dark yellowish orange,	Resume drilling 2/21/07
- - - 75_ -32.5	76.0					(10YR 6/6), moist, mild HCl reaction, carbonate material Limestone Fragments 72.3-73.6' - very fine grained, strong HCl reaction, extremely weak (R0), limestone fragments to 2", silty matrix Silt (ML) 73.6-75.5' - dry, very stiff, nonplastic, strong HCl reaction, blocky, carbonate material Silty Clay (CL) 75.5-76.0' - light brown, (5YR 5/6),	- - - - - -
- - - - - -37.5 - - -	R9-SN 10 ft 75%	NA	NA	76.0-86.0' - NA		moist, low to medium plasticity	SC-5 collected at 81.0-82.5'
85_ -42.5 _	86.0		NR			caused by fractures within rocks and mechanical breaks from drilling No Recovery 83.5-86.0'	- - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-01	SHEET	6	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/6	5/07 START : 2/20/2007 END : 2/2	22/200	7 LOGGER : R. Gomez	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-						Silty Clay (CL) 86.0-89.1' - grayish orange pink, (5YR 7/2), strong HCl reaction, unconsolidated, carbonate matrix, <5% sand, 10-15% coarse gravel-size limestone fragments (<3/4") Limestone	- - - -
90 -47.5 - - - - -	R10-SN 10 ft 100%		NA	- - - - - -		89.1-89.7' - very pale orange, (10YR 8/2), very fine grained, strong HCl reaction Clay (CH) 89.7-90.7' - moderate yellowish brown, (10YR 4/2), dry to moist, very stiff, with silt (ML), blocky partings Limestone Fragments 90.7-93.0' - very pale orange, (10YR 8/2), fine grained, strong HCl reaction, fragments up to 3/4" Clayey Silt (ML)	- - - - - - -
- - 95 -52.5 -	96.0			- - - -		93.0-94.0' - light brown, (5YR 5/6), dry to moist, strong HCl reaction, carbonate matrix Limestone Fragments 94.0-96.0' - sand to gravel-sized fragments, weak (R0), fossiliferous (molds/casts/shell fragments) 96.0-99.0' - very pale orange, (10YR	- - - - -
- - - - 100 -57.5				96.0-106.0' - NA		8/2), strong HCI reaction, 50% silty matrix, sand to gravel-sized fragments, poorly to moderately fossiliferous (10-20%) Lignite 99.0-99.2' - extremely weak (R0), black organic partings	- - - - -
-51.9	R11-SN 10 ft 100%		NA	- - - - -		Limestone 99.2-101.0' - Same as 96.0-99.0' Clayey Silt (ML) 101.0-103.0' - dry, very stiff, low to medium plasticity, strong HCl reaction, blocky partings Limestone 103.0-105.0' - Same as 96.0-99.0'	- - - - -
- 105 -62.5	106.0			- - -		105.0-105.1' - very pale orange, (10YR 8/2), very fine grained, poorly fossiliferous (<10% coverage)	- - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-01	SHEET	7	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	5 bgs	on 3/0	6/07 START : 2/20/2007 END : 2/2	22/20	D7 LOGGER : R. Gomez	
≥∩≘	(%)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
ELO N (fi	JN, AND RY (%		ZES IT	DESCRIPTION	CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
				_		Limestone - 105.1-105.8' - fragments	_
_				106.0-116.0' - NA	H	105.8-106.0' - Same as 105.0-105.1' 106.0-109.5' - grayish orange, (10YR	_
_				100.0-110.0 - NA	H	 7/4), very fine to fine grained, strong 	-
-				-		HCl reaction, laminar bedding, where the pieces are broken down the	-
					H	 material is silt-sized, fragments to 3/8" in size 	
-				_	H	[
110 -67.5				_	H	109.5-114.0' - very fine to fine — grained, sand to gravel-sized	_
-07.5	R12-SN			-	Ħ	fragments, non fossiliferous	-
-	10 ft 100%	NA	NA	-	Ħ	-	-
_				-	Ħ		-
				_	H		
-				<u>-</u>	\equiv	_	-
-				-			-
-				-	Ш		=
115				-	ш	 (10YR 4/2), strong HCl reaction, laminated bedding 	-
-72. 5					Ш	114.2-121.0' - very pale orange, - (10YR 8/2), very fine to fine grained,	
-	116.0			-	口	strong HCl reaction, 20-30% gravel-sized and 70-80% fines,	_
-				-	団	- fragments up to 2"	=
-				116.0-126.0' - NA	囯	-	=
_				-	H	-	-
				_	Ħ	_	
-				-	H	-	-
400				-	П	-	-
120_ -77.5				_	Ш	_	_
	R13-SN 10 ft		NA		H		
_	100%	NA	INA	_	H	Disaggregated Limestone 121.0-126.0' - pale yellowish brown,	Rock disaggregated due to sonic drilling method
-				-	H	(10YR 6/2), strong HCl reaction, with sand-sized to fine gravel-sized	-
-				-	H	- limestone fragments	-
-				-	Ħ	-	-
					Ħ	_	
_					Ħ	-]
125_ -82.5				_	H	<u></u>	_
-	126.0			<u>-</u>		-	-
	120.0			-			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-01	SHEET	8	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

	_ V L L O . 0.0	o bgs	on 3/6	6/07 START : 2/20/2007 END : 2/	<u> 22/20(</u>	D7 LOGGER : R. Gomez	
≥∩≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
130 -87.5 - - - - - - - - - - - - - - - - - - -	R14-SN 10 ft 100%	NA	NA	126.0-136.0' - NA		Limestone 126.0-136.0' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/4), very fine to fine grained, strong HCI reaction, sand to gravel-sized weak (R2) limestone fragments, grains and gravel reduce to silt-sized material (rock flour), few fine grained weak to medium strong (R2 to R3) fragments from 132.0-133.5'	- - - - - - - - - - - - - - - - - - -
140 -97.5 - - - - 145 -102.5	R15-SN 10 ft 100%	NA	NA	136.0-146.0' - NA		136.0-136.9' - Same as 126.0-136.0' 136.9-142.5' - very pale yellowish brown, (10YR 6/2), medium strong to strong (R3 to R4), very fossiliferous, up to 70% covered in fossil shells/casts/molds, 10-20% covered in voids (<1/16" up to 3/8"), cavities up to 4-3/4", broken sand to gravel-sized pieces at 139.0-139.5' Silty Clay (CL) 142.5-143.0' - moderate brown, (5YR 4/4), dry, low plasticity, blocky partings Limestone 143.0-146.0' - Same as 126.0-136.0'	- - - - - - - - - - - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-01	SHEET	9	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	55 bgs	on 3/6	5/07 START : 2/20/2007 END : 2/	22/20	D7 LOGGER : R. Gomez	
≥O₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEF	COF	RQ	FRA PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	NAS H	CHARACTERISTICS Limestone - 146.0-148.7' - moderate yellowish	DROPS, TEST RESULTS, ETC. SC-6 collected at 146.3-
- - -				146.0-156.0' - NA	brown, (10YR 5/4), fine graine strong HCl reaction, strong to strong (R4 to R5), <1/16" void <10% of surface, trace fossils		147.2'
- 150_ -107.5				-		148.7-151.0' - strong HCl reaction, silt to fine gravel-sized limestone fragments	- -
- - -	R16-SN - 10 ft - 88%		NA			- 151.0-151.9' - strong HCl reaction, very weak to weak (R1 to R2), very fossiliferous 151.9-154.0' - Same as 148.7-151.0'	- - - -
- - -							- - -
155_ -112.5			ND			Limestone Fragments 154.0-154.8' - strong HCl reaction No Recovery 154.8-156.0'	<u>-</u>
	156.0		NR		Ħ	-	-
-				156.0-166.0' - NA		Disaggregated Limestone 156.0-161.6' - pale yellowish brown, (10YR 6/2), strong HCl reaction, silt to coarse gravel-sized limestone fragments	- - -
- - -						- - -	- - -
160_ -117.5 -			NA			- - -	
- - -	10 ft 1					Limestone 161.6-161.8' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCI reaction, medium strong to strong (R3 to R4), non	- - - -
- - 165 -122.5						fossiliferous Disaggregated Limestone 161.8-163.0' - strong HCl reaction, carbonate materials Limestone Fragments 163.0-165.7' - moderate brown, (5YR	- - -
-	166.0					4/4), fine grained with silt, silt to 1" size limestone fragments	_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-01	SHEET	10	OF	15	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

### DEPTH TYPE: GRIENTATION ROUGHNESS AND ROCK MASS ON PROCESS CONNE ROLL TO PROCEED BY PLANARITY MILLION MATERIAL ROS ON PROCESS CONNE ROLL TO PROCESS CONNER ROLL TO PROCESS CONNER ROLL	Description Description	WATER	LEVELS: 3.6	55 bgs	on 3/6	6/07 START : 2/20/2007 END : 2	22/200	COMPANY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF T	
Limestone 165.7-16.0." moderate brown, (GYR 444), fine grained, weak to medium strong (R2 to R5), ibssillerous brown, (10YR 844), fine grained, weak to medium strong (R2 to R5), ibssillerous brown, (10YR 844), fine grained, seak to medium strong (R3 to R5), ibssillerous brown, (10YR 844), fine grained, seak to medium strong to strong (R3 to R4), strong HCI reaction and to grave-listed fragments, trace iaminated bedding with mild HCI reaction (10YR 544), fine grained, medium strong to strong (R3 to R4), 10-20% covered in cavities (but to 38° in size) 170.0-172.0° - moderate yellowish brown, (10YR 844), fine grained, medium strong to strong (R3 to R4), 10-20% covered in cavities (but to 38° in size) 172.0-173.7° - moderate yellowish brown, (10YR 844), fine grained, mild HCI reaction, rock-floor, silly matrix, sand to coarse grave-listed fragments 173.7-174.7° - moderate yellowish brown, (10YR 844), fine grained, mild HCI reaction, rock-floor, silly matrix, sand to coarse grave-listed fragments 173.7-174.7° - moderate yellowish brown, (10YR 844), sine grained, strong HCI reaction, up to 34° grave-listed process of 183.0° - moderate yellowish brown, (10YR 844), moderate HCI reaction, gill to fragments, soil like properties 176.0-178.5° - Same as 126.0-136.0° except core fragments up to 2-1/2° 179.5-180.6° - moderate yellowish brown, (10YR 844), moderate HCI reaction, sill to fragments, soil like properties 176.0-178.5° - Same as 126.0-136.0° except core fragments yellowish brown, (10YR 845), moderate HCI reaction, sill to fragments, soil like properties 176.0-178.5° - Same as 179.5-180.6° 183.0-184.5° - Same as 179.5-180.6° 183.0-184.5° - Same as 179.5-180.6° 183.0-184.5° - Same as 179.5-180.6° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183	Limestone 165.7-160.0" moderate brown, (5YR 444), line grained, weak to medium strong (R2 fo R3), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1777 fo), lossifierous brown, (1777 fo), lossifierous brown, (1777 fo), lossifierous brown, (1777 fo), lossifierous brown, (1777 fo), lossifierous brown, (1777 fo), lossifierous brown, (1776 fo), lossifierous brown, (1	≥∩≘	- (°			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
Limestone 165.7-16.0." moderate brown, (GYR 444), fine grained, weak to medium strong (R2 to R5), ibssillerous brown, (10YR 844), fine grained, weak to medium strong (R2 to R5), ibssillerous brown, (10YR 844), fine grained, seak to medium strong (R3 to R5), ibssillerous brown, (10YR 844), fine grained, seak to medium strong to strong (R3 to R4), strong HCI reaction and to grave-listed fragments, trace iaminated bedding with mild HCI reaction (10YR 544), fine grained, medium strong to strong (R3 to R4), 10-20% covered in cavities (but to 38° in size) 170.0-172.0° - moderate yellowish brown, (10YR 844), fine grained, medium strong to strong (R3 to R4), 10-20% covered in cavities (but to 38° in size) 172.0-173.7° - moderate yellowish brown, (10YR 844), fine grained, mild HCI reaction, rock-floor, silly matrix, sand to coarse grave-listed fragments 173.7-174.7° - moderate yellowish brown, (10YR 844), fine grained, mild HCI reaction, rock-floor, silly matrix, sand to coarse grave-listed fragments 173.7-174.7° - moderate yellowish brown, (10YR 844), sine grained, strong HCI reaction, up to 34° grave-listed process of 183.0° - moderate yellowish brown, (10YR 844), moderate HCI reaction, gill to fragments, soil like properties 176.0-178.5° - Same as 126.0-136.0° except core fragments up to 2-1/2° 179.5-180.6° - moderate yellowish brown, (10YR 844), moderate HCI reaction, sill to fragments, soil like properties 176.0-178.5° - Same as 126.0-136.0° except core fragments yellowish brown, (10YR 845), moderate HCI reaction, sill to fragments, soil like properties 176.0-178.5° - Same as 179.5-180.6° 183.0-184.5° - Same as 179.5-180.6° 183.0-184.5° - Same as 179.5-180.6° 183.0-184.5° - Same as 179.5-180.6° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183.0° 183.0-184.5° - Same as 180.0-183	Limestone 165.7-160.0" moderate brown, (5YR 444), line grained, weak to medium strong (R2 fo R3), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1776 fo), lossifierous brown, (1777 fo), lossifierous brown, (1777 fo), lossifierous brown, (1777 fo), lossifierous brown, (1777 fo), lossifierous brown, (1777 fo), lossifierous brown, (1777 fo), lossifierous brown, (1776 fo), lossifierous brown, (1	DEPTH BELOV SURFACE ANI ELEVATION (f	CORE RUN, LENGTH, AND RECOVERY (%	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LO	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
Compacted silt and limestone Limestone 176.0-179.5 - Same as 126.0-136.0' except core fragments up to 2-1/2" 179.5-180.6' - moderate yellowish brown, (10YR 5/4), moderate HCI reaction, silt to fragments, soil like properties 180.6-183.0' - grayish orange, (10YR 7/4), medium to coarse grained, strong HCI reaction, shell fragments, molds, casts, 30-40% cavities to 3/8" in size 183.0-184.5' - Same as 179.5-180.6' 184.5-185.2' - Same as 180.6-183.0' 185.5-185.5' - Same as 180.6-183.0' 185.5-185.5' - Same as 180.6-183.0' 185.5-185.5' - Same as 180.6-183.0'	Compacted slit and limestone Limestone 176.0-186.0' - NA 179.5-180.6' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, slit to fragments, soil like properties 180.6-183.0' - grayish orange, (10YR 7/4), medium to coarse grained, strong HCl reaction, shell fragments, molds, casts, 30-40% cavities to 3/8" in size 185.2-185.5' - Same as 179.5-180.6' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0' 185.2-185.5' - Same as 180.6-183.0'		R18-SN 10 ft		NA	166.0-176.0' - NA		165.7-166.0' - moderate brown, (5YR 4/4), fine grained, weak to medium strong (R2 to R3), fossiliferous 166.0-170.0' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, sand to gravel-sized fragments, trace laminated bedding with mild HCl reaction 170.0-172.0' - moderate yellowish brown, (10YR 5/4), fine grained, medium strong to strong (R3 to R4), 10-20% covered in cavities (up to 3/8" in size) 172.0-173.7' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, rock-floor, silty matrix, sand to coarse gravel-sized fragments 173.7-174.2' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, medium strong to strong HCl reaction, medium strong to strong (R3 to R4), laminated Disaggregated Limestone	- - - - - - - - - - - - - - - - - - -
100.0	\	-137.5 - - - - - - - - - - - - - - - - - - -	R19-SN 10 ft 100%		NA	176.0-186.0' - NA		compacted silt and limestone Limestone 176.0-179.5' - Same as 126.0-136.0' except core fragments up to 2-1/2" 179.5-180.6' - moderate yellowish brown, (10YR 5/4), moderate HCI reaction, silt to fragments, soil like properties 180.6-183.0' - grayish orange, (10YR 7/4), medium to coarse grained, strong HCI reaction, shell fragments, molds, casts, 30-40% cavities to 3/8" in size 183.0-184.5' - Same as 179.5-180.6' 184.5-185.2' - Same as 176.0-179.5'	- - - - - - - - - - - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-01	SHEET	11	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

			6/07 START : 2/20/2007 END : 2/3	22/20	D7 LOGGER : R. Gomez	
_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
CORE RUN, LENGTH, AND RECOVERY (9	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LC	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
R20-SN 10 ft 100%	NA	NA	186.0-196.0' - NA		Limestone 185.7-186.0' - Same as 176.0-179.5' 186.0-196.0' - moderate yellowish brown, (10YR 5/4), medium to coarse grained, mild to moderate HCI reaction, sand to gravel-sized fragments, fossiliferous, cavities up to 3/16" over 30-50% of surface at 186.6-186.8'	
R21-SN		NA NR	196.0-206.0' - NA		196.0-201.8' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), strong HCI reaction, blocky partings, silt to gravel-sized limestone fragments, friable No Recovery 201.8-206.0'	_
206.0				\vdash		
	10 ft 100%	R20-SN 10 ft 100% NA 196.0	R20-SN NA NA 100% NA NA 100% NA NA NA NA NA NA NA NA NA NA NA NA NA	186.0-196.0' - NA R20-SN NA NA 100% NA NA 100% NA NA 100% NA NA 196.0-206.0' - NA R21-SN 10 ft 58% NA NA	R20-SN 10 ft 100% NA NA 196.0' - NA 196.0 - 206.0' - NA 196.0-206.	186.0-196.0' - NA



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-01	SHEET	12	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	55 bgs	on 3/6	6/07 START : 2/20/2007 END : :	2/22/20	07 LOGGER : R. Gomez	
≥∩≘	- (°			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-172.5	R22-SN 10 ft 100%		NA	206.0-216.0' - NA		Limestone - 206.0-216.0' - Same as 196.0-201.8'	- - - - - - - - - - - - - - - - - - -
-220 -177.5 - - - - - - - - - - - - - - - - - - -	R23-SN 10 ft 100%		NA	216.0-226.0' - NA		216.0-223.0' - Same as 196.0-201.8' Clayey Silt (ML) 223.3-224.0' - light brown to very pale orange, (5YR 6/4 to 10YR 8/2), dry to moist, low plasticity when wet Limestone 224.0-226.0' - Same as 196.0-201.8'	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-01	SHEET	13	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	5 bgs	on 3/6	6/07 START : 2/20/2007 END : 2/	22/200	D7 LOGGER : R. Gomez	
≥∩≘	_ (6			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
230 -187.5 - - - - - - - - - - - - - - - - - - -	R24-SN 10 ft 100%		NA	226.0-236.0' - NA		Limestone 226.0-233.0' - very pale orange, (10YR 8/2), fine grained, strong HCI reaction, extremely weak (R0), sand to coarse gravel-sized fragments, friable 233.0-236.0' - Same as 226.0-233.0' except increase in dark yellowish brown (10YR 4/2) silt	- - - - - - - - - - - - - - - - - - -
-240 -197.5 - - - - - 245 -202.5	236.0 R25-SN 10 ft 100%		NA	236.0-246.0' - NA		236.0-246.0' - Same as 226.0-233.0'	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-01	SHEET	14 ()F	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

					22/20	07 LOGGER : R. Gomez	
≥∩≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
250 -207.5 - - - 255 - - - 255 - - 212.5	R26-SN 10 ft 100%	NA	NA	246.0-256.0' - NA		Limestone - 246.0-255.7' - Same as 226.0-233.0'	
-260 -217.5 27.5 	256.0 R27-SN 10 ft 97%		NA	256.0-266.0' - NA		Silt (ML) 255.7-256.0' - grayish orange, (10YR 7/4), strong HCl reaction, unconsolidated material, silt to sand grain-sized Limestone 256.0-265.7' - Same as 226.0-233.0'	
_	266.0		NR			No Recovery 265.7-266.0'	



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	l I-01	SHEET	15 O	F ·	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEVELS: 3.65 bgs on 3/6/07				6/07 START : 2/20/2007	END : 2/2	2/200	D7 LOGGER : R. Gomez	
>00	<u>.</u>			DISCONTINUITIES		₀	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H H H	F.Y. VER	(%)	IUR 1	DEPTH, TYPE, ORIENTATION, ROUGH	NESS	OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FYF.	ORE COO	R Q D (%)	AC-	PLANARITY, INFILLING MATERIAL A	AND	/MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	898	ď	F F	THICKNESS, SURFACE STAINING, AND TH	GHINESS	S	CHARACTERISTICS	BROT 6, 1261 REGGET6, 216.
							Bottom of Boring at 266.0 ft bgs on	
							2/22/2007	
					_		_]
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-02	SHEET	1	OF	17

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLIN	G METH	OD AND	EQUIPM	ENT : Rotosonic S	s/N SR-116, sonic, 6" outer casing and 4" core barrel		ORIENTATION : Vertical
WATER	LEVELS	: 3.65 bg	s on 3/6/0)7 S	TART : 2/23/2007 END : 2/26/2007 LOGGEF	R : C.	Sump, S. Parks
300				STANDARD	SOIL DESCRIPTION	ڻ	COMMENTS
AND	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		2.0	DEDT. OF 040010 DDILLING DATE
A BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	o Lic	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
42.3	0.0			(N)	Tonocil	7/ 1/ O	Water level is based on Cround Water
42.5	0.0				Topsoil 0.0-1.0' -	, , ,	Water level is based on Ground Water Monitoring at LNP site (FSAR Table -
-					Poorly Graded Sand (SP)	/ \(\frac{\sqrt{\sq}}\sqrt{\sq}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}	2.4.12.08)"
_					1.0-5.4' - light gray to medium gray, (N7 to N5),		-
_					medium to coarse grained, with variable iron oxide staining, silica sand		-
_					Stalling, Silica Sand		_
_					-		
-		6.4	R1-SN		-		Water levels were not recorded for I-02
_					-		_
_					-		_
5							
37.3					Sandy Silt (ML)	Ш	_
_					5.4-6.4' - yellowish gray, (5Y 7/2), moist to wet, low to	$\ \ $	_
_					non plasticity, some fine to medium grain sand No Recovery 6.4-7.0'	Ш	_
_	7.0				<u> </u>	$\ \ $	_
_					Sandy Silt (ML) 7.0-9.0' - Same as 5.4-6.4'		_
_					-		_
_					<u>-</u>		_
_						Ш	_
_					9.0-15.0' - grayish yellow to yellowish gray, (5Y 7/2 to 5Y 8/4), moist, nonplastic to low plasticity, some fine	Ш	_
10					to coarse sand-size and gravel-size, some "clasts"	Ш	_
32.3					<1" size at 9.5-10.5', all carbonate material	Ш	_
_					_	Ш	_
_					_	Ш	_
_		10.0	R2-SN		_	Ш	_
_		10.0	112 011		_	Ш	
_					_	Ш	
_					_	Ш	
_					_	Ш	
_					_	Ш	
15						Ш	
27.3					Limestone Fragments With Silt 15.0-17.0' - fragments are 1"-3" diameter, making up	dash	Possibly drill induced breakage
					>50% of sample, with silt <50% of soil, all carbonate		
					materials (soil may be thin limestone beds with silty interbeds)]
	17.0				,	Ь]
					Silty Sand With Limestone Fragments (SM) 17.0-22.0' - yellowish gray, (5Y 7/2), moist, fine to		1
]					coarse grained, grades to sandy silt with depth, <10%]
1 7					fine to coarse gravel-sized (<1/2") limestone clasts, all carbonate materials		1
1 7					Carporate materials -	$\ \ $]
1 7					-]
20							1
						I	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-02	SHEET	2	OF	17

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLIN	G METH	OD AND	EQUIPM	ENT : Rotosonic S	6/N SR-116, sonic, 6" outer casing and 4" core barrel		ORIENTATION : Vertical
WATER	LEVELS	: 3.65 bg	s on 3/6/0)7 5	TART : 2/23/2007 END : 2/26/2007 LOGGER	R : C.	Sump, S. Parks
>001				STANDARD	SOIL DESCRIPTION	ဖွ	COMMENTS
ANE (f)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOS OBOLID CAMBOL, COLOR	070	DEDTIL OF CACING DRILLING DATE
A BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	Š	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
<u> </u>				(N)		S	
		10.0	R3-SN		Limestone Fragments 22.0-23.6' - moderate yellowish brown, (10YR 5/4), 1"-3" thick fragments with 1"-2" thick light tan/gray silt/clay infill (possible interbeds) Silty Sand With Limestone Fragments (SM) 23.6-27.0' - grayish orange, (10YR 7/4), fine to coarse grained, strong HCI reaction, 10-20% fine to coarse gravel-sized limestone fragments (1/4"-1-1/4")		Possibly drill induced breakage (breaks without infilling of fines)
- - - - 30_ 12.3_	27.0				Limestone Fragments 27.0-29.0' - moderate yellowish brown, (10YR 5/4), 1"-4" thick fragments, fossiliferous with small (1/16"-1/8") voids across the surface (40-60%), clay/silt on fragment faces, all carbonate derived Silty Sand With Limestone Fragments (SM) 29.0-31.4' - moderate yellowish brown, (10YR 5/4), fine to coarse grained, 10-15% fine to coarse gravel-sized limestone fragments (<1" diameter), all carbonate material		Possibly drill induced breakage
- - - - 35_ 7.3 - -	07.0	7.8	R4-SN		Limestone Fragments 31.4-31.7' - yellowish gray, (5Y 8/1), moderate HCI reaction, 1" thick fragments, light gray (N7) clay interbeds between fragments, all carbonate materials Sandy Silt (ML) 31.7-33.0' - moderate yellowish brown, (10YR 5/4), 10-15% fine to coarse gravel-sized limestone fragments, all carbonate derived materials Limestone Fragments 33.0-34.8' - dark gray, (N3), fine grained, moderate HCI reaction, medium strong (R3), silt material infilling around fragments, all carbonate materials No Recovery 34.8-37.0'		Possibly drill induced breakage
- - - - 40	37.0				Limestone 37.0-39.6' - olive gray, (5Y 4/1), medium strong (R3), finer grained than above, poorly fossiliferous, fine laminations/bedding planes visible in zones (1/8"-1/2"), horizontal partings 1"-4" spacing, light gray to medium gray (N7 to N6) clayey infill on partings, all carbonate materials		- - - - Possibly drill induced breakage



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	3	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

						END: 2/26/2007		. D · C	S. Sump, S. Parks
	LEVELS	. J.UJ D <u>Q</u>	3 011 3/0/(START : 2/23/2007	END: 2/26/2007 SOIL DESCRIPTION	LUGGE		COMMENTS
<u></u>	SAMPI F	INTERVA	L (ft)	STANDARD PENETRATION				- 8	
SELC ION	0,	RECOVE	` ,	TEST RESULTS	SOIL NAME	, USCS GROUP SYMBOL	, COLOR,	S	DEPTH OF CASING, DRILLING RATE,
YFAC		I TREGOVE		6" 6" 6"				MBO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUR			#11171	(N)		, , , , , , , , , , , , , , , , , , , ,		SY	
2.3 PEPTH BELOW 45 PERT 1 PERT	47.0	6.2	#TYPE R5-SN R6-SN	6"-6"-6" (N)	Silty Sand With 39.6-44.0' - pale coarse grained, limestone fragm carbonate mater 44.0-44.5' - yello (molds/casts), 5 and small rough horizontal partin partings Silty Sand (SM) 44.5-47.0' - yello grained, 20-30% fragments, decrematerials Silty Sand With 47.0-53.2' - fine to subangular lir limestone core p 50.0-51.0' with the parting surfaces	owish gray, (5Y 7/2), foss i0% small surface voids (ily circular solution cavition igs 1"-2", silty clay infilling	(SM) 6/2), fine to ravel-sized oth, all siliferous (1/16"-1/8") es (1/2"), g material on to coarse zed limestone bonate (SM) 70% angular diameter (4") -49.5' and on horizontal	A SAMBOLICIOG	Difficulty driving 6" casing to 51.0' below ground surface Top of rock estimated to be approximately 53.0' below ground surface
-								+	-
60								1	1
							=		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	4	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

				MENT . ROLOSOFIIC 3/N 3R-110, SOFIIC, O OULEI CASING AND			ORIENTATION . Vertical
WATER	LEVELS: 3.6	5 bgs	on 3/0	6/07 START : 2/23/2007 END : 2/	26/20	D7 LOGGER : C. Sump, S. Parks	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(0	DESCRIPTION	SYMBOLIC LOG		
N N N	₹ _{AN} ,	_	Æ.	DESCRIPTION	J	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
# S E	₽, H,H	(%) Q	58	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	١٦	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF	R 66	ο	AC.	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD
DE SU ELE	SEES	8	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	53.2				+-	Limestone	Start of rock core
_	50. <u>2</u>					53.2-57.0' - yellowish brown to gray,	Start of lock core
_				4-001-114	\blacksquare	moderate to strong HCl reaction, light	_
				47.0-57.0' - NA	\vdash	gray silty clay interbed/infill material	
	R6-SN				╨	on horizontal parting surfaces	1
55 <u> </u>	3.8 ft	NA	NA	_	╁┯	— spaced 1"-2" with few up to 4",	Coming was times and
-12.7	100%					_ medium yellowish brown silt (<15%)	Coring run times not recorded for I-02
					Ш	zone at 54.0-54.5', highly fragmented	recorded for 1-02
-					╁	 56.0-57' with angular to subangular 	-
l _					┷	_ fragments 2"-3" in size, increasing	
	57.0					silt sized component with depth	Highly fragmented
-						Limestone Fragments	limestone
-					₽	- 57.0-59.5' - strong HCl reaction,	Possibly drill induced _
					ᅪ	angular to subangular fragments 1-3"	breakage
1 7				57.0-67.0' - NA	1	in diameter, <40% carbonate derived	1
-						 clayey silt, fines change color from 	-
_					╀	light gray to moderate yellowish	
					\vdash	brown at 58.0'	
					T	Limestone	- 1
60				_	E	— 59.5-63.0' - moderate yellowish	
-17.7					ш	brown, (10YR 5/4), horizontal	NA = Not Applicable
					\mathbf{L}	partings 1"-2" spacing with dark	NR = No Recovery -
-					+	 grayish brown clayey silt interbed 	-
l _						_ material rough and undulating, fine	
	R7-SN					black laminar inclusions 1/16"-1/8" in	
_	10 ft	NA	NA		╨	length (horizontal)	1
I -	100%				╆┯	-	-
					ш	63.0-64.7' - yellowish gray to olive	December delli induced
-					╁	 gray, fine grained, trace to no fossils, 	Possibly drill induced _
l _					╀╌	few small surface voids (1/16"-1/8"),	breakage
						horizontal partings at various spacing	
						from 1"-8", parting surfaces mostly	1
65				_	4111	clean with trace silty clayey material	
-22.7						Silt (ML)	
					Ш	64.7-65.5' - dark brown, black	1
-					—	_ \ mottling/laminations, possibly	
					╨	\organics, possible bioturbation	
	67.0				\vdash	Limestone	
-	07.0				Ľ	_ 65.5-68.1' - grayish yellow brown, medium strong (R3), fossiliferous,	Possibly drill induced
-					\Box	horizontal partings with 2"-4"	breakage -
					\vdash	_ spacing, trace to no infill in partings,	- 3 -
				67.0-77.0' - NA	1 ++-	surface coverage of small (<1/8")	Possibly drill induced
-					4	\voids >50%	breakage -
					┲	Silt With Limestone Fragments (ML)	Repeating limestone/silt
						68.1-68.8' - orange gray, limestone	interbeds
					仜	fragments 1/2"-1" diameter	
70				_	I	Limestone	
-27.7						68.8-70.0' - yellowish brown, fine	
1 7					Ш	named, medium strong to strong (R3 Γ	1
-					₩.	to R4), few fossils (<5%) few surface	
					\vdash	voids, dense partings 3/4"-4", light	
1	R8-SN				\vdash	gray silty infilling (interbeds)	7
-	10 ft	NA	NA		Ė	- Silt (ML)	
-	100%				ĮΙ	70.0-70.5' - Same as 68.1-68.8'	_
					\vdash	except strong HCl reaction	
—					1	-	
					1		



PROJECT NUMBER:	BORING NUMBER:					•
338884 FI	I-02	CHEET	5	ΩE	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/	5/07 START : 2/23/2007 END : 2/	26/20	007 LOGGER : C. Sump, S. Parks	
≥ ∪≎	(%)			DISCONTINUITIES	ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-5 -75 -32.7 	77.0			-		Limestone 70.5-74.2' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), medium strong (R3), moderately fossiliferous (molds/casts), 2"-8" horizontal partings, 1"-2" thick semi-indurated gray silty interbeds (dry), dry powdery interbed material at 73.0' 74.2-75.9' - dusky orange to gray, fragmented, fine sand-sized material (carbonate derived) with sparse 1/2"	- - - - - -
- - - - 80 -37.7 -	R9-SN 10 ft 93%	NA	NA	77.0-87.0' - NA		limestone clasts, few fine black organic laminations 75.9-76.5' - dark gray, strong HCI reaction, fossiliferous, large solution cavities (1"x3"), interconnected rounded cavities (possible tube borings) Silt (ML) 76.5-77.0' - light gray to tan, laminated Limestone 77.0-81.5' - moderate yellowish brown, (10YR 5/4), dense, moderate HCI reaction, medium strong to strong (R3 to R4), small surface voids (1/16"-1/8") covering 40-50%	- - - - - - - -
- - - 85 -42.7 - - -	87.0		NR			surface, limestone parting (horizontal) 2"-6" thick, gray clayey silt interbeds, clay zone 78.5-79.6' (dark brown /black interbed laminations, vitreous luster when rubbed with hand, organic) 81.5-82.3' - pale yellowish brown, (10YR 6/2), fine grained, medium strong (R3), few small surface voids, (1/16"-1/8") (<10%), few fossils Limestone Fragments 82.3-84.2' - moderate HCl reaction, gravel sized fragments (1/4"-1-1/2"), smaller fragments are subangular to subrounded, larger fragments	- - - - - - -
	R10-SN 10 ft 100%		NA	87.0-97.0' - NA		subrounded, larger fragments angular to subangular Limestone 84.2-86.3' - pale yellowish brown to yellowish brown, (10YR 6/2 to 10YR 5/4), small surface voids (<1/8") covering 50% of surface, 5-10% small (<1/2") roughly circular cavities, light gray silty clay infilling on horizontal partings vary from 1"-9", increasing fossils (mostly molds) with depth No Recovery 86.3-87.0' Disaggregated Limestone 87.0-91.4' - mottled gray/tan/brown, moderate HCI reaction, <20% limestone fragments (<3/4"), few fragments >1-1/2"	Possibly drill induced breakage -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	6	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	5 bgs	on 3/	5/07 START : 2/23/2007 END : 2/2	26/20	07 LOGGER : C. Sump, S. Parks	
≥∩≘	(%)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
ELO, I. ANI	AND AY (%		ZES T	DESCRIPTION	OLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR	S O	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
<u> </u>						91.4-91.6' - light grayish tan, weak	_
_				-	上	(R2) - Limestone	_
_				-	上	91.6-92.7' - light yellowish gray,	_
95 <u> </u>				-	\vdash	medium strong (R3), <10% small — surface voids (1/16"-1/8"),	
"-				-	\mathbf{H}	fossiliferous Disaggregated Limestone	-
-				-	F	Disaggregated Limestone 92.7-94.4' - light grayish tan,	-
-	07.0			-	Ħ	compacted, <20% gravel size (<1") limestone fragments, dark olive	-
-	97.0			-	Ħ	 brown laminations (possible organics) 	Upward fining sequences
_				-	Ħ	Limestone	of increasing clay and - decreasing sand fractions
_				97.0-107.0' - NA	片	94.4-94.8' - Same as 91.6-92.7'Disaggregated Limestone	over 4.0'-6.0' intervals
					片	94.8-97.0' - light grayish orange, few - (<10%) gravel sized (<3/4")	
				_	片	limestone fragments, dark brown	
100_				_	₽	lamination appears to transect bedding	_
-57. 7				-	F	Limestone Fragments 97.0-107.0' - 0-25% carbonate	_
_				-		 derived clav. gravel size (<1") 	_
-	R11-SN			-		limestone fragments, few fragments >1-1/2", friable fragments of slightly	-
-	10 ft	NA	NA	-		 more competent material are easily broken by hand, sparse dark brown 	-
-	100%			-	Ħ	roughly horizontal laminations	-
_				-	口	 associated with finer grained zones (organics) 	-
_				-			-
_				-		-	_
105							
-62.7				_		-	_
_				-	Ь	<u>-</u>	_
_				-	一	-	-
-	107.0			-	H	 107.0-117.0' - Same as 97.0-107.0'	-
-				-	F	-	-
-				107.0-117.0' - NA	F	-	-
-				-	Ħ	-	-
_				-	Ħ	-	-
110				-	廿	-]
-67.7					片	-	
					片	_	
_				-	世	<u>-</u>	
_	R12-SN 10 ft	NA	NA	_	E	-	-
_	100%			-	₽	-	-
_				-	E	_	-
					1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-02	SHEET	7	OF 1	7

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEVELS: 3.65 bgs on 3/6/07			on 3/6	6/07 START : 2/23/2007 END : 2/3	26/20	07 LOGGER : C. Sump, S. Parks			
≥ ∩ ⊕	(9)			DISCONTINUITIES	ق	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
115 -72.7 - - - - - - - 120 -77.7	117.0			117.0-127.0' - NA		Limestone Fragments - 117.0-127.0' - Same as 97.0-107.0'	- - - - - - - - - - - - - - - - - - -		
- - - - 125 -82.7 -	R13-SN 10 ft 100%	NA	NA	- - - - -		- - - - - - - - - - - - - - - - - - -	- - - - - - - -		
 130 -87.7 	R14-SN 10 ft 100%	NA	NA	127.0-137.0' - NA		127.0-137.0' - Same as 97.0-107.0'	- - - - - - - -		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	8	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/6	5/07 START : 2/23/2007 END : 2/2	26/20	07 LOGGER : C. Sump, S. Parks	
₹ □₽	(%)			DISCONTINUITIES	စ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
135 -92.7 - - - - - 140 -97.7 - - - - - - - - - - - - - - - - - -	137.0 R15-SN 10 ft 100%	NA	NA	137.0-147.0' - NA		Limestone Fragments 137.0-139.5' - Same as 97.0-107.0' Limestone 139.5-143.0' - very pale grayish orange, numerous (1/2"-1") solution cavities, fine black inclusions (<1/8"), variable zones of small voids (<1/16") on surface, fossiliferous, molds and casts up to 3/4" in size, dark brown staining on some of the partings (original bedding plane), mottled dark gray 143.0-145.6' - moderate yellowish brown, (10YR 5/4), strong HCI reaction, dense, less fossiliferous than above, few surface voids/cavities (<10%), horizontal partings 2"-4" spacing, 2"-3"	Fossiliferous, partial recrystallization (very fine subhedral/cross faces)
-102.7 - - - - - 150 -107.7 - -	147.0 R16-SN 10 ft 100%		NA	147.0-157.0' - NA		semi-compacted clayey silt interbeds Disaggregated Limestone 145.6-147.0' - grayish orange brown, few gravel sized (<1/2") limestone fragments 147.0-148.9' - Same as 145.6-147.0' except increasing percent of limestone fragments and increase in size of fragments (1"-3") Limestone 148.9-151.6' - grayish orange, (10YR 7/4), small voids (1/16"-1/8") covering 50% surface, horizontal partings 6"-1.0' spacing, silty clay interbeds (up to 1.0"), partings thickness decreasing with depth Disaggregated Limestone 151.6-152.3' - moderate yellowish brown, (10YR 5/4), with friable limestone fragments 3/4"-1 1/2" diameter	Repeating sequences of limestone with softer (carbonate derived) interbeds separated by zones of unconsolidated carbonates with limestone fragments (possibly drill induced breakage)



PROJECT NUMBER:	BORING NUMBER:		
338884.FL	I-02	SHEET	9 OF 17

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	55 bgs	on 3/6	5/07 START : 2/23/2007 END : 2/2	26/200	7 LOGGER : C. Sump, S. Parks	
> O :	(9)			DISCONTINUITIES	ي	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BI	E RU STH, OVEF	(%) Q	ĮŽ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF FLEV	CORE	ROE	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014	ш	ш.п.		0)	Limestone	
				_	Н	152.3-153.9' - Same as 148.9-151.6'	_
				_	H	Disaggregated Limestone 153.9-155.1' - grayish orange to very	_
155					罝	pale orange, (10YR 7/4 to 10YR 8/2),	_
-112.7						msmall (<1/2") gravel-sized limestone fragments <10%	
				_	Н	Limestone 155.1-156.0' - Same as 148.9-151.6'	_
				_	Щ	Limestone Fragments	Possibly drill induced breakage -
	157.0			_	П	156.0-157.0' - limestone fragments (60%) 3/4"-2" size, friable, with sandy	breakage _
				_	ш	silt-sized carbonates	_
				157.0.167.0' NA	H	Disaggregated Limestone 157.0-160.8' - with 30-40% grayish	-
1 -				157.0-167.0' - NA -	H	orange limestone fragments	_
_				<u>-</u>	Ħ	(1/2"-1-1/2")	_
_				-		-	-
160_ -117.7				_	凵	_	
-117.7				-	╀	-	_
_				-	щ	- 160.8-165.7' - Same as 157.0-160.8'	Possibly drilling induced -
_	R17-SN		NA	-	П	except increasing amount of limestone fragments with depth (up	segregation of particles
-	10 ft	NA	I NA	-	口	to 40-50%), color change for	-
-	93%			-	₩	limestone fragments to very pale orange (10YR 8/2)	-
-				-	\vdash	-	-
-				-	Н	-	-
-				-	H		-
165				-	Ħ	-	-
-122.7					H	_	_
-				-	냅	Limestans	-
1 -				-	⊬	Limestone 165.7-166.3' - dark dusky yellow, (5Y	<u> </u>
1 -	167.0		NR	-	甲	6/4), 50% surface voids (1/16"-1/8"), fossiliferous	Material lost may have – been fines from above
1 -				-	囯	No Recovery 166.3-167.0'	Repeating sequence of
1 -				-	団	Limestone 167.0-167.2' - fossiliferous, large	limestone (with interbeds)
1 7				167.0-177.0' - NA	Ш	number of solution cavities (1/2"),	separated by zones of silty material with limestone
1 7				_	Ы	167.2-168.4' - pale yellowish gray,	fragments
				_	尸	dense, horizontal partings, 3/4"-1" thick	Possibly drill induced breakage
170					口	Limestone Fragments	_
-127.7 -				_	口	168.4-168.9' - moderate yellowish - brown, (10YR 5/4), carbonate	_
1 -				_	H	derived silt to sand-sized matrix with	_
1 -				-	出	limestone fragments 1/2"-2" in size Limestone	_
1 -	R18-SN - 10 ft 94%		NA	-	円	168.9-170.5' - Same as 167.2-168.4' except 2"-4" horizontal partings	-
1 -				-	鬥	becoming large fragments at end	-
-				-	Щ	-	-
					П		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	10	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	5 bgs	on 3/	6/07 START : 2/23/2007 END : 2/2	26/20	D7 LOGGER : C. Sump, S. Parks	
≥∩≘	(9)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-175 -132.7 -132.7 - - - - - - - - - - - - - - - - - - -	R19-SN 10 ft 100%	NA	NR	177.0-187.0' - NA		Pasty Limestone 170.5-171.0' - yellowish gray to orange gray, dark brown laminations (possible organics), no gravel sized fragments Limestone 171.0-173.9' - Same as 167.2-168.4' Disaggregated Limestone 173.9-176.4' - brown, limestone fragments generally 3/4" but up to 1"-3" diameter, light gray interbeds No Recovery 176.4-177.0' Disaggregated Limestone 177.0-177.3' - Same as 173.9-176.4' Limestone 177.3-179.0' - yellowish gray, dense, little to no surface voids, horizontal partings 1"-3" spacing Limestone Fragments 179.0-179.9' - moderate yellowish brown, (10YR 5/4), fine grained, 50% limestone fragments 3/4"-1-1/2" size Limestone 179.9-180.9' - Same as 177.3-179.0' except increase in small (1/16"-1/8") surface voids and soft interbeds on 1"-2" partings Disaggregated Limestone 180.9-183.6' - moderate yellowish brown, (10YR 5/4), fine grained, with limestone fragments Limestone 183.6-187.0' - yellowish gray, fragmented, fragments <1/2"-3" size	Possibly drill induced breakage
	R20-SN 10 ft 81%		NA	- 187.0-197.0' - NA - - - - - - -		187.0-189.0' - fragmented, angular to subangular, 1-1/2"-3" size 189.0-192.0' - fossiliferous (molds/casts), horizontal partings 1"-3" spacing, very thin soft interbeds (1/2") Limestone Fragments 192.0-195.1' - limestone fragments, sand-sized to 1/2"-2" size	Possibly drill induced breakage -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	11	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	35 bgs	on 3/6	S/07 START : 2/23/2007 END :	2/26/20	07 LOGGER : C. Sump, S. Parks	
\$0₽	<u>(</u> %			DISCONTINUITIES		LITHOLOGY	COMMENTS
BELO' CE AN TION (f	RUN, H, AND FRY (9	(%	URES	DESCRIPTION DESCRIPTION		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-						-	-
_					井	<u> </u>	
195 -152.7				·	井	<u>[</u> 	_
-132.7						}	-
-			NR		\perp	No Recovery 195.1-197.0'	-
	197.0				\perp	<u>-</u> <u>-</u> .	_
-					井	Limestone Fragments 197.0-203.3' - medium to coarse	-
_				197.0-207.0' - NA	丰	grained, grain size increasing with depth, limestone fragments are 2"-4"	-
-						size, subangular to angular, fragments above 200' are fine	-
_					1	grained, exhibit bedding plane fractures and have trace to no	
200 -157.7					井	surface voids, fragments below 200.0' are fossiliferous (molds/casts)	_
-			NA		\pm	and exhibit 30-40% small (1/16"-1/8") surface voids and small cavities	-
_	D04 0N					(<1/2")	
_		R21-SN 10 ft NA 74%			\perp	-	-
_	74%				士	}-	-
_					世	- - Disaggregated Limestone	-
_					\vdash	203.3-204.4' - yellowish gray/moderate brown, 25% limestone	
-					\perp	- fragments No Recovery 204.4-207.0'	Lost material may be fines –
205_ -162.7					+	NO Recovery 204.4-207.0	from across entire run
			NR		#	[
_					井	1	-
-	207.0				\pm	Limestone Fragments	Possibly drill induced
-					士	- 207.0-215.7' - mild HCl reaction, variable (5-15%) clay-sized pasty	breakage -
				207.0-217.0' - NA	1	limestone, limestone is fine grained, fossiliferous with 1/2"-3/4" cavities,	
-					杆	fragments are angular to subangular with smooth to irregular surfaces, 6"	-
210						clayey layers at 211.0' and 215.7', silt and clay-sized carbonate content	-
-167.7					#	decrease with depth	
_					#	1	_
-	R22-SN - 10 ft NA 87%	NA		#	}	-	
-					芹	}	-
					E	_	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	12	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	/ATER LEVELS : 3.65 bgs on 3/6/0					07 LOGGER : C. Sump, S. Parks		
≥0 ⊕	(9)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q i	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD	
215 -172.7	COI LEN REG	ВВ	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	I SAN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.	
-	217.0		NR	-		No Recovery 215.7-217.0'	-	
220 -177.7 - - - - - - - - - 225 -182.7	R23-SN 10 ft 90%	NA	NA	217.0-227.0' - NA		Disaggregated Limestone 217.0-217.5' - very pale orange and grayish orange, (10YR 8/2 and 10YR 7/4), moderate HCI reaction, laminated, dark brown organic rich layers, limestone fragments (<10%) 1/4"-1/2" in diameter Limestone Fragments 217.5-226.0' - pale greenish yellow to very light gray, (10Y 8/2 to N8), repeating sequences of upward fining material with limestone fragments up to 3" in coarse zones, average sequence length 2.0'-2.5', limestone fragments are moderate to strong HCI reaction fossiliferous, (molds & casts), mostly subangular, few subrounded fragments	- - - - - - - - - - - - - - - - - - -	
-	227.0		NR	-		No Recovery 226.0-227.0'	- -	
230 -187.7 -	R24-SN 10 ft 100%		NA	227.0-237.0' - NA		Limestone Fragments 227.0-235.5' - medium to coarse grained, 30-50% limestone fragments generally <3/4", few >1" fragments, repeating/alternating zones (1'-2' length) of coarser material and finer silt zones (less fragments)	- - - - - - - - -	
	13370			- -		-	-	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	13	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	WATER LEVELS: 3.65 bgs on 3/6/0			6/07 START : 2/23/2007 END : 2/3	26/20	07 LOGGER : C. Sump, S. Parks	
≥∩≘	_ (%			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
235 -192.7 - - - - - 240 -197.7	237.0 R25-SN 10 ft 100%	NA	NA	237.0-247.0' - NA		Disaggregated Limestone 235.5-236.5' - orange gray/moderate brown, contorted laminations, organics Limestone 236.5-237.0' - light yellowish gray, fine grained, very weak (R1), thinly bedded (1/4"-1/2" thick), well developed bedding planes, appears similar to silt material Limestone Fragments 237.0-247.0' - grayish orange and yellowish gray, (10YR 7/4 and 5Y 7/2), very fine to medium grained, moderate to mild HCl reaction, two zones with organic laminations (3"-4" thick), gravel-sized material is subangular, size varies from 1/4"-2"	
245 -202.7 -	247.0			- - - - -		- - - - - - - 247.0-255.7' - grayish orange and	- - - - - - -
250 -207.7 - -	R26-SN 10 ft 87%		NA	247.0-257.0' - NA		- very pale orange, (10YR 7/4 and 10YR 8/2), mild HCl reaction, limestone fragments are sand to gravel-sized, angular, up to 3", with zones of fragments that appear to have been possibly laminated prior to drilling	- - - - - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	14	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	ATER LEVELS: 3.65 bgs on 3/6/0			1 1		LOGGER : C. Sump, S. Parks	
≥0 ::	(9)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	(%) 🛭	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	CORI	RO	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014				Ű		_
					Н	[
_				_	F	No Recovery 255.7-257.0'	
255_					Ħ		_
-212 . 7				_	H	1	_
_				-	H	-	_
_			NR	-		-	_
_	257.0			-	ш	Limestone Fragments	-
_				-	П	Limestone Fragments 257.0-268.5' - Same as 247.0-255.7'	-
-				257.0-267.0' - NA	口	}	-
-				-	口	}	-
-				-	\vdash	 	-
				-	╁	+	-
260_ -217.7				-	F	-	_
-				-	Ħ	1	-
-	1 1			-	Ħ	†	-
-	R27-SN			-	Ħ	<u>†</u>	-
_	10 ft 100%	NA	NA NA	-	H	Ī	_
_				-		Ť	_
_				_	Н	Ī	
					Ш	[]
_				_	ш	[
265_					ш		
-222.7				_	ь	_	_
_				-	\vdash	-	_
_				-	F	+	-
-	267.0			-	F	}	-
-				-	F	}	-
_				- 267.0-277.0' - NA	Ħ	}	-
-				-	Ħ	 268.5-271.5' - very pale orange,	-
_				-	片	(10YR 8/2), mild to moderate HCl reaction, laminated with organic	-
270				-	世	layers in top 6", limestone fragments	-
-227.7				_	H	— are angular to subangular, average 1/4"-1/2" size	-
_				-	F	T]
_				-	H	Ī]
	R28-SN		NIA	_	ш	[]
	10 ft 100%	INA	NA		Ь	[
				_	Ь	1	
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	15	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

COMING	METHODA	IND EC	XOII IV	/IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	- 00	C Darrer	ORIENTATION : Vertical
WATER	LEVELS: 3.6	35 bgs	on 3/	6/07 START : 2/23/2007 END : 2/2	26/200	7 LOGGER : C. Sump, S. Parks	
≥∩≎	. (6			DISCONTINUITIES	ပ္	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱ႘ᇋ	AUN H A'N H	(%	URE	DEDTIL TYPE OBJECTATION BOUGHNESS	일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	ZE F	R Q D (%)	CT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	JBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COF	RQ	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
					Н	Limestone Fragments	
				_		271.5-277.0' - grayish orange, (10YR	
-				-	Н	7/4), moderate to mild HCl reaction,	=
-				-	ш	limestone fragment size ranges from 1/4"-4", predominately subangular	_
275_					Н	— with some rounded fragments,	
-232.7				_		percentage of limestone fragments	
					Ш	increases with depth	
_				-	Н	-	_
-				-	Ш	-	-
-	277.0			-	Н	277.0-282.0' - grayish orange, (10YR	_
-				-	Ш	- 7/4), moderate to mild HCl reaction,	_
				_	$\vdash\vdash$	graded into fining up sequence	
]				277.0-287.0' - NA	口	2.0'-2-1/2' thick, varies from angular	
				-	Н	to rounded, 1/4"-4", fossiliferous with molds and casts, vuggy	1
-				-	Ш		-
-				-	Н	-	-
280 <u>-</u> -237.7					ш	_	
-231.1				_	Ш	_	
			NA	_	Н	-	
-	R29-SN		14/ (-	1	-	-
-	10 ft	NA		-	ш	282.0-285.7' - very light gray, (N8),	-
-	87%			-	Н	 moderate to mild HCl reaction, some 	_
_				-	H	organic laminations in upper 0.5',	_
					Н	predominately angular to subangular, fossiliferous, 1/4"-1" average size,	
						some fragments up to 2", thin layer of	
				-	Ш	limestone fragments at 285.0',	_
				-	ш	- laminated up to 2"	-
285 <u>-</u> -242.7					Н		
				-	ш	-	_
				_	Н	No Recovery 285.7-287.0'	
			NR		H	-	
1 7	287.0			_	Ш		1
-				-	Ш	Disaggregated Limestone	Note: Using 20.0' core
-				-	$\vdash\vdash$	- 287.0-297.0' - yellowish gray with	barrel to increase sample -
-				287.0-297.0' - NA	H	very pale orange and dark gray mottling, (10YR 8/2 and N3), 1/4"	depth beyond bottom of 6" casing (302.0')
-				201.0-231.0 - NA	ш	- average size	- Guoning (GOZ.O)
				_	Ш	_	
					$\vdash \vdash$		
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PROJECT NUMBER:	BORING NUMBER:			
338884.FL	I-02	SHEET	16 OF 17	,

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/6	6/07 START : 2/23/2007 END : 2/2	26/20	07 LOGGER : C. Sump, S. Parks			
				DISCONTINUITIES		LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ËS	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,		
H BE ACE ATIO	: RUI TH, /	Q D (%)	TUR:	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ ا	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND		
EPT URF LEV	ORE	οD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΒ	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
ООШ	072	ď	ша	THICKNESS, SURFACE STAIRING, AND HOTTINESS	S	CHARACTERISTICS			
-				-	Ħ	 	-		
_	R30-SN			-	Ľ	-	-		
295	15 ft 67%	NA		-	╙	-	_		
-252.7				_					
				-	Ш		_		
				_	<u> </u>				
				_		_	-		
				_	\vdash	No Recovery 297.0-302.0'	_		
				_	H		_		
1 7				297.0-307.0' - NA	片]		
1 7					片]		
			NR		H				
300_			INIX	_			_		
-257.7				_	Ш	_			
				_	Ш	_	_		
_				_	- -	_			
_	302.0			_	-				
_				-	F	Limestone Fragments - 302.0-302.75' - Same as	Note: Using 20.0' 4" cave barrel to sample material		
_				-	Ħ	287.0-297.0'	beyond 6" casing depth (302.0') 1st attempt failed to		
_					Ħ	302.75-305.75' - grayish orange, - (10YR 7/4), moderate to mild HCl			
_				-	世	reaction, limestone, size ranges from 1/4"-2", subangular, crystalline quartz	recover material (fell out during retrieval)		
_			NA	<u>-</u>	₽	grains found throughout column	2nd attempt with flapper bit -		
305_ -262.7							successful although sample is disturbed		
-				-	仜	_	-		
-				-	仜	 305.75-306.5' - very pale orange and dusky blue green, (10YR 8/2 and 	-		
-				-	士	5BG 3/2), very little to reaction with	-		
-				-	\vdash	HCl without scratching the surface, angular to subangular limestone	-		
1 -				-	F	No Recovery 306.5-317.0'	-		
-				307.0-317.0' - NA	Ħ	-	-		
-				-	片	-	-		
-	R31-SN			-	片	-	-		
310	15 ft 30%			-	⊬	-	-		
-267.7	30 /0	30 /8		_	H	_	_		
-				-	口	-	-		
-					口		-		
1 -		│ │ _{NR} │				-	-		
1 1				-	F	-]		
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	17	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	VATER LEVELS: 3.65 bgs on 3/6/07		on 3/6						
300	<u> </u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
315272.7	317.0	28 S	FR PE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	\s\s\s	Bottom of Boring at 317.0 ft bgs on 2/26/2007	Total depth of boring is		



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-03	SHEET	1	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLIN	GIVIETH	OD AND	EQUIPM	ENT: Rotosonic	S/N SR-116, sonic, 8" suna	ace casing, 6" outer casing	g and 4" core b	arrei	ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft bo	gs on 3/2	1/07	START : 3/21/2007	END: 3/23/2007	LOGGER	: C.	Sump, J. Burkard
				STANDARD	SO	IL DESCRIPTION		ģ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
HU		RECOVE	ERY (ft)			CS GROUP SYMBOL, CO TENT, RELATIVE DENSIT		OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FAY A			#TYPE	6"-6"-6"		OIL STRUCTURE, MINER		/MB	INSTRUMENTATION
				(N)				S	
42.1	0.0				Poorly Graded Sand 0.0-3.0' - fine to med	l (SP) ium grained, no HCl rea	action		Start drilling 12:32 Set 8" casing
_					brownish black (5YR	2/1) and organic rich from	om		0-27' below ground surface
						ding to pale brown (5YR (10YR 4/2) between 2.			
					dark yellowish blowi	1 (1011\(\frac{4}{2}\) between 2.	0-3.0		
							_		Water level: 2 ft below ground surface
-							_		-
-		5.4	R1-SN		Clayey Sand (SC)		_		-
-					3.0-6.0' - medium pla	asticity, no HCl reaction, ninated with dark yellow	, tine – ish		-
-						yers and light gray (N7)			-
5							-		-
37.1							_		R1: 2 minutes
-							-		-
_	6.0				Silt With Sand (ML)				-
_					6.0-16.0' - grayish or	ange, (10YR 7/4), mild t	to strong -		-
_						ne to fine sand-sized par iments at 15.8', carbona			-
_					materials	monto at 1010, canbona	-		-
							-		-
_							_		-
_							-		-
_							_		-
10									_
32.1							_		_
		10.0	R2-SN				_		_
		10.0	INZ-OIN				_		
									_
1							_		_
							_	l	_
-							_		-
-							_	l	-
15							_		-
27.1									R2: 10 minutes
1 -	16.0						-		5 bolts sheared off on drill head. Down for
-	10.0				Limestone			Ш	maintance 12:55-15:13 (2:18)
-						e orange, (10YR 8/2), fo ssils exhibit preferential		\vdash	-
-					horizontal orientatior	(bedding plane), few la	arge _	H	-
					¬ molds (3/4"), numero	ous small voids (3/8" to	1-3/16") _/	H	-
1 -						Horizontal partings (1-4 to 2" thick, partings may			-
-					mechanical breaks	, p			-
							_		-
-							-		-
20									



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-03	SHEET	2	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical										
WATER	LEVELS	: 2.0 ft bo	s on 3/21	1/07		C. Sump, J. Burkard				
>				STANDARD	SOIL DESCRIPTION	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY					
H H H		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
FYF.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION				
				(N)						
22.1		8.6	R3-SN		Silty Sand With Limestone Fragments (SM) 17.5-24.6' - very pale orange, (10YR 8/2), fine-coarse sand-sized materials and variable fines content ranging from <5% to >15%. Limestone fragments are similar to limestone above and are subangular to subrounded in shape. Most fragments <0.5" with few large fragments >2" on 2.0-3.0' spacing (thin beds)					
-					No Bosovery 24 6 26 0'	<u>-</u>				
25 17.1					No Recovery 24.6-26.0'	R3: 20 minutes				
''.' -					41	- 173. 20 minutes				
-	26.0				Silty Sand And Limestone Fragments (SM) 26.0-27.2' - Same as 17.5-24.6'	Drill induced breakage -				
30		10.0	R4-SN		Limestone 27.2-28.1' - Same as 26.0-27.2 except thin beds (1-2" thick) with clay/silt interbeds (1-1/2" thick) Silty Sand And Limestone Fragments (SM) 28.1-36.0' - moderate yellowish brown, (10YR 5/4), fine to coarse sand-sized materials, 20-40% fine to coarse gravel-sized limestone fragments, range from 3/4"-1-1/2" with few >2"	R4: 12 minutes				
- - -					See the next sheet for the rock core log	- - - -				
-					-	-				
-					-	-				
40						-				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-03	SHEET	3	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0) ft bgs	s on 3/			D7 LOGGER : C. Sump, J. Burkard	
				DISCONTINUITIES	ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - - 40	36.0			36.0-46.0' - NA		Limestone Fragments 36.0-39.6' - with horizontal partings (2-4" spacing) with clayey silt interbeds/infilling on partings (1/4"-3/4" thick) Silt (ML) 39.6-41.0' - moderate yellow brown,	- - - - -
2.1 45	R5-SN 10 ft 89%	NA	NA	- - - - - - -		- (10YR 5/4), mild to moderate HCl reaction Well Graded Limestone Fragments With Sand 41.0-43.0' - limestone fragments <1". At 41.0' large, irregularly shaped limestone fragment (5") Limestone 43.0-44.9' - Same as 36.0-39.6' except with very thin clayey silt infilling on horizontal parting surfaces (bedding planes)	NA = Not Applicable NR = No Recovery
-2.9	46.0		NR	-		No Recovery 44.9-46.0'	R5: 13 minutes
50 -7.9 -7.9 -7.9 -7.9	R6-SN 10 ft 96%	NA	NA	46.0-56.0' - NA		Limestone And Limestone Fragments 46.0-56.0' - Same as 41.0-44.9' except on 1.5-2.0' spacing with well graded gravel (limestone fragments) with silt and sand (GW-GM) interval in between, very thin clayey silt similar to 41.0-44.9' above	
-12.9	56.0		NR	-		No Recovery 55.6-56.0'	ro. 14 minutes -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-03	SHEET	4	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DISCONTINUITIES DISCONTINU	WATER	LEVELS : 2.0	ft bgs	on 3/	21/07 START : 3/21/2007 END : 3/3	23/200	DOT LOGGER : C. Sump, J. Burkard	
Core not timestone Core no	30₽	(%			DISCONTINUITIES	စ္က	LITHOLOGY	COMMENTS
Core not timestone Core no	DEPTH BELOV SURFACE AN ELEVATION (f	CORE RUN, LENGTH, AND RECOVERY (9	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
Core run times not recorded below R7-SN		R7-SN 10 ft 100%			56.0-66.0' - NA		56.0-58.3' - very pale orange, (10YR 8/2), fossiliferous limestone (molds/casts), voids (1/16"-1/8") over 20-30% of surface, horizontal partings on 2-6" spacing (bedding plane), with 1-2" clayey, silty (low to moderate plasticity) interbeds with gravel-sized limestone fragments <1" Calcareous Silt With Limestone Fragments (ML) 58.3-60.0' Limestone 60.0-61.4'	R7: 38 minutes
		R8-SN 10 ft 85%	NA		66.0-76.0' - NA		- 66.0-68.6' - medium to coarse grained, voids (<1/16") over 80% of surface - Limestone Fragments - 68.6-70.1' - Limestone - 70.1-71.5' - Limestone Fragments - 71.5-72.5' - Disaggregated Limestone - 72.5-74.5' - contains limestone fragments	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-03	SHEET	5	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0) ft bgs	s on 3	21/07 START : 3/21/2007 END : 3/2	23/20	07 LOGGER : C. Sump, J. Burkard	
≥0.0	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - -				76.0-86.0' - NA - - -		Limestone 76.0-79.0' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, discs up to 3" in length with interbeds of silt and gravel-sized fragments with voids over 10% of surface	- - - -
80_ -37.9	R9-SN			- - - -		79.0-81.0' - Same as 76.0-79.0' except limestone fragments with increased fines and interbeds of clay and sand-sized particles	- - - -
- - -	10 ft 100%	NA	NA	- - -		81.0-82.5' - pale yellowish brown, (10YR 6/2), moderate HCl reaction	- - -
- -				- -		82.5-83.7' - gravel-sized limestone fragments with silt size fines]
- 85_ -42.9				- - -		_ 83.7-86.0' - moderate yellowish brown, (10YR 4/2), moderate HCl reaction, 4" limestone fragments with voids over 60-75% of surface, poorly fossiliferous	- - - -
- - -	86.0			86.0-96.0' - NA -		86.0-88.0' - Same as 83.7-86.0' - except 2" fragments	- - -
- - - 90_ -47.9				- - -		Limestone Fragments - 88.0-88.8' - Same as 86.0-88.0' except gravel-sized fragments 88.8-90.3' - Same as 83.7-86.0' except with black organic matter (1-1/2"- 1/2" spacing)	- - - -
-	R10-SN 10 ft 100%		NA	- - - -		Limestone Fragments With Clay And Sand 90.3-92.4' - yellowish gray, (5Y 7/2), strong HCl reaction, fragments are gravel-sized	- - -
-				- - -		Limestone Fragments 92.4-95.0' - very pale orange, (10YR 8/2), strong HCl reaction, limestone disc up to 5" in length with thin clay interbeds, trace voids on surface, apparent non-fossiliferous, rock is dry and powdery	- - - - -
95 <u> </u>	96.0			-		95.0-96.0' - Same as 92.4-95.0' - except with thin beds of dry lean clay	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-03	SHEET	6	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 2.0	ft bgs	s on 3/	21/07 START : 3/21/2007 END : 3/	23/20	D7 LOGGER : C. Sump, J. Burkard	
≥∩≘	_ (6			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R11-SN 10 ft 100%	NA	NA	96.0-106.0' - NA		Disaggregated Limestone 96.0-106.0' - very pale orange, (10YR 8/2), strong HCI reaction, with lean clay interbedding and isolated limestone disc, moderately moist, 20-40% lean clay at 99.0-99.8' and 103.0-106.0'	
-110 -67.9 -115 -72.9	R12-SN 10 ft 100%		NA	106.0-116.0' - NA		106.0-116.0' - very pale orange, (10YR 8/2), strong HCI reaction	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-03	SHEET	7	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 2.0) ft bgs	on 3/	21/07 START : 3/21/2007 END :	3/23/20	07	LOGGER : C. Sump, J. Burkard	
≥∩≘	- (9			DISCONTINUITIES	ပ္ခ		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R13-SN 10 ft 100%		NA	116.0-126.0' - NA		Diss	aggregated Limestone .0-126.0' - Same as 106.0-116.0'	- - - - - - - - - - - - - - - - - - -
	R14-SN 10 ft 85%		NA NR	126.0-136.0' - NA		- (10° interior frage 10° in	.0-134.3' - very pale orange, YR 8/2), strong HCl reaction, rbedded limestone discs and iments, locally moist and dry tions Recovery 134.3-136.0'	
-	136.0				╫			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-03	SHEET	8	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0	ft bgs	s on 3/	21/07 START : 3/21/2007 END : 3/	23/20	D7 LOGGER : C. Sump, J. Burkard	_
≳o.⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R15-SN 10 ft l 93%		NA	136.0-146.0' - NA		Limestone Fragments 136.0-139.4' - yellowish gray, (5Y 7/2), strong HCl reaction, gravel-sized fragments 139.4-142.3' - moderate brown, (10YR 6/2), strong HCl reaction, limestone fragments up to 2" in length with little to no fines, with worm holes that contain pyrite, fine grained, moderately fossiliferous 142.3-143.6' - gravel-sized rock fragments up to 2" in diameter with thin clay coating Limestone 143.6-146.0' - yellowish gray, (5Y	SC-1 collected at 144.2-
-145_ -102.9 -	146.0		NR			 7/2), 13" long with no fines, voids over 50-75% of surface, fine grained, poorly fossiliferous No Recovery 145.3-146.0' 	
-				146.0-156.0' - NA		Limestone Fragments 146.0-148.0' - yellowish gray, (5Y 7/2), strong HCl reaction, fragments are gravel-sized 148.0-149.5' - dusky yellow, (5Y 6/4), strong HCl reaction, fragments are gravel-sized, silica sand present	- - - - -
150 -107.9 - - - - -	R16-SN 10 ft 100%		NA			Limestone 149.5-152.9' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl reaction, limestone core segment with interbedded clay lenses 1/8" to 2" thick, poorly fossiliferous Limestone Fragments 152.9.156.0' dusky yellow (5X.6/4)	
- 155 -112.9 -	156.0					 152.9-156.0' - dusky yellow, (5Y 6/4), strong HCl reaction, fragments are gravel-sized, silica sand present 154.3-156.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction, limestone core segment up to 5" in length with interbedded clay, poorly fossiliferous 	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-03	SHEET	9	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

300					<u> 23/20(</u>	D7 LOGGER: C. Sump, J. Burkard	
	_ @			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
160 -117.9 - - - - - - - - - - - - - - - - - - -	R17-SN 10 ft 100%		NA	156.0-166.0' - NA		Disaggregated Limestone 156.0-163.7' - yellowish gray, (5Y 7/2), strong HCI reaction, contains isolated limestone fragments up to 3" in diameter Limestone 163.7-166.0' - dusky yellow, (5Y 6/4), fine grained, strong HCI reaction, limestone fragments up to 1" in length with interbedded silty sand,	- - - - - - - - - - - - - - - - - - -
170 -127.9 - - - - - - - - - - - - - - - - - - -	R18-SN 10 ft 100%	NA	NA	166.0-176.0' - NA		Limestone Fragments 166.0-168.9' - yellowish gray, (10YR 6/2), fine grained, strong HCl reaction, up to 3" in length with no fines, moderately fossiliferous, voids over 25-50% of surface Disaggregated Limestone 168.9-170.5' - grayish orange, (10YR 7/4), strong HCl reaction Limestone 170.5-172.3' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, with limestone discs up to 4" in length with thin interbeds of clay, voids over 20-40% of surface Disaggregated Limestone 172.3-173.5' - dusky yellow, (5Y 6/4), strong HCl reaction Limestone 173.5-176.0' - Same as 170.5-172.3'	Possible rip-up clast at 168.8'



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	1-03	CHEET	40	ΩE	4.4	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

<u>ا</u> ا	D (%)	RES	DISCONTINUITIES DESCRIPTION	၂ ဗွ	LITHOLOGY	COMMENTS
AECOVERY EX	(%) O	RES	DESCRIPTION			
	a Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
9-SN 0 ft 1		NA	176.0-186.0' - NA		Limestone Fragments 176.0-181.0' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, strong HCl reaction, 4" in length, poorly fossiliferous, voids over 10-20% of surface Disaggregated Limestone 181.0-182.1' - yellowish gray, (5Y 7/2), moderate HCl reaction 182.1-183.6' - moderate yellowish brown, (10YR 5/4), strong HCl reaction	
0-SN 0 ft 1	NA	NA	186.0-196.0' - NA		Limestone 183.6-186.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction, discs up to 3" in length with interbedded clays 1/8" to 1" thick, highly fossiliferous with voids over 30-60% of surface Disaggregated Limestone 186.0-196.0' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, limestone fragments throughout 10' section, 60-80% limestone fragments from 186.0-188.8', decreases with depth to <10% from 192.0-196.0'	
		NA	NA NA	NA NA -	NA NA - T	NA NA



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-03	SHEET	11	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0	ft bgs	s on 3/	21/07 START: 3/21/2007 END: 3	23/20	07 LOGGER : C. Sump, J. Burkard	
≥∩ ∷	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R21-SN 10 ft ¹ 80%		NA	196.0-206.0' - NA		Limestone Fragments 196.0-199.7' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCI reaction, vary from 2"-5" in length and discs 1/8" to 2-1/2" in diameter Disaggregated Limestone 199.7-203.0' - grayish orange, (10YR 7/4), mild to moderate HCI reaction, fragments with voids over 50-70% of surface	
- 205 -162.9 -	206.0		NR	- 206.0-216.0' - NA		Limestone Fragments 203.0-204.0' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, fragments are gravel-sized, up to 1/2" in diameter No Recovery 204.0-206.0' Limestone Fragments	- - - - -
210 -167.9 - - - - - - 215 - -172.9	R22-SN 10 ft 1 100%		NA			- 206.0-207.0' - yellowish gray, (5Y 7/2), very fine to fine grained, mild HCI reaction, poorly fossiliferous - Disaggregated Limestone 207.0-216.0' - yellowish gray, (5Y 7/2), mild to strong HCI reaction, gravel-sized fragments up to 1" in diameter, subrounded to subangular	
	216.0						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-03	SHEET	12	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0	ft bgs	on 3/	21/07 START : 3/21/2007 END : 3/	23/200	7 LOGGER : C. Sump, J. Burkard	
≥0 ::	(9)			DISCONTINUITIES	ပ္	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-177.9 -220 -177.9 - - - - - - - - - - - - - - - - - - -	R23-SN 10 ft 100%		NA	216.0-226.0' - NA		Disaggregated Limestone 216.0-233.0' - yellowish gray, (5Y 7/2), moderate to strong HCI reaction, subangular to angular gravel-sized fragments up to 1" in diameter, limestone fragments up to 3" in diameter at 220.0-220.7', pale greenish yellow (10YR 8/2), fine grained, strong HCI reaction	- - - - - - - - - - - - - - - - - - -
- - - 230 -187.9 - - - - - - 235 -192.9	R24-SN 10 ft 85%		NA NR	226.0-236.0' - NA		Limestone Fragments 233.0-234.5' - moderate yellowish brown, (10YR 5/4), mild to moderate HCI reaction, fragments are gravel-sized No Recovery 234.5-236.0'	- - - - - - - - - - - - - - - - - - -
-	236.0				\prod	-	-



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	I-03	SHEET	13	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0	ft bgs	s on 3/	21/07 START : 3/21/2007 END : 3/2	7 START : 3/21/2007 END : 3/23/2007		
≥∩ ∵	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	D (%)	STUF FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR!	COR	RQ	FRA(PER	PLANARITÝ, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0	_		236.0-246.0' - NA		Limestone Fragments	
-				-	\vdash	 236.0-246.0' - yellowish gray, (5Y 7/2), fine grained, moderate to strong 	-
-				-	Ħ	HCl reaction, fine-grained limestone	-
_				-	Ħ	 fragments, subrounded to subangular gravel-sized fragments 	=
_				-		up to 1" in diameter	_
					H	_	
					H		
240_				<u> </u>	H		
-197.9 -				<u>-</u>	H	_	_
-	R25-SN 10 ft	NA	NA	-	H	-	=
-	100%			-	Ш	_	-
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-				-	団	_	-
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-				-	Ш	-	-
245				-	Н	-	-
-202.9					Н		
	246.0				H	_	
_				246.0-256.0' - NA	H	Disaggregated Limestone - 246.0-254.6' - Same as 236.0-246.0'	_
_				_	Ħ	- Calle 201.0 Calle 40 200.0 210.0	_
_				<u>-</u>	Ħ	_	-
_				-	Ħ	_	_
-				-	H	-	-
-				-	H	-	-
250				-	Ш	_ Limestone Fragments	=
-207.9			NA		Ш	 249.5-254.6' - fine grained, mild HCI reaction, non fossiliferous 	
-	R26-SN			-	\vdash	_	=
_	10 ft 86%	NA		-	Ш	 250.8-254.6' - mild HCl reaction, highly fossiliferous limestone 	_
					Ш	fragments with voids over 60-80% of surface	_
_				_	Ш	_	
-				_	Щ	- -	
-				-	Ш	- -	_
-				<u>-</u>	Ш	-	-
-				-	Ш	N- B 054 0 050 0'	-
255 <u>-</u> 212.9			ND		Ы	No Recovery 254.6-256.0'	_
-	-		NR	-	\Box	-	-
	256.0				Ħ		-
1							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-03	SHEET	14	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0	ft bgs	s on 3/	/21/07 START : 3/21/2007 END : 3	/23/20	07 LOGGER : C. Sump, J. Burkard	
≥ ∩ ⊙	(9)			DISCONTINUITIES	ပ္	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B	RE RI AGTH COVE	Q D (%)	ACTU R FOC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBOL	WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUF	SE SE	R	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
_				256.0-266.0' - NA	Ш	Limestone Fragments - 256.0-266.0' - Same as 249.5-254.6'	
-					世	-	-
-					世	-	-
-					#	-	-
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260				<u>-</u>	H	_	
-217 <u>.9</u>	R27-SN				井	-	-
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265					+	-	-
-222.9				-	Ħ		_
	266.0				蒀		=
	·				1	Bottom of Boring at 266.0 ft bgs on 3/23/2007	
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-04	SHEET	1	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS	: 1.0 ft bo	gs on 3/23	3/07	START : 3/23/2007 END : 3/24/2007 LOGGE	R : /	A. Teal, C. Sump
				STANDARD	SOIL DESCRIPTION	ن ا	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	RECOVE	RY (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SYMBOLICITOR	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEP1 SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	N N	INSTRUMENTATION
41.6	0.0	6.0	R1-SN		Poorly Graded Sand (SP) 0.0-4.0' - moderate yellowish brown, (10YR 5/4), trace fine gravel, fine to medium silica sand to 1/16", trace fines, trace organics, color varies to dark yellowish orange (10YR 6/6) between 1.0-2.0', dusky yellow (5Y 6/4) between 2.0-4.0'	- 100 - 100	
5 36.6 -	6.0				Sandy Lean Clay (CL) 4.0-5.0' - pale olive, (10Y 6/2), moist, soft, low to medium plasticity, slow to rapid dilatancy, no HCl reaction, 30-35% very fine to fine silica sand Silt (ML) 5.0-6.0' - grayish yellow, (5Y 8/4), wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized sand, carbonate materials	-	R1: 3 minutes
- - - - 10					6.0-7.9' - Same as 5.0-6.0' Limestone 7.9-9.9' - dusky yellow, (5Y 6/4), medium grained, mild HCl reaction, very weak (R1), moderately cemented, 60% coverage of small voids		
31.6		10.0	R2-SN		Silt (ML) 9.9-16.0' - Same as 4.0-5.0' except small 1-2" thick sections of limestone	- - - -	
1526.6	16.0				16.0-26.0' - Same as 5.0-6.0' except strong HCl reaction, limestone fragments up to 3" thick, many small fragments from gravel-size up to 3/8"	-	R2: 7 minutes
20							



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-04	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

					STADT : 2/22/2007			1,000	D . A	ORIENTATION : VERICAL
	LEVELS	. 1.0 11 00	gs on 3/23		START : 3/23/2007	END : 3/24 SOIL DESCRIP		LUGGE		. Teal, C. Sump COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPI F	INTERVA	AL (ft)	STANDARD PENETRATION TEST RESULTS					SYMBOLIC LOG	
SELC ON SELC	O WIII EE	RECOVE		TEST RESULTS	SOIL NAME	E, USCS GROUP	SYMBOL, COLO	R,		DEPTH OF CASING, DRILLING RATE,
TH I		I NEOOVE	#TYPE	6"-6"-6"		CONTENT, RELACY, SOIL STRUCT			ABO ABO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUF			#IYPE	(N)	OONOICTEN	51, 0012 011 .0 01	orte, mirter orte	001	S	interregional visit in the state of the stat
21.6									Ш	
		40.0	DO ON						111	
		10.0	R3-SN						111	
									111	
									111	
									111	
									111	
]	
25								_		_
16.6									111	R3: 9 minutes
_	26.0								111	
_					Silt With Sand 26 0-36 0' - Sar	And Limestone me as 16.0-26.0'	Fragments (ML except strong F	L) HCI	411	
_					reaction, limest	one fragments up	o to 2". 20% vei	rv fine	411	
_					to fine sand-siz	ed fragments, las ve gray (5Y 5/2)	st 3" slightly dar	rker in	411	
_						3 3 7 (3 3 7			411	
_									411	
_									$\parallel \parallel$	
_									$\parallel \parallel$	
30								_	411	_
11.6									$\parallel \parallel$	
_		10.0	R4-SN						$\parallel \parallel$	
_									$\parallel \parallel$	
-									$\parallel \parallel$	
_									$\parallel \parallel$	
-									-	
-									$\parallel \parallel$	
-									$\parallel \parallel$	
									$\parallel \parallel$	
35 6.6								_	-	R4: 12 minutes
-										
-	36.0				Limestone				╂╫	<u></u>
-					36.0-44.7' - ligh	t olive gray, (5Y HCl reaction, me	5/2), fine to me	dium	F	-
-					(R3 to R4), stro	ingly cemented, 8	30-90% coverac	strong ge of	卡	<u></u>
-					small voids, fev	v cavities up to 1/	4" in size	-	世	-
-									\forall	
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40									口	-
40								-	+	-



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	1-04	CHEET	3 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEVELS: 1.0 ft bgs on 3/23/07 START: 3/23/2007 END: 3/24/2007 LOGGER: A. Teal, C. Sump										
\				STANDARD	SOIL DESCRIPTION	₀	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND			
DEPT SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYME	INSTRUMENTATION			
1.6		10.0	R5-SN		Sandy Lean Clay (CL) 44.7-46.0' - moderate olive brown, (5Y 4/4), moist, low to moderate plasticity, strong HCl reaction, 30-40%					
	46.0	9.5	R6-SN		sand-sized sand, carbonate materials Silt (ML) 46.0-47.6' - light olive gray, (5Y 5/2), nonplastic to low plasticity, moderate to strong HCl reaction, fine to medium sand-sized particles, carbonate materials Limestone 47.6-55.5' - Same as 36.0-46.0' except many zones where rock fragments from fine to medium sand-sized up to cobble sized fragments, possibly from drilling					
55_ -13.4							R6: 9 minutes			
- - - - - - 60					Begin Rock Coring at 56.0 ft bgs See the next sheet for the rock core log		- - - - -			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-04	SHEET	4	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 3/	23/07 START : 3/23/2007 END : 3/2	24/200	7 LOGGER: A. Teal, C. Sump	
≥o.⊋	(%			DISCONTINUITIES	ე <u> </u>	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - 60 -18.4	87-SN 10 ft 55%	NA	NA	56.0-66.0' - NA		Limestone 56.0-57.4' - Same as 36.0-46.0' except silt to very fine to fine sand-sized fragments of limestone, possibly from drilling 57.4-58.7' - Same as 56.0-57.4' 59.9-60.7' - Same as 56.0-57.4'	Poor recovery due to core rods becoming stuck in hole. Driller asked if he could over drill with outer casing to recover bit in order to prevent future problems later that have come as a byproduct of overstressing these borings to "un-stick" steel. NA = Not Applicable
65 -23.4	66.0		NR	- - - - -		No Recovery 61.5-66.0'	NR = No Recovery
	R8-SN 10 ft 76%	NA	NA	66.0-76.0' - NA		Limestone - 66.0-76.0' - Same as 36.0-46.0' except strong HCl reaction, medium strong to strong (R3 to R4), 90-95% coverage small voids, many cavities up to 1/4", several silt zones in section - No Recovery 73.6-76.0'	Silt zones explain poor recovery -
75_ -33.4 	76.0		NR	-			R8: 21 minutes



PROJECT NUMBER:	BORING NUMBER:		
338884.FL	I-04	SHEET	5 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 1.0	ft bgs	on 3/	23/07 START : 3/23/2007 END : 3/	24/200	7 LOGGER : A. Teal, C. Sump	
30₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
80 -38.4 - - - - - - - - - - - - -	R9-SN 10 ft 93%	NA	NA	76.0-86.0' - NA		Limestone 76.0-86.0' - Same as 36.0-46.0' except at 76.0-77.0' dark gray solution features, very fine micro-sized grains, many cavities up to 1/4" 77.0-86.0' - several silt zones, possibly due to drilling	The limestone matrix (olive gray limestone) has strong HCI reaction, while dark gray features have mild HCI reaction
	86.0		NR		H	_	
- - - - 90 -48.4	R10-SN 10 ft 100%		NA	86.0-96.0' - NA		Limestone 80.0-91.7' - Same as 36.0-46.0' except yellowish gray, (5Y 7/2), 60-70% coverage of small voids	- - - - - - - - -
95 -53.4	96.0			- - - -		91.7-92.0' - greenish black, (5GY 2/1), very stiff, low plasticity, micro stress features (folding) bedding features	R10: 15 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l-04	SHEET	6	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 3/	23/07 START : 3/23/2007 END : 3/	24/200)7 LOGGER : A. Teal, C. Sump	
30€	(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R11-SN 10 ft		NA	96.0-106.0' - NA		Limestone 96.0-106.0' - Same as 36.0-46.0'	- - - - - -
	50%	INA	NR			No Recovery 101.0-106.0'	R11: 27 minutes
-110 -68.4 	R12-SN 10 ft 100%		NA	106.0-116.0' - NA		Disaggregated Weak Limestone 106.0-116.0' - very pale orange, (10YR 8/2), strong HCI reaction, gravel-sized clasts of more indurated fine grained material, thin (<1/32") calcite fracture coating observed on one indurated fragment, fossil molds visible on few indurated fragments; 115.5-116.0' - weak (R2), roughly horizontal parting surfaces (2-3" apart), rough and undulating	Logger changes to C. Sump at 106.0' until end of log Driller's Remark: maintaining drilling fluid circulation at 106.0-112.0' Weak limestone completely disaggregated by drilling method Run time: N/A, core at end of previous shift retrieved at start of this shift (3/24/07)



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-04	SHEET	7	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DISCONTINUITIES DISCRIPTION PROCEEDINGS DISCRIPTIO	WATER	LEVELS : 1.0	ft bg	s on 3/	/23/07 START: 3/23/2007 END: 3/3	24/200	07 LOGGER : A. Teal, C. Sump	
Limestone Fragments 116.0-126.0' - NA	30₽	(%			DISCONTINUITIES	စ္က	LITHOLOGY	COMMENTS
Limestone Fragments 116.0-126.0' - NA	DEPTH BELO' SURFACE AN ELEVATION (f	CORE RUN, LENGTH, ANC RECOVERY ([©]	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
126.0 126.0 126.0-136.0' - NA	- - - - - 120	R13-SN 10 ft			116.0-126.0' - NA		116.0-124.5' - very pale orange, (10YR 8/2), strong HCI reaction, fragments very weak and friable, range in size from fine gravel to 3.0" lenticular disc-shaped fragments (1-2" thickness), large fragments may be indicative of thin more competent limestone beds with weaker interbeds that disintegrate	
Limestone Fragments 126.0-133.9' - very pale orange to yellowish gray, (10YR 8/2 to 5Y 7/2), very strong HCl reaction, >15% gravel-sized limestone fragments, limestone fragments 1" or less in silty zone increasing to 2.5" in the lower half of run, silt-size particles grading with depth into sand-sized fragments NA R14-SN 10 ft 79% NA NR NR R14: 20 minutes	125_ -83.4 -	126.0		NR	<u>-</u>		-	lost over length of run
-93.4 R14: 20 minutes		10 ft		NA	126.0-136.0' - NA		Limestone Fragments 126.0-133.9' - very pale orange to yellowish gray, (10YR 8/2 to 5Y 7/2), very strong HCl reaction, >15% gravel-sized limestone fragments, limestone fragments 1" or less in silty zone increasing to 2.5" in the lower half of run, silt-size particles grading with depth into sand-sized fragments	- - - - - - - - - - - - - - - - - - -
	135_ -93.4 -	136.0		NR	- - -		- -	R14: 20 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-04	SHEET	8	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 1.0) ft bgs	s on 3/	/23/07 START : 3/23/2007 END : 3/2	24/20	D7 LOGGER : A. Teal, C. Sump	
>00	(0			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - -						Disaggregated Limestone With Limestone Fragments 136.0-140.0' - very pale orange, (10YR 8/2), strong HCI reaction, gravel-sized (<1.0" diameter) fragments similar to 126.0-136.0, horizontal partings range from 0.75-3.0" with little to no fine grained infill material	- - - - - -
140 -98.4 - - - - - -	R15-SN 10 ft 87%		NA	- - - - - - - -		Limestone And Limestone Fragments 140.0-142.5' - very pale orange, (10YR 8/2), strong HCI reaction, medium strong (R3), fossiliferous limestone with molds and casts, fine grained with irregular zones of small voids (<1/32-1/8") covering 25-30% of surface, large brachiopod molds and casts up to 0.75" diameter, surfaces of molds and casts have fine crystalline appearance indicating partial recrystallization, fine grain pyrite crystals on the interior of some	
145_ -103.4 -	146.0		NR	 -		molds; horizontal partings range from 0.75-30" with little or no fragment infill material Limestone	R15: 24 minutes Driller's Remark: Lost
-108.4 -108.4 	R16-SN 10 ft 75%		NA			142.5-143.5' - medium yellow brown, (10YR 5/4), medium HCl reaction 143.5-144.7' - yellowish gray, (5Y 7/2), strong (R4), fine grained limestone with thin (1/64-1/32") pale yellowish brown laminations on variable spacing (1/32-1/8"), dense, partial recrystallization, moderate HCl reaction at grain boundaries and when scratched, possible very fine silica sand (<10%), 15-30" horizontal partings (bedding plane) with medium indurated light olive gray (5Y 5/2) interbeds 0.75-1.0" thick No Recovery 144.7-146.0' Limestone Fragments 146.0-147.8' - very strong HCl reaction, weak (R2), partially friable by hand, fragments 1-2" diameter and <1/2" thick (lenticular), likely representing thinly bedded material	circulation (driving 6" casing) at approximately 141' Trace very fine silica sand grains (<5%)
155_ -113.4 -	156.0		NR			- - - -	R16: 22 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-04	SHEET	9	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 1.0) ft bgs	on 3/	23/07 START : 3/23/2007 END : 3/2	24/20	D7 LOGGER : A. Teal, C. Sump	
>00	(9			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 160 -118.4 -	R17-SN 10 ft 87%		NA	- 156.0-166.0' - NA - - - - -		Limestone 147.8-150.5' - pale yellowish brown, (10YR 6/2), strong HCI reaction, medium strong to strong (R3 to R4), dense, poorly fossiliferous with few small voids (1/32-1/8") on <5% of surface, light gray (N7) clayey silt interbed at 148.2' (2" thick) with thin coatings on partings below, slight recrystallization evident on fresh surfaces 150.5-151.5' - moderate yellowish brown, (10YR 5/4), mild to moderate HCI reaction, friable thinly bedded (<1/2") limestone fragments with sandy fines, trace silica sand grains (<5%)	Driller's Remark: Sample fell out of core barrel during retrieval. Used 20' core barrel to recover this interval plus following run (166.0-176.0'). Sample is disturbed, upward fining sequence from 156.0-161.0' may be the result of losing the sample on first attempt.
- - - 165_ -123.4	166.0		NR	- - - - - -		151.5-153.5' - Same as 150.5-151.5' except moderate yellowish brown, sandy silt at bottom No Recovery 153.5-156.0' Disaggregated Limestone With Limestone Fragments 156.0-161.6' - with few subangular to subrounded limestone fragments at top of run grading with depth to Poorly Graded Gravel with Sand (GP), sand-sized and gravel-sized fragments are all carbonate derived and likely segregated during drilling	Up to 10% silica sand grains With up to 10% fine silica sand grains
	R18-SN 10 ft 89%		NA	166.0-176.0' - NA		brown, (10YR 5/4), strong HCl reaction Limestone 161.8-164.7' - moderate yellow brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moderate to strong particularly at grain boundaries HCl reaction, argillaceous, horizontal partings, 1-6" spacing with light gray sandy silt interbeds/coating (light gray, N7) No Recovery 164.7-166.0' Limestone 166.0-168.5' - light olive gray, (5Y 5/2), moderate especially grain boundaries HCl reaction, poorly to moderately indurated argillaceous fine grained limestone, finely laminated, with very thin (1/16-1/8") very pale orange (10YR 8/2) laminations, 1/8"-3/8" spacing, more indurated zones exhibit well developed bedding plane partings, less indurated zones are soft and friable and exhibit contorted lamination surfaces, pale orange greater than olive gray	166.0-176.0' interval not disturbed -
-133.4 -	176.0		NR			greater trian onve gray _	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-04	SHEET	10	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 1.0) ft bgs	on 3/	23/07 START : 3/23/2007 END : 3/	24/200)7 LOGGER : A. Teal, C. Sump	
₹ Ω <i>⊊</i>	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-138.4 	R19-SN 10 ft 84%		NA	176.0-186.0' - NA		Limestone 168.5-171.0' - yellowish gray, (5Y 7/2), medium strong (R3), poorly fossiliferous with small voids (1/16-1/8") over <10% of surface, horizontal partings 1-4" spacing, light gray (N7) clayey silt with gravel-sized limestone fragments Limestone Fragments 171.0-174.9' - Same as 168.5-171.0' except with more fragmentation and disaggregation (down to silt and clay-sized particles) possibly due to drilling, full core-sized limestone fragment at end of run No Recovery 174.9-176.0' Limestone Fragments 176.0-178.6' - moderate yellow brown, (10YR 8/9), fine grained, argillaceous, with fine gravel-sized small fragments, fragments exhibit well defined bedding plane fractures (1/4" bedding) Disaggregated Limestone With Limestone Fragments 178.6-178.9' - moderate yellow	- 10% silica fine sand
185 -143.4 -	186.0		NR	<u>-</u>		brown, (10YR 8/9), medium to coarse grained, moderate HCl reaction Limestone	R19: 33 minutes
	R20-SN 10 ft 93%		NA	186.0-196.0' - NA		178.9-182.0' - grayish orange, (10YR 7/4), 20-30% small voids (1/16-1/8") in discreet zones, few larger solution cavities (possible fossil molds) 1"x1" Disaggregated Limestone With Limestone Fragments 182.0-183.5' - Same as 178.9-182.0 except moderate yellow brown, (10YR 8/9), 4" layer argillaceous, limestone fragments are gravel-sized Limestone 183.5-184.4' - Same as 178.9-182.0' except increasing fossil content with depth, large (up to 1.0") brachiopod and gastropod molds and casts No Recovery 184.4-186.0'	R20: 23 minutes
	196.0		NR		団	_	-
							l



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-04	SHEET	11	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CONING				IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and			
WATER	LEVELS : 1.0) ft bgs	s on 3	23/07 START: 3/23/2007 END: 3/2	24/2007	LOGGER : A. Teal, C. Sump	
300	· ·			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BH	N A A	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
HA WAT	GTR	6) a	FJ F	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
P.R.E.	E C C C	R Q D (%)	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	∑	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	Olk	<u>~</u>	ΗД	THISTATEOU, COTA TOE OTTAINING, THE HOTTINESS	S		
					Ш	Limestone And Limestone	
_				-	HT	Fragments 186.0-195.3' - grayish orange, (10YR	<u> </u>
-				196.0-206.0' - NA	□	7/9), limestone with variable	-
_				190.0-200.0 - NA	₽	percentage of small voids	-
					Н	(1/16-1/8"), larger cavities and fossil	
				-	口	molds up to 1.0" in diameter (few),	<u> </u>
-				-	₩	length of full core diameter limestone	-
_				-	┢	fragments range from 1-2" with few fragments >3.0", parting surfaces are	-
						rough and irregular, zones of smaller	_
200					Н	fragments contain fine grained	
-158.4					tt	limestone with little or no	
-	R21-SN		NA	-	口	fossils/small voids, smaller	-
-	10 ft			-	₽	fragments tend to be more angular	_
	92%					and exhibit well define bedding planes approximately 1/2"-3/4" thick,	
				_	Ш	sand-sized and gravel-sized	
-				-	╁	limestone fragments at end of run	-
-				-	╓	193.8-195.3'	-
				_	\mathbb{H}	No Recovery 195.3-196.0'	_
					H	Limestone Fragments 196.0-199.0' - fine grained, mild to	
-				-		moderate HCl reaction, medium	-
-				-	╁┼	strong (R3), 90% fragments are >1"	-
_				_	┞┼┼	diameter, angular and lack well	_
205						developed bedding plane surfaces	
-163.4					ΗГ	rough, irregular fracture surfaces), tends to be more equidimensional	R21: 22 minutes
-			NR	-	廿	than fine grained limestone	-
-	206.0			-	₽	fragments noted earlier, trace	-
_				_	╀	silt-sized particles	_
						199.0-201.0' - well graded upward	
				206.0-216.0' - NA	Ш	fining sequence of fine grained limestone fragments beginning with	_
-				-	++	coarse sand-sized and ending with	-
_				-	ㅁ	fragments >1" similar to above	-
					Щ	201.0-204.2' - fragments are	_
						gravel-sized, and are less angular,	
]				-	ㅁ	contain small voids (1/16"-1/8") over 10-20% of surface, and are more	-
-				-	╁┼┼	fossiliferous than fragments above	-
210_				_	╓	Disaggregated Limestone	l
-168.4					Н	204.2-205.2' - moderate yellow	
1 7	R22-SN			_	${m H}$	brown, (10YR 7/4), strong HCI	l
_	10 ft	NA	NA	-	団	reaction, "punky texture", weakly indurated, somewhat	-
-	100%			-	╁	mottled/remnant laminations	-
				_	┞┼┼	No Recovery 205.2-206.0'	_
						Disaggregated Limestone With	
-				-	┞┼┞	Limestone Fragments	-
-				-	世十	206.0-216.0' - moderate HCl	-
-				-	₽	reaction, all material carbonate derived, limestone fragments are	-
					H	gravel-sized, large (>3.0") limestone	
]				_	丗	fragments at 208.2-209.3', 6" slightly	1
045				-	口	indurated silt bed at 212.0', finely	-
215 <u> </u>					╁┼┼	_ laminated more indurated layers in	
-173.4				_	ᆣ	center of bed (<3/4" thick)	_
	216.0				Щ		
				-	t t		1



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-04	SHEET	12	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING	IVIE I HOD AI	ND E	עורוע	/IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	4 CON	e natiei	ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bgs	on 3/	/23/07 START : 3/23/2007 END : 3/	24/200	7 LOGGER : A. Teal, C. Sump	
>				DISCONTINUITIES	_თ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	, ND √ (%) √ (%)		SII	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OIZE AND DEDTIL OF CAST
ᆱᇬ	RUN H, A	(%)	FRACTURES PER FOOT	DEDTH TYPE OPIENTATION POLICINESS	[일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
RFA WA:	RE NGT COV	R Q D (%)	ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
님ゔ님	CORE RUN, LENGTH, AND RECOVERY (%)	RG	PE.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
					Ш	Disaggregated Limestone With	
-				-	╁	Limestone Fragments 216.0-226.0' - mild HCl reaction,	-
-				216.0-226.0' - NA	口	grading to Silty Sand with Gravel	-
-					╁┼┼	(SP-SM) in places, similar to above	-
_					₩	(206.0-216.0') except greater silt and sand-sized particles and limestone	-
_					ᇤ	fragments are smaller (<1") and	
_					╁┼┼	weaker (very friable)	_
_				_	П	216.6-217.0' moderately indurated	_
220					oxdot	silt-sized, light gray (N7) bed, friable	
-178.4				_	Щ		
-	R23-SN		NA		団		
-	10 ft 94%	NA			H		
_	0.73				口		
-					ᡛ╂		-
-				-	田		-
-				-	団		-
_					╁┼┼		-
_				-	H		-
_					버		
225_				_	Щ	_	
-183 <u>.4</u> -					Ш	No December 225 4 220 0	R23: 24 minutes
_	226.0		NR		Н	No Recovery 225.4-226.0'	
					H	Disaggregated Limestone With Limestone Fragments	
_					Ш	226.0-236.0' - Same as 216.0-226.0'	
_				226.0-236.0' - NA	НГ	except no semi indurated silt bed,	
_				-	ш	slight increase in overall fine to medium sand-sized material	-
_				-	╁┼	(carbonate derived), few zones with	-
-				-	口	very thin (<3/4") gravel-sized angular fragments of limestone (or indurated	
-					丗	calcareous silt-sized material)	
					╀┼┼	,	
230_ -188.4				_	口	_	-
-100.4	D04.0N				╁┼		
_	R24-SN 10 ft		NA		口		
_	100%	,	, .	_	凵		
_					Ш		
					Щ		
_					Ш		
_					H		
_					丗		
-					┼┼		
					団		
235 <u> </u>				_	╁┼	_	R24: 36 minutes —
					\Box		
	236.0	1			\mathbf{H}		1
	200.0						
	250.0				П		



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	I-04	SHEET	13 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

,				IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	4 0010	5 5411-01	ORIENTATION: Vertical
WATER I	LEVELS : 1.0	ft bgs	on 3		24/2007	7 LOGGER : A. Teal, C. Sump	
≥0≥	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A B B B B B B B B B B B B B B B B B B	S.F.R	(%)	TUR 00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF 등	SING	R Q D (%)	SAC ER F	PLANARITY, INFILLING MATERIAL AND	/MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	222	ď	# #	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ဖ်	CHARACTERISTICS	
					Н	Disaggregated Limestone With Limestone Fragments	_
					Ш	236.0-246.0' - Same as 226.0-236.0'	
				236.0-246.0' - NA	Ш	except weakly consolidated silt-sized	
					Н	material with little gravel-sized limestone fragments from	_
1 1					口	236.0-237.5', otherwise very similar	-
-				•	╁┼	to above	-
-					田		-
]					団		_
240 -198.4				-	╁┼	_	_
-	R25-SN				冄		-
-	10 ft		NA		丗		-
-	100%				₩		_
					口		-
					坩		_
4					F		_
				_	耳		_
					Н		_
					Щ		_
245					Ш		
-203.4				_	Н	_	R25: 27 minutes
1 7	246.0				H		_
l					Ħ	246.0-256.0' - mild to moderate HCI	_
1 1					╁┼	reaction, slightly more indurated silt-sized material forming larger	-
				246.0-256.0' - NA	Ш	clasts, finely laminated very weakly	-
-					世	indurated 6" thick silt zones at 248.5, 249.2', 251.8' and 254.0' (repeating	-
-					╁	sequence), may be argillaceous	-
-					冄		-
-					丗		-
					╁┼┼		-
250							•
-208 4				_	┅	_	_
-208.4	Doe ON					_	
-208.4 -	R26-SN 10 ft		NA			_	 - -
-208.4 - - -			NA			_	- - - -
-208.4 - - - -	10 ft		NA	- - -		_	 - - -
-208.4 - - - -	10 ft		NA			_	 - - - -
-208.4 - - - - -	10 ft		NA	- - - -		_	
-208.4 	10 ft		NA				 - - - - - -
-208.4	10 ft		NA				 - - - - - -
-208.4 	10 ft		NA				
-208.4 - - - - - - -	10 ft		NA				
-208.4 	10 ft		NA				
-208.4 - - - - - - 255 -213.4	10 ft 100%		NA				R26: 31 minutes
-208.4 - - - - - - 255 -213.4	10 ft		NA				R26: 31 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-04	SHEET	14	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

,				/IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and		ore barrer	ORIENTATION : Vertical
WATER	LEVELS : 1.0	ft bgs	s on 3		4/20	07 LOGGER : A. Teal, C. Sump	
≥ ∩ ∵	_ ;;			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACINO
불병은	RUH AH, A	(%)	URI JOC	DEDTH TYPE ODIENTATION DOLLCHNESS	딝	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F ₹ ¥	AGT CO	R Q D (%)	ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
E SE	SHR	R	FR. PE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
						Disaggregated Limestone With	No silica sand grains
-				-	Н	 Limestone Fragments 	visible (too fine grained)
1 -				256.0-266.0' - NA		256.0-266.0' - Same as 246.0-256.0' except lack of distinct laminated beds	=
1 4				250.0-200.0 - NA	Ш	of silt-sized material, silty sand-sized,	_
				_		with gravel-sized limestone	
					Н	fragments (weak, friable), all carbonate derived	
						- Carbonate derived	
				-	ш	-	_
260				-		-	_
-218.4					Н	-	
	D07 CN			-		-	_
	R27-SN 10 ft		NA	-	Н	-	_
	100%			_	Ш		
					Н		
1							
1 1				-	H	-	_
-				-		-	-
1 -				-	Н	-	-
1 -				-		-	_
				_	Н	_	_
265_					Щ		
-223.4							R27: 37 minutes
1 7	266.0				\vdash		
1 7						Bottom of Boring at 266.0 ft bgs on	
1 1				-	i	- 3/24/2007	_
1 -				-	l	-	-
1 -				-		-	_
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PROJECT NUMBER:	BORING NUMBER:		
338884 FI	I-05	CHEET	1 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLIN	DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical									
WATER	LEVELS	: 4.41 bg	s on 3/6/0)7 5	TART : 2/9/2007 END : 2/12/2007 LOGGER :	: M.	Faurote, J. Burkard			
> 0 0				STANDARD	SOIL DESCRIPTION	စ္ခ	COMMENTS			
ANE ANE	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCS CROUD SYMBOL COLOR	ССС	DEDTILOF CASING DOULING DATE			
H BE ACE ATIC		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	30	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND			
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION			
42.2	0.0			(**)	Poorly Graded Sand (SP) 0.0-5.0' - brownish gray, (5YR 4/1), moist, very fine grained, no HCl reaction, angular to subrounded, weakly to moderately iron oxide stained, black organic blebs, limited bedding, silica sand 1.0-1.5' - brownish black to moderate brown, (5YR 2/1		"Water level is based on Ground Water Monitoring at LNP site (FSAR Table - 2.4.12.08)"			
- - -		6.0	R1-SN		to 5YR 3/4) 1.5-5.0' - light brown to dark yellowish orange, (5YR - 5/6 to 10YR 6/6)		Water levels were not recorded for I-05			
5							Coring run times were not recorded for I-05			
37.2 - -	6.0				Well Graded Sand With Silt And Limestone Fragments (SW-SM) 5.0-6.0' - pale green, (10G 6/2), no to mild HCl		Drilled extremely fast, sands are loose and friable with enough silt to be cohesive			
		10.0	R2-SN		reaction, 10-15% fines and 20% rock fragments (very hard, with shell fragments) Poorly Graded Sand With Silt (SP-SM) 6.0-7.3' - dark yellowish orange, (10YR 6/6), very fine grained, no to mild HCI reaction, 12-15% nonplastic fines, iron oxide staining, silica sand Clayey Sand (SC) 7.3-8.1' - dark yellowish orange to light brown, (10YR 6/6 to 5YR 5/6), very fine to fine grained, no HCI reaction, 15% medium plastic fines, silica sand, iron stained Sandy Silt (ML) 8.1-13.0' - grayish orange, (10YR 7/4), loose, nonplastic, no dilatancy, mild HCI reaction, with very fine to fine grained sand-sized particles, carbonate materials Sandy Silt And Limestone Fragments (ML) 13.0-19.0' - grayish orange, (10YR 7/4), low plasticity, mild to moderate HCI reaction, with fine to coarse sand-sized particles and rock fragments (1/4" to 1/2", friable, fossiliferous, no HCI reaction), all carbonate material		These fine grained materials may be the friable limestone destroyed via sonic drilling methods			
	16.0				Silt (ML) 19.0-20.0' - grayish orange, (10YR 7/4), low plasticity, mild to moderate HCl reaction, carbonate material		- - - - - - - -			
					mile to moderate membership, carbonate material	щ				



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-05	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLIN	G METH	OD AND	EQUIPM	ENT : Rotosonic S	S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION: Vertical
WATER	LEVELS	: 4.41 bg	s on 3/6/0)7 S	START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	AL (ft)	PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
O HE A		RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, 모 DEPTH OF CASING, DRILLING RATE,
AHSH		RECOVE	=ΚΥ (π)		MOISTURE CONTENT, RELATIVE DENSITY OR OF DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
22.2				(N)	
					Silty Sand With Limestone Fragments (SM) 20.0-21.3' - dusky yellow, (5Y 6/4), limestone
l _		10.0	R3-SN		fragments are friable, 1/4" to 2" in size, fossiliferous
		10.0	113-314		(casts/molds), some shell "hash", all carbonate
-					\material Sandy Silt (ML)
-					21.3-24.8' - dusky yellow, (5Y 6/4), nonplastic to low
-					plasticity, mild to moderate HCl reaction, carbonate -
-					material
l _					I
					1
25					
25 17.2					Silty Sand With Limestone Fragments (SM) — Forams, gastropods, possible bryozoans —
-					24.8-31.2' - grayish orange, (10YR 7/4), fine to coarse grained, moderate HCl reaction, with nonplastic to low
-	26.0				plasticity fines and fine to coarse gravel-sized (1/4 to 🔠 📗 📗
I _					1/2") limestone (fossiliferous [molds/casts], friable), all □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
					carbonate materials, iron oxide staining at 27.0'
-					1 Third
-					1 THE
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l _					1
					1 HH
30					1 71/01
12.2					1 - 1111
-					1
-		10.0	R4-SN		<u> </u>
-					Limestone Interfragmental filling of fat clay, clay and
_					31.2-34.0' - greenish gray, (5GY 6/1), very fine to fine grained, mild HCl reaction, fragmented (up to 2" size), gravel-sized fragments; the fines have
					fragments separated by fat clay with sand (pale graver-sized fragments reaction to HCl, limited plasticity
					yellowish brown [10YR 6/2]), limestone fragments
-					have abundant fossil casts, sparse organic fragments
-					and cast linings, HCl reaction occurs mostly at void linings and healed fractures
-					Silt With Sand (ML)
-					34.0-36.0' - pale yellowish brown, (10YR 6/2),
35					nonplastic, moderate HCl reaction, with very fine
7.2					grained sand-size particles, all carbonate materials
	36.0				1
_	30.0				Fat Clay With Sand (CH) Silica grains (very fine) to silt-sized in very
-					36.0-37.6' - grayish brown, (5YR 3/2), high plasticity, — thin pseudobeds may exhibit microstructures
-					no HCl reaction, with very fine to fine grained silica of deformation and bedding sand, organic rich
-					<u></u>
					Silty Sand To Sandy Silt (SM)
I -					37.6-47.8' - pale yellowish brown, (10YR 6/2), trace fine gravel-sized fragments of fossiliferous limestone,
-					with grayish brown (5YR 3/2) stringers of clay
-					(medium plastic, trace sand-sized grains) at
-					46.7-47.5', all carbonate materials
40					<u> </u>
I	l		1		1



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-05	SHEET	3	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT: Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION: Vertical

WATER	LEVELS	: 4.41 bg	s on 3/6/0)7 5	START : 2/9/2007	END : 2/12/20	007 L	OGGER	: M.	Faurote, J. Burkard
>00				STANDARD		SOIL DESCRIPTION	DN		၅	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION TEST RESULTS	SOIL NAM	ME LISCS CROUR SV	MBOL COLOR		SYMBOLIC LOG	DEDTH OF CASING DRILLING BATE
H BE ACE ATIC		RECOVE	RY (ft)		MOISTURE	ME, USCS GROUP SY E CONTENT, RELATIV	/E DENSITY OR	₹	30LI	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT URF LEV,			#TYPE	6"-6"-6" (N)	CONSISTEN	ICY, SOIL STRUCTUF	RE, MINERALOG	SY	3YME	INSTRUMENTATION
<u> 2.2</u>				(14)				<u> </u>	TIT	
-								-		-
-		10.0	R5-SN							-
-								-1		-
-								-	Ш	-
-								-		-
-								1		-
								1		_
_								1		_
45								1		_
-2.8										
	46.0]		_
l _									Ш	_
_								_		Grayish brown clay (5YR 3/2) as stringers,
_								_		tacky, soft and contains minor sand size grains
-					Sandy Silt Wit	th Limestone Fragm	nents (ML)		Ш	-
_					47.8-56.0' - pa	lle yellowish brown, (oderate HCl reaction,	5YR 3/2), mois	t, -		-
-					fine sand-sized	d particles and 20-35	5% fine to coars	se -		-
					gravel-sized lir limestone frag	mestone fragments, ments increases with	percentage of n depth, all	-		-
50 -7.8					carbonate mat	terials		-		Brown clay seams
-								-		-
-		10.0	R6-SN					-		-
-								1		-
-								-		Clay seams
-								1		Gravel-sized fragments increase in percentage to end of run
-								1		percentage to end of run -
1 -								1		
]		
55										
-12.8										_
-					Danie D. L.C.				Ш	
-					See the next s	oring at 56.0 ft bgs sheet for the rock cor	e log	4		-
-							-	-		-
-								-		_
-								-		-
-										-
-								-		-
60										-
60_										



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	4	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEVELS: 4.4	1 bgs o	on 3/6	/07 START : 2/9/2007 END : 2/1	2/200	7 LOGGER : M. Faurote, J. Burkard	
\$Q\$ 08			DISCONTINUITIES	ပ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
56.0 		NA	56.0-66.0' - NA		Limestone Fragments 56.0-57.5' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate HCl reaction, fragments from 1/2" to 1" in length, fossil casts and tiny voids over 100% of the surface Disaggregated Limestone With Limestone Fragments 57.5-62.5' - dusky yellow, (5Y 6/4), moderate HCl reaction, sparse limestone fragments to 4" Limestone 62.5-66.0' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate HCl reaction, medium strong (R3), limestone fragments from 1/2" to 8" with fossil casts and small (<1/16" voids over 100% surface, interbedded with clay	Rock may have been fragmented due to the drilling process Limestone fragments 58.5-59.3', 61.7-62.0' NA = Not Applicable NR = No Recovery
70 -27.8 - R8-SN 10 ft 100%	NA	NA	66.0-76.0' - NA		66.0-70.0' - moderate olive brown, (5Y 4/4), fine grained, strong HCI reaction, medium strong to strong (R3 to R4), fragmented, with fragments from 4" to 6", fossiliferous with voids (<1/16") covering 85% of surface, intermittent sections of clay, silt, gravelly silt, and silty clay comprising 10% of core Disaggregated Weak Limestone 70.0-71.0' - light brown, (5YR 6/4), moderate to strong HCI reaction, all carbonate derived 71.0-71.8' - light medium brown to grayish orange, (10YR 7/4) Limestone 71.8-76.5' - Same as 66.0-70.0' except light brown, (5YR 6/4), weak to medium strong (R2 to R3), fragments to 3" in length, 15% fine sand-sized particles, sparse organic material	SC-1 collected at 69.3- 70.0' Possible organics in 1/4" or less stringers



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	5	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	11 bgs	on 3/6	5/07 START : 2/9/2007 END : 2/	12/20	D7 LOGGER : M. Faurote, J. Burkar	d
≥ ∩ ∵	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
8037.8	R9-SN	α.	NA PER	THICKNESS, SURFACE STAINING, AND TIGHTNESS - 76.0-86.0' - NA		Disaggregated Limestone With Limestone Fragments 76.5-79.5' - light brown, (5YR 5/6), strong HCl reaction, gravel-sized (3/8" to 1") limestone fragments Limestone 79.5-85.0' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, medium strong to strong	Limestone fragments are very friable, easily broken with finger pressure, very fossiliferous and composed of sand and silt sized carbonate derived grains
- - - - 85_ -42.8	10 ft 90% 86.0	NA	(R3 to F length, i partings 2" wide, surface,		(R3 to R4), fragments up up 4" in length, infilling between fragments or partings, partings range from 1/2" to 2" wide, 60-70% porosity on fresh surface, delayed reaction to HCl	- - - - - -	
- - - 90 -47.8 - - - - - - - -	R10-SN 10 ft 90%		NA	86.0-96.0' - NA		Limestone 86.0-87.0' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, pulverized to sand-sized particles Limestone Fragments 87.0-88.0' - light brown, (5YR 5/6), fragments are in a sandy silt matrix, probably separated from material 86.0-87.0' Disaggregated Limestone With Limestone Fragments 88.0-89.8' - yellowish gray, (5Y 7/2), strong HCl reaction, carbonate derived, subrounded limestone fragments up to 1-1/2", with moderate HCl reaction Disaggregated Limestone 89.8-92.5' - yellowish gray, thinly bedded (<3/8") down to varve-like planes Limestone 92.5-93.4' - very pale orange, (10YR 8/2), micritic, sparse flecks of organic material	Limestone contains numerous voids (65-70%) of fossil casts and molds, thin (<1/8") organic stringers less than 1/2" long
95 -52.8 _	96.0		NR				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	6	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

Piles Fragments 96.0-106.0' - NA Disaggregated Limestone With 100	See 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	WATER LE	VELS : 4.4	1 bgs	on 3/6	5/07 START : 2/9/2007 END : 2/	12/200	CONTRACTOR NO. 10 CONTRACTOR N	
Disaggregated Limestone With Limestone Fragments 98.0-106.0' - NA 96.0-106.0' isaggregated Limestone With Limestone Fragments 93.4-95.0" - very pale orange fines 93.4-95.0" - very	≥0 ⊕	(6)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS	
Disaggregated Limestone With Limestone Fragments 98.0-106.0' - NA 96.0-106.0' isaggregated Limestone With Limestone Fragments 93.4-95.0" - very pale orange fines 93.4-95.0" - very	DEPTH BELOV SURFACE ANI ELEVATION (ff	CORE RUN, LENGTH, AND RECOVERY (%	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LO	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD	
110 -67.8 R12-SN 10 ft 95% NA NA Wery friable light brown (5YR 6/4) limestone fragments of carbonate derived sand and silt at 110.5; fragments from 2"x2-1/2" to pea gravel size with numerous fossil casts and visible shell fragments, most of the rock is sand and silt-sized grains, void space is minimal at 25-30%, moderate HCl reaction No Recovery 115 5-116 0"	Total Name of the rock is sand and silt at 115. Treaction No. Precovery 115 5-116 0'	- - - - 100 -57.8 - - - - - - - -	R11-SN 10 ft	NA		96.0-106.0' - NA		Limestone Fragments 93.4-95.0' - very pale orange fines, (10YR 5/2), strong HCI reaction, grayish orange pink (5YR 7/2) limestone fragments from 3/16" to >2", fragments are fossiliferous with casts and molds, <5% shell fragments, <10% organic material, fragments react moderately to HCI No Recovery 95.0-96.0' Disaggregated Limestone With Limestone Fragments 96.0-115.5' - very pale orange, (10YR 8/2), moderate to strong HCI reaction, grades from a tacky, pasty, carbonate derived silt/clay with 10-15% sand-sized particles becoming 35-45% gravel-sized fragments at 102.3', fragments are fossiliferous limestone (bi-valves, forams and bryozoans) with 50%	- - - - - - - - - - - - - - - - - - -
110.0		-110 -67.8 - - - - - - - - - - - - - - - - - - -	R12-SN 10 ft 95%	NA		106.0-116.0' - NA		limestone fragments of carbonate derived sand and silt at 110.5', fragments from 2"x2-1/2" to pea gravel size with numerous fossil casts and visible shell fragments, most of the rock is sand and silt-sized grains, void space is minimal at 25-30%, moderate HCl reaction	the same as the constituents of the limestone fragments, suggesting that the drilling method disaggregates the



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	7	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	6/07 START : 2/9/2007 END : 2/	12/20	D7 LOGGER : M. Faurote, J. Burkan	d
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R13-SN 10 ft 100%		NA	116.0-126.0' - NA		Disaggregated Limestone With Limestone Fragments 116.0-118.3' - very fine grained, 6" of light brown sandy silt-sized particles with gravel-sized particles atop 0.8' of limestone fragments, pale yellowish brown (micritic) limestone clasts with 15% void space and poorly fossiliferous Disaggregated Limestone 118.3-123.1' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), strong HCl reaction, strong reaction to HCl in all carbonate derived particles, gravel-sized fragments at 120.5-121.0' Disaggregated Limestone With Limestone Fragments 123.1-125.2' - very pale orange, (10YR 8/2), strong HCl reaction, limestone fragments up to 1" in size 125.2-126.0' - very pale orange,	Delayed mild to moderate reaction to HCl on actual limestone, finer grained clast fillings react strongly to HCl This is carbonate silt-sized material
	R14-SN 10 ft 100%		NA	126.0-136.0' - NA		(10YR 8/2), 15% fragments (up to 3/4") of very fine grained limestone 126.0-128.1' - very pale orange, (10YR 8/2), moderate HCI reaction, sand and silt-sized carbonate grains, limestone fragments are composed of sand and silt-sized grains and 3-5% black spots (1/16") that appear organic Disaggregated Interbedded Weak Limestone 128.1-135.6' - grayish orange pink, (5YR 7/2), moderate to strong HCI reaction, friable to micritic thin (<1/2") limestone beds; beds are undulant and generally discontinuous across the width of the core	The sequence at 126.0- 136.0' looks very similar to the immediately preceding fining upward materials The major part of these runs were sliced in half by the spatula and moved with a mortar trowel; the gravelly parts tend to be in more pieces



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	8	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	11 bgs	on 3/6	S/07 START : 2/9/2007 END : 2/	12/20	D7 LOGGER : M. Faurote, J. Burkar	d
≥ □₽	(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R15-SN 10 ft 90%		NA	136.0-146.0' - NA		Limestone Fragments 135.6-137.5' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl reaction, strong to very strong (R4 to R5), partings show thin re-crystallized coatings of carbonate and minor iron oxide Disaggregated Weak Limestone With Limestone Fragments 137.5-141.0' - light brown, (5YR 6/4), fine grained, mild HCl reaction, fragments are angular, with apparent carbonaceous material on fracture surfaces and 5-15% of "spots" in fine grained limestone Limestone Fragments 141.0-142.5' - grayish orange, (10YR 7/4), very fine grained, mild HCl reaction, fragments up to 4" long, many partings with not much infilling, some iron oxides noted, particularly at 142.0-142.5' Limestone 142.5-145.0' - angular, granulated fragments, fragments are very friable and composed of silt and sand-sized carbonate particles	Large fossil (possible gastropod) in pale yellowish brown (10YR 6/2) limestone This unit appears to be weak rock; limestone destroyed during sonic drilling Limestone fragments appear broken due to drilling methods
-102 <u>.8</u> -	146.0		NR		Ħ	No Recovery 145.0-146.0'	-
	R16-SN 10 ft 100%		NA	146.0-156.0' - NA		Limestone 146.0-148.6' - the first 0.8' is angular to very angular washed limestone fragments up to 2-1/2", most fragments are porous (55% voids space) from fossil dissolution Disaggregated Weak Limestone 148.6-151.0' - yellowish gray, (5Y 7/2), strong HCl reaction, all size ranges are carbonate derived grains Limestone 151.0-151.3' - light brown, (5YR 6/4),	- - - - - - - - -
- - - - 155 -112.8	156.0					fossiliferous (casts), fragments up to 1" in size Disaggregated Limestone With Limestone Fragments 151.3-156.5' - strong HCl reaction, limestone fragments (5-20%) are yellowish gray (5Y 8/1), very fine to fine grained, friable, "orange" spots may indicate iron oxide halos, no discernible bedding features, at 155.6-156.0' the limestone fragments are up to 1-1/2", angular, and friable	- - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	9	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

				DIOZ			ORIENTATION . Vertical
	LEVELS : 4.4	ei bgs	on 3/6	6/07 START : 2/9/2007 END : 2/ DISCONTINUITIES	12/20	D7 LOGGER : M. Faurote, J. Burkard LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		<i>,</i>	DESCRIPTION	SYMBOLIC LOG		OOWNIVILIVIO
SEL(ON A	Z,Y,Z	(9	J.ES	DESCRIPTION	IC.	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAC	STE O	(%) _Q	FO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	SASS	RQ	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	016				, , , , , , , , , , , , , , , , , , ,		
-				-		Arenaceous Limestone	-
_				450 0 400 0L NA	₽	- 156.5-161.0' - pale brown, (5YR 5/2),	4
_				156.0-166.0' - NA	П	very fine grained, medium strong	_
				_		(R3), fossiliferous, fragmented with the largest fragment being 0.4' long,	_
					Н	60% void spaces (casts of dissolved	159.0-161.0' may have been broken apart by the
						biota), sparse 1/16"-3/16" voids, thin to laminar bedding with beds as thin	drilling method
				-	Н	as 1/8", possible pyrite blebs	
160				-	Ш	_	_
-117.8				_	ш	_	_
-	R17-SN			-	┢	-	-
-	10 ft		NA	-		_ Limestone	-
-	100%			-	世	- 161.0-162.3' - light brown, (5YR 6/4),	-
-					ш	very fine grained, moderate to strong HCl reaction, weak to medium strong	-
_					世	- (R2 to R3), fossiliferous (casts)	This material is highly –
_					┢	Limestone To Arenaceous	broken _
1 _				_	Ľ	Limestone - 162.3-163.8' - light brown, (5YR 6/4),	_
				_	H	mild HCl reaction, very thinly to thinly	_
						bedded, limestone contains silica grains	
165				-	ш	Disaggregated Weak Limestone	
-122.8				_	Н	163.8-165.2' - light olive gray, (5Y	
-	166.0					 5/2), carbonate derived silt-sized particles along bedding planes <1/8" 	_
-	100.0				╁	to 3/8" thick, beds contain <10%	-
-					ш	 silica sand Arenaceous Limestone 	-
-				166.0-176.0' - NA	┰	165.2-170.8' - light brown, (5YR 6/4),	-
_					\vdash	mild HCl reaction, medium strong	-
-				-		(R3), 15-25% very fine silica grains widely distributed through the micro	-
_					H	to very fine grained limestone, mild	_
_					\Box	reaction to HCl, with a weak intergranular and void filling	_
				_	Ш	response, 40-45% porosity,	_
170_					\vdash	arenaceous limestone grades into very fine grained limestone that is	
-127.8			NIA			represented as 0.1' to 0.4' pieces to	
]	R18-SN		NA		Ľ	the end of this run (170.8')]
1 7	10 ft 90%	NA		-	Щ	 Disaggregated Weak Limestone 170.8-171.6' - moderate brown, (5YR 	The drilling method may
				·	Ш	4/4), moderate HCl reaction, <2%	have created the partings - and vibrated the fines
-				·	\vdash	 muscovite and pyrite as slightly oxidized blebs, some small rock 	between individual pieces
-				-	Ė	fragments	of rock -
-					世	- Limestone	No euhedral or subhedral
-				-	⊬	_ 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCl	crystals visible -
-					仜	 reaction, weak to medium strong (R2 	SC-2 collected at 171.6- 172.3'
-					\vdash	to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts	-
175				_	F		
-132.8 -			NR		片	No Recovery 175.0-176.0'	_
	176.0				Н		



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-05	SHEET	10	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION: Vertical

WATER	LEVELS : 4.4	1 bgs	on 3/6	5/07 START : 2/9/2007 END : 2/	12/20	D7 LOGGER : M. Faurote, J. Burkard	d
×0.5	(%)			DISCONTINUITIES	ဉ	LITHOLOGY	COMMENTS
ANI ANI (fi	AND ≪ GOD		SIL	DESCRIPTION	C LO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_				-	H	Limestone - 176.0-183.2' - grayish orange to pale brown, (10YR 7/4 to 5YR 5/2), very	Partings or interbed surfaces exhibit organic or -
-				176.0-186.0' - NA	Ħ	fine grained, mild to moderate HCl	iron oxide (Gothite) patinas _ or stains
-				-	Ħ	 reaction, arenaceous, thinly interbedded with carbonate 	-
-				-	H	intergranular filling, HCl reaction is mainly in void filling and fossil cast	-
				_	Ħ	lining, poorly fossiliferous, overt	
_				<u>-</u>	Ħ	porosity is <35%, limestone contact is irregular and gradational in a very	179.0-179.6' - Appears as a breccia, gray clast in pale -
180 -137.8				_	H	thin zone (<1/16")	brown limestone matrix
-	R19-SN		NA	-	Ħ	-	-
-		NA		-	Ħ	-	- 181.0-182.1' - Thinly
-	3070			-	Ħ	-	bedded limestone -
				_	Ħ	-	- 182.1-183.2' - Thin broken
				_	Ħ		beds, drilling related
_				-	H	Disaggregated Weak Limestone	183.2-185.0' - Unit may _
-				-	Ħ	183.2-185.0' - grayish orange, (10YR 7/4), very fine grained, strong HCl	have been broken by drilling method, particularly -
185				-	Ħ	reaction, carbonate derived silt-sized and very fine sand-sized grains in	in "harder" beds
-142.8				_	irregular thin beds with organic material defining some of the planar		
_	186.0		NR		Ħ	features, silica <5% and sparse No Recovery 185.0-186.0'	-
	·			_	Ħ	Disaggregated Limestone With	This appears to be partially to be a very weak
_				186.0-196.0' - NA	H	Limestone Fragments - 186.0-194.1' - grayish orange, (10YR	agglomeration of silt, sand and rock (gravel-sized
_				100.0-190.0 - NA	H	7/4), mild to moderate HCl reaction, up to 40% gravel-sized limestone	fragments) that may -
_				-	H	 fragments, broken and granulated, fragments range from <1/4" to 	represent a collapse feature
_				-		1-1/2"x2"x1", independent clasts	=
					\vdash	 exhibit bedding plane discontinuities and settling features, limestone]
190				_		moderately fossiliferous (casts)	
-147.8 -	R20-SN			-	Ы	_	-
-	10 ft		NA	-		-	-
-	100%			-		_	-
-				-	\Box	-	-
					\Box	-]
-				-	Ш	- -	_
-				-	Ш	-	_
-				-	Ш	_	-
195 <u></u> -152.8				-	ш	<u></u>	_
-	196.0			-	Ш	-	-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-05	SHEET	11	OF	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	11 bgs	on 3/	6/07 START : 2/9/2007 END : 2/	12/20	D7 LOGGER : M. Faurote, J. Burkard	1
≥∩≘	(9)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
ANE (#	Ä, AND ≪ (%		ES T	DESCRIPTION	3 LO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-				196.0-206.0' - NA		Limestone 194.1-204.7' - very pale orange, (10YR 8/2), very fine grained, mild to moderate HCI reaction, with sub-horizontal, thin (<1/8") beds with apparent organic partings above a	The rock fragments (195.5-196.0') appear to have been broken by the drilling method Possible collapse infilling, or extremely broken from
- 200 -157.8				- - -		very broken (in angular, sharp fragments) very fine grained limestone with fragments showing possible subsidence features (cracks)	the drilling method
-	R21-SN 10 ft 100%	NA	NA	- - -		- - - -	- - -
205				- - - -		_ _ _ Disaggregated Interbedded	- - - -
-162 <u>.8</u> - -	206.0					Limestone 204.7-206.0' - very pale orange, (10YR 8/2), moderate to strong HCl reaction, very tacky when wet	
-167.8				206.0-216.0' - NA		Disaggregated Interbedded Limestone With Limestone Fragments 206.0-210.5' - Same as 204.7-206.0' except with sandy silt and gravel-sized limestone fragments, where the limestone fragments are very angular to generally sub-rounded, fragments constitute 35-50% of the total material, thin micritic layers/fragments found at 209.8' and 214.0'	repetitive units, ie. a fossil cast/mold rich generally friable limestone grading into a very fine grained micritic limestone, with limestone fragments up to 1-1/2", many of the limestone "fragments" are adhesions of sand sized carbonate grains that are quite friable, they may be weak rock, but became
- - -	R22-SN 10 ft 100%	NA	NA	- - - -		Disaggregated Weak Limestone 210.5-213.5'	disaggregated due to the sonic drilling method
215 -172.8	-			- - -		Disaggregated Interbedded Limestone With Limestone Fragments 213.5-216.0' - Same as 206.0-210.5'	- - - -
	216.0				Ħ		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	12	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DESCRIPTION DESCR	WATER LEVELS : 4.4	3 : 4.41	1 bgs	on 3/0	6/07 START : 2/9/2007 END : 2/	2/200	7 LOGGER : M. Faurote, J. Burkard	1
Disaggregated Fossiliferous Limestone 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - Same as 216.0-225.5'	≥∩≘	。 L			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
Disaggregated Fossiliferous Limestone 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 216.0-226.0' - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - NA 226.0 - Same as 216.0-225.5'	DEPTH BELOX SURFACE ANI ELEVATION (ff CORE RUN, LENGTH, AND RECOVERY (%	RECOVERY (%	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
226.0 NR No Recovery 225.5-226.0' Disaggregated Fossiliferous Limestone 226.0-236.0' - Same as 216.0-225.5'	220 -177.8 - 10 ft 95%	:3-SN 0 ft 1	NA		216.0-226.0' - NA		Limestone 216.0-225.5' - grayish orange to grayish orange pink, (10YR 7/4 to 5YR 7/2), moderate to strong HCI reaction, friable and pliable, with carbonate derived sand and silt-sized grains that react to HCI, thin (<1" to 2") layers with a 10-15% clay content and higher plasticity, sparse rock fragments consisting of very fine grained, fossiliferous (casts) limestone that exhibits HCI reactions primarily in void filling or along	apparent carbonaceous organic materials, but they
Disaggregated Fossiliferous Limestone 226.0-236.0' - NA	-			NR	-	\exists	No Recovery 225.5-226.0'	
230 -187.8 R24-SN 10 ft 100% NA NA NA 235 -192.8	230 -187.8 - 10 ft 100%	0 ft 1	NA		226.0-236.0' - NA		Disaggregated Fossiliferous Limestone	_
236.0	236.0	_				H		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	13	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	5/07 START : 2/9/2007 END : 2/1	12/20	D7 LOGGER : M. Faurote, J. Burkard	1
≥∩≘	(%)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
ELO N (f	AND ₹	_	ZES T	DESCRIPTION	CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP- SURI ELE/	COR	ROI	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		_			ш	Disaggregated Fossiliferous	
-				-		 Limestone 236.0-246.0' - Same as 216.0-236.0' 	At 236.5' - very fine
-				236.0-246.0' - NA	\vdash	except with occasional limestone	grained, small (1/2"x3/8") – limestone fragment is
-				-		- fragments	moderate orange pink (5YR 8/4), with very few
					H	_	fossil casts, strong HCl
_				_		_	reaction
-				<u>-</u>	H	_	_
240 -197.8				_	H	_	
-197.6	R25-SN			-	H	_	-
-	10 ft	NA	NA	-	H	-	-
-	100%			-	Ш	-	-
-				-	Ш	-	All of these samples were
-				-	Ш	-	split with the spatula blade and one-half the core was
-				-		_	placed in the core box; very
						_	few rock fragments = = = = = = = = = = = = = = = = = = =
_				_	Ш	_	_
245_ -202.8					Ш	_	TI 5 100 001 5 1 111
-202.8				-	П	_	The final 20-30' of drilling was quite difficult, and
-	246.0			-	Ш	246.0-254.5' - very pale orange,	many runs in and out were _ required to drill the hole
-				-	Ш	 (10YR 8/2), strong HCl reaction, 	and maintain the borehole; -
-				246.0-256.0' - NA	Ш	fragments of very fine grained fossiliferous limestone at 247.5'	some of the rock appears completely broken due to
-				-	Ш	 exhibit very sharp angular edges, fragments are easily broken, a 	the drilling technique -
-				-		fragment at 254.3' shows a nearly	=
-				_		 horizontal contact between fossiliferous (casts) and very fine 	=
					Ш	grained limestone, both exhibiting strong reactions to HCl, the rock	
250_						character change is obvious	
-207.8 -	DOC ON		NA	-		_	-
-	R26-SN 10 ft			-	Н	_	-
-	85%			-	H	-	-
-				-	H	-	-
-				-	H	-	-
1 -				-	Ħ	-	=
1 -				-	H	_	-
					H	_	
25 <u>5</u> -212.8					H	No Recovery 254.5-256.0'	
-212.8			NR	_	H	- -	_
	256.0				H		-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	14	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

			<u> </u>	IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	. 00	NO BOILDI	ORIENTATION : Vertical
WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 2/9/2007 END : 2/	12/20	D7 LOGGER: M. Faurote, J. Burkard	i
				DISCONTINUITIES	(5)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(0	DESCRIPTION	SYMBOLIC LOG		
D'A'N	Z Z Z	_	FRACTURES PER FOOT	DESCRIF HON	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A S E	BEE H	(%) O		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Į,	WEATHERING, HARDNESS.	FLUID LOSS, CORING RATE AND
무두짓	RS S S	a	R F	PLANARITY, INFILLING MATERIAL AND	ME	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
2 2 I		S O	F. H.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	BROI 6, 1201 R200216, 216.
					ш	Disaggregated Limestone With	
-				-	╁	 Limestone Fragments 	=
_				050 0 000 01 114	H	256.0-259.7' - light brown, (5YR 6/4),	_
				256.0-266.0' - NA		fine to medium grained, moderate to strong HCl reaction, composed of	
					Н	carbonate derived grains, <15%	
-				-	H	gravel-sized limestone fragments	-
-				-	\blacksquare	(angular, <1" in size, typically	-
_				_	┢	micritic)	_
260					ш	250.7.205.0! light brown (5VD 0/4)	_
-217.8					╁	259.7-265.0' - light brown, (5YR 6/4), moderate HCl reaction, limestone	
	!			-		fragments average less than 1" in	_
I _	R27-SN 10 ft		NA	_	ш	_ size	
1	100%	INA	INA		\vdash		
-	1			-		-	-
-				-	₩	-	-
_					\vdash	=	_
_				-	╙	-	_
_				-	fT	-	-
-				-	\vdash	_	-
_				_		_	_
265							
-222.8				_	Н	Disaggregated Limestone	Drilled to 266.0', driller
-				-	+-	- 265.0-266.0' - moderate orange pink,	dropped casing twice and -
-	266.0			-	ш	(5YR 8/4), contains no limestone fragments	had to retrieve; retrieval process resulted in
l _				_	\vdash	- 266.0-267.5' - 1.5' recovered	extending the boring's total -
			NA			20010 20710 110 100070100	depth to 271.0' in order to
_				266.0-271.0' - NA	ш	-	recover casing and core
_				-	\vdash	No Recovery 267.5-271.0'	-
_				-		-	=
_	5 ft	NA			\vdash		
	30%	INA					
_			NR	-	\Box	-	1
-				-	╀╌	-	-
270 -227.8				_	匚	_	_
-221.8				_	\vdash	_	
	271.0						
_					Г	Bottom of Boring at 271.0 ft bgs on	Total depth of boring is
_				-	1	- 2/12/2007	271.0' -
_				-	1	_	=
I _				_	1	_	
1 -				-	1	Ť	1
-				-	1	-	
-					1	-	_
I -							1
-					1		_
-				-	1	_	-
	1		1 1		I		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-06	SHEET	1	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache ELEVATION: 42.3 ft (NAVD88)

DRILLIN	G METH	OD AND	EQUIPM	ENT : Rotosonic	S/N SR-116, sonic, 6" outer casing and 4" core barrel	ORIENTATION : Vertical
WATER	LEVELS	: 4.41 bg	s on 3/6/0)7	START: 3/7/2007 END: 3/10/2007 LOGGER: C.	Sump
>				STANDARD	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEDTIL OF GLOBIC DEVILUE DATE
불병		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
THE AND			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION
				(N)		
42.3	0.0				Topsoil 0.0-0.3' - brownish black, (5YR 2/1), organic rich Poorly Graded Sand Grading To Poorly Graded Sand With Silt (SP-SM) 0.3-3.3' - brownish black grading to grayish orange, (5YR 2/1 grading to 10YR 7/4), fine grained, fines increase with depth to 10-15%, HCl reaction in fines,	Reduced recovery typical of partial core lengths (6' in 10' core barrel) "Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)"
5 37.3		4.5	R1-SN		silica sands 3.3-4.5' - light gray, (N7 to N8), fine grained, 10-15% silt/clay increasing with depth, carbonate matrix, silica sand, 2-1/2" limestone fragment at 4.3-3.5' (very pale orange [10YR 8/2], fossiliferous [molds/casts], strong HCI reaction) No Recovery 4.5-6.0'	Water levels were not recorded for I-06
10 32.3 - - - - - - - - - - - - - - - - - - -	16.0	10.0	R2-SN		Poorly Graded Sand (SP) 6.0-7.0' - light gray, (N7), brownish black (5YR 2/1) organic material (slough) Silty Sand With Limestone Fragments (SM) 7.0-8.5' - 3" yellowish gray (5Y 8/1), disc shaped, rounded clast at 7.4' Sandy Silt (ML) 8.5-15.0' - <10% fine gravel clasts (<1/2"), large concretionary limestone masses (possible stromatolites) at 10' that have botryoidal, non-concentric, globular appearance, and a strong reaction to HCI, medium strong (R3), portion at 14.5' has a tapered horn shape 15.0-16.0' - Same as 8.5-15.0' except grayish orange, (10YR 7/4), moderate to strong HCI reaction, weak (R2), thin bedding plane fractures (1/4-3/4"), friable, carbonate 16.0-26.0' - Same as 15.0-16.0' except nonplastic to low plasticity, very fine sand-sized particles decreasing with depth, trace fine gravel-sized limestone fragments, carbonate materials	At 10.0-14.0' possible stromatolites, large euhedral crystals (associated with globular concretionary masses), smoky clear with tetrahedral form well defined, twinning visible, no reaction to HCI



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-06	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS	: 4.41 bg	s on 3/6/0)7 5	START : 3/7/2007 END : 3/10/2007 LC	OGGER	: C.	Sump
300				STANDARD	SOIL DESCRIPTION		Ō	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE	ERY (ft)	STANDARD PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEP SUR ELE			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOS	'	SYN	INSTRUMENTATION
22.3 22.3 25_17.3 30_12.3 35_7.3	26.0	10.0	R3-SN		26.0-30.3' - Same as 16.0-26.0' except no very fine sand, no fine gravel-sized limestone fragments Begin Rock Coring at 30.0 ft bgs See the next sheet for the rock core log			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-06	SHEET	3	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

프로트 종 50 DEPTH TYPE OPIENTATION POLICHNESS 하 WINCERALOUS, TEATURE, FLUID LOSS, CORING RATE A	WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 3/7/2007 END : 3/	10/2	2007	LOGGER : C. Sump	
12.3 30.0 30.3-36.0' - NA	≥D₽	<u> </u>			DISCONTINUITIES	ع	Ļ	LITHOLOGY	COMMENTS
12.3 30.0 30.3-36.0' - NA	EPTH BELOV JRFACE AN EVATION (f	ORE RUN, NGTH, AND ECOVERY (9	a D (%)	ACTURES ER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBOI IC I C		MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS TEST RESULTS FTC
			ŭ	HH	THICKNESS, SURFACE STAINING, AND TIGHTNESS			CHARACTERISTICS	BROFG, FEOT REGGETG, ETC.
36.0-46.0' - NA 36.0-46.0' - NA 36.0-46.0' - NA Sandy Slit With Limestone Fagments (ML) 36.0-46.7' - moderate yellowish brown, (10VR, 5/4), nonplastic to low plasticity, moderate HCI reaction, fine gravel-sized fragments (<10%) <1/2" diameter, <10% very fine to fine sand-sized, dark brown organic material at 42.0' 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone Fagments (ML) 36.0-46.0' - NA 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fagments (ML) 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fagments (ML) 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fagments (ML) 56.0' - NA 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fagments (ML) 56.0' - NA 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fagments (ML) 56.0' - NA 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fagments (ML) 56.0' - NA 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fagments (ML) 56.0' - NA 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fagments (ML) 56.0' - NA 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fagments (ML) 67.0' - NA 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fagments (ML) 67.0' - NA 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fagments (ML) 67.0' - NA	- - - - - - - 35	R4-SN 6 ft 100%	NA	NA	30.3-36.0' - NA			30.3-36.0' - grayish orange and medium gray, (10YR 7/4 and N5), moderate to strong HCI reaction, medium strong (R3), thin to medium bedding, horizontal partings 3/4"-4", numerous small (1/32"-1/8") voids, few (<3/4") cavities, fossiliferous with significantly more molds than casts, thin horizontal zones (possibly beds) of fine grained limestone with no voids; 1/2"-4" thick (1"-3" average) silt/clay interbeds with gravel-sized limestone fragments, light gray (N6) grading to medium dark gray (N4)	
-2.8 46.0 46.0-56.0' - NA 46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fragments, dark brown organic mottling, 10% to >50% sand content, <10% fine gravel-sized		R5-SN 10 ft	NA	NA	36.0-46.0' - NA			Fragments (ML) 36.0-46.0' - moderate yellowish brown, (10YR 5/4), nonplastic to low plasticity, moderate HCl reaction, fine gravel-sized fragments (<10%) <1/2" diameter, <10% very fine to fine sand-sized, dark brown organic	- - - - - - - - - - - -
50	-2.8	46.0			46.0-56.0' - NA			except coarse grained sand-sized limestone fragments, dark brown organic mottling, 10% to >50% sand content, <10% fine gravel-sized	- - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	I-06	SHEET	4	OF '	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	5/07 START : 3/7/2007 END : 3/	10/2	007	LOGGER : C. Sump	
>00	(9			DISCONTINUITIES			LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	Г	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIO	TH./	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 5		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPTI URF,	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB		AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	038	ď	# 5	TRICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	4	CHARACTERISTICS	· ·
-7.8 -					Ш	l		_
_	R6-SN 10 ft	NA	NA		411	IL		_
_	100%				411	IL		_
_					Ш	IL		
_					Ш	Щ		
_						$\frac{1}{2}$	Limestone 52.5-52.8' - yellowish gray, (5Y 7/2),	1 _
_							fossiliferous (significantly more	
_							molds than casts), numerous <1/32"-1/8" voids, very few small	_
_						1	cavities 1/4"-1/2" diameter, full	_
55				_		1	diameter core fragments; horizontal, smooth, planar partings; thin silty	_
-12.8						1	clay coating on fracture surface	
-	56.0			FC O GC O' NA			Sandy Lean Clay With Limestone Fragments (CL)	-
_				56.0-66.0' - NA		1	52.8-56.0' - 15-25% subangular to	-
_						4	subrounded gravel-sized (1/2"-1") limestone fragments	-
_						1	56.0-61.0' - Same as 52.8-56.0'	-
_						1	except 10-20% gravel-sized moderate yellowish brown limestone	-
_						4	fragments	-
_						4		-
_						1		
60 <u> </u>				_		1	-	-
- 17.5	R7-SN				<i>\//</i>	4		-
_	10 ft	NA	NA		Y //	4	Interbedded Limestone And Clay	
_	100%				F	1	61.0-63.4' - light medium gray (clay),	-
-					H	╁	(N6), moderate to strong HCl reaction, few fossils or surface voids	-
-					Ľ	╁	or cavities, dark brown/black	-
-					Н	+	laminated inclusions, thin partings every 1"-3"	-
-					F	7	Disaggregated Limestone	-
-					口	‡	63.4-66.0' - moderate yellowish brown, moderate to strong HCl	-
-					口	+	reaction, mostly very fine sand-sized	-
65 <u> </u>				_	╘	\pm	limestone fragments, with gravel-sized limestone fragments	-
-	66.0				F	╁	similar to 61.0-63.4'	-
-	66.0			66.0-76.0' - NA	F	1	Limestone	Repeating sequences of
-					Ħ	†	66.0-66.9' - Same as 61.0-63.4' except thin bedding and clayey silt	mostly thinly bedded - limestone with silty clay /
-					H	士	interbeds	clayey silt interbeds (1-2")
-					H	+	Limestone Fragments 66.9-68.7' - fine gravel-sized (4"-6")	with larger zones of sandy - silt +/- clay with gravel
-					Γ	7	particles, sandy silt, carbonate	sized limestone fragments
-					₶	†	derived	(3-5') – Driller's Remark: Difficulty _
-					ㅂ	†		advancing 6" casing
70					Ь	\pm		-
'				_	ſ	T		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-06	SHEET	5	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	S/07 START: 3/7/2007 END:	3/10/20	07 LOGGER : C. Sump	
≥ O ≎	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	~	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B	GTH GOVE	RQD(%)	CTU	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COA REC	S O	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-27.8					工	Interbedded Limestone	
	R8-SN				世	- 68.7-73.5' - thin bedding, similar to 66.9-68.7' except increasing interbed	-
	10 ft 100%	NA	NA		\perp	thickness with depth (<1"-6"), limestone partings	1
					Ъ	L	
_					\perp	_	
_					F	-	
_					\perp		-
_					\perp	Disaggregated Limestone - 73.5-76.0' - moderate HCl reaction,	-
					#	_ 10-20% gravel-sized (1/2"-1") limestone fragments, carbonate	-
75 <u> </u>					士	— derived material	
-	76.0				廿	-	-
-	76.0			76.0-86.0' - NA	\perp	- 76.0-83.0' - 20-50% gravel-sized	Driller's Remark: Extremely
-					+	 limestone fragments, dark brown organic silt laminae, coarse sand 	difficult advancing 6" - casing, lost drilling fluid
-					\top		circulation
					\perp	-	1
					丁		
					厂	_	
_					上	-	
80 <u> </u>					ፗ	_	
-57.0	R9-SN				\pm	-	-
-	10 ft	NA	NA		\pm	-	-
-	100%				\pm	-	-
-					+	-	-
-					+	-	-
_					\top	Limestone Fragments	-
					\perp	 83.0-86.0' - yellowish gray, coarse sand to coarse gravel-sized 	1
					井	fragments (1/4" to >3")	
85					井	_	
-42. 8					井	 -	-
-	86.0			86.0-96.0' - NA	片	86 0 86 31 Vellowich grov to ducky	Driller's Remark: Difficult
-				00.0-30.0 - IVA	世	86.0-86.3' - yellowish gray to dusky yellow, (5Y7/2 to 5Y6/4), fragments	advancing 6" casing; no -
-					\perp	3" diameter 86.3-89.5' - moderate yellowish	drilling mud circulation _
-					+	 brown, moderate HCl reaction, 	-
-					F	30-50% gravel-sized limestone fragments, friable, 30-40% small	-
-					F	 voids (1/32"-1/8"), with coarse sand-sized matrix, thin silty zones 	-
-					拝	with thin (1/4"-1/2") dark brown to	
90					上	 black organic layers 	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-06	SHEET	6	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	I1 bgs	on 3/0	6/07 START : 3/7/2007 END : 3/	10/200	D7 LOGGER : C. Sump	
≥∩⊙	(9)			DISCONTINUITIES	Ö	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-47.8 - - - - - - - -52.8	R10-SN 10 ft 100%		NA			Limestone Fragments - 89.5-96.0' - moderate yellowish brown, (10YR 5/4), fine grained, strong (R4), >3" diameter limestone fragments with 6"-10" spacing, clayey silt interbeds are mottled pale brown (5YR 5/2) to light olive gray (5Y 5/2), dark brown / black organic laminations/mottling sparse except at 92.0-92.5', gravel-size limestone fragments range from 1/2"-1" diameter and become yellowish gray to light olive gray with depth, few zones of material similar to 86.3-89.5', few fragments with 30-40% voids (1/16"-1/8")	- - - - - - -
100 -57.8 - - 105 -62.8 - - 1110	96.0 R11-SN 10 ft 100%		NA	96.0-106.0' - NA		96.0-98.0' - grayish orange pink with olive gray staining on fracture surfaces, (5YR 7/2 with 5Y 5/2), irregular zones of small voids (1/32"-1/8") with fossil molds and casts, fine sand-sized limestone particles 98.0-98.4' - Same as 96.0-98.0' except silty clay infilling on 1"-2" horizontal partings Disaggregated Limestone With Limestone Fragments 98.4-106.0' - moderate yellowish brown at 99.0', 90% gravel-sized (1/4"-3/4" diameter) limestone fragments, large (>3" to full core diameter) fragments on approximately 1.0' spacing with fine grained disaggregated interbeds in between, the percentage of larger fragments increases at end of run (>50%)	Driller's Remark: Difficulty establishing correct amount of tube when driving 6" casing (stuck at 5000); difficulty for previous 3 runs (86-116') may increase potential for drill induced breakage and/or segregation of disaggregated material in retrieved cores



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-06	SHEET	7	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING	NETHOD A	ND EC	עורוטג	IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	4 COI	e parrei	ORIENTATION : Vertical
WATER	LEVELS: 4.4	11 bas	on 3/	5/07 START : 3/7/2007 END : 3/	10/200	7 LOGGER : C. Sump	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-67.8 	R12-SN 10 ft 100%		NA NA			Limestone Fragments With Disaggregated Limestone 106.0-116.0' - moderate yellowish brown, (10YR 5/4), moderate HCI reaction, fragments (3"-4") comprise >50% of core at top of run, decreasing with depth to 15-30% as core material becomes more disaggregated, matrix is disaggregated limestone and smaller (<1") limestone fragments, fragments exhibit small voids (25-30% of surface) and few (<5%) fine black horizontal (possibly organic) laminae (3/16"-3/8" long), interval at 114.0-114.5' is pale yellowish brown (10YR 6/6) fine grained limestone,	- - - - - - -
- - - - - 120 -77.8	116.0 R13-SN 10 ft		NA	116.0-126.0' - NA -		strong (R4), with no small voids or fossils 116.0-122.0' - Same as 106.0-116.0' except limestone fragments (3"-4") are irregularly shaped, angular to subangular, gravel-sized limestone fragments (30-80%), in silt-sized to sand-sized disaggregated limestone material	Driller's Remark: Difficulty advancing 6" casing -
- - - - 125 -82.8 - - - - - - - - - -	100%			126.0-136.0' - NA		Interbedded Limestone And Clayey Silt 122.0-123.5' - dusky yellowish brown limestone, medium strong (R3), very thin to thin bedding, few small voids (1/32"-1/8"), 5% dark yellowish gray horizontal banding, horizontal partings 2"-4" with clayey carbonaceous silt interbeds (1"-3"), contains limestone fragments <1" Limestone Fragments With Disaggregated Limestone 123.5-126.0' - Same as 116.0-122.0' except limestone fragments with sandy silt with gravel Limestone 126.0-127.0' - coarse sand-sized carbonate derived material grading to silty fine sand with 3"-4" limestone fragments 127.0-127.7' - yellowish gray, (5Y 7/2), medium strong to strong (R3 to R4), trace small voids (1/32"-1/8") <5%, single full core diameter piece	- - - - - - - - - - - - - - - - - - -
							-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-06	SHEET	8	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	5/07 START : 3/7/2007 END :	3/10/20	07 LOGGER : C. Sump	
≳□£	(%			DISCONTINUITIES	_ _ g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAC	GTH C	R Q D (%)	CTU	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR	RQ	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	s N	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-87.8					\perp	Limestone	
-	R14-SN				\pm	- 127.7-133.0' - limestone fragments 2"-4" diameter with varying amounts	-
1 1	10 ft 100%	NA	NA		+	of fine grained disaggregated	-
1 1	.0070				Ħ	 limestone, interval at 128.5-129.0' has 3 full size core fragments with 	-
1 7						fragments in between and exhibits	1
1 1					1	- fine (1/10"-1/2") bedding planes 133.0-134.9' - yellowish gray, (5Y	1
1 7					\mathbb{H}	7/2), similar to 127.0-127.7', horizontal partings vary from 1"-7",	_
					\mathbb{H}	light gray clayey silt infilling on	
					\Box	partings	
135					$oldsymbol{\perp}$	134.9-136.0' - limestone fragments	
-92.8					\perp	with sandy silt to gravel-sized	
1 4	136.0			420 0 440 OL NA	廿	fragments, angular to subangular, similar to above except more silt to	Drillaria Damari :
1 4				136.0-146.0' - NA	\pm	sand-sized particles	Driller's Remark: Advancing 6" casing -
1 4					+	136.0-141.0' - medium gray intermixed with yellowish gray, (N6	becoming easier (better _ rock)
-					+	with 5Y 7/2), moderate to strong HCI	- TOCK)
1 -					#	reaction, medium strong (R3), fragmented, fossiliferous (molds &	=
-					+	casts), large burrows (1/2" wide, 3"-4" long), voids in irregular zones	-
1 -					廿	(up to 30% surface), cavities (1/2"	-
-					\pm	diameter, circular), fragments 1"-4" diameter/length, lack of fines except	=
140 -97.8			NA		╁	in interval at 140.0-140.4' which is	_
1 -	R15-SN		INA		+	medium brown, fine grained disaggregated limestone (5-10%	-
-	10 ft 86%	NA			口	silica grains) with moderate HCI reaction	-
1 1	0070				甘	141.0-143.4' - with limestone	-
1 1					\perp	- fragments up to 3", intact core sections up to 0.3' in length	-
					1	j j	1
1 1]-	[1
					F	Disaggregated Limestone 143.4-144.6' - mild to moderate HCl	
					井	reaction, 10-20% silica grains	
145_					井	No Recovery 144.6-146.0'	
-102.8			NR		#	1	
1 4	146.0			440.0.450.0! NA	\perp	 	_
				146.0-156.0' - NA	+	Limestone Fragments - 146.0-147.6' - very coarse grained,	_
					\Box	with >50% of fragments 1/4" or larger, grading to coarse sand-sized	-
1 -					\perp	 with 2"-3" limestone fragments, all 	-
-					口	carbonate derived 147.6-147.9' - yellowish brown,	-
-					\pm	1-1/2"-2" thick, no interbed	-
-					+	147.9-151.0' - similar to 147.6-147.9', bedding plane parting evident	-
150					+	_ 1/2"-3/4" thick	-
150					十	-	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-06	SHEET	9	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	I1 bgs	on 3/	6/07 START : 3/7/2007 END : 3/	10/20	D7 LOGGER : C. Sump	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-107.8 - - - - - - 155 -112.8	R16-SN 10 ft 100%		NA	156.0-166.0' - NA		Limestone 151.0-151.8' - medium strong to strong (R3 to R4), fossiliferous (molds & casts), voids (1/32"-1/8") < 5% Limestone Fragments 151.8-153.9' - Same as 151.0-151.8' except 1" thick Disaggregated Limestone 153.9-155.0' - with gravel-sized limestone fragments, some dark brown mottling, possible organics Limestone 155.0-155.4' - Same as 151.0-151.8' Disaggregated Limestone	- - - - - - - -
- - - 160 -117.8 - -	R17-SN 10 ft 100%	NA	NA			155.4-156.0' - Same as 153.9-155.0 Limestone Fragments 156.0-166.0' - moderate yellowish brown to medium light gray, (10YR 5/4 to N6), strong (R4), with thin yellowish gray/dark brown sandy silt layer (1-1/2"-2" thick) at 158.0' and 159.0', few full core diameter limestone fragments 2"-3" thick at 161.0-163.0' with smaller fragments in between, disaggregated limestone increasing with depth at 164.5-166.0', fragments are medium strong to strong (R3 to R4), with trace small voids (1/32"-1/8") and cavities (<3/4" diameter) at 161.4-162.6' and 165.5-166.0', fragments are generally thin, partial disc shaped fragments that appear to be breaking on bedding plane surfaces, full core diameter limestone fragments at 158.6-159.0'	- - - - - - - - - - -
-165 -122.8 	166.0			166.0-176.0' - NA		Disaggregated Limestone 166.0-166.9' - with gravel-sized limestone fragments Limestone Fragments 166.9-167.7' - yellowish gray to light olive gray, medium strong to strong (R3 to R4), 1"-3" partings, clayey silt-sized infilling Limestone Fragments With Disaggregated Limestone 167.7-169.3' - fragments 1"-1-1/2" diameter, angular to subangular	Driller's Remark: Segregated by drilling



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-06	SHEET	10	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 3/7/2007 END : 3/	10/200	7 LOGGER : C. Sump	
₹ Ω <i>⊋</i>	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-127.8 175 -132.8	R18-SN 10 ft i 100%		NA			Limestone Fragments 169.3-171.6' - limestone with clayey silt light gray (N4) interbeds, limestone 1"-3" thick with interbeds 1"-2" thick 171.6-176.0' - limestone fragments (2"-4") with variable amounts of disaggregated limestone, full core diameter, limestone fragments from 173.1-173.3' and 175.4-176.0' are 2-1/2"-3" thickness	- - - - - -
-180 -137.8 -	R19-SN 10 ft I 100%		NA	176.0-186.0' - NA		176.0-176.2' - dense, hard, well rounded cobble-sized limestone fragments, spherical to lenticular, 1"-2" diameter, very fine crystal faces suggest recrystallization, strong HCI reaction when scratched 176.2-183.4' - limestone fragments are fine grained and angular to subangular, increasing disaggregation with depth	- - - - - - - - - - - -
-185 -142.8 	186.0			186.0-196.0' - NA		Disaggregated Limestone With Limestone Fragments 183.4-184.3' - gray clayey silt-sized limestone fragments with gravel-sized limestone fragments (3/4"-1-1/2") 184.3-185.3' - 2"-3" partings/fractures with clayey silt-sized limestone interbeds Disaggregated Limestone 185.3-186.0' - with gravel-sized limestone fragments 186.0-187.0' - disaggregated limestone Limestone With Limestone Fragments 187.0-188.9' - medium strong (R3), fragments are 2"-4" size, fossiliferous (molds and casts), cavities (1/2")	Driller's Remark: Segregation due to drilling



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-06	SHEET	11	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	6/07 START: 3/7/2007 END: 3/	10/20	07 LOGGER : C. Sump				
≥O €	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,			
TH B FACE	E RU STH, OVE	(%) _Q	FOC	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD			
DEP' SURI ELE	COR	S O	FRA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.			
-147.8					Ť	Limestone				
_	R20-SN				\vdash	 188.9-189.7' - strong (R4), trace fossils/voids 				
_	10 ft 100%	NA	NA		F	Limestone Fragments				
-	.0070				Ħ	 189.7-192.0' - coarse sand-sized grading downward to gravel-sized 	1			
						limestone fragments (2"-4")	1			
					Ħ	 192.0-192.2' - medium strong to strong (R3 to R4), moderate 	1			
_					H	yellowish brown limestone breccia 192.2-196.0' - limestone fragments]			
					H	with coarse sand/fine gravel-sized]			
					₽	disaggregated limestone, full core diameter limestone fragments at]			
195_				_		192.0' and 196.0'				
-152 <u>.</u> 8					厂	-				
	196.0			196.0-206.0' - NA	厂	Limestone With Limestone	-			
_				190.0-200.0 - NA	仜	- Fragments				
_					士	196.0-206.0' - moderate yellowish brown to grayish yellow, medium	-			
-								 strong to strong (R3 to R4). 		
_								+	limestone and fragmented limestone, fossiliferous with molds & casts to	
-							H	 10%, voids (1/32"-1/8") variable with depth and occurring in discreet 		
_					Ħ	zones (up to 40% of surface area),				
200					Ħ	 cavities roughly circular with diameters to 1", fine grained strong 				
-157.8					_	Ħ	(R4) rock at 201.0-201.4'			
	R21-SN				H	-	1			
	10 ft 100%	NA	NA		H	_]			
_					\vdash	_]			
_					F	_]			
_					I	-]			
_					I	-	-			
-					扛	-	-			
-					士	-	-			
205_ -162.8				_	士	L	-			
-	206.0				\perp	-	-			
	206.0			206.0-216.0' - NA	H	Limestone Fragments	-			
-					Ħ	- 206.0-207.5' - light olive gray, (5Y 5/2), fossiliferous, fragmented (2 full				
					Ħ	core diameter fragments), fossil				
					#	 molds and small cavities (<3/4") aligned horizontally along bedding 				
					1	planes, fragments are disc shaped 1/2"-3/4" thick with clayey silt on	1			
					H	parting surfaces (thin beds)	1			
					\vdash	- -]			
210										



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	1-06	CHEET	42	ΩE	4.4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	11 bgs	on 3/6	5/07 START : 3/7/2007 END : 3/	10/20	07 LOGGER : C. Sump	
≥ ∩ ∷	6)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-167.8 - - - - - -	R22-SN 10 ft 85%		NA	- - - - -		Limestone Fragments - 207.5-214.5' - silty to sandy gravel-sized limestone fragments, fragments vary from to 50 to >90% of core and range in size from 1/2" to >3" diameter, medium brown silt layer at 213.5' (organics)	- - - - - -
215 -172.8 - -	216.0		NR	216.0-226.0' - NA		No Recovery 214.5-216.0' Limestone - 216.0-225.0' - similar to 207.5-216.0', repeating sequence of (2"-4")	- - - - - -
- - 220 -177.8 - -	R23-SN 10 ft 90%		NA	- - - - - - - - -		angular limestone fragments and few full core diameter disc shaped fragments with sandy to silt with gravel-sized limestone fragment layers (1.0-2.0' thick) Limestone Fragments 217.2-217.6' - light olive gray, highly fossiliferous limestone fragments, large molds and casts (>1/2") (brachiopods), dark gray/black pyritic surface staining on parting surfaces and often restricted to fossil molds 217.6-219.3' - highly fragmented limestone, few fossils/voids Limestone Breccia 219.3-219.6' - light yellowish gray, medium strong (R3), with olive gray angular clasts, pyrite on fracture surfaces Disaggregated Limestone 220.0-222.4' - with grayel-sized	- - - - - - - - - - -
-225 -182.8 	226.0		NR	- - - 226.0-236.0' - NA		220.0-222.4' - with gravel-sized	- - - - - - - - -
200							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-06	SHEET	13	OF '	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 3/7/2007 END : 3/	10/20	D7 LOGGER : C. Sump	
≥∩≘	_ (%			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-187.8 - - - - - - 235 -192.8	R24-SN 10 ft I 100%		NA			Limestone 227.0-228.0' - fine grained, few fossils or cavities exhibiting pronounced bedding plane parting (1/4"-1/2" thick), highly fragmented 228.0-236.0' - disaggregated, coarse sand and fine gravel-sized (<1/2"), limestone fragments (1"-3") silt and fine sand-size percentage varies but is <15%, except medium brown sandy silt with <10% small (<1/4") limestone fragments at 232.0-232.5'	- -
240 -197.8	236.0 R25-SN 10 ft i 100%	NA	NA	236.0-246.0' - NA		236.0-246.0' - Same as 228.0-236.0' except medium brown with gravel-sized fragments (<15%)	- - - - - - - - - -
-245 -202.8 	246.0			246.0-256.0' - NA		244.2-245.4' - few larger (>1") limestone fragments, moderate HCI reaction	Driller's Remark: 6" casing advanced very easily



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-06	SHEET	14	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION : Vertical

WATER	LEVELS : 4.4	11 bgs	on 3/6	5/07 START : 3/7/2007 END : 3/	10/20	07 LOGGER : C. Sump	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-207.8 - - - - - -	R26-SN 10 ft 85%		NA	- - - - - - -		246.0-254.5' - Same as 236.0-246.0' - except except single full size diameter limestone fragment at 252.0', cone shaped with very thin dark brown horizontal laminations (< 1/32"), 1/6" total thickness, 1" diameter limestone fragment immediately above has dark gray/black pyritic coating on two fracture faces; medium yellowish brown sandy silt with fine gravel-sized fragments (<10%, 1/4"-1/2" diameter) at 253.4-253.5'	- - - - - -
255_ -212.8 -	256.0		NR	- - -		No Recovery 254.5-256.0'	- - -
260 -217.8 - - - - - - - - - - - - - - - - - - -	256.0 R27-SN 10 ft 92%	NA	NA	256.0-266.0' - NA		Limestone 256.0-265.2' - disaggregated, with limestone fragments, same as 253.4-253.5', fragments 1"-3" diameter	Driller's Remark: Drilling 6" casing advanced very easily
- - - - -	266.0		NR	- - - - -		Bottom of Boring at 266.0 ft bgs on 3/10/2007	- - - - -
-				<u>-</u>			-



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	I-07	CHEET	1 OF 16

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLIN	DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical							
WATER	LEVELS	: 4.41 bg	s on 3/6/0)7 5	TART : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard			
>00				STANDARD	SOIL DESCRIPTION g COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
H BE ACE ATIC		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND			
LEV.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
42.4 - - - - - -	0.0	5.0	R1-SN		Topsoil 0.0-0.7' - dark brownish black, (5YR 2/1), fine silica sand, organic matter Poorly Graded Sand Grading To Poorly Graded Sand With Silt (SP/SP-SM) 0.7-4.8' - brownish black grading to light gray mottled with dark yellowish orange, (5YR 2/1 to N7 with 10YR 6/6), no HCl reaction, fine silica sand, fines increase to 10% with depth, organics decrease with depth Note: Retrieved core appears compressed (larger diameter >6"); actual recovery is likely closer to 100% "Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Water levels not recorded during drilling Coring run times not recorded for I-07			
5 37.4 - -	7.0				Silty Sand / Sandy Silt (SM/ML) 4.8-5.0' - yellowish gray, (5Y 7/2), strong HCl reaction, very fine to fine sand, nonplastic fines, carbonate materials No Recovery 5.0-7.0'			
10_32.4	17.0	10.0	R2-SN		Poorly Graded Sand (SP) 7.0-8.3' - no HCI reaction, fine silica sand, may be slough material Silt With Sand (ML) 8.3-17.0' - grayish orange, (10YR 7/4), nonplastic to low plasticity, strong HCI reaction, <5% coarse sand to fine gravel (1/8"-1/4"), carbonate materials, at 8.0-9.0' are two 4"-5" diameter spherical, hard limestone fragments, with concentric layering/banding, light gray/light olive brown, possible re-crystallization indicated by fine "sparkling" reflective grains 17.0-27.0' - Same as 8.3-17.0' except grades to silty sand with gravel-sized limestone fragments at 19.0-22.0', grades back to silt with sand from 22.0-27.0', fragments are very friable and fossiliferous, with small (11/6") surface voids over 30-040% of surface, strong HCI reaction for both the silt and the limestone fragments, all material carbonate			



PROJECT NUMBER:	BORING NUMBER:			
338884 FI	I_07	CHEET	2 OF /	16

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION: Vertical

	LEVELS				START : 2/27/2007 END : 3/7/2007 L0	OGGER	· С	Sump, J. Burkard
			5 511 5/0/0	STANDARD	SOIL DESCRIPTION			COMMENTS
ĕĞ€ ŞŞ€	SAMPLE	INTERVA	L (ft)	PENETRATION			L06	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
PTH EVAJ			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOG		MBC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUI			<i></i>	(N)			SΥ	
22.4						_		_
l _		10.0	R3-SN			_		_
_		10.0	110 011			_		_
-						-		-
-						_		-
-						_		-
_						-		-
25 <u> </u>								
'''-						-		-
-						-		-
-						-		-
-	27.0				Silty Sand With Limestone Fragments (SM)		+	Core "hot" immediately following drilling,
_					27.0-29.5' - grayish orange, (10YR 7/4), fine graine	ed, -		likely drying thin layers
-					with gravel-sized (1/4"-3/4") limestone fragments (similar to fragments described for 19.0-22.0' abov	/е), –		-
-					gravel fragments are <15% of sample, clayey zone 29.0' with dark brown silt layer (possible organics),			-
-					carbonate materials	, all _		-
30					Limestone			-
12.4					29.5-36.6' - pale yellowish brown, (10YR 6/2), core fragmented, with one piece 8" in length, fossiliferou	eis —	Т	
-					(casts/molds), small (1/16"-1/8") surface voids ove			-
_					10-15% of surface, horizontal partings roughly 1"-2-1/2" apart, yellowish gray (5YR 7/2) clayey silt	, -	Ė	-
-					interbeds between partings, interbeds average <1"	,		-
-		9.6	R4-SN		and are compacted, between 34.0-35.0' and 36.0-36.7' there are some 12" thick clay/silt interbe	eds -		<u>-</u>
-					with 10% coarse sand and fine gravel-sized particl	les	Ш	
_						_	Т	<u>-</u>
1 -						_		1
1 -								<u> </u>
35						1		<u> </u>
7.4								
1						1	Ė	1
1						1	\vdash	Top of rock estimated to be approximately 37' below ground surface
					No Recovery 36.6-37.0'			or below ground surface
1 -					Begin Rock Coring at 37.0 ft bgs See the next sheet for the rock core log			
1 -					233 the host enection the rook core log			_
1 -								_
1 -						_		_
1 -						_		_
40								
1								
	l							İ



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	3	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard									
≥ ∩ ∷	6)			DISCONTINUITIES	ō		LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH TYPE OPIENTATION POLICIANESS	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND		
DEPTH SURFA ELEVA	CORE LENGT RECO\	RQD(FRACT PER FO	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBC		WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
	37.0 R5-SN 10 ft 100%	NA	NA	37.0-47.0' - NA			Silt And Limestone Fragments (ML) 37.0-47.0' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, with limestone in 1.0' thick interbeds at 4.0' intervals, limestone fragments (1"-3") subangular to slightly subrounded, contains numerous small voids (1/16"-1/8") and are friable (easily broken by hand), all carbonate materials	Start of rock coring		
-50 -7.6 -7.6 -7.6 12.6	R6-SN 10 ft 92%	NA	NA	47.0-57.0' - NA			Disaggregated Weak Limestone 47.0-54.5' - moderate yellow brown, (10YR 5/4), trace (<5%) limestone fragments (1/2"-3/4" in diameter), similar to above except zones containing thin dark brown/black lamination (possible organics) Limestone - 54.5-55.3' - moderate yellowish brown, with light yellowish gray silty clay interbeds, horizontal partings 1/2"-1" with clayey interbeds 1/4"-1/2" thick	Limestone not full core diameter, possible drill induced breakage		
-	57.0		NR	-	H	†	UHON	iliduced breakage		
	57.0				H	\dagger		-		
					l					



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-07	SHEET	4	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	S/07 START : 2/27/2007 END : 3/	7/200	LOGGER : C. Sump, J. Burkard	
₹ Ω <i>⊊</i>	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-0 -0 -17.6 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	R7-SN 10 ft 95%	NA	NA	57.0-67.0' - NA		Disaggregated Weak Limestone 55.3-56.2' - Same as 47.0-54.5' No Recovery 56.2-57.0' Disaggregated Limestone 57.0-63.0' - very fine grained, <5% limestone fragments (1/4"-3/4" in diameter), few large limestone fragments at 57.4' and 60.0' may represent thin harder limestone interbeds Limestone Fragments 63.0-63.5' - fragments are 1"-1-1/2" thick with silty (carbonate derived) material on surfaces, friable, fossiliferous (casts/molds), numerous small (1/16"-3/16") voids covering 50-60% of surface Disaggregated Limestone 63.5-66.5' - pale yellowish brown, changing with depth to limestone	- - - - - - - - - - - - - - - - - - -
70	R8-SN 10 ft 96%	NA	RR SA SR	67.0-77.0' - NA		fragments 1/4"-2" in diameter, dark brown/black thin organic rich lamination No Recovery 66.5-67.0' Limestone Fragments 67.0-76.6' - interbedded sequences, 4.0-5.0' of limestone fragments (2"-4" size) and disaggregated limestone with <5% small (<1/2") limestone fragments, thinly bedded (1/2"-3/4"), limestone with fine silt material and bedding plane parting 69.0-69.5', very friable, (mild to no HCl reaction on faces, mild reaction on partings), 1/2" thick, dark black laminated organic layer at 74.5' at top of upward fining sequence (silt zone) No Recovery 76.6-77.0'	
	11.U		1411			The Receiving Following	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	5	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 <u>bg</u> s	on 3/6	5/07 START : 2/27/2007 END : 3/7	7/2007	7 LOGGER : C. Sump, J. Burkard		
>00	(6			DISCONTINUITIES	G	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
— — — — — — — — — — — — — — — — — — —	018	ж.	H 4	77.0-87.0' - NA		Limestone Fragments 77.0-83.3' - Same as 67.0-76.6' except gravel-sized limestone fragments with depth (locally up to 4")	Lost circulation between 77.0-87.0' -	
80 -37.6 - - - -	R9-SN 10 ft 100%	NA	NA	NA				
85_ -42.6				- - - - -		- 83.3-85.6' - 4"-5" limestone fragments, light gray clayey silt with 15% small (1/4"-3/4") limestone fragments Limestone 85.6-87.0' - yellowish gray, (5Y7/2), dense, fine grained, fossiliferous	- - - - -	
- - - - 90 -47.6 -	87.0					(casts/molds), small voids (1/16"-1/8"), 10-15% small cavities (1/2"), 8"-9" core fragment, light gray clayey interbed Disaggregated Limestone 87.0-92.5' - carbonate derived very fine sand, dark brown/black organic layers (1"-2" thick), limestone fragments, subangular with few subrounded, 75% of limestone fragments are <1" in diameter with large (2"-4") fragments from 91.5-92.5'	- - - - - - - -	
- - - - 95_ -52.6 -	R10-SN 10 ft I 100%		NA	-		Limestone 92.5-97.0' - moderate yellowish brown, (10YR5/4), fine grained, moderately strong to strong (to R4), fossiliferous limestone, with variable percentages small surface voids (1/16"-1/8"), small circular solution cavities (<1/2"), clayey silt and limestone interbeds 94.0-94.5' and 94.6-95.0'	- - - - - - -	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	6	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DEPTH BELOW SUGATION (#) OI OI OI OI OI OI OI OI OI OI OI OI OI	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DISCONTINUITIES DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	LITHOLOGY ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	COMMENTS SIZE AND DEPTH OF CASING,
100	CORE RUN. LENGTH, ANI RECOVERY (ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,			
				PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBC	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - 105 -62.6	R11-SN 10 ft 96%		NA	97.0-107.0' - NA		Limestone 97.0-98.8' - grayish orange, (10YR 7/4), fine grained, trace surface voids or cavities, fine bedding lamination visible in discrete zones, irregularly shaped fragments 98.8-104.1' - moderate yellowish brown, (10YR 5/4), variable density of small (1/16"-1/8") surface voids with few small (<3/4") cavities Limestone Fragments 104.1-106.6' - large (2"-4") and fine gravel-sized limestone fragments (1/4"-3/4" in diameter), silty and sandy matrix (disaggregated limestone), very weak (R1) at 105.0-106.0'	SC-1 collected at 99.2- 100.0'
110 -67.6	R12-SN 10 ft 100%	NA	NR NA	107.0-117.0' - NA		No Recovery 106.6-107.0' Disaggregated Limestone 107.0-108.0' - with limestone fragments 1/4"-3/4" in diameter Limestone 108.0-110.9' - pale yellowish gray, (5Y 7/2), fossiliferous (molds & casts) (5%), small voids (1/16"-1/8") 30-40%, roughly circular cavities 1/2"-3/4" in diameter Limestone Fragments 110.9-113.1' - Same as 108.0-110.9' except larger fragments (3"-4"), with irregular subangular shape Limestone 113.1-113.9' - Same as 108.0-110.9' except less fragmented Limestone Fragments 113.9-114.4' - very friable Limestone 114.4-117.0' - Same as 113.9-114.4' except less fragmented	"Sandy" material at top of run may be the result of segregation during drilling Possible drill induced breakage SC-2 collected at 113.1-113.9' SC-3 collected at 115.8-116.6'



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-07	SHEET	7	OF	16

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

COMING	I WIL I I IOD AI	ND L	VIIIV	IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	4 00	ie bailei	ORIENTATION: Vertical
WATER	LEVELS: 4.4	11 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/2007	7 LOGGER : C. Sump, J. Burkard	
				DISCONTINUITIES	(n	LITHOLOGY	COMMENTS
S S S	.Q%		S	DESCRIPTION	1 💆	ROCK TYPE, COLOR,	
BEL ON	Z - R	(%	滿다		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SHOW THE SHOWER	RO	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014				, °	Disaggregated Limestone With	
-				-		- Limestone Fragments	4
					Ш	117.0-121.2' - moderate yellowish	_
				117.0-127.0' - NA		brown, (10YR 5/4), moderate to	
				-	Н	 strong HCl reaction, gravel-sized fragments are friable limestone. 	_
-				-		fragments range from 1/4"-1-1/4"	-
-				-	Ш	 with few large 2"-4" fragments 	-
120 -77.6				-	団		
-77.0				_	Н	_	_
					Н		
					Ш	Limestone	
	R13-SN			-	Ш	121.2-122.0'	1
-	10 ft 100%	NA	NA	-	口	Limestone Fragments	Possible drill induced
-	100%			-	버	 122.0-125.4' - moderate yellowish 	breakage -
-				-	₽Д	brown, (10YR 5/4), fragments of fine grained limestone in a light gray	-
_				-	Ш	- clayey silt matrix	-
				_	Н	_	_
125				-	Ш	_	
-82.6				_	Ш	_	_
-				-	╂┼╂	Limestone	-
-				-	目	 125.4-127.0' - Same as 108.0-110.9' except moderate yellowish brown, 	-
-				-	Н	fragmented at 126.5-127.0'	-
-	127.0			-	Ш	- Discourse rated Limeatons With	-
_				_	\vdash	Disaggregated Limestone With Limestone Fragments	_
				_	囯	127.0-128.0' - moderate yellowish	_
				127.0-137.0' - NA	Ш	brown, (10YR 5/4), moderate HCl	
				-	Ш	 reaction, carbonate derived Limestone 	_
-				-	H	128.0-137.0' - pale yellowish brown,	-
-				-	口	- (10YR 6/2), fine to medium grained,	-
130 <u> </u>					ᡛᡃᡰ	strong HCl reaction, limestone beds and fragments, fossiliferous, voids	
- 37.5				-	Ш	 (<1/16") over 75% of surface at 	-
_					団	128.0-128.9', 10% voids	-
				_	\vdash	128.9-133.0', trace voids on surface 134.0-137.0', interbedded with clay at	
	R14-SN		NA		川	133.0-134.0'	
	10 ft 100%	INA	NA		Ш]
	,			-	Ш	_	
-				-	╁┼┼	<u></u>	-
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_					Ш	_	-
135				_	$\vdash \vdash \vdash$		
-92.6					口		
					Н]
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-	407.0			-	╂┼┼	<u></u>	-
-	137.0				曰		-
			I				



PROJECT NUMBER:	BORING NUMBER:		
338884.FL	I-07	SHEET	8 OF 16

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	11 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/7	<u>//2</u> 00	7 LOGGER : C. Sump, J. Burkard	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ËS T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE	: RU :TH,	(%) O	TUR 100-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT SURF	ORE	RQD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	0.716	LE.	шш		0)	Limestone Fragments	
-				-	H	 137.0-137.9' - pale yellowish brown, 	-
_				- 137.0-147.0' - NA	H	(10YR 6/2), moderate HCl reaction, fragments are well graded	-
-				-	Ш	 gravel-size, carbonate derived Limestone 	-
-				-		137.9-138.6' - pale yellowish brown,	-
140				-	Н	 (10YR 6/2), medium to fine grained, 25-50% voids on surface, possible 	1
-97.6						alteration zone	_
_				-	Ш	 138.6-143.0' - light bluish gray grading to pale yellowish brown, (5B 	1
_			NA	-	ш	7/1 to 10YR 6/2), fine grained, strong HCl reaction, no voids, fossiliferous	1
	R15-SN			_	Ш	- norreaction, no voids, lossillerous	1
	10 ft 85%	NA		_	Ш	_	1
					Н	_]
_				_	H	143.0-143.9' - medium grained, - strong HCl reaction, 25-50% voids	_
_				_	H	(<1/16") on surface	_
_				_		Limestone Fragments - 143.9-145.5' - grayish orange, (10YR	
14 <u>5</u> -102.6						6/2), silty sand-sized disaggregated limestone with gravel-sized limestone	_
-102.6				-		- fragments	Core barrel quickly dropped while drilling –
_				-		No Recovery 145.5-147.0'	145.0-147.0'
_			NR	-		_	-
_	147.0			-	Ш	Disaggregated Limestone	SC-4 collected at 147.6-
_				-	Ш	 147.0-147.4' - pale yellowish brown, (10YR 6/2), strong HCl reaction 	148.4'
-				147.0-157.0' - NA	ш	Limestone	-
_				-	ш	 147.4-152.9' - pale yellowish brown, (10YR 6/2), medium grained, 	1
_				-		moderate to strong HCl reaction,	-
150				-	Н	 voids over 5-15% of the surface, fragments vary in size from 1"-6", 	1
-107.6				_	\vdash	slight color change (medium bluish gray [5B 7/1]) and possible alteration	
				_	H	zone at 151.2-151.6', increase in	1
					Ħ	surface voids to 25-50% at - 152.6-152.9'	
	R16-SN 10 ft		NA	_	H	_	_
_	100%	14/7	14/7	_	Ш	_]
_				-	Н	152.9-154.4' - light brownish gray,	
-				-	Н	_ (5YR 6/1), medium to fine grained,	
-				-	Щ	with fragments ranging from sand-size to 1" in diameter	-
-				-	Ш	154.4-155.6' - pale yellowish brown,	-
155 <u> </u>					Ш	(10YR 6/2), strong HCl reaction, interbedded clays, trace voids	-
-				-	Ш	Limestone Fragments	-
-				-	Ш	155.6-157.0' - Same as 154.4-155.6'	-
-	157.0			-		 except fragmented 	-
-	157.0						-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	9	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/200	LOGGER : C. Sump, J. Burkard	
ŞQ⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 160 -117.6 - - - - - - - - - - - - - - - - - - -	R17-SN 10 ft 90%		NA	157.0-167.0' - NA		Disaggregated Limestone With Limestone Fragments 157.0-157.8' - pale yellowish brown, (10YR 6/2), sand-sized disaggregated limestone material, with gravel-sized limestone fragments Limestone 157.8-158.3' - yellowish gray, (6Y 7/2), fine to medium grained, strong HCl reaction 158.3-160.9' - light olive gray, (5YR 5/2), fine to medium grained, strong HCl reaction, delayed HCl reaction, fragmented 160.9-164.6' - light olive gray, (5Y 5/2), fine to medium grained, strong HCl reaction, partially broken into disc-shaped fragments, numerous small solution cavities 164.6-166.0' - Same as 160.9-164.6' except more fragmented, with silt at bottom of section	
_			NR		Ш	No Recovery 166.0-167.0'	
-177 <u>-</u> -127.6 -127.6 175 <u>-</u> -132.6	R18-SN 10 ft 85%		NA	167.0-177.0' - NA		Disaggregated Limestone With Limestone Fragments 167.0-167.3' - pale yellowish brown, (10YR 6/2), fragments are gravel-sized Limestone 167.3-175.5' - yellowish gray, (5Y 7/2), medium grained, partially broken into disc-shaped fragments, voids (<1/16") over 10-25% of surface, with some small solution cavities (<5), HCL reaction is delayed	Possible drill induced breakage 167.3-171.0' Possible drill induced breakage 172.0-173.0'
-	177.0		NR			-	



PROJECT NUMBER:	BORING NUMBER:			-		
338884.FL	I-07	SHEET	10	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

COMING	METHODA	ND L	ZOII IV	IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	7 00	ne barrer	ORIENTATION: Vertical
WATER	LEVELS: 4.4	11 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/200	LOGGER : C. Sump, J. Burkard	
	(DISCONTINUITIES	C	LITHOLOGY	COMMENTS
ON (#)	ΝD (%)		S	DESCRIPTION	1 ŏ l	ROCK TYPE, COLOR,	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%	FRACTURES PER FOOT		SYMBOLIC LOG	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
HH X	RE FIGURE	(%) О	F.F.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
SUR	SOR	A Q	-RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λ×	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	016	ш	ш.ш	,	0,	Limestone Fragments	
_				_	H	- 177.0-180.0' - light olive gray, (5Y	_
					\Box	5/2), fine to medium grained,	
				177.0-187.0' - NA	Н	moderate to strong HCl reaction,	
_				-		 fragmented, voids (1/16") over 75% of surface, fossiliferous 	_
-				-	H	_ Of Surface, lossifilerous	-
_				-	ш	_	-
180					Н		
-137.6				_		Limestone Fragments With Disaggregated Limestone	_
					Н	180.0-185.3' - moderate yellowish	
				-	ш	brown, (10YR 5/4), large (up to 1"	_
-	R19-SN			-	Н	- thick) limestone fragments, with silt	_
-	10 ft		NA	-		and sand-sized disaggregated limestone, at 181.3-181.6' the	
-	100%			-	Н	 limestone fragments are light olive 	-
				-	Ш	gray (5YR 5/2), very fine grained,	_
				_	Н	with moderate HCl reaction	_
				_	Н	_	
185				-	ш	-	-
-142.6				_	╁		
-				-		 Limestone 	_
_				-	₽	185.3-187.0' - light olive gray, (5Y 5/2), fine to medium grained,	_
_				-	ш	- moderate to strong HCl reaction,	_
	187.0			_	Н	fragmented, voids (1/16") over	_
						10-40% of surface, fossiliferous Limestone Fragments	
					Н	187.0-196.4' - light olive gray to	
				187.0-197.0' - NA	Ш	yellowish gray, (5Y 5/2 to 5Y 7/2),	_
-				-		 fine to medium grained, mild to moderate HCl reaction, fragmented 	-
-				-	Н	(1/4"-1"), with disc-shaped fragments	-
_				-	H	up to 3" thick, poorly fossiliferous,	_
190_					Щ	voids vary from 0-30% coverage	
-147.6				_	Ш	_	
					Н		
1 7				_	H		1
	R20-SN		NA	-	Н	T .	
-	10 ft 94%	NA		-	ш	-	-
-	94%			-	H	-	-
-				-		_	-
_				_	Н	-	_
				_	Щ	_	
					Н		
195				_	H		1
-152.6				_	Н	_	
-				-	Ш	-	-
-				-	Ш	-	-
-			ND	-	A	No Recovery 196.4-197.0'	-
	197.0		NR		H	-	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	11	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/2007	LOGGER : C. Sump, J. Burkard	
≩O⊋	<u> </u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - 200 -157.6 - -	R21-SN 10 ft 100%		NA	197.0-207.0' - NA		Disaggregated Limestone 197.0-198.2' - coarse grained, carbonate derived, few (<10%) gravel-sized limestone fragments Limestone 198.2-203.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/1), abundant voids, thin (1/16" thick) light olive gray (5Y 5/2) convoluted bedding lamination with variable spacing (1/16"-1/2"), horizontal parting surfaces, also thin zones of limestone fragments with little or no surface voids or fossils visible Limestone Fragments	Possible drill induced segregation of core materials Run drilled 2/28/07 Infill material may have been lost during drilling 198.2-200.0' (parting/ fracture surfaces do not match) Possible drill induced breakage
- 205_ -162.6 - -	207.0			_		 203.0-207.0' - yellowish gray, with light olive gray to medium gray inclusions, (5Y 7/2 with 5Y 5/2 to N5), medium to coarse grained, moderate to strong HCI reaction, fragmented, void rich, fossiliferous, inclusions (1/2"-4") that are very hard/dense with mild HCI reaction even when pulverized (may be breccia fragments) 	- - - - - -
210 -167.6 -	R22-SN 10 ft 84%		NA	207.0-217.0' - NA		207.0-208.0' - yellowish gray, (5Y 7/2), fine grained, fragmented into 1"-4" diameter angular to subangular fragments 208.0-215.4' - moderate yellowish brown to light olive gray, (10YR 5/4 to 5Y 5/2), fine grained, medium strong (R3), fragmented (3/4"-2" diameter) with few pieces of full diameter core, highly fossiliferous (molds/casts), abundant voids, zone of less competent rock at 213.5', fine grained fossil-poor zone at 211.5'	Possible drill induced breakage -
215_ -172.6	217.0		NR	- - -		- - - No Recovery 215.4-217.0' -	- - - -



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	1-07	CHEET	12 OF 16

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

Possible limestone breccia	WATER	LEVELS: 4.4	11 bgs	on 3/0	6/07 START : 2/27/2007 END : 3/3	7/200	7 LOGGER : C. Sump, J. Burkard	
Limestone Fragments 217.0-217.9 Possible limestone breccia 227.0-237.0 Possible limestone breccia 227.0 Possible limestone	≷D≎	(%)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
Limestone Fragments 217.0-217.9 Possible limestone breccia 227.0-237.0 Possible limestone breccia 227.0 Possible limestone	DEPTH BELOV SURFACE ANI ELEVATION (f	CORE RUN, LENGTH, AND RECOVERY (%	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
227.0-237.0' - yellowish gray, (5Y 8/1), fine grained, with light olive gray (5Y 6/1) lamination, fragmented to coarse sand- and grayel-sized irregular-shaped fragments (large [>1"] fragments make up 10-20% of volume), fragments exhibit strong bedding plane features (beds 1/2"-1" thick) at 230.0-232.0', some recrease and gray surface coating that appear partially recrystallized (fine reflective crystal faces) R24-SN 10 ft NA NA 100% NA NA 100%	- 220 -177.6 - - - - - - - - - - - - - -	R23-SN 10 ft			217.0-227.0' - NA		217.0-219.5' - yellowish gray, (5Y 7/2), fine grained, fragmented, thin light olive gray (5Y 5/2) to medium gray (N5) lamination, well defined bedding plane partings (smooth, planar, 1/2"-1" spacing) on many fragments, other fragments are typically angular to subangular 219.5-227.0' - medium to coarse grained, fragmented, with increasing percentage of sand-size material (carbonate derived), highly fossiliferous (casts/molds), fragments include medium gray angular inclusions (1/2"-1") at 222.0-224.0' (possible limestone	
	-187.6 	R24-SN 10 ft		NA	227.0-237.0' - NA		8/1), fine grained, with light olive gray (5Y 6/1) lamination, fragmented to coarse sand- and gravel-sized irregular-shaped fragments (large [>1"] fragments make up 10-20% of volume), fragments exhibit strong bedding plane features (beds 1/2"-1" thick) at 230.0-232.0', some fragments exhibit dark gray surface coating that appear partially recrystallized (fine reflective crystal	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	13	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/2007	LOGGER : C. Sump, J. Burkard	
≥∩≘	_ (\$			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
240 -197.6 - - - - - - 245 - 202.6	R25-SN	NA	NA	237.0-247.0' - NA		Limestone Fragments 237.0-247.0' - Same as 227.0-237.0' except 6" of medium brown silt with gravel at 240.0', increasing percentage of sand-sized material with depth, limestone fragments are more friable and tend to decrease in size with depth	Possible drill induced "disaggregation"
250 -207.6 - - - - - - - - - - - - - - - - - - -	247.0 R26-SN 10 ft 100%		NA	247.0-257.0' - NA		247.0-257.0' - Same as 237.0-247.0' except limestone fragments vary from 30-70% over most of interval except sandy silt zone at 253.0-254.0'	Repeating upward fining sequences.



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-07	SHEET	14	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	11 bgs	on 3/	6/07 START: 2/27/2007 END: 3/	7/2007	LOGGER : C. Sump, J. Burkard	ard		
>∩ ⊕	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS		
ELO ANI	N, AND 3Y (%		ZES T	DESCRIPTION	CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
				_		Limestone Fragments - 257.0-267.0' - Same as 247.0-257.0'	_		
_				257.0-267.0' - NA		except consisting of sand to gravel-size (1") limestone fragments,	-		
-				257.0-207.0 - INA		 with fragments decreasing and 	-		
-				-		 becoming more friable with depth, few large fragments of more 	-		
260				-		competent fine grained limestone, silt zone is absent	-		
-217.6				-	Н				
_					Ш	<u>[</u>	_		
_	R27-SN			-	Н	-	_		
-	10 ft		NA	-	H	-	-		
-	100%			-		-	-		
_				-	H	-	-		
				_	H	-	_		
_				-		-	_		
265_ -222.6						_	_		
-					H	}	_		
_						-	-		
	267.0			_		1			
_				-		267.0-277.0' - Same as 257.0-267.0' except with gravel-sized fragments	Material appears drier than similar zone at boring I-02		
_				- 267.0-277.0' - NA		(1/4"-1-1/2") and sand-sized fragments of varying percentages,	drilling with mud Repeating upward fining		
=				-	ш	few large (>3") limestone fragments at 267.0' and 269.5' that exhibit fine	sequences (3-4' thick)		
					ш	bedding laminations (1/8"-1/2") and bedding plane partings, medium	_		
270_					Ш	brown silty zone at 275.0'	_		
-227.6				-	П	_	-		
-				-		-	-		
-	R28-SN			-		-	-		
	10 ft 100%	NA	NA		Н	_	-		
_				<u>-</u>		_	-		
_				-	Ш	_	-		
-				-	出	-	-		
275	<u>-</u>			-	\Box	-	-		
275_ -232.6					H	 -			
-					H	-	_		
-				-	片	-	-		
	277.0				H	-			



PROJECT NUMBER:	BORING NUMBER:			
338884 FI	I-07	CHEET	15 OF 1	6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/2007	LOGGER : C. Sump, J. Burkard	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-280 -237.6	R29-SN 10 ft	NA	NA			Disaggregated Limestone 277.0-283.4' - with gravel-size limestone fragments (20-40%)	4" core penetration slow (hard) upper 5-6 ft of run, very rapid in bottom 3 ft 6" casing driving very hard entire length of run Lost core material may have been poorly graded sand sized material that fell out of core barrel or (less probably) a void from 284-287, based on difficulty of driving 6" casing
-285 -242.6	64%		NR	- - - - -		- No Recovery 283.4-287.0'	- - - - - - -
-290 -247.6 	R30-SN 10 ft 95%		NA NR	287.0-297.0' - NA		Disaggregated Limestone - 287.0-290.0' - with gravel-size (1/4"-3/4") limestone fragments (10-15%), fragments are angular to subangular in shape, sand-sized material has strong HCI reaction, silty material has mild to moderate HCI reaction - Limestone - 290.0-291.5' - light olive gray, (5Y 5/2), fossiliferous, small (1/16"-1/8") voids over (15-30%) of surface, few larger (<3/4"), cavities, horizontal partings 1"-1-1/2" thick, fragments (2"-4"), few fragments are full core diameter No Recovery 291.5-292.0' Disaggregated Limestone With	Core from 287-291.5' recovered during 1st attempt coring 287.0-297.0' (45% recovery), bottom half of run assumed to have fallen out of core barrel 6" casing driven to 292' with difficulty, 4" core barrel retrieved and 6" casing advanced to 297 (causing slough to accumulate in hole)
295 -252.6 -	297.0		NA	- - - -		Limestone Fragments 292.0-297.0' - moderate HCl reaction, gravel-sized (1/2") limestone fragments 5-10%, HCL reaction is delayed	- - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	16	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/200	7 LOGGER : C. Sump, J. Burkard	
≩ Ω≨	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
ELO E AN ON (f	JN, AND RY (6	(RES	DESCRIPTION	- C LC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH E	SE RI IGTH SOVE	%) О	CTU FOC	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	/BOL	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
SUF	COF	RQ	FRA PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
(#) DEPTH BELOW SURFACE AND 307-6 1 1 1 1 1 1 1 1 1	CORE RUN, LENGTH, AND 31-0 ES 1-0 P. RECOVERY (%) RECOVERY (%)		FRACTURES FRACTURES FER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SOTIORIUS AL AL AL AL AL AL AL AL AL AL AL AL AL	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS Disaggregated Limestone With Limestone Fragments 297.0-297.8' - Same as 292.0-297.0' except limestone fragments are up to 3/4" diameter and make up 10% of	FLUID LOSS, CORING RATE AND
					1	_	_
				-		-	-
-					1	-	-
-					1	-	-
					\vdash		
					\perp		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-08	SHEET	1	OF	14	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

STADDUS STANDARD SOLD ESCRIPTION STANDARD SOLD ESCRIPTION SOLD ASSET STANDARD SOLD ESCRIPTION FRECOVERY (II) SOLD ASSET STANDARD SOLD ESCRIPTION SOLD ESCR	DRILLIN	DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical									
SOIL NAME. USCS GROUP SYMBOL. COLOR MOISTREAD PRINTING STRESH.TS SOIL NAME. USCS GROUP SYMBOL. COLOR MOISTRE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOCY RECOVERY (th) FTYPE 6*-8*-6* (N) Read Base Limestone 0.0-1.0 - very pale drange, (10YR 8/2), dry, fragments (<i (10yr="" (13),="" (158="" (5yr="" (cfi)="" (srw),="" -="" 1),="" 1.0-2.5*="" 2="" 2),="" 3.10="" 30-50%="" 4="" 5.1-5.2'="" 5.3.0-5.1="" 6="" 9.00="" 9.20="" <20%="" an="" analysis="" and="" as="" black,="" blue,="" brace="" brown,="" brownish="" clay="" dark="" diameter)="" dilatancy,="" except="" fat="" fi<="" fill="" fine="" fines="" fines,="" fire="" frontels,="" grained="" grained,="" greation,="" hci="" high="" hol="" imported="" medium="" moderate="" moist,="" motted="" no="" or="" organic.="" organics—wood="" pale="" plasticity,="" reaction,="" respectively,="" same="" sand="" sand,="" silica="" silky="" so="" td="" to="" yellowish=""><td>WATER</td><td>LEVELS</td><td>: 3.5 ft bo</td><td>s on 3/13</td><td>3/07</td><td></td></i>	WATER	LEVELS	: 3.5 ft bo	s on 3/13	3/07						
SOIL NAME, USCS GROUP SYMBOL, COLOR, BTYPE 6'-6'-6'-6'-6'-6'-6'-6'-6'-6'-6'-6'-6'-6						SOIL DESCRIPTION 0 COMMENTS					
Road Base Limestone 0.0-1.0' - very pale orrange, (10YR 8/2), dry, fragments (<3' diameter) imported fill Sity Sand (SM) 1.0-2.5' - dark gray, (N3), moist, fine to medium grained, no HCl reaction, <20% fines, organics-wood/rootlets, silica 2.5-3.0' - Same as 1.0-2.5' except brownish black, (5YR 2/1), 30-50% fines and organic 3.0-5.1' - Same as 1.0-2.5' except moderate yellowish brown, (10YR 4/2), no organics-wood/rootlets, silica 2.5-3.0' - Same as 1.0-2.5' except moderate yellowish brown, (10YR 4/2), no organics 5.1-5.2' - Same as 1.0-2.5' except dusky brown, (5YR 2/2), highly organic - rootlets up to 20%, up to 40% fines 5.2-5.8' - Same as 1.0-2.5' except dark yellowish brown, (10YR 4/2), 15-30% silt Poorly Graded Sand (SP) 5.8-6.0' - white, (N7), medium grained, silica sand, trace fines Sity Sand (SM) 6.0-8.2' - pale yellowish brown, (10YR 4/2), fine grained, no HCl reaction, fine silica sand, 10-20% fines grades to Fat Clay (CH) 10.32.5' - Same as 6.8-2' except pale blue, (56 6/2), moist, extremely high plasticity, no dilatancy, -10% every fine silica sand frat Clay (CH) 9.3-10.9' - pale blue, mottled pale yellowish brown, (68 6/2, 10YR 5/4), moist, extremely high plasticity, no dilatancy, -10% every fine silica sand to 10% calcareous gravel-sized fragments up to 1/2', trace fossil structure 10.9-11.0' - Same as 9.3-10.9' except grading to Silt (ML), very pale orange (10YR 8/2), moist, nonplastic, moderate to rapid dilatancy, strong HCl reaction, 10% every fines and selected and readrals Begin Rock Coring at 11.0 it bgs See the next sheet for the rock core log	AND Z	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	070					
Road Base Limestone 0.0-1.0' - very pale orrange, (10YR 8/2), dry, fragments (<3" diameter) imported fill Sity Sand (SM) 1.0-2.5' - dark gray, (N3), moist, fine to medium grained, no HCl reaction, <20% fines, organics-wood/rootlets, silica 2.5-3.0' - Same as 1.0-2.5' except brownish black, (5YR 2/1), 30-50% fines and organic 3.0-5.1' - Same as 1.0-2.5' except moderate yellowish brown, (10YR 4/2), no organics-wood/rootlets, silica 2.2', highly organic - rootlets up to 20%, up to 40% fines 5.1-5.2' - Same as 1.0-2.5' except dusky brown, (5YR 2/2), highly organic - rootlets up to 20%, up to 40% fines 5.2-5.8' - Same as 1.0-2.5' except dark yellowish brown, (10YR 4/2), 15-30% silt Poorly Graded Sand (SP) 5.8-6.0' - white, (N7), medium grained, silica sand, trace fines Sity Sand (SM) 6.0-8.2' - pale yellowish brown, (10YR 4/2), fine grained, no HCl reaction, fine silica sand, 10-20% fines grades to Fat Clay (CH) 9.3-10.9' - pale blue, mottled pale yellowish brown, (68 6/2, 10YR 5/4), moist, extremely high plasticity, no dilatancy, -10% every fine silica sand provided from the silica sand, to 10% calcareous gravel-sized fragments up to 1/2', trace fossil structure 10.9-11.0' - Same as 9.3-10.9' except grading to Silt (ML), very pale orange (10YR 8/2), moist, nonplastic, moderate to rapid dilatancy, strong HCl reaction, 10% every fines and sate and translatis Begin Rock Coring at 11.0 ft bys See the next sheet for the rock core log	H H H		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND					
Road Base Limestone 0.0-1.0' - very pale orrange, (10YR 8/2), dry, fragments (<3" diameter) imported fill Sity Sand (SM) 1.0-2.5' - dark gray, (N3), moist, fine to medium grained, no HCl reaction, <20% fines, organics-wood/rootlets, silica 2.5-3.0' - Same as 1.0-2.5' except brownish black, (5YR 2/1), 30-50% fines and organic 3.0-5.1' - Same as 1.0-2.5' except moderate yellowish brown, (10YR 4/2), no organics-wood/rootlets, silica 2.2', highly organic - rootlets up to 20%, up to 40% fines 5.1-5.2' - Same as 1.0-2.5' except dusky brown, (5YR 2/2), highly organic - rootlets up to 20%, up to 40% fines 5.2-5.8' - Same as 1.0-2.5' except dark yellowish brown, (10YR 4/2), 15-30% silt Poorly Graded Sand (SP) 5.8-6.0' - white, (N7), medium grained, silica sand, trace fines Sity Sand (SM) 6.0-8.2' - pale yellowish brown, (10YR 4/2), fine grained, no HCl reaction, fine silica sand, 10-20% fines grades to Fat Clay (CH) 9.3-10.9' - pale blue, mottled pale yellowish brown, (68 6/2, 10YR 5/4), moist, extremely high plasticity, no dilatancy, -10% every fine silica sand provided from the silica sand, to 10% calcareous gravel-sized fragments up to 1/2', trace fossil structure 10.9-11.0' - Same as 9.3-10.9' except grading to Silt (ML), very pale orange (10YR 8/2), moist, nonplastic, moderate to rapid dilatancy, strong HCl reaction, 10% every fines and sate and translatis Begin Rock Coring at 11.0 ft bys See the next sheet for the rock core log	PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY					
0.0-1.0" - very pale orange, (10YR 8/2), dry, fragments (-3" diameter) imported fill Silty Sand (SM) 1.0-2.5" - dark gray, (N3), moist, fine to medium grained, no HCI reaction, <20% fines, organics-wood/rootlets, silica 2.5-3.0" - Same as 1.0-2.5' except brownish black, (5YR 2/1), 30-50% fines and organic 3.0-5.1" - Same as 1.0-2.5' except moderate yellowish brown, (10YR 4/2), no organics-rootlets up to 20%, up to 40% fines 5.2-5.8" - Same as 1.0-2.5' except dark yellowish brown, (10YR 4/2), 15-30% sillt Poorly Graded Sand (SP) 5.5-6.0" - white, (N7), medium grained, silica sand, lirace fines Sity Sand (SM) 6.0-3.2" - pale yellowish brown, (10YR 4/2), fine grades to Fat Clay (CH) 9.3-10.3" - Same as 6.0-8.2' except pale blue, (58 6/2), moist, extremely high plasticity, no dilatancy, no HCI reaction, 10% every fine silica sand Fat Clay (CH) 9.3-10.3" - yale blue, mottled pale yellowish brown, (68 8/2, 10YR 8/4), moist, extremely high plasticity, no dilatancy, <10% fine silica sand, up to 10% calcareous gravel-sized fragments up to 1/2", trace fossil structure 10.9-11.0" - Same as 9.3-10.9" except grading to Silt (ML), very pale orange (10YR 8/2), moist, nonplastic, moderate to rapid dilatancy, strong HCI reaction, <10% every fines and sezded carbonate materials Begin Rock Coring at 11.0 ft bgs See the next sheet for the rock core log					(N)						
fines 5.2-5.8' - Same as 1.0-2.5' except dark yellowish brown, (10YR 4/2), 15-30% slit Poorty Graded Sand (SP) 5.8-6.0' - white, (N7), medium grained, silica sand, trace fines Silty Sand (SM) 6.0-8.2' - pale yellowish brown, (10YR 4/2), fine grained, no HCI reaction, fine silica sand, 10-20% fines grades to Fat Clay (CH) 8.2-9.3' - Same as 6.0-8.2' except pale blue, (5B 6/2), moist, extremely high plasticity, no dilatancy, no HCI reaction, <10% very fine silica sand Fat Clay (CH) 9.3-10.9' - pale blue, mottled pale yellowish brown, (5B 6/2, 10YR 5/4), moist, extremely high plasticity, no dilatancy, <10% fine silica sand, up to 10% calcareous gravel-sized fragments up to 1/2", trace fossil structure 10.9-11.0' - Same as 9.3-10.9' except grading to Silt (ML), very pale orange (10YR 8/2), moist, nonplastic, moderate to rapid dilatancy, strong HCI reaction, <10% very fine sand-sized carbonate materials Begin Rock Coring at 11.0 ft bgs See the next sheet for the rock core log		0.0	6.0	R1-SN		0.0-1.0' - very pale orange, (10YR 8/2), dry, fragments (<3" diameter) imported fill Silty Sand (SM) 1.0-2.5' - dark gray, (N3), moist, fine to medium grained, no HCl reaction, <20% fines, organics-wood/rootlets, silica 2.5-3.0' - Same as 1.0-2.5' except brownish black, (5YR 2/1), 30-50% fines and organic 3.0-5.1' - Same as 1.0-2.5' except moderate yellowish brown, (10YR 4/2), no organics 5.1-5.2' - Same as 1.0-2.5' except dusky brown, (5YR					
20	32.5 - - - - - 15 27.5 - - - -	6.0				fines 5.2-5.8' - Same as 1.0-2.5' except dark yellowish brown, (10YR 4/2), 15-30% silt Poorly Graded Sand (SP) 5.8-6.0' - white, (N7), medium grained, silica sand, trace fines Silty Sand (SM) 6.0-8.2' - pale yellowish brown, (10YR 4/2), fine grained, no HCl reaction, fine silica sand, 10-20% fines grades to Fat Clay (CH) 8.2-9.3' - Same as 6.0-8.2' except pale blue, (5B 6/2), moist, extremely high plasticity, no dilatancy, no HCl reaction, <10% very fine silica sand Fat Clay (CH) 9.3-10.9' - pale blue, mottled pale yellowish brown, (5B 6/2, 10YR 5/4), moist, extremely high plasticity, no dilatancy, <10% fine silica sand, up to 10% calcareous gravel-sized fragments up to 1/2", trace fossil structure 10.9-11.0' - Same as 9.3-10.9' except grading to Silt (ML), very pale orange (10YR 8/2), moist, nonplastic, moderate to rapid dilatancy, strong HCl reaction, <10% very fine sand-sized carbonate materials Begin Rock Coring at 11.0 ft bgs					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-08	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION : Vertical

WATER	LEVELS: 3.5	ft bgs	on 3/	13/07 START: 3/13/2007 END:	3/15/2	2007	LOGGER : L. Prochaska, C. Sum	р
ŞĢ⊋	(%			DISCONTINUITIES	<u> </u>	۶ L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	is S	STMBOLIC LO	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - 15 27.5	R2-SN ¹ 10 ft 100%	NA	NA	11.0-16.0' - NA		-	Fat Clay (CH) (11.0-11.3' - Same as 10.9-11.0 Silty Sand And Limestone (SM) 11.3-16.0' - very pale orange, (10YR 8/2), dry, strong HCl reaction, extremely fine to very fine sand-sized, very friable fragments up to 4" in diameter	NA = Not Applicable NR = No Recovery R2: 9 minutes, 6' slough at top of core (discarded)
 20	R3-SN 10 ft	ΣĄ	NA	16.0-26.0' - NA			16.0-21.6' - Same as 11.3-16.0' except fragments up to 4" in diameter from 19.8-20.6', predominately gravel-sized fragments (<1/2"), voids (<1/16") covering 30-40% of surface, fossiliferous (molds and casts)	Note: Installed 30' of 8" casing during run
- - - - - 25 17.5	100%						21.6-24.4' - Same as 11.3-16.0' except strong HCI reaction, 20-30% sand-sized particles, 30% gravel-sized fragments (<2"), carbonate materials 24.4-26.0' - Same as 16.0-21.6' except grayish orange, (10YR 7/4)	R3: 26 minutes
- - - - - - 30 12.5	R4-SN			26.0-36.0' - NA	- - - - - -	- - - - -	Sandy Silt (ML) 26.0-31.8' - grayish orange, (10YR 7/4), very fine to fine grained, nonplastic, carbonate (similar to 24.4-26.0')	_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-08	SHEET	3	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	s on 3/	/13/07 START: 3/13/2007 END: 3	/15/2	200	7 LOGGER : L. Prochaska, C. Sur	mp
≥∩≎	(%			DISCONTINUITIES	ي	٦	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLICITOR	3 [ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	E RU STH, OVEF	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	0.0		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF	SORE	ROD	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	X ME	I	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
000	10 ft	NA	NA		111	,		
-	100%				1	╟		-
_					1111	Ш	Silt With Sand (ML) 31.8-32.3' - pale yellowish brown,	_
_					111		mottled dusky yellowish brown,	-
-					1		(10YR 6/2, 10YR 4/2), fine to medium grained, nonplastic, rapid	-
_					111		dilatancy, dusky yellowish brown material has no HCl reactivity; pale	-
							yellowish brown material is calcium	=
35				_]		carbonate, dusky yellowish brown is organics and moderate HCl reaction	
7.5							Silty Sand And Limestone	R4: 11 minutes
_	36.0			20.0.40.01. NA	11	Щ	Fragments (SM) 32.3-32.5' - Same as 24.4-26.0'	_
-				36.0-46.0' - NA	Ľ	⇉	32.5-36.0' - Same as 24.4-26.0' except light gray, (N7), moist, strong	-
-					Ł	╚	HCl reaction, friable fragments up to	-
_					Ł	4	4" in diameter comprised of very fine to fine sand-sized particles.	-
-					+	H	carbonate materials	-
_					₽	4	Limestone Fragments 36.0-46.0' - pale yellowish brown,	-
-					卩	4	(10YR 6/2), moist, very fine to fine grained, strong HCl reaction, very	-
40					乜	┖	weak (R1), very friable; 36.0-36.8'	=
2.5				-	þ	┫	 fragments up to 3-1/2" in diameter and 2" in length of medium strong 	Driller's Remark: Broke
_	R5-SN	NIA.	NIA		Ъ	₫	(R3) rock, voids up to 3/16" covering approximately 20% of the surface, no	threads on 6" casing during - run
	10 ft 100%	NA	NA		Ъ	₫	fossils; 36.8-37.2': fracture zone	41.1-42.0' Possible
_					Ь		same as 36.0-36.8' except maximum 2" diameter; 37.2-37.5': fragment	carbonized organics
_					Ь	╛	zone same as 36.8-37.2' except gravel fragments up to 1/2";	_
_					F	\dashv	41.1-42.0" black (N1) mottling,	-
-					F	\exists	organics	-
_					F	7		-
					F	7		-
45 <u> </u>				-	Ħ	╁	_	R5: 11 minutes —
-	46.0				Ħ	#		End drilling 3/13/07
-	70.0			46.0-56.0' - NA	Ľ	Ⅎ	Disaggregated Weak Limestone	Resume drilling on 3/14/07
-					Ľ	Ⅎ	With Limestone Fragments 46.0-56.0' - grayish orange, (10YR	-
					\mathbb{H}	╣	7/4), <10% gravel (<1-1/2"), dark brown/black mottling and thin layer at	
					F	4	irregular intervals (organics),	
					\mathbb{P}	\Box	moderate reaction to HCl (slow to start, especially given fine grain	
_					上	4	size), gravel-sized limestone	
_					口	\Box	fragments of weak (R2) and friable material, carbonate derived with	_
50 -7.5				-	占	╬	possible trace silica fine sand-sized grains	_
-1.5	R6-SN				占	╛	g. 3.1.10	-
	140-014				┾	\dashv		_
					-	_		



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	l I-08	SHEET	4	OF ·	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.5	ft bg	s on 3	/13/07 START : 3/13/2007 END : 3/1	15/20)7 LOGGER : L. Prochaska, C. Sum	р
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIO	TH.	Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE	ο	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	0 ⊒ m 10 ft	ı≃ NA	u⊥α NA	THIORNESO, OUTLI AGE GTAINING, AND HOTTINESO	S	CHARACTERISTICS	
_	100%		' ' '	-	H		Higher percentage of sand-
_				-	Н	_	sized particles at top of
-				-	Н	_	run, possible segregation _ during drilling or slough
_				-		_	material -
_				-		_	-
-				-	Ш	_	-
				-	Н	_	-
55 <u> </u>					\Box		R6: 11 minutes
-				-	H	_	-
-	56.0			- 56.0-66.0' - NA	H	Disaggregated Limestone With	-
-				-	Ш	 Limestone Fragments 	=
-				-	Н	56.0-66.0' - similar to 46.0-56.0' (carbonate derived) from 56.0-61.0',	Driller's Remark: Slightly
-				-		 thin limestone beds (1" thick) with light gray clayey silt interbeds 	more difficulty advancing - 6" casing
-				-		(1/2"-1" thick) from 61.0-62.0', from	o casing _
-				-	Ш	 62.0-66.0 grayish orange (10YR 7/4) sandy-silt with gravel-sized limestone 	-
-				-		fragments as described above from	-
60				-		 56.0-61.0', fragments angular to subangular and most (90%) are 	-
-17.5						<3/4" diameter	
-	R7-SN			-	H	_	-
-	10 ft 100%	NA	NA	-	H	_	_
				-		_	-
				_	Ш		=
				_	Ш	_	_
				_	Ш	_	_
					Ш	_	
					Ы		
65_				_	\vdash		
-22.5				_	H		R7: 15 minutes
	66.0				H		_
				66.0-76.0' - NA	H	Limestone - 66.0-69.5' - thinly bedded (3/4"-2")	_
4				-	Ш	with silty sand material on parting	Cilly a and intout!-
4				-	Щ	surfaces, highly fossiliferous (mold, casts, brachiopods), numerous small	Silty sand interbeds washed out during drilling –
-				-	Щ	voids (1/32"-1/8") over 40-50% surface area. few voids/molds filled	
-				-	Ш	 with black platy soft material 	Continued repeating sequences of thin -
-				-	Ш	_ (possible organics) 69.5-71.0' - thin beds with finer	limestone beds with fine grained interbeds
-				-	Н	 clayey soft interbed material (1/2"-1" 	separated by silty sands -
70 <u> </u>				_	\vdash	thick), limestone exhibits fine bedding laminations with dark	with limestone fragment zones 4.0-6.0' thick
	R8-SN			-	H	 brown/black shining on parting 	
-	110-011					surfaces	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l-08	SHEET	5	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	s on 3	/13/07 START : 3/13/2007 END : 3/	15/20	007	LOGGER : L. Prochaska, C. Sum	np q	
≥∩≎	(%)			DISCONTINUITIES	ပ္ခ	L	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
FH BI	E RU 3TH, OVEF	(%) O	STUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD	
DEP SURI ELE\	COR	ROI	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.	
	10 ft	NA	NA		Ħ	┢	Disaggregated Limestone		
_	100%				\perp	╁	71.0-76.0' - with gravel-sized limestone fragments (all carbonate	-	
-					H	ł	derived), becoming more coarse with	-	
_					F	7	 depth to gravel-sized limestone fragments, 10% gravel-sized 	-	
					H	Ť	fragments >1" diameter (upward fining sequence)	_	
]	[illing sequence)		
					H	1			
75				_	H	┖	_		
-32.5					H	╁		R8: 24 minutes	
-	76.0			76 0 96 0! NA	H	╁	Diagramment Limesters With		
-				76.0-86.0' - NA	\mathbf{H}	7	Disaggregated Limestone With Limestone Fragments	-	
-					\vdash	1	76.0-83.9' - coarse sand-sized with bi-modal gravel-sized limestone	Driller's Remark: Difficulty	
-					扛	‡	fragments, fine gravel-sized	driving 6" casing, tight, -	
_					士	╁	fragments (1/4"-3/4") with few (<10%) 1"-2" fragments, all	(80.0-81.0') medium coarse sand causing	
-					\perp	†	carbonate derived (moderate to strong reaction with HCI), silt	problems -	
_						t	dominated zones at 78.0-78.5' and	-	
80					+	╁	80.8-81.4', black tacky clayey layer approximately 3" thick at 81.2'	-	
-37.5			NIA.	_	Ħ	approximately 5 thick at 61.2			
_	R9-SN	NIA		NIA			Ħ	Ŧ	_
	10 ft 100%	NA	NA		F	Į			
					Ħ	1			
_					H	‡		_	
_					片	‡		_	
_					Ł	╁		-	
-					╀	╁	Limestone And Limestone	Fine interbed material	
-					F	7	Fragments 83.9-86.0' - medium strong (R3),	possibly washed out during _ drilling	
85 <u> </u>				_	┰	╊	1"-3-1/2" fragments and full diameter	R9: 18 minutes	
-	86.0				仜	1	for core fragments, yellowish gray, fossiliferous (molds>casts), small	-	
-	00.0			86.0-96.0' - NA	口	†	voids over 20% of surface 86.0-87.4' - Same as 83.9-86.0'		
_					口	†	00.0-07.4 - Gaine as 03.3-00.0		
-					口	†		Driller's Remark: Lost	
					Ь	1	87.4-88.5' - coarse grained, sandy gravel-sized limestone fragments	drilling fluid (bentonite – mud) circulation	
					上	\int	(1-3" diameter), increasing clay]	
_					\vdash	Ł	content Limestone]	
_					F	1	88.5-91.4' - 1"-4" thick with light gray (N7) clayey silt interbeds (1/2"-2"]	
90 <u> </u>				_	F	1	thick)	_	
-47.5	D40 CN				#	1		-	
_	R10-SN				╁	-			
					•	-			



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-08	SHEET	6	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.5	ft bgs	s on 3/	13/07 START : 3/13/2007 ENI	D : 3/15/2	2007	LOGGER : L. Prochaska, C. Surr	р
≳□£	<u> </u>			DISCONTINUITIES	g	Ł	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTN	ΙΨ		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
95 -52.5 -52.5 -100 -7.5 -62.5 -62.5 -7.5 -7.5 -7.5 -7.5 -7.5 -7.5 -7.5 -7	10 ft 100% R11-SN 10 ft 92%	ON NO NO NO NO NO NO NO NO NO NO NO NO N	X					R10: 26 minutes R11: 25 minutes R11: 25 minutes Approximately 50% of run limestone fragments



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-08	SHEET	7	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

COMING	METHODA	ND L	ZOII IV	/IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	14 0	core parrer	ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bgs	s on 3	/13/07 START : 3/13/2007 END : 3/	15/20	007 LOGGER : L. Prochaska, C. Sum	р
	<u> </u>		DISCONTINUITIES		(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH	Z - Z	(%	굶			MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
TH VAT	RE F GTP SOVI	5)	F5	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	IBOI	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUR SUR SILE	READ READ READ READ READ READ READ READ	R Q D (%)	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	3Y M	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	10 ft	NΑ	NA	·	+ "		
-	100%				L		-
_					╨		_
					П		
					Ъ-	-[·
-						<u>†</u>	-
-					╨	<u>+</u>	-
_					╁	-	-
_					╀	<u>_</u>	_
115_				_	片		
-72.5					Н	Disaggregated Limestone 115.0-116.0' - with gravel-sized	R12: 16 minutes
1 7	116.0				П	limestone fragments as found in	_
1 -	. 10.0			116.0-126.0' - NA	\vdash	106.0-115.0' (sharp contact)	· -
-					世	- Fragmented Limestone	-
-					╨	116.0-123.8' - moderate yellowish brown, (10YR 5/4), moderate to	Driller's Remark: 118.0-
-					世	_ strong HCl reaction, medium strong	120.0' & 121.0-123.0' -
_					┢	(R3), with coarse sandy fines and	possible voids based on
						fine gravel-sized limestone in zones (1/4"-1"), large limestone fragments	penetration rate
					Ш	are fossiliferous with numerous small	
_					Т	voids (1/32"-1/8") over 20-40% of the	-
400					╁	surface, large cavities (1/2") associated with large fossil molds,	-
120 -77.5			NA	_	世	few worm borings (1/4" diameter,	
-	R13-SN				₩	1"-3" long). End of run: limestone	-
_	10 ft	NA			世	fragment with fine grained angular clasts 1/4" thick, 1"-1-1/2" across	_
	78%				┢	(may be rip-up clasts) with mild	_
						reaction to HCl when scratched,	
					Н	clasts are hard and contain at least 10% silica (fine quartz grains visible	
_					ш	in fracture corners), clasts are finely	-
-					╁	laminated with alternating light and	-
-					亡	dark layers (1/32"-1/8" thick)	-
-					╀	No Recovery: 123.8-126.0'	-
-					П	1	-
125_			NR	_	\vdash	_	
-82.5							R13: 29 minutes
1 7	126.0				\vdash	-	_
1 -	-20.0			126.0-136.0' - NA	Ħ	7	-
-					+	†	=
-					F	}	-
-					╀	<u></u>	-
					Д	_	_
					\vdash	1	_
1 7					F		
1 7					⇈	†	_
100					口	-	-
130 <u> </u>				_	╁╌	 -	_
-	D44 C1		NA		F	-	-
	R14-SN		INA		片		
					1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-08	SHEET	8	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING	NETHOD A	ND EC	ZUIFIV	/IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	4 (0)	e barrer	ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bgs	s on 3	/13/07 START : 3/13/2007 END : 3/	15/200	7 LOGGER : L. Prochaska, C. Sum	np .
	_			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG		
ON A	Z, ₹, Z	~	FRACTURES PER FOOT	DESCRIPTION	길	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI		(%) O	T. D.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	l g	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무유의		Ø	ZAC ER	PLANARITY, INFILLING MATERIAL AND	₹	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
		ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
	10 ft 93%	NA				Limestone Fragments	Driller's Remark: Possible
_	9376			-	$\Box \Box$	126.0-135.3' - alternating 1.0-2.0'	void at 131.0-133.0' based -
-				-	口	intervals of large limestone fragments (>3") and coarse sandy	on 4" core penetration rate
_				-	₽	gravel-sized limestone fragments	1
						(1/2"-2") with finely laminated	
1 7						(1/16"-1/6") argillaceous fragments	1
-				-	╆	from 132.3-133.9', fragments exhibit	1 -
-				-	╁┰╂	well defined bedding plane parting (smooth and planar) and react	-
				_	口	moderately to HCl when scratched	_
135					Н	(poorly when not), fine quartz grains	
-92.5					ш	visible on fresh fracture faces and	R14: 18 minutes
-			NR	-	╁	corners (10-15% quartz) no fossils or	-
-	136.0		L	420 0 440 0L NA	₽	voids, siliceous, well bedded, finely laminated, calcareous, silty sandy	-
I _				136.0-146.0' - NA -	Ш	limestone material below]
					\vdash	No Recovery 135.3-136.0'	
1 1				-	口	Limestone Fragments	1 1
-				-	╙	. 136.0-144.6' - mild HCl reaction, medium strong (R3), limestone	-
_				-	╁┼┼	fragments with coarse sand and	-
				_		gravel-sized fragments of limestone	_
						(1/4"-1"), larger limestone fragments	
				_	Ш	(>3" diameter), at 136.8 finely	1
				-	╁	bedded limestone, 1/4" bedding planes, smooth & planar, fine	-
140 <u> </u>					╀┼	alternating light/dark laminations,	
-97.5			NA	_		quartz (silica) grains visible on	_
	R15-SN				Н	fracture edges (approximately 10%)	
1 7	10 ft 86%	NA		-	11	•	1
-	0070			-	┅		-
-				-	╁┰╂		-
				_			_
					Н		
				_	$\Box \Box$	•	1
-				-	口		-
-				-	╀┼		-
				_	ш]
145					Н	No Recovery 144.6-146.0'	
-102.5			NR		口		R15: 37 minutes
1 -	4400		'''`	-	ഥ	•	1
-	146.0			- 146.0-156.0' - NA	$\vdash \vdash$	Limestone	-
				170.0-130.0 - NA -	口	146.0-146.3' - light olive gray, (5Y] -
					Н	5/2), fine grained, mild to moderate	
					Ш	HCl reaction, fine silica grains, drusy	1
-				-	다	calcite, fine, clear yellowish recrystallized grains, poorly	1
-				-	₩	fossiliferous, sharp contact with	Disaggregated due to
				-	口	underlying rock	drilling method
					Н	146.3-148.0' - yellowish grey, (5Y	
1 7				_	卅	7/2), strong HCl reaction,	1
,				-	口	fossiliferous, with small voids	-
150 <u> </u>					╁┼┼	_ (1/32"-1/8") over 10% of surface	-
-107.3	_			_	口]
	R16-SN				Ш		
L					Ш		
_							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-08	SHEET	9	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

COMING	METHODA	ND L	VIIIOX	IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	4 00	le bailei	ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bgs	s on 3	/13/07 START : 3/13/2007 END : 3/	15/200	7 LOGGER : L. Prochaska, C. Sum	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
HH	N F F	(o	FRACTURES PER FOOT	2200.111 11011	읙	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HE E	E R STH	(%) O	FO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무용의	RNA	Ø	RA(ER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	⋝	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δѕш		œ		THIORNEOU, OUTLAND TOTTIVEOU	S		
	10 ft 100%	NA	NA		Ш	Limestone Fragments	
_	10070			-	Ш	- 148.0-154.3' - yellowish gray, (5Y 7/2), fossiliferous with small voids	1
-				-		(1/32"-1/8") over 10-20% of surface,	-
l -					₽₽	few larger (1/2") cavities (fossil	-
					Ш	molds), 2"-4" horizontal partings with	
-				-		clayey silt and gravel-sized limestone	1
-				-	ш	- fragment interbeds (1/2"-1-1/2"	-
_				-	$+ \Box$	thick), interbed material exhibits low to moderate plasticity, thin zone	-
l _						- (2"-3" thick) of friable limestone	Disaggregated due to -
155					ш	fragments and moderately graded	drilling method
-112.5				_	ТT	sand-sized material, strong reaction	R16: 34 minutes
-				-	口	to HCl and trace (<5%) silica grains	-
I -	156.0				₽₩	is present at 148.6'	
1				156.0-166.0' - NA	Ш	154.3-156.0' - moderate yellowish brown, (10YR 5/4), moderate to	
I -					\Box	strong HCl reaction, silty, sandy]
-				-	╁┼	gravel-sized material (all carbonate	
-				-		derived), gravel-sized fragments	-
l _					Н	friable	_
					Н	156.0-156.8' - yellowish gray, (5Y 7/2), fossiliferous, small voids	
-				-	Ш	(1/32"-1/8") over 10-20% surface,	1
-				-	╁┼┼	large cavities (up to 1/2" diameter	-
l _				_	H	and 1/2" deep), fragments	_
160						subangular to subrounded in shape	
-117.5					Н	156.8-158.0' - moderate yellowish brown to dark yellowish orange,	
-	R17-SN		NA	-	TT	(10YR 5/4 to 10YR 6/6), very friable,	-
-	10 ft	NA		-	ш	fine recrystallization, possible trace	-
l _	94%				Н	silica sand	_
						158.0-163.0' - Same as 156.0-156.8'	
_				-	ш	except strong HCl reaction, light gray	1
-				-	НН	clayey silt layer at 160.9' (low plasticity), moderate brown (5YR 3/4)	-
-				_		- poorly graded very fine	_
					ш	sand/silt-sized material, possible	
_				_	$\vdash \vdash \vdash$	trace silica sand (fine), fine clear]
1 -				-	口	- particles (recrystallization)	Assume material not
-				-	╀┸┨	Limestone 163.0-165.4' - light olive gray, (5Y	recovered was lost at end -
165_						— 5/2), strong (R4), dense, hard, few	of run
-122.5						small voids (1/32"-1/8") <5% surface,	R17: 36 minutes
I -	166.0		NR	-	Ш	horizontal partings (3/4"-5" spacing),	1
-	100.0			166.0-176.0' - NA	Ш	generally planar, silty with	<u> </u>
-				-	\Box	gravel-sized limestone fragments, interbeds at 164.0' (2" thick) and	-
I _				_	Н	164.5' (light gray N7, dry), at 164.3'	
					Ш	very dry, powdery silt-sized interbed	
I -				-	╟┤	material	
-				-	╁┼┤	No Recovery 165.4-166.0'	-
I -					Ш	_	-
					Н	_	
I -					Н	_]
I				-	口	-	
170 -127.5			NA	_	╀┤		-
-127.5				-	Н	_	
	R18-SN				Ш]
					1 1		
					l l		
							ı



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-08	SHEET	10	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.5	ft bgs	s on 3	/13/07 START : 3/13/2007 END : 3/	15/20	07 LOGGER : L. Prochaska, C. Sun	np
≥∩ ::	(9)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - -	10 ft 78%	NA		-		Limestone And Limestone Fragments 166.0-173.8' - light olive gray, (5Y 5/2), with intervals of completely disaggregated limestone material, silty sand-sized with gravel-sized fragments (all carbonate derived) to silty-sandy gravel-sized limestone fragments, limestone at top of run has moderately developed bedding	- - - - -
-175_ -132.5 -	176.0		NR	<u>-</u> 		 plane partings, limestone core (6") at 169.5' exhibits very fine bedding plane partings on top of core (finely laminated <1/32"), few small (1/2") cavities (sharp contact with above), 	R18: 16 minutes
- - - -				176.0-186.0' - NA		bedding planes not visible over core length, amount of disaggregated sand-sized and smaller limestone fragments increasing with depth, slightly plastic clayey silt (light gray N7) at end of run No Recovery 173.8-176.0' Limestone Fragments 176.0-179.0' - light olive gray, (5Y 5/2), slow to moderate HCI reaction,	Driller's Remark: possible void from 177.0-181.0' based on advancement of 4" core barrel, void not suggested based on 100% recovery
180 -137.5 - - - - -	R19-SN 10 ft I 100%	NA	NA	- - - - - -		subangular to angular, coarse sandy/gravel-sized carbonate disaggregated material (drilling induced), fragments are 2"-4" and larger in diameter, coarse sand and gravel-sized unconsolidated material is moderate yellowish brown (10YR 5/4), reacts strongly to HCl and is well rounded (gravel-sized <1") Limestone 179.0-179.8' - dark yellowish orange	- - - - - -
- - 185 -142.5 -	186.0					to grayish orange, (10YR 6/6, 10YR 7/4), strong HCI reaction, small voids (1/32"-1/16") over 5-10% of surface, poorly fossiliferous with few molds (1/2"), fine recrystallization, Limestone Fragments 179.8-181.7' - silty sandy gravel-sized material, carbonate derived, yellowish gray (5Y 7/2) fines 181.7-182.7' - moderate brown grading to pale yellowish brown, (5YR 4/4 to 10YR 6/2), moderate HCI	R19: 38 minutes
- - - 190 -147.5	R20-SN			- - - -		reaction, very fine sand/salt with gravel-sized limestone fragments (<10%), trace silica sand 182.7-183.8' - Same as 179.0-179.8' Limestone And Limestone Fragments 183.8-186.0' - strong HCl reaction, with clayey silt-sized material	- - - - -



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-08	SHEET	11	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEVELS: 3.5 ft bgs on 3/13/07 START: 3/13/2007 END: 3/15/2007 LOGGER: L. Prochaska, C. Sump DISCONTINUITIES LITHOLOGY COMMEN ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CORNOR, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS LITHOLOGY ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS DROPS, TEST RES Limestone Fragments 186.0-196.0' - alternating sequences of fragmented limestone and fossiliferous limestone exhibit fine laminations (1/32"-3/4") and planar bedding plane partings, silty sand and gravel-sized limestone	OF CASING, NG RATE AND
DESCRIPTION ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CORING MAND ROCK MASS CORING MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CORING MAND ROCK MASS CORING MAND ROCK MASS CORING MAND ROCK MASS CORING MAND ROCK MASS CORING MAND ROCK MASS CORING MAND ROCK MASS CORING MAND ROCK MASS CORING MAND ROCK MASS CORING MAND ROCK MASS CORING MAND ROCK MASS CORING MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CORING MINERALOGY, TEXTURE, WEATHERING, HARDNESS, CORING MINERALOGY, TEXTURE, WEATHERING, HARDNESS, CORING MINERALOGY, TEXTURE, WEATHERING, HARDNESS, CORING MINERALOGY, TEXTURE, WEATHERING, HARDNESS, CORING MINERALOGY, TEXTURE, WEATHERING, HARDNESS, CORING MINERALOGY, TEXTURE, WEATHERING, HARDNESS, CORING MAND ROCK MASS CORING MINERALOGY, TEXTURE, WEATHERING, HARDNESS, CORING MINERALOG	OF CASING, NG RATE AND
10 ft 100% NA NA NA Limestone Fragments 186.0-196.0' - alternating sequences of fragmented limestone and fossiliferous limestone fragments, fragmented limestone exhibit fine laminations (1/32"-3/4") and planar bedding plane partings, silty sand and gravel-sized limestone	NG RATE AND
10 ft 100% Limestone Fragments 186.0-196.0' - alternating sequences of fragmented limestone and fossiliferous limestone fragments, fragmented limestone exhibit fine laminations (1/32"-3/4") and planar bedding plane partings, silty sand and gravel-sized limestone	
- 100% - 186.0-196.0' - alternating sequences of fragmented limestone and fossiliferous limestone fragments, fragmented limestone exhibit fine laminations (1/32"-3/4") and planar bedding plane partings, silty sand and gravel-sized limestone	50L15, E1C.
fragments at 192.5-193.0' and 195.0-196.0', sharp contact between fragmented finely laminated limestone and coarse fossiliferous limestone with large (1/2") fossil casts/molds at 194.0' R20: 25 minutes	
196.0-205.0' - with coarse sand/fine gravel-sized material (<10%), limestone fragments alternating between fine grained finely bedded limestone (argillaceous) and fossiliferous massive limestone with small voids (1/32"-1/8") over 10-15% of surfaces, fine grained limestone forms very angular fragments and are typically <3" in size and are <3/4" thick, fine grained limestone is light olive gray (5Y 5/2) with slow mild HCl reaction, fossiliferous limestone is yellowish gray to grayish orange (5Y 7/2 to 10/YR 7/4) with moderate HCl reaction and is typically associated with coarse sand-sized material, coarse moderately graded sand-sized material at top of run (196.0-196.7'), possibly segregated during drilling	
205 -162.5 No Recovery 205.0-206.0' R21: 18 minutes	_
- NR Finished drilling or	n 3/14/07
206.0 216.0' - NA Limestone Fragments 206.0-216.0' - silty sandy gravel-sized well graded limestone fragments 1/2"-3" and larger in diameter with fines grading to coarse sand and silt-sized (<5%), fragments are subangular, fossiliferous (more molds than casts), and exhibit small voids (1/32"-1/8") over 10-20% over the surface	
210	
-167.5	_
R22-SN The R22-SN The	



PROJECT NUMBER:	BORING NUMBER:			
338884.FL	I-08	SHEET	12 OF 14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	s on 3/	13/07 START : 3/13/2007 END	3/15/20	07 LOGGER : L. Prochaska, C. Sur	mp
₹Q₽	(%			DISCONTINUITIES	¤	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 215 -172.5	10 ft 100%	NA	NA	216.0-226.0' - NA		Limestone Fragments 216.0-219.0' - yellowish brown, medium strong to strong (R3 to R4), gravel-sized limestone fragments,	R22: 11 minutes
- - 220 -177.5 - -	R23-SN 10 ft i 100%		NA			little to no finer material, thin zones of grayish orange fossiliferous limestone with small voids over 10-20% of surface 219.0-226.0' - well graded gravel-sized limestone fragments with coarse sand-sized material, 6" zones of large fragments (>3") at 222.0' and 223.5' may represent competent beds, fragmented by drilling method	- - - - - - - - - -
- - 225 -182.5 - - - - - -	226.0			226.0-236.0' - NA		226.0-236.0' - well graded coarse sandy gravel-sized limestone fragments, mostly less than 1" with few exceptions, 20-30% of gravel-sized clasts are very friable and composed silt to sand-sized carbonate material	R23: 26 minutes
230 -187.5 -	R24-SN						-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-08	SHEET	13	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	s on 3/		3/15/20	D7 LOGGER : L. Prochaska, C. Sur	тр	
≳□⊋	<u> </u>			DISCONTINUITIES	_ ფ	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(9	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,	
YFAC VATI	RE RI IGTH XOVE	R Q D (%)	CTU FOC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BOL	WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD	
SUB	RECENSE	RQ	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNES	s X	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.	
	10 ft 100%	NA	NA		H			
	10070				厂	_		
					上	_	_	
					<u></u>	=	_	
-					上	_	_	
-					+	-	-	
					世	-	-	
235 -192.5					\pm	_	R24: 27 minutes	
-	236.0				\Box	<u>-</u>	-	
†	200.0			236.0-246.0' - NA	F	Limestone Fragments - 236.0-246.0' - Same as 226.0-236.0'	-	
					茾	except increasing percentage silt and		
					\perp	fine sand-sized component, medium yellowish brown (10YR 5/4) silty		
					F	zones	_	
							-	=
-					H.	_	_	
					片	-	-	
240 -197.5					士	_	_	
1 1	R25-SN				\pm	-	-	
	10 ft 100%	NA	NA			-	-	
						-	-	
					\perp	_	_	
					\perp	_		
					F		_	
					\blacksquare	-	-	
					\perp	-	-	
245 -202.5					丰	_	R25: 13 minutes	
1 -	246.0				甘	-	-	
	246.0			246.0-256.0' - NA	世	246.0-256.0' - Same as 236.0-246.0'	-	
					\dagger	 except decreasing percentage of silt-sized material (similar to 	-	
					\downarrow	226.0-236.0'), increasing percentage	-	
					\perp	of coarse, sand-sized material, all carbonate		
					\perp	_		
						<u>-</u>	_	
					+	-	-	
250 -207.5					+	_		
-57.5	R26-SN				+	_	-	
	20 5/1				╁		-	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-08	SHEET	14	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

			<u> </u>	IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	1 - 00	STO DUTTO!	ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft ba	s on 3/	/13/07 START : 3/13/2007 END : 3/	15/20	07 LOGGER : L. Prochaska, C. Sum	ID.
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)				SYMBOLIC LOG		
N E E	Z'A'Ä		FRACTURES PER FOOT	DESCRIPTION	S	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
AGB	J. H.	(%) Q	128	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E F S	NG: CO	ΩC	P P F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SC	잉필盟	RQ	띪	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	10 ft	NA	NA		T		
-	100%					-	_
					H	_	_
					Н		
_					Г	<u>F</u>	
-					₽	+	-
_					I	<u> </u> -	_
					Н	1	1
						<u> </u>	-
255				_	-	_ _	D00: 05
-212.5					\vdash	L	R26: 35 minutes
	256.0]	
-	_55.5			256.0-266.0' - NA	\vdash	Limestone Fragments	
-					╁	- 256.0-266.0' - Same as 246.0-256.0'	-
_				,	仜	except increased percentage of large	_
					H	limestone fragments (>3/4") from	
					┰	- 256.0-259.0' (approximately 50% by volume)	1
-						154.3-156.0' - moderate yellowish	-
_					╁	brown, (10YR 5/4), moderate to	_
						strong HCl reaction, silty, sandy	
						gravel-sized material (all carbonate	
				•	Ь	derived), gravel-sized fragments	-
260_ -217.5				_	╀	friable 146.3-148.0' - yellowish grey, (5Y	
-217.5						7/2), strong HCl reaction,	_
	R27-SN				Н	fossiliferous, with small voids	
	10 ft 100%	NA	NA		1	(1/32"-1/8") over 10% of surface	1
-	100 /0				ш	}-	-
_					╁	-	_
						1	_
					ш]
-					T	Ť	-
-						}	-
-				,	₽	<u> </u>	
					\vdash	1	Boring at total planned
265						Ţ	depth 3/15/07 -
-222.5				_	₩	 -	R27: 29 minutes
-					仜	1-	-
	266.0						
					1	Bottom of Boring at 266.0 ft bgs on	Water level on 3/20/07 is
					1	- 3/15/2007	about 3' below ground - surface
-					1	}	Suriace
-					4	-	Install and grout 4" -
					1	L	schedule 40 PVC casing in
1 7					1		boring
-					1	†	Bottom of casing tagged at -
-					1	F	267.0'
					1	L	
					1		
-				_	1	广	-
-					1	ŀ	-
					1		
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	I-09	SHEET	1	OF	14	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION : Vertical

WATER	LEVELS	: 4.41 bg	s on 3/6/0)7 5	START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska
300				STANDARD	SOIL DESCRIPTION g COMMENTS
A P P P P P P P P P P P P P P P P P P P	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
A SE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
<u> 42.4</u>	0.0			(N)	Sandy Organic Topsoil (3.14) Water level above ground surface due to
-	0.0				0.0-1.0' - dark brown
-					Poorly Graded Sand (SP) "Water level is based on Ground Water Monitoring at LNP site (FSAR Table
-					1.0-4.0' - grayish yellow, (5Y 5/4), fine grained, no HCl 2.4.12.08)"
-					reaction, silica sand
-					-
-		6.0	R1-SN		-
-					-
-					4.0-6.0' - Same as 1.0-4.0' except yellowish gray, (5Y
					8/1)
5 37.4					Coring run times not recorded for I-09
-	0.0				- ∴
1 -	6.0				6.0-16.0' - Same as 1.0-4.0' except yellowish gray,
1 -					(5Y 8/2 to 5Y 8/1), very poorly graded, yellowish gray from 6.0-10.0' becoming lighter shade of yellowish
-					gray from 10.0-16.0'
-					
-					
-					
-					
10					
32.4					
-					1 /4
_		10.0	R2-SN		
-					
-					1
-					1
-					1 :4
-					1
_					1
15					
27.4					7.4
	16.0				1:1
1 -					16.0-20.4' - Same as 4.0-6.0' except very poorly
1 -					graded
1 -					1 1
1 -					101
1 -					1:1
1 -					1.1
1 -					1:1
20					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-09	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS	: 4.41 bg	s on 3/6/0)7 5	START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska
300				STANDARD	SOIL DESCRIPTION g COMMENTS
ANC (# ON	SAMPLE	INTERVA		STANDARD PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
22.4				. ,	
-	1	10.0	R3-SN		Poorly Graded Sand (SP) 20.4-26.0' - pale yellowish brown to pale brown, (10YR 6/2 to 5YR 5/2), silica sand
		10.0	K9-SIN		(10YR 6/2 to 5YR 5/2), silica sand
l _					
-					484
-	-				-[X]
-					- <u>-</u>
-					
25_					-
17.4					<u> 구항</u>
-	26.0				101
					26.0-31.5' - Same as 20.0-26.0' except mottled dusky yellowish brown, (10YR 2/2), moist, fine grained
_					yellowish brown, (10112 2/2), moist, line grained
-					-
-					-
-					- ∰
-					
30	-				-
12.4					
_	1		D4 ON		1 64
		5.5	R4-SN]例
_					No Recovery 31.5-36.0'
_					<u> </u>
-					- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
-					
-					
35	1				
7.4	1				78
_					Begin Rock Coring at 36.0 ft bgs See the next sheet for the rock core log
_					
-	-				
-	-				
-	-				
-	1				
40	1				1
1					



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-09	SHEET	3	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEVELS: 4.41 bgs on 3/6/07		on 3/6	5/07 START : 3/11/2007 END : 3/	12/2	200	7 LOGGER : C. Sump, L. Prochask	a	
≥∩≘	_ (%			DISCONTINUITIES	ي [ے ل	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	901010aMAS	OT IMPOLIO LO	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R5-SN 10 ft 100%	NA	NA	36.0-46.0' - NA			Sand (SP) 36.0-37.7' - Same as 26.0-31.5' except pale yellowish brown to dusky yellowish brown, (10YR 6/2 to 10YR 2/2), mottled Silt (ML) 37.7-38.9' - dark yellowish brown to dusky yellowish brown, (10YR 4/2 to 10YR 2/2), moist, <10% sand, nonplastic, rapid dilatancy, no HCl reaction, siliceous, heavily mottled Limestone 38.9-46.0' - yellowish gray, (5Y 7/2), dry, very fine to fine grained, strong HCl reaction, extremely weak (R0), unconsolidated and very fine grained from 41.7-41.9'	NA = Not Applicable NR = No Recovery
	R6-SN 10 ft 100%	NA	NA	46.0-56.0' - NA			Silty Sand (SM) 46.0-47.1' - brownish gray, (5YR 4/1), wet, fine to coarse grained, very poorly graded, gravel-size fragments up to 2", fine grained silica and carbonate sand mixture (20-30%) Silt (ML) 47.1-51.0' - pale yellowish brown, (10YR 6/2), moist, nonplastic, slow dilatancy, strong HCl reaction, <10% poorly graded sand, all carbonate Silt With Sand (ML) 51.0-52.5' - pale yellowish brown, (10YR 6/2), wet, nonplastic, rapid dilatancy, moderate HCl reaction, 10-20% medium grained sand, all carbonate 52.5-56.0' - Same as 51.0-52.5' except moist, strong HCl reaction, very fine to medium grained sand, gravel-sized calcareous rock fragments up to 3" in diameter	- - - - - - - - - - - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-09	SHEET	4	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

Mineralogy, Texture, Study	WATER	EVELS: 4.4	1 bgs	on 3/6	6/07 START: 3/11/2007 END: 3	/12/20	D7 LOGGER: C. Sump, L. Prochast	a
Section	₹ □₽	(%			DISCONTINUITIES	၂	LITHOLOGY	COMMENTS
Section	DEPTH BELO' SURFACE AN ELEVATION (f	CORE RUN, LENGTH, AND RECOVERY (9	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
66.0-76.0' - NA 66.0-76.0' - NA 66.0-66.0' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, extremely weak (R0), clay interbeds up to 1" Disaggregated Limestone 66.0-66.5' - dark yellowish brown, (10YR 4/2), moderate HCl reaction, 10-20% poorly graded fine to medium grain sand, calcareous Limestone 66.5-67.5' - Same as 56.0-56.3' except fragments up to 4" in diameter Disaggregated Limestone 67.5-69.5' - Same as 56.3-57.9' Limestone 69.5-76.0' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), very fine to fine grained, strong HCl reaction, gravel-sized rock	60_ -17.6 - - - - - - - - - - - - - - - - - - -	R7-SN 10 ft 100%			56.0-66.0' - NA		 56.0-56.3' - dark yellowish brown, (10YR 4/2), moderate HCI reaction, weak to medium strong (R2 to R3), fragments up to 3" in diameter Disaggregated Limestone 56.3-57.9' - dark yellowish brown, (10YR 4/2), strong HCI reaction, staining, organics, moderate dilatancy, carbonate 57.9-65.6' - dark yellowish brown, (10YR 4/2), strong HCI reaction, 20-30% poorly graded sand-sized, all carbonate 	
75 -32.6	70 -27.6 - - - - - - - - - - - - - - - - - - -	R8-SN 10 ft 100%	NA	NA	66.0-76.0' - NA		65.6-66.0' - pale yellowish brown, (10YR 6/2), moderate HCI reaction, extremely weak (R0), clay interbeds up to 1" Disaggregated Limestone 66.0-66.5' - dark yellowish brown, (10YR 4/2), moderate HCI reaction, 10-20% poorly graded fine to medium grain sand, calcareous Limestone 66.5-67.5' - Same as 56.0-56.3' except fragments up to 4" in diameter Disaggregated Limestone 67.5-69.5' - Same as 56.3-57.9' Limestone 69.5-76.0' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), very fine to fine grained, strong HCI reaction, gravel-sized rock	- - - - - - - - - - - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-09	SHEET	5	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska									
≥0 ⊙	(9)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,			
H BI	E RU STH, OVER	Q D (%)	TUF FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD			
SUR	SOR	RQI	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.			
	0	_		76.0-86.0' - NA		Disaggregated Limestone				
-	-			-		- 76.0-76.8' - Same as 66.0-66.5' except limestone fragments up to 1"	1			
-	-			-	\vdash	in diameter	-			
-	1			-		- 76.8-79.0' - Same as 56.3-57.9'	-			
-	-			-		=	-			
-	1			-		-	1			
						79.0-83.2' - Same as 66.0-66.5' except few extremely weak (R0)				
80_					Н	limestone fragments, up to 4" in				
-37.6				_		diameter -				
_	R9-SN 10 ft	NA	NA	_	Щ	_	_			
-	100%			-	Щ	-	_			
-	-			-		-	-			
-	-			-		-	-			
-	-			-		-	-			
_	-			-		_ 83.2-86.0' - Same as 66.0-66.5' except dry, one fragment (up to 1")	-			
-						 with organic staining, few limestone 	-			
85	-			-		_ fragments (up to 2" diameter)	-			
-42.6	-				-	-				
-	86.0				-		-	-		
-	00.0			86.0-96.0' - NA		86.0-87.5' - Same as 66.0-65.5'	Driller's Remark: Loss of			
				_		 except 20-40% poorly graded sand-sized calcareous particles, 	circulation -			
						limestone fragments up to 1" - diameter, 1" lens of staining dark				
_					Н	yellowish brown (10YR 4/2)				
_				_	Н	Limestone - 87.5-88.0' - subangular rock				
_				-	Ш	fragments 2"-4" in diameter 88.0-88.4' - yellowish gray, (5Y 8/1),	_			
-	-			-		 weak (R2), fossiliferous 	-			
90 <u>-</u>	-			_		(molds/casts), small voids/cavities (<1/2") due to fossil molds, 1"-2"	_			
	R10-SN			-		 thick irregular horizontal partings, 	-			
-	10 ft		NA	-		rough to undulating bedding planes, little to no infilling or staining	-			
-	100%			-		Disaggregated Limestone 88.4-90.7' - gravel-sized limestone	-			
-	1			-	\vdash	fragments, >50%, ranging in size				
-				-	H	from 1/4"-1" Limestone With Clayey Silt				
-	1			-	Ħ	90.7-94.0' - grayish yellow to yellowish brown, voids (1/16"-1/8")				
-				-	H	across 15-20% of surface and				
-]			-	Ш	concentrated in irregular zones, small black inclusions (1/16"-1/8"),	1			
95_]				oxdot	horizontal partings/beds, 1"-4" in	1			
-52.6	1				ш	thickness with light gray to medium				
_	<u> </u>			_		gray (N7 to N5) gravel-sized clayey				
-	96.0			-	Ш	silt fragments, interbeds (1"-2" thick)	-			



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-09	SHEET	6	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

				ILIVI : Notosofiic on one inc, o outer casing and			ONENTATION : Vertical
WATER	LEVELS : 4.4	1 bgs	on 3/		2/200		
≩Q£	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
AGE	S.H.	(%) Q	TF.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLI I	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
I PR	NG CO	σD	SAC ER F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	SHR	ď	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	BROT 6, 1201 (A200216, 210.
				96.0-106.0' - NA	Ш	Disaggregated Limestone	
-				-	Н	 94.0-96.0' - Same as 86.0-87.5' except 10% fewer gravel-sized 	-
-				-		limestone clasts	-
-				-	Н	96.0-97.6' - Same as 66.0-66.5'	-
_				_		except 20-40% poorly graded	_
					Н	sand-sized calcareous grains, 20% gravel-sized limestone clasts from	_
						3/16"-3"	
				-	Ш	Limestone	-
400				-		 97.6-98.4' - Same as 69.5-76.0' except subangular rock fragments up 	-
100 <u> </u>					Н	to 3" in diameter	_
-	544.01			-		 Disaggregated Limestone 	_
	R11-SN 10 ft		NA	_	Ш	98.4-99.3' - Same as 56.3-57.9'	_
	100%	, ,	, .			99.3-100.0' - Same as 66.0-66.5' except 10% gravel-size calcareous	
					Н	fragments up to 1/2" in diameter	
1 -				-	ш	Limestone With Clayey Silt	-
-				-	ш	_ 100.0-102.8' - Same as 90.7-94.0' except no black inclusions	-
-				-	Н	Disaggregated Limestone	-
_				_		_ 102.8-103.5' - Same as 99.3-100.0'	_
				_	Н	103.5-104.5' - Same as 56.3-57.9'	
105				_	Н	Limestone With Clayey Silt	
-62.6					\vdash	 104.5-106.0' - Same as 90.7-94.0' except no black inclusions 	
-				-	Н	_ except no black inclusions	-
-	106.0			- 106.0-116.0' - NA	ш	Limestone	-
-				- 100.0-110.0 - NA	Н	- 106.0-108.0' - Same as 87.5-87.8'	_
_				_	Н	except with some silt 20-30%, up to	_
				_		3" in diameter	
				-	Ш	Disaggregated Limestone	_
-				-	\vdash	- 108.0-108.6' - Same as 99.3-100.0'	-
-				-	H	except 30-50% gravel-sized rock fragments up to 1-1/2"	-
-				-	Щ	- Limestone With Clay And Silt	_
110					Ш	108.6-114.7' - Same as 90.7-94.0'	
-67.6			NA	_	H	except no black inclusions and sandy silt (ML-SP) beds, same as 99.3-100'	
]	R12-SN				Ш	from 101.3-101.5' and 102.3-103.0']
	10 ft 87%	NΑ		_	Щ]
-	0.70			-	Ш	_	-
-				-	$\vdash \vdash$	_	-
-				-	Ш	_	-
-				-	Ш	_	-
				_	Ш	_	
					\vdash		
1				-	Ш]
145				-	П	No December 444 7 440 01	-
115 <u> </u>					Н	No Recovery 114.7-116.0'	
			NR	-	H	_	-
	116.0				Н		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-09	SHEET	7	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	5/07 START : 3/11/2007 END : 3/1	12/20	07 LOGGER : C. Sump, L. Prochask	a
>00	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 120 -77.6			NA	116.0-126.0' - NA -		Disaggregated Limestone 116.0-117.0' - dark yellowish brown, (10YR 4/2), coarse grained, calcareous Limestone With Clay And Silt 117.0-120.0' - Same as 108.6-114.7' except fine to medium grained, moderate HCI reaction, pale yellowish brown (10YR 6/2) sandy silt (ML-SP) from 119.0-119.3', 10-20% limestone fragments up to 1" in diameter	- - - - -
-//.6 - - - - - - - - - - - - - - - - - - -	R13-SN 10 ft ' 40%	NA	NR	- - - - - -		No Recovery 120.0-126.0'	- - - - - -
	R14-SN 10 ft 95%		NA	126.0-136.0' - NA		Limestone 126.0-126.5' - grayish orange, (10YR 7/4), moderate HCI reaction, fossiliferous (molds/casts), voids (1/16"-1/8") over 25-30% of surface, cavities (up to 1/2"), associated with fossil molds 126.5-130.5' - 80% angular to subangular limestone fragments >2" in diameter, few pieces up to 4", highly fragmented portion comprised of fine grained limestone with few fossils or voids, little fine material (silt/clay), thin medium brown coatings Disaggregated Limestone 130.5-135.5' - moderate yellowish brown, (10YR 5/4), mild to moderate HCI reaction, gravel-sized fragments of limestone in silty sand-sized matrix, <10% siliceous sand, 15% gravel-sized fragments typically <1" in thin (<1") zones, thin dark brown horizontal layers	- - - - - - - - - - - - - - - - - - -
-92.6 -	136.0		NR	-		No Recovery 135.5-136.0'	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-09	SHEET	8	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	D7 LOGGER : C. Sump, L. Prochask	a				
≥0.0	6)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
140 -97.6 - - 145 -102.6	R15-SN 10 ft 100%		NA	136.0-146.0' - NA		Disaggregated Limestone 136.0-140.5' - coarse grained, 30% angular to subangular limestone fragments ranging in size between (1/4"-1") and 50% ranging in size from 2"-4" in diameter 140.5-142.1' - Same as 136.0-140.5' except increasing percentage of siltand sand-sized material 142.1-145.5' - mild to strong HCl reaction, increasing silt/clay content, limestone fragments up to 2"-4" in diameter on 2"-4" spacing with light gray (N7) silty, clayey, and gravelly interbeds, few voids or fossils	-
	R16-SN 10 ft 100%		NA	146.0-156.0' - NA		145.5-146.0' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), strong HCI reaction, sharp contact, mottled appearance, 5-10% very fine grained silica sand Interbedded Limestone 146.0-148.5' - yellowish gray to grayish orange, (5Y 7/2 to 10YR 7/4), with silt and clay, interbeds with gravel-sized limestone fragments, voids 1/16"-1/8" over <20% surface, few fossils (mold/casts), core and fragment thickness range from 1-1/2"-5" with light gray (N7) clayey silt with gravel interbeds 2"-4" thick Disaggregated Limestone 148.5-150.5' - moderate yellowish brown and dark yellowish brown, (10YR 5/4 and 10YR 4/2), very fine silty sand-sized Disaggregated Interbedded Limestone 150.5-155.3' - moderate yellowish brown, (10YR 5/4), with thin beds of gravel-sized limestone fragments, 6" limestone fragments every 6"-8" with clayey gravel (<2") Disaggregated Limestone 155.3-156.0' - Same as 148.5-150.5'	- - - - - - - - - - - - - - - - - - -
	156.0				H	155.3-156.0' - Same as 148.5-150.5'	
					ı		



PROJECT NUMBER:	BORING NUMBER:		
338884.FL	I-09	SHEET	9 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEV	VELS: 4.4	1 bgs	on 3/6	6/07 START : 3/11/2007 END : 3/	12/200	DOT LOGGER : C. Sump, L. Prochask	a
≥00	_ ;;			DISCONTINUITIES	ي [LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
160 -117.6 - - - - - - - - - - - - - - - - - - -	R17-SN 10 ft 100%	NA	NA	156.0-166.0' - NA		Disaggregated Interbedded Limestone 156.0-157.5' - Same as described above except 2" silty, very fine, dark yellowish brown to dusky yellowish brown (10YR 4/2 to 10YR 2/2) sand-sized layer at 157.0' (similar to previously described), trace silica (quartz) grains; appears to be part of repeating sequence of gravel-sized fragments with few full core diameter limestone pieces with dark yellowish brown silty to very fine sandy layers on 25.0' spacing Limestone 157.5-158.5' - yellowish gray, (5Y 8/2), fine grained, mild to moderate HCI reaction, weak (R2), few fossils or voids Disaggregated Interbedded Limestone 158.5-162.0' - limestone fragments less than 2", increasing silt and clay-sized content with depth Disaggregated Limestone 162.0-162.4' - dark yellowish brown, (10YR 4/2), poorly graded Disaggregated Interbedded Limestone	
-170 -127.6 	R18-SN 10 ft 100%	NA	NA	166.0-176.0' - NA		Limestone 166.0-169.9' - yellowish gray, (5Y 8/1), fine grained, weak (R2), limestone fragments (>2"), 1-3" core lengths, very thin clayey silt (<1/16") on parting surfaces, fine alternating light and dark laminae at 166.0-166.3', very fine iridescent grains (pyrite) on fresh surface, trace fine grained silica Disaggregated Interbedded Limestone 169.9-171.3' - light gray, (N7), with large (>3") fragments separated by silty to clayey gravel (<1-1/2" pieces), suggestive of interbeds 171.3-174.5' - with large limestone fragments (3"-4")	



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	1-09	CHEET	10	ΩE	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

				ILIVI : Notosonic on one inc, o outer casing and			ONENTATION: Vertical
WATER	LEVELS: 4.4	1 bgs	on 3/		12/20		
>	<u> </u>			DISCONTINUITIES	_{(J}	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ø	DESCRIPTION	LOG	ROCK TYPE, COLOR,	
OH H	N. A.Y.		FRACTURES PER FOOT	223011111111	SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATIE	IN THE	(%) О	ΞĞ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무류의	NS S	Ø	SAC ER I	PLANARITY, INFILLING MATERIAL AND	¥	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ESE	222	œ	표표	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ŝ	CHARACTERISTICS	BROI 6, 1201 R266216, 216.
				176.0-186.0' - NA		Disaggregated Limestone	
-				-	Н	 174.5-176.0' - moderate yellowish 	-
_				_	Н	brown to yellowish gray, (10YR 5/4 to	_
					Н	5Y 8/1), very fine with few fine	
_				-		gravel-sized fragments (<5%), with	_
-				-	ш	darker brown mottled layer at 174.9' Limestone Fragments	=
					Ы	- 176.0-178.3' - fine to coarse grained	
						limestone fragments, trace fine silica	
-				-	ш	sand, subangular with 20%	=
_				-	Н	 subrounded fragments 1"-2" in 	_
180_					ш	diameter	
-137.6					Ш	Limestone	
-	R19-SN			-	$\vdash\vdash$	 178.3-183.6' - fractured limestone fragments 2"-4" with very few fines, 	-
-	10 ft		NA	-	Н	highly fossiliferous fragments	-
	100%			_	Ш	containing numerous molds (and few	
					$\vdash\vdash$	casts) 1/4"-1/2" in diameter	7
-				-	Н	<u> </u>	-
-				-	ш	_	-
					Щ		
					Н	-[]	
-				-	ш	Limestone Fragments	-
_				-		183.6-186.0' - limestone fragments,	=
					Н	similar to 176.0-178.3', 50%	
185					П	limestone fragments (>2") exhibit	
-142.6					Ш	bedding plane partings or fractures	
_				-	Н	_ 3/4"-1" thick	-
	186.0			_	Н		_
				186.0-196.0' - NA		Disaggregated Interbedded	
_				-	ш	- Limestone	_
_				-	hп	186.0-196.0' - limestone fragments (1"-4" in diameter) with coarse sand	=
				_		to fine gravel-sized (1/4"-3/4")	_
					ш	limestone fragments, 3.0' zones of	
				-	$\vdash \vdash$	large fragments (>2") with 1-2' thick	
-				-	口	 zones of smaller limestone 	-
				-	ш	fragments (1/2"-1-1/25") and	_
					Н	increased percentage of coarse sand	
190				-		 to fine gravel-sized fragments 	1
-147.6					Ш	_	_
				-	H	<u> </u>	
	R20-SN		NA		口		
1 7	10 ft 100%	NΑ	NA		ш]
-	100 /0			-	$\vdash \vdash \vdash$	-	-
_				-		_	_
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1 7				_	$\vdash \vdash \vdash$		1
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1 7					$\vdash \vdash$		1
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195_					\Box	<u> </u>	
-152.6					$\vdash \vdash$		
1 7	196.0			_	Ш		1
	130.0				$\vdash \exists$		-



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	1_09	CHEET	11	OE	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

- 10	21-SN	PA RQD(%)	S FRACTURES PER FOOT	DISCONTINUITIES DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 196.0-206.0' - NA	H H H H H H H H H H H H H H SAMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS Disaggregated Interbedded Limestone 196.0-206.0' - Same as 186.0-196.0' except repeating sequences of large limestone fragments separated by zones of coarse sand and finer gravel-sized limestone fragments, some bedding plane fractures (1/4"-1/2" thick), angular fragments	COMMENTS SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
200 -157.6 R21 100 - 100 - - - - - - - - - - - - - -	21-SN			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	H H H H H H H H H H H H H H H H H H H	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS Disaggregated Interbedded Limestone 196.0-206.0' - Same as 186.0-196.0' except repeating sequences of large limestone fragments separated by zones of coarse sand and finer gravel-sized limestone fragments, some bedding plane fractures	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
200 -157.6 R21 100 - 100 - - - - - - - - - - - - - -	21-SN			196.0-206.0' - NA		- Limestone 196.0-206.0' - Same as 186.0-196.0' except repeating sequences of large limestone fragments separated by zones of coarse sand and finer gravel-sized limestone fragments, some bedding plane fractures	
206.0				_	Н	_	_
- 10	22-SN 10 ft 000%	NA	NA	206.0-216.0' - NA		Limestone Fragments 206.0-209.5' - coarse grained, all carbonate derived, more coarse with depth to poorly graded gravel-sized limestone fragments <1/2", angular 209.5-216.0' - angular to subangular limestone fragments more coarse with depth, from 211.0-216.0' fragments are 2"-5" in diameter, 4" diameter pieces from 213.2-214.2', 1"-2" thick limestone beds with silty sand interbeds (<1/2" thick)	_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-09	SHEET	12	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER L	EVELS : 4.4	1 bgs	on 3/6	6/07 START : 3/11/2007 END : 3/	12/200	DOT LOGGER: C. Sump, L. Prochast	a
≥∩≘	_ @			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 220 -177.6 - - - - - - - - - - - - - - - - - - -	R23-SN 10 ft 100%	NA	NA	216.0-226.0' - NA		Disaggregated Interbedded Limestone 216.0-226.0' - alternating 1.0-2.0' thick zones of coarse sandy gravel-sized limestone fragments and large (>3") limestone fragments, finer gravel-sized fragments (<3/4") are angular and some exhibit bedding plane fractures (smooth, planar), larger fragments are mostly irregular subangular in shape with undulating fracture surfaces	- - - - - - - - - - - - - - - - - - -
230 -187.6 - - - - - - - - - - - - - - - - - - -	R24-SN 10 ft 100%	NA	NA	226.0-236.0' - NA		Limestone Fragments 226.0-231.0' - coarse sandy gravel-sized (<1/2") limestone fragments at top, more coarse to large (>3") limestone fragments at 231.0', fragments are angular to subangular, fragments <1-1/2" exhibit bedding plane fracture surfaces (smooth and planar) 1/4"-3/4" in thickness, fragments >2" are irregular 231.0-235.7' - coarse grained, less than 10% subangular to subrounded fragments 2" or greater	- - - - - - - - - - - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-09	SHEET	13	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	5/07 START : 3/11/2007 END : 3/	12/20	D7 LOGGER : C. Sump, L. Prochask	a
≥∩≎	(%)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
240 -197.6 -	R25-SN 10 ft 90%		NA	236.0-246.0' - NA		Disaggregated Limestone 235.7-236.0' - moderate yellowish brown, (10YR 5/4), <10% gravel Limestone Fragments 236.0-245.0' - similar to 231.0-235.7' except yellowish gray (5Y 8/1) silt (with gravel) <10%, <1/2" in diameter at 237.3-238.0'	- - - - - - - - - - - - - - - -
-202.6	246 0		NR	-	Ħ	No Recovery 245.0-246.0'	_
250 -207.6 - - - - - - - - - - - - - - - - - - -	R26-SN 10 ft 85%		NA	246.0-256.0' - NA		Limestone Fragments 246.0-254.5' - Same as 236.0-245.0' except limestone fragments No Recovery 254.5-256.0'	Extreme difficulty advancing 6" casing. Casing advanced to 250.0' then 4" casing and core retracted. Finished driving 6" and then cleared out the hole prior to coring to 266.0'.
-212.6	256.0		NR	_		_	



PROJECT NUMBER:	BORING NUMBER:			
338884.FL	I-09	SHEET	14 OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

COMING	NILTHOUA	ND L	ZUIFIV	IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	4 ((OIE	Darrei	ORIENTATION : Vertical
\\/\TED	LEVELS : 4.4	I1 has	on 3/	6/07 START : 3/11/2007 END : 3/	12/20	<u> ۱۸</u> 7	LOGGER : C. Sump, L. Prochask	2
WALLY	LL V LLO . 4.4	r i bys	011 0/1		12,20	<u> </u>		
> -	_			DISCONTINUITIES	ניז		LITHOLOGY	COMMENTS
§5€	9%		m	DESCRIPTION	٦ŏ	Г	DOOK TYPE COLOR	
	ĭ{\\$}		₩ ₋	DEJURIF HUN	ū		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEDTH TYPE OBJENITATION POLICUNIESS	SYMBOLIC LOG		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
I ≒₹¥ I	# <u>P</u>	۵	[2 [2]	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	Æ		WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
655		Ø	RA ER	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š		CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
υош	שרט	Ľ	шФ		S	L		
- - -				256.0-266.0' - NA			Limestone Fragments 256.0-266.0' - Same as 246.0-254.5'	6" casing advanced to 256.0' after retrieving 4" – core sample (246.0-256.0'). Driller cleaned borehole and advanced 4" – case from 256.0-266.0'. Sample fell out during
-				-		-		retrieval. Used 20.0' core – barrel with flapper bit to retrieve disturbed material.
260 -217.6				_	1	F	-	Bottom 10.0' logged as - material from 256.0-266.0'.
-	R27-SN				1	F		-
	10 ft	NA	NA		1	F		_
	100%		` '		1			
1 7					1	r		1
-					1	F		-
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1 -				-	1	r		-
1 -				-	1	F		-
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265				_	1	L	_	
-222.6					1	1		
1 7	266.0				1	Γ		1
-	200.0				1	\vdash	Bottom of Boring at 266.0 ft bgs on	-
					1	L	3/12/2007	_
1					1	1		
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PROJECT NUMBER:	BORING NUMBER:					
338884 FI	I-10	SHEET	1	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION : Vertical

WATER	LEVELS	: 1.0 ft bo	gs on 03/2	25/07	START : 3/25/2007 END : 3/26/2007 LOGGER	₹ : J.	Burkard
				STANDARD	SOIL DESCRIPTION	G	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOGO COCCUS STATES.	SYMBOLIC LOG	DEDTILOS CACINO CONTUNA DATE
4 BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	0 LIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT! URF,			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	YME	INSTRUMENTATION
<u>о</u> мш 42.0	0.0			(N)	Poorly Graded Sand (SP)	0)	
-	0.0				0.0-5.0' - grayish brown to moderate yellowish brown, -		Water level is 1.0' below ground surface
-					(5Y 3/2 to 10YR 5/4), moist, fine grained, no HCl reaction, silica sand, one very pale orange (10YR		-
-					8/2), round limestone fragment 3" diameter at 4.6' with -		-
-					strong HCl reaction		-
-					-		-
-		5.0	R1-SN		-		Core run times not recorded for I-10
-					-		-
-					-		-
5					-		1
37.0					No Recovery 5.0-6.0'		1
	6.0				-		1
-					Poorly Graded Sand (SP)		1
					6.0-11.0' - moderate yellowish brown to very pale orange, (10YR 5/4 to 10YR 8/2), moist, fine grained,		
					strong HCl reaction, silica sand, with carbonate fines in orange material near bottom of interval		
					-		_
_					_		_
_					<u>-</u>		_
_					-		_
10 <u> </u>					_		_
32.0					-		-
-		9.0	R2-SN		Limestone Fragments		-
-					11.0-13.0' - moderate yellowish brown transitioning to -	H	-
-					yellowish gray, (10YR 5/4 to 5Y 7/2), strong HCl reaction, very fine grained to microcrystalline,		-
-					contains numerous voids surfaces, colors vary	H	-
-					depending on voids, visible calcite crystals with visible _ cleavage planes		-
-					13.0-14.4' - yellowish gray, (5Y 7/2), mild HCl reaction, voids (<1/16") on 20-40% of surface	H	-
-					- 100000011, volus (1710) 011 20-40 /0 01 3011000		-
15					Silt (ML) 14.4-15.0' - very pale orange, (10YR 8/2), strong HCl	1	1
27.0					reaction, carbonate material	1	
-	16.0				No Recovery 15.0-16.0'	1	1
					Silt (ML)	1	1
					16.0-16.5' - very pale orange, (10YR 8/2), strong HCl reaction, carbonate material	Щ	1
					Limestone Fragments	Ш]
					16.5-19.6' - very pale orange, (10YR 8/2), strong HCl reaction, limestone fragments up to 4" in diameter	Ш]
]]					with sections of pulverized rock less than 1" in diameter, voids (<1/16") on 20-40% of surface, poorly]
_					fossiliferous	Ь	_
-					-		_
20							



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-10	SHEET	2	OF 14	4

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

						5 Outer casing and 4 Core). 	ORIENTATION : Vertical
WATER	LEVELS	. ι.υ π ιο	gs on 03/2		START : 3/25/2007	END: 3/26/2007 SOIL DESCRIPTION	LUGG	JEK:	J. Burkard COMMENTS
≷Ç∉	CAMPLE	INTERVA	1 (6)	STANDARD PENETRATION	-	JOIL DESCRIPTION		— 8	5 CONNIVILIATS
ELC ON (SAMPLE		- '	TEST RESULTS	SOIL NAM	E, USCS GROUP SYMBO	L. COLOR.	<u> </u>	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE			MOISTURE	CONTENT, RELATIVE D	ENSITY OR	2	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTEN	CY, SOIL STRUCTURE, N	MINERALOGY	OC O TO TO ANA	INSTRUMENTATION
22.0				(14)	Limestone Fra	aments		Ť	
-					19.6-26.0' - gra	ayish orange, (10YR 7/4), mild HCl	+	-
-		10.0	R3-SN		reaction, fine s	and-sized to fine gravel- ments, highly fossiliferou	·sized (up to 1") is limestone	E	_
-					has immediate	mild HCl reaction, carb	onate materials	₽	닉 -
-								\Box	_
_								中	_
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								Ľ	<u>-</u>
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25									
17.0								Ъ	
	26.0							F	_
-						me as 19.6-26.0' excep	mild to no HCI	T	
-					reaction			H	-
_								1	<u> </u>
-								\Box	
-								Ь	Driller's Remark: Drill rod dropped quickly
-								Б	between 28.0-31.0' in depth, possible void
-								E	(however, 100% recovery achieved)
-					29.5-31.4' - mo	oderate yellowish brown,	(10YR 5/4).	+	닉 -
30 12.0					mild HCl reacti	on, fragments up to 7" v	ith interbedded	$-\mathbb{P}$	<u> </u>
					clays, poorly to of surface	ossiliferous, voids (<1/16	") on 50-75%	+	□ -
-		10.0	R4-SN		or carrace			十	-
-					31.4-36.0' - lial	nt olive gray, (5Y 5/2), m	ild to moderate	+	-
_					HCl reaction, fr	ragments up to 3" with s	urface voids,	F	_
_					moderately fos	siliterous		₽	닉 -
_								₽	_
_								Ъ	_
_								ь	
_								\perp	-
35								上	-
7.0								\perp	┧ .
	36.0							Ъ	-
					Disaggregated	d Interbedded Limestor	1 0		
					moderate HCI	rk yellowish brown, (10Y reaction, carbonate mat	erial, part of	Ъ	
1 7					repeating alter	nating sequences of silt	and broken	F	-
1 7					limestone fragments and core segments		T	<u>-</u>	
1 -								1	<u>-</u>
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-10	SHEET	3	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS	: 1.0 ft bo	gs on 03/2	25/07 S	START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard
≥∩≎				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
N N N	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
H BE ATIO		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
2.0				(,	
-	1		D= 01.		<u></u>
-		10.0	R5-SN		1
-					Limestone Fragments 41.4-42.7' - moderate yellowish brown, (10YR 5/4),
_					mild HCl reaction, fragments up to 2", voids (<1/16")
					on 15-30% of surface, poorly fossiliferous Disaggregated Interbedded Limestone
_					42.7-44.2' - Same as 36.0-41.4'
_					
_					Limestone Fragments
45 -3.0					44.2-44.9' - Same as 41.4-42.7' 44.9-46.0' - dark yellowish brown, (10YR 4/2),
-	-				moderate to strong HCl reaction, carbonate materials, coarse sand-sized to gravel-sized limestone
-	46.0				fragments
-					46.0-56.6' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), moderate to
-					strong HCl reaction, fine to coarse sand-sized and fine to coarse gravel-sized limestone fragments in
-	-				varying amounts throughout interval, isolated
-	-				limestone core segment (1" long) at 47.4' with strong HCl reaction and voids (<1/16") covering 50-75% of
-	-				surface, black (N1) organic staining at 53.9-54.3'
-					
50					<u>_</u>
-8.0					\Box
_		10.0	R6-SN		
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55 -	-				H H
-13.0	1				<u>-</u>
-					
					Begin Rock Coring at 56.0 ft bgs See the next sheet for the rock core log
] -					See the next sheet for the rock cole log
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-10	SHEET	4	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 0	3/25/07 START : 3/25/2007 END : 3/	26/20	07 LOGGER : J. Burkard	
≥o.⊋	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ЦОШ	56.0	IL.	NA	56.0-66.0' - NA	<i>o</i>	0.544.0.2.40.100	
-						Limestone Fragments With Silt 56.6-64.0' - moderate yellowish brown, (10YR 5/4), strong HCI reaction	- - - -
60 -18.0 - - - -	R7-SN 10 ft 100%	NA	NA			- - - - -	NA = Not Applicable NR = No Recovery
65 -23.0 - - - -	66.0			66.0-76.0' - NA		Limestone Fragments 64.0-66.0' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, limestone fragments up to 3", voids (<1/16") on 50-75% of surface of fragments 66.0-66.5' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, fragments up to 3", trace voids on surface of fragments 66.5-76.0' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, fragments and	Rock fragments are most likely pulverized due to drilling method
-70 -28.0 - - - - - -	R8-SN 10 ft 100%	NA	NA			core segments (up to 3") with pulverized rock, poorly fossiliferous, voids (<1/16") on 50-75% of surface of fragments	- - - - - - - - - - - - - - - - - - -
75_ -33.0	76.0					- - - -	- - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-10	SHEET	5	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 1.0) ft bg	s on 0	3/25/07 START : 3/25/2007 END : 3/2	26/200	D7 LOGGER : J. Burkard	
				DISCONTINUITIES	ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
80 -38.0 -38.0 - - - - - - - - - -	R9-SN 10 ft 100%	NA	NA	76.0-86.0' - NA		Limestone Fragments 76.0-86.0' - Same as 66.5-76.0' except pulverized rock fragments <1/4" in diameter	Pulverized rock most likely is more cohesive rock that has been broken up as a result of the sonic drilling method
90 -48.0 - - - - - - - - - - - - - - - -	R10-SN 10 ft 100%		NA	86.0-96.0' - NA		Disaggregated Limestone 88.6-89.2' - dusky yellowish brown, (10YR 2/2), strong HCI reaction, carbonate material Limestone Fragments 89.2-96.0' - moderate yellowish brown, (10YR 5/4), moderate HCI reaction, fragments and core segments with pulverized gravel-sized particles, voids (<1/16") on 25-50% of fragment surfaces, poorly to non fossiliferous	Gravel-sized particles most likely part of cohesive rock but broken by drilling method



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-10	SHEET	6	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 03		26/20	D7 LOGGER : J. Burkard	
≳□£	(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - -				96.0-106.0' - NA		Limestone Fragments - 96.0-106.0' - Same as 89.2-96.0' -	Lost circulation during run at 96.0-106.0'
100 -58.0 - - - - - - 105 -63.0	R11-SN 10 ft 100%		NA				- - - - - - - - - - -
-110 -68.0 - - - - - - - - - - - - - - - - - - -	R12-SN 10 ft 100%		NA	106.0-116.0' - NA		106.0-116.0' - dark yellowish orange, (10YR 6/6), moderate to strong HCI reaction, voids (<1/16") on 25-50% of surface, fragments and core segments up to 5" in length, with sections of pulverized rock that is gravel to coarse sand-sized particles	Pulverized rock most likely is more cohesive rock that has been broken up as a result of the sonic drilling method



PROJECT NUMBER:	BORING NUMBER:				
338884 FI	I_10	CHEET	7	OE	4

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION : Vertical

CORE RUN, AND LENGTH, AND STECOVERY (%) : 500	(%) О		DISCONTINUITIES		D7 LOGGER : J. Burkard LITHOLOGY	COMMENTS
CORE RUN, LENGTH, AND RECOVERY (%	(%)	ES	DECODIDATION	-1 ×		
	RQD	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		NA	116.0-126.0' - NA		Limestone Fragments 116.0-116.8' - dark yellowish orange, (10YR 6/6), mild to no HCl reaction, pulverized limestone fragments, coarse to medium sand-sized particles 116.8-119.5' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, trace voids on surface, fragments are up to 4" 119.5-124.8' - yellowish gray, (5Y 7/2), mild HCl reaction, extremely weak (R0), fragments with sections of pulverized limestone particles that are coarse to medium sand-sized up to 1-1/2" in length, voids (<1/16") on 25-50% of surfaces Silt (ML) 124.8-126.0' - yellowish gray to pale greenish yellow, (5Y 7/2 to 10YR 8/2), strong HCl reaction, carbonate	End coring for the day 3/25/07 at 116.0'
		NA NR	120.0-130.0 - INA		material Limestone Fragments 126.0-134.0' - dusky yellow and yellowish gray, (5Y 6/4 and 5Y 7/2), mild HCl reaction, core segments and fragments of limestone with sections of pulverized rock, voids (<1/16") on 15-25% of surface	Sharp lithologic contact between the two types of limestone, 126.0-134.0' and 134.0-135.5'
	10 ft 100% 126.0 R14-SN 10 ft 95%	126.0 R14-SN 10 ft NA 95%	10 ft 100% NA NA 100% NA 126.0 NA 95% NA	10 ft NA NA 100% NA 126.0 - 136.0 - NA 126.0 - 136.0 - NA 126.0 - 136.0 - NA 126.0 - 136.0 - NA 126.0 - 136.0 - NA 126.0 - 136.0 - NA 126.0 - 136.0 - NA 126.0 - 136.0 - NA 126.0 - 136.0 - NA 126.0 - 136.0 - NA 126.0 - NA	126.0 126.0 126.0-136.0' - NA R14-SN NA 95% NA NA HA HA HA HA HA HA HA HA HA HA HA HA HA	Pulverized limestone fragments, coarse to medium sand-sized particles 116.8-119.5 - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, trace voids on surface, fragments are up to 4" 119.5-124.8' - yellowish gray, (5Y 772), mild HCl reaction, extremely weak (R0), fragments with sections of pulverized limestone particles that are coarse to medium sand-sized up to 1-1.2" in length, voids (<17.16") on 25-50% of surfaces Sitt (ML) 25-50% of surfaces 126.0 - 136.0' - NA 126.0 - 136.0' - NA 126.0 - 136.0' - NA 127.0 - 136.0' - NA 128.0 -



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-10	SHEET	8	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

SELOW SE AND ION (ft)	_(%)			DISCONTINUITIES		LITHOLOGY	
SELO SE ANI ION (f	_ ೧೯		_	2.000.11.110.11.20	ပ္ထ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
140 -98.0 - - - - - - - - - - - - - - - - - - -	R15-SN 10 ft 100%		NA	136.0-146.0' - NA		Limestone Fragments 134.0-135.5' - yellowish gray and medium gray, (5Y 8/1 and N5), mild to moderate HCl reaction, limestone fragments and core segments up to 6" in length, sharp color contact on some core segments and fragments, poorly fossiliferous, few cavities (1/4"-1/2" in size) present on core between 135.0-135.5' No Recovery 135.5-136.0' Limestone Fragments 136.0-137.5' - yellowish gray, (5Y 7/2), mild HCl reaction, gravel-sized rock fragments, voids (<1/16") on 15-25% of surface with small (1/4") surface cavities (possible solution cavities) 137.5-140.2' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, mild HCl reaction, fragments up to 8" in length, consisting of void-rich limestone (light olive gray), interbedded with fine grained limestone (yellowish gray) in intervals up to 1" thick, up to 20% coverage of small (1/16") voids 140.2-144.5' - dusky yellow, (5Y 6/4), mild HCl reaction, pulverized	- - - - - - - - - - - - - - - - - - -
150 -108.0	R16-SN 10 ft 100%		NA	146.0-156.0' - NA	Iii	limestone in medium to fine sand-size particles and rock fragments up to 3" in diameter 144.5-146.0' - light olive gray, (5Y 6/1), moderate HCl reaction, core segments up to 4" in length, trace voids on surface 146.0-147.9' - light olive gray, (5Y 6/1), mild to moderate HCl reaction, trace voids on surface 147.9-152.0' - dusky yellow, (5Y 6/4), moderate HCl reaction, gravel-sized limestone fragments with pulverized limestone (silt-sized particles) 152.0-153.3' - light olive gray to medium bluish gray, (5Y 6/1 to 5B 5/1), core segments up to 5" in length 153.3-154.5' - Same as 147.9-152.0' except contains a core segment up to 4" in length 154.5-156.0' - Same as 152.0-153.3'	Repeating alternating sequences from 147.9- 156.0'



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	l I-10	SHEET	9 (ΩF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 03	3/25/07 START : 3/25/2007 END : 3/	26/20	D7 LOGGER : J. Burkard	
≥∩≘	_ (6			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - 160 -118.0				156.0-166.0' - NA		Limestone Fragments 156.0-161.2' - dusky yellow, (5Y 6/4), mild HCl reaction, fragments up to 4" in diameter, voids (<1/16") on 25-50% of surface, sections of coarse to medium sand-sized particles of pulverized limestone	
- - - - - - 165_ -123.0	R17-SN 10 ft i 100%		NA			161.2-166.0' - light olive gray, (5Y 5/2), dense, fine grained, mild HCl reaction, fragments and core segments up to 2" in length, trace voids on surface	- - - - - -
- - - - - - 170	166.0			166.0-176.0' - NA		Limestone 166.0-168.8' - dusky yellow, (5Y 6/4), coarse to medium grained, mild HCl reaction, cavities (1/4" in diameter) present on surface, fragments up to 8" in length Limestone Fragments 168.8-175.7' - dusky yellow, (5Y 6/4), fine grained, mild HCl reaction, gravel-size particles and core	- - - - - -
-128.0 - - - - - - - - - - - - - - - - - - -	R18-SN 10 ft 100%		NA			fragments up to 6" long, trace voids on surface	- - - - - - -
175_ -133.0 -	176.0					-	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-10	SHEET	10	OF	14

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 03	8/25/07 START: 3/25/2007 END: 3/	26/200	COMPANY OF THE LOGGER : J. Burkard	
≥∩≘	_ (%			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-188.0 -138.0 -138.0 -138.0 	R19-SN		NA	176.0-186.0' - NA		Disaggregated Limestone 175.7-176.0' - moderate yellowish brown, (10YR 5/4), strong HCI reaction, carbonate sand with 10-20% silica content Limestone Fragments 176.0-179.9' - moderate yellowish brown, (10YR 5/4), strong HCI reaction, gravel-sized particles between 1/4"-1" in diameter, all carbonate materials 179.9-185.0' - dusky yellow, (5Y 6/4), strong HCI reaction, core segments up to 4", voids (<1/16") over 50-75% of surface, numerous cavities on surface, poorly to highly fossiliferous, some interbedded clay between 184.1-185.0'	
-190 -148.0 -190 -148.0 	R20-SN 10 ft 1 87%		NA	186.0-196.0' - NA		6/1), fine grained, mild HČI reaction, core segments up to 3" in length Disaggregated Limestone 186.0-186.5' - light olive gray, (5Y 6/1), strong HCI reaction, silt-sized with coarse sand-sized particles, possibly slough material, all carbonate material Limestone Fragments 186.5-187.5' - light olive gray, (5Y 6/1), dense, fine grained, mild HCI reaction, core segments up to 2" in length, fragments 1/4"-1" in diameter 187.5-194.7' - yellowish gray, (5Y 7/2), mild to moderate HCI reaction, core segments up to 3" in length, fragments 1/2"-2" in diameter, moderate to highly fossiliferous, numerous surface cavities present on limestone No Recovery 194.7-196.0'	_
-153.0	196.0		NR		Ħ	_	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-10	SHEET	11	OF	14

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LE	EVELS: 1.0	ft bgs	s on 03	3/25/07 START: 3/25/2007 END: 3	/26/20	07 LOGGER : J. Burkard	
≥∩≘	_			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 200 -158.0 - - - - - - - - - - - - - - - - - - -	R21-SN 10 ft 100%		NA	196.0-206.0' - NA		Limestone Fragments 196.0-198.0' - light olive gray, (5Y 5/2), strong HCI reaction, silt with sand-sized particles and gravel-sized limestone fragments, all carbonate 198.0-200.0' - light olive gray, (5Y 6/1), fine grained, mild HCI reaction, fragments 1/2"-4" in diameter, several surface cavities (1/4"-1/2") at 198.2-198.5', fracture at 45 deg through one cavity 200.0-205.0' - fragments range from 1/4"-3", possible breccia zone, matrix appears as for material from 196.0-198.0', clasts appear as for material from 198.0-200.0'	
210 -168.0 - - - - - - - - - - - - - - - - - - -	R22-SN 10 ft 100%	NA	NA	206.0-216.0' - NA		6/1), very fine grained, moderate HCI reaction, fragments and core segments up to 4" in diameter 206.0-216.0' - light olive gray, (5Y 6/1), strong HCI reaction, coarse sand-sized particles and rock fragments up to 4", highly fossiliferous, voids (<1/16") over 25-50% of surface, with isolated sections of fine grained, dense, yellowish gray (5Y 7/2) core segments and fragments, with strong HCI reaction, at 210.0-210.4', 211.3-211.4' and 214.6-215.0'	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-10	SHEET	12	OF	14

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 03	3/25/07 START : 3/25/2007 END : 3/	26/200	D7 LOGGER : J. Burkard	
≥∩≘	_ (6			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-178.0	R23-SN 10 ft 100%		NA	216.0-226.0' - NA		Limestone Fragments 216.0-217.5' - light olive gray, (5Y 6/1), strong HCl reaction, with sand-sized particles and gravel-sized rock fragments, all carbonate material 217.5-219.2' - yellowish gray, (5Y 7/2), dense, fine grained, moderate HCl reaction, fragments up to 4" in diameter, poorly fossiliferous 219.2-221.4' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, void rich, poorly fossiliferous	Apparent repeating sequences at 217.5-225.0'
- - - 225 -183.0	226.0					222.2-225.0' - Same as 219.2-221.4' Disaggregated Limestone 225.0-226.0' - yellowish gray, (5Y 7/2), moderate HCI reaction,	
- - - 230 -188.0 - - - - - - - - 235 -193.0	R24-SN 10 ft 1 100%	NA	NA	226.0-236.0' - NA		carbonate material Limestone Fragments 226.0-236.0' - dark yellowish orange, (10YR 6/6), sand-sized particles to gravel-sized limestone fragments, strong HCI reaction for the silt and sand-sized particles, mild to moderate HCI reaction for gravel-sized fragments, limestone fragments are easily distinguished as either fine grained, yellowish gray (5Y 7/2), dense, and poorly fossiliferous with moderate HCI reaction, or as void rich, yellowish gray (5Y 7/2), poorly fossiliferous, with mild to moderate HCI reaction	Silt and limestone fragments are most likely cohesive rock that has been broken up by the sonic drilling method
	∠30.U						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-10	SHEET	13	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 03	3/25/07 START : 3/25/2007 END : 3/	26/200	D7 LOGGER : J. Burkard	
≥∩≘	_ (6			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R25-SN	NA	NA	236.0-246.0' - NA		Limestone Fragments 236.0-246.0' - Same as 226.0-236.0' except with isolated sections of fine grained and void-rich limestone	
250 -208.0 -255 -213.0	246.0 R26-SN 10 ft 1 100%		NA	246.0-256.0' - NA		246.0-256.0' - Same as 236.0-246.0' except less void-rich limestone (only trace to 10% coverage of small [<1/16"] voids)	Original page of field log (246.0-256.0') "lost", page re-written by original logger J. Burkard on 2/7/08 based on photographs of recovered material



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-10	SHEET	14	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bg	s on 0		3/26/20	2007	LOGGER : J. Burkard	
≳o⊋	(%			DISCONTINUITIES	g	ιL	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUF	COLEN	A Q	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNES	S X		CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
_				256.0-266.0' - NA	\perp	_	Limestone Fragments 256.0-266.0' - Same as 226.0-236.0'	-
-					#	+		╡
-					+	‡		-
					<u> </u>	ŧ		
_						7		-
					\pm	}		-
260 -218.0						士		_
_	R27-SN 10 ft		NA		1	‡		_
_	100%				H	7		-
-					\blacksquare	}		-
_					1	╁.		-
_					\downarrow	₹.]
-					Ħ	‡		-
265					Ħ	}		-
-223.0					\perp	1	•	Completed drilling hole at 16:40 on 3/26/07 to 266.0',
_	266.0				井	‡	Bottom of Boring at 266.0 ft bgs on	however total depth tagged on 3/27/07 at 267.0' below
-					-	╁	3/26/2007	ground surface
_					1	t		_
]	Į.		
-					4	F		Borehole grouted to surface with 4" schedule 40
-					-	F		PVC pipe down hole; depth inside PVC pipe re-tagged
					1	L		at 267'3" below ground – surface after grouting
-					-	-		-
-					+	F		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	IT-01	SHEET	1	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLIN	DRILLING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical									
WATER	LEVELS	: 42.0 ft b	ogs on 6/2	28/07	START : 6/27/2007 END : 6/29/2007 LOGGER : J. Schaeffer, D. Thomas					
300				STANDARD	SOIL DESCRIPTION COMMENTS					
ANE (#	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS						
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND					
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY					
20.9	0.0			(14)	Topsoil Topsoil					
-		1.2	SS-1	1-5-10	0.0-0.2' - roots /-					
-	1			(15)	Sandy Silt With Limestone Fragments (ML) 0.2-1.2' - grayish orange, (10YR 7/4), orange, dry to					
-	1.5				moist, medium stiff, nonplastic, strong HCl reaction,					
-	-				\\ \sqrt{30 % fine to coarse sand-sized material, 30% fine to \\ \rac{1}{2} \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \					
-	-				-					
-	-				Driller's Remark: Sand at 3.0-3.5'					
-	1				1					
-	1				1					
5	5.0				1					
15.9					Poorly Graded Sand With Silt (SP-SM)					
1 -		0.6	SS-2	2-3-4 (7)	5.0-5.6' - moderate yellowish brown, (10YR 5/4), ————————————————————————————————————					
	6.5			(,)	\silica sand, trace medium grained carbonate sand, \ \bigcircle{-} \ \text{-} \ \ \text{-} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \					
l _]]					
_]					
_]					
l -]					
10	10.0									
10.9				3-3-3	Poorly Graded Sand With Silt (SP-SM) \[\begin{align*} \text{10.0-10.3'} - Same as 5.0-5.6' except dark yellowish \frac{\text{11.1}}{\text{21.1}} \]					
_	_	0.6	SS-3	(6)	\brown, (10YR 4/2), mottled, 5-10% nonplastic fines,					
_	11.5				\trace medium sand-sized carbonate sand \\ \Poorly Graded Sand With Silt And Organics \\ \Text{Poorly Graded Sand With Silt And Organics}					
-					\((SP-SM)					
-	_				10.3-10.6' - grayish brown, (5YR 3/2), moist, loose, no HCl reaction, fine silica sand, 15-20% fines that					
_	-				appear to be very fine grained organics, nonplastic					
_					fines -					
-					-					
-	-									
15 5.9	15.0				Poorly Graded Sand (SP)					
-	-	0.8	SS-4	5-7-11	15.0-15.8' - dark vellowish brown. (10YR 4/2). white.					
-		0.0	33-4	(18)	moist, medium dense, nonplastic, no HCl reaction,					
-	16.5									
-	-									
-	-				-					
-	-									
-	-									
-	1				<u> </u>					
20	1				<u> </u>					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	IT-01	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WAIERL								Cohooffor D Thomas
1	LVLLO	. 42.U IL	gs on 6/2		TART : 6/27/2007 END : 6/29/2007 SOIL DESCRIPTION	LUGGER	. J. i	Schaeffer, D. Thomas COMMENTS
≥9€ T	CAMPLE	INTERVA	I (ft)	STANDARD PENETRATION	GOIL DEGOMI TION		90.	GOWINIENTO
	SAIVIFLE			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLO	OR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
FAC		RECOVE	_ ` `		MOISTURE CONTENT, RELATIVE DENSITY CONSISTENCY, SOIL STRUCTURE, MINERAL		IBOI	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCE, SOIL STRUCTURE, WIINERAL	.001	SYN	INSTRUMENTATION
0.9	20.0			. ,	Poorly Graded Sand With Silt (SP-SM)		TH	
1 1		0.9	SS-5	11-10-13	20.0-20.9' - pale yellowish brown, (10YR 6/2), o yellowish brown (10yr 4/2), moist, medium den			-
1 1	21.5			(23)	silica sand, trace carbonate sand in first 0.2', tr	ace /		-
1 +	21.0				nonplastic fines, no HCl reaction in silica, mild carbonate	in / -		-
1 1					Carbonate		1	-
1 1						-	1	-
1 1						-	1	-
1 1						-	1	-
1 -						-		-
	05.0					-		-
25 -4.1	25.0				Poorly Graded Sand (SP)			-
		0.8	SS-6	4-5-5	25.0-25.8' - dark yellowish brown, (10YR 4/2), ¬ mottled, wet, loose, no HCl reaction, fine silica	cond =		-
1 1	00.5	0.0	000	(10)	trace nonplastic fines	sand, /_		-
1 +	26.5							-
1 -						_	l	-
1 1						-		-
1 1						-	1	-
1 -						-		-
1 -						-		-
	00.0					-	l	-
30 -9.1	30.0				Poorly Graded Sand (SP)			_
1 -		0.9	SS-7	2-3-4	\setminus 30.0-30.9' - Same as 25.0-25.8' except mottled	and /=		-
1 1	24.5	0.0	00 /	(7)	banded	/ -		-
1 +	31.5					_	l	-
1 1						-	1	-
1 1						-		-
						-		-
						-		-
-						-	1	Driller's Remark: Very soft at 33.0', possible
] , -	25.0					-		change of material in SS-8
35 -14.1	35.0				Interbedded Organic Soil (SP)			-
-		1.5	SS-8	0-0-0	35.0-35.6' - dusky brown, (5YR 2/2), wet, 60%	organic _		-
-	26.5	1.5	55-0	(0)	soil and 40% poorly graded sand; organic soil of low to medium plasticity, slow dilatancy, no HC	ı /-		-
1 +	36.5				reaction; poorly graded sand is fine grained, poorly orange silica grains, 10-15% organic fines, no	ossible		-
					reaction	no -		-
					Poorly Graded Sand Grading To Silty Sand V	Vith -		-
					Organics (SP) 35.6-36.5' - dusky brown, (5YR 2/2), wet, very	loose, -		Driller's Remark: Gravelly material at 38.0'
					no HCl reaction, fine sand, possible orange sili	ca -	1	(like SS-9)
					grains, trace coarse sand-sized pyrite grains, 1 low plastic fines, increasing with depth, appear		1	-
					organics		1	-
40							\vdash	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	IT-01	SHEET	3	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

DRILLING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical									
WATER	LEVELS	: 42.0 ft b	ogs on 6/2	28/07	TART : 6/27/2007 END : 6/29/2007 LOGGER : J. Schaeffer, D. Thomas				
				STANDARD	SOIL DESCRIPTION 0 COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
BH		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
SU				(N)					
-19.1	40.0				Silty Sand (SM) 40.0-41.3' - mixed yellowish gray, medium light gray,				
		1.3	SS-9	3-5-8 (13)	light bluish gray, (5Y 8/1, N6, 5B 7/1), wet, medium				
	41.5			(10)	dense, strong HCl reaction, fine to coarse sand-sized				
-					shells and limestone				
_					1 				
-					1 				
-					† 				
-					- 1 1				
-					Driller's Remark: 100% loss of circulation at				
l					- 44.0-44.5'				
45 <u> </u>	45.0				Silty Gravels (GM) Finished drilling at 45.0' at end of 6/27/07 at				
			00.40	12-41-40	45.0-45.8' - 50/50 split in sample; lenses alternates, -				
-		0.8	SS-10	(81)	\[\begin{align*} \begin{align*} \begin{align*} \begin{align*} \begin{align*} 1"-2-1/2" thick limestone fragments are medium gray \\ (N5), strong HCl reaction, same as SS-9, angular fine \\ \begin{align*} Driller set HW casing \\ \text{Driller Semark: Caving at 16.0-17'} \]				
-	46.5				to coarse gravel-sized, silt with sand (ML) is pale (possible water table); casing is dry up to				
-					yellowish brown, wet, very soft, nonplastic, very rapid dilatancy, 10-20% very fine sand-sized particles, mild 43.5'.				
_					to moderate HCl reaction, carbonate materials On 6/28/07 water table is at 42.0'; resume				
_					drilling at 07:30 AM				
_					Driller's Remark: Alternating layers of soft and hard material between 45.0-50.0'; lost				
l _					circulation at 45.0'				
50	50.0] [
-29.1					Silty Gravels (GM)				
-		1.4	SS-11	31-27-17 (44)	50.0-51.4' - Same as 45.0-45.8' except limestone in gravel-sized particles, one 1" fragment in middle of				
_	51.5			(44)	sample, fine to coarse angular gravel-sized limestone				
_	01.0				from 51.0-51.4'; silt is same as SS-10				
-					† 				
-					† 				
-					- 1				
-					- 1				
-					- 				
					 				
55 -34.1	55.0		00.15	50-50/1.5	Well Graded Limestone Gravel With Silt And Sand				
-	55.6	0.5	SS-12	(100/7.5")	(GW)				
-					55.0-55.5' - Same as 45.0-45.8' except medium gray to moderate yellowish brown, (N5, 10YR 5/4), wet,				
-					very dense, gravel is in both colors and fines are in				
-					brown color, fine to coarse angular gravel-sized				
-					limestone, 30% fine to coarse angular sand-sized material, 15% nonplastic fines, gray material has				
_					strong HCl reaction, brown material has mild to				
_					moderate HCl reaction, all carbonate materials Driller's Remark: Change to SS-13 material at 58.0'; Install casing to 60.0'				
_					at oo.o, mount ocomy to oo.o				
60									
			1		i i				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l IT-01	SHEET	4	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						auto hammer, NW rods, 3			ORIENTATION : Vertical
WATER	LEVELS	: 42.0 π	ogs on 6/2		START : 6/27/2007	END: 6/29/2007 SOIL DESCRIPTION	LOGGE	₹ : J. · 	Schaeffer, D. Thomas COMMENTS
≥ 9€1	CAMPLE	INTERVA	\ \(\frac{4}{4} \)	STANDARD PENETRATION		GOIL DEGUNIF HON	90.	GOIVIIVILINIG	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE		TEST RESULTS	SOIL NAME, MOISTURE O	USCS GROUP SYMBOL, CONTENT, RELATIVE DEN	COLOR, NSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH SURF/ ELEVA			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MIN	IERALOGY	SYMB	INSTRUMENTATION
-39.1 - - -	60.0	1.2	SS-13	16-19-25 (44)	60.0-61.2' - mode wet, dense, fine t	Limestone Fragments (erate yellowish brown, (1 to coarse grained, nonpl 25% silt, 15% fine grave	0YR 5/4), astic. mild	- -	Driller's Remark: Circulation lost after spoon
- - - -									Driller's Remark: Hard at 62.0'
65	65.0								Driller's Remark: Softer at 64.0', circulation returns, installed 10' more casing (to 65.0')
-44.1 - - - - - - -	65.3	0.3	SS-14	50/3.0 (50/3.0")	\ moderate HCl rea	e as 60.0-61.2' except m action, 25% sand, predo dium coarse sand, all car	minantly fine	-	Driller's Remark: 65.0-70.0' drilling hard, a little chatter at 69.5'
70 <u>-</u> -49.1	7 0.9	0.0	∖SS-15 /	50/1.0	No Recovery 70.	0.70.4			 Driller's Remark: Hard from 70.0-75.0', little
- - - - - - 75	74.9		\SS-16/	50/1.5	No Recovery 75.			-	chatter -
-54.1 - - - - - - - 80		0.0	10)	(50/1.5")	Begin Rock Corin			-	- - - - - -



FRACTURES PER FOOT

0

2

1

1

1

1

2

>10

3

3

3

>10

5

NR

8

3

0

RQD(%)

100 0

WATER LEVELS: 42.0 ft bgs on 6/28/07

CORE RUN, LENGTH, AND RECOVERY (%)

75.0 R1-HQ

76.0

1 ft 100%

R2-HQ

5 ft 97 1

100%

R3-HQ

5 ft 63 1

100%

R4-HQ

5 ft 35

88%

R5-HO

5 ft

68%

28 7

DEPTH BELOW SURFACE AND ELEVATION (ft)

-54.1

80

-59 T

85

-64 1

90

-69.7

95

91.0

86.0

81.0

BORING NUMBER: PROJECT NUMBER: 338884.FL IT-01 SHEET 5 OF 8

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1705495.9 N, 457735.8 E (NAD83)

START: 6/27/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

76.95, 79.85, 80.55' - Fracture (3), 25 deg and 45 deg, rough, planar to undulating, tight

77.4' - Fracture, 30 deg, rough, undulating,

77.75' - Fracture, horizontal, rough, planar,

78.3' - Fracture, horizontal, rough, planar to

81.9' - Fracture, horizontal, rough, planar

with a 1" fragment wedge between 2

82.35' - Fracture (2), 30 deg, rough, planar,

83.95' - Fracture, 50 deg, rough, stepped,

84.85' - Fracture, 60 deg, rough, undulating,

85.0-85.15' - Fracture zone, small 1/4 and

85.15, 85.4, 85.75' - Fracture (3), 10 deg,

85.5' - Fracture, 80 deg, rough, undulating to stepped, from 85.15 to 85.75

85.85' - Fracture, 70 deg, rough, undulating,

from 85.75 to 86.0 continuation of overlying

86.2' - Fracture, 75 deg, rough, undulating,

fragmentation and debris, nearly fracture

87.0, 87.2' - Fracture (2), 10 deg, rough,

87.65' - Fracture, 10 deg and 30 deg, rough,

undulating to stepped, tight to healed 88.75' - Fracture, 75 deg, rough, stepped, tight, bounded by fractures at 88.15 and

89.15' - Fracture, 20 deg, rough, stepped,

very open fracture with significant

88.45' - Fracture, horizontal, rough,

very open with fragmentation

89.5-89.8' - Fracture zone

planar, open, rounded

undulating, open

89 15'

86.55' - Fractures, horizontal, rough, stepped,

84.55' - Fracture, 10 deg, rough, planar

leading to fracture zone at 85.0'

rough, undulating to stepped

DISCONTINUITIES

DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard ELEVATION: 20.9 ft (NAVD88)

9

 $\underline{\circ}$

CORING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, HQ tools, HW casing

nearly healed

undulating, tight

healed

fractures

tight

smaller

fracture

tight to open

tiaht

END: 6/29/2007 LOGGER: J. Schaeffer, D. Thomas LITHOLOGY COMMENTS ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS Switch to coring; finished Limestone 75.0-76.0' - moderate yellowish soil drilling at 15:30 on brown, (10YR 5/4), fine grained, 6/28/07 moderate HCI reaction, weak (R2), R1: 3 minutes voids (up to 1/16") cover 20% of the surface area, one large 3/4" deep and 4" long cavity, 2"X3/16" with up to 1/8" calcite crystals 76.0-77.55' - Same as 75.0-76.0' except moderate yellowish brown to dark yellowish orange, (10YR 5/4, SC-1 collected at 78.5-10YR 6/6), weak to very weak (R2 to 79.5 R1), voids (up to 1/16") cover 5-25% of the surface area, voids coverage Drilled twice as fast from decreases with depth 79.5-81.0' 77.55-79.5' - light olive gray, (5Y R2: 17 minutes 5/2), fine to coarse grained, moderate HCI reaction, medium strong (R3), 25% of the rock grains are sub angular to sub rounded, voids (up to 1/16") cover 10% of the surface, voids (1/8"-3/16") cover 10% of the surface, shallow and elongated cavities up to 2" long 79.5-81.0' - Same as 79.5-81.0 except grayish orange, (10YR 7/4), very fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), voids (up to 1/16") cover 25% of the surface, few voids (1/8"-3/16"), no cavities R3: 8 minutes 81.0-86.0' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCI reaction, medium strong (R3), voids (<1/16") cover 25-30% of the surface area, few cavities (1/4"-1/2"), somewhat friable; except 81.7-82.1' weak rock (R2), voids cover 5% of the surface 86.0-86.55' - Same as 81.0-86.0' except medium strong (R3), 25-30% void coverage 86.55-87.65' - moderate yellowish Driller's Remark: 50% brown, (10YR 5/4), fine grained, circulation loss moderate HCI reaction, very weak (R1), voids (<1/16") cover 0-5% of the surface, 1/4"-1/2" thick trace R4: 9 minutes planar bedding 87.65-88.6' - Same as 86.0-86.55' Driller's Remark: 100% 88.6-88.7' - light olive gray, (5Y 5/2), circulation loss as soon as very fine grained, moderate HCI reaction, strong (R4), 20% sub drilling starts at 91.0'; 100% loss through to 96.0' angular coarse sand-sized particles (possible shell fragments), voids (up to 1/16") cover 3% of the rock surface, cavities (up to 1/2") 88.7-89.8' - Same as 86.0-86.55' 89.8-90.4' - Same as 86.0-86.55' except light olive gray, (5Y 5/2), strong to very strong (R4 to R5) No Recovery 90.4-91.0'

ORIENTATION: Vertical



PROJECT NUMBER:

338884.FL

BORING NUMBER:

IT-01

SHEET 6 OF 8

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing

WATER	LEVELS: 42.	.0 ft b	gs on 6	6/28/07 START : 6/27/2007 END :	5/29/20	07 LOGGER: J. Schaeffer, D. Thom	as
≩∩⊋	<u> </u>			DISCONTINUITIES	٦	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI ACE ATIC	J.H.	(%) Q	128	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ď	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS CORING RATE AND
EV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ĭ MB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	035	ď			, s		
-74.1 -			NR	89.8' - Fracture, 30 deg, rough, undulating, open to fracture zone	╁	Limestone - 91.0-91.65' - light olive gray, (5Y	R5: 15 minutes
_	96.0			90.05' - Fracture, 20 deg, rough, stepped,	\perp	5/2), fine grained, moderate HCl	_
			0	very open 90.2' - Fracture, 70 deg, rough, undulating,		reaction, weak (R2), voids cover 25% of the surface, 3% gray voids, same	Added EZ-Mud, still 100%
_			١	fracture to fragmentation	\mathbf{H}	as 88.6-88.7'	water loss -
_				91.25' - Fracture, 30 deg, smooth, undulating		91.65-93.0' - light olive gray, (5Y	_
_			0	91.45, 91.5, 91.6, 91.65' - Fracture (4), horizontal, rough, planar, open fragmentation	1	 5/2), fine grained, moderate HCI reaction, strong (R4), transition to 	
_	R6-HQ			(sub angular) from 91.6-91.65'	1	moderate yellowish brown	-
_	5 ft 100%	62	2	92.2' - Fracture, 40 deg, rough, planar, healed with trace fragmentation (sharp	扛	 particularly at the top and bottom, voids (up to 1/16") cover 15-20% of 	-
_	100%			angular)	+	the surface, 1/2" cavities and fossil	-
_			3	92.35' - Fracture, 20 deg, rough, planar,	+=	– casts	-
100 <u> </u>				fragments, joins with 92.2 fracture 92.55' - Fracture, horizontal, smooth, planar		93.0-94.4' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction,	R6: 5 minutes
-79.1			>10	93.0' - Fracture, 70 deg, rough, undulating,	\perp	weak to medium strong (R2 to R3),	Ro. 5 minutes
_	101.0			tight 93.2' - Fracture, 20 deg, rough, undulating,	上	5% rounded coarse fragments, voids (up to 1/16") cover 10% of the	_
_			0	tight	\perp	L surface	_
			Ŭ	93.65' - Fracture, 70 deg, rough, undulating,		No Recovery 94.4-96.0'	_
			1	tight 93.8-93.95' - Fracture zone		Limestone 96.0-98.1' - dusky yellow, (5Y 6/4),	
_			│	93.95' - Fracture, 10 deg, rough, stepped,	\perp	fine grained, moderate HCl reaction,	1
_	R7-HQ			open 98.3' - Fracture, 25 deg, rough, undulating,		weak to medium strong (R2 to R3), voids (up to 1/16") cover 30-40% of	_
_	5 ft 96%	77	1	tight	1	the surface, trace elongate cavities	-
-	3070			98.55' - Fracture, 80 deg, rough, undulating,		up to 3/4"X1/4", trace organics (up to	100 % water loss from
405			1	that starts at 98.3 and ends as unbroken fracture at 98.8,	世	1/4") 98.1-101.0' - moderate yellowish	101.0-106.0' -
105 <u> </u>				99.45' - Fracture, 50 deg, rough, planar, tight	╁	— brown, (10YR 5/4), fine grained,	R7: 14 minutes
_			2	99.6' - Fracture, 70 deg, rough, undulating to planar, tight extends from 99.45 to 99.65'	\perp	moderate HCl reaction, weak to very weak (R2 to R1), voids (up to 1/16")	-
_	106.0		NR	99.65' - Fracture, 30 deg, rough, planar, tight	+	cover 5-15% of the rock surface,	-
_			>10	100.1' - Fracture, horizontal, rough, stepped, open to fracture zone below	+	organics (up to 1/8" long) 101.0-103.5' - Same as 96.0-98.1'	-
_				100.1-100.7' - Fracture zone, with several	\perp	except very weak to weak (R1 to R2),	_
_			>10	large 3" subangular fragments and several 0	#	the rock is gray where it is stronger,]
_				to 70 degree fractures 100.7' - Fracture, horizontal, rough, stepped,	\perp	voids (up to 1/16") cover 10-25% of the surface, cavities (up to 1/4") and]
_	R8-HQ 5 ft	0	>10	very weak (R1) rock and rounded core with	上	trace 3/4"-1" cavities with molds and	
	100%	U	- 10	faded color 102.85' - Fracture, 60 deg, rough, undulating,		casts, more voids in 103.2-103.5' - 103.5-105.15' - light olive gray, (5Y]
				healed		5/2), fine to very fine grained,]
110			>10	103.45' - Fracture, 25 deg, rough, undulating,	+	moderate HCI reaction, medium	1
-89.1				open 103.65' - Fracture, horizontal, rough,	工	— strong to strong (R3 to R4), voids (up to 1/16") cover 10-15% of the	R8: 7 minutes
-	1110		>10	stepped, very open	\pm	surface, cavities (up to 1/4") cover	
-	111.0		-	104.25' - Fracture, 10 deg, rough, stepped, very open fracture with some fragments	+-	5% of the surface and frequency decreases with depth, rare larger	100% circulation loss from
-			>10	105.15' - Fracture, 50 deg, rough, undulating,	+	cavities also decreasing with depth	111.0-116.0'
-				healed	+	_ 105.15-105.8' - Same as	-
_			>10	105.35-105.45' - Fracture zone, rough, planar 106.3' - Fracture, 20 deg, rough, undulating,	\perp	101.0-103.5' except steep increase in voids, more brownish	-
_				open	\perp	No Recovery 105.8-106.0'	_
_	R9-HQ 5 ft	25	2	106.55' - Fracture, 20 deg, rough, undulating to stepped, very open fracture	\blacksquare	_	_
_	84%	_0		106.7-106.85' - Fracture zone, 30 deg and 60		-	
			0	deg, subrounded	┰		
115			U]



PROJECT NUMBER:

338884.FL

BORING NUMBER:

IT-01

SHEET 7 OF 8

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, HQ tools, HW casing

				6/09/07 CTADT : 6/07/0007 FND : 6			LOCCED L Cabacter D Than	ONLIVIATION: Vertical
WATER	LEVELS : 42	U II D	ys on	6/28/07 START : 6/27/2007 END : 6/ DISCONTINUITIES	29/20	<u> 107</u>	LOGGER: J. Schaeffer, D. Thon LITHOLOGY	COMMENTS
≷ 9€	CORE RUN, LENGTH, AND RECOVERY (%)				8	H	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ZAN.	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE	J. H. H. H. H. H. H. H. H. H. H. H. H. H.	(%)	128	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	S		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
뚜쥬핏	NG S	OΩ	SAC ER F	PLANARITY, INFILLING MATERIAL AND	₩		AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	SHR	ď	FB	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S		CHARACTERISTICS	5.10. 0, 120. 1200210, 2.0.
-94.1			>10	106.85' - Fracture, horizontal, rough, planar,		Ŧ	Limestone	R9: 4 minutes
-	116.0		NR	with fragmentation transition abruptly to different material	\top	t	106.0-106.7' - moderate to dark yellowish brown, (10YR 5/4, 10YR	1
-	110.0			106.95' - Fracture, 45 deg, rough, stepped,	1	╁	5/6), fine grained, moderate HCl	100% circulation loss from
-			>10	very fine steps	╂┷	╁	reaction, medium strong (R3), voids	116.0-121.0'
_				107.15, 107.5' - Fracture (2), 80 deg, rough,	\perp	1	(up to 1/16") cover 30% of the	-
_			0	undulating, stained 107.65' - Fracture, 10 deg and vertical,	ᅪ	Ł	surface, 1" long elongated fossil molds and casts, slightly stronger	
			١٠	break, angular		1	where mottled as 105.15-105.8'	
_	R10-HQ			107.75' - Fracture, 10 deg, rough, stepped,	╨	╁	106.7-107.75' - light olive gray, (5Y	1
_	5 ft	63	>10		\pm	╁	5/2), fine to very fine grained, mild to	-
_	100%			107.75-108.75' - Fracture zone, horizontal and vertical, present significant 1/4"	\blacksquare	7	moderate HCl reaction, medium strong to strong (R3 to R4), voids (up	-
_			2	fragments	╨	Ł	to 1/16") cover 0-5%	
120			-	108.75-109.85' - Fracture zone, angular		1	107.75-109.85' - Same as	
-99.1				fragments	1—	T	106.0-106.7' except extremely weak	R10: 5 minutes
-	404.0		>10	109.85' - Fracture, vertical, rough, undulating, 10" long fracture	亡	†	(R0), transitioning gradually from 108.5-109.5' as very weak rock (R1)	1
-	121.0			110.6-111.0' - Fracture, horizontal, rough,	╁	╁	with voids (up to 1/16") cover 20% of	100% circulation loss from
-			4	undulating, fracture zone, sub angular, 1-2"	<u>-</u>	1	the surface, trace fine organics	121.0-126.0'
_				fragments to end of core	ᅪ	Ł	109.85-111.0' - Same as	
			0	111.0-111.95' - Fracture zone, vertical, 1-4" subangular fragments		1	106.7-107.75' except increased voids to 10% and trace 1/4" cavities, trace	
_			0	111.95, 112.35' - Fracture, horizontal, rough,	\perp	Ţ	organics, almost transition to rock	1
_	R11-HQ			undulating, open to fracture zone at 112.35	╁╌	t	similar to 105.15-105.8'	SC-2 collected at 122.9-
_	5 ft	63	0	112.9' - Fracture, horizontal, rough, planar	-	₽	111.0-115.2' - moderate yellowish	124.0'
_	98%			113.5' - Fracture, 45 deg, rough, planar, fragmentation along plane, closely spaced	₽	╁	brown, (10YR 5/4, 10YR 6/6), fine grained, moderate HCl reaction,	-
_			3	fractures, tight to open	ш	1	weak to very weak (R2 to R1),	
125			٦	113.9' - Fracture, 20 deg, rough, undulating,	Ъ	F	gradual transition throughout the	
-104.1				open –	7	t	core, voids (up to 1/16") cover	R11: 5 minutes
-			>10	115.0-115.2' - Fracture zone, sand and sub angular fragments	┰	╁	10-25% of the rock surface, trace 1/4" molds, molds (up to 1/2") over	Driller's Remark: Used -
-	126.0		NR	116.0-116.4' - Fracture zone, sub angular	┾╌	╁	less than 2% of the surface, fewer	1200 gallons of water at hole; water 25.0' below
-				fragments, sand to 1" fragments	_	H	voids and cavities where the rock	ground surface before
_				116.4' - Fracture, horizontal, rough, stepped, very open			strength is very weak (R1); 111.0-112.5', rock is weak (R2) and	∖grouting at 6/29/07 at 14:00
				116.85' - Fracture, 60 deg, smooth,			voids cover 15% of the surface with	
I -				undulating, tight	1		some cavities;	1
-				118.05' - Fracture, 60 deg, rough, undulating,	1	H	112.5-113.5', rock is very weak (R1)	1
-				similar to fracture above in size and orientation but followed at depth by crush	-	F	and voids cover 10% of the surface with few cavities;] -
-				118.2-118.45' - Fracture zone, sand to 1"	-	F	113.5-115.2', rock is weak (R2),	-
l _				subangular fragments	1	L	voids cover 25% of the surface,]
				118.45, 118.65' - Fractures (2), horizontal, rough, stepped, tight to open, fracture at	1		some cavities, ends with rock fragments that are sub-angular to	1
I -				118.65 also splits off at 60 degree near one	1	Г	sub-rounded	
-				side	1	H	No Recovery 115.2-116.0'	1
-				119.15' - Fracture, 10 deg, rough, planar,	-	F	Limestone]
_				tight to healed 119.8' - Fracture, 15 deg, rough, undulating,	4	F	116.0-116.75' - dark yellowish orange to moderate yellowish brown,	-
_				tight	1	L	(10YR 6/6, 10YR 5/4), fine grained,]
				120.5, 120.55' - Fracture, horizontal, rough,	1		moderate HCl reaction, very weak	
I -				planar, tight	1	Γ	(R1), voids (up to 1/16") cover 25%	1
-				120.55-120.8' - Fracture zone, sand to gravel sized fragments, weakly to non competent	1	F	of the surface, trace cavities (1"-1/2" elongate infilled with grayish	1
-				1208' - Fracture, horizontal, rough, undulating	-	F	silt-sized infill)	-
_				to stepped	4	F	116.75-118.15' - Same as	1
				121.5' - Fracture, 50 deg, smooth, undulating,	_	L	116.0-116.75' except weak to	
I -				open, with fragmentation to smaller orthogonal fractures at same depth	1	Γ	extremely weak (R2 to R0), hard to determine voids and cavities	1
				- S. S. S. S. S. S. S. S. S. S. S. S. S.		T	TOTAL MINE TOTAL MINE CONTROL	
l			ı		1	1		1



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	IT-01	SHEET	8	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 42	.0 ft b	gs on (6/28/07 START : 6/27/2007 END : 6/2	29/20	2007 LOGGER: J. Schaeffer, D. Thomas
				DISCONTINUITIES	ß	LITHOLOGY COMMENTS
ELOV :: ANC	N, AND 3Y (%	_	ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING,
TH BI FACE	E RU 3TH, OVEF	(%) O	STUF FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, MOOTHNESS, CAVING ROD
DEP SUR ELE	COR LEN(REC	a a	FRA(PER	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS DROPS, TEST RESULTS, ETC.
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 121.75' - Fracture, 50 deg, smooth, undulating, tight to healed fracture with some orientation as 121.5 fracture 124.05' - Fracture, 25 deg, rough, undulating, some fragmentation 124.55' - Fracture, 60 deg, rough, undulating, open fracture with a near horizontal fracture and fragmentation 125.45' - Fracture, horizontal, smooth, undulating, open 125.45-125.9' - Fracture zone, fracture zone with sub angular fragments 1/2-2" in size	WAS .	AND ROCK MASS CHARACTERISTICS I18.65-120.3' - Same as I16.75-118.15' except weak to medium strong (R2 to R3) Limestone I20.3-121.0' - Same as I16.0-116.75' except extremely weak to very weak (R0 to R1) I21.0-125.9' - moderate yellowish brown to dark yellowish orange, (10YR 5/4, 10YR 6/6), fine grained, moderate HCI reaction, very weak to medium strong (R1 to R3), gradual transitions, voids (up to 1/16') cover I0-25% of the surface, trace open cavities (1/4'), larger completely infilled cavities over 2% of the surface, percent of voids decreases to 10-15% with depth, I24.0-125.9' increasing weakness, very weak (R1) at bottom No Recovery 125.9-126.0' Bottom of Boring at 126.0 ft bgs on 6/29/2007



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	IT-02	SHEET	1	OF	7

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	<u>ENT : CME 75 S/</u>	N 252437, mud rotary, au	uto hammer, NW rods, 4-7/8	" tri-cone bit		ORIENTATION : Vertical
WATER	LEVELS	: 30.0 ft l	ogs on 7/2	2/2007	START: 7/1/2007	END: 7/2/2007	LOGGER	: J.	Schaeffer, C. Dougherty
				STANDARD	S	OIL DESCRIPTION		(D	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	J (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
E A ON	0,			TEST RESULTS	SOIL NAME, U	ISCS GROUP SYMBOL, COI	LOR,	101	DEPTH OF CASING, DRILLING RATE,
A HE		RECOVE	<u> </u>			NTENT, RELATIVE DENSIT		BOI	DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6"	CONSISTENCY,	SOIL STRUCTURE, MINERA	ALOGY	λX	INSTRUMENTATION
29.6	0.0			(N)	Poorly Graded Sa	nd With Silt To Silty Sand	I (CD CM/	T	
25.0	0.0			0-2-3	SM)	ind with one to only oand	1 (SF -SNI) -		SS-1 appears to be fill -
l _	[1.0	SS-1	(5)	0.0-1.0' - pale yello	wish brown to moderate b			_
	1.5			. ,	(10YR 6/2 to 5YR	4/4), moist, loose, fine to m HCl reaction in carbonate	nedium		
1 -						arbonate and silica grains,			_
-	1				nonplastic fines, tra		10 20 /0 -		-
-	-								-
-							-		-
_							_		_
l _									_
5	5.0						_		_
24.6	0.0					nd With Silt (SP-SM)		TT	
-	-	10	SS-2	11-12-13		vn with grayish brown, (5YI		掛	-
-		1.0	33-2	(25)	with 5YR 3/2), mois	st to wet, medium dense, f action, silica sand, 5-10%	ine	1.14	-
-	6.5				nonplastic fines	action, Silica Sand, 5-10%	/_		_
l _					(ep.aeae iii.ee				_
_	1						-		-
-							-		-
-							-		-
-							_		-
l _							_		_
10	10.0								
19.6					Poorly Graded Sa				
_	1	0.7	SS-3	4-7-11	10.0-10.7' - light br □ gray (5VR 6/1 to 5	ownish gray grading to yel 5Y 8/1), moist, medium der	llowish -		-
-	44.5			(18)	grained, no HCl rea	action, silica sand, 5-10%	130, 1110		-
-	11.5				nonplastic fines gra				-
-							_		-
_							_		_
l _									_
-	1						_		-
-	1						-		-
l							-		-
15 <u> </u>	15.0				Poorly Graded Sa	nd (SD)			
14.0				6-7-6		as 10.0-10.7' except trace,			-
_	[0.7	SS-4	(13)	nonplastic fines, tra				_
	16.5			. ,					
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	IT-02	SHEET	2	OF	7

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard ELEVATION: 29.6 ft (NAVD88)

		DD AND			N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 30.0 ft b	gs on 7/2	2/2007	TART : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty
>00				STANDARD	SOIL DESCRIPTION g COMMENTS
ANE (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
H BE ACE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DELLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
9.6	20.0			(/	Poorly Graded Sand (SP) SS-5 is coarser grained than previous
-		0.9	SS-5	4-6-9 (15)	20.0-20.9' - brownish gray, (5YR 4/1), moist to wet, — samples — medium dense, fine to medium grained, no HCl
-	21.5			(15)	reaction, silica sand, 5% nonplastic fines
-	20				11
-					11
					11
					Cuttings from bit above SS-6 are Fat Clay (CH) - greenish gray (5G 6/1), wet, high plasticity, no
					dilatancy, no HCl reaction
25	25.9				Driller's Remark: Hard at 24.5'
4.6		0.0/	_SS-6_/	50/1" (50/1")	No Recovery 25.0-25.1' 25.0' - a few coarse grained limestone fragments,
_				(00/1)	\very mild HCl reaction / _
_					Driller's Remark: 100% circulation loss at 26.0'; grinding to 26.0-26.5'; then softer
-					_ drilling (still hard)
-					.
-					4 1
_					
-					
-					
30 -0.4	30.0				Limestone And Silty Sand (SM) Driller's Remark: 30.0-35.0' medium hard, no
		0.9	SS-7	15-31-61	30.0-31.5' - medium gray, light olive gray and -{ }
-		0.9	55-1	(92)	yellowish gray, (N5, 5Y 6/1 and 5Y 8/1), wet, dense, strong HCl reaction, fine to medium sand-sized, 3"
-	31.5				√ lense of limestone, silty sand lenses 1/4" thick, 30%
-					\low to medium plastic fines, few carbonate material \ -
-					
-					
-					- 1 1
-					1 1
35	35.0				Driller's Remark: Softer at 34.5'
35 -5.4	35.0 35.2	0.0	SS-8	50/2"	No Recovery 35.0-35.2'
				(50/2")	11
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	IT-02	SHEET	3	OF	7

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical

DRILLIN	G METH	<u>OD AND</u>	EQUIPM	ENT : CME 75 S/I	N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 30.0 ft l	bgs on 7/2	2/2007	START : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL SE A		RECOVI	FRY (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
TH VAT			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SUF			#ITPE	(N)	Solido 1 So
-10.4	40.0				Silty Sand (SM) Driller's Remark: No circulation at 40'.0
_		1.5	SS-9	30-43-31	40.0-41.5' - light olive gray, (5Y 5/2), wet, very dense, mild HCl reaction, very fine to medium sand-sized, all
-	41.5			(74)	carbonate materials, 40-45% nonplastic fines, white
-	41.5				thread-like lenses from 41.3-41.5', 1" limestone piece
-					dit 41.3, lossililerous, filliu fici feaction
-					Driller's Remark: Harder at 42.5'; still no
-					circulation. HW casing to 40.0'. Unclear if
-					circulation loss is into formation at depth below casing or along the sides of the
_					casing.
-					
45	45.0	00	00.40	E0/0"	No Decayons 45 0 45 91
-15. 4 -	45.3	0.0	SS-10	50/3" (50/3") /	No Recovery 45.0-45.3' \[\begin{align*} \text{Visual Recovery 45.0-45.3'} \\
_				(=====	\ olive gray (5Y 5/2), highly fossiliferous, mild to \ \ \ Driller's Remark: 45.0-50.0' not as hard as
_					moderate HCl reaction above
_					」
					11
_					1
_					1
-					
50 50	50.0				
-20.4	50.0				Silty Sand (SM) Driller's Remark: 50.0-55.0' drills hard and
-		0.9	SS-11	21-14-9	50.0-50.9' - mottled light olive gray, (5Y 5/2), wet, dense, mild to strong HCl reaction, fine to medium
-		0.5	00 11	(23)	dense, mild to strong HCl reaction, fine to medium sand-sized, predominantly fine, 15-30% nonplastic to
-	51.5				\ low plasticity fines varies throughout sample in lenses, -
-					1" thick lens of coarse sand to fine gravel-sized lenticular limestone at 50.3', fine to coarse
-					gravel-size, rounded limestone fragments with silt -
_					matrix surrounding fragments, HCl reaction varies from mild in limestone lense (50.0-50.5') to moderate
_					to strong in fragments (50.5-50.9')
_					
_]
55	55.0				
-25.4				10.10.10	Silty Sand With Limestone Fragments (SM) 55.0-56.3' - yellowish gray to light olive gray, (5Y 7/2
		1.3	SS-12	12-19-13 (32)	to 5Y 5/2), wet, dense, fine to coarse grained, mild to
1 7	56.5			(02)	moderate HCl reaction, similar to SS-11, all
-					carbonate, 30-40% nonplastic fines, 2" limestone fragment at top of sample, highly fossiliferous
-					-
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PROJECT NUMBER:

338884.FL BORING NUMBER:

IT-02 SHEET 4 OF 7

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND FOLIPMENT: CMF 75 S/N 252437 mud rotary auto hammer NW rods 4-7/8" tri-cone hit ORIENTATION: Vertical

DRILLIN	ORILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical											
WATER	LEVELS	: 30.0 ft l	bgs on 7/2	2/2007	START : 7/1/2007 END : 7/2/2007 LOGGER	: J. §	Schaeffer, C. Dougherty					
				STANDARD	SOIL DESCRIPTION	(ŋ	COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG						
BEI CE.		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	ЭГІС	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND					
PTH RFA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MB(INSTRUMENTATION					
				(N)		SΥ						
-30.4	60.0			24.0.7	Limestone	\mathbf{T}	Finished drilling at 60.0' on 7/1/2007, HW casing to 45.0'					
l _		1.1	SS-13	24-8-7 (15)	\limestone fragment in SS-12		Resume drilling at 7:30 7/2/2007					
	61.5			` '	Silty Sand With Limestone Fragments (SM)							
					60.3-61.1' - mottled light olive gray, (5Y 5/2), wet, medium dense, fine to coarse grained, mild to							
					moderate HCI reaction, similar to SS-11 and SS-12,							
					all carbonate materials, 15-35% nonplastic fines							
]					1		1					
65	65.0]		1					
-35.4	-				Silty Sand (SM)	Ш	SS-9 through SS-14: Darker gray colors					
		1.0	SS-14	24-55-48 (103)	65.0-66.0' - mottled light olive gray to medium gray, - (5Y 5/2 to N5), wet, very dense, predominantly fine to		more associated with coarser lenses -					
	66.5			(100)	medium grained, mild to moderate HCl reaction, similar to above, all carbonate materials, 5-10%		1					
					coarse sand, 20-40% fines (varies in lenses)							
							1					
							1					
-					_		_					
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70	70.0				_		1					
-40.4					Silty Sand (SM)	\prod	Driller's Remark: Materials are not coreable					
		1.1	SS-15	18-27-31 (58)	70.0-71.1' - pale to moderate yellowish brown with scattered medium gray lenses, (10Y 6/2 to 10YR 5/4		(wash out of core barrel) SS-9 through SS-15 appear to be					
	71.5			(66)	with N5), wet, very dense, fine to medium grained, mild to moderate HCl reaction, similar to above, 35%	111	interbedded carbonate silts, sands with some gravels and limestone lenses are irregularly					
					\nonplastic fines		shaped and sized.					
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1 7					-		1					
75	75.0				_		1					
-45.4	73.1	0.0	SS-16	50/1.5"	No Recovery 75.0-75.1'		Driller's Remark: Still in and out of harder					
				(50/1.5")	_		and softer lenses -					
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

IT-02

SHEET 5 OF 7

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical

DKILLIN	DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical											
WATER	LEVELS	: 30.0 ft I	ogs on 7/2	2/2007 S	TART : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty							
				STANDARD	SOIL DESCRIPTION COMMENTS							
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPL F	INTERVA	L (ft)	PENETRATION								
N H H		RECOVE	` '	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, \Box DEPTH OF CASING, DRILLING RATE,							
A HE E		RECOVE	<u> </u>		MOISTURE CONTENT, RELATIVE DENSITY OR ON DRILLING FLUID LOSS, TESTS, AND							
E.E.R.P.			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY							
-50.4	80.0				Silty Sand With Limestone Fragments (SM) SS-17: Lenses of limestone pieces							
-		0.8	SS-17	41-50/5" (91/11")	80.0-80.7' - moderate yellowish brown, (10YR 5/4), - IIII throughout sample, much more than							
-	80.9			(0)	wet, very dense, fine to coarse grained, mild to moderate HCl reaction, similar to SS-15, 25-30% previous samples. Driller's Remark: 80-85 still drilling hard and							
					\nonplastic fines, 15-20% fine gravel-sized limestone \ - \ soft, material is likely to wash out of core							
l .					Mixed Materials barrel							
					80.7-80.8' - moderate yellowish brown to dark							
]				yellowish brown to dusky brown, (10YR 5/4 to 10YR 4/2 to 5YR 2/2), moist, moderate HCl reaction, lense							
-	1				of mixed silts, fine to coarse sand-sized angular							
-	1				limestone and organic soil							
-	1				 							
-	1				 							
85 <u> </u>	85.0				Sandy Clay With Silt (CL-ML)							
-55.4				5-8-9	85.0-86.1' - moderate yellowish brown, (10YR 5/4),							
_		1.1	SS-18	(17)	wet, stiff, nonplastic, rapid dilatancy, mild to moderate							
	86.5				HCI reaction, 5-10% very fine to fine sand, all							
l .												
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-	1				11							
-	1				Driller's Remark: 100% water loss at 88.0'							
-	1				Driller's Remark: Extremely soft at 88.5',							
-	-				- possibly cavity							
-	-				- 							
90 <u> </u>					- Drillada Damarki Far CC 40 rada drannad ta -							
-00.4	90.5				Driller's Remark: For SS-19 rods dropped to 90.5', SPT taken at 90.5', potential cavity							
_	90.9	0.4	SS-19	50/5" (50/5")	Silty Gravels (GM) 90.5-90.9' - mild to moderate HCl reaction, similar to							
l .				(00.0)	∖ SS-17 and SS-18, all carbonate materials, 1" rounded / │							
					\gravel-sized limestone piece, several 1/2" angular							
-	1				\text{pieces} \text{Pieces} \text{Pieces} \text{Pieces} \q							
-	1				See the next sheet for the rock core log							
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

IT-02

SHEET 6 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

				,,	asiriy		ORIENTATION : Vertical		
WATER	LEVELS: 30	.0 ft b	gs on		2/2007				
≥⊖£	<u> </u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
ОΩШ		œ	╙╙		Ś				
-	91.0		>10	91.0-91.6' - Fracture zone, rough, undulating, numerous small fragments 3/16"-1-1/2" in size 91.9' - Mechanical break		Limestone 91.0-92.6' - moderate olive brown, (5Y 4/4), fine grained, mild to moderate HCl reaction, medium	- Driller's Remark: Water at		
-			>10	92.1-92.6' - Fracture zone, rough, undulating,	╂┼┨	 strong (R3), voids (<1/16") over 25% 	30.0' below ground surface -		
-	R1-HQ 5 ft 72%	33	NR	numerous small fragments 3/16"-1" in size		of surface, larger voids (up to 3/16") over 5% of surface, moderately fossiliferous, trace organics No Recovery 92.6-94.0'	before extending casing from 45.0-90.0' Driller's Remark: Only about 25% return on		
95			>10	94.0-94.5' - Fracture zone, 0-45 deg, rough, undulating, several fragments up to 9/16", film of organic material on some faces		Limestone 94.0-96.0' - Same as 91.0-92.6'	circulation Driller's Remark: Core barrel hung up, barrel was		
-65. 4 -	96.0		0	94.8-95.1' - Fracture zone, 0-90 deg, rough, undulating, fragments up to 2" 95.4, 95.5, 96.5' - Mechanical break (3)		- 00 0 00 51 0 0 0 0 0 0 0 0 0	pulled out, cleaned and put back in to finish run R1: 14 minutes		
-			0	97.0-98.6' - Fracture zone, 0-90 deg, rough,		96.0-98.5' - Same as 91.0-92.6' - except light olive gray, (5Y 5/2), strong (R4) rock at 97.7-97.8'	- Driller's Remark: Loss of		
-	R2-HQ		>10	undulating, fragments from <3/8" - 3"		- -	circulation at about 97.0'		
-	5 ft 100%	50	>10	98.8' - Mechanical break, brown and gray		Limestone 98.5-101.0' - moderate yellowish	-		
100_ -70.4			2	staining on surfaces 99.6-99.8' - Fracture, horizontal on lower face, 30 deg on upper face, crushed rock		 brown, (10YR 5/4), fine grained, moderate HCl reaction, medium strong (R3), small voids (<1/16") 	R2: 6 minutes		
-	101.0		0	material and fragments up to 1/2" 99.8-100.2' - Fracture, <5 deg 100.8' - Mechanical break		over about 30% of surface, larger voids (3/16"x3/8") over about 5% of surface, fossil molds and casts	-		
-			>10	101.0-102.1' - Fracture zone, numerous fragments, film of carbonate derived silt in fractures		common, very fossiliferous, small fragments of gray limestone make up 5 <5% of surface. Thin (1/2") layer of gray limestone at 93.8'			
-			0		ш	Limestone	-		
-	R3-HQ 5 ft 84%	57	1	103.1' - Mechanical break 103.9' - Fracture, horizontal, film of carbonate		 101.0-105.2' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, medium strong (R3), voids (<1/16") cover 	SC-1 collected at 103.1- 103.9'		
105_ -75.4			0	derived silt infill 104.8' - Mechanical break —		25% of surface to about 102', then only 15%, trace voids larger than — 1/16", trace organics	-		
-75.4	106.0		O NR			No Recovery 105.2-106.0'	R3: 8 minutes -		
-			2	106.5, 106.6' - Fractures, horizontal, rough, undulating, tight to open up to 1/16" 107.0-107.2' - Fracture zone, rough,		 106.0-109.4' - pale yellowish brown transitions to dusky yellow, (10YR 6/2 to 5Y 6/4), fine grained, moderate 	- -		
-	R4-HQ		>10	undulating, numerous small fragments (3/16" to 9/16") 107.7-107.8' - Fracture zone, same as for		HCI reaction, medium strong (R3), <1/16" voids cover about 15% of surface, trace larger voids (up to	-		
-	5 ft 68%	47	1 >10	107.0-107.2' 107.8-108.1' - Fracture, vertical, rough, undulating, tight		- 3/16"), trace organics 106.8-107.9' - voids more abundant (35% for <1/16" voids and 5% for up	- -		
110 -80.4			>10 NR	108.3-108.7' - Fracture, 70 deg, closed 109.0-109.4' - Fracture zone –		 to 3/16" voids). Larger voids and fossil molds are up to 3/16"x1-3/16" 108.1' - a large cavity measuring about 1-3/16"x2-3/8" 			
	111.0				Ш	No Recovery 109.4-111.0'			



PROJECT NUMBER:

338884.FL

BORING NUMBER:

IT-02

SHEET 7 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 30	.0 ft b	gs on T	7/2/2007 START : 7/1/2007 END : 7/	2/200	7 LOGGER : J. Schaeffer, C. Doug	herty
				DISCONTINUITIES	g	LITHOLOGY	COMMENTS
N (ff	N, AND 3Y (%		ES T	DESCRIPTION	CLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - -	R5-HQ 5 ft 8%	0	>10 NR	111.0-111.4' - Fracture zone, rough, undulating, numerous fragments 3/8" to 1-3/16" in size		Limestone 111.0-111.4' - moderate olive brown, (5YR 4/4), fine to coarse grained gravel-sized grained, moderate HCl reaction, weak to medium strong (R2 to R3), very fossiliferous, voids (<1/16") over 30% of surface, larger voids (up to 3/16"-3/8") and fossil molds over 5% of surface No Recovery 111.4-116.0'	R4-HQ: 6 minutes Driller's Remark: Apparent cavity beginning at about 110.0', little resistance to drilling -
11 <u>5</u> -85.4				_			R5: 1 minute
-	116.0				E	_ Limestone	-
-			2	undulating, several small fragments (0.5-1.5") 116.6' - Fracture, horizontal for lower face, 50 deg for upper face, open, film of silty fine		transitions to light olive gray by 116.3', (5Y 7/2 to 5Y 6/1), fine	-
-				sand on lower face	世	 grained, mild to moderate HCl 	-
-	R6-HQ 5 ft	13			Ħ	reaction, strong (R4), voids (<1/16") over 5% of surface, trace larger voids (up to 3/16")	- -
-	20%		NR			No Recovery 117.0-121.0'	-
120_ -90.4						_	R6: 2 minutes
_	121.0			4041 Unaccasidated metadial No freetons	þ.	Decade Oracle (OD)	_
-			0	121' - Unconsolidated material. No fractures.		Poorly Graded Sand With Silt (SP) 121.0-125.6' - light gray to light olive gray, (N7 to 5Y 6/1), wet/saturated,	-
_			0			medium dense, fine grained, silica sand, about 10% fines (carbonate derived), well rounded grains, 124.4'	-
-	R7-HQ 5 ft 92%	0	0			- a 1" limestone fragment, 124.8' - fines increasing to about 50%, color change to olive gray (5Y 3/2)	_
- 125			0			-	-
-95. 4			0			-	R7: 1 minute
-	126.0				\vdash	No Recovery 125.6-126.0' Bottom of Boring at 126.0 ft bgs on	
-			NR			- 7/2/2007 -	-
-			INIX		-	-	_
-					1	_	-
					1	-	
-					1	-	_
-				_	1	_	_
-					1	-	-
					1		



LNP- OFFSET BORIN	IG PROGRAN	Λ	LOG OF BORING NO. O-1		PROJECT NO. 07-3935
(FEET MSL) DEPTH (FEET) SAMPLE NO.	OR RUN NO. BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.) PROFILE	COORDINATES N 1723173.4 E 458057.4 SURFACE EL: 42.7	USCS SYMBOL	REMARKS
S (S)	o go	REC	DESCRIPTION	l S	
0			0.0-20.0' Sand-fine grained. As above except with Dolomite layers, little clay.	sp sp	Destructive drilling from 0-20'. Log based on drill cuttings.
DATE STARTED: DATE COMPLETED: FIELD GEOLOGIST: CHECKED BY:		GWL:	DEPTH: 3.4' DATE/TIME: 9/3/09 @ 0730 DEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 ING METHOD: Mud Rotary/PQ3 Coring	NOTE	ES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
APPROVED BY: DRILLING CO.: HUS	S	DRIL	.ER: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (OFFSET B	ORING I	PROGRAI	М		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723173.4 E 458057.4 SURFACE EL: 42.7	SSYMBOL	REMARKS
E E		SAN	BLO R 8	REC		DESCRIPTION	nscs	
22.7	16 — 18 — 20 — 22 — 24 — 26 — 28 —					TOP OF AVON PARK FORMATION 20.0-35.0' DOLOMITE, fossiliferous, highly weathered, porous, soft.	sp	At 20' switched to core barrel for advancement-no casing set. Chatter at 28'. Soft area 25-30'. Kelly Bar RPM: 203 Engine PRM: 1300
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	TED: 9/8 IST: JL	0		GWL: D GWL: D DRILLIN	_	<u>I</u> Note	ES: Logging of coring per the Wor Plan started at 62'. General rock description logged from 20-62'.
APPR	NED BY: OVED BY: ING CO.:		DS		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	OFFSET B	ORING F	PROGRAI	М		LOG OF BORING NO. O-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723173.4 E 458057.4 SURFACE EL: 42.7	SYMBOL	REMARKS
ELE (FEF		SAM OR F	SEO.	ECO	R		NSCS	
	30 — 32 — 34 — 36 — 36 —	о O	BI	RE		35.0-45.0' DOLOMITE (tan), replacing limestone (gray), highly weathered.	SN SN	Driller notes hard area starting at 33'.
	38 — 40 — 42 — 5TARTED		2/09		GWL: D		NOTE	40-45' No Recovery. ES: Logging of coring per the Worn Plan started at 62'. General
FIELD	COMPLET GEOLOG KED BY:	IST: JL			GWL: D DRILLIN	EPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 IG METHOD: Mud Rotary/PQ3 Coring		rock description logged from 20-62'.
	OVED BY:		-	Ī	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (OFFSET B	ORING F	PROGRAM	М		LOG OF BORING NO. O-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	H.(T.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	
EVA:	DEPTH (FEET)	MPLI	2 % F	OVE	PROFILE	SURFACE EL: 42.7	S S	REMARKS
EL (F)		SA OF	BLO	REC		DESCRIPTION	- NSCS	
-11.3	44 —					45.0-54.0' DOLOMITE with interbedded degraded dolomite layers (sandy texture).		55.0-60.0' Drill time: 13min 18sec.
-14.3	_ _ 58 					57.0-61.15' DOLOMITE.	57'-	Driller Notes: harder at 57'. Water level on 9/3/09 @ 0730 is 3.4'.
DATE FIELD	STARTED COMPLET GEOLOGI	ED: 9/8	0		GWL: D GWL: D DRILLIN	_	NOT	TES: Logging of coring per the Wor Plan started at 62'. General rock description logged from 20-62'.
APPRO	KED BY: OVED BY: ING CO.:		DS	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG	Failing 1500



LNP- C	OFFSET B	ORING F	PROGRA	М		LOG OF BORING NO. O-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	тн Ет)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	ERY (ft.)	-ILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	
EET	ОЕРТН (FEET)	MPL RU	2W/8 8 % (R. %	RECOVERY	PROFILE	SURFACE EL: 42.7		REMARKS
EI F)		SA	BL(REC		DESCRIPTION	nscs	
	60 —					61.15-63.1' DOLOMITE, pale yellowish brown (10YR 6/2), moderatel hard to hard, thick bedded, with organic layers, porous, unfractured, weak reaction to 1N HCl when powdered.	v	60-62' Drill Time: 11min 20sec. Set casing at 62'. Run-1: Drilling Pressure: 250-300 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 10min 8sec
-20.4 -21.1	64 —	R-1	100% (55%)	3.85		63.1-63.8' CLAY, calcareous, sandy, no plasticity, some dolomite fragments throughout. 63.8-65.5' DOLOMITE, same as above. 65.5-66.0' Wash out zone (evidence of bit spinning on core above).	l ci	Circulation loss: none Run-2: Drilling Pressure: 300-350 psi Kelly Bar RPM: 197
	66 — — — 68 —	R-2	96% (44%)	4.8		66-69.4' DOLOMITE, pale yellowish brown (10YR 6/2), alternating zones of porous and fine grained layers, trace organics, moderately hard, fresh to slightly weathered, moderate reaction to 1N HCl when powdered.		Engine RPM: 1200 Drill Time: 26min 9sec Circulation loss: none 67', 67.5', 67.7', 67.8', 69.2' fines washed out.
-26.7 -27.3	70 — - -					69.4-70.0' Sandy CLAY (cl), pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), interbedded with highly weathered dolomite. 70-75' DOLOMITE, pale yellowish brown (10YR 6/2) with limestone clasts (light gray (N7) to medium light gray (N6)), moderately hard, slightly to moderately weathered, porous, vuggy, becomes very sand below 73', weak reaction to 1N HCI when powdered, some fossils. 71.2-72.1' Vertical fracture.	<u>.</u>	Run-3: Drilling Pressure: 350-250 psi Kelly Bar RPM: 207 Engine RPM: 1300 Drill Time: 12min 34sec Circulation loss: none
DATE	72 — - - STARTED	R-3 : 9/2	80% (40%)	4.0	GWL: D	72.5' Soft zone (residual remains), silty clay, grayish brown (5YR 3/2)		ES: Logging of coring per the Wor
DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS				GWL: DEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 DRILLING METHOD: Mud Rotary/PQ3 Coring			Plan started at 62'. General rock description logged from 20-62'.	
APPRO	OVED BY:		-		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	OFFSET B	ORING F	PROGRAI	М		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723173.4 E 458057.4 SURFACE EL: 42.7	SS SYMBOL	REMARKS
⊞ ()		δ <u>Q</u>	BLO	REC		DESCRIPTION	nscs	
	74 — -					75-78.5' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, porous, sandy texture, fined grained, fossiliferous, moderately		Run-4: Drilling Pressure: 300-250 psi
	76 	R-4	92%	4.6		weathered, thick bedded but moderately to intensely fractured, weak reaction to 1N HCl when powdered. Vertical fractures at 75.3-76.2', and 76.2-76.5'. 76.5-76.7' Rubble.		Kelly Bar RPM: 196 Engine RPM: 196 Engine RPM: 1200 Drill Time: 20min 53sec Circulation loss: none Driller Notes: 77.5-78.5' softer, dark color cuttings return. Vertical fractures at 75.3-76.2', 76. 2-76.5'
-35.8 -35.9	78 — _ _ _	K-4	(10%)	4.0		78.5-78.6' Silty CLAY, grayish brown (5YR 3/2), as above. 78.6' Dolomite becomes very sandy, poorly indurated.	"	
	80 —					80.0-85.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, porous, slightly to moderately weathred, fossiliferous, moderate reaction to 1N HCl when powdered, thick bedded.		Run-5: Drilling Pressure: 350-500-300 psi Kelly Bar RPM: 198 Engine RPM: 1200 Drill Time: 29min 23sec Circulation loss: none
	82 — - - - 84 —	R-5	90% (38%)	4.5		81.7-82.0' Vertical fracture. 82.0-82.8' Dolomite becomes very sandy, severely weathered. Vuggy below 82.8'.		
	86 —	R-6	100% (32%)	2.5		85-85.6' DOLOMITE, pale yellowish brown (10YR 6/2), fresh, vuggy, weak reaction to 1N HCl when powdered, medium bedded, moderately hard. 85.6-88.3' DOLOMITE, pale yellowish brown (10YR 6/2), moderately to severely weathered, fossiliferous, porous, moderate reaction to 1N HCl when powdered, vuggy, intensely fractured.		Run-6: Drilling Pressure: 200 psi Kelly Bar RPM: 199 Engine RPM: 1200 Drill Time: 13min 41sec (85-85.8') 13min 54sec (85.8-87.5') Circulation loss: none
DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO					GWL: DEPTH: 3.4' DATE/TIME: 9/3/09 @ 0730 GWL: DEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 DRILLING METHOD: Mud Rotary/PQ3 Coring			Run-7: ES: Logging of coring per the Wor Plan started at 62'. General rock description logged from 20-62'.
APPRO	KED BY: OVED BY: NG CO.:		OS ———		DRILLER: Eddie Palmer HELPER: Chad/Cody			Failing 1500



## weathered. ## 90 -	LNP- (OFFSET B	ORING F	ROGRA	М		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
88— R-7 (12%) 88.3-3 Collive gray (FY 3/2), no plasticity sandy CLAY around dolomite pleces. 88.3-5 COLOMITE becomes sandy, highly fractured, no foesils, moderate reaction to 1N HCI when powdered, moderately weathered, moderately weathered, moderately weathered, moderately weathered, moderately weathered, moderately weathered, socialiferous, moderately soft, slightly for moderately weathered, blocking class, fossiliferous, moderately soft, slightly for moderately weathered, preask easily gray and produced soft of the production to 1N HCI when powdered, moderately weathered, blocking class, fossiliferous, moderately soft, slightly for moderately weathered, preask easily gray and produced soft of the production to 1N HCI when powdered. 98.8-15 DOLOMITE, sandy, prorus, vuggy, grayish orange (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 874), moderately hard, slightly weathered, with this layers of microcrystalline dolomite, sandy toxinry, medium bedded. 97.8-100 DOLOMITE, pale yellowish brown (10YR 874), moderately hard, slightly weathered, with this layers of microcrystalline dolomite, sandy toxinry, medium bedded. 97.8-100 DOLOMITE, pale yellowish brown (10YR 874), moderately hard, slightly weathered, with this layers of microcrystalline dolomite, sandy toxinry, medium bedded. 97.8-100 DOLOMITE, pale yellowish brown (10YR 874), moderately hard, slightly weathered, with this layers of microcrystalline dolomite, sandy toxinry, medium bedded. 97.8-100 DOLOMITE, sandy yellowish brown (10YR 874), moderately hard, moderately hard, moderate reaction to 1N HCI medium bedded, vuggy, 100-100 Dolomite, sandy toxinry, medium bedded, vuggy, 100-1	VATION ET MSL)	ЕРТН ЕЕТ)	PLE NO. RUN NO.	//6" & (N) % REC. RQD)	VERY (ft.)	OFILE	N 1723173.4 E 458057.4		REMARKS
88— R-7 (12%) 88.3-3 Collive gray (FY 3/2), no plasticity sandy CLAY around dolomite pleces. 88.3-5 COLOMITE becomes sandy, highly fractured, no foesils, moderate reaction to 1N HCI when powdered, moderately weathered, moderately weathered, moderately weathered, moderately weathered, moderately weathered, moderately weathered, socialiferous, moderately soft, slightly for moderately weathered, blocking class, fossiliferous, moderately soft, slightly for moderately weathered, preask easily gray and produced soft of the production to 1N HCI when powdered, moderately weathered, blocking class, fossiliferous, moderately soft, slightly for moderately weathered, preask easily gray and produced soft of the production to 1N HCI when powdered. 98.8-15 DOLOMITE, sandy, prorus, vuggy, grayish orange (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 872) dolomite class, foreign (10YR 874), moderately hard, slightly weathered, with this layers of microcrystalline dolomite, sandy toxinry, medium bedded. 97.8-100 DOLOMITE, pale yellowish brown (10YR 874), moderately hard, slightly weathered, with this layers of microcrystalline dolomite, sandy toxinry, medium bedded. 97.8-100 DOLOMITE, pale yellowish brown (10YR 874), moderately hard, slightly weathered, with this layers of microcrystalline dolomite, sandy toxinry, medium bedded. 97.8-100 DOLOMITE, pale yellowish brown (10YR 874), moderately hard, slightly weathered, with this layers of microcrystalline dolomite, sandy toxinry, medium bedded. 97.8-100 DOLOMITE, sandy yellowish brown (10YR 874), moderately hard, moderately hard, moderate reaction to 1N HCI medium bedded, vuggy, 100-100 Dolomite, sandy toxinry, medium bedded, vuggy, 100-1	ELE) (FEE	JO F)	SAMI OR F	SLOW OR '	ECO	P.R.		SSS	
8.8.2 Olive gray (SY 3/2), no plasticity sandy CLAY around dolomite pieces. 8.3-90 POLOMITE becomes sandy, highly fractured, no fessile, watching of the process of the pro		88 —			<u> </u>	///// /	DESCRIF HON	1 -	
98 - R-9 (22%) A. 100 - DOLOMITE, sandy, porous, vuggy, grayish orange (10YR R/2) dolomite classis, fossilifarous, moderately soft, slightly to moderately weathered, breaks easily. 96 - R-9 (22%) A. 100 - DOLOMITE, sand as above. 96 - R-9 (22%) 100 - DOLOMITE, sand as above. 97 - PS-97.8 ROD DROP 91.5-92. 98 - Second Bighly fractured with clasts of crystalline dolomite. 98 - Second Bighly fractured with clasts of crystalline dolomite. 98 - Second Bighly fractured with clasts of crystalline dolomite. 99 - Second Bighly fractured with clasts of crystalline dolomite. 99 - Second Bighly fractured with clasts of crystalline dolomite. 99 - Second Bighly fractured with clasts of crystalline dolomite. 99 - Second Bighly fractured with clasts of crystalline dolomite. 99 - Second Bighly fractured with clasts of crystalline dolomite. 99 - Second Bighly fractured with clasts of crystalline dolomite. 99 - Second Bighly fractured with clasts of crystalline dolomite. 99 - Second Bighly fractured with clasts of crystalline dolomite. 99 - Second Bighly fractured with clasts of crystalline dolomite. 99 - Second Bighly fractured with clasts of crystalline dolomite. 99 - Second Bighly fractured. 90 - Second Bighly fractured. 90 - Second Bighly fractured. 90 - Second Bighly fractured. 90 - Second Bighly fractured. 91 - Second Bighly fractured. 91 - Second Bighly fractured. 92 - Second Bighly fractured. 93 - Second Bighly fractured. 94 - Second Bighly fractured. 95 - Second Bighly fractured. 96 - Second Bighly fractured. 97 - Second Bighly fractured. 97 - Second Bighly fractured. 97 - Second Bighly fractured. 97 - Second Bighly fractured. 97 - Second Bighly fractured. 97 - Second Bighly fractured. 97 - Second Bighly fractured. 97 - Second Bighly fractured. 97 - Second Bighly fractured. 98 - Second Bighly fractured. 99 - Second Bighly fractured. 99 - Second Bighly fractured. 99 - Second Bighly fractured. 99 - Second Bighly fractured. 99 - Second Bighly fractured. 99 - Second Bighly fract		- - -	R-7		2.3		pieces. 88.3-90' DOLOMITE becomes sandy, highly fractured, no fossils, hard, moderate reaction to 1N HCl when powdered, moderately		Engine RPM: 1100 Drill Time: 19min 24sec Circulation loss: 90% Water level on 9/4/09 @ 0730 is
## A8.8 92		90 					90.8-91.5' DOLOMITE, sandy, porous, vuggy, grayish orange (10YR 7/4) with very pale orange (10YR 8/2) dolomite clasts, fossiliferous,		Drilling Pressure: 500 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 23min 12sec Circulation
4.5 90%	-48.8	_				44444	91.5		loss: 20%
94 — 94 — 95-5.2' Residual dolomite gravel from previous run. 95-95.2' Residual dolomite gravel from previous run. 95-97 DOLOMITE, pale yellowish brown (10'NR 6/2), moderately hard, slightly weathered, with thin layers of microcrystalline dolomite, sandy texture, medium bedded. 97-8-100' DOLOMITE, as above except highly fractured. 97-8-100' DOLOMITE, as above except highly fractured. 97-8-100' DOLOMITE, grayish orange (10'NR 7/4), moderately hard, moderate reaction to 10-10.7' DOLOMITE, grayish orange (10'NR 7/4), moderately hard, moderate reaction to 11-10.1' moderately weathered and fractured). 97-8-100' DOLOMITE, grayish orange (10'NR 7/4), moderately hard, moderate reaction to 1N HCI, medium bedded, vuggy, fossiliferous, fresh (sexpet for 101-101.2' moderately weathered and fractured). DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS PS-9-2-8-100' DOLOMITE, as above except highly fractured. PS-9-3-8-100' DOLOMITE rubble. Run-10: Drilling Pressure: 450 psi Kelly Bar RPM: 183 Figure RPM: 183 Figure RPM: 183 Figure RPM: 183 Figure RPM: 183 Figure RPM: 1100-1200 Drill Time: 18nin 36sec Circulation loss: 100% Figure RPM: 183 Figure RPM: 180 Figure RPM: 1100-1200 Drill Time: 18nin 36sec Circulation loss: 100% Figure RPM: 183 Figure RPM: 180 Figure RPM: 180 Figure RPM: 1200	-49.3	92 	R-8		4.5		92-95.2' DOLOMITE, same as above. 92.3' Color change (gradual transition) to pale yellowish brown (10YF 6/2) with increase in amount and size of very pale orange (10 YR 8/2		
96 — R-9 80% 4.0 97-97.8' ROD DROP. 97-97.8' ROD DR		94 —					reaction to 1N HCl when powdered.		
PATE STARTED: 9/2/09 DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 PTELD GEOLOGIST: JLO CHECKED BY: WDS 97.8' ROD DROP. 97.97.8' ROD DROP. 97.8-100' DOLOMITE, as above except highly fractured. 97.8' 97.8-100' DOLOMITE, as above except highly fractured. 97.8' 97.8-100' DOLOMITE, as above except highly fractured. 97.8' 97.8-100' DOLOMITE, as above except highly fractured. 100-100.7' DOLOMITE rubble. 100-100.7' DOLOMITE, grayish orange (10YR 7/4), moderately hard, moderately hard, moderate reaction to 1N HCI, medium bedded, vuggy, fossiliferous, fresh (except for 101-101.2' moderately weathered and fractured). 101-6-105.0' Color change to pale yellowish brown (10YR 6/2), vuggy. 102-102.2' Severely weathered/broken zone. PATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 DATE COMPLETED: 9/8/09 PARIS THOD: Mud Rotary/PQ3 Coring NOTES: Logging of coring per the Weather oracle and fractured). PATE STARTED: 9/8/09 @ 0900 DATE COMPLETED: 9/8/09 PARIS THOD: Mud Rotary/PQ3 Coring NOTES: Logging of coring per the Weather oracle and fractured). PATE STARTED: 9/8/09 @ 0900 DATE COMPLETED: 9/8/09 PARIS THOD: Mud Rotary/PQ3 Coring NOTES: Logging of coring per the Weather oracle and fractured). PATE STARTED: 9/8/09 @ 0900 DATE COMPLETED: 9/8/09 PARIS THOD: Mud Rotary/PQ3 Coring		96 —					95.2-97' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, slightly weathered, fossiliferous, porous, moderate reaction to 1N HCl when powdered, with thin layers of microcrystalline dolomite,		Drilling Pressure: 400 psi Kelly Bar RPM: 197 Engine RPM: 1200 Drill Time: 24min 51sec Circulation
97.8-100' DOLOMITE, as above except highly fractured. 97.8-100' DOLOMITE rubble. 100 - 100.7' DOLOMITE rubble. 100.7-101.6' DOLOMITE, grayish orange (10YR 7/4), moderately hard, moderate reaction to 1N HCl, medium bedded, vuggy, fractured). 102 - 102 - 102.2' Severely weathered/broken zone. DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS Run-10: Drilling Pressure: 450 psi Kelly Bar RPM: 183 Engine RPM: 1100-1200 Drill Time: 18min 36sec Circulation loss: 100% Run-10: Drilling Pressure: 450 psi Kelly Bar RPM: 183 Engine RPM: 1100-1200 Drill Time: 18min 36sec Circulation loss: 100% Run-10: Drilling Pressure: 450 psi Kelly Bar RPM: 183 Engine RPM: 1100-1200 Drill Time: 18min 36sec Circulation loss: 100% Plan started at 62'. General rock description logged from 20-62'.	-54.3		D 0	80%	4.0	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		1	
DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS TOO.7-101.6' DOLOMITE, grayish orange (10YR 7/4), moderately hard, moderate reaction to 1N HCl, medium bedded, vuggy, fossiliferous, fresh (except for 101-101.2' moderately weathered and fractured). 101.6-105.0' Color change to pale yellowish brown (10YR 6/2), vuggy. 102-102.2' Severely weathered/broken zone. DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 CHECKED BY: WDS DRILLING METHOD: Mud Rotary/PQ3 Coring DIVITION: Notes: Logging of coring per the W Plan started at 62'. General rock description logged from 20-62'.	-55.1	98 — - -	K-9	(22%)	4.0				
DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS Vuggy. 102-102.2' Severely weathered/broken zone. DATE/TIME: 9/3/09 @ 0730 GWL: DEPTH: 3.4' DATE/TIME: 9/8/09 @ 0900 Plan started at 62'. General rock description logged from 20-62'.		100 					100.7-101.6' DOLOMITE, grayish orange (10YR 7/4), moderately hard, moderate reaction to 1N HCl, medium bedded, vuggy, fossiliferous, fresh (except for 101-101.2' moderately weathered and fractured).		Drilling Pressure: 450 psi Kelly Bar RPM: 183 Engine RPM: 1100-1200 Drill Time: 18min 36sec
DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS GWL: DEPTH: 3.4' DATE/TIME: 9/3/09 @ 0730 GWL: DEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 Plan started at 62'. General rock description logged from 20-62'.		102					vuggy.		
	DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO					GWL: DEPTH: 3.4' DATE/TIME: 9/3/09 @ 0730 GWL: DEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900			Plan started at 62'. General rock description logged from
	APPROVED BY: DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody			Failing 1500



LND	LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935											
LNP- (DEFSETE	ORING F	ROGRAI	VI		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935				
ELEVATION (FEET MSL)	HT.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	FILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL					
EVA EET	DEPTH (FEET)	MPL RUI	OW/6 R % & (R(SOVE	PROFILE	SURFACE EL: 42.7	SS S	REMARKS				
11 F)						DESCRIPTION	SOSN					
	- - 104 —	R-10	100% (24%)	5.0		102.9' Broken zone, then becomes sandy DOLOMITE, moderately soft, highly fractured, vertical fracture from 103-104.5', moderate reaction to 1N HCl when powdered.						
	- - 106 —					105-110' DOLOMITE, sandy, grayish orange (10YR 7/4), moderately soft, porous, few fossils, thick bedded, fresh to slightly weathered, some fractures (106.8' 45°- possibly mechanical), moderate reaction to 1N HCl when powdered.		Run-11: Drilling Pressure: 400 psi Kelly Bar RPM: 228 Engine RPM: 1400-1500 Drill Time: 10min 15sec Circulation loss: 100%				
	- 108 -	R-11	100% (56%)	5.0		108-109.1' Vertical fracture.						
-68.3	- 110 					110-115.0' DOLOMITE, interlayered sandy and microcrystalline, vuggy, moderately fractured, moderate reaction to 1N HCl, few to no fossils, medium bedded, moderately to severely weathered.	<u>.</u>	Run-12: Drilling Pressure: 300 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 13min 6sec				
-68.5	- 112 — - - - 114 —	R-12	86% (28%)	4.3		111.0-111.2' ROD DROP. 111.2 112.7' Possible soft zone. 113.7' Dolomite becomes all sandy, larger vugs, fossiliferous, moderately hard, slightly to moderately weathered.	<u>-</u>	Circulation loss: 100% Driller notes slight rod drop around 111' (2 to 3") softer material, faster drilling.				
	_ _ 116 — _ _					115-119.5' DOLOMITE, severely weathered, medium to coarse grained, poorly indurated, soft, fossiliferous, friable, pale yellowish brown (10YR 6/2), thick bedded, moderate reaction to 1N HCl when powdered.		Run-13: Drilling Pressure: 200-250 psi Kelly Bar RPM: 212 Engine RPM: 1300-1400 Drill Time: 6min 23sec Circulation loss: 100% Driller notes extremely soft first 4 feet.				
DATE FIELD	DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					DATE/TIME: 9/3/09 @ 0730 DATE/TIME: 9/8/09 @ 0900 SIG METHOD: Mud Rotary/PQ3 Coring	NOTE	ES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.				
APPR	OVED BY:		JS		DRILLER: Eddie Palmer HELPER: Chad/Cody			Failing 1500				
DRILL	ING CO.:	HUSS										



I NP. (OFFSET B	ODING B	POGPA	M				PROJECT NO. 07-3935
LIVI - V	JIT OLT B	ORINGT	- TOOKA			LOG OF BORING NO. O-1		1 KOSEST NO. 07-3333
ELEVATION (FEET MSL)	тн ЕТ)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	FILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	DEMARKO
LEV#	DEPTH (FEET)	AMPI R RU	OW/6	COVI	PROFILE	SURFACE EL: 42.7	USCS S	REMARKS
ш		Ø 0	BL	RE		DESCRIPTION	Sn	
	- 118 	R-13	60% (32%)	3.0				
	- 120 — - -					119.5-120.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, fresh, moderate reaction to 1N HCl when powdered fossiliferous, porous, sandy texture. 120-121.6' DOLOMITE, grayish orange (10YR 7/4), moderately hard, porous, fossiliferous, vuggy (in horizontal bands), medium bedded, fresh to slightly weathered, with interbedded layers of hard, fine grained dolomite, medium light gray (N6). 121.6-122.5' As above except no dolomite layers, intensely fractured,	,	Run-14: Drilling Pressure: 200-300 psi Kelly Bar RPM: 193 Engine RPM: 1200 Drill Time: 17min 30sec Circulation loss: 100%
	122 — - - - 124 —	R-14	98% (56%)	4.9		moderately weathered. 122.5-124.8' DOLOMITE, grayish orange (10YR 7/4), moderately soft, moderate to strong reaction to 1N HCl when powdered, thick bedded, vuggy, fossiliferous, porous, fresh.		
-83.8	126 —					124.8-125' Same as 120-121.6'. 125-126.5' DOLOMITE, light olive gray (5Y 5/2), moderately hard, weak reaction to 1N HCl, vuggy, fossiliferous, porous/sandy texture, thick bedded, fresh to slightly weathered.	-	Run-15: Drilling Pressure: 200 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 18min 10sec Circulation loss: 100% Driller Notes: soft at 128'.
-84.3 -84.8 -85.3	- 128 - -	R-15	62% (26%)	3.1		ROD DROP 126.5-127.0'. 127.0-127.5' LIMESTONE, medium light gray (N6), strong reaction to 1N HCl, thin bedded, few fossils. ROD DROP 127.5-128.0'. 128-130' DOLOMITE, as above except moderately to severely weathered, fossiliferous, vuggy, porous.	<u>'</u> -	Stiller Notes. Soit at 120.
	130 					130-130.8' DOLOMITE, fine grained but porous, moderate reaction to 1N HCI, medium bedded, fresh, few vugs and fossils, yellowish gray (5Y 7/2). 130.8-131.6' As above except more porous/sandy texture, friable, moderately weathered.		Run-16: Drilling Pressure: 350-200 psi Kelly Bar RPM: 198 and 188 Engine RPM: 1200-1300 and 1100- 1200 Drill Time: 9min 30sec (130-131.5')
DATE FIELD	DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					EPTH: 3.4' DATE/TIME: 9/3/09 @ 0730 EPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 NG METHOD: Mud Rotary/PQ3 Coring	NOTE	ES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
APPR	OVED BY:		-		DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500			
DIVILL								



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935											
LNP- (JEFSEI B	OKING P	RUGRA	IVI		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935			
ELEVATION (FEET MSL)	Ξ£	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	IE IE	COORDINATES N 1723173.4 E 458057.4	SYMBOL				
EVA'	DEPTH (FEET)	MPLE RUN	7 % F R (RC	OVE	PROFILE	SURFACE EL: 42.7		REMARKS			
EL (F)		SA	BLO	REC	"	DESCRIPTION	nscs				
	132 —	R-16	80% (64%)	4.0		131.6-135' DOLOMITE, with interbedded LIMESTONE clasts, colors are as above, strong reaction to 1N HCl when powdered, thick bedded, fresh to slightly weathered, becomes moderately weathered with depth.		10min 58sec (131.5-135) Circulation loss: 100% Chatter at 132'. 130.5' horizontal fracture, edges slightly rounded. Driller Notes: 131.5-132.0' possible wash-out zone, soft.			
-93.3	134 — - - - 136 —					135-135.4' DOLOMITE, light olive gray (5Y 5/2), moderately hard, porous, vuggy, fossiliferous, moderate reaction to 1N HCl when powdered. 135.4-138.7' DOLOMITE, severely weathered zone, light gray (N7), moderately hard to hard, fossiliferous, vuggy (most are continuous throughout core).		Run-17: Drilling Pressure: 200-300-500 psi Kelly Bar RPM: 196 Engine RPM: 1200 Drill Time: 25min 41sec (135-139') 12min 16sec (139-140') Circulation loss: 100%			
-94.0	- 138 -	R-17	78% (20%)	3.9		ROD DROP 136-136.7'. 136.7 138.7-140' DOLOMITE, yellowish gray (5Y 7/2) and grayish orange (10YR 7/4), moderately hard, intensely fractured, porous/sandy		Driller notes Rod drop 136-136.7' Water level on 9/5/09 @ 0730 is 4.4'.			
	140 — - 142 — - 144 —	R-18	90% (76%)	4.5		texture, vuggy, fossiliferous, moderate reaction to 1N HCl when powdered. 140-141' DOLOMITE, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), moderately hard to hard, fine grained to crystalline, fresh, trace to no fossils, weak reaction to 1N HCl when powdered. 141-141.3' DOLOMITE becomes highly fossiliferous, porous, moderately weathered with thin coating of degraded dolomite, possible small wash out zone. 141.3-141.7' DOLOMITE, crystalline, pale yellowish brown (10YR 6/2), hard, fine grained, no fossils, fresh, few healed fractures (very thin-closed), abrupt upper contact. 141.7-142' Gradual basal contact-transition to coarse gained dolomite, pale yellowish brown (10YR 6/2), fossiliferous, fresh to slightly weathered, moderately hard. 142-145' DOLOMITE, sandy texture, poorly to moderately indurated, moderately weathered, soft, strong reaction to 1N HCl when powdered, fine to medium grained, rounded to subangular grains, some fossils.		Run-18: Drilling Pressure: 500 psi Kelly Bar RPM: 218 Engine RPM: 1400 Drill Time: 13min 35sec (140-141') 13min 50sec (141-145') Circulation loss: 100% Driller Notes: softer from 143-145' Vertical fracture from 143.3-144.0'.			
DATE	146 — STARTED COMPLET GEOLOGI	ED: 9/8			GWL: D	S		Run-19: Drilling Pressure: 300 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 13min 49sec (145-149') ES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.			
APPRO	KED BY: OVED BY: NG CO.:		os		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			



LNP- (OFFSET B	ORING F	ROGRA	M		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
		٠. د	9	ft.)		COORDINATES	٦	
TION MSL)	H.(T.	9 9 2 9	" & (r REC. 2D)	RY (I	JI.E	N 1723173.4 E 458057.4	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	SURFACE EL: 42.7		REMARKS
E (F		SA OF	BLO	REC		DESCRIPTION	nscs	
	 _ 148 	R-19	68% (30%)	3.4		146.5-150' DOLOMITE, yellowish gray (5Y 7/2) to light olive gray (5Y 5/2), moderately hard to hard, alternating zones/bands of fresh and slightly to moderately weathered, fossiliferous, vuggy, sandy texture in weathered zones, moderate to strong reaction to 1N HCl when powdered, few clasts of limestone, thick bedded (horizontal breaks are mechanical).		2min 57sec (149-150') Circulation loss: 100%
	150 — - - - 152 —	R-20	100%	5.0		150-154' DOLOMITE, light olive gray (5Y 5/2), yellowish gray (5Y 7/2), pale yellowish brown (10YR 6/2), and pale yellowish orange (10YR 8/6) in thin layers, moderately hard, some vugs, few fossils, moderate reaction to 1N HCl when powdered, thick bedded, fresh. 151.4-151.8' As above except moderately weathered (porous texture). 151.8-153' Same as at 150'.		Run-20: Drilling Pressure: 450-350 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 16min 50sec (150-153') 9min 21sec (153-155') Circulation loss: 100%
	- 154 — - -					153-154' Intensely weathered to degraded, thinly laminated. 154-155' DOLOMITE, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), moderately hard, thick bedded, crystalline, strong reaction to 1N HCl when powdered, moderately fractured (vertical). 155-156.2' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, moderate reaction to 1N HCl when powdered, fossiliferous, vuggy, fresh, thick bedded.	,	Run-21: Drilling Pressure: 250-300 Kelly Bar RPM: 210 Engine RPM: 1300
-114.8	156 — — — — 158 —	R-21	92% (42%)	4.6		156.2-157.5' As above except moderately to severely weathered, porous texture, sandy. 157.5-159' LIMESTONE, moderately hard to hard, light gray (N7) to light olive gray (5Y 6/1), medium to thick bedded, fresh to slightly weathered, moderately fractured, banded layers, strong reaction to 1N HCI.	, <u>.</u>	Drill Time: 7min 39sec (155-157') 21min 10sec (157-159') 2min 54sec (159-160') Circulation loss: 100% 155-155.6' Healed vertical fracture.
-116.3 -116.5	_				7757	159-160' DOLOMITE as at 156.2'.		
-117.0	400				7,7,7,	159.2 ROD DROP 159.2-159.7'.		
	160 					160-161' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, porous texture, moderate reaction to 1N HCl, fossiliferous, moderated weathered, thick bedded.		Run-22: Drilling Pressure: 300 psi Kelly Bar RPM: 199
DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: DEPTH: 3.4' DATE/TIME: 9/3/09 @ 0730 GWL: DEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 DRILLING METHOD: Mud Rotary/PQ3 Coring			Engine RPM: 1200-1300 ES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
APPRO	OVED BY:				DRILLER: Eddie Palmer HELPER: Chad/Cody			Failing 1500
DRILL	ING CO.:	HUSS						



LNP- C	OFFSET B	ORING F	ROGRA	М		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	REMARKS
	DEI (FE	AMP R RU	OW/ R % R (R	200	PRO	SURFACE EL: 42.7	uscs s	KLMAKKS
ш С		/S	BL	RE		DESCRIPTION	Sn	
	162 — - - - - 164 —	R-22	94% (40%)	4.7		161-161.9' Vertical fracture. 161.9-162.7' DOLOMITE, as above except slightly weathered, vuggy, some pale brown (5YR 5/2) layers/bands and trace limestone. 162.7-163' As above except intensely broken (possibly mechanical). 163-165' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, strong reaction to 1N HCl when powdered, medium to thick bedded, moderately weathered, porous texture, fossiliferous, few horizontal breaks (possibly mechanical).		Drill Time: 10min 13sec (160-163') 6min 27sec (163-165') Circulation loss: 100%
	166 —					165-167' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, moderate reaction to 1N HCI when powdered, moderately weathered, porous texture, sandy, vuggy, with limestone zones and layers, moderately fractured, limestone is medium light gray (N6), strong reaction to 1N HCI, hard.		Run-23: Drilling Pressure: 300-250-300 psi Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 8min 39sec (165-167.5' 21min 56sec (167.5-170) Circulation loss: 100%
	- 168 - -	R-23	90% (16%)	4.5		167-170' DOLOMITE, crystalline, pale yellowish brown (10YR 6/2), moderately hard, fresh, thick bedded, few fossils, few vugs, strong reaction to 1N HCI. 168.2-168.5' Vertical fracture. 168.3-170' As above except intensely fractured (possibly mechanical).		165.5-166' Vertical fracture-faces stained black with white rounded calcite grains.
	170 — - 172 — - 174 —	R-24	100%	5.0		170-174.5' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, fresh to slightly weathered, thick bedded, moderate reaction to 1N HCl when powdered, with some light olive gray (5Y 5/2) dolomite clasts from 107.3-170.7'. 170.8-171.5' As above except moderately weathered, vuggy, porous texture, sandy. 172-172.5' Intensely fractured. 172.5-173' Unfractured, no dolomite clasts. 173-174.5' Moderately fractured, moderately weathered.		Run-24: Drilling Pressure: 350-200-250 ps Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 17min 11sec (170- 172.5') 10min 34sec (172.5-174') 10min 1sec (174-175') Circulation loss: 100% Water level on 9/8/09 @ 0900 is 4.5'. NOTE: Zones at 172.5' and 174' mechanically broken during removal from shoe.
DATE (STARTED COMPLET	TED: 9/8	0		GWL: D GWL: D	S		Run-25: Drilling Pressure: 300-250 psi ES: Logging of coring per the Worn Plan started at 62'. General rock description logged from 20-62'.
CHECKED BY: WDS APPROVED BY: DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody			Failing 1500



LNP- (OFFSET B	ORING F	ROGRA	M		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	TH (T.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	
EVA:	ОЕРТН (FEET)	MPLI	7.W/6' R % F R (RC	OVE	PROFILE	SURFACE EL: 42.7	SS SY	REMARKS
크 노		S A	BLC	REC	"	DESCRIPTION	nscs	
	176 —					175-180' DOLOMITE, moderately soft to moderately hard, pale yellowish brown (10YR 6/2) to dark yellowish orange (10YR 6/6), thicl bedded, moderately weathered, porous texture, sandy (with nodules of dolomite-medium light gray (N6)), hard, strong reaction to 1N HCl, weak to moderate reaction to 1N HCl when powdered.		Kelly Bar RPM: 216 Engine RPM: 1300-1400 Drill Time: 30min 5sec Circulation loss: 100% Driller Notes: 175-176' very soft.
	 178 	R-25	90% (38%)	4.5		177.6' Dolomite becomes moderately fractured, vuggy.		
	180 — — — — — 182 —	R-26	100%	5.0		180-185' DOLOMITE, moderately hard to hard, pale yellowish brown (10YR 6/2), moderately to intensely fractured, thick bedded, fresh to slightly weathered, moderate to strong reaction to 1N HCI when powdered, some vugs and medium light gray (N6) dolomite clasts. 181.6' Very thin sandy CLAY layer, no plasticity, moderate yellowish brown (10YR 5/4)-in between a horizontal fracture.		Run-26: Drilling Pressure: 250-200 psi Kelly Bar RPM: 223 Engine RPM: 1400-1500 Drill Time: 12min 7sec (180-182') 21min 42sec (182-185') Circulation loss: 100%
	184 — - - - - 186 —					185-187' DOLOMITE, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4), moderately hard, moderate to strong reaction to 1N HCl when powdered, thick bedded, moderately to intensely fractured, few vugs and fossils, slightly to moderately weathered, MnO grains throughout, few thin layers of crystalline dolomite.		Run-27: Drilling Pressure: 200-250-250 Kelly Bar RPM: 225 Engine RPM: 1400-1500 Drill Time: 16min 9sec (185-187') 3min 25sec (187-190') Circulation loss: 100%
	- 188 	R-27	90%	4.5		187' Becomes moderately to severly weathered, sandy texture. 187-190.0' DOLOMITE, soft, severely weathered to degraded, sandy texture, intensely fractured, few nodules of unweathered limestone, moderate reaction to 1N HCI, few darker (possibly organic) layers, very thin.		187-190' very soft-fast drilling.
	190 —			L		190-190.8' DOLOMITE, grayish orange (10YR 7/4) to pale yellowish		Run-28:
DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D DRILLII	9	NOTE	ES: Logging of coring per the Wor Plan started at 62'. General rock description logged from 20-62'.
CHECKED BY: WDS APPROVED BY:					DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILLI	ING CO.:	HUSS						



192	LNP- O	FFSET B	ORING F	ROGRAI	М		LOG OF BORING NO. O-1		PROJECT NO. 07-3935
brown (10/R 6/2), moderately weathered, prorus toture-sandy to wagy, thick bedded, flw small thin factures, moderately activated reaction to 1N HCI when powdered. 192 — R-28 190% 194 — 195 196.5 DOLOMITE, pale yellowish brown (10/R 6/2) and grayish orange (10/R 74), moderately brown (10/R 6/2) and grayish orange (10/R 74), moderately brown (10/R 6/2) and grayish orange (10/R 74), moderately brown (10/R 6/2) and grayish orange (10/R 74), moderately brown (10/R 6/2) and grayish orange (10/R 74), moderately brown (10/R 6/2) and grayish orange (10/R 74), moderately brown (10/R 6/2) and grayish orange (10/R 74), moderately brown (10/R 6/2) and grayish orange (10/R 74), moderately brown (10/R 6/2) and grayish orange (10/R 74), moderately brown (10/R 6/2) and grayish orange (10/R 74), moderately weathered, pitted, fossiliferous, intensely fractured. 196 — 197 — 198 —	MSL)	HT. (T:	N N N O	". & (N) REC. 2D)	ERY (ft.)	-ILE	COORDINATES	YMBOL	
brown (10/R 6/2), moderately weathered, prorus texture-sandy to the first part of the provided first p	LEVA EEET	DEP (FEE	MPL R RU	OW/6 R % 8 (R)	SOVE	PROF	SURFACE EL: 42.7		REMARKS
vuggy, hick bedded, few small thin fractures, moderate reaction to 190.8-192.4 COLOMITE, pele yellowish brown (10YR 62) to dark 190.8-192.4 COLOMITE, pele yellowish brown (10YR 62) to dark 190.8-192.4 COLOMITE, pele yellowish brown (10YR 54), moderately weathered, pele yellowish brown (10YR 54), moderately soft, moderately meathered, pele (193.5-195) Circulation loss; 100% (19%) 5.0 220.2-203.5 DOLOMITE, crystalline, fresh, moderately fractured, way 193.3-195 As above except lossifierous, intensely fractured. (10YR 74), moderately hard, few fossils, and few dolomic closels. (10YR 74), moderately hard, few fossils, and few dolomic closels. (10YR 74) and the pele yellowish provided by the pele yellowish pr			S O	BLO	REC			nS(
193.3-195' As above except fossiliferous, intensely fractured. 194 — 195.196.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) to yellowish gray (5Y 7/2), intensely fractured, crystalline, slightly to moderately weathered to strong reaction to 1N HCl when powdered, thick bedded. 196.5-197.4' As above except very intensely fractured. 197.4-200' DOLOMITE, moderately hard, moderate to strong reaction to 1N HCl when powdered, banded apperance in color-grayish ordinaries and moderately pale of the providence of the pr		192 —	R-28		5.0		vuggy, thick bedded, few small thin fractures, moderate reaction to 1N HCl when powdered. 190.8-192.4' DOLOMITE, pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 5/4), moderately soft, moderately weathered, thick bedded but with banded apperance, few vugs, moderately fractured, wavy basal contact. 192.4-195' DOLOMITE, crystalline, fresh, moderately fractured, pitted, pale yellowish brown (10YR 6/2) and grayish orange (10YR 7/		Kelly Bar RPM: 215 Engine RPM: 1300-1400 Drill Time: 4min 38sec (190-192') 10min 26sec (192-193.5') 25min 44sec (193.5-195)
to moderately weathered, pitted, fossiliferous in bands, moderate to strong reaction to 1N HCl when powdered, thick bedded. R-29 (0%) 198 — R-29 (0%) 5.0 (0%) 197.4-200' DOLOMITE, moderately hard, moderate to strong reaction to 1N HCl when powdered, banded apperance in color-grayish orange (10YR 7/4), pale yellowish brown (10Y 6/2), and moderate yellowish brown (10YR 6/4), bick bedded, moderately to intensely fractured, sightly fractured, moderate reaction to 1N HCl when powdered. 200 — R-30 (54%) 5.0 (54%) 5.0 (54%) 5.0 (54%) 202.7-203.5' DOLOMITE, yellowish gray (5Y 7/2) to pale yellowish brown (10YR 6/2), and moderate reaction to 1N HCl when powdered. Run-30: Drilli Time: 35min 41sec Circul loss: 100% Run-30: Drilli Time: 35min 41sec Circul loss: 100% Run-30: Drilli Time: 35min 41sec Circul loss: 100% Run-30: Drilli Time: 35min 41sec Circul loss: 100% Run-30: Drilli Time: 35min 41sec Circul loss: 100% 202.7-203.5' DOLOMITE, as above except very slightly fractured, slightly weathered, moderately weathered, fine grained, pitted and fossiliferous in bands. 203.5-204.1' LIMESTONE, moderately hard to hard, light olive gray (5Y 6/1), moderately fractured, slightly to moderately weathered, fine grained, pitted and fossiliferous in bands. 204.1' 204.1-205' DOLOMITE, pale yellowish brown (10YR 6/2), slightly to DOLOMITE, pale yellowish brown (10YR 6/2), slightly to moderately Pan started at 62'. Gene rock describing loaged for okd sec		- 194 — -					193.3-195' As above except fossiliferous, intensely fractured.	R	Run-29:
to 1N HCI when powdered, banded apperance in color-grayish orange (10YR 7/4), pale yellowish brown (10YR 6/2), and moderate yellowish brown (10YR 5/4), fossiliferous in zones/ bands, thin bedded, moderately to intensely fractured. 200 — R-30 100% 5.0 200-202.7' DOLOMITE, yellowish gray (5Y 7/2) to pale yellowish brown (10YR 6/2), thick bedded, moderately to intensely fractured, fossiliferous, pitted, moderately weathered, moderate reaction to 1N HCI when powdered. 202 — R-30 100% 5.0 202.7-203.5' DOLOMITE, as above except very slightly fractured, slightly weathered, pitted, vuggy, few thin laminae (dark gray (N3)). 202.7-203.5' DOLOMITE, as above except very slightly fractured, slightly to moderately weathered, fine grained, pitted and fossiliferous in bands. 204 — 204 — 204 — 205 DATE STARTED: 9/2/09 GWL: DEPTH: 3.4' DATE/TIME: 9/8/09 @ 0900 ONOTES: Logging of coring per the Plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan started at 62'. Gene rock description looged from the plan star		- 196 — -		100%			6/2) to yellowish gray (5Y 7/2), intensely fractured, crystalline, slightly to moderately weathered, pitted, fossiliferous in bands, moderate to strong reaction to 1N HCl when powdered, thick bedded. 196.5-197.4' As above except very intensely fractured.		Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 56min 43sec
brown (10°YR 6/2), thick bedded, moderately to intensely fractured, fossiliferous, pitted, moderately weathered, moderate reaction to 1N HCl when powdered. 8-30 100% (54%) 5.0 202.7-203.5' DOLOMITE, as above except very slightly fractured, slightly weathered, pitted, vuggy, few thin laminae (dark gray (N3)). 203.5-204.1' LIMESTONE, moderately hard to hard, light olive gray (5Y 6/1), moderately fractured, slightly to moderately weathered, fine grained, pitted and fossiliferous in bands. 204.1-205' DOLOMITE, pale yellowish brown (10YR 6/2), slightly to DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 GWL: DEPTH: 3.4' DATE/TIME: 9/8/09 @ 0900 NOTES: Logging of coring per the Plan started at 62'. Gene rock description logged for cook description.		198 — — —	R-29	(0%)	5.0		to 1N HCl when powdered, banded apperance in color-grayish orange (10YR 7/4), pale yellowish brown (10Y 6/2), and moderate yellowish brown (10YR 5/4), fossiliferous, pitted/fossiliferous in zones		
203.5'- 204 — 204 — 203.5'- 204.1' LIMESTONE, moderately hard to hard, light olive gray (5Y 6/1), moderately fractured, slightly to moderately weathered, fine grained, pitted and fossiliferous in bands. 204.1'- 204.1-205' DOLOMITE, pale yellowish brown (10YR 6/2), slightly to DATE STARTED: 9/2/09 DATE COMPLETED: 9/8/09 GWL: DEPTH: 3.4' DATE/TIME: 9/3/09 @ 0730 GWL: DEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 NOTES: Logging of coring per the Plan started at 62'. Gene rock description logged from the process of the		-	R-30		5.0		brown (10YR 6/2), thick bedded, moderately to intensely fractured, fossiliferous, pitted, moderately weathered, moderate reaction to 1N HCl when powdered. 202.7-203.5' DOLOMITE, as above except very slightly fractured,		Drilling Pressure: 100-150-100 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 35min 41sec Circulation
DATE COMPLETED: 9/8/09 GWL: DEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 Plan started at 62'. Gene rock description logged fr		204 —					203.5-204.1' LIMESTONE, moderately hard to hard, light olive gray (5Y 6/1), moderately fractured, slightly to moderately weathered, fine grained, pitted and fossiliferous in bands.		
FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/PQ3 Coring 20-62'. CHECKED BY: WDS	DATE COMPLETED: 9/8/09 FIELD GEOLOGIST: JLO					GWL: D	S	NOTE	Plan started at 62'. General rock description logged from
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500						DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	OFFSET B	ORING F	PROGRAI	М		LOG OF BORING NO. O-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723173.4 E 458057.4 SURFACE EL: 42.7 DESCRIPTION	USCS SYMBOL	REMARKS
-162.3	206 — 208 — 210 — 212 — 214 — 216 — 218 —					moderately weathered, pitted/vuggy, fossiliferous, moderately hard, moderate reaction to 1N HCl when powdered, thick bedded, unfractured. BOTTOM OF BORING 205'		
DATE (FIELD CHECK APPRO	STARTED COMPLET GEOLOGI KED BY: DVED BY: NG CO.:	TED: 9/8 IST: JL W				DEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 NG METHOD: Mud Rotary/PQ3 Coring		S: Logging of coring per the Worl Plan started at 62'. General rock description logged from 20-62'.



LNP- C	FFSET E	ORING P	ROGRAI	М		LOG OF BORING NO. O-2		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7 SURFACE EL: 42.7 DESCRIPTION	USCS SYMBOL	REMARKS
	0		_			0.0-1.5' POORLY GRADED SAND (sp), fine to medium grained,	sp	
	_	S-1	4-7 5 (12)	0.8		subrounded to rounded, no plasticity, no dry strength, rapid dilatancy low toughness, grayish brown (5YR 3/2), moist to wet, no reaction to 1N HCI, medium dense.		
	2— -	S-2	8-6 5 (11)	1.0		1.5-5.0' POORLY GRADED SAND (sp), fine to medium grained, well sorted, subangular to subrounded, no plasticity, no dry strength, rapid dilatancy, low toughness, dark yellowish orange (10YR 6/6), moist, no reaction to 1N HCI, medium dense.	o	
	4 	S-3	5-3 3 (6)	1.0			sp	
	_						sp	
36.7	6 —	S-4	5-4 4 (8)	1.0	<i>7.7.7.</i> 4	5.0-6.0' POORLY GRADED SAND (sp), fine grained, subangular to rounded, well sorted, no plasticity, no dry strength, rapid dilatancy, low toughness, very pale orange (10YR 8/2), no reaction to 1N HCI, loose.	sp	
	-	S-5	3-3 4 (7)	1.0		6.0-9.0' POORLY GRADED SAND with CLAY (sp-sc), fine grained, well sorted, subangular to subrounded, medium plasticity, medium dry strength, slow dilatancy, medium toughness, light gray (N7) to medium light gray (N6), medium stiff, no reaction to 1N HCl.	sp-sc	
	8 —	S-6	1-1 1 (2)	0.9		7.5' As above except with less clay, very light gray (N8) to light gray (N7).	sp-sc	
	10 —	S-7	W-1 1 (2)	0.8		9.0-12.0' POORLY GRADED SAND with CLAY (sp-sc), 5% dolomite (large pebble size, soft), fine grained, subrounded to rounded, maximum size large pebble, well sorted, medium plasticity, medium dry strength, slow dilatancy, low toughness, medium dry strength, very light gray (N8) to light gray (N7), moist, very soft, strong reaction to 1N HCl.		
	-	S-8	W-W 1 (1)	0.4	/	10.5' As above except more dolomite.	sp-sc	
30.7 29.9	12 - -	S-9	1-3 5 (8)	1.1		12.0-12.8' POORLY GRADED SAND (sp), trace silt, fine to medium grained, low plasticity, low dry strength, rapid dilatancy, low toughness, light bluish gray (5B 7/1), moist, no reaction to 1N HCI, loose.	sp	
	_				rrictiri Niceti	12.8-15.5' POORLY GRADED SAND with SILT (sp-sm), fine grained	,	
	14 —	S-10	5-12 42 (54)	1.5		no plasticity, low dry strength, rapid dilatancy, low toughness, grayish orange (10YR 7/4), moist, no reaction to 1N HCl, loose.	sp- sm	
1	STARTED		0/09		GWL: D	9	NOTE	ES: Used AWJ rods for SPT
1		TED: 9/1			GWL: DEPTH: 4.3' DATE/TIME: 9/19/09 @ 0725 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring			sampling from 0-20'. Used NWJ rods for SPT
1	GEOLOG KED BY:	IST: JLO WI			PKILL	NG INIET HOD. CONTINUOUS SPT/INIUU KOTARY/PQ3 CORING		sampling below 20'
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILLI	NG CO.:	HUSS						



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
							LOG OF BORING NO. O-2			
ELEVATION (FEET MSL)	H (SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE L		COORDINATES N 1722994.8 E 457937.7	SYMBOL		
EVA-	DEPTH (FEET)	MPLE	DW/6" R % F & (RC	OVE	PROFILE		SURFACE EL: 42.7		REMARKS	
<u>П</u>		AS Q	BLC	REC			DESCRIPTION	nscs		
27.2	-	S-11	48-50/0 (50)	0.2			15.0' As above except with granule to small pebble size limestone pieces. —15.5'	sp- sm	15.5-20.0' Started coring to advance boring-no casing set.	
	16 — - -						TOP OF AVON PARK FORMATION 15.5-20.0' DOLOMITE, moderately soft, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), slightly weathered, fossiliferous, thick bedded, unfractured.			
	18 	OB-1	51% (51%)	2.3						
22.7	20 —						20'-21.5' SILT with GRAVEL (ml), 20% limestone granules, 10% sand	ml	Sample could also be classified as degraded dolomite.	
	_	S-12	2-5 6 (11)	1.2			70% silt, angular, maximum size-granule, no to slow dilatancy, low dry strength, low toughness, grayish orange (10YR 7/2), strong reaction to 1N HCl, medium dense, moist.		Driller notes: soft from 19.5-20'. Stopped coring at 20' and switched back to mud rotary and SPT sampling.	
	22 —	S-13	9-24 37 (61)	1.4			21.5-24.5' SILT with GRAVEL (ml), 40% silt, 60% dolomite granules, angular, moderately soft granules, no plasticity, low dry strength, slow dilatancy, low toughness, grayish orange (10YR 7/4), moist, strong reaction to 1N HCl, dense.	ml '	NOTE: switched to NWJ rods for the remainder of drilling-Energy Testing attempted from 21.5-35.2'.	
	_							ml		
	24 —	S-14	46-34 50/6 (84)	1.2						
	-	S-15	28-45 50 (95)	1.0			24.5-26.75' SANDY SILT with GRAVEL (ml), 20% fine grained sand, 20% dolomite granules, 60% silt, maximum particle size-granules, moderately soft, no plasticity, slow dilatancy, low toughness, low dry strength, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), moist, moderate reaction to 1N HCl, very dense.	ml		
	26 —	S-16	28-50/3 (50)	0.5				ml		
16.0		OB-2	37% (22%)	1.2			26.75' 26.75-31.5' DOLOMITE, moderately hard, thick bedded, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), slightly weathered, fossiliferous, vuggy, porous.	-	Switched to PQ3 coring starting at 26.75'. Possible wash out zone at top of core run, material was too hard to split spoon but not hard enough to core.	
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO						.: D	EPTH: 5.2' DATE/TIME: 9/12/09 @ 0715 EPTH: 4.3' DATE/TIME: 9/19/09 @ 0725 NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring	NOTE	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'	
CHECKED BY: WDS APPROVED BY: DRILLING CO: HUSS						LE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500	
PIZILLI	DRILLING CO.: HUSS									



LNP- C	OFFSET B	ORING P	ROGRAI	M		LOG OF BORING NO. O-2		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	F (:	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL	
EVAT	DEPTH (FEET)	MPLE RUN	7 % F RQ	OVE	PROFILE	SURFACE EL: 42.7	S SY	REMARKS
크린		SA	BLC OF	REC		DESCRIPTION	nscs	
9.7 8.2 7.5	30 — 32 — 34 — 36 — 38 —	OB-3 S-17 OB-4 S-18 OB-5 OB-6	0% (0%) 16-31 50/5 (81) 60% (0%) 42-50/2 (50) 93% (20%)	0 1.1 0.9 0.4 1.4		No recovery 30-31.5'. 31.5-33.0' SANDY SILT with GRAVEL (ml), similar to 24.5'. 33.0-34.5' DOLOMITE, as above, except moderately weathered. 34.5-35.2' SILT with GRAVEL (ml), 60% dolomite granules, 40% silt, angular grained-moderately soft, no plasticity, low dry strength, slow dilatancy, low toughness, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), wet, moderate reaction to 1N HCl, very dense. 35.2-40.0' DOLOMITE, very light gray (N8) to medium light gray (N6) moderately soft to moderately hard, thick bedded, moderately weathered, pitted/porous in zones (filled with weathered dolomite), moderately fractured.] ml	NOTE: 32.9-33.0' no sample. NOTE: Sample re-labeled to S-18-1.
DATE FIELD	40 — 42 — STARTED COMPLET GEOLOG KED BY: DVED BY:	ED: 9/1 IST: JL0 W[Э	3.2		40-45' DOLOMITE, moderately soft to moderately hard, yellowish gray (5Y 7/2) to light olive gray (5Y 5/2), fresh to slightly weathered, thick bedded, moderately fractured, fossiliferous, pitted, few vugs, strong reaction to 1N HCI. DEPTH: 5.2' DATE/TIME: 9/12/09 @ 0715 DEPTH: 4.3' DATE/TIME: 9/19/09 @ 0725 NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring		OB-8: Drilling Pressure: 250-200 psi Kelly Bar RPM: 220 Engine RPM: 1400 Drill Time: 22min 49sec (40-42.8') 4min 49sec (42.8-45') Circulation Loss: none Core loss area-wash out last 2.2 feet of run. ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20' Failing 1500



LNP- C	LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
						LOG OF BORING NO. O-2					
ELEVATION (FEET MSL)	H.(T	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE I	COORDINATES N 1722994.8 E 457937.7	SYMBOL				
LEVA'	DEPTH (FEET)	AMPLI R RUN	OW/6' R % F & (RC	SOVE	PROFILE	SURFACE EL: 42.7	CS S	REMARKS			
		<i>\$</i> 0	BLO	REC		DESCRIPTION	nscs				
-2.3 -3.2	44 —	S-18	20-50/5 (50)	0.8		45.0-45.9' SILT with GRAVEL (ml), 40% gravel, 60% silt, calcareous, coarse sand to very coarse sand size, subangular, moderately soft, no plasticity, low dry strength, slow dilatancy, low toughness, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4) moist, strong reaction to 1N HCl, very dense. 45.9-50.0' DOLOMITE above except moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2).		NOTE: sample re-labeled S-18-2. Water level on 9/12/09 @ 0715 5.2'. OB-9: Drilling Pressure: 250 psi Kelly Bar RPM: 212 Engine RPM: 1300-1400 Drill Time: 5min 38sec Criculation loss: none			
-7.3 -7.8	48 — — — 50 —	S-20	50/6 (50)	0.3		50.0-50.5' SILT with GRAVEL (ml), 40% dolomite gravel (coarse sand size), no plasticity, low dry strength, no dilatancy, low toughness, moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2), strong reaction to 1N HCl, very dense.	i ''''	Note: OB-9 sample put in soil jar due to very soft soil-like nature. OB-10: Drilling Pressure: 150 psi Kelly Bar RPM: 214			
	52 — - - - 54 —	OB-10	58% (0%)	2.9		50.5-65.0' Degraded DOLOMITE, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), very soft, poorly indurated, but mainly silt with gravel (as described above), strong reaction to 1N HCI, bedding not apparent.	1	Engine RPM: 1300-1400 Drill Time: 10min 28sec Criculation loss: none Special care sample: 50.8-51.6'.			
	56 — - - - - 58 —	S-21	43-50/3 (50) 	2.6				OB-11: Drilling Pressure: 200 psi Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 12min 15sec Criculation loss: none			
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D DRILLIN		<u> </u> Note	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
APPRO	KED BY: OVED BY: ING CO.:		JS	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			
		_									



LNP- (OFFSET B	ORING P	ROGRA	M		LOG OF BORING NO. O-2		PROJECT NO. 07-393
ELEVATION (FEET MSL)	гн Т)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL	
EVA EET I	ОЕРТН (FEET)	MPLE RUN	NW/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 42.7	SSY	REMARKS
E (F		SA	BLC	REC		DESCRIPTION	SOSA	
	60 —	S-22 OB-12	50/5 (50)	1.7		65.0-67.5' DOLOMITE, severly weathered to degraded, 65-65.6'		OB-12: Drilling Pressure: 150 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 8min 14sec Criculation loss: none
	66 	OB-13	68% (0%)	1.7		moderately to poorly indurated, 65.6-67.5', very soft, very dense, calcareous silt (degraded dolomite), moderately soft to soft, some very thin black (possibly organic layers) throughout, strong reaction to 1N HCI.		Drilling Pressure: 200 psi Kelly Bar RPM: 216 Engine RPM: 1300-1400 Drill Time: 10min 0sec Criculation loss: none
	68 — - -	OB-14	100%	2.5		67.5-75.0' DOLOMITE, moderately hard, pitted/porous, vuggy, fossiliferous, moderately fractured, modetately weathered, pale yellowish brown (10YR 6/2), strong reaction to 1N HCl when powdered.		OB-14: Drilling Pressure: 150-200 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 10min 46sec Criculation loss: none
	70 — - - 72 — - -	R-1	80% (38%)	4.0		As above except slightly to moderately fractured.		Run-1: Drilling Pressure: 150-150 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 9min 16sec (70-73') 6min 34sec (73-75') Circulation Loss: none Driller Notes 70-72' very soft.
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D DRILLIN	_	NOTE	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'
APPR	OVED BY:		-		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	OFFSET B	ORING F	ROGRAI	M 		LOG OF BORING NO. O-2		PROJECT NO. 07-393
ION ASL)	ŦΈ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	IE	COORDINATES N 1722994.8 E 457937.7	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	MPLE	7W/6" R % F RQ (RQ	OVE	PROFILE	SURFACE EL: 42.7	\S SX	REMARKS
日		S O OF	BLC	REC		DESCRIPTION	nscs	
	- 74 — -							
	76 — -	R-2	90%	4.5		75-76' DOLOMITE, soft to very soft, moderately to intensely weathered, sandy texture, intensely fractured, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), weak to moderate reaction to 1N HCl when powdered, thick bedded, pitted/porous, no fossils. 76-77.7' As above except moderately hard, moderately to intensely fractured, fossiliferous.		Run-2: Drilling Pressure: 200 psi Kelly Bar RPM: 206 Engine RPM: 1200-1300 Drill Time: 4min 20sec (75-78') 15min 12sec (78-80') Circulation Loss: none Driller Notes 75-77.5' soft, 77.5-78 harder, then soft.
	78 — –	11.2	(16%)	4.0		77.7-78.7' DOLOMITE, moderately hard to hard, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), strong reaction to 1N HCl, vuggy, fresh to slightly weathered, moderately fractured. 78.7-80' DOLOMITE, as at 75-76'.		
	80 —		30-32			80-81.5' Degraded DOLOMITE, same as at 75-76' except not silty.		Run-3: Drilling Pressure: 150-200 psi
	- - 82	S-23	50/6 (82)	1.0		81.5-82.2' Same as above except moderately weathered, intensely fractured.		Kelly Bar RPM: 213, 206 Engine RPM: 1200-1300 Drill Time: 4min 56sec (80-82.5') 9min 8sec (82.5-85') Circulation Loss: none
	- -	R-3	80% (18%)	4.0		82.2-83.8' DOLOMITE, moderately hard, moderately fractured, pitted porous, moderately weathered, weak reaction to 1N HCl when powdered, pale yellowish brown (10YR 6/2).	/	
	84 — —					83.8-85.0' DOLOMITE, moderately soft, grayish orange (10YR 7/4), thick bedded, fresh, pitted in thin bands, strong reaction to 1N HCl when powdered.		
	- 86 					85-92.4' DOLOMITE, moderately hard, slightly to moderately weathered, pitted/porous, fossiliferous, yellowish gray (5Y 7/2), thick bedded, moderately to intensely fractured, strong reaction to 1N HCl, 86-87' rubble, very broken-possible zone of wash out/cave-in, few thi bands/pockets of dark brown (5YR 2/2) organic material.		Run-4: Drilling Pressure: 150-200 psi Kelly Bar RPM: 208 Engine RPM: 1300 Drill Time: 6min 42sec (85-85.8') 15min 6sec (85.8-90') Circulation Loss: 30%
	-	R-4	92% (12%)	4.6				553.44.67. 2555. 5570
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D DRILLIN		NOTE	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'
APPRO	OVED BY: ING CO.:			_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	OFFSET E	ORING P	ROGRAI	M				PROJECT NO. 07-3935		
						LOG OF BORING NO. O-2				
TION MSL)	ΞĒ	NO.	' & (N) REC. 2D)	RECOVERY (ft.)]. -	COORDINATES N 1722994.8 E 457937.7	SYMBOL			
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N OR % REC. & (RQD)	COVE	PROFILE	SURFACE EL: 42.7	USCS SY	REMARKS		
Щ.		§ 0	BL	RE		DESCRIPTION	ns			
	88 									
	90 —							Run-5: Drilling Pressure: 150 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 17min 27sec (90-94') 3min 42sec (94-95')-no recovery Circulation Loss: 100% starting at		
	92 —	R-5	68% (10%)	3.4		92.4-95' DOLOMITE, soft, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), intensely weathered, silty-poorly indurated, strong reaction to 1N HCl when powdered, sandy texture, porous.		92.5°.		
	94 —	S-24	21-50/2 (50)	0.4		95-95.3' DOLOMITE as at 85'. 95.3-97.9' DOLOMITE, moderately hard, moderately weathered, thick bedded, porous/pitted, vuggy, fossiliferous, moderately to intensely fractured, weak reaction to 1N HCl, pale yellowish brown (10YR 6/2).	(Run-6: Drilling Pressure: 150 psi Kelly Bar RPM: 208 Engine RPM: 1300 Drill Time: 26min 48sec		
	- - 98 - -	R-6	100% (0%)	5.0		98.1-99.2' DOLOMITE, as at 95.3' except with some dolomite clasts.		Circulation Loss: 100%		
-56.5	100 —					99.2-101.1' LIMESTONE, moderately hard, very pale orange (10YR 8/2), moderately to intensely fractured, thick bedded, strong reaction to 1N HCl, fossiliferous, slightly to moderately weathered, slightly pitted in zones.		Run-7: Drilling Pressure: 150 psi Kelly Bar RPM: 220 Engine RPM: 1400		
-58.4	102 —					101.1-101.3' DOLOMITE, grayish orange (10YR 7/4) to pale yellowisi brown (10YR 6/2), porous/pitted, fossiliferous, moderately hard, thick bedded. 101.3-103.2' Unfractured, then becomes moderately to intensely fractured dolomite and crystalline dolomite mix (102.6-103.2')	n	Drill Time: 17min 4sec (100-103.5') 14min 17sec (103.5-105') Circulation Loss: 100%		
DATE	STARTED): 9/1	0/09		GWL: D		NOTE	S: Used AWJ rods for SPT		
1		ΓED: 9/1			GWL: D	C		sampling from 0-20'. Used NWJ rods for SPT		
1		IST: JL			DRILLIN	NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring		sampling below 20'		
	KED BY: OVED BY:	WE	JS	-	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG.	Failing 1500		
				\dashv	PINIE	T. Lodie i ailliei - HELFER. Gliad/Gody	MG.	i aiiiig 1000		
	DRILLING CO.: HUSS									



LNP- (LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
						LOG OF BORING NO. 0-2					
TION ASL)	н (Т	E NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL				
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	OW/6" R % F & (RC	COVE	PROFILE	SURFACE EL: 42.7	SS SY	REMARKS			
		% O	BLO	RE(DESCRIPTION	nscs				
		R-7	96% (26%)	4.8		103.2-110' DOLOMITE, moderately hard, fresh to slightly weathered, weak reaction to 1N HCl when powdered, pitted/vuggy in thin bands/					
	104 					zones, fine grained to crystalline, fossiliferous, thick bedded, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4). Vertical fracture 103.2-105.0'.					
	106 —	S-25	32-48 50/5 (98)	0.9				Run-8: Drilling Pressure: 100-150 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 12min 10sec (105-107') 21min 40sec (107-110')			
	_ _ _	R-8	100%	5.0				Circulation Loss: 100%			
	108 —		(30%)								
	110 					110-120' DOLOMITE, very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), pitted/porous, strong reaction to 1N HCl when powdered, moderately to intensely fractured, vertical fracture 110-112.2' (all other fractured extend from this vertical fracture), thick bedded, slightly to moderately weathered, moderately hard, few vugs few fossils.	,	Run-9: Drilling Pressure: 100 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400 Drill Time: 22min 20sec (110- 113.2')			
	 112 - -	R-9	100% (10%)	5.0		ICW IOSSIIS.		13min 7sec (113.2-115) Circulation Loss: 100%			
-71.6 -71.8	 114 										
	116—							Run-10: Drilling Pressure: 100 psi Kelly Bar RPM: 207 Engine RPM: 1300 Drill Time: 12min 24sec (115-116') 18min 43sec (116-120')			
						116.6-118.3' Thin vertical fracture, closed from 117.5-118.3'.		Circulation Loss: 100%			
DATE FIELD	STARTED COMPLET	TED: 9/1 IST: JLO)		GWL: D GWL: D DRILLIN	9	<u>I</u> Note	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
APPR	KED BY: OVED BY: ING CO.:		<u> </u>	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			
	RILLING CO.: HUSS										



LNP- (LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
						LOG OF BORING NO. 0-2					
ELEVATION (FEET MSL)	Н Т)	E NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL				
EVA-	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	DW/6" R % F & (RC	OVE	PROFILE	SURFACE EL: 42.7	SS SY	REMARKS			
 		S O	BL(REC		DESCRIPTION	nscs				
	- 118 	R-10	100% (40%)	5.0		118.6-119' As above except not as pitted.					
	120 — —					120-121' DOLOMITE, very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), moderately hard, pitted/porous, few vugs, thick bedded, fresh to slightly weathered, unfractured, fossiliferous, strong reaction to 1N HCl when powdered. 121' Start of fracture, black coating on surface-area becomes soft.		Run-11: Drilling Pressure: 150-200 psi Kelly Bar RPM: 208 Engine RPM: 1300 Drill Time: 13min 38sec (120-121') Circulation Loss: 100%			
-79.8	122 —	S-26	32-39 12 (51)	0.7		121-122.5' DOLOMITE, highly weathered, as above, black staining or some pieces, crushed/fracture zone. Horizontal fracture at 121.8'.		Driller notes soft at 121'			
-79.0	_	R-11	40%	2.0		ROD DROP 122.5-123.7'.					
-81.0	_	K-11	(16%)	2.0							
-81.3	124 —				****	123.7-124.0' DOLOMITE as above.	1				
	_	S-27	2-3 17	0.6		ROD DROP 124.0-125.0'.					
-82.3	_		(20)	0.0	77777	125-127.5' Rubble (see remarks column).		125-126' clean out of rubble/ disturbance caused by split spoon			
	126 							sampling. Run-12: Drilling Pressure: 100 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 6min 4sec (126-127')			
	- 128 — - -	R-12	100% (12%)	4.0		127.5-130' DOLOMITE, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), moderately hard, slightly to moderately weathered pitted/porous, some vugs, moderately to intensely fractured, strong reaction to 1N HCl when powdered, thick bedded, vertical fracture 127.5-128.4'.	,	2min 14sec (127-128') 2min 18sec (128-129') 5min 8 sec (129-130') Circulation Loss: 100%			
00.2	130 —					130-131.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, weak reaction to 1N HCl when powdered, fresh, slightly pitted, few vugs, thick bedded, unbroken.		Run-13: Drilling Pressure: 150-200 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300			
-88.3 -88.8						ROD DROP 131.0-131.5'. 131.5		Drill Time: 8min 22sec (130-132.5') 9min 16sec (132.5-135')			
	STARTED): 9/1	0/09		GWL: D			L ES: Used AWJ rods for SPT			
DATE	COMPLET GEOLOG	ΓED: 9/1			GWL: D	9		sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
CHEC	KED BY: OVED BY:	WE		}		, ,	RIG.	Failing 1500			
	ING CO.:				3. WELL						



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
	OE1 D					LOG OF BORING NO. O-2		1 1100201 110. 01-0900		
ELEVATION (FEET MSL)	rH T)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL			
EVA'	ОЕРТН (FEET)	MPLE RUN	DW/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 42.7		REMARKS		
		S, O	BL(RE(DESCRIPTION	nscs			
	132 — —	R-13	94% (28%)	3.7		131.5-133' DOLOMITE, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), moderately weathered, slightly to moderately fractured, pitted, fossiliferous, vuggy, moderately soft, moderate to strong reaction to 1N HCl when powdered, thick bedded. 132.3-132.5' Intensely weathered/degraded. 133-133.5' Crystalline DOLOMITE, yellowish gray (5Y 7/2), hard, strong reaction to 1N HCl, fine grained, no fossils, medium bedded,		Circulation Loss: 100%		
	134 — 					fresh. 133.5-135' DOLOMITE, as at 131.5-133.0' except moderately to intensely weathered.				
	-	S-28	4-50/5 (50)	0.3		135-136' Rubble from split spoon disturbance above.		Run-14: Drilling Pressure: 250 psi Kelly Bar RPM: 194 Engine RPM: 1200		
	136 — – –		100%			136-137.8' Crystalline DOLOMITE, moderately hard, light gray (N7), thick bedded, moderately to intensely fractured, fresh to slightly weathered, pitted in thin bands, strong reaction to 1N HCI.		Drill Time: 8min 57sec (135-137') 14min 38sec (137-139') 4min 51sec (139-140') Circulation Loss: 100%		
-96.3	138 	R-14	(26%)	5.0		137.8-139' DOLOMITE, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4), moderately hard, strong reaction to 1N HCl when powdered, thick bedded, fresh to slightly weathered, vuggy (weathered out fossils), fossiliferous, unfractured, pitted in bands.				
-97.3	140 —					139-140' LIMESTONE rubble, intensely fractured (some pieces). 140-141.6' DOLOMITE, very pale orange (10YR 8/2) to pale yellowisi		Run-15:		
	- -					brown (10YR 6/2), moderately hard, weak reaction to 1N HCl, thick bedded, intensely fractured, moderately weathered, vuggy, fossiliferous.		Drilling Pressure: 150-200 psi Kelly Bar RPM: 203 Engine RPM: 1200-1300 Drill Time: 26min 57sec (140-141') 28min 8sec (141-143')		
	142 — — — — 144 —	R-15	94% (46%)	4.7		141.6-142.4' DOLOMITE, medium light gray (N6) and light olive gray (5Y 6/1), moderately hard, fresh, slightly fractured (2 healed vertical fractures-very thin), vuggy band at 141.9', strong reaction to 1N HCl when powdered, thick bedded, moderately weathered zone (porous/vuggy from 142.2-142.3'), with bands of black material (very thin) throughout. 142.4-142.6' Crystalline DOLOMITE. 142.6-146.2' DOLOMITE, moderately hard, moderately weathered, vuggy, pitted/porous, fossiliferous, pale yellowish brown (10YR 6/2) and medium light gray (N6), strong reaction to 1N HCl when powdered, thick bedded, slightly fractured.		16min 42sec (143-145') Circulation Loss: 100%		
								Run-16: Drilling Pressure: 150 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 47min 4 sec		
DATE	STARTED)· Q/1	0/09		GWL: D	EPTH: 5.2' DATE/TIME: 9/12/09 @ 0715	NOTE	ES: Used AWJ rods for SPT		
DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO					GWL: D	_	11011	sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		
APPRO	KED BY: OVED BY: ING CO.:		J9	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		
DIVILL	DRILLING CO.: HUSS									



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
LINF	FF3E1 B	JKING F	ROGRAI	IVI		LOG OF BORING NO. O-2		FROJECT NO. 07-3933		
ELEVATION (FEET MSL)	TH (T:	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL			
EVA:	DEPTH (FEET)	MPLI R RUN	2W/6' R % F & (RC	SOVE	PROFILE	SURFACE EL: 42.7		REMARKS		
== ==		S O	BLO	RE(DESCRIPTION	nscs			
						146.2-149' As above except fresh to slightly weathered.		Circulation loss: 100%		
	148 —	R-16	100%	5.0		146.9' Horizontal fracture (crushed rock zone infilling).				
	150 —					149-149.5' Crystalline DOLOMITE, fresh as at 142.4'. 149.5-150' DOLOMITE as at 146.2'. 150-152.5' DOLOMITE, pale yellowish brown (10YR 6/2) and mediun light gray (N6), moderately hard, moderately weathered, pitted/porous/vuggy in thin bands, moderately fractured, fossiliferous, strong reaction to 1N HCl when powdered, thick bedded.		Run-17: Drilling Pressure: 150 psi Kelly Bar RPM: 206 Engine RPM: 1200-1300 Drill Time: 44min 5sec (150-152.5') 44min 25sec (152.5-155')		
	152 — — — — — 154 —	R-17	100% (32%)	5.0		152.5-154' DOLOMITE, moderately hard, light gray (N7) to medium light gray (N6), moderately weathered, fossiliferous-weathering out creating long vugs, pitted/porous, slightly fractured- breaks along vugs. 154' As above except more porous, no fossils. 154-155' Vertical fracture-black coating on face-open.		Circulation loss: 100%		
-114.6	156 —	R-18	100%	5.0		155-155.9' DOLOMITE as at 154' 155-9-157' DOLOMITE, crystalline, pale yellowish brown (10YR 6/2), moderately hard, intensely fractured (some grout infilling fractures). 157-160' Alternating beds of moderately weathered porous/vuggy dolomite and crystalline dolomite as described above, moderately fractured (thin, closed). 157.3-163.5' Grout-sidewall of adjacent A-series boring.		Run-18: Drilling Pressure: 150-200-150 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 44min 13sec Circulation loss: 100%		
DATE ST DATE CO FIELD G	160 ————————————————————————————————————	ED: 9/1 ST: JL	0		GWL: D GWL: D DRILLIN	S		Run-19: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		
	VED BY: VED BY: NG CO.: I	WI HUSS			DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
						LOG OF BORING NO. O-2				
FION MSL)	П Т.)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL			
ELEVATION (FEET MSL)	DEPTH (FEET)	MPLE RUN	2W/6' R % F & (RG	SOVE	PROFILE	SURFACE EL: 42.7	SS SY	REMARKS		
田田		S O	BL(RE(DESCRIPTION	nscs			
	162 —	D 10	100%	F 0		162 4 162! December moderately to interpoly fractured		Drill Time: 44min 46sec Circulation loss: 100% First 0.3' of Run-19 from the end of R-18.		
-120.8		R-19	(42%)	5.0	\	162.4-163' Becomes moderately to intensely fractured. 163-164.5' DOLOMITE, as above except with few (0.1' thick) moderate yellowish brown (10YR 5/4) bands. 163.5	<u>.</u>			
	166 — - - 168 — - -	R-20	100%	5.0		164.5-164.7' Crystalline DOLOMITE, moderately to intensely fractured. 164.7-165' DOLOMITE as at 163'. 165-170' DOLOMITE, grayish orange (10YR 7/4) and pale yellowish brown (10YR 6/2), moderately hard, porous/pitted, fossiliferous, few vugs, moderately to intensely fractured, slightly to moderately weathered, strong reaction 1N HCl when powdered. 165.5-165.6' Crystalline DOLOMITE, fresh, pale yellowish brown (10YR 6/2).		Run-20: Drilling Pressure: 200-150 psi Kelly Bar RPM: 200, 201 Engine RPM: 1200-1300 Drill Time: 19min 55sec (165-167') 22min 17sec (167-170') Circulation Loss: 100%		
	170 — - 172 — - 174 — -	R-21	100%	5.0		170-171.6' DOLOMITE, pale yellowish brown (10YR 6/2), moderaetly to intensely fractured, fresh to slightly weathered, slightly pitted, porous, few vugs, few fossils, thick bedded, strong reaction to 1N HC when powdered. 171.6-173.2' DOLOMITE, moderately weathered, thin bedded, varigated colors-pale yellowish brown (10YR 6/2), grayish orange (10YR 7/4), dark yellowish orange (10YR 6/6), porous/pitted, some fossils, slightly fractured (horizontal only). 173.2-173.4' Crushed zone. 173.4-175' DOLOMITE, as at 170'.		Run-21: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 40min 48sec Circulation Loss: 100%		
	_					175-175.8' Crystalline DOLOMITE, moderately hard to hard, medium light gray (N6), intensely fractured (horizontal and vertical fractures).		Run-22: Drilling Pressure: 200-250 psi		
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: E GWL: E DRILLII	C	NOTE	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		
APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935											
						LOG OF BORING NO. O-2	_				
ELEVATION (FEET MSL)	H)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1722994.8 E 457937.7	SYMBOL				
EVA ⁻	DEPTH (FEET)	MPLE RUN	DW/6" R % F & (RC	COVE	PROFILE	SURFACE EL: 42.7		REMARKS			
田币		SA	BLC	REC		DESCRIPTION	nscs				
	176 — —					175.8-176.1' DOLOMITE as at 170'. 176.1-177' DOLOMITE, moderately soft to soft, dark yellowish orange (10YR 6/6) and dark yellowish brown (10YR 4/2), thin bedded/banded, pitted/porous, sandy texture, poorly indurated, strong reaction to 1N HCl when powdered. 177-178.5' DOLOMITE as at 170' except intensely fractured.	Э	Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 37min 24sec Circulation Loss: 100% Driller notes: soft 176-177' and 178-179'.			
	- 178 -	R-22	(0%)	5.0		178.5-178.8' DOLOMITE as at 176.1'. 178.8-180' DOLOMITE as at 170'.					
	180 					180-181.1' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2), moderately fractured (180.6-180.7'-intensely fractured/crushed), thick bedded, moderately weathered, weak to moderate reaction to 1N HCl when powdered. 181.1-182.7' DOLOMITE, moderately soft to soft, dark yellowish		Run-23: Drilling Pressure: 200 psi Kelly Bar RPM: 220 Engine RPM: 1400 Drill Time: 41min 54sec Circulation Loss: 100%			
	182 	R-23	100% (46%)	5.0		orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), pitted/porous, sandy texture, moderately to severly weathered, fossiliferous vertical fracture from 182-182.4'. 182.2-182.7' Transitional/gradational zone, thin bedded/banded, some rip-up clasts of crystalline dolomite. 182.7-183.3' Crystalline DOLOMITE, moderately hard, light olive gray (5Y 6/1), intensely fractured along vertical fracture. 183.3-184.1' DOLOMITE, similar to 181.1'.		Driller notes: 181-182.5' very soft.			
	184 — — —					184.1-185' DOLOMITE, similar to 182.7' except moderately fractured (all horizontal). 185-186.2' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2), moderately weathered, pitted/porous, vuggy, fossiliferous, sand	₹	Run-24: Drilling Pressure: 200 psi			
	186 — —					texture in weathered areas, thick bedded, strong reaction to 1N HCl when powdered. 186.2-187' Crystalline DOLOMITE, moderately hard, fresh, moderately fractured, light gray (N7) to light olive gray (5Y 6/1), stron reaction to 1N HCl when dry/powdered. 187-187.8' DOLOMITE as at 185'.		Kelly Bar RPM: 224 Engine RPM: 1400-1500 Drill Time: 33min 13sec Circulation Loss: 100%			
	- 188 -	R-24	100% (46%)	5.0		187.8-188.2' Crystalline DOLOMITE as at 186.2'. 188.2-188.8' Severly weathered DOLOMITE, coarse grained, poorly indurated, pitted/porous, sandy texture.					
	190 —					188.8-191.9' DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4), dark yellowish brown (10YR 4/2) and pale yellowish brown (10YR 6/2), thin bedded/banded, slightly fractured, moderately weathered, some vugs, weak to moderate reaction to 1N HCl when powdered, vertical fracture from 190-191.1'.		Run-25:			
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D DRILLIN	C	NOTE	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
APPRO	OVED BY:			_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			
		_									



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
LOG OF BORING NO. O-2										
JON ASL) H T)	: NO. I NO.	& (N) (EC. (D)	RECOVERY (ft.)	LE	COORDINATES N 1722994.8 E 457937.7	SYMBOL				
(FEET MSL) DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	SOVE	PROFILE	SURFACE EL: 42.7		REMARKS			
	S, O	BLO	REC		DESCRIPTION	nscs				
192— 194— 196— 198— 200— 202—	R-25 R-26	92% (28%)	5.0 5.0		DESCRIPTION 191.9-192.2' Crystalline DOLOMITE, moderately to intensely weathered as at 186.2'. 192.2-194.2' DOLOMITE, moderately hard, strong reaction to 1N HCI when powdered, very pale orange (10YR 8/2) to yellowish gray (5Y 7.2) (cream color), slightly to moderately weathered, moderately fractured, fossiliferous, pitted, vuggy, thick bedded. 194.2-195' DOLOMITE as at 188.8'. 195-197.6' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2), moderately weathered, pitted/porous, unfractured, becomes intensely fractured below 197.3', thick bedded, dark yellowish brown (10YR 4/2) very thin bands from 196.7-197.6', strong reaction to 1N HCI when powdered. 197.6-198.7' Transistion zone, thin alternating layers of dolomite as above and crystalline dolomite, moderately fractured. 198.7-200' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2) to light olive gray (5Y 6/1), moderately hard, vugs (0.05' wide), moderately to intensely fractured (possibly mechanical), thick bedded fresh to slightly weathered, strong reaction to 1N HCI when dry/ powdered. 200-202.4' As above except slightly to moderately weathered, few very thin pitted bands, vertical fracture from 200-201.3'. 202.4-205' DOLOMITE, very light gray (N8) to medium light gray (N6) on outside of core, light olive gray (5Y 6/1) on fresh sample, moderate yellowish brown (10YR 5/4) when weathered, moderately weathered, fossiliferous, pitted/porous, vuggy, sandy texture, with clasts of crystalline dolomite throughout, moderately soft to soft, weak reaction to 1N HCI when broken, unfractured by moderately to poorly indurated (conglomerate-like appearance) bedding no apparent.		Drilling Pressure: 200 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 26min 9sec Circulation Loss: 100% Run-26: Drilling Pressure: 350 psi Kelly Bar RPM: 227 Engine RPM: 1400-1500 Drill Time: 20min 55sec Circulation Loss: 100% 9/18/09-No water level taken-rods locked in hole. Run-27: Drilling Pressure: 200 psi Kelly Bar RPM: 234 Engine RPM: 1500 Drill Time: 23min 23sec Circulation Loss: 100%			
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS				GWL: DEPTH: 4.3' DATE/TIME: 9/19/09 @ 0725 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring			ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
APPROVED BY: DRILLING CO.: HUSS DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500										



LNP- OFFSET BORING PROGRAM LOG OF BORING NO. O-2										
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7 SURFACE EL: 42.7	SYMBOL	REMARKS		
		SAN	BLO OR &	RECC		DESCRIPTION	USCS			
	206 —	R-28	92% (36%)	4.6		205-205.6' DOLOMITE, light gray (N7), moderately hard, slightly weathered, vuggy, fossiliferous, pitted, unfractured, moderately weathered at ends of core. 205.6-206.1' DOLOMITE as at 202.4-205'. 206.1-206.5' DOLOMITE gravel, no matrix. 206.5-208.7' DOLOMITE, moderately soft, yellowish gray (5Y 8/1) and yellowish gray (5Y 7/2), thin to very thin bedded, banded with pale yellowish brown (10YR 6/2), fresh to slightly weathered, strong reaction to 1N HCl when powdered, unfractured-breaks along darker colored bands-slickensides. 208' Color change to very light gray (N8).		Run-28: Drilling Pressure: 200 psi Kelly Bar RPM: 195 Engine RPM: 1200 Drill Time: 11min 20sec Circulation Loss: 100% Driller Notes: 206-209' soft.		
	210 —	R-29	94% (18%)	4.7		(some mechanical), fossiliferous, sandy texture, pitted/porous, pale yellowish brown (10YR 6/2). 210-213' DOLOMITE, light gray (N7) to medium light gray (N6)-fresh zones, pale yellowish brown (10YR 6/2) on weathered zones, moderately to intensely weathered, moderately to intensely fractured due to weathering, strong reaction to 1N HCI when broken, conglomerate-like appearance (differential weathering), vuggy, fossiliferous, sandy texture, porous. 212-213' As above except more crystalline dolomite clasts (80-90%) and less weathered dolomite "matrix" (10-20%). 213-215' DOLOMITE, very light gray (N8) on outside of core, grayish orange (10YR 7/4), moderately hard, moderately weathered, slightly to moderately fractured, vuggy, weak reaction to 1N HCI when powdered, some fossils, thick bedded.		Run-29: Drilling Pressure: 250-150 psi Kelly Bar RPM: 201, 205 Engine RPM: 1200-1300 Drill Time: 15min 49sec (210-212') 12min 11sec (212-213') 4min 40sec (213-215') Circulation Loss: 100%		
	216 — - - - - 218 — -	R-30	96% (44%)	4.8		215-216.6' DOLOMITE, moderately soft to moderately hard, light gray (N7) with very thin pale yellowish brown (10YR 6/2) bands, fresh to slightly weathered, thick bedded, few vugs (weathered out fossils), strong reaction to 1N HCl when powdered. 216.6-217' DOLOMITE, moderately hard, moderately weathered, fossiliferous, vuggy, pitted, light gray (N7). 217-217.8' DOLOMITE, moderately soft, grayish orange (10YR 7/4) and pale yellowish brown (10YR 6/2), moderately weathered, pitted/porous in bands, weak reaction to 1N HCl when powdered, sandy texture, friable. 217.8-218.6' DOLOMITE, intensely fractured/crushed zone.		Run-30: Drilling Pressure: 350-400 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 18min 5sec Circulation Loss: 100%		
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D DRILLIN	C	NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
	APPROVED BY: DRILLING CO.: HUSS DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500									



LNP- C	OFFSET E	ORING F	ROGRA	M		LOG OF BORING NO. O-2		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7 SURFACE EL: 42.7 DESCRIPTION	USCS SYMBOL	REMARKS
	220 — -					220-221.7' DOLOMITE, moderately soft, moderately to severly weathered, with very thin dark yellowish brown (10YR 4/2) bands, vuggy, pitted/porous in bands, very light gray (N8), moderately fractured (along pitted bands).		Run-31: Drilling Pressure: 300 psi Kelly Bar RPM: 223 Engine RPM: 1400-1500 Drill Time: 23min 41sec
		R-31	100% (46%)	5.0		221.7-222.3' DOLOMITE, as above except hard, slightly weathered. 222.3-224' DOLOMITE, soft, severly weathered, grayish orange (10YR 7/4), fossiliferous, area slightly washed out but still intact.		Circulation Loss: 100% Water level on 9/19/09 at 0725 is 4.3'.
-182.3	 224 					224-225' DOLOMITE, light gray (N7), moderately soft, pitted/porous, vuggy, moderately fractured (vertical fracture 223.1-223.7'), thick bedded, moderately weathered, weak reaction to 1N HCl when powdered, fossiliferous. BOTTOM OF BORING 225'		
	226 — - -							
	228 — - -							
	230 — - -							
	232 — - -							
DATE (234 STARTEE COMPLET GEOLOG	TED: 9/1	0		GWL: D GWL: D DRILLIN	9	NOTE	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'
APPRO	KED BY: OVED BY: NG CO.:		79		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3			PROJECT NO. 07-3935
ION ISL)	IC	0 N O	& (N) EC.	RECOVERY (ft.)	LE LE	COORDINATES N 1723189.3 E 458086.9		SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	OVEF	PROFILE	SURFACE EL: 42.5		SSYI	REMARKS
- I - I - I - I - I - I - I - I - I - I		SA	BLC	REC		DESCRIPTION		nscs	
32.5	0					0.0-10.0' Sandy CLAY. 10.0-15.0' SAND.	—10.0'-	sp	0-15' Destructive drilling, log based on drill cuttings.
DATE FIELD	STARTED COMPLET GEOLOG	ED: 10	0		GWL: D GWL: D DRILLIN		N	NOTE	ES: NA
APPR	KED BY: OVED BY: ING CO.:		DS	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	F	RIG:	Failing 1500



27.5 15 27.5 15 27.5	LNP- Offset Boring Program	LOG OF BORING NO. O-3		PROJECT NO. 07-3935
27.5 15	ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. DR RUN NO. LOW/6" & (N) OR % REC. & (RQD)	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5	SCS SYMBOL	REMARKS
13.5 – 15.		DESCRIPTION	l s	
DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DRILLING METHOD: Mud Rotary/PQ3 Coring DRILLING METHOD: Mud Rotary/PQ3 Coring DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	13.5— 16.5— OB-1 18— OB-2 100% (100%) 1.5	TOP OF AVON PARK FORMATION 15.0-18.5' DOLOMITE, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), moderately soft, strong reaction to 1N HCl when powdered, slightly weathered, unfractured, thick bedded, slightly pitted. 16.4-17' Becomes moderately to intensely weathered, intensely fractured, fossiliferous. 17-18.5' Slightly weathered, slightly fractured. 18.5-21.3' DOLOMITE, moderately soft, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), slightly weathered, fossiliferous, vuggy, silty texture when weathered, unfractured-except 1 horizontal break at 19.5', strong reaction to 1N HCl when powdered.	, t	Driller notes: harder at approximately 15 feet. Switched to coring to advance boring, no casing set.
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO	GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720	NOTE	S: NA
		DRILLER: Eddie Palmer HELPER: Chad/Cody I	RIG:	Failing 1500



COORDINATE COMPUTE Fracture Compute Coordinate	I NP. (Offset Bor	ina Proa	ram					PROJECT NO. 07-3935
22.5 — OB-3 79% 3.8 22.5	2.0.	Jiiget Boi	g i iog	· wiii			LOG OF BORING NO. O-3		1 NOCEO 1 NO. 07 0000
22.5 — OB-3 79% 3.8 22.5	rion MSL)	TH T)	NO.	' & (N) REC. ND)	RY (ft.)	LE LE		MBOL	
22.5 — OB-3 79% 3.8 22.5	EVA ⁻	DEP1 (FEE	MPLE	DW/6" R % F & (RC	OVE	PROF	SURFACE EL: 42.5	SS SY	REMARKS
22.5 — OB-3			S Q	BL(REC		DESCRIPTION	nsc	
25.5 — OB-4 (1985) 3.0 26.2:27 Becomes moderately to intensely fractured. 26.2:27 Becomes moderately to intensely fractured. 28.5 — OB-5 (1985) 3.0 26.2:27 Becomes moderately to intensely fractured. 30.9-37.7 DOLOMITE, light gray (N7) to medium light gray (N6), moderately hard, strong reaction to 1N HG, thick bedded, unfractured, fresh, fossiliferous, slightly pitted. DATE STARTED: 9/21/99 OWI: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS DRILLING METHOD: Mud Rotary/PQ3 Coring DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Falling 1500		22.5 — —	OB-3		3.8		bedded, friable, low toughness, no plasticity, low dry strength, slow		
27 — OB-4 (19%) 3.0 28.5 — 30.9-37.7' DOLOMITE, light gray (N7) to medium light gray (N6), moderately hard, strong reaction to Th HCI, thick bedded, unfractured, fresh, fossiliferous, slightly pitted. DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 NOTES: NA PRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		- - -							
30.9-37.7' DOLOMITE, light gray (N7) to medium light gray (N6), moderately hard, strong reaction to 1N HCl, thick bedded, unfractured, fresh, fossiliferous, slightly pitted. DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		- - -	OB-4		3.0		26.2-27' Becomes moderately to intensely fractured.		
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: 30.9-37.7' DOLOMITE, light gray (N7) to medium light gray (N6), moderately hard, strong reaction to 1N HCI, thick bedded, unfractured, fresh, fossiliferous, slightly pitted. 30.9-37.7' DOLOMITE, light gray (N7) to medium light gray (N6), moderately hard, strong reaction to 1N HCI, thick bedded, unfractured, fresh, fossiliferous, slightly pitted. 30.9-37.7' DOLOMITE, light gray (N7) to medium light gray (N6), moderately hard, strong reaction to 1N HCI, thick bedded, unfractured, fresh, fossiliferous, slightly pitted. 31.5 GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 DRILLING METHOD: Mud Rotary/PQ3 Coring DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		- - -							
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: OB-5		- - -		7,40			moderately hard, strong reaction to 1N HCl, thick bedded,		
DATE COMPLETED: 10/1/09 GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 PIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		_	OB-5		3.7				
DATE COMPLETED: 10/1/09 GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 PIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	DATE	STARTED	: 9/2	1/09		GWL: D	DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715	NOTE	<u>I</u> ES: NA
CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500							<u> </u>		- · - ·
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500						DRILLI	NG METHOD: Mud Rotary/PQ3 Coring		
, ,	1			os .	}	DPILLE	R: Eddie Palmer HEI DED: Ched/Cody	BIG.	Failing 1500
	_						TILLFER. Offau/Couy	INIG.	



LND	Offset Bor	laa Daa						DDO 1507 NO 07 0005
LNP-	Jitset Bor	ing Progi	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	H.()	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	I.E	COORDINATES N 1723189.3 E 458086.9	SYMBOL	
EVA-	DEPTH (FEET)	MPLE	7W/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 42.5	S SY	REMARKS
		SA OF	BLC	SEC		DESCRIPTION	SOSN	
4.1	33 — 34.5 — 34.5 — 37.5 — 40.5 — 42 — 42 — 42 — 42 — 42 — 42 — 442	OB-6	78% (46%)	2.0		35.0-37.7' As above except slightly fractured (horizontal-along bedding planes). 37.7-38.4' As above except moderately to intensely fractured. 38.4-43.2' SILT with GRAVEL (DEGRADED DOLOMITE), 50% silt, 50% gravel, nonplastic, no dry strength, gravel is very soft, slow to not dilatancy, low toughness, moderate yellowish brown (10YR 5/4) to dark yellowish orange (10YR 6/6), weak reaction to 1N HCl, poorly indurated.		Driller notes: 38.5-40' soft drilling.
-0.7	43.5					43.2 43.2-44.7' DOLOMITE, moderately hard, pitted/porous, moderately weathered, unfractured, thick bedded, fossiliferous, pale yellowish brown (10YR 6/2).	, <u> </u>	
DATE	STARTED	: 9/2	1/09		GWL: D	•	NOTE	ES: NA
	COMPLET				GWL: D	٥		
	GEOLOG KED BY:	IST: JLO WE			DRILLI	NG METHOD: Mud Rotary/PQ3 Coring		
	KED BY: OVED BY:		<i>,</i> 3	<u> </u>	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
	ING CO.:							Ü



LNP- Offset Boring Program				PROJECT NO. 07-3935
		LOG OF BORING NO. O-3		
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. OR RUN NO. OR % REC. & (RQD)	RECOVERY (II.)	COORDINATES N 1723189.3 E 458086.9	SYMBOL	
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. OR % REC. & (RQD)	COVERY	SURFACE EL: 42.5	SS SY	REMARKS
S S O S O O O	XE T	DESCRIPTION	nscs	
45— 46.5— — OB-8 91% (40%) 48— — 49.5—	.8	44.7-50' Same as above except 45.3-47.6' moderately to severely weathered, moderately to intensely fractured.		Water level on 9/22/09 @ 0715 4.6'.
54 — 54 — DATE STARTED: 9/21/09	.2 GWL: C	9		ES: NA
DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO	GWL: D	_		
CHECKED BY: WDS APPROVED BY: DRILLING CO.: HUSS	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offset Bor	ing Progi	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. O-3		
rion ASL)	ΕÇ	Ö Ö N Ö	& (N) REC. RD)	RECOVERY (ft.)	빌	COORDINATES N 1723189.3 E 458086.9	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N OR % REC. & (RQD)	SOVEI	PROFILE	SURFACE EL: 42.5	SS SY	REMARKS
∃ ()		<i>\</i> \$ 10	BLO	RE		DESCRIPTION	nscs	
	55.5 — -							Driller notes: 55.5' very soft.
	57 — - - - -	OB-10	80% (16%)	4.0		57-61' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2 to moderate yellowish brown (10YR 5/4), fresh, slightly pitted (in bands), moderately fractured-mechanical, intensely fractured-rubble from 57.3-58.2', thick bedded, few very thin organic layers.)	
	58.5 —	******		*****				
	61.5 —	OB-11	68% (38%)	3.4		61-67.5' DOLOMITE, moderate yellowish brown (10YR 5/4), moderately hard, fresh to slightly weathered, strong reaction to 1N HCl when powdered, thick bedded, slightly fractured (horizontal).		
	64.5 —							OB-12: Drilling Pressure: 150-200 psi Kelly Bar RPM: 224 Engine RPM: 1400-1500
DATE	STARTED COMPLET GEOLOG	ED: 10/			GWL: D GWL: D DRILLIN		NOTE	ES: NA
APPRO	KED BY: OVED BY: ING CO.:	WE HUSS	os		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offset Bor	ing Progi	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9	SYMBOL	REMARKS
ELEV (FEE	HE)	SAMP OR RI	LOW, OR % (F	∈co∧	PRC	SURFACE EL: 42.5	nscs (, ,_,,, ,, ,, ,,
			В	Z.	77777	DESCRIPTION) Ö	Drill Time: 8min 23sec
	66 — _ _ _	OB-12	68% (56%)	1.7		67.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) slightly weathered, pitted/porous, sandy texture, unfractured, thick bedded, with banded appearance, strong reaction to 1N HCl when powdered.	,	Circ. Loss: none Driller notes: 65-66.5' soft then hard.
	67.5 — — —							OB-13: Drilling Pressure: 150 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 22min 42sec Circ. Loss: none
	69 	OB-13	100% (32%)	2.5		Becomes moderately to intensely fractured.		Circ. Loss. Hone
	70.5 —					70-72' Soft zone, possible wash out zone (see driller notes).		Run-1: Drilling Pressure: 150-200 psi Kelly Bar RPM: 240 Engine RPM: 1500-1600 Drill Time: 12min 31sec Circ. Loss: none Driller notes: soft 70-72'.
	72 — - - -	R-1	66% (24%)	3.3		72-74.5' DOLOMITE, moderately hard, slightly to moderately weathered, pitted/porous, vuggy, fossiliferous, vertical fracture from 72.5-73.5' open, rough, pale yellowish brown (10YR 6/2), thick beddded, strong reaction to 1N HCl when powdered, slightly fractured.		
	73.5 —					74.5-75' As above except severely weathered to degraded, silty texture to sandy texture, poorly indurated.		
	75 — — — — 76.5 —					75-80' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, slightly to moderately weathered, thick bedded, pitted/porous, fossiliferous, some larger vugs from 77-78' (0.05' wide), moderate to strong reaction to 1N HCl when powdered, fracture at 75.7-76'(stepped), and 76.6'(horiztonal), slightly fractured.		R-2: Drilling Pressure: 150 psi Kelly Bar RPM: 196 Engine RPM: 1200-1300 Drill Time: 22min 33sec Circ. Loss: none Note: no water level taken on 9/23/
	_			<u> </u>		T	<u> </u>	09-still driving casing.
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	TED: 10/)		GWL: D GWL: D DRILLIN	3	NOTE	ES: NA
APPRO	OVED BY: NG CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



	LNP- Offset Boring Program PROJECT NO. 07-3935										
LNP-	Offset Bori	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935			
ELEVATION (FEET MSL)	££	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1723189.3 E 458086.9	SYMBOL				
EVA'	DEPTH (FEET)	MPLE	7W/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 42.5	SS	REMARKS			
IJ) TI		SA	BLC	SEC		DESCRIPTION	nscs				
DATE FIELD	78 — 78 — 79.5 — 81 — 82.5 — 85.5 — 85.5 — 85.5 — 87 — STARTED COMPLET GEOLOGI KED BY:	ED: 10	98% (82%) 76% (0%) 11/09 11/09 11/09	4.9	GWL: C	79.3-79.4' Few very thin black organic layers, becomes slightly to moderately weathered, sandy texture. 80-80.8' Rubble zone (dolomite as above). 80.8-81.2' As above except moderately to intensely fractured. 81.2-81.6' Intensely fractured to crushed. 81.6-85' DOLOMITE, moderately hard, pale yellowish brown (10YR 62), pitted/porous, moderately to intensely fractured, vertical fracture 31.6-85' open, rough, thick bedded, few vugs, fossiliferous, slightly weathered, end of run intensely fractured (mechanical). 85-86' DOLOMITE, fossiliferous, pitted/porous, vuggy, pale yellowish brown (10YR 6/2), thick bedded, moderately to severely weathered (85.3-85.5' crushed/rubble zone), moderately hard. 86-90' DOLOMITE, slightly weathered, few fossils, pitted/porous in thin bands, moderately hard, unfractured except at 86.3' (horizontal), silty/sandy texture at fractures. 87.5' Becomes more pitted/porous and vuggy, few very thin organic EPTH: 4.6' DATE/TIME: 9/22/09 @ 0715		R-3: Drilling Pressure: 150 psi Kelly Bar RPM: 226 Engine RPM: 1400-1500 Drill Time: 18min 45sec Circ. Loss: none R-4: Drilling Pressure: 150, 150 psi Kelly Bar RPM: 184, 218 Engine RPM: 1100-1200, 1300-1400 Drill Time: 9min 24sec (85-87') 11min 19sec (87-88.5') 2min 9sec (88.5-90') Circ. Loss: none Driller notes: soft 85-86', Becomes soft at 88.5, soft from 88.5-89' (core loss zone).			
	APPROVED BY:					R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			
DRILL	ING CO.:	HUSS				l					



LNP- O	NP- Offset Boring Program PROJECT NO. 07-3935										
						LOG OF BORING NO. O-3					
rion ASL)	ΕÇ	. NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)		COORDINATES N 1723189.3 E 458086.9	SYMBOL				
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	OW/6" R % F & (RG	COVE	PROFILE	SURFACE EL: 42.5		REMARKS			
		δō	BL	RE		DESCRIPTION	nscs				
	88.5 —					lenses. 88.5-89.8' Rubble-core loss area.					
	90 —					90-91.8' Rubble, moderately weathered DOLOMITE, as above.		R-5: Drilling Pressure: 150, 150-200, 150 psi Kelly Bar RPM: 205, 221, 214 Engine RPM: 1200-1300, 1400- 1500			
	91.5 — — — — — — — — — — — — — — — — — — —	R-5	100% (24%)	5.0		91.8-92.3' Crystalline DOLOMITE, light gray (N7) to medium light gray (N6) outer core, pale yellowish brown (10YR 6/2) on fresh, hard, no fossils, intensely fractured (possibly mechanical), strong reaction to 1N HCl when dry. 92.3-92.4' Severly weathered. degraded DOLOMITE, very soft, friable. 92.4-92.7' Crystalline DOLOMITE as above. 92.7-95' DOLOMITE, as at 86-90' except with very pale orange (10Yl 8/2) dolomite clasts, moderately fractured (45° breaks).		Drill Time: 12min 3sec (90-91') 8min 22sec (91-92') 5min 23sec (92-93') 13min 3sec (93-95') Circ. Loss: none Used new core catcher starting on Run-5.			
	94.5 —					95-95.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 62) with few zones of very pale orange (10YR 8/2), slightly to moderately weathered, pitted/porous, some fossils, weak to moderate reaction to 1N HCl when powdered, thick bedded, slightly fractured. 95.5-96' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2),	Э	R-6: Drilling Pressure: 200-250 psi Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 27min 15sec (95-97.5')			
	96 — - - - 97.5 — - -	R-6	100% (0%)	5.0		hard, pitted in bands, strong reaction to 1N HCl when dry, few fossils thin bedded, intensely fractured, fresh to slightly weathered. 96-102' DOLOMITE, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), moderately hard, moderate to strong reaction to 1N HCl when powdered, pitted/porous, fossiliferous, sand texture, moderately to intensely fractured (few rubble zones), few vugs, thick bedded.		12min 46sec (97.5-99') 5min 22sec (99-100') Circ. Loss: none Water level 9/28/09 @ 0740 5.7'			
DATE C	HETARTED COMPLET GEOLOGI	ED: 10/			GWL: D GWL: D DRILLIN		<u>I</u> Note	I ES: NA			
APPRO	ED BY: VED BY: NG CO.:	WI HUSS	os ———	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			



CORDINATES STATED SIZ109 SIZ 0	LNP- Offset Boring Program	m		LOG OF BORING NO. O-3		PROJECT NO. 07-3935
102.— 102.— 103.5.— 105.— 105.— 105.— 105.— 105.— 106.5.— 106.5.— 107. R-8 109% 109.5.— 109.6.— 109.5.— 109.6.— 1	MOST NOST TH TH (T: NO. ON Z	α (N) αEC. ΔD) RY (ft.)	ILE	COORDINATES	MBOL	
100.5— 107. R-7 (14%) 3.8 (105-105 DOLOMITE same as above except moderately fractured, moderately weathered, sandy texture. 105.— 105.— 105.— 106.5— 107. R-8 (105) 5.0 (105-106.6° DOLOMITE as above except soft, breaks easily. 106.5— 107. 108.— 109.5—	EET I EET I DEP' (FEE	R % F 8 (RG	PROF	SURFACE EL: 42.5	SS SY	REMARKS
102 — R-7 76% 3.8	S A S) NEC		DESCRIPTION)SN	
Drilling Pressure: 150, 150,psi Kelly Bar RPM: 211,199 Engine RPM: 1300-1400, 1200- Datt Tarket.D. 9/21/09 DATE STARTED: 9/21/09 DATE STARTED: 9/21/09 DATE STARTED: 9/21/09 DATE STARTED: 9/21/09 DATE STARTED: 9/21/09 DATE STARTED: 9/21/09 DATE STARTED: 9/21/09 DATE STARTED: 9/21/09 SPILL DEPTH: 4.6° DATE/TIME: 9/22/09 @ 0715 DATE COMPLETED: 107/109 FIELD GEOLOGIST: JLO CHECKED BY: WDS DRILLER: Eddle Palmer HELPER: Chad/Cody RIG: Falling 1500 Drilling Pressure: 150, psi Kelly Bar RPM: 201 Engine RPM: 1300-1400, 1200-100 Datt Tarket.PM: 201 Engine RPM: 1300-1400 Datt Tarket.PM: 202 Engine RPM: 1300-1400 Datt Engine RPM: 203 Engine	99 — — — — — — — — — — — — — — — — — —					R-7:
103.5 - 105.106.6* DOLOMITE as above except soft, breaks easily. R-8: Drilling Pressure: 150 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 12min 36sec (105-106 ft) and party produced, few footsis, thick bedded, moderately valued vertical fracture 106.1-108.4*, open-rough, slightly to moderately weathered. 108.4*, open-rough, slightly to moderately weathered. Sandy texture. R-8: Drilling Pressure: 150 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 12min 36sec (106-106 12min 26sec) (106-106 12min 26sec) (106-106) 106.6-110* DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, pitted/porous, strong reaction to 1N HCl when powdered, few footsis, thick bedded, moderately fractured vertical fracture 106.1-108.4*, open-rough, slightly to moderately weathered. 108.4*, open-rough, slightly to moderately weathered. 108.4*, open-rough, slightly to moderately appear to 106.1-108.4*, open-rough, slightly to moderately meathered. 108.4*, open-rough, slightly to moderately meathered. 108.4*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-rough, slightly to moderately meathered. 108.1*, open-r	100.5 —					Drilling Pressure: 150, 150psi Kelly Bar RPM: 211, 199 Engine RPM: 1300-1400, 1200- 1300 Drill Time: 11min 37sec (100-102') 10min 33sec (102-105')
105-106.6' DOLOMITE as above except soft, breaks easily. 105-106.6' DOLOMITE as above except soft, breaks easily. 106.5 — 106.5 — 108.6-110' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, pitted/porous, strong reaction to 1 N Holt when powdered, few fossist, thick bedded, moderately fractured-vertical fracture 106.1-108.4', open-rough, slightly to moderately weathered. DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: WDS APPROVED BY: DATE Eddle Palmer HELPER: Chad/Cody RIG: Failing 1500	- - R-7	I 3.8				
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: Circ. Loss: 10% 106.6-110' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, pitted/porous, strong reaction to 1N HCI when powdered, few fossils, thick bedded, moderately fracture-0-vertical fracture 106.1- 108.4', open-rough, slightly to moderately weathered. Circ. Loss: 10% Circ. Loss				105-106.6' DOLOMITE as above except soft, breaks easily.		Drilling Pressure: 150 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 12min 36sec (105-106')
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: APPROVED BY: DATE STARTED: 9/21/09 GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 DATE/TIME: 10/1/09 @ 0720 DRILLING METHOD: Mud Rotary/PQ3 Coring DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	_ _ _ _ R-8	l 5.0		hard, pitted/porous, strong reaction to 1N HCl when powdered, few fossils, thick bedded, moderately fractured-vertical fracture 106.1-		Circ. Loss: 10%
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: APPROVED BY: DATE STARTED: 9/21/09 GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 DATE/TIME: 10/1/09 @ 0720 DRILLING METHOD: Mud Rotary/PQ3 Coring DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	109.5					
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	DATE STARTED: 9/21/0 DATE COMPLETED: 10/1/0 FIELD GEOLOGIST: JLO	/09	GWL: D	EPTH: 6.3' DATE/TIME: 10/1/09 @ 0720	<u>I</u> Note	I ES: NA
I DINEERTO CO., 11000			DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offset Boring Program PROJECT NO. 07-3935										
					LOG OF BORING NO. O-3		,			
MSL)	ON ON ON ON ON ON ON ON ON ON ON ON ON O	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1723189.3 E 458086.9	SYMBOL				
ELEVATION (FEET MSL) DEPTH (FEET)	SAMPLE NO. OR RUN NO.	DW/6" R % F & (RG	SOVE	PROFILE	SURFACE EL: 42.5	SS SY	REMARKS			
	8 9	BL(REC		DESCRIPTION	nscs				
111 -] - - -				110-111.8' DOLOMITE, as above except slightly weathered, unbroked (except 111.4-111.8' rubble/crushed zone).		R-9: Drilling Pressure: 150 psi Kelly Bar RPM: 203 Engine RPM: 1200-1300 Drill Time: 16min 22sec Circ. Loss: 10%			
112.5 -	 R-9	86% (56%)	4.3		111.8-112.2' Crystalline DOLOMITE light gray (N7), hard, pitted in very thin bands, few vugs. 112.2-115' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, pitted/porous, vuggy, some fossils, moderately weathered, sandy texture, becomes more weathered at approximately 114', wea reaction to 1N HCl when powdered, moderately fractured (bedding planes).					
114 - 115.5 -					115-118.1' DOLOMITE, soft to very soft, moderate yellowish brown (10YR 5/4) to dark yellowish orange (10YR 6/6), severly weathered to degraded, friable, moderately to poorly indurated, sandy texture, vuggy, porous/pitted, fossiliferous, moderately to intensely fractured (mostly along bedding planes).	o	R-10: Drilling Pressure: 100-150 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 4min 42sec (115-117.5')			
117 -	- - - - - - - - - - - - - - - - - - -	70% (10%)	3.5				12min 52sec (117.5-120') Circ. Loss: 10% SHELBY TUBE ST-1: Down Pressure 900 psi Pushed 3.5" Bottom crushed. Driller notes: soft-fast drilling 115- 117.5' Fast drilling-very soft 119.2-120'			
-75.6 118.5 -					118.1-118.8' LIMESTONE, moderately hard to hard, strong reaction to 1N HCl, fresh, few vugs filled with sandy textured DOLOMITE, few pits, no fossils, medium light gray (N6), thick bedded.	,				
	_ _ _				118.8-120' DOLOMITE, severly weathered to degraded, very soft to soft, poorly indurated, sandy texture, moderate yellowish brown (10YR 5/4), no plasticity, low to no dry strength, slow dilatancy, low toughness, 60% dolomite, 40% degraded dolomite.					
120 -	<u> </u>				120-125' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, pitted/porous, vuggy, slightly weathered, thick bedded, moderately fractured (vertical fracture 120.7-122.3'), strong reaction to 1N HCl when powdered, some fossils.		R-11: Drilling Pressure: 150 psi Kelly Bar RPM: 227 Engine RPM: 1400-1500			
DATE STARTI DATE COMPL FIELD GEOLO CHECKED BY	ETED: 10 OGIST: JL	0		GWL: D GWL: D DRILLIN	EPTH: 4.6' DATE/TIME: 9/22/09 @ 0715	NOTI	ES: NA			
APPROVED B	Y:			DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			



LNP- (Offset Bor	ing Prog	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. 0-3		
ION ASL)	ŦΈ	NO.	& (N) (EC. (D)	RECOVERY (ft.)		COORDINATES N 1723189.3 E 458086.9	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	SOVEF	PROFILE	SURFACE EL: 42.5	USCS SY	REMARKS
		\$ 0	BLO	RE(DESCRIPTION	NS(
	_ _ 121.5 — _ _					123.4-123.6' Becomes intensely fractured/crushed.		Drill Time: 9min 4sec (120-122') 6min 41sec (122-125') Circ. Loss: 10%
	123 	R-11	100% (42%)	5.0				
	124.5 — — —			÷		125-128' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, thick bedded, slightly weathered, pitted/porous, fossiliferous,		R-12: Drilling Pressure: 150-200 psi
	- 126 					vuggy, weak to moderate reaction to 1N HCl when powdered, slightly fractured (bedding planes). 126-126.3' Larger vugs (0.05' thick) oblong shaped.		Kelly Bar RPM: 207, 217 Engine RPM: 1200-1300, 1300- 1400 Drill Time: 8min 46sec (125-128') 7min 55sec (128-129') Locked in hole, using EZ-mud, AIRLIFT 2min 54sec (129-130') Circ. Loss: 100% Driller Notes: 126-126.3' soft- possible core loss zone
	127.5 — - - -	R-12	86% (32%)	4.3				127.5-127.8' soft- possible core loss zone 128-128.5' possible core loss zone Water level 9/29/09 @ 0745 5.35'
	- 129 - - -					128.5-129.0' DOLOMITE, crystalline, medium light gray (N6), hard with pockets of weathered fossiliferous dolomite (grayish orange (10YR 7/4)), no fossils, medium bedded, fresh to slightly weathered, slightly fractured (1 horizontal break at 128.9'). 129-130.35' DOLOMITE as at 126.3'.		D 42.
	- 130.5 - - -					130.35-130.45' Crystalline DOLOMITE. 130.45-130.6' DOLOMITE, grayish orange (10YR 7/4) and dark yellowish brown (10YR 4/2), moderately soft to soft, friable, fossiliferous, moderately weathered, thin to medium bedded, moderately fractured, weak reaction to 1N HCl when powdered. 130.6-131.4' Crystalline DOLOMITE, light gray (N7) exterior, pale yellowish brown (10YR 4/2) on fresh, moderately hard, strong		R-13: Drilling Pressure: 150 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time:11min 18sec (130-132') 5min 55sec (132-135') Circ. Loss: 100%
DATE	STARTED	: 9/2	21/09		GWL: D	EPTH: 4.6' DATE/TIME: 9/22/09 @ 0715	NOTE	ES: NA
DATE	COMPLET	ED: 10	/1/09		GWL: D	EPTH: 6.3' DATE/TIME: 10/1/09 @ 0720		
1	GEOLOG				DRILLIN	NG METHOD: Mud Rotary/PQ3 Coring		
APPR	KED BY: OVED BY:		JS		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DKILL	ING CO.:	ทบออ						



I NP.	Offset Bor	ina Proa	ram					PROJECT NO. 07-3935
LINE	onset boi	ilig Flog	Iaiii			LOG OF BORING NO. O-3		FROJECT NO. 07-3933
ELEVATION (FEET MSL)	TH ET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	:ILE	COORDINATES N 1723189.3 E 458086.9	SYMBOL	
EET	DEPTH (FEET)	MPL RUI	OW/6 R % & (R(COVE	PROFILE	SURFACE EL: 42.5		REMARKS
		S O	BL(BEC		DESCRIPTION	nscs	
	132 —	R-13	94% (8%)	4.7		reaction to 1N HCl when powdered, thick bedded, pitted in very thin bands, no fossils, moderately fractured (vertical fracture 130.6-132.0'), fresh to slightly weathered. 131.4-132' DOLOMITE, crystalline, as above except moderately to intensely weathered, friable, poorly indurated, sandy texture. 132-135' DOLOMITE, moderately soft, pale yellowish brown (10YR 6-2), pitted/porous, few yugs, some fossils, thick bedded, moderately to		
	- 133.5 — - - -					intensely fractured, weak to moderate reaction to 1N HCI, sandy texture, vertical fracture from 132-133.9' open, rough, rubble zone 133.1-133.4'.		
	135 — - - -					135-136.3' DOLOMITE, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), moderately weathered, moderately to intensely fractured, pitted/porous, vuggy, medium bedded, strong reaction to 1N HCl when powdered.		R-14: Drilling Pressure: 150-200, 200 psi Kelly Bar RPM: 213, 204 Engine RPM: 1300-1400, 1200- 1300 Drill Time: 8min 43sec (135-136.6')
	- 136.5 	D 44	92%	4.0		136.3-137.5' Crystalline DOLOMITE, moderately hard to hard, yellowish gray (5Y 7/2) and light gray (N7), vuggy, pitted in bands, moderately fractured, strong reaction to 1N HCl when powdered, fossiliferous in bands, some vugs filled with porous dolomite		10min 29sec (136.6-136.8') 29min 38sec (136.8-140') Circ. Loss: 100%
	138 — - - -	R-14	(20%)	4.6		(yellowish gray (5Y 7/2)), thick bedded, slightly to moderately weathered. 137.5-140.0' DOLOMITE as at 135-136.3' except light gray (N7) to light olive gray (5Y 6/1).		
	_ 139.5 — _					139.3-140' Intensely fractured.		
	141 — - -					140-144' Crystalline DOLOMITE, with few thin interbeds of pitted dolomite, pale yellowish brown (10YR 6/2), moderately hard, no fossils, fresh, moderately to itensely fractured, medium to thick bedded, strong reaction to 1N HCl when powdered, pitted dolomite is moderately hard, pale yellowish brown (10YR 6/2), pitted/porous, fossiliferous, thin to medium bedded-banded appearance, slightly to moderately weathered, unfractured, moderate to strong reaction to 1N HCl when powdered.		R-15: Drilling Pressure: 150-200 psi Kelly Bar RPM: 219 Engine RPM: 1400 Drill Time: 55min 21sec (140-144') 1min 10sec (144-145') Circ. Loss: 100% Driller notes: soft at 144'(poor recovery last 1 foot)
	_ _ 142.5 	R-15	70%	3.5				
	STARTED COMPLET		21/09		GWL: D	<u> </u>	NOTE	ES: NA
1	GEOLOG					NG METHOD: Mud Rotary/PQ3 Coring		
	KED BY: OVED BY:	WI	os .			R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP-	Offset Boi	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ON SL)	T ~	. O O	S C S	Y (ft.)	щ	COORDINATES N 1723189.3 E 458086.9	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	SURFACE EL: 42.5		REMARKS
ELE (PE		SAN	BLO OR &	REC		DESCRIPTION	nscs	
	144— 145.5— 147— 150— 151.5— 153— 153—	ST-2	100% (NA%) 100% (29%)	1.2		144-145' DOLOMITE, dark yellowish orange (10YR 6/6), soft, fossiliferous (packstone-like), sandy texture. DOLOMITE, as above (144-145') except poorly cemented/indurated, harder piece at bottom of Shelby tube. 146.2-150' DOLOMITE as at 144-145' except moderately to fractured (bedding planes). 147.2-148.0' Crushed zone. 148.4-150.0' Unfractured (1 horizontal break at 149.7'). 150-150.7' DOLOMITE, moderately hard, strong reaction to 1N HCl, medium light gray (N6) to light olive gray (5Y 6/1), slightly to moderately weathered, porous/pitted, vuggy, sandy texture in vugs filled with weathered dolomite, slightly fractured. 150.6-151.2' Vertical fracture. 150.7-155' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2) to dark yellowish orange (10YR 6/6), moderately weathered, pitted/porous, sandy texture, few vugs, slightly to moderately fractured, thick bedded, weak reaction to 1N HCl. 152.1-152.5' Becomes moderately soft. 153.8-154.2' Vertical fracture.		Shelby Tube ST-2: 145-146.2' Down Pressure: 900 psi Pushed: 14 inches Recovery: 1.2' R-16: Drilling Pressure: 150 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 3min 15sec (146.2- 147.8') 19min 32sec (147.8-150') Circ. Loss: 100% R-17: Drilling Pressure: 150-200, 300-35i psi Kelly Bar RPM: 215, 210 Engine RPM: 1300-1400, 1300 Drill Time: 10min 3sec (150-152.1') 9min 34sec (152.1-155') AIRLIFT Circ. Loss: 100% NOTE: Run-17A and R-17B equal R-17. Water level 9/30/09 @ 0725 5.3'.
DATE	STARTED COMPLE	TED: 10/			GWL: D	DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720	NOTE	ES: NA
	GEOLOG KED BY:	IST: JLO WE			DRILLIN	NG METHOD: Mud Rotary/PQ3 Coring		
APPR	OVED BY:		-		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP-	Offset Bor	ing Prog	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. O-3		
rion MSL)	Ξ÷	Ö Ö N Ö	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1723189.3 E 458086.9	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	OW/6" R % F & (RC	COVE	PROFILE	SURFACE EL: 42.5	USCS SY	REMARKS
Ш Ш		Ø O	BL	RE		DESCRIPTION	ΝS	
	154.5 — - 156 — - 157.5 — - 159 —	R-17B	(62%) 88% (20%)	2.6		155-155.7' DOLOMITE, moderately weathered, thin bedded, sandy texture, fossiliferous, pale yellowish brown (10YR 6/2), moderate yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/2), pitted/porous, moderately soft, strong reaction to 1N HCl when powdered, unfractured except horiztonal at 155.2'. 155.7-156.1' DOLOMITE, crystalline, hard, yellowish gray (5Y 7/2) to very light gray (N8), fresh, with very thin black organic layers, abrupt top and basal contact, strong reaction to 1N HCl when powdered, thit to moderate bedding, unfractured except vertical fracture from 155.9-157'. 156.1-160.0' DOLOMITE as at 155-155.7'.	ו	R-18: Drilling Pressure: 200-300 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 26min 8sec (155-158') 7min 24sec (158-160') Circ. Loss: 100%
-118.0 -119.0	_ _ _					160-160.5' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2) and dark yellowish brown (10YR 4/2), laminated (thin layers), moderately weathered, sandy texture, pitted/ porous, unfractured, weak to moderate reaction to 1N HCl when powdered. 160.5-161.5' ROD DROP.	<u> </u> - 	R-19: Drilling Pressure: 150-200, 200 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 3min 48sec (160-160.5') 9min 58sec (161.5-163.5') 3min 10sec (163.5-165') Circ. Loss: 100% Driller Notes:
-120.0	162 	R-19	50%	2.5		161.5-162.8' DOLOMITE, as above except with few very thin layers/pockets of crystalline dolomite. 162.5		ROD DROP 160.5-161.5' ROD DROP 162.5-163' AIRLIFT
-25.5			(38%)			162.5-163.0' ROD DROP.		
-120.5	163.5 — - - - -					163.0 163.3-163.7' DOLOMITE as at 161.5-162.8'. 163.7-165' Washed out zone (piece of core wedged in core barrel shoe.)	' <u>'</u>	
DATE	STARTED	9/2	1/09		GWL: D	EPTH: 4.6' DATE/TIME: 9/22/09 @ 0715	NOT	ES: NA
1	COMPLET				GWL: D	C		
	GEOLOGI				DRILLIN	NG METHOD: Mud Rotary/PQ3 Coring		
	KED BY: OVED BY:	WE	Jo	}	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						-



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5	USCS SYMBOL	REMARKS
			В	Ω.		DESCRIPTION	Ö	
	165 — — —					165-165.7' Rubble, cave-in from above. 165.7-166.7' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), moderately weathered, pitted/porous, sandy texture, vuggy, medium bedded, moderately fractured.		R-20: Drilling Pressure: 150-200 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 5min 15sec (165-166') 5min 11sec (166-166.7')
	 166.5 —					vaggy, medium bedded, moderatery mactured.		8min 29sec (168-170') Circ. Loss: 100%
-124.2	- -				\$\$\$\$\$	166.7-168' ROD DROP.	-	Driller Notes: 166.7-168' rod drop (166.7-167' no recovery) Changed inner barrel shoe and core catcher.
	_	R-20	48% (22%)	2.4				
-125.5	168 					168-170' DOLOMITE, moderately hard, fresh to slightly weathered, moderate yellowish brown (10YR 5/4), porous, few pits and vugs, no fossils, unfractured-healed vertical fracture 168.2-168.7', moderate to strong reaction to 1N HCl when powdered.		
	- 169.5 -							
	- - 171 — - -					170-173.4' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2), strong reaction to 1N HCl when powdered, very thin bedded/laminated, slightly to moderately weathered, sandy texture in fractured areas, pitted/porous in very thin bands, no fossils, crystalline, intensely fractured (bedding planes, vertical fracture from 172.3-173.5').		R-21: Drilling Pressure: 150-200 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 17min 5sec (170-172') 18min 28sec (172-175') Circ. Loss: 100%
	_ 172.5 _ _	R-21	94% (48%)	4.7				
	- 174 -					173.4-175' DOLOMITE, moderately soft to moderately hard, slightly to moderately weathered, sandy texture, no fossils, no pits or vugs, strong reaction to 1N HCl when powdered, thick bedded, dense, unfractured.		
	_ _ 175.5 <u></u>					175-175.7' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2), moderately weathered, sandy texture, pitted/porous, medium bedded, fractured at top of run (possibly mechanical), no fossils, no	2	R-22: Drilling Pressure: 200 psi Kelly Bar RPM: 214
DATE	STARTED	: 9/2	1/09		GWL: D		Note	ES: NA
	COMPLET				GWL: D	9		
	GEOLOG KED BY:	IST: JL0 WE			DRILLIN	NG METHOD: Mud Rotary/PQ3 Coring		
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS				·		



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5 DESCRIPTION	USCS SYMBOL	REMARKS
	177 — - 177 — - - 178.5 — - -	R-22	100% (24%)	5.0		vugs, unfractured, weak to moderate reaction to 1N HCl when powdered. 175.7-176.8' DOLOMITE, light gray (N7) exterior, pale yellowish brown (10YR 6/2) when broken, medium bedded, slightly to moderately weathered, moderately to intensely fractured, vuggy (mostly weathered out fossils), slightly pitted, some fossils, strong reaction to 1N HCl when dry (powdered), vertical fracture 175.7-176.8'-open, rough, stepped. 176.8-180' DOLOMITE, pale yellowish brown (10YR 6/2) and dark yellowish orange (10YR 6/6), moderately hard to hard, strong reaction to 1N HCl when powdered, thin bedded (177.7-178.1' thinly laminated), slightly to moderately weathered, sandy texture in weathered areas, slightly to moderately fractured, pitted/porous.	n	Engine RPM: 1300-1400 Drill Time: 31min 31sec Circ. Loss: 100%
	180 — — — — — — 181.5 —					180-180.5' DOLOMITE, crystalline, pale yellowish brown (10YR 6/2), moderately hard to hard, thin to medium bedded, moderately fractured, pitted in very thin bands, fresh to slightly weathered, strong reaction to 1N HCl when powdered. 180.5-182.6' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) to very pale orange (10YR 8/2), moderately weathered, pitted/porous, vuggy, slightly fractured (bedding planes), strong reaction to 1N HCl when powdered, thick bedded, few fossils.		R-23: Drilling Pressure: 200 psi Kelly Bar RPM: 220 Engine RPM: 1400 Drill Time: 11min 5sec (180-184') Rods locked in hole 2min 59sec (184-185') Circ. Loss: 100% Driller notes: soft at approximately 184'.
	- 183 — - - - - 184.5 —	R-23	80% (22%)	4.0		182.6-185' Very thin bedded crystalline and moderately weathered sandy textured DOLOMITE (layers are approximately 0.01-0.05' thick), moderately to intensely fractured along bedding planes.		
DATE	186 — STARTED): 9/2	21/09	1	GWL: D	185-187' DOLOMITE, moderately hard, light gray (N7) to light olive gray (5Y 6/1), medium to thin bedded, fresh to slightly weathered, slightly to moderately fractured (all breaks horizontal), slightly pitted ivery thin bands, sandy texture, moderate to strong reaction to 1N HCI. 186.2-186.3' thinly laminated.		R-24: Drilling Pressure: 350-400 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 31min 51sec Circ. Loss: 100% NOTE: core rods stuck briefly whele trying to retrieve core run. ES: NA
FIELD CHEC APPR	COMPLET GEOLOG KED BY: OVED BY: ING CO.:	IST: JL		-		PEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 NG METHOD: Mud Rotary/PQ3 Coring R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5	CS SYMBOL	REMARKS
		% Ō	BLO	RE(DESCRIPTION	nscs	
	187.5 — — — — — — — —	R-24	90% (40%)	4.5		187-187.4' Moderately to severly weathered DOLOMITE, soft to very soft, moderate yellowish brown (10YR 5/4), sandy texture, friable, poorly indurated, pitted/porous, thin bedded, weak reaction to 1N HCI when powdered. 187.4-187.9' DOLOMITE as at 185-187' except moderately to intensely fractured. 187.9-190.7' Crystalline DOLOMITE, medium light gray (N6) to medium gray (N5), hard, fresh to slightly weathered, pitted in very thin bands, few vugs, no fossils, slightly fractured (horizontal), banded appearance-laminated.		Water level on 10/1/09 @ 0720 6.3'. AIRLIFT at end of R-24.
	- - 190.5 — - - - 192 —					190.7-192.8' DOLOMITE, moderately hard to hard, moderately weathered, pitted/porous, fossiliferous in bands (thin to very thin), moderately to intensely fractured-vertical fracture 191-195', dark gray (N3) coating on fracture surfaces, light olive gray (5Y 6/1), thin bedded, interbedded with thin crystalline dolomite laminations.		R-25: Drilling Pressure: 200-250 psi Kelly Bar RPM: 190 Engine RPM: 1200-1300 Drill Time: 46min 34sec Circ. Loss: 100%
	- - - 193.5 — -	R-25	100%	5.0		192.8-194.3' Crystalline DOLOMITE as at 190' except moderately to intensely fractured.		
	- 195 — - - - 196.5 —					194.3-195.3' DOLOMITE, moderately soft, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), pitted/porous, sandy texture, few vugs, medium bedded, moderately weathered, slightly fractured, weak to moderate reaction to 1N HCl when powdered. 195.3-198.1' DOLOMITE, moderately hard, strong reaction to 1N HCl when powdered, very thinly laminated, very pale orange (10YR 8/2), pale yellowish brown (10YR 6/2), and moderate yellowish brown (10YR 5/4), moderately to intensely fractured from 195.3-196.5', fossiliferous, vuggy, 196.5-197.4' unfractured, 197.4-198.1' moderately fractured, slightly to moderately weathered.		R-26: Drilling Pressure: 200-250, 200 psi Kelly Bar RPM: 195 Engine RPM: 1200 Drill Time: 54min 38sec Circ. Loss: 100%
			100%					
DATE FIELD	STARTED COMPLET GEOLOGI KED BY:	ED: 10	21/09 /1/09 O		GWL: D GWL: D DRILLIN	9	I Note	I ES: NA
APPR	OVED BY:		-		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- (Offset Bor	ing Prog	ram					PROJECT NO. 07-3935
		-59				LOG OF BORING NO. O-3		
ELEVATION (FEET MSL)	тн :т)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1723189.3 E 458086.9	SYMBOL	
EVA.	DEPTH (FEET)	MPLI R RUN	DW/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 42.5	SS S)	REMARKS
<u> </u>						DESCRIPTION	nscs	
	198 — — — —	R-26	(28%)	5.0		198.1-200' DOLOMITE, yellowish gray (5Y 7/2), pitted, vuggy, fossiliferous, thick bedded, moderately weathered, intensely fractured (vertical fracture from 198.1-200', open, rough, dolomite more pitted/porous on fracture faces), strong reaction to 1N HCl when powdered.		
	199.5 — — —					200-201.6' DOLOMITE, moderately hard, yellowish gray (5Y 7/2) and pale yellowish brown (10YR 6/2), conglomerate-like appearance,		R-27: Drilling Pressure: 200-300 psi
	201 —					moderately weathered, vuggy, some fossils, weak reaction to 1N HCl when powdered, sandy texture in weathered zones.		Kelly Bar RPM: 195 Engine RPM: 1200 Drill Time: 48min 33sec Circ. Loss: 100%
	202.5 — —	R-27	100% (42%)	5.0		201.6-202' Crystalline DOLOMITE, hard, strong reaction to 1N HCl when dry/powdered, moderately fractured, medium bedded, pale yellowish brown (10YR 6/2). 202-204.0' DOLOMITE, moderately hard, grayish orange (10YR 7/4) and pale yellowish brown (10YR 6/2), moderately weathered, porous/pitted, fossiliferous, thick bedded, slightly fractured, sandy texture.		
160 F	204 —					204.0-205.0' DOLOMITE as at 195.3-198.1'.		
-162.5	_					BOTTOM OF BORING 205'		
	205.5 —							
	207 — — — — —							
DATE	STARTED): 9/2	1/09		GWL: D	PEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715	NOTE	ES: NA
	COMPLET GEOLOG				GWL: D	_		
	KED BY: OVED BY:	WE	os		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



I NP.	Offset Bor	ina Prog	ram					PROJECT NO. 07-3935
LINE		g F10g				LOG OF BORING NO. O-4		
ELEVATION (FEET MSL)	££	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
EVA ⁻	DEPTH (FEET)	MPLE	7W/6" R % F & (RC	OVE	PROFILE	SURFACE EL: 42.3	\S SX	REMARKS
급은		SA	BLC	REC		DESCRIPTION	nscs	
41.9	0 _		7-12			0.0-0.4' SILTY SAND (sm), 60% sand, 40% silt, sand-fine grained, no plasticity, no dry strength, slow dilatancy, low toughness, black (N9), wet, no reaction to 1N HCl, medium dense.		
	- - 1.5 	S-1	10 (22)	1.0		0.4-1.5' POORLY GRADED SAND (sp), angular to rounded grains, fine grained, no plasticity, no dry strength, rapid dilatancy, low toughness, light gray (N7) to medium light gray (N6), no reaction to 1N HCl, moist, medium dense.		
	- - -	S-2	6-10 11 (21)	1.0		1.5-3.0' POORLY GRADED SAND (sp), angular to subrounded grains, fine to medium grained, no plasticity, no dry strength, rapid dilatancy, low toughness, dark yellowish orange (10YR 6/6), moist, n reaction to 1N HCl, medium dense.	sp	
	3—		6-10			3.0-5.0' As above except dark yellowish orange (10YR 6/6) to grayish orange (10YR 7/4), medium dense.	n sp	
	-	S-3	11 (21)	1.0				
	4.5 —						sp	
37.3	- - -	S-4	4-4 2 (6)	0.7		5.0-6.0' POORLY GRADED SAND with SILT (sp-sm), 90% sand, 10% silt, sand-fine grained, subrounded to rounded, no plasticity, no dry strength, rapid dilatancy, low toughness, dusky brown (5YR 2/2), moist, no reaction to 1N HCI, loose.	sp- sm	
36.3	6 —		4-4		1-	6.0-7.5' Same as 3.0-5.0' except loose.	sp	
	-	S-5	3 (7)	1.0				
	7.5 —		٠	٠		7.5-7.8' Same as above.	sp	
34.2	_	S-6	3-3 4 (7)	1.1		7.8-8.1' POORLY GRADED SAND (sp), medium grained, angular to subrounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, pinkish gray (5YR 8/1) to very light gray (N8), moist, no reaction to 1N HCl, loose.		
33.3	9 —					8.1-9.0' FAT CLAY with SAND (ch), 60% clay, 40% sand, sand- fine grained, subrounded to rounded, medium to high plasticity, medium dry strength, no dilatancy, medium toughness, light bluish gray (5B 7 1) to light greenish gray (5G 8/1), moist, weak reaction to 1N HCl, medium stiff.	ch	
	_ _ _	S-7	3-3 5 (8)	0.9		9.0-10.5' Same as 7.8-8.1'.	sp	
31.8	10.5 — –					10.5-11' Same as 8.1-9.0'.	ch	
	STARTED		/6/09		GWL: D	S	NOTE	ES: Used NWJ for SPT sampling.
1	COMPLE ^T GEOLOG				GWL: D	S		
	GEOLOG KED BY:	IST: JE			PKILLI	NG METHOD: Mud Rotary/Continuous SPT/PQ3 Coring		
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS				·		



CONTINUES CONT	LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
12	VATION ET MSL)	EPTH EET)	PLE NO. ?UN NO.	V/6" & (N) % REC (RQD)	VERY (ft.)	OFILE	COORDINATES N 1722990.9 E 458053.5	SYMBOL	REMARKS
31.3 S-8 6-19 1.0 11-12.0' Same as 9.0-10.5'. 5p 12-12.0' Same as 9.0-10.0'	ELE)	[[]	SAM OR F	BLOV OR	RECO	PR		SSS	
12	31.3	_		6-10				_	
S-9		-	S-8		1.0		11-12.0' Same as 9.0-10.5'.	sp	
27.3 15		12 — - - -	S-9	9	0.9		plasticity, no dry strength, rapid dilatancy, low toughness, very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), moist, no	sp sp	
16.5 S-11	28.8	13.5 — — — — —	S-10	5	0.5		13.5-15.0' SILTY SAND (sm), 20% silt, 80% sand, sand-fine grained, subangular to rounded grains, low plasticity, low dry strength, slow dilatancy, low toughness, pale yellowish brown (10YR 6/2), moist,	sm	
S-12 3-5 3-5 1.0 1.0	27.3	15 — - - -	S-11	6	0.9		15.0-16.5' POORLY GRADED SAND with SILT (sp-sm), 10% silt, 90% sand, sand-fine grained, angular to subrounded, no plasticity, low dry strength, rapid dilatancy, low toughness, pale brown (5YR 5/	l sh-	
DATE STARTED: 10/6/09 DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: S-13 S-13 3-3 (6) 1.1.1 19.5-21.0 POORLY GRADED SAND with SILT (sp-sm), 10% silt, 10% silt, 10% sand, sand-fine grained, subangular to rounded grains, no to low sm plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, pale plasticity, no dry strength, slow dilatancy, low toughness, dry low		16.5 — — — —	S-12	3	1.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	plasticity, medium to high dry strength, no dilatancy, medium toughness, light bluish gray (5B 7/1) to greenish gray (5G 6/1), moist,	sm	
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 PIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: 1.4 30		18 — - - -	S-13	3	1.1		18.0.19.5' Same as above.		
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DATE STARTED: 10/6/09 DRILLER: Eddie Palmer DRILLER: Eddie Palmer DATE STARTED: 10/13/09 @ 0745 DATE/TIME: 10/7/09 @ 0745 DATE/TIME: 10/13/09 @ 0750 DRILLER: Eddie Palmer DATE/TIME: 10/13/09 @ 0750 DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		19.5 — — — —	S-14	2	1.4		90% sand, sand-fine grained, subangular to rounded grains, no to lov plasticity, no dry strength, slow dilatancy, low toughness, pale yellowish brown (10YR 6/2), moist, no reaction to 1N HCl, very loose,	/ sm	
DATE STARTED: 10/6/09 GWL: DEPTH: 5.1' DATE/TIME: 10/7/09 @ 0745 NOTES: Used NWJ for SPT sampling. DATE COMPLETED: 10/12/09 GWL: DEPTH: 5.4' DATE/TIME: 10/13/09 @ 0750 FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		21 — – –	S-15		15				
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	DATE FIELD	COMPLET GEOLOG	: 10, FED: 10, IST: JL	(3) /6/09 /12/09 O	1.0	GWL: [DEPTH: 5.4' DATE/TIME: 10/13/09 @ 0750	<u> </u> Note	I ES: Used NWJ for SPT sampling.
	APPR	OVED BY:			_	DRILLE	ER: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LOG OF BORING NO. O-4 NOT SHAPE Section	. 07-3935
19.8 22.5 S-16 WOR (0) 1.5 22.5-24' SILT with SAND (ml), 80-90% silt, 10-20% sand, sand-fine grained, low to no plasticity, low dry strength, slow dilatancy, low toughness, pale yellowish brown (10YR 6/2), no reaction to 1N HCl, very soft. 24 - 24 - 24 - 24 - 24 - 25.5' SILT (ml), no plasticity, low to no dry strength, slow to no dilatancy, low toughness, grayish orange (10YR 7/4), moist, weak reaction to 1N HCl, medium stiff. 25.5 - 27' Same as above except banded apperance, very thin calcereous layers. SILT (ml), as above except hard, strong reaction to 1N HCl. 27.1' and 27.1' 27.1-28.5' POORLY GRADED GRAVEL with SILT (gp-gm), 40-50% grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-	
19.8 22.5 S-16 WOR (0) 1.5 22.5-24' SILT with SAND (ml), 80-90% silt, 10-20% sand, sand-fine grained, low to no plasticity, low dry strength, slow dilatancy, low toughness, pale yellowish brown (10YR 6/2), no reaction to 1N HCl, very soft. 24 - 24 - 24 - 24 - 24 - 25.5' SILT (ml), no plasticity, low to no dry strength, slow to no dilatancy, low toughness, grayish orange (10YR 7/4), moist, weak reaction to 1N HCl, medium stiff. 25.5 - 27' Same as above except banded apperance, very thin calcereous layers. SILT (ml), as above except hard, strong reaction to 1N HCl. 27.1' and 27.1' 27.1-28.5' POORLY GRADED GRAVEL with SILT (gp-gm), 40-50% grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-	
19.8 22.5 S-16 WOR (0) 1.5 S-17 S (8) 0.5 S-18 S (8) 0.5 S-18 S (8) 0.8 S	
24 — S-16 WOR (0) 1.5 S-16 WOR (0) 1.5 S-16 WOR (0) 1.5 S-16 WOR (0) 1.5 S-16 WOR (0) 1.5 S-16 WOR (0) 1.5 S-16 WOR (0) 1.5 S-17 S-10 S-17 S-10 (0) WOR (0) 1.5 S-17 S-10 (0) WOR (0)	
S-16 WOR (0) 1.5 grained, low to no plasticity, low dry strength, slow dilatancy, low toughness, pale yellowish brown (10YR 6/2), no reaction to 1N HCl, very soft. 24 - 24 - 24 - 25.5' SILT (ml), no plasticity, low to no dry strength, slow to no dilatancy, low toughness, grayish orange (10YR 7/4), moist, weak reaction to 1N HCl, medium stiff. 25.5 - 25.5-27' Same as above except banded apperance, very thin calcereous layers. S-18 7-10 10 (20) 0.8 25.5-27' Same as above except banded apperance, very thin calcereous layers. SILT (ml), as above except hard, strong reaction to 1N HCl. 27.1' 27.1-28.5' POORLY GRADED GRAVEL with SILT (gp-gm), 40-50% are reaction to 3 to 1 to 1 to 1 to 1 to 1 to 1 to 1	
25.5 — S-18 7-10 10 27.1-28.5' POORLY GRADED GRAVEL with SILT (gp-gm), 40-50% grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite), granule to large pebble size, soft-breaks gp-grayel (weathered dolomite).	
S-18 7-10 10 10 27 27.1 2	
SILT (ml), as above except hard, strong reaction to 1N HCI. 27.1'- 27.1	
S-19 27 (50) 0.9 easily, no plasticity, low to medium dry strength, slow to no dilatancy, low to medium toughness, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), strong reaction to 1N HCl. 28.5 — 28.5 — 28.5-30.0' As above except increase in dolomite, 60-70%, coarse sand to granule size.	
S-20 15-17 1.3 30-31.4' Same as above. gp-gm gm ggm	
10.8 31.5 — 31.5' TOP OF AVON PARK FORMATION 31.5-35.2' DOLOMITE, soft to very soft, poorly indurated, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), strong reaction to 1N HCl, severly weathered, sandy/silty texture. 31.4-31.5' No sample. Switched to Coring Driller notes: some of sam lost back down the hole were retrieving barrel-too soft to barrel-amount unknown.	hile
DATE STARTED: 10/6/09 GWL: DEPTH: 5.1' DATE/TIME: 10/7/09 @ 0745 NOTES: Used NWJ for SPT so DATE COMPLETED: 10/12/09 GWL: DEPTH: 5.4' DATE/TIME: 10/13/09 @ 0750 FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring CHECKED BY:	ampling.
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS	



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	Η£	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	I.E	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
EVA] EET I	ОЕРТН (FEET)	MPLE	1 % S 3 % F 4 (RG	OVE	PROFILE	SURFACE EL: 42.3		REMARKS
크린		SAI	BLC OF	REC		DESCRIPTION	nscs	
	33 — — — — — — — — — — — — — — — — — —	OB-1	34% (0%)	1.2		35.2-35.6' DOLOMITE, moderately soft to soft, dark yellowish brown (10YR 4/2), thin bedded, moderately weathered-sandy texture, intensely fractured, weak reaction to 1N HCl when powdered. 35.6-36.3' DOLOMITE, moderately hard, medium bedded, very pale orange (10YR 8/2), pitted/vuggy, slightly to moderately weathered, vertical fracture 35.6-36.5', strong reaction to 1N HCl when powdered 36.3-37.4' DOLOMITE as at 35.2-35.6' except fossiliferous in thin bands.	1.	OB-2: Drilling Pressure: 250 psi Kelly Bar RPM: 204 Enginer RPM: 1200-1300 Drill Time: 39min 18sec Circ. Loss: none NOTE: Top 4 inches of sample are drill cuttings
	37.5 — — — — — — — — — — — — — — — — — — —	OB-2	(22%)	4.6		2), slightly weathered, slightly pitted, few vugs, few fossils, slightly fractured (all horizontal), strong reaction to 1N HCl when powdered, sandy texture when weathered. 40-42.7' DOLOMITE, moderately hard, strong reaction to 1N HCl when powdered, pale yellowish brown (10YR 6/2), fresh to slightly weathered, slightly pitted, unfractured, few vugs.		OB-3: Drilling Pressure: 250 psi Kelly Bar RPM: 210 Enginer RPM: 1300 Drill Time: 31min 17sec Circ. Loss: none
	42 — 	OB-3	76% (20%)	3.8		41.2-41.7' Moderately fractured. 41.7-42.5' Vertical fracture. 42.7-45' DOLOMITE, moderately soft to soft, moderately to severly weathered, poorly indurated, intensely fractured, moderate to strong reaction to 1N HCl when weathered, gradual color change to dark yellowish orange (10YR 6/6), sandy/silty texture, bedding planes not evident.		Driller notes: Becomes soft at 44'.
DATE FIELD	STARTED COMPLET GEOLOG	TED: 10/ IST: JLO	0		GWL: D GWL: D DRILLIN		NOTE	ES: Used NWJ for SPT sampling.
APPR	KED BY: OVED BY: ING CO.:		J8	-	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offset Bor	ing Prog	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. 0-4		
ELEVATION (FEET MSL)	тн :Т)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
EVA'	DEPTH (FEET)	MPLI R RUN	OW/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 42.3	SS SY	REMARKS
□ H)		& Q	BL(REC		DESCRIPTION	nscs	
	45 — 46.5 — 48 —	OB-4	76% (24%)	3.8		45-46.4' DOLOMITE, very soft, poorly indurated, silty texture, severely weathered to degraded, some areas sandy texture, no bedding evident, slightly fractured 45.7-47.5'. 46.4-47.2' GRAVELLY SILT (ml)/degraded DOLOMITE, 40% dolomite pieces-coarse sand size, soft-breaks easily, no plasticity, low dry strength, slow dilatancy, low toughness, pale yellowish brown (10YR 6/2), moist to wet, moderate to strong reaction to 1N HCI. 47.2-48.2' Same as 45-46.4' except with very thin organic layers/ laminations.		OB-4: Drilling Pressure: 200 psi Kelly Bar RPM: 215 Enginer RPM: 1300-1400 Drill Time: 10min 35sec Circ. Loss: none
	49.5 — — — — — — — — — — — — — — — — — — —	OB-5	98% (28%)	4.9		50-55' DOLOMITE, alternating layers of soft to very soft moderate yellowish brown (10YR 5/4), moderately to severly weathered, poorly indurated, bedding structure not evident, slightly to moderately fractured (in zones), weak to moderate reaction to 1N HCl, pitted/porous, sandy texture.		OB-5: Drilling Pressure: 250 psi Kelly Bar RPM: 213 Enginer RPM: 1300-1400 Drill Time: 11min 23sec Circ. Loss: none Note: 50-52.5' soft, fast drilling 0.1' top of run is cuttings. Water level 10/7/09 @ 0745 5.1'.
DATE FIELD	STARTED COMPLET GEOLOG	ED: 10/)		GWL: D GWL: D DRILLIN	_	NOTE	ES: Used NWJ for SPT sampling.
APPR	KED BY: OVED BY: ING CO.:		os ————		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offset Boring Program				PROJECT NO. 07-3935
		LOG OF BORING NO. O-4		
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. BLOW/6" & (N) OR % REC. & (RQD)		COORDINATES N 1722990.9 E 458053.5	SYMBOL	
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. OR % REC. OR % REC.	PROFILE	SURFACE EL: 42.3	SS SY	REMARKS
S S O O O O O O O O O O O O O O O O O O		DESCRIPTION	nscs	
55.5 —		55-60' As above except with very thin organic layers/laminations. 55-57' Intensely fractured.		OB-6: Drilling Pressure: 250 psi Kelly Bar RPM: 197 Enginer RPM: 1200-1300 Drill Time: 13min 40sec Circ. Loss: none
57 — OB-6 (38%) 3.9				
58.5 — - - - - - - - - - - - - -		60.0-65.0' As above except no organic layers.		OB-7: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Enginer RPM: 1200-1300 Drill Time: 11min 27sec
61.5 — 61.5 — 63 — 63 — 63 — 63 — 63 — 63 — 63 — 6				Circ. Loss: none
64.5 —		65-67' DOLOMITE, moderately hard, slightly to moderately weathered, pitted/porous, moderately to intensely fractured-vertical fracture 65-66.7', few very thin laminae/pockets of black organic material, thick bedded, strong reaction to 1N HCl when powdered,		Run-1: Drilling Pressure: 200 psi Kelly Bar RPM: 206 Enginer RPM: 1200-1300
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO	GWL: E GWL: E DRILLII	9	NOTE	ES: Used NWJ for SPT sampling.
CHECKED BY: WDS APPROVED BY: DRILLING CO.: HUSS	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offset Bor	ina Proa	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. O-4		
ELEVATION (FEET MSL)	TH (T:	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
EVA:	ОЕРТН (FEET)	MPL RUI	200/6 R % I & (RC	SOVE	PROFILE	SURFACE EL: 42.3	SS S)	REMARKS
II		δ. Q.	BL(REC		DESCRIPTION	nscs	
	66 —					pale yellowish brown (10YR 6/2).		Drill Time: 38min 38sec Circ. Loss: none
	67.5	R-1	100% (44%)	5.0		67-68' As above except unfractured.		
	69 —					68-74.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 62) to dark yellowish orange (10YR 6/6), pitted/porous, fossiliferous, vuggy/weathered out fossils, moderately weathered, sandy texture, medium to thick bedded, moderate to strong reaction to 1N HCI, slightly to moderately fractured (bedding planes).	/	
	70.5 —							Run-2: Drilling Pressure: 250 psi Kelly Bar RPM: 204 Enginer RPM: 1200-1300 Drill Time: 30min 40sec Circ. Loss: none
	72 -	R-2	98% (76%)	4.9				
	73.5 — — — —					74.5-75' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/		
	75 — - - - 76.5 —					2) to moderate yellowish brown (10YR 5/4), moderately weathered, pitted/porous, sandy/silty texture, medium bedded with very thin black (N9) organic laminations, friable, unfractured, weak to moderate reaction to 1N HCl when powdered. 75-80' DOLOMITE, moderately hard, porous/pitted, intensely fractured, pale yellowish brown (10YR 6/2), thick bedded, moderately weathered, sandy texture, moderate to strong reaction to 1N HCl when powdered. 76-76.6' As above except not pitted/porous, few horizontal fractures.		Run-3: Drilling Pressure: 150 psi Kelly Bar RPM: 198 Enginer RPM: 1200-1300 Drill Time: 15min 22sec Circ. Loss: none
	_			L.,			<u> </u>	
	STARTED COMPLET		/6/09 /12/09		GWL: D		NOTE	ES: Used NWJ for SPT sampling.
	GEOLOG					NG METHOD: Mud Rotary/Continuous SPT/PQ3 Coring		
	KED BY:	W	os					
	OVED BY:			\dashv	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
PIXILLI	. 10 00	11000						



REMARKS TO DESCRIPTION R.3 178	LNP- 0	Offset Bori	ng Prog	ram			LOG OF BORING NO. 0-4		PROJECT NO. 07-3935
R-3 (%) 3.9 77,5-80' As above except intensely fractured/rubble (not cave-in), fossiliforous. 80-80.7' DOLOMITE, moderately soft, palle yellowish brown (10VR 6/2), pitted/piprous, moderately to intensely fractured, moderately to intensely soft, palle yellowish brown (10VR 6/2), pitted/piprous, moderately to intensely soft to severy weathered, uogy, pitted in brads, witensely fractured, storing reaction to fN HCL when powdered. 80-78.12 DOLOMITE, very light gray (N8) to light gray (N7), produced to the p					£			ب ا	
R.3 79% 3.9 200. The constitution of the state of the sta	ION ASL)	Ή£	NO.	⊗ E ⊗ (S	3Y (fi	쁘		MBO	
R-3 77% (9%) 3.9 77.5-80' As above except intensely fractured/rubble (not cave-in), fossiliferous. 80-80.7' DOLOMITE, moderately soft, pale yellowish brown (10VR 6/2), pitted-piporuse, moderately weathered, moderately to intensely fractured, moderately has to severy eventhered, vaggy, pitted in broads; intensely produced to 1 NH Cl. When powdered. 80.7-81.2 DOLOMITE, very light gray (NB) to light gray (N7). Some black (NB) organic laminae, pitted/porous, moderately to intensely value and to some plack (NB) organic laminae, pitted/porous, moderately to intensely value in the powdered. 82.5 — R-4 38% (9%) 1.9 85-85 FDEGRADED DOLOMITE (SILT (ml)), no plasticly, low dry strongth, no distancy, low bugshness, grayish orange (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers throughout. Brown (10VR 6/2), with very thin organic lalvers throughout. Brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic lalvers (10VR 7/4) to pale yellowish brown (10VR 6/2) to pale yellowish brown (10VR 6/2), with very thin orga	EVAT	DEPT (FEE	MPLE R RUN	20W/6" R % R & (RQ	SOVEF	PROF	SURFACE EL: 42.3	SS SY	REMARKS
R-3 (0%) 3.9 Final Pressure: 150 psi Shelby Tube ST-1: Pushed: 7.5 February 1.00 psi Shelby Tube ST-1: Pushed: 7.5 February 1.	日子		8 5	B _O	RE(DESCRIPTION	ns(
80-80.7 DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2). pitted/porous, moderately weathered, moderately to intensely fractured, moderately hard to hard, moderately by severely weathered, wagy, moderately hard to hard, moderately by severely weathered, wagy, moderately hard to hard, moderately by severely weathered, wagy, moderately hard to hard, moderately by severely weathered, wagy, moderately hard to hard, moderately by severely weathered, wagy, moderately hard to hard, moderately by severely weathered, wagy, moderately by part of hard, moderately by the powdered. 82.5 — R-4 38% (%) 1.9 ### 1300-1200 ### 130		- - 78 — -	R-3		3.9				
ST-1 (NA%) 85.5 — ST-1 (NA%) 85.85.6' DEGRADED DOLOMITE (SILT (ml)), no plasticity, low dry strength, no dilatancy, low toughness, grayish orange (10VR 7/4) to pale yellowish brown (10VR 6/2), with very thin organic layers throughout. 85.6-90' DOLOMITE, moderately soft to soft, pale yellowish brown (10VR 6/2), moderately to severely weathered, friable, pitted/porous, vuggy, moderate to strong reaction to 1N HCl when powdered, moderately to intensely fractured. DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO Shelby Tube ST-1: Pushed: 7.5" Pressure: 100 psi Sample bagged Run-5: Drilling Pressure: 200 psi Kelly Bar RPM: 206 Enginer RPM: 1200-1300 Drill Time: 3min 32/sec (85.5 7min 41/sec (87-90')) Circ. Loss: 100% then circul returns shortly after starting		81 — - - - - -	R-4		1.9		2), pitted/porous, moderately weathered, moderately to intensely fractured, moderate to strong reaction to 1N HCl when powdered. 80.7-81.2' DOLOMITE, very light gray (N8) to light gray (N7), moderately hard to hard, moderately to severly weathered, vuggy, pitted in bands, intensely fractured, strong reaction to 1N HCl. 81.2-85' DOLOMITE, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), soft, friable, sandy/silty texture, with some black (N9) organic laminae, pitted/porous, moderately to intensely weathered, moderate to strong reaction to 1N HCl when	,	Drilling Pressure: 150 psi Kelly Bar RPM: 190 Enginer RPM: 1100-1200 Drill Time: 4min 30sec (80-82') 3min 4sec (82-85') 0.1' recovery, rig chattering Circ. Loss: 100% Driller Notes: very soft at 82' NOTE: Driller thinks 0.1' recovery harder than material below and softer material was washed out-no
FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring		85.5 — - - 87 — - STARTED	: 10	(NA%)	0.5		strength, no dilatancy, low toughness, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), with very thin organic layers throughout. 85.6-90' DOLOMITE, moderately soft to soft, pale yellowish brown (10YR 6/2), moderately to severely weathered, friable, pitted/porous, vuggy, moderate to strong reaction to 1N HCl when powdered, moderately to intensely fractured.		Pushed: 7.5" Pressure: 100 psi Sample bagged Run-5: Drilling Pressure: 200 psi Kelly Bar RPM: 206 Enginer RPM: 1200-1300 Drill Time: 3min 32sec (85.5-87') 7min 41sec (87-90') Circ. Loss: 100% then circulation returns shortly after starting run
ONEONED D1. WDO	FIELD	GEOLOGI	ST: JL	0			<u> </u>		
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS	APPRO	OVED BY:		<i></i>	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offset Bor	ing Prog	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. O-4		
ELEVATION (FEET MSL)	ΕÇ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
EVA'	DEPTH (FEET)	MPLE RUN	OW/6' R % F & (RC	SOVE	PROFILE	SURFACE EL: 42.3	SS SY	REMARKS
						DESCRIPTION	nscs	
	88.5 —	R-5	(13%)	4.5		88.7' Becomes moderately hard, slightly fractured.		
	90 —					90-90.7' DOLOMITE, moderately hard, pale yellowish brown (10YR 62), slightly weathered, pitted, weak to moderate reaction to 1N HCI, thick bedded, slightly fractured. 90.7-91.6' As above except intensely fractured/rubble, moderately weathered.	5/	Run-6: Drilling Pressure: 200 psi Kelly Bar RPM: 198 Enginer RPM: 1200-1300 Drill Time: 26min 6sec Circ. Loss: none
	91.5 —	R-6	100% (54%)	5.0		91.6-95' DOLOMITE, as at 90' except fresh to slightly weathered, few vugs, slightly fractured (horizontal break at 93.6').	,	
	94.5 —					Vertical fracture 94.1-95'. 95-96.2' DOLOMITE, moderately hard, weak reaction to 1N HCl whe powdered, pitted, few vugs, few very thin black (N9) organic pockets, very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), unfractured, thick bedded.		Run-7: Drilling Pressure: 250-300, 200 psi Kelly Bar RPM: 210 Enginer RPM: 1300-1400 Drill Time: 10min 41sec (95-98') 1.2' recovery
	97.5 —	R-7	76% (44%)	3.8		96.2' Becomes moderately to intensely fractured (possible washout zone 96.2-98') 96.2-98' Crushed/rubble with silt, dark yellowish brown (10YR 4/2). 98-98.8' DOLOMITE, moderately hard, slightly weathered, pitted, moderately fractured (at 45° angles), fossiliferous, weak reaction to 1N HCl when powdered, pale yellowish brown (10YR 6/2).		22min 15sec (98-100') Circ. Loss: none Water level 10/8/09 @ 0745 6.5'
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ΓED: 10)		GWL: D GWL: D DRILLIN	9	NOTE	ES: Used NWJ for SPT sampling.
	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	E£.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
EVA:	DEPTH (FEET)	MPLI	2W/6' R % F R (RG	OVE	PROFILE	SURFACE EL: 42.3		REMARKS
日		SA	BLC	REC	"	DESCRIPTION	nscs	
	99 —					98.8-101' As above except with very pale orange (10YR 8/2) dolomite clasts (0.01-0.1' round), vuggy.		Run-8:
-59.7		R-8	50% (33%)	1.5		101-101.3' DOLOMITE, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4), moderately hard, unfractured, some fossils, strong reaction to 1N HCl when powdered, few vugs, fresh to slightly weathered. 101.3-102' DOLOMITE, moderately hard, light gray (N7), unfractured pitted in very thin bands/pockets, some fossils (in very thin bands), strong reaction to 1N HCl, few vugs, fresh to slightly weathered.		Drilling Pressure: 100-150 psi Kelly Bar RPM: 221 Enginer RPM: 1400-1500 Drill Time: 2min 1sec (100-101') 0.1' recovery 22min 56sec (101-103') Airlift Circ. Loss: 100% Driller Notes: Rod drop of 8" between 102' and 103'.
	_					102' Grout-coincides with rod drop noted by driller.		
-60.7	103.5 — — — — —	ST-2	0%	0.0		Drill cuttings, bentonite chips (from adjacent A-series boring)	1_	Shelby Tube ST-2: Pushed: 2 feet Pressure: 150 psi
	105 — — — — — — — — — — — — — — — — — — —	R-9	66% (8%)	3.3		105-108.5' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2), pitted, vuggy, intensely fractured, some fossils, weak reaction to 1N HCl when powdered. 108.5-109.7' Rubble (driller does not think it is cave-in).		Run-9: Drilling Pressure: 150 psi Kelly Bar RPM: 201 Enginer RPM: 1200-1300 Drill Time: 11min 45sec (105-107') 0.5' recovery 4min 37sec (107-108.5') 0.7' recovery 8min 26sec (108.5-110') Circ. Loss: 100% Driller notes: very soft at 105' (possible rod drop with cuttings infilled-soft zone from Boring A-18 washed out by previous coring) Airlift
DATE FIELD	STARTED COMPLE GEOLOG KED BY:	ΓED: 10	0		GWL: D GWL: D DRILLIN		NOTE	ES: Used NWJ for SPT sampling.
APPR	OVED BY: ING CO.:			_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722990.9 E 458053.5 SURFACE EL: 42.3 DESCRIPTION	USCS SYMBOL	REMARKS
	_			<u>«</u>	7.7.7	109.7-110' DOLOMITE as at 101-101.3'.	1 -	
	111 —					110-115' DOLOMITE, moderately hard, pitted/porous, pale yellowish brown (10YR 6/2), slightly weathered, slightly to moderately fractured few vugs, thick bedded, weak reaction to 1N HCl when powdered, few fossils. 111.5-113.3' Vertical fracture.	1,	Run-10: Drilling Pressure: 150 psi Kelly Bar RPM: 217 Enginer RPM: 1300-1400 Drill Time: 24min 33sec Circ. Loss: 100% 0.5' Rubble
	112.5 — — — — — — — — — ———————————————————	R-10	86% (48%)	4.3				
						115-120' DOLOMITE, as above except slightly fractured (bedding planes).		Run-11: Drilling Pressure: 150-200 psi Kelly Bar RPM: 206 Enginer RPM: 1200-1300 Drill Time: 26min 14sec Circ. Loss: 100% 0.3' Rubble
	117 — — — — 118.5 — —	R-11	100% (82%)	5.0				
	120 					120-121.5' DOLOMITE, moderately hard, pale yellowish brown (10Y) 6/2), slightly weathered, pitted/porous, moderately fractured-vertical fracture 120.4-122.0' open, rough, black coating on surface, strong reaction to 1N HCl when powdered.		Run-12: Drilling Pressure: 200 psi Kelly Bar RPM: 208 Enginer RPM: 1300
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	TED: 10	0		GWL: D GWL: D DRILLIN	3	NOTI	ES: Used NWJ for SPT sampling.
APPR	OVED BY: ING CO.:			_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- 0	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722990.9 E 458053.5 SURFACE EL: 42.3	S SYMBOL	REMARKS
크		SA	BLC	REC	"	DESCRIPTION	nscs	
	- 121.5 - - -	R-12	56% (22%)	2.8		121.5-122' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2) to very light gray (N8), moderately hard to hard, few (0.05' round) pitted dolomite, moderately fractured, strong reaction to 1N HCl wher dry/powdered. 122-125' DOLOMITE, moderately hard, grayish orange (10YR 7/4) and pale yellowish brown (10YR 6/2), moderately weathered, pitted/porous, vuggy, fossiliferous, sandy texture, unfractured, thin to	1	Drill Time: 20min 8sec (120-123.5') 1' recovery 30sec (123.5-125') No recovery- not a rod drop Circ. Loss: 100% Driller Notes: very soft at 123.5'
	123 — - - - - 124.5 —					medium bedded.		
	126 —	ST-3	80% (0%)	1.0		Same as above except crushed. 126.3-128' DOLOMITE, moderately hard, weak reaction to 1N HCI when powdered, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), pitted/porous, sandy texture, vuggy, some fossils, slightly to moderately fractured (all horizontal), with pockets of crystalline	,	Shelby Tube ST-3: Pushed: 15" Pressure: 1000 psi Sample bagged Water level 10/9/09 @ 0755 5.3' Run-13: Drilling Pressure: 200 psi Kelly Bar RPM: 195 Enginer RPM: 1200
	- 127.5 -	R-13	81%	3.0		dolomite. 128-128.2' Crystalline DOLOMITE, light gray (N7) to medium light		Drill Time: 17min 1sec Circ. Loss: 100% 1.7' rubble
	_ 129 	N-13	(46%)	3.0		gray (N6), hard, very thin bedded, moderately fractured, fresh, pitted in very thin bands, strong reaction to 1N HCl when dry/ powdered. 128.2-130' DOLOMITE, dark yellowish orange (10YR 6/6), moderately hard, moderately weathered, sandy texture, pitted/porous vuggy, some fossils, medium to thick bedded, weak reaction to 1N HCl when powdered, unfractured. 128.8' Color change to light olive gray (5Y 6/1).	·,	
	- 130.5 					130-135' As above except with zones of pale yellowish brown (10YR 6/2) and dark yellowish orange (10YR 6/6), few pockets of crystalline dolomite, moderately fractured.		Run-14: Drilling Pressure: 200 psi Kelly Bar RPM: 196 Enginer RPM: 1200-1300 Drill Time: 22min 3sec Circ. Loss: 100% 0.5' Rubble Driller Notes: Rod drop 134.5- 135.6'
DATE FIELD	STARTED COMPLET GEOLOG	ED: 10/)		GWL: D GWL: D DRILLIN	9	NOTE	ES: Used NWJ for SPT sampling.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offset Boring Program		LOG OF BORING NO. O-4		PROJECT NO. 07-3935
	_ -	LUG OF BURING NO. U-4	Τ.	
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. OR RUN NO. OR RUN NO. BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (II.) PROFILE	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. OR RUN NO. BLOW/6" & (NO. OR % REC.	PROFILE	SURFACE EL: 42.3	USCS S)	REMARKS
	ž l	DESCRIPTION	Sn	
132 — R-14 74% 3	.7	132-132.7' Vertical fracture, moderately to intensely fractured area.		
133.5 —				
-92.2	7777	134.5' Becomes fossiliferous.	,	
135 —		134.5-135.6' ROD DROP.		Run-15: Drilling Pressure: 150-200 psi
-93.3	.7	135.6-137' DOLOMITE, moderately soft to moderately hard, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), fossiliferous (sand dollar casts), moderately weathered, sandy texture, pitted/porous, vuggy, moderate to strong reaction to 1N HCl, slightly fractured (along bedding plane at 135.4'). 137-139' Crystalline DOLOMITE, moderately hard to hard, moderately to intensely fractured, pale yellowish brown (10YR 6/2) to light gray (N7), moderate to strong reaction to 1N HCl when dry/powdered, fresh, no fossils, pitted in very thin bands, medium to thick bedded.		Kelly Bar RPM: 218 Enginer RPM: 1300-1400 Drill Time: 1min 58sec (135-137') 1' recovery 15min 14sec (137-139') 1' recovery 5min 55sec (139-140') 0.7' recovery, 0.3' rubble Circ. Loss: 100% Driller notes: Rod drop 139.5-140' (0.3' rod drop measured from recovered core).
-97.4 -97.7 -98.0 -98.7 141—		139-139.7' DOLOMITE, light olive gray (5Y 6/1), moderately hard, medium to thick bedded, slightly weathered, pitted in very thin bands, unfractured, moderate to strong reaction to 1N HCl when powdered. 139.7-140' ROD DROP. 140-140.3' DOLOMITE, moderately to severly weathered, moderately soft, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), pitted/porous, sandy texture, fossiliferous (sand dollars), moderate to strong reaction to 1N HC when powdered, slightly to moderately fractured. 140.3-141' ROD DROP. 141-141.7' DOLOMITE, as above except moderately weathered,	\ '- '	Run-16: Drilling Pressure: 200 psi Kelly Bar RPM: 198 Enginer RPM: 1200-1300 Drill Time: 2min 47sec (140-142') 0.8' rubble, rods temporarily stuck Airlift 8min 55sec (142-145') 1.0' rubble Circ. Loss: 100% Driller Notes: Rod drop 140.3-141'
	.1	vuggy. 141.7-142.6' Banded/laminated apperance.		and 143-144.5'
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS	GWL: D GWL: D DRILLIN	9	NOTE	ES: Used NWJ for SPT sampling.
APPROVED BY: DRILLING CO.: HUSS	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offset Boring Program		LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.) PROFILE	COORDINATES N 1722990.9 E 458053.5 SURFACE EL: 42.3	USCS SYMBOL	REMARKS
1	8	DESCRIPTION	Ĭ	
_ (26%)		142.6-142.8' Crystalline DOLOMITE as at 137-139'.		
-100.7		143-144.5' ROD DROP.		
144 —				
-102.2		144.5-145' DOLOMITE as at 141' except with pockets of crystalline dolomite, fossiliferous, vuggy. 145-147.2' DOLOMITE, as above, very pale orange (10YR 8/2) to	<u>.</u>	Run-17:
-103.2 145.5 — -103.4 _		yellowish gray (5Y 8/1), with medium dark gray (N4) dolomite pockets, moderately hard, some vugs, medium bedded, slightly to moderately weathered, moderately to intensely fractured (bedding planes).	<u> </u>	Drilling Pressure: 150-200 psi Kelly Bar RPM: 195 Enginer RPM: 1200 Drill Time: 20min 22sec (145-147') 0.6' recovery
- - 147 —		145.5-145.7' ROD DROP. 145.7' Becomes thinly bedded/laminated apperance, elongated vugs (weathered out fossils), moderately weathered, hard, moderate to strong reaction to 1N HCl when powdered, unfractured.	<u>.</u>	26min 26sec (147-150') Circ. Loss: 100% Driller Notes: Rod drop at approximately 145.5' (2") Rod drop 147.5-148'
-105.2 R-17 56% (12%)	2.8	147.2-147.5' DOLOMITE, moderately hard, laminated apperance, yellowish gray (5Y 7/2) and pale yellowish brown (10YR 6/2), fresh to slightly weathered, thick bedded, few vugs, strong reaction to 1N HCI when powdered, unfractured.		Water Level 10/10/09 @ 0800 6.3'
-105.7		147.5-148' ROD DROP.		
148.5 — - - - -		148-148.6' DOLOMITE, as at 147.2-147.5'. 148.6-150' DOLOMITE as at 145.7'.	'- 	
150 — · · · · · · · · · · · · · · · · · ·		150-151' DOLOMITE, same as at 147.2-147.5'. 151-153.5' DOLOMITE, moderately soft to moderately hard, pitted/		Run-18: Drilling Pressure: 200 psi Kelly Bar RPM: 196 Enginer RPM: 1200-1300 Drill Time: 4min 44sec (150-151') 0.3' recovery-rods temporarily stuck
151.5 —		porous, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), moderately weathered-sandy texture, some fossils, moderate to strong reaction to 1N HCl when powdered, slightly fractured (horizontal-bedding planes only).	า	15min 16sec (151-152') Airlift Core recovery from outer barrel 151-152' Changed bit at 152' 10min 25sec (152-155') 0.7' rubble Circ. Loss: none
R-18 86% (54%)	4.3			
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS	GWL: D GWL: D DRILLIN		NOTI	ES: Used NWJ for SPT sampling.
CHECKED BY: WDS APPROVED BY: DRILLING CO.: HUSS	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722990.9 E 458053.5 SURFACE EL: 42.3 DESCRIPTION	USCS SYMBOL	REMARKS
	_ _ 154.5 — _ _ _					153.5-155' DOLOMITE, light gray (N7) and pale yellowish brown (10YR 6/2), slightly weathered, not as pitted, few vugs, strong reaction to 1N HCl when powdered, slightly fractured from 153.7-154.1', slightly to moderately weathered. 155-157.6' DOLOMITE, same as above except vuggy/pitted/fossiliferous in very thin bands.		Run-19: Drilling Pressure: 200 psi Kelly Bar RPM: 207
	156 — — — — — — 157.5 —	R-19	100%	5.0		157.6-158.7' DOLOMITE, thinly laminated, moderately weathered,		Enginer RPM: 1200-1300 Drill Time: 10min 47sec (155-158') 0.5' rubble 7min 38sec (158-160') 0.2' rubble Circ. Loss: 100% Rods temporarily stuck.
	159 —					porous/pitted, vuggy, moderately hard, unfractured to moderately fractured along bedding planes. 158.7-160' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2) to light gray (N7), hard, strong reaction to 1N HCl when dry/ powdered, moderately fractured (all horizontal), few vugs, pitted in very thin bands, fresh to slightly weathered.		
	160.5 — — — —					160-161.6' DOLOMITE, moderately hard, weak to moderate reaction to 1N HCl when powdered, slightly weathered, some fossils, vuggy, unfractured, thick bedded, light olive gray (5Y 6/1) to medium light gray (N6). 161.6-163.3' DOLOMITE, moderately hard, pitted/porous, some vugs		Run-20: Drilling Pressure: 250-300 psi Kelly Bar RPM: 200 Enginer RPM: 1200-1300 Drill Time: 5min 54sec (160-160.5' Airlift 6min 48sec (160.5-165') 0.2' rubbli Circ. Loss: 100% Special Care Sample 162.0-163.2'
-121.0	162 — — — — — —	R-20	84% (62%)	4.2		moderately weathered, banded apperance, light olive gray (5Y 6/1) to pale yellowish brown (10YR 6/2), thick bedded, unfractured (161.9-162.1' horizontal fracture), strong reaction to 1N HCl when powdered. 163.3-164.3' ROD DROP.		Driller Notes: Rod drop 163.3-164.3' (approximately 1 foot, measured 0.8' in core)
-122.0 DATE	STARTED	r: 10	/6/09		GWL: D	164.3-165' As above except vuggy, moderately weathered-sandy DEPTH: 5.1' DATE/TIME: 10/7/09 @ 0745		ES: Used NWJ for SPT sampling.
FIELD CHEC APPR	COMPLET GEOLOG KED BY: OVED BY: ING CO.:	IST: JL	0			NG METHOD: Mud Rotary/Continuous SPT/PQ3 Coring	RIG:	Failing 1500



LNP- O	ffset Bor	ing Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722990.9 E 458053.5 SURFACE EL: 42.3	USCS SYMBOL	REMARKS
		<i>s</i> 0	BI	2	<u> </u>	DESCRIPTION	👸	
-123.0	165 —					texture. 165-165.1' DOLOMITE, moderately soft, dark yellowish orange (10Y) 6/6), strong reaction to 1N HCl when powdered, pitted/porous, fossiliferous, sandy texture, moderately to severely weathered, thin bedded.	₹	Run-21: Drilling Pressure: 250 psi Kelly Bar RPM: 207 Enginer RPM: 1200-1300
-124.0 1	- 166.5 — - -	D 01	74%	0.7		165.1-165.3' Crystalline DOLOMITE, light olive gray (5Y 6/1), moderately hard to hard, fresh to slightly weathered, porous/pitted in bands, strong reaction to 1N HCl when dry/powdered, slightly to moderately fractured (horizontal only)		Drill Time: 1min 47sec (165-166.3') 11min 30sec (166.3-168.3') Rods stuck-Airlift 7min 30sec (168.3-168.8') 7min 59sec (168.8-170') Circ. Loss: 100% Driller Notes: Rod drop 165.3- 166.3' (approximate)
	168 —	R-21	(30%)	3.7				
1	169.5 — — — — — — 171 —					170-170.7' DOLOMITE, moderately hard, light gray (N7) to light olive gray (5Y 6/1), pitted/porous in bands, slightly to moderately weathered, fossils in bands with pits, moderate to strong reaction to 1N HCl when powdered, medium bedded, moderately fractured-vertical fracture 170-170.8' (rough, open). 170.7-172.3' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) to yellowish gray (5Y 7/2), moderately weathered-sandy		Run-22: Drilling Pressure: 200-250 psi Kelly Bar RPM: 195 Enginer RPM: 1200 Drill Time: 19min 31sec 0.7' cuttings Circ. Loss: 100%
1	- - - 172.5 — -	R-22	86% (48%)	4.3		texture, fossiliferous, pitted/porous, vuggy, unfractured to moderately fractured (107.7-171'), strong reaction to 1N HCl when powdered. 172.3-173.5' crystalline DOLOMITE, as at 165.1'.		Airlift after end of run
	174 — —					173.5-175' DOLOMITE, moderately hard, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), moderately weathered, pitted, slightly fractured (bedding planes), thick bedded, strong reaction to 1N HCl when powdered.		
1	_ _ 175.5 <u></u>					175-180' DOLOMITE, moderately hard, fresh to slightly weathered, pitted/porous in zones, medium to thick bedded, light olive gray (5Y 6 1) to light gray (N8), slightly fractured along bedding planes (except	5/	Run-23: Drilling Pressure: 250-300 psi Kelly Bar RPM: 192
DATE C	STARTED COMPLET GEOLOG (ED BY:	ΓED: 10)		GWL: D GWL: D DRILLIN		NOTE	ES: Used NWJ for SPT sampling.
APPRO	VED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offset Bo	ring Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	HT.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	:ILE	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
EVA.	DEPTH (FEET)	MPL	DW/6 R % I & (RC	OVE	PROFILE	SURFACE EL: 42.3		REMARKS
日子		SA OF	BLC	REC		DESCRIPTION	nscs	
	- - 177 — - - - 178.5 —	R-23	96% (76%)	4.8		178.8-179.1' vertical fracture-moderately to intensely fractured), vuggy 177.6-178.7', strong reaction to 1N HCl when powdered. 176.6-176.9' Moderately soft, fresh, not pitted.		Enginer RPM: 1100-1200 Drill Time: 18min 8sec 0.3' rubble Circ. Loss: 100%
-138.7 -139.5		R-24	78% (16%)	3.9		180-180.5' DOLOMITE, moderately hard, thin to medium bedded, few interlayers of crystalline dolomite, fresh to slightly weathered, pitted in bands, unfractured, vuggy in bands, light olive gray (5Y 6/1) to medium light gray (N6), strong reaction to 1N HCl when powdered. 180.5-181' Crystalline DOLOMITE, medium light gray (N6) to light olive gray (5Y 6/1), hard, strong reaction to 1N HCl when dry/powdered, fresh to slightly weathered, pitted in very thin bands, moderately to intensely fractured, thin to medium bedded. 181-181.8' ROD DROP. 181.8-183' DOLOMITE as at 180.5-181'.	-	Run-24: Drilling Pressure: 200-300 psi Kelly Bar RPM: 221, 203 Enginer RPM: 1400-1500, 1200- 1300 Drill Time: 3min 48sec (180-181.8') 13min 34sec (181.8- 183.4') Airlift 6min 5sec (183.4-183.5') 5min 38sec (183.5-185') Circ. Loss: 100% Rod drop 181-181.8' Rod drop 183-183.4'
-140.7 -141.1	183 —					183-183.4' ROD DROP. 183.4-183.5' DOLOMITE as at 180.5', intensely fractured (bedding planes). 183.5-185.2' DOLOMITE same as at 181.8'. 185.2-185.8' DOLOMITE, moderately soft, grayish orange (10YR 7/4), moderately to severly weathered, pitted/porous- sandy texture, vuggy, unfractured, medium bedded, weak to moderate reaction to 1N HCl when powdered. 185.8-186.2' As above except intensely fractured/rubble. 186.2-186.5' DOLOMITE, light olive gray (5Y 6/1) to moderate		Run-25: Drilling Pressure: 250 psi Kelly Bar RPM: 210 Enginer RPM: 1300 Drill Time: 13min 18sec Circ. Loss: 100%
DATE FIELD	STARTEL COMPLE GEOLOG	TED: 10	Э		GWL: D GWL: D DRILLIN	9	<u>I</u> NOTE	Les: Used NWJ for SPT sampling.
CHECKED BY: WDS APPROVED BY: DF						R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS				·		-



LNP-	Offset Bori	ing Prog	ram			LOC OF POPING NO. O.4		PROJECT NO. 07-3935
				_		LOG OF BORING NO. O-4	Τ.	
ON SL)	Τ 🦳	Ŏ Ö Ö	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	Щ	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
ATI M Ti	DEPTH (FEET)	S E	//6" 8 % RE RQD	VER	PROFILE	SURFACE EL: 42.3		REMARKS
ELEVATION (FEET MSL)	B F	SAMPLE NO. OR RUN NO.	LOW OR 9	000	PR		nscs	
		<i>w</i> 0	В	RE	 	DESCRIPTION friable, moderately to severly weathered, pitted/porous, thin to	ļ Š	
	_ _ 187.5 — _ _ _	R-25	90% (70%)	4.5		medium bedded, undulating abrupt basal contact. 186.5-192.9' Alternating bands of crystalline DOLOMITE (0.2- 0.3' thick), slightly fractured (bedding planes) and fossiliferous weathered DOLOMITE (0.3-0.8' thick). Crystalline DOLOMITE, hard, light gray (N7), fresh, pitted in very thin bands, strong reaction to 1N HCl when dry. Fossiliferous DOLOMITE, yellowish gray (5Y 7/2), moderately hard, pitted/porous, moderately weathered, weak to moderate reaction to 1N HCl when powdered.		
	189 — - - -							Run-26:
	190.5 — - - - -							Drilling Pressure: 200-250 psi Kelly Bar RPM: 216 Enginer RPM: 1300-1400 Drill Time: 14min 52sec 0.3' rubble Circ. Loss: 100%
	192 — - - -	R-26	96% (72%)	4.8		192.9-193.6' DOLOMITE as at 186.2-186.5' except moderately		
	193.5 — - - - - -					fractured. 193.6-195' DOLOMITE, light olive gray (5Y 6/1) to medium light gray (N6), slightly to moderately weathered, vuggy, pitted/porous in bands moderate to strong reaction to 1N HCl when powdered, thick bedded moderately fractured (bedding planes).		
	195 — — — — —					195-196.9' DOLOMITE, moderately soft to moderately hard, pitted/porous, moderately weathered, dark yellowish orange (10YR 6/6), thin banded/laminated apperance, moderate to strong reaction to 1N HCl when powdered, few fossils with few thin bands of crystalline dolomite, undulating abrupt basal contact, moderately fractured (bedding planes).		Run-27: Drilling Pressure: 250-300 psi Kelly Bar RPM: 206 Enginer RPM: 1200-1300 Drill Time: 8min 55sec Circ. Loss: 100%
	196.5 — — — —		100%			196.9-200' DOLOMITE, moderately hard, yellowish gray (5Y 7/2), moderately to intensely fractured, pitted, vuggy, some fossils, thick bedded, slightly to moderately weathered, strong reaction to 1N HCl		
DATE	STARTED	: 10/	/6/09		GWL: D	٥	NOTE	ES: Used NWJ for SPT sampling.
1	COMPLET				GWL: D	9		
1	GEOLOGI KED BY:	ST: JL0 W[DKILLI	NG METHOD: Mud Rotary/Continuous SPT/PQ3 Coring		
	APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500							
DRILL	ING CO.:	HUSS				·		



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. 0-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722990.9 E 458053.5 SURFACE EL: 42.3	USCS SYMBOL	REMARKS
-162.7	198 — 199.5 — 201 — 202.5 — 204 — 205.5 — 207 —	% © R-27	90% (24%)	5.0 4.5		DESCRIPTION when powdered, silty texture in weathered areas, with very thin pockets of medium light gray (N6) material. 200-202.3' DOLOMITE, as at 195-196.9'. 202.3-205' Crystalline DOLOMITE, moderately hard to hard, intensely fractured, light olive gray (5Y 6/1) to very light gray (N8), fresh to slightly weathered, pitted/vuggy in very thin bands, strong reaction to 1N HCl when dry/powdered. BOTTOM OF BORING 205'	/	Run-28: Drilling Pressure: 250 psi Kelly Bar RPM: 196 Enginer RPM: 1200-1300 Drill Time: 13min 33sec 0.3' rubble Circ. Loss: 100% Final water level 10/13/ 09 @ 0750 5.4'.
DATE FIELD CHEC APPR	STARTED COMPLET GEOLOG KED BY: OVED BY:	red: 10, IST: JL ^o WI	0			EPTH: 5.4' DATE/TIME: 10/13/09 @ 0750 NG METHOD: Mud Rotary/Continuous SPT/PQ3 Coring		ES: Used NWJ for SPT sampling.



LNP- Offes	st Boring Pr	ogram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL) DEPTH	(FEET) SAMPLE NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
EEVAT	(FEET)	"3W/6" 7 % F 8 (RQ	OVE	PROFILE	SURFACE EL: 42.6	SS SY	REMARKS
日氏	AS G	BLO	REC	"	DESCRIPTION	nscs	
1	0	10/19/09		GWL: C	7.0-7.4' Weathered DOLOMITE. EPTH: 5.9' DATE/TIME: 10/20/09 @ 0750		0-22' destructive drilling, log based on cuttings.
DATE COM	MPLETED: DLOGIST:	10/28/09		GWL: D			
APPROVE				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offest Boring Program PROJECT NO. 07-3935									
						LOG OF BORING NO. 0-5			
ELEVATION (FEET MSL)	Ħ.E.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1724150.2 E 457769.9	SYMBOL		
EVA'	DEPTH (FEET)	MPLE RUN	DW/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 42.6	SS SY	REMARKS	
		& Q	BLO	REC		DESCRIPTION	nscs		
20.6	16 — 18 — 20 — 22 — 24 — 26 — 28 — 28 —	OB-2	84% (32%) 50% (0%)	4.2		TOP OF AVON PARK FORMATION 22.0-23.0' DOLOMITE, soft, highly weathered, slightly fractured, thin bedded, weak reaction to 1N HCl, olive gray (5Y 3/2). 23.0-27.0' DOLOMITE, soft to moderately soft, highly weathered, weak reaction to 1N HCl, grayish orange (10YR 7/ 4) to very pale orange (10YR 8/2), moderately fractured. 25.6-25.9' Very soft.		Drillers Notes: circulation loss at 15'. Switched to Coring OB-1: Drilling Pressure: 450 psi Kelly Bar RPM: 196 Engine RPM: 1200-1300 Drill Time: 10min 3sec Circulation loss: 100% OB-2: Drilling Pressure: 250 psi Kelly Bar RPM: 197 Engine RPM: 197 Engine RPM: 190-1300 Drill Time: 5min 49sec Circulation loss: 100 %	
DATE	DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS					EPTH: 6.3' DATE/TIME: 10/28/09 @ 1015	NOTE	ES: NA	
	GEOLOG KED BY:	IST: VVL JL(PKILLI	NG METHOD: Mud Rotary/PQ3 coring			
APPR	OVED BY:		-		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500	
DRILL	ING CO.:	HUSS							



LNP- Offest Boring Program PROJECT NO. 07-3935										
						LOG OF BORING NO. 0-5				
rion MSL)	H.C	ÖN .	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1724150.2 E 457769.9	SYMBOL			
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	OW/6" R % F & (RC	COVE	PROFILE	SURFACE EL: 42.6	USCS SY	REMARKS		
E E		∕s ⊡	BL	RE(DESCRIPTION)SN			
	30 —					30.0-33.0' DOLOMITE, very weathered-soft drilling, no recovery of material but cuttings, similar to material above.		OB-3: Drilling Pressure: 200 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300		
	32 	OB-3	36% (0%)	1.8				Drill Time: 13min 32sec 2" of material fall in from above. Driller Notes: very soft from 130'- 133'		
	34 —					33.0-35.0' DOLOMITE, very weathered, intensely fractured (bedding planes), no reaction to 1N HCl, moderate reaction when powdered, moderately hard to hard, grayish orange (10YR 7/4).				
	36 — —					35.0-37.0' DOLOMITE, moderately weathered, moderately fractured (bedding planes), no reaction to 1N HCl, moderately hard to hard, light olive gray (5Y 5/2).		OB-4: Drilling Pressure: 250 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 10min 43sec Circulation loss: 90%		
	- 38 	OB-4	28% (14%)	1.4		37.0-45.0' DOLOMITE, intensely weathered, soft, no recovery of material but cuttings similar to material above.				
	40 —							OB-5: Drilling Pressure: 200 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400 Drill Time: 2min 23sec Circulation loss: 100 % NOTE: No picture taken since no		
	42 — — —	OB-5	0% (0%)	0.0				sample recovered.		
DATE (STARTED COMPLET GEOLOG	ED: 10/	os		GWL: D GWL: D DRILLIN	9	NOTE	ES: NA		
APPRO	KED BY: OVED BY: NG CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP- C	Offest Bor	ing Prog	LNP- Offest Boring Program PROJECT NO. 07-3935									
						LOG OF BORING NO. 0-5						
TION MSL)	H.(O O	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1724150.2 E 457769.9	SYMBOL					
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	OW/6' R % F & (RC	SOVE	PROFILE	SURFACE EL: 42.6	CS SY	REMARKS				
		% Ō	BLO	RE(DESCRIPTION	nscs					
	46 —	OB-6	16% (0%)	0.8		45.0-50.0' DOLOMITE, soft, intensely weathered, intensely fractured, no reaction to 1N HCI, moderate reaction when powdered, light olive gray (5Y 5/2) to olive gray (5Y 3/2).		OB-6: Drilling Pressure: 200 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 4min 13sec Circulation loss: 100%				
	50 — - - - 52 —		92%			50.0-52.8' DOLOMITE, moderately hard, light olive gray (5Y 5/2), argillaceous, thick bedded, slightly fractured (horizontal-bedding planes), moderately weathered, no reaction to 1N HCI. 50.2' Horizontal fracture.		OB-7: Drilling Pressure: 400 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 15min 57sec Circulation loss: None Water level 10/20/09 @ 0750 5.9'.				
	54 — - 56 —	OB-7	(80%)	4.6		52.8-55.0' DOLOMITE, soft, moderate yellowish brown (10YR 5/4), sandy, thinly bedded, slightly fractured, moderately to intensely weathered, no reaction to 1N HCl, moderate reaction when powdered. 55.0-58.8' DOLOMITE, moderately soft, light olive gray (5Y 5/2), sandy, thick bedded, slightly fractured (horizontal-bedding planes), moderately weathered, no reaction to 1N HCl, moderate reaction when powdered.		OB-8: Drilling Pressure: 300 psi Kelly Bar RPM: 206 Engine RPM: 1200-1300 Drill Time: 26min 17sec Circulation loss: None				
	- 58 —	OB-8	80% (74%)	4.0		_		1" of material fall in from above. Driller Notes: soft from 57.8-58.8'.				
	STARTED		19/09		GWL: D		NOTE	ES: NA				
	COMPLET				GWL: D							
	GEOLOG				DRILLIN	NG METHOD: Mud Rotary/PQ3 coring						
CHECKED BY: JLO APPROVED BY: DRIL						R: Eddie Palmer HELPER: Chad/Cody	RIG.	Failing 1500				
		HUSS		\dashv	PINICLE	TILLI LIX. Ollad/Outy	i viO.	raining 1000				
	DRILLING CO.: HUSS											



LNP- Offest Boring Program PROJECT NO. 07-3935										
LNP- (Untest Bor	ing Progi	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935		
ELEVATION (FEET MSL)	TH TT)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	:ILE	COORDINATES N 1724150.2 E 457769.9	SYMBOL			
EVA EET	ОЕРТН (FEET)	MPL RUI	DW/6 R % I & (R(COVE	PROFILE	SURFACE EL: 42.6	SS S	REMARKS		
<u>п</u> н		& Q	BL(REC		DESCRIPTION	nscs			
	60 —					58.8-60.0' DOLOMITE, hard, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), crystalline, thick bedded, unfractured, fresh to slightly weathered, no reaction to 1N HCl, moderate reaction when powdered. 60.0-60.5' As above except yellowish gray (5Y 8/1). 60.5-63.4' DOLOMITE, thinly laminated with some pits, yellowish brown (10YR 5/4).		Run 1: Drilling Pressure: 300 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 24min 35sec Circulation loss: none		
	62 	R-1	100% (100%)	5.0		63.4-65.0' DOLOMITE, moderately soft, moderate yellowish brown		Picture of sample in tray shows Run# but not number 1, depth is correct on picture.		
	64 — _ _					(10YR 5/4), sandy, thinly bedded, pitted, unfractured, moderately weathered, no reaction to 1N HCl, moderate reaction when powdered. 65.0-70.0' DOLOMITE, moderately hard, pale yellowish brown (10YR)		Run-2:		
	- 66 — -					6/2) to moderate yellowish brown (10YR 5/4), thin to medium bedded slightly to moderately weathered, few pits, slightly fractured (bedding planes), no reaction to 1N HCI, moderate reaction when powdered. 66.6-67.8' Moderately soft.	١,	Drilling Pressure: 300 psi Kelly Bar RPM: 209 Engine RPM: 1200-1300 Drill Time: 31min 17sec Circulation loss: None Water Level 10/21/09 @ 0747 5.8'.		
	68 	R-2	(84%)	5.0						
	70 — — — — 72 —					70.0-70.7' As above except pale yellowish brown (10YR 6/2). 70.7-70.8' DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4), thinly bedded, few pits, intensely weathered, no reaction to 1N HCl, weak reaction when powdered. 70.8-72.3' DOLOMITE, hard, light gray (N7), thick bedded, some pitting, moderate reaction to 1N HCl, weak reaction to powdered, fresh, slightly fractured (bedding planes).		Run 3: Drilling Pressure: 300 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 41min 26sec Circulation loss: 0% Driller Notes: bottom 2' soft.		
	_	R-3	64% (38%)	3.2		72.3-74.6' DOLOMITE, soft, moderate yellowish brown (10YR 5/4), pitted, thinly bedded, severely weathered, no reaction to 1N HCl, strong reaction when powdered, intensely fractured.				
DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO					GWL: D GWL: D DRILLIN		NOTE	ES: NA		
APPRO	APPROVED BY:					R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		
DRILLING CO.: HUSS										



LNP- (Offest Bori	ing Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6	SYMBOL	REMARKS
ELE (FE		SAN	BLO OR &	ZECC	=	DESCRIPTION	nscs	
-32.4	74 — 76 — 78 —	R-4	100% (52%)	5.0		74.6-75.0' DOLOMITE, moderately hard, moderate yellowish brown (10YR 5/4), some vugs and pits, thinly bedded, weak reaction to 1N HCI, intensely fractured. 75.0-77.1' LIMESTONE, very hard, crystalline, thick bedded, very light gray (N8), 75-75.6' some pitting, slightly fractured (horizontal-bedding planes), moderate to strong reaction to 1N HCI. 77.1-77.5' DOLOMITE, moderately soft, thinly bedded, moderate yellowish brown (10YR 5/4), intensely fractured, no reaction to 1N HCI. 77.5-79.3' Same as 75.0-77.1' except slightly pitted, moderately fractured.	, <u>'</u> _	Run 4: Drilling Pressure: 300 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 35min 53sec (75.0-77.5 24min 40sec (77.5-80.0') Circulation loss: None Note: Picture in tray mislabeled- shows RUN 3.
	80 —	R-5	100%	5.0		79.3-80.0' DOLOMITE, moderately soft, thinly bedded to laminated, pitted, moderate yellowish brown (10YR 5/4), moderately fractured, no reaction to 1N HCI. 80.0-80.7' As above except moderate yellowish brown (10YR 5/4) and light gray (N7). 80.7-81.3' As above except intensely fractured. 81.3-85.9' DOLOMITE, thick bedded, moderately hard, pitted, few small vugs, light gray (N7), very slightly fractured (horizontal break at 84'), no reaction to 1N HCI, weak reaction when powdered.		Run 5: Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 16min 24sec Circulation loss: none
DATE	84 — 86 — STARTED COMPLET GEOLOGI	ED: 10	100% (62%) /19/09 /28/09 OS	5.0	GWL: D			Run-6: Drilling Pressure: 250 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 16min 52sec Circulation loss: None
CHEC	FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY: DRILLING CO.: HUSS					R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offest Bo	ing Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6	SS SYMBOL	REMARKS
🗆 🖰		S Q	BL(REC		DESCRIPTION	nscs	
	88 —					brown (10YR 4/2), no reaction to 1N HCl, weak reaction when powdered, slightly weathered. 88.4' Fracture, filled with organics, no odor.		
	-					89.1-90.0' DOLOMITE, soft, thin bedded, very pale orange (10YR 8/2), no reaction to 1N HCl, moderately to severely weathered, moderately fractured.		
	90 —					90.0-91.8' DOLOMITE, thick bedded, hard, very pale orange (10YR 82), unfractured, some pits filled with dolomite (grayish orange (10YR 7/4)) and a fewer thin streaks (dusky yellowish brown (10YR 2/2)), strong reaction to 1N HCl, fresh to slightly weathered.		Run-7: Drilling Pressure: 200 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 41min 29sec Circulation loss: None Driller Notes: soft 94-95'.
	92 —	R-7	86% (32%)	4.3		91.8'-92.3' DOLOMITE, moderately soft, thick bedded, pale yellowish brown (10YR 6/2), slightly fractured, severely weathered, no reaction to 1N HCl. 92.3-93.2' Same as 90.0-91.8' except intensely fractured.		Dillier Notes, suit 94-93.
	94 — -					93.2-95.7' DOLOMITE, moderately soft, thin bedded, dark yellowish brown (10YR 4/2) with black (N1) streaks, severly weathered, intensely fractured, no reaction to 1N HCI, slight reaction when powdered, pitted.		
	96 —					95.7-100.0' DOLOMITE, moderately soft, thick bedded, moderately to intensely fractured (vertical), moderately weathered, few pits, very pale orange (10YR 8/2), no reaction to 1N HCI, moderate reaction when powdered.)	Run-8: Drilling Pressure: 250 psi Kelly Bar RPM: 203 Engine RPM: 1200-1300 Drill Time: 15min 9sec Circulation loss: None Material from above: 2"
	98 	R-8	100%	5.0				
	100 —					100.0-102.9' As above except slightly fractured (bedding planes).		Run-9: Drilling Pressure: 250 psi Kelly Bar RPM: 221 Engine RPM: 1400-1500 Drill Time: 15min 50sec Circulation loss: 100%
DATE). 40	/10/00		CM	SEDTU: 5.01 DATE/TIME: 40/00/00 © 0750	NOT:	ES: NA
DATE FIELD	STARTED COMPLE GEOLOG KED BY:	TED: 10	os		GWL: D GWL: D DRILLIN	G	NOTE	ES: NA
APPR	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offest Boring Program PROJECT NO. 07-3935										
LNP-	Jitest Bor	ing Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935		
ELEVATION (FEET MSL)	££	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	E E	COORDINATES N 1724150.2 E 457769.9	SYMBOL			
EVAT	DEPTH (FEET)	MPLE	N//6" R % F & (RG	OVE	PROFILE	SURFACE EL: 42.6	SSY	REMARKS		
H (F)						DESCRIPTION	SOSN			
	1 1	R-9	98% (66%)	4.9		102.9-105.0' As above except moderately to intensely fractured.				
	104 — - - - 106 —					105.0-112.9' As above except slightly fractured (vertical fractures at 106-106.3' and 106.8-107.5').		Run-10: Drilling Pressure: 200 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300		
	108 —	R-10	100% (78%)	5.0				Drill Time: 18min 15sec Circulation loss: partial Catcher malfunction, 0.4' added to R-10 from R-11.		
	- 110 							Run-11: Drilling Pressure: 150 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400 Drill Time: 7min 29sec Circulation loss: 30%		
	112 — - - - 114 —	R-11	100% (78%)	5.0		112.9-115.9' DOLOMITE, grayish orange (10YR 7/4), moderately soft, thin bedded, moderately fractured, severely weathered, pitted, vuggy, no reaction to 1N HCI, moderate reaction when powdered, sandy.		Material from above: 0.4' Note solid core from above core run (added to Run-10).		
	116 —					115.9-116.9' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2), sandy, thinly bedded, slightly weathered, moderately fractured, no reaction to 1N HCI, moderate reaction when powdered.		Run-12: Drilling Pressure: 400 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 8min 23sec Circulation loss: 50% Water level 10/26/09 @ 0830 6.5'. Picture taken in tray has incorrect		
DATE FIELD	STARTED COMPLET GEOLOG	ED: 10/	os		GWL: D GWL: D DRILLIN		NOTE	ES: NA		
APPR	KED BY:	JL(<i></i>		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		
DRILL	DRILLING CO.: HUSS									



LNP- Offest Boring Program PROJECT NO. 07-3935										
						LOG OF BORING NO. 0-5	_			
ELEVATION (FEET MSL)	ΕÇ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1724150.2 E 457769.9	SYMBOL			
EVA'	DEPTH (FEET)	MPLE	DW/6' R % F & (RG	OVE	PROFILE	SURFACE EL: 42.6	S SY	REMARKS		
⊞ 		S Q	BL(RE(DESCRIPTION	nscs			
	118 —	R-12	100% (62%)	5.0		116.9-117.4' DOLOMITE, moderately hard, very pale orange (10YR 8/2), crystalline, thin bedded, slightly weathered, moderately fractured, moderate reaction to 1N HCI. 117.4-118.7' DOLOMITE, moderately soft, grayish orange (10YR 7/4), sandy, thin bedded, moderately weathered, slightly fractured, no reaction to 1N HCI.		date.		
	_					118.7-120.0' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2), pitted, fossiliferous, moderately to severely weathered, thin bedded, intensely fractured, no reaction to 1N HCl.				
	120 					120.0-120.5' DOLOMITE, moderately hard, grayish orange (10YR 7/4), crystalline to sandy, thin bedded, slightly weathered, unfractured, no reaction to 1N HCl, moderate reaction when powdered. 120.5-121.5' As above except intensely fractured-vertical fracture from 120.5-122.0'.		Run-13: Drilling Pressure: 350 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 11min 45sec Circulation loss: 50%		
	122 —					121.5-122.4' As above except slightly fractured.		Driller Notes: end of core fell in hole as he was bringing core out. NOTE: picture shows 84% recovery		
	_	R-13	96% (52%)	4.8		122.4-126.2' DOLOMITE, moderately hard, crystalline, very pale orange (10YR 8/2), pitted, slightly weathered, unfractured, no reaction 1N HCI, moderate reaction when powdered.	n	since it was taken before the following core run retrieved the fallen piece. Picture in tray has incorrect date.		
	124 — –									
	126 —					126.2-126.6' Same as above except laminated, moderately fractured very pale orange (10YR 8/2), no pits. 126.6-127.0' DOLOMITE, soft, pitted, fossiliferous, pale yellowish	,	Run-14: Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 9min 54sec Circulation loss: 50% Material from above: 0.6'		
	- - 128	R-14	96% (66%)	4.8		brown (10YR 6/2), severely weathered, intensely fractured, moderate reaction to 1N HCI. 127.0-128.0' Same as 126.2-126.6'.		Picture in tray shows incorrect date.		
	- - -					128.0-130.0' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2), pitted, fossiliferous, moderately weathered, slightly fractured, no reaction to 1N HCI, weak reaction when powdered.				
	130 — - - -					130.0-132.7' DOLOMITE, moderately soft, thinly laminated, grayish orange (10YR 7/4), layers of dark yellowish brown (10YR 4/2), very pale orange (10YR 8/2), and pale yellowish brown (10YR 6/2), some pits and fossils, slightly to moderately weathered, slightly fractured (horizontal-bedding planes), no reaction to 1N HCl, moderate reaction when powdered.		Run-15: Drilling Pressure: 250 psi Kelly Bar RPM: 206 Engine RPM: 1200-1300 Drill Time: 10min 50sec Circulation loss: 50%		
DATE	STARTED	: 10/	/19/09		GWL: D	PEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750	NOTE	ES: NA		
1	COMPLET				GWL: D	C				
1	GEOLOGI KED BY:	IST: WE JL(DRILLIN	NG METHOD: Mud Rotary/PQ3 coring				
APPRO	OVED BY:			_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		
DRILLING CO.: HUSS										



LNP-	Offest Bor	ing Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6	CS SYMBOL	REMARKS
		% Ō	BLO	RE(DESCRIPTION	nscs	
	132 —	R-15	100% (74%)	5.0		132.7-136.4' DOLOMITE, moderately hard, thinly bedded, sandy to crystalline, pale yellowish brown (10YR 8/2), some pits, slightly weathered, slightly to moderately fractured (horizontal-bedding planes), no reaction to 1N HCI, moderate reaction when powdered,		Picture in tray shows incorrect date.
	134 — — — —					some laminations-dark yellowish brown (10YR 4/2) at 134.7'.		Run-16: Drilling Pressure: 300 psi Kelly Bar RPM: 213
	136 — — — —	R-16	100% (32%)	5.0		136.4-136.9' As above except pale yellowish brown (10YR 6/2), unfractured. 136.9-140.0' DOLOMITE, hard, crystalline, thick bedded, pale yellowish brown (10YR 6/2) and moderate yellowish brown (10YR 5/4), pitted, some vugs, moderately weathered, intensely fractured, no		Engine RPM: 1300-1400 Drill Time: 30min 42sec Circulation loss: 50%
	138 —		(02.76)			reaction to 1N HCl, some fossils.		
	140 — — — —					140.0-141.8' DOLOMITE, very hard, pale yellowish brown (10YR 6/2 with medium gray (N5) bands, laminated, some pits, slightly weathered at 141.6' (moderate yellowish brown (10YR 5/4) and more pitted), slightly fractured, crystalline, no reaction to 1N HCl, moderate reaction when powdered. 141.8-145.8' DOLOMITE, moderately hard, very pale orange (10YR)		Run-17: Drilling Pressure: 250 psi Kelly Bar RPM: 217 Engine RPM: 1300-1400 Drill Time: 28min 24sec Circulation loss: 50% Material from above: 5"
	142 — — — — — — — — — — — — — — — — — — —	R-17	100% (100%)	5.0		8/2) and pale yellowish brown (10YR 6/2), sandy to crystalline, thin bedded, unfractured, very slightly weathered, no reaction to 1N HCl, moderate reaction when powdered.		
	_ _ 146 —					145.8-148.1' DOLOMITE, very hard, pale yellowish brown (10YR 6/2 crystalline, few fossils, more pitted at 147.7' to 148.1', unfractured,),	Run-18: Drilling Pressure: 250 psi Kelly Bar RPM: 208 Engine RPM: 1200-1300 Drill Time: 19min 50sec
DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO					GWL: D GWL: D DRILLIN	_	NOTE	ES: NA
	OVED BY: ING CO.:	HUSS			DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offest Bor	ing Prog	ram					PROJECT NO. 07-3935
			•	1		LOG OF BORING NO. 0-5		
FION MSL)	Εç	. ON .	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	OW/6" R % F & (RG	SOVE	PROFILE	SURFACE EL: 42.6		REMARKS
⊞ —		% ō	BLO	RE(DESCRIPTION	nscs	
	_	R-18	86% (74%)	4.3		very slightly weathered, thin bedded, no reaction to 1N HCl, moderate to high reaction when powdered.	e	Circulation loss: 50% Material from above: 3"
	148 — — — —					148.1-148.7' DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4), sandy, thinly laminated, severly weathered, moderately fractured along bedding planes, pitted, no reaction to 1N HCI. 148.7-150.0' DOLOMITE, moderately hard, thinly laminated, very pal orange (10YR 8/2) with light gray (NT) bands, moderately weathered unfractured, weak reaction to 1N HCI.	e	
	150 — — — —					150.0-150.3' As above except pale yellowish brown (10YR 6/2). 150.3-152.1' As above except grayish orange (10YR 7/4).		Run-19: Drilling Pressure: 200 psi Kelly Bar RPM: 215 Engine RPM: 1300-1400 Drill Time: 14min 57sec Circulation loss: 50%
	152 — _ _	R-19	100% (92%)	5.0		152.1-153.0' As above except pitted, grayish orange (10YR 7/4).		
	_ 154 — _					153.0-154.0' As above except not pitted, pale yellowish brown (10YR 6/2). 154.0-154.6' DOLOMITE, hard, thinly laminated, crystalline, yellowish gray (5Y 8/1) and light gray (N7), fresh, moderately fractured, no reaction to 1N HCl, slight reaction when powdered.		
	_ _ _ 156 —					154.6-155.0' Same as 153.0'-154.0'. 155.0-156.2' DOLOMITE, moderately hard, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), sandy to crystalline, pitted, slightly weathered, unfractured, weak reaction to 1N HCI.		Run-20: Drilling Pressure: 200 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300
-114.7	_		100%			156.2-156.6' As above except pale yellowish brown (10YR 6/2), unfractured. 156.6-157.3' Same as 155.0-156.2'.	\ '-	Drill Time: 12min 5sec Circulation loss: 50%
	158 —	R-20	(72%)	5.0		157.3-160.0' LIMESTONE, moderately hard, sandy to crystalline, ver pale orange (10YR 8/2) with light gray (N7), slightly weathered, moderately fractured, medium to strong reaction to 1N HCI.	ý	
	160 —					160.0-161.2' As above except unfractured.		Run-21: Drilling Pressure: 250 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400
DATE	STARTED	: 10	/19/09		GWL: D	EPTH: 5.9' DATE/TIME: 10/20/09 @ 0750	NOT	ES: NA
DATE	COMPLET	ED: 10	/28/09		GWL: D	EPTH: 6.3' DATE/TIME: 10/28/09 @ 1015		
	GEOLOG				DRILLIN	NG METHOD: Mud Rotary/PQ3 coring		
CHECKED BY: JLO APPROVED BY:					DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- C	Offest Bor	ing Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	H.E.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	:ILE	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
EET	DEPTH (FEET)	MPL RUI	2W/6 R % I & (RC	OVE	PROFILE	SURFACE EL: 42.6		REMARKS
<u>п</u> г.		S OF	BLO	REC		DESCRIPTION	nscs	
-118.6	162 	R-21	92% (50%)	4.6		161.2-161.9' DOLOMITE, hard, crystalline, medium light gray (N6), intensely fractured along bedding planes, fresh, no reaction to 1N HCl, moderate reaction when powdered. 161.9-163.0' DOLOMITE, moderately hard, sandy, pale yellowish brown (10YR 6/2) and light gray (N7), moderately weathered, moderately to intensely fractured along bedding planes, no reaction to		Drill Time: 19min 54sec Circulation loss: 50%
	164 —					1N HCI, some pits. 163.0-163.8' DOLOMITE, moderately soft, sandy, dark yellowish brown (10YR 4/2), pitted, moderately weathered, moderately fractured, no reaction to 1N HCI, thin bedded. 163.8-165.0' DOLOMITE, hard, pitted with some vugs, thinly laminated, moderate yellowish brown (10YR 5/4), moderately weathered, moderately fractured along bedding planes, no reaction to 1N HCI.	D.	
	166 —					165.0-166.4' DOLOMITE, moderately hard, thinly bedded, organic, sandy to crystalline, very pale orange (10YR 8/2), slightly pitted, slightly weathered, moderately fractured along bedding planes, no reaction to 1N HCI, weak reaction when powdered. 166.4-166.5' Same as 161.2-161.9'.		Run-22: Drilling Pressure: 300 psi Kelly Bar RPM: 195 Engine RPM: 1200-1300 Drill Time: 11min 48sec Circulation loss: 50%
	- 168 — -	R-22	100% (54%)	5.0		166.5-169.3' Same as 165-166.4' except very pale orange (10YR 8/2 and moderate yellowish brown (10YR 4/2), thinly laminated from 169 169.3'.)	
	- 170 — - -					169.3-170.0' DOLOMITE, hard, sandy to crystalline, pale yellowish brown (10YR 6/2), some pits,moderately fractured (vertical fractures) slightly weathered, no reaction to 1N HCl, weak reaction when powdered. 170.0-172.2' Vertical fracture.	,	Run-23: Drilling Pressure: 250 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 20min 44sec Circulation loss: 50% AIRLIFT at 170.0'
	172 — - - - 174 —	R-23	98% (46%)	4.9		172.2-172.4' Same as 161.2' to 161.9' except unfractured. 172.4-172.7' DOLOMITE, moderately hard, thinly laminated, moderate yellowish brown (10YR 5/4) with black (N1) bands (perpendicular to bedding), moderately to severely weathered, moderately fractured along bedding planes, sandy, no reaction to 1N HCI. 172.7-173.1' Same as 170.0-172.2'. 173.1-173.5' Same as 172.4-172.7' except intensely fractured. 173.5-175.3' DOLOMITE, hard, thin bedded, crystalline, pale yellowish brown (10YR 6/2), moderate yellowish brown (10YR 5/4) filled vugs, light gray (N7) beds, pitted, slightly weathered, moderatel		
			110/0-			fractured, no reaction to 1N HCl, weak reaction when powdered. 175.3-176.9' DOLOMITE, hard, thin bedded, broken at 175.3' and		Run-24: Drilling Pressure: 300 psi
DATE (STARTED COMPLET GEOLOG KED BY:	ED: 10	os		GWL: D GWL: D DRILLII		NOTE	ES: NA
APPRO	OVED BY: NG CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offest Bor	ing Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
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ION (JSL)	ΉC	Ŏ N O	& (N EC.	۲۲ (ft		COORDINATES N 1724150.2 E 457769.9	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	SURFACE EL: 42.6		REMARKS
		AS Q	BL(REC		DESCRIPTION	nscs	
	176 —					175.5', moderately fractured, moderately weathered, sandy, moderate yellowish brown (10YR 5/4) and grayish orange (10YR 7/4), no reaction to 1N HCl.		Kelly Bar RPM: 190 Engine RPM: 1100-1200 Drill Time: 23min 38sec Circulation loss: 50% Water level 10/27/09 @ 0745 6.3'.
	178 —	R-24	100% (38%)	5.0		176.9-177.6' DOLOMITE, hard, laminated, sandy, moderate yellowish brown (10YR 5/4) and light gray (N7), moderately fractured, slightly weathered, no reaction to 1N HCl. 177.6-178.3' DOLOMITE, very hard, crystalline, light gray (N7), slightly fractured, fresh, thick bedded, no reaction to 1N HCl.		100 100 100 100 E 07 10 0.0.
	_					178.3-179.4' DOLOMITE, moderately soft, sandy, moderate yellowish brown (10YR 5/4), thinly laminated, moderately weathered, pitted, slightly to moderately fractured, no reaction to 1N HCI.		
	=					179.4-180.0' Same as 175.3-176.9'.		
	180 —					180.0-181.2' DOLOMITE, hard, fossiliferous, pale yellowish brown (10YR 6/2), slightly weathered, sandy, slightly fractured, pitted, no reaction to 1N HCl, thick bedded.		Run-25: Drilling Pressure: 300-250 psi Kelly Bar RPM: 196-194 Engine RPM: 1200-1300
	- 182 —	R-25	100%	5.0		181.2-181.5' As above except thinly laminated, pale yellowish brown (10YR 6/2) and grayish orange pink (5YR 7/2). 181.5-182.5' DOLOMITE, hard, sandy to crystalline, moderate yellowish brown (10YR 5/4) and light gray (N7), slightly weathered, moderately fractured, no reaction to 1N HCl, laminated. 182.5-183.1' DOLOMITE, very hard, crystalline, thin bedded, dark		Drill Time: 13min 58sec (180-183') 8min 26sec (183-185') Circulation loss: 50%
	- 184 — -		(40%)			yellowish orange (10YR 6/6), fresh, slightly fractured, no reaction to 1N HCI. 183.1-185.0' DOLOMITE, moderately hard, moderate yellowish browr (10YR 5/4) and very light gray (N8), thinly laminated, sandy, moderately weathered, moderately to intensely fractured along bedding planes, no reaction to 1N HCI, weak reaction when powdered, pitted.	n	
	186 — —	R-26	90%	4.5		185.0-185.9' As above except unfractured. 185.9-186.2' DOLOMITE, same as 182.5-183.1'. 186.2-188.3' DOLOMITE, moderately soft, thinly laminated, moderate yellowish brown (10YR 5/4) with dark gray (N3) bands, sandy, moderately to intensely weathered, intensely fractured along bedding planes, no reaction to 1N HCl, very soft and weathered at 188.1-188.3' (possible core loss zone).		Run-26: Drilling Pressure: 200 psi Kelly Bar RPM: 198 Engine RPM: 1200-1300 Drill Time: 10min 54sec Circulation loss: 100% Material from above: 1"
	188 — — — —		(26%)			188.3-190.0' DOLOMITE, crystalline, very hard, thick bedded, intensely fractured, fresh, blocky, light gray (N7), no reaction to 1N HCl.		
	190 —					190.0-192.0' DOLOMITE, moderately hard, fossiliferous, thick		Run-27:
DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS					GWL: D GWL: D DRILLIN	EPTH: 5.9' DATE/TIME: 10/20/09 @ 0750	NOTE	ES: NA
CHECKED BY: JLO APPROVED BY:					DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS				ŕ		-



LNP- Offest Bor	ing Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935	
ELEVATION (FEET MSL) DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6	USCS SYMBOL	REMARKS	
-153.0 - 196 198 200 202 204 204 204	R-27	92% (12%)	· · · · · · · · · · · · · · · · · · ·		DESCRIPTION bedded, very pale orange (10YR 8/2), sandy to crystalline, slightly weathered, moderately fractured (angular and vertical), no reaction to 1N HCI, weak reaction when powdered. 192.0-192.2' Same as above except crushed. 192.2-194.2' DOLOMITE, moderately hard, sandy, pitted, pale yellowish brown (10YR 6/2), thin bedded to laminated at 194.0-194.2' moderately weathered, moderately fractured, no reaction to 1N HCI. 194.2-195.0' DOLOMITE, moderately hard, thinly laminated, sandy to crystalline, pale yellowish brown (10YR 6/2) with dark yellowish brown (10YR 4/2) bands, slightly weathered, slightly fractured, no reaction to 1N HCI. 195.0-195.3' Same as 188.3-190.0'. 195.6-197.0' DOLOMITE, moderately hard, thin bedded, intensely fractured, slightly weathered, sandy to crystalline, pale yellowish brown (10YR 6/2), no reaction to 1N HCI. 197.0-201.0', DOLOMITE, hard, sandy, pitted, slightly fractured, thin bedded, moderate yellowish brown (10YR 5/4), moderately weathered, no reaction to 1N HCI. 201.0-202.6' DOLOMITE, hard, sandy, pitted, slightly fractured, thin bedded, moderate yellowish brown (10YR 5/4), moderately weathered, no reaction to 1N HCI.	,	Drilling Pressure: 200 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 6min 7sec Circulation loss: 100% Material from above: 4" Run-28: Drilling Pressure: 200 psi Kelly Bar RPM: 225 Engine RPM: 1400-1500 Drill Time: 8min 8sec Circulation loss: 100% Material from above: 0.8" Run-29: Drilling Pressure: 250 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 10min 40sec Circulation loss: 100% Material from above: 0.4"	
DATE STARTED: 10/19/09 GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 NOTES: NA DATE COMPLETED: 10/28/09 GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 FIELD GEOLOGIST: WDS DRILLING METHOD: Mud Rotary/PQ3 coring CHECKED BY: JLO							ES: NA	
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS								



LNP- 0	Offest Bor	ina Proa	ram					PROJECT NO. 07-3935
	J.11001 201					LOG OF BORING NO. 0-5		
rion ASL)	H (SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE LE	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
ELEVATION (FEET MSL)	ОЕРТН (FEET)	MPLE	DW/6" R % F & (RG	OVE	PROFILE	SURFACE EL: 42.6		REMARKS
田市		S O	BLC	REC		DESCRIPTION	nscs	
	206 —	R-30	66%	3.3		205.0-208.2' DOLOMITE, broken, intensely fractured/rubble, pitted, medium light gray (N6) and pale yellowish brown (10YR 6/2), weathered, crystalline to sandy, no reaction to 1N HCl.		Run-30 Drilling Pressure: 450 psi Kelly Bar RPM: 195 Engine RPM: 1200-1300 Drill Time: 2min 58sec (205-208') 4min 52sec (208-210') Circulation loss: 100% Material from above: 5" Driller Notes: soft drilling from 205'-208', chattering.
	208 —		(0%)			208.2-208.7' DOLOMITE, soft, powdery, very pale orange (10YR 8/2 with pale yellowish brown (10YR 6/2), thin bedded, severely weathered, intensely fractured, no reaction to 1N HCI. 208.7-210.9' DOLOMITE, moderately hard, sandy, pitted, pale yellowish brown (10YR 6/2), moderately weathered, moderately to intensely fractured, no reaction to 1N HCI.)	Run-31:
	212 — - - - - - 214 —	R-31	90% (48%)	4.5		210.9-211.6' DOLOMITE, moderately soft, laminated, very pale orange (10YR 8/2) and pale yellowish brown (10YR 6/2), some pits, powdery, moderately weathered, unfractured, no reaction to 1N HCI. 211.6-212.4' As above except fossiliferous. 212.4-212.6' As above except intensely fractured. 212.6-212.9' DOLOMITE, very hard, crystalline, moderately fractured (angular and vertical), light gray (N7), fresh, weak reaction to 1N HCI 212.9-213.3' DOLOMITE, moderately soft, thinly laminated, moderately weathered, unfractured, sandy, moderate yellowish brow (10YR 5/4), no reaction to 1N HCI, weak reaction when powdered. 213.3-215.0', DOLOMITE, moderately soft, yellowish gray (5Y 7/2),		Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 9min 5sec Circulation loss: 100%
	216 —	R-32	66% (0%)	3.3		moderately weathered, unfractured, pits filled with very pale orange (10YR 8/2), no reaction with 1N HCI. 215.0-217.5' As above except intensely fractured/crushed/rubble. 217.5-217.9' DOLOMITE, moderately hard, sandy with shells, fossiliferous, pale yellowish brown (10YR 6/2), severely weathered, pitted, moderately fractured, no reaction to 1N HCI. 217.9-219.3' DOLOMITE, moderately soft, severely weathered, sandy, some pits, grayish orange pink (5YR 7/2), slightly fractured, no reaction to 1N HCI.	D	R-32: Drilling Pressure: 250 psi Kelly Bar RPM: 215 Engine RPM: 1300-1400 Drill Time: 6min 42sec (215-217') 2min 28sec (217-220') Circulation loss: 100% Material from above: 0.4' from first drill run. 0.6' from second drill run.
DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS					GWL: C GWL: C DRILLI	<u> </u>	NOTE	ES: NA
APPR	KED BY: OVED BY: ING CO.:	JL(HUSS	O		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offest Bor	ina Proa	ram			PROJECT NO. 07-3935		
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rion MSL)	гн Т)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE LE	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	MPLE RUN	2W/6" R % F & (RC	SOVE	PROFILE	SURFACE EL: 42.6	SS SY	REMARKS
		S Q	BL(REC		DESCRIPTION	nscs	
	220 —					219.3-221.1' DOLOMITE, moderately hard, sandy to crystalline, slightly weathered, intensely fractured, grayish orange (10YR 7/4), thick bedded, no reaction to 1N HCI.		R-33: Drilling Pressure: 250 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400
	222 — - - - - 224 —	R-33	78% (18%)	3.9		221.1-222.0' DOLOMITE, moderately soft, sandy, grayish orange (10YR 7/4), thin bedded, severely weathered, unfractured, no reaction to 1N HCI. 222.0-222.5' DOLOMITE, soft, sandy, severely weathered, pale yellowish brown (10YR 6/2), intensely fractured, thin bedded, no reaction to 1N HCI. 222.5-223.1' DOLOMITE, moderately hard, thinly laminated, grayish orange (10YR 7/4) and very pale orange (10YR 8/2), sandy, slightly weathered, moderately fractured, no reaction to 1N HCI. 223.1-223.3' As above except intensely fractured/crushed. 223.3-228.0' DOLOMITE, soft, sandy, severely weathered, intensely		Drill Time: 3min 35sec Circulation loss: 100% Material from above: 0.4'
	226 —					fractured, moderate yellowish brown (10YR 5/4), pitted, no reaction with 1N HCI.		Run-34: Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 1min 29sec Circulation loss: 100% Material from above: 0.6'
	228 — - -	R-34	74% (18%)	3.7		228.0-228.3' As above except very soft. 228.3-230.0' As above except moderately soft.		
	230 —	R-35	8% (0%)	0.4		230.0-234.5' DOLOMITE as above.		Run-35: Drilling Pressure: 250 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 4min 48sec Circulation loss: 100% Material from above: 0.4' Driller Notes: very soft except last 6". Possibly piece stuck in bottom of shoe affected recovery. Drillers had to AIRLIFT two times to
DATE	234 STARTED	· 10	/19/09		GWL: D	EPTH: 5.9' DATE/TIME: 10/20/09 @ 0750	NOTE	clean hole of cuttings from soft dolomite.
DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS					GWL: D	<u> </u>		
CHECKED BY: JLO APPROVED BY: DRILLING CO.: HUSS					DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DKILL	ING CO.:	ทบรร						



LNP- Offest Boring Program LOG OF BORING NO. 0-5										
	LOG OF BORING NO. 0-5									
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. OR % REC. & (RQD) RECOVERY (ft.)	COORDINATES N 1724150.2 E 457769.9	SYMBOL								
LEVATIO EET MS DEPTH (FEET) NMPLE N R RUN N R RUN N R REG & (RQD)	N 1724150.2 E 457769.9 O SURFACE EL: 42.6	SS S)	REMARKS							
SA OF O	DESCRIPTION	nscs								
236—	234.5-235.0' DOLOMITE, very hard, fresh, crystalline, intensely fractured, thick bedded, grayish orange (10VR 7/4), no reaction to 1N HCl. 235.0-237.4' DOLOMITE, moderately hard, hard at 236.7', sandy to crystalline, pale yellowish brown (10YR 6/2), slightly to moderately fractured along bedding planes, slightly weathered, broken at 235.8' and 236.6', no reaction to 1N HCl, thick bedded. 237.4-240.0' DOLOMITE, moderately soft, thinly laminated, grayish orange (10YR 7/4) to moderate yellowish brown (10YR 5/4), sandy, intensely fractured, intensely weathered, no reaction to 1N HCl. BOTTOM OF BORING 240'		Run-36 Drilling Pressure: 350 psi Kelly Bar RPM: 194 Engine RPM: 1200 Drill Time: 4min 54sec Circulation loss: 100% Material from above: 0.6' NOTE: Includes a large piece of hard dolomite which had been stuck in core barrel. This was affecting the recovery from above based on drillers statement. Water level 10/28/09 @ 1015 6.3'							
DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS	GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 N GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 DRILLING METHOD: Mud Rotary/PQ3 coring	NOTE	ES: NA							
CHECKED BY: JLO APPROVED BY: DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody F	RIG:	Failing 1500							



LNP- Offset Boring Program	1		LOG OF BORING NO. O-6		PROJECT NO. 07-3935
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. BLOW/6" & (N)	OR % REC. & (RQD) RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION	USCS SYMBOL	REMARKS
0	09	GWL. D	0.0-5.0' POORLY GRADED SAND (sp), fine grained, well sorted. 5.0-13.0' SANDY CLAY (cl), low plasticity, sand-fine grained (40%), clay (60%).	sp cl	0-14' Drilled destructively-log based on cuttings.
DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DRILLING CO.: HUSS			IG METHOD: Mud Rotary/PQ3 Coring	RIG:	Failing 1500



LNP- Offset I	Boring Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
(FEET MSL) DEPTH (FEET)	SAMPLE NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION	USCS SYMBOL	REMARKS
29.2 13.5· 28.2 15· 16.5· 18. 19.5·	OB-2	76% (34%)	3.8		13.0-14.0' CLAYEY SAND. 14.0-19.0' DOLOMITE, moderately hard, grayish orange (10YR 7/4), weak reaction to 1N HCl when powdered, fresh to slightly weathered, slightly pitted, few vugs, slightly fractured (horizontal-bedding planes) thick bedded, coarse grained. 17.6-19' Vertical fracture, becomes moderately soft. 19.0-22.3' DOLOMITE, as above except fossiliferous, slightly to moderately weathered, slightly fractured (horizontal).	' sc	Switched to Coring OB-1: Drilling Pressure: 250-300 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 15min 8sec Circ. Loss: None Driller Notes: 14.8-16.0' core loss zone. OB-2: Drilling Pressure: 250 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 27min 44sec Circ. Loss: None NOTE: Lots of rig chatter, 0.1' fall- in from above.
DATE START DATE COMPI FIELD GEOL CHECKED BY	LETED: 11 DGIST: JL 7: W	0			EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 NG METHOD: Mud Rotary/PQ3 Coring		ES: NA
APPROVED E				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	KIG:	Failing 1500



LOG OF BORING NO. O-6 COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION	LNP- (Offset Bor	ina Proa	ram					PROJECT NO. 07-3935
22.5-22.5 Pubble zone. 22.5-24 DOLOMITE, an above except moderately hard to hard, few fossis, vertical fracture 22.6-24.0°, more crystalline. 24.24 DOLOMITE, moderately hard to moderately soft, moderately weathered, pilted/prous, sone fossis, thick dedded, slightly weathered, pilted/prous, sone fossis, thick dedded, slightly weathered, pilted/prous, sone fossis, thick dedded, slightly weathered, charge (10/18 6/6), moderatel to strong reaction to 1N HCl when powdered, charge grained, firable. 26.5 — OB-3 72% (eith) 3.6 6 27 — 28.5 — OB-3 72% (eith) 3.6 6 29.30° DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, charge grained, firable. OB-3 (eith) Bar RPM 211 Engine RPM: 1200-1400 Deliming Pressure: 200-250 psi kell by Bar RPM 211 Engine RPM: 1200-1400 Deliming Pressure: 150-200 psi weather powdered, charge grained, firable. OB-3 (eith) Bar RPM 211 Engine RPM: 1200-1400 Deliming Pressure: 150-200 psi weathered, fossiliferous, few yeap, weak reaction to 1N HCl weather provided and provi	Livi	on set bor	ilig i rogi				LOG OF BORING NO. O-6		1 NOOLOT NO. 07-3333
22.5-22.5 Pubble zone. 22.5-24 DOLOMITE, an above except moderately hard to hard, few fossis, vertical fracture 22.6-24.0°, more crystalline. 24.24 DOLOMITE, moderately hard to moderately soft, moderately weathered, pilted/prous, sone fossis, thick dedded, slightly weathered, pilted/prous, sone fossis, thick dedded, slightly weathered, pilted/prous, sone fossis, thick dedded, slightly weathered, charge (10/18 6/6), moderatel to strong reaction to 1N HCl when powdered, charge grained, firable. 26.5 — OB-3 72% (eith) 3.6 6 27 — 28.5 — OB-3 72% (eith) 3.6 6 29.30° DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, charge grained, firable. OB-3 (eith) Bar RPM 211 Engine RPM: 1200-1400 Deliming Pressure: 200-250 psi kell by Bar RPM 211 Engine RPM: 1200-1400 Deliming Pressure: 150-200 psi weather powdered, charge grained, firable. OB-3 (eith) Bar RPM 211 Engine RPM: 1200-1400 Deliming Pressure: 150-200 psi weathered, fossiliferous, few yeap, weak reaction to 1N HCl weather provided and provi	TION MSL)	гн .T.)	NO.	' & (N) REC. ND)	RY (ft.)	ILE		MBOL	
22.5-22.5 Pubble zone. 22.5-24 DOLOMITE, an above except moderately hard to hard, few fossis, vertical fracture 22.6-24.0°, more crystalline. 24.24 DOLOMITE, moderately hard to moderately soft, moderately weathered, pilted/prous, sone fossis, thick dedded, slightly weathered, pilted/prous, sone fossis, thick dedded, slightly weathered, pilted/prous, sone fossis, thick dedded, slightly weathered, charge (10/18 6/6), moderatel to strong reaction to 1N HCl when powdered, charge grained, firable. 26.5 — OB-3 72% (eith) 3.6 6 27 — 28.5 — OB-3 72% (eith) 3.6 6 29.30° DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, charge grained, firable. OB-3 (eith) Bar RPM 211 Engine RPM: 1200-1400 Deliming Pressure: 200-250 psi kell by Bar RPM 211 Engine RPM: 1200-1400 Deliming Pressure: 150-200 psi weather powdered, charge grained, firable. OB-3 (eith) Bar RPM 211 Engine RPM: 1200-1400 Deliming Pressure: 150-200 psi weathered, fossiliferous, few yeap, weak reaction to 1N HCl weather provided and provi	EVA'	DEP' (FEE	MPLE	OW/6' R % F & (RG	OVE	ROF	SURFACE EL: 42.2	S SY	REMARKS
22.5.24 OLOMITE, as above except moderately hard to hard, few fossils, vertical fracture 22.5.24.07, more crystalline. 24.29° DOLOMITE, moderately hard to moderately self, moderately weathered, pitted procus, some fossils, their backfed, slightly weathered, pitted procus, some fossils, their backfed, slightly weathered, pitted procus, some fossils, their backfed, slightly weathered (10°N 616), moderately hard to moderately self, moderately weathered to strong reaction to 1N HCl when powdered, coarse grained, friable. 25.5 — OB-3 77%, (46%) 3.6 6 27 — OB-3 77%, (46%) 3.6 6 28 — OB-3 77%, (46%) 3.6 6 OB-3 Pressure: 200-230 pai fossils from the powdered, coarse grained, friable, all physical to strong reaction to 1N HCl when powdered, grayleth orange (10°N 7.4°/4) to pale yellowish brown (10°N 8.2°). OB-4 (46%) 30.0-34.0° DOLOMITE, moderately hard, unfractured, thick badded, slightly weathered; fossilifarous, few vugs, weak reaction to 1N HCl when powdered, grayleth orange (10°N 7.4°/4) to pale yellowish brown (10°N 8.2°). OB-4 (46%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-4 (56%) 30.0-34.0° DOLOMITE, same as 24.0-29.0°. OB-5 (56%) 30.0-34.0° DOLOMITE, same as 24.0-2	H EI		S O	BLC	REC		DESCRIPTION)SN	
weethered, pitter/glorous, some fossils, thick bedded, slightly fractured (bedding planes), graysh orange (10/R 74) to dark yellowish orange (10/R 6/6), moderate to strong reaction to 1N HCl when powdered, coarse grained, friable. 28.5 — 28.5 — 29.50' DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliforous, few rugs, weak reaction to 1N HCl when powdered, graysh orange (10/R 74) to pale yellowish brown (10/R 8/2). 30 — 31.5 — OB-4 (10/R 6/2), 2.9 (10/R 6/2), and the process of the process of the powdered of the process of		22.5 — —					22.5-24' DOLOMITE, as above except moderately hard to hard, few		
28.5 — OB-3 (46%) 3.6 29-30' DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few vugs, weak reaction to 1N HCI when powdered, grayish orange (10YR 7/4) to pale yellowish brown (10YR 8iz). 30 — 31.5 — OB-4 (32%) 2.9 20 20 20 20 20 20 20 20 20 20 20 20 20		- 24 — - -					weathered, pitted/porous, some fossils, thick bedded, slightly fractured (bedding planes), grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), moderate to strong reaction to 1N HCl		Drilling Pressure: 200-250 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 20min 6sec Circ. Loss: None
29-30' DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few vugs, weak reaction to IN HCI when powdered, graysh orange (10YR 7/4) to pale yellowish brown (10YR 6/2). 30.0-34.0' DOLOMITE, same as 24.0-29.0'. DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 PIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DATE STARTED: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		25.5 — — —	OB-3		3.6				NOTE: lots of rig chatter approximately halfway through run.
29-30' DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI when powdered, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2). 30.0-34.0' DOLOMITE, same as 24.0-29.0'. DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DATION TO DOLOMITE, moderately hard, unfractured, thick bedded, sellightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI when powdered, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2). 30.0-34.0' DOLOMITE, same as 24.0-29.0'. DOLOMITE, moderately hard, unfractured, thick bedded, sellightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI when powdered, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2). Solution of the Complex o		- - -							
31.5 — OB-4 (32%) 2.9		- - -					slightly weathered, fossiliferous, few vugs, weak reaction to 1N HCI when powdered, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2).		Drilling Pressure: 150-200 psi Kelly Bar RPM: 217 Engine RPM: 1300-1400 Drill Time: 10min 45sec Circ. Loss: None NOTE: Picture for OB-4 not taken
DATE COMPLETED: 11/2/09 GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/PQ3 Coring CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		31.5 —	OB-4		2.9				
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	DATE	DATE COMPLETED: 11/2/09					EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845	NOTE	I ES: NA
	APPRO	OVED BY:		os	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LOG OF BORING NO. O-6 COORDINATES N 172/0805.3 E 45783.4 SURFACE EL: 42.2 DESCRIPTION 33.3 OB-5 OB-5 OB-6 OB-6 OB-6 OB-6 OB-6 OB-7 OB-6 OB-7 OB-7 OB-7 OB-7 OB-7 OB-7 OB-7 OB-7 OB-8 OB	LNP- 0	LNP- Offset Boring Program PROJECT NO. 07-3935									
34.0.39.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard slightly weathered, some fosalis, slightly fractured (horizontal-bedding planes), few yougs, moderate to strong reaction to 1N HCI when powdered, thick bedded. 37.5 — OB-6 (77%) 4.7 (70%) 1.0 (70			-5 · · · · · ·				LOG OF BORING NO. O-6				
34.0.39.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard slightly weathered, some fosalis, slightly fractured (horizontal-bedding planes), few yougs, moderate to strong reaction to 1N HCI when powdered, thick bedded. 37.5 — OB-6 (77%) 4.7 (70%) 1.0 (70	TION MSL)	TH (T:	N N O O	" & (N) 3EC. 1D)	RY (ft.)			/MBOL			
34.0.39.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard slightly weathered, some fosalis, slightly fractured (horizontal-bedding planes), few yougs, moderate to strong reaction to 1N HCI when powdered, thick bedded. 37.5 — OB-6 (77%) 4.7 (70%) 1.0 (70	EVA ⁻	DEP' (FEE	MPLE	DW/6' R % F & (RG	OVE	NROF	SURFACE EL: 42.2	SSY	REMARKS		
34.5 — 34.5 — OB-5 Serv. 4.7 334.5 — OB-6 TOOK. 1.0	<u>п</u> .		ς Q Q	BL(REC		DESCRIPTION	OSC			
41.0-41.4 Degraded DOLOMITE, pale yellowish brown (10YR 6/2), 80% silt, 20% dolomite gravel, no plasticity, gravel crushes easily. 41.4-50.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately soft, pitted/porous, moderately to severly weathered, coarse grained, few vugs, some fossils, medium bedded, intensely fractured, moderate to strong reaction to 1N HCl when powdered.		34.5 — 36 — 37.5 — 39 — 39 — 39 — 39 — 39 — 39 — 39 — 3	OB-5	94% (72%)	4.7		34.0-39.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, slightly weathered, some fossils, slightly fractured (horizontal-bedding planes), few vugs, moderate to strong reaction to 1N HCl when powdered, thick bedded. 39-40' DOLOMITE, moderately hard to moderately soft, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4) strong reaction to 1N HCl when powdered, thick bedded, with thin lenses of dark yellowish brown (10YR 4/2), moderately weathered, pitted, sandy texture, moderately fractured (bedding planes).		Drilling Pressure: 250 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 39min 8sec Circ. Loss: None NOTE: 0.2' fall-in from above. OB-6: Drilling Pressure: 300 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400 Drill Time: 1min 40sec Circ. Loss: None Set casing to 40'. Run-1: Drilling Pressure: 250-300 psi Kelly Bar RPM: 192		
DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: APPROVED BY: DATE STARTED: 10/29/09 GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 DRILLING METHOD: Mud Rotary/PQ3 Coring DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	DATE FIELD CHEC	43.5— STARTED COMPLET GEOLOG KED BY:	: 10/ FED: 11/ IST: JL(WE	(0%) (29/09 (2/09	2.6	GWL: D	80% silt, 20% dolomite gravel, no plasticity, gravel crushes easily. 41.4-50.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately soft, pitted/porous, moderately to severly weathered, coarse grained, few vugs, some fossils, medium bedded, intensely fractured, moderate to strong reaction to 1N HCl when powdered. EPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 NG METHOD: Mud Rotary/PQ3 Coring	NOTE	Engine RPM: 1100-1200 Drill Time: 8min 20sec Circ. Loss: None		



I NP- (LNP- Offset Boring Program PROJECT NO. 07-39									
LIVI - V	Jiiget Boi	ing r rog				LOG OF BORING NO. O-6		- TROUEST NO. 07-3333		
ELEVATION (FEET MSL)	ΕÇ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1724065.3 E 457853.4	SYMBOL			
EVA ⁻	DEPTH (FEET)	MPLE	OW/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 42.2	S SY	REMARKS		
EI (F		SA	BL(REC		DESCRIPTION	nscs			
	 45 					45.0' Becomes moderately fractured (horizontal).		Run-2: Drilling Pressure: 200 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 10min 20sec Circ. Loss: None 0.2' Fall-in from above.		
	48.5 — 49.5 — -	R-2	60% (18%)	3.0						
	51 — - - - - - 52.5 — - -	R-3	90%	4.5		50.0-55.0' DOLOMITE, moderately hard, moderately weathered, pitted/porous, pale yellowish brown (10YR 6/2) and dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), moderately fractured (vertical fractures 50.9-51.6' and 53-53.8'), thick bedded, weak to moderate reaction to 1N HCl when powdered, some fossils.		Run-3: Drilling Pressure: 200-250 psi Kelly Bar RPM: 197 Engine RPM: 1200-1300 Drill Time: 13min 1sec Circ. Loss: None Water level 10/30/09 @ 0745 5.8'.		
DATE	54 — - - STARTED	. 10	29/09	T	GWL: D	EPTH: 5.8' DATE/TIME: 10/30/09 @ 0745	NOTE	ES: NA		
DATE FIELD	DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO					DATE/TIME: 10/30/09 @ 0745 EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 NG METHOD: Mud Rotary/PQ3 Coring	NUIE	LS. IVA		
APPR	KED BY:	WI)S		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		
DKILL	ING CO.:	HUSS								



LNP- (Offset Bori	ing Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION	USCS SYMBOL	REMARKS	
	=		Ш	R	77777		+		
	55.5 — —					55.0-61.6' DOLOMITE, same as above except 55.7-55.9' thin layer of crystalline dolomite, pale yellowish brown (10YR 6/2), moderately hard to hard, pitted in very thin bands, strong reaction to 1N HCl when dry/powdered, thin bedded, no fossils, moderately fractured (horizontal).		Run-4: Drilling Pressure: 200 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 14min 10sec Circ. Loss: None	
	57 	R-4	88% (38%)	4.4					
	58.5 — - - -								
	60 — - - - -					Vertical fracture 60.0-64.6'.		Run-5: Drilling Pressure: 200 psi Kelly Bar RPM: 192 Engine RPM: 1100-1200 Drill Time: 25min 50sec Circ. Loss: None	
	61.5 — — — — — — — — — — — — — — — — — — —	R-5	96% (28%)	4.8		61.6-62.0' DOLOMITE, moderately soft, friable, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), thinly laminated with dark yellowish brown (10YR 4/2) layers, weak to moderate reaction to 1N HCl when powdered, slightly fractured, moderately weathered, silty/sandy texture, pitted, no fossils. 62.0-64.2' DOLOMITE, moderately hard to hard, pale yellowish brown (10YR 6/2), pitted in bands, moderately fractured, some very thin organic (black) lenses throughout, weak to moderate reaction to 1N HCl when powdered.			
	64.5 —					64.2-65' DOLOMITE, same as 61.6-62.0'.		Dun 6	
						65.0-66.4' DOLOMITE, same as 64.2-65.0'.		Run-6: Drilling Pressure: 150 psi Kelly Bar RPM: 211 Engine RPM: 1400-1500	
DATE FIELD	DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					EPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 NG METHOD: Mud Rotary/PQ3 Coring	NOTE	ES: NA	
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500	
DRILL	APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS								



LNP- (LNP- Offset Boring Program PROJECT NO. 07-3935									
	Jiioct Boi	g i iog				LOG OF BORING NO. O-6	_	1100201110.07 0000		
ELEVATION (FEET MSL)	тн :Т)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724065.3 E 457853.4	SYMBOL			
EVA'	ОЕРТН (FEET)	MPLE RUN	DW/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 42.2	SS SY	REMARKS		
EL (F		SA OF	BLC	BEC		DESCRIPTION	nscs			
() ()	66 — 67.5 — 67.5 — 70.5 — 72 — 72 —	R-6	100% (32%)	5.0		66.4-69.1' DOLOMITE, moderately hard to moderately soft, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4), thick bedded, moderately weathered, pitted/porous, few vugs, few very this black organic lenses, few fossils, moderately fractured-mostly horizontal along bedding planes (67.7-68' and 68.7-69.1' intensely fractured), moderate to strong reaction to 1N HCI when powdered. 69.1-69.5' As above except very pitted/fossiliferous. 69.5-70.0' DOLOMITE, as at 65.0-66.4'. 70.0-71.0' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2), slightly to moderately weathered, pitted/porous, few vugs, some fossils, thick bedded, unfractured (1 horizontal break at 70.7'), moderate to strong reaction to 1N HCI when powdered. 71.0-72.0' As above except with lenses/very thin layers of crystalline dolomite, intensely fractured.		Drill Time: 9min 42sec Circ. Loss: None Run-7: Drilling Pressure: 200 psi Kelly Bar RPM: 197 Engine RPM: 1200-1300 Drill Time: 22min 10sec (70-72.5') 2.4' recovery 22min 21sec (72.5-75') Circ. Loss: None Driller Notes: soft at 72.5'		
DATE FIELD CHEC	73.5 — 75 — 76.5 — STARTED COMPLET GEOLOG KED BY:	TED: 11. IST: JL: WI	0	3.6		1N HCl when dry, pitted in very thin bands, no fossils, intensely fractured. 72.5-75.0' DOLOMITE, same as 71.0-72.0' except slightly fractured. 75.0-75.5' DOLOMITE, moderately hard, moderately weathered, pitted/porous, fossiliferous, few vugs, medium bedded, few very thin black organic lenses, moderately fractured (horizontal break at 75.3') moderate to strong reaction to 1N HCl when powdered. 75.5-80.0' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2) t light olive gray (5G 6/1), moderately to intensely fractured, pitted/ fossiliferous in bands, strong reaction to 1N HCl when dry, fresh to slightly weathered, thick bedded. EPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 NG METHOD: Mud Rotary/PQ3 Coring	NOTE	Run-8: Drilling Pressure: 150 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 45min 14sec Circ. Loss: None NOTE: 0.5' fall-in from above. ES: NA		
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		
PKILL	ING CO.:	CCULI								



LNP- (LNP- Offset Boring Program PROJECT NO. 07-3935											
	LOG OF BORING NO. O-6											
ELEVATION (FEET MSL)	гн Т)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724065.3 E 457853.4	SYMBOL					
EVA ⁻	DEPTH (FEET)	MPLE	DW/6" R % F & (RC	OVE	PROFILE	SURFACE EL: 42.2	SS SY	REMARKS				
田田		& Q	BL(REC		DESCRIPTION	nscs					
	78 — 78 — 79.5 —	R-8	74% (14%)	3.7		76.9' Becomes moderately weathered (dark yellowish orange (10YR 6/6)), friable in very thin zones.						
-37.8 -39.3	81 — - - 81 — - - - 82.5 —	R-9	80%	4.0		80.0-81.5' LIMESTONE, very light gray (N8) to light olive gray (5Y 6/1), moderately hard, medium bedded, with some light gray (N7) lenses, strong reaction to 1N HCl, vug at 80.5-80.6'-not continuous, fresh to slightly weathered, slightly fractured, pitted/fossiliferous in thin bands, 81.2-81.5', intensely fractured. 81.5-81.8' Crystalline DOLOMITE as at 75.5-80.0'. 81.8-85' DOLOMITE, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), moderately hard, moderately weathered pitted/porous, fossiliferous, thick bedded, slightly fractured (horizontal-bedding planes only), strong reaction to 1N HCl when	·	Run-9: Drilling Pressure: 200 psi Kelly Bar RPM: 208 Engine RPM: 1300 Drill Time: 36min 10sec Circ. Loss: None NOTE: 0.8' fall-in from above.				
DATE	84 — 85.5 — 87 —	R-10	92% (52%)	4.6		85.0-88.2' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), slightly weathered, pitted, fossiliferous, few vugs, thick bedded, slightly to moderately fractured (vertical fractures 86.5-87.2' and 87.5 88.1'), few thin pockets of black organic material, strong reaction to 1N HCl when powdered.	-	Run-10: Drilling Pressure: 150 psi Kelly Bar RPM: 212 Engine RPM: 1300-1400 Drill Time: 23min 32sec Circ. Loss: None NOTE: 0.1' fall-in from above.				
DATE FIELD	DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO				GWL: D GWL: D DRILLIN		NOTE	ES: NA				
APPR	KED BY: OVED BY: ING CO.:		OS	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500				



LNP- (Offset Bori	ng Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-393
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4	SYMBOL	DEMARKS
EV/	EEEE	MPL RRU	2W/6 R % & (R	SOVE)RO	SURFACE EL: 42.2	S SS	REMARKS
⊞ ()		S, O	BL(BEC		DESCRIPTION	SOSN	
	91.5 — 93 — 94.5 — 96 — —	R-11	100% (50%)	5.0		88.1-88.2' Crushed zone. 88.2-90.0' DOLOMITE, moderately hard to moderately soft, yellowish gray (5Y 8/1) to very pale orange (10YR 8/2), mottled with light bluisl gray (5B 7/1), strong reaction to 1N HCl when powdered, slightly to moderately weathered, medium to thick bedded, slightly fractured (horizontal fracture at 89.0'). 90.0-91.9' DOLOMITE, dark yellowish orange (10YR 6/6) to pale yellowish brown (10YR 6/2), moderately hard, moderately weathered pitted, fossiliferous, thick bedded, slightly fractured (horizontal-bedding planes only), few very thin black organic lenses, strong reaction to 1N HCl when powdered. 91.9-93.0' Transitional zone, mix of DOLOMITE as above and DOLOMITE, yellowish gray (5Y 7/2), moderately soft, fresh to slightly weathered, no fossils, silty texture when weathered, strong reaction to 1N HCl when powdered, few pits, medium to thick bedded, unfractured. 93.0-95.0' DOLOMITE (yellowish gray (5Y 7/2) as above) except with very thin laminae of medium light gray (N6). 94.1-95.0' Becomes moderately to intensely fractured- vertical fractures. 95.8-96.2' Very thinly laminated DOLOMITE and black organic material, moderately soft to soft, moderately weathered, moderately to intensely fractured (vertical fracture 95.8-96.8'), strong reaction to 1N HCl when powdered. 96.2-100.0' DOLOMITE, yellowish gray (5Y 7/2), moderately hard to	, ,	Run-11: Drilling Pressure: 200 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 37min 45sec Circ. Loss: None Run-12: Drilling Pressure: 200 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 10min 25sec Circ. Loss: None
DATE	97.5 — — — — — — — — — STARTED:	ED: 11		5.0	GWL: D	EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845		ES: NA
	GEOLOGI KED BY:	ST: JL0 W[DKILLI	NG METHOD: Mud Rotary/PQ3 Coring		
	OVED BY:	VVL		f	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS				•		



LNP- Offset Boring Program LOG OF BORING	G NO. O-6	PROJECT NO. 07-3935
	oinates 🤘	
N 1724062:3 N 1724062:3 N 1724062:3 N 1724062:3 N 1724062:3 N 1724062:3	E EL: 42.2	REMARKS
DESCF	E EL: 42.2	
99 — 100.0-106.1' DOLOMITE, modera	tely hard to moderately soft.	13:
moderately weathered, pitted, fos thick bedded, slightly fractured (very thin black organic layers, strong powdered.	org reaction to 1N HCl when Drillir (Sy 7/2), few ong reaction to 1N HCl when Drillir (Drill)	ng Pressure: 200 psi Bar RPM: 205 ne RPM: 1200-1300 Fime: 9min 38sec Loss: None
102 — R-13 94% 4.7 102.1- 102.7' Intensely fractured.		
103.5	Kelly Engir Drill Circ.	14: ng Pressure: 200 psi Bar RPM: 202 ne RPM: 1200-1300 Fime: 10min 23sec Loss: None
107-110').	derately fractured (vertical fracture as pitted, silty texture at weathered	
DATE STARTED: 10/29/09 GWL: DEPTH: 5.8' DATE/TI	ME: 10/30/09 @ 0745 NOTES: N	A
	ME: 11/2/09 @ 0845	
	ER: Chad/Cody RIG: Failin	g 1500



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	TH (T:	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	:ILE	COORDINATES N 1724065.3 E 457853.4	SYMBOL	
EVA EET	DEPTH (FEET)	MPL RUI	2W/6 R % I	OVE	PROFILE	SURFACE EL: 42.2		REMARKS
밐匠		SA	BLC	REC		DESCRIPTION	nscs	
	- - 1111 — - - -		92%			110.0-115.0' DOLOMITE, moderately soft to moderately hard, yellowish gray (5Y 7/2), slightly weathered, slightly fractured, strong reaction to 1N HCl when powdered, slightly pitted, few fossils, few healed vertical fractures throughout, black infilling, thick bedded.		Run-15: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 9min 40sec Circ. Loss: None
	112.5 — - - - - 114 — -	R-15	(40%)	4.6		113.1-115.0' Vertical fracture-open.		
	- 115.5 - - - -					115-116.6' DOLOMITE, moderately soft, yellowish gray (5Y 7/2), moderately weathered, sandy texture, thick bedded, moderately fractured (115-155.3' intensely fractured), strong reaction to 1N HCI when powdered, some fossils, coarse grained. 116.6-118.1' DOLOMITE as above except fossiliferous, pitted/vuggy.		Run-16: Drilling Pressure: 200 psi Kelly Bar RPM: 216 Engine RPM: 1300-1400 Drill Time: 4min 17sec Circ. Loss: None NOTE: 0.4' fall-in from above. Water level 10/31/09 @ 0755 6.3'.
	117 — - - - 118.5 — - -	R-16	100% (60%)	5.0		118.1-118.4' DOLOMITE, same as 115-116.6'. 118.4-119.5' DOLOMITE, same as 116.6-118.1'. 119.5-121.3' DOLOMITE, as at 115-116.6'.		
	120 							Run-17: Drilling Pressure: 250 psi Kelly Bar RPM: 190 Engine RPM: 1100-1200
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ED: 11	0		GWL: D GWL: D DRILLIN	9	NOTE	ES: NA
APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DKILL	ING CO.:	HUSS						



LNP- C	LNP- Offset Boring Program PROJECT NO. 07-3935									
L.,						LOG OF BORING NO. O-6				
TION MSL)	ΕF	NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1724065.3 E 457853.4	SYMBOL			
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	OW/6" R % F & (RG	COVE	PROFILE	SURFACE EL: 42.2	CS SY	REMARKS		
		% Ō	BLO	RE(DESCRIPTION	nscs			
	_ _ 121.5 — _ _					121.3-123.4' DOLOMITE, as at 116.6-118.1'.		Drill Time: 6min 3sec Circ. Loss: None		
	123 —	R-17	100% (74%)	5.0		123.4-125.0' DOLOMITE, as at 119.5-121.3'.				
	124.5 — - - - - 126 —			÷		125.0-125.6' DOLOMITE, moderately hard, yellowish gray (5Y 7/2), few vugs, medium to thick bedded, slightly weathered, unfractured, strong reaction to 1N HCl when powdered, few fossils. 125.6' Wavy Contact. 125.6-128.8' DOLOMITE, moderately hard, yellowish gray (5Y 7/2), some vugs, some fossils, thick bedded, strong reaction to 1N HCl		Run-18: Drilling Pressure: 200 psi Kelly Bar RPM: 208 Engine RPM: 1300 Drill Time: 10min 0sec Circ. Loss: None		
	- - - 127.5 — -	R-18	100% (96%)	5.0		when powdered, unfractured, slightly weathered.				
	129 —					128.8-130.2' DOLOMITE, moderately hard, yellowish gray (5Y 7/2), fossiliferous, coarse grained, moderately weathered, strong reaction to 1N HCl when powdered, thick bedded, very slightly fractured (horizontal).				
	- 130.5 - - -					130.2-130.8' DOLOMITE, same as 125.6-128.8' except moderately fractured (all horizontal-bedding planes). 130.8-133.0' DOLOMITE, same as 128.8-130.2' except moderately fractured (all horizontal-bedding planes).		Run-19: Drilling Pressure: 250-300 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 8min 56sec Circ. Loss: None Added 0.2' from Run-20, recaluated percent recovery, RQD not affected.		
DATE (STARTED COMPLET GEOLOGI KED BY:	ED: 11)		GWL: D GWL: D DRILLIN		NOTE	ES: NA		
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ΙC	SAMPLE NO. OR RUN NO.	& (N) EC. D)	RECOVERY (ft.)	Ш	COORDINATES N 1724065.3 E 457853.4	SYMBOL	
EVAT	DEPTH (FEET)	APLE RUN	"/// 8 % R (RQ	OVEF	PROFILE	SURFACE EL: 42.2		REMARKS
		SAN	BLOW/6" & (N OR % REC. & (RQD)	REC		DESCRIPTION	nscs	
	132 — 133.5 — 135 — 136.5 — 139.5 — 141 — 141 —	R-19	94% (32%)	4.7		133.0-135.0' DOLOMITE, same as 130.2-130.8', thinly laminated in zones with black organic layers. 135.0-135.8' DOLOMITE, moderately hard to moderately soft, yellowish gray (5Y 7/2), coarse grained, thinly laminated, moderately weathered, moderately fractured (horizontal-bedding planes), some fossils, strong reaction to 1N HCI when powdered. 135.8-137.7' DOLOMITE, yellowish gray (5Y 8/1), moderately hard to moderately soft, slightly to moderately weathered (silty texture in weathered zones), pitted, some fossils, few vugs, slightly fractured (horizontal-bedding planes), thick bedded, strong reaction to 1N HCI when powdered. 137.7-137.9' DOLOMITE, moderately hard to moderately soft, slightly weathered, light olive gray (5Y 5/2), with very thin bands of DOLOMITE as at 135-135.8', thin bedded, strong reaction to 1N HCI when powdered, unfractured. 137.9-139.3' DOLOMITE, moderately hard, yellowish gray (5Y 8/1) at 135.8-137.7' except with pockets of light bluish gray (5B 7/1) limestone (possible rip-up clasts). 139.3-143.0' Crystalline DOLOMITE, continuous vugs, grayish orang (10YR 7/4) to yellowish gray (5Y 7/2), hard, strong reaction to 1N HCI some fossils, pitted in bands, thick bedded, fresh to slightly weathered, slightly to moderately fractured.) s e	Run-20: Drilling Pressure: 200 psi Kelly Bar RPM: 196 Engine RPM: 1200-1300 Drill Time: 17min 26sec Circ. Loss: None NOTE: 0.2' from previous run, 0.4' fall-in (re-drill marks). Run-21: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 44min 6sec Circ. Loss: None
DATE	142.5 — STARTED COMPLET GEOLOG	TED: 11		4.8	GWL: D GWL: D DRILLIN	9	NOTE	ES: NA
APPR	KED BY: OVED BY: ING CO.:		OS		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION 144.— 145.5— R-22 100% (80%) 5.0 100% REMARKS COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION 145.0-150.0 DLOMITE, moderately hard, pale yellowish brown (10/R 6/2) to yellowish gray (5Y 7/2), strong reaction to 1N HCl when powdered, thick bedded, fossiliferous, unfractured, slightly weathered. 145.0-150.0 DoLOMITE, moderately hard, yellowish gray (5Y 7/2) to light olive gray (5Y 5/2), some fossils to fossiliferous, slightly fractured (relational reaction to 1N HCl when powdered). 145.0-150.0 DoLOMITE, moderately hard, yellowish gray (5Y 7/2) to light olive gray (5Y 5/2), some fossils to fossiliferous, slightly fractured (relational reaction to 1N HCl when powdered). 145.0-150.0 DoLOMITE, moderately hard, yellowish gray (5Y 7/2) to Dilling Pressure: 200 psi (relational reaction to 1N HCl when powdered). 145.0-150.0 DoLOMITE, moderately hard, yellowish gray (5Y 7/2) to Dilling Pressure: 200 psi (relational reaction to 1N HCl when powdered). 145.0-150.0 DoLOMITE, moderately hard, yellowish gray (5Y 7/2) to Dilling Pressure: 200 psi (relational reaction to 1N HCl when powdered). 145.0-150.0 DoLOMITE, moderately hard, yellowish gray (5Y 7/2) to Dilling Pressure: 200 psi (relational reaction to 1N HCl when powdered). 145.0-150.0 DoLOMITE, moderately hard, yellowish gray (5Y 7/2) to Dilling Pressure: 200 psi (relational reaction to 1N HCl when powdered). 145.0-150.0 DoLOMITE, moderately hard, yellowish gray (5Y 7/2) to Dilling Pressure: 200 psi (relational reactional reaction to 1N HCl when powdered). 145.0-150.0 DoLOMITE, moderately hard, yellowish gray (5Y 7/2) to Dilling Pressure: 200 psi (relational reactional reaction to 1N HCl when powdered).	LOG OF BORIN	PROJECT NO. 07-
143.0-143.5' Crystalline DOLOMITE, yellowish gray (5Y 7/2), thin to medium bedded, no fossils, fresh, pitted in very thin bands, unfractured. 143.5-145.0' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) to yellowish gray (5Y 7/2), strong reaction to 1N HCl when powdered, thick bedded, fossiliferous, unfractured, slightly weathered. 145.5-150.0' DOLOMITE, moderately hard, pale yellowish gray (5Y 7/2) to ight olive gray (5Y 5/2), some fossils to fossiliferous, slightly fractured (vertical fracture 146.6-147'), all others horizontal-bedding planes), thinly bedded laminated appearance, moderately weathered, strong reaction to 1N HCl when powdered. R-22 100% (80%) 5.0 20 20 20 20 20 20 20 20 20 20 20 20 20	<u> </u>	TES 457853.4
143.0-143.5' Crystalline DOLOMITE, yellowish gray (5Y 7/2), thin to medium bedded, no fossils, fresh, pitted in very thin bands, unfractured. 143.0-145.0' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) to yellowish gray (5Y 7/2), strong reaction to 1N HCl when powdered, thick bedded, fossiliferous, unfractured, slightly weathered. 145.5— 145.5— 147— 147— R-22 100% (80%) 5.0 10	DESC	ON 5
R-22 100% 5.0	medium bedded, no fossils, fresi unfractured. 143.5-145.0' DOLOMITE, model (10YR 6/2) to yellowish gray (5Y powdered, thick bedded, fossilife 145.0-150.0' DOLOMITE, model light olive gray (5Y 5/2), some for (vertical fracture 146.6-147'), all thinly bedded/ laminated appear	nard, pale yellowish brown strong reaction to 1N HCl when unfractured, slightly weathered. nard, yellowish gray (5Y 7/2) to be fossiliferous, slightly fractured horizontal-bedding planes), moderately weathered, strong Run-22: Drilling Pressure: 200 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 12min 2sec Circ. Loss: None
	5.0	
149.5-149.7' With thin beds of crystalline DOLOMITE. 150.0—151.9' DOLOMITE, moderately hard to hard, yellowish gray (5Y 7/2), few vugs, some fossils, fresh, unfractured, thick bedded, moderate to strong reaction to 1N HCl when powdered. Run-23: Drilling Pressure: 200 psi Kelly Bar RPM: 193 Engine RPM: 1200 Drill Time: 22min 17sec Circ. Loss: None	150.0-151.9' DOLOMITE, model (5Y 7/2), few vugs, some fossils	nard to hard, yellowish gray, unfractured, thick bedded, when powdered. Run-23: Drilling Pressure: 200 psi Kelly Bar RPM: 193 Engine RPM: 1200 Drill Time: 22min 17sec
R-23 R-23 100% (50%) 151.9-153.0' Becomes thinly laminated, yellowish gray (5Y 7/2), grayish yellow (5Y 8/4) to light olive gray (5Y 5/2) moderately fractured (horizontal). 153.0-153.5' Becomes soft, friable, intensely fractured (approximately 45° en-echelon).	grayish yellow (5Y 8/4) to light o fractured (horizontal). 5.0 153.0-153.5' Becomes soft, friab	ensely fractured (approximately
DATE STARTED: 10/29/09 GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 NOTES: NA DATE COMPLETED: 11/2/09 GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/PQ3 Coring CHECKED BY: WDS	GWL: DEPTH: 5.7' DATE/	11/2/09 @ 0845
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS	DRILLER: Eddie Palmer HEL	Chad/Cody RIG: Failing 1500



LNP-	Offset Bor	ina Proa	LNP- Offset Boring Program PROJECT NO. 07-3935								
		9 9				LOG OF BORING NO. O-6		1 1100201 1101 01 0000			
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2	USCS SYMBOL	REMARKS			
		<i>w</i> 0	B)	RE		DESCRIPTION	ļ š				
	- - 154.5 					153.5-154.0' DOLOMITE as at 150-151.9' except pale yellowish brown (10YR 6/2). 154.0-155.0' DOLOMITE as at 153-153.5'.					
	156 —					155.0-155.2' DOLOMITE, moderately hard, fossiliferous, coarse grained, thin bedded, unfractured, moderately weathered, yellowish gray (5Y 8/1), strong reaction to 1N HCl when powdered. 155.2-156.1' DOLOMITE, moderately hard to moderately soft, coarse grained, pitted/porous, moderately weathered, slightly fractured, thin to medium bedded, with few layers of crystalline DOLOMITE (very thin bands), strong reaction to 1N HCl when powdered, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), some fossils. 156.1-156.5' Crystalline DOLOMITE, very light gray (N8), hard, fresh interactly fractured no fossile, pitted in very thin badded.	h	Run-24: Drilling Pressure: 300 psi Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 12min 40sec Circ. Loss: None Water level 11/2/09 @ 0845 5.7'.			
	- 157.5 — - - -	R-24	98% (68%)	4.9		intensely fractured, no fossils, pitted in very thin bands, thin bedded, strong reaction to 1N HCl when powdered. 156.5-160.0' DOLOMITE as at 155.2-156.1' except yellowish gray (5' 7/2), fossiliferous, no crystalline dolomite bands, thick bedded, slightl fractured.					
	159 — - - -										
	- 160.5 — - -					160.0-160.5' DOLOMITE, as at 155.2-156.1'. 160.5-163.1' DOLOMITE, moderately hard to moderately soft, yellowish gray (5Y 8/1), moderately weathered, moderately fractured (vertical fracture 161.2-162.0'), strong reaction to 1N HCl when powdered, some fossils in bands, thick bedded.		Run-25: Drilling Pressure: 250-300 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 11min 44sec Circ. Loss: None			
	- 162 	R-25	80% (22%)	4.0							
	- 163.5 — - - -					163.1-163.4' DOLOMITE as above except moderately to severely weathered, intensely fractured/crushed. 163.4-165.0' Crystalline DOLOMITE, medium light gray (N6) to light olive gray (5Y 6/1), hard, strong reaction to 1N HCl when dry, thin to medium bedded, pitted in bands, no fossils, fresh, moderately fractured.					
DATE	STARTED	: 10/	/29/09		GWL: D	DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745	NOTE	ES: NA			
	COMPLET				GWL: D	<u> </u>					
1	GEOLOG				DRILLI	NG METHOD: Mud Rotary/PQ3 Coring					
APPR	KED BY: OVED BY:	WI)S 		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			
DRILL	ING CO.:	HUSS									



166.5 R-26 R-3 R-26 R-26 R-3 R-26 R-3 R-26 R-3 R-26 R-3 R-26 R-3 R-26 R-3 R-26 R-3 R-3 R-26 R-3 R-3 R-26 R-3 R-3 R-3 R-3 R-3 R-3 R-3 R-	LNP- (Offset Boi	ing Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
185.5 - 165.2* DOLOMITE, same as 163.1-163.4*. 182.4 123.8 123.8 125.5 - 165.2* DOLOMITE, same as 163.1-163.4*. 186.5 -	EVATION EET MSL)	DEPTH FEET)	APLE NO. RUN NO.	W/6" & (N) R % REC. RQD)	OVERY (ft.)	ROFILE	N 1724065.3 E 457853.4		REMARKS
123.4			SAN	BLO OF	REC		DESCRIPTION	nsc	
163.5 166.5	-123.4	- 165 — - -					165.2-165.6' Crystalline DOLOMITE, slightly weathered, light olive gray (5Y 6/1), hard, pitted, strong reaction to 1N HCl when powdered, \unfractured, medium bedded.		Drilling Pressure: 300 psi Kelly Bar RPM: 198 Engine RPM: 1200-1300
168 — 4.7	-123.8	166.5 — - - - -	D 00	90%	4.5		165.6-166.0' ROD DROP. 166.0-166.2' Crystalline DOLOMITE as above except fresh. 166.2-167.1' DOLOMITE, moderately hard, moderately weathered, pitted/porous, fossiliferous, strong reaction to 1N HCl when powdered, thick bedded, coarse grained, slightly fractured (horizontal-bedding planes only), dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4).	-	8min 8sec (167-170') 3.0' recovery Circ. Loss: None Driller Notes: Rod drop of 6-8" about 6" into run. NOTE: Recovery percentage
170.0-175.0' Same as 167.5-170.0' except beds are 0.7-1.0' thick, slightly fractured (horizontal-bedding planes only). 170.0-170.2' Intensely fracture-open. 171— 172.5—R-27 (48%) 4.7 175.5—175.5—175.0-178.1' Alternating layer of moderately weathered DOLOMITE and crystalline DOLOMITE and crystalline DOLOMITE as above. 175.5—175.5—10/29/09 DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 DATE COMPLETED: 11/2/09 GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 DATE COMPLETED: 11/2/09 DATE COMPLETED: 11/2/09 GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 DRILLING METHOD: Mud Rotary/PQ3 Coring DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		168 — - - -	R-26	(40%)	4.5		6/1), with lenses of medium light gray (N6) throughout, pitted, some fossils and vugs, medium bedded, fresh to slightly weathered, moderate to strong reaction to 1N HCl when powdered. 167.5-170.0' Alternating beds (0.1-0.3' thick) of DOLOMITE as at		
171— 172.5— R-27 94% 4.7		169.5 — - - -					slightly fractured (horizontal-bedding planes only). 170.0-170.2' Intensely fractured/crushed zone.		Drilling Pressure: 200-250 psi Kelly Bar RPM: 196
172.5		171 — - - - -					170.2-170.6' Vertical fracture-open.		Drill Time: 13min 10sec Circ. Loss: None NOTE: Lots of rig chatter, 0.3' fall-
T75.0-178.1' Alternating layer of moderately weathered DOLOMITE and crystalline DOLOMITE as above. DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		172.5 — - - - -	R-27		4.7				
175.5		174 — — — —							
DATE COMPLETED: 11/2/09 GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	DATE). 40	/20/02			,	L NOT	Kelly Bar RPM: 197
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	DATE FIELD	COMPLE GEOLOG	ΓED: 11/ IST: JL0	/2/09 O		GWL: D	EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845	note	:S: NA
	APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offset Boring Program LOG OF BORING NO. O-6 PROJECT NO. 07-3935								
ELEVATION (FEET MSL)	ŦΈ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724065.3 E 457853.4	SYMBOL	
EVAT	DEPTH (FEET)	MPLE	1.W/6" 7.% F 7. (RQ	OVEI	PROFILE	SURFACE EL: 42.2		REMARKS
크린		SAI	BLC OF	REC		DESCRIPTION	nscs	
	177 — - 177 — - - 178.5 — -	R-28	90% (16%)	4.5		178.1-178.7' DOLOMITE, moderately weathered, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), moderately hard, sandy texture in weathered areas, larger vugs-almost continuous, coarse grained, intensely fractured, strong reaction to 1N HCl when powdered. 178.7-179.0' As above except no vugs. 179.0-180.0' DOLOMITE as at 178.7-179.0' except intensely fractured (rubble-like).		Engine RPM: 1200-1300 Drill Time: 14min 22sec Circ. Loss: None NOTE: Moderate rig chatter in zones during drilling. 0.3' fall-in from above. Last 3-4" of run mechanically broken trying to remove from shoe (destroyed).
	180 — — — — — — —					180.0-181.6' Alternating layers of moderately weathered DOLOMITE and crystalline DOLOMITE as at 175.1-178.1'. 181.6-182.7' DOLOMITE, moderately hard to moderately soft, coarse		Run-29: Drilling Pressure: 250 psi Kelly Bar RPM: 185 Engine RPM: 1100-1200 Drill Time: 14min 54sec Circ. Loss: None NOTE: Lots of rig chatter near end of run.
	 183 	R-29	96% (40%)	4.8		grained, medium yellowish brown (10YR 5/4), medium bedded to thinly laminated near the basal contact (mottled with dark yellowish brown (10YR 4/2)), moderately fractured-vertical fracture 181.6-182.4', weak to moderate reaction to 1N HCI when powdered, sandy texture, pitted/porous, moderately weathered. 182.7-184.1' DOLOMITE, hard, fossiliferous, slightly to moderately weathered, medium to thick bedded, unfractured (183.6-183.8' crushed), light gray (N7) to light olive gray (5Y 6/1).		
	184.5 — — — — — — — — — — — — — — — — — — —		//29/09		GWL: C	184.1-184.4' Crystalline DOLOMITE. 184.4-185.6' DOLOMITE as at 182.7-184.1' except thinly laminated (fissile-like). 185.6-185.9' Fossiliferous DOLOMITE as at 182.7-184.1'. 185.9-188.4' Alternating layers of moderately weathered DOLOMITE and crystalline DOLOMITE as at 180.0' (layers 0.7-1.3' thick).	NOT	Run-30: Drilling Pressure: 200 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 14min 50sec Circ. Loss: None NOTE: 0.2' fall-in from above. ES: NA
DATE FIELD	STARTEL COMPLE ^T GEOLOG KED BY:	ΓED: 11	/2/09 O		GWL: D		NUIL	LO. IVA
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- Offset Boring Program PROJECT NO. 07-3935								
LOG OF BORING NO. O-6								
ELEVATION (FEET MSL)	H (:	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724065.3 E 457853.4	SYMBOL	
LEVA	DEPTH (FEET)	AMPL R RUI	OW/6 DR % I & (RC	COVE	PROFILE	SURFACE EL: 42.2	USCS S	REMARKS
ше		<i>⊗</i> 0	BL	RE		DESCRIPTION	Sn	
	187.5 —	R-30	100%	5.0		188.4-189.9' DOLOMITE, moderately hard, possibly friable, thinly laminated, light olive gray (5Y 6/1), grayish orange (10YR 7/4) and dark yellowish brown (10YR 4/2), slightly to moderately weathered, pitted, no fossils, unfractured, strong reaction to 1N HCl when powdered, sandy/silty texture. 189.9-190.0' Crystalline DOLOMITE as above. 190.0-191.0' Crystalline DOLOMITE as above except moderately weathered. 191.0-192.0' DOLOMITE same as at 188.4-189.9'.		Run-31: Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 6min 36sec Circ. Loss: None
DATE	193.5 — 195 — 196.5 — 2 STARTED	R-31	(18%) 80%	5.0	GWL: C	reaction to 1N HCl when powdered, few vugs (weathered-out fossils), thick bedded. 195.0-197.5' DOLOMITE, moderately hard, moderately weathered, pitted/porous, coarse grained, fossiliferous, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), moderate to strong reaction to 1N HCl when powdered, thick bedded, with few very thin layers of finer grained DOLOMITE, slightly fractured, intensely fractured from 197.3-197.5'.		Run-32: Drilling Pressure: 400 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 9min 15sec Circ. Loss: None
DATE COMPLETED: 11/2/09						DEPTH: 5.8 DATE/TIME: 10/30/09 @ 0745 DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 NG METHOD: Mud Rotary/PQ3 Coring	NOTE	J. IVA
CHECKED BY: WDS APPROVED BY: DRILLER: Eddic						R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILLING CO.: HUSS								



LNP- Offset Boring Program LOG OF BORING NO. O-6									
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION	USCS SYMBOL	REMARKS	
	198 	R-32	(34%)	4.0		197.5-200.0' Crystalline DOLOMITE, very light gray (N8) to light olive gray (5Y 6/1), hard, strong reaction to 1N HCl when dry, intensely fractured, no fossils, medium bedded, fresh to slightly weathered, pitted in bands.			
	199.5 — — — — — — 201 —					200.0-201.6' Crystalline DOLOMITE as above except moderately to intensely fractured, with few very thin black organic (possibly) laminations.		Run-33: Drilling Pressure: 200 psi Kelly Bar RPM: 193 Engine RPM: 1200 Drill Time: 6min 47sec Circ. Loss: None	
		R-33	100%	5.0		201.6-205.0' DOLOMITE, moderately hard, yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), coarse grained, some fossils to fossiliferous, moderate to strong reaction to 1N HCl when powdered, moderately weathered, moderately to intensely fractured, pitted/porous, sandy texture, thick bedded.			
-162.8	204 — - - -								
	205.5 — — — — —					BOTTOM OF BORING 205'			
	207 —								
DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 I GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 DRILLING METHOD: Mud Rotary/PQ3 Coring		NOTES: NA		
I						RILLER: Eddie Palmer HELPER: Chad/Cody		RIG: Failing 1500	