



GEOTECHNICAL BORING LOG

Prepared By JST Date 12/16/09Checked By MM Date 12/16/09

SHEET 1 OF 3

BECHTEL PROJECT NO.: 25161				MACTEC PROJECT NO.: 6468-09-2473				COUNTY: Louisa, VA				GEOLOGIST: A. Mwembeshi												
SITE DESCRIPTION: North Anna 3 Project Supplement 2												DRILLER: R. Landeros/D. Reneau				FLUID LEVEL (ft)								
BORING NO.: M-19				DRILL METHOD: Mud Rotary/Rock Core				DRILL MACHINE: CME-550X (ATL)				0 HR. NA												
GROUND ELEV.: 280.4 ft (NAVD88)				NORTHING: 3,910,053 US ft (NAD83)				EASTING: 11,685,856 US ft (NAD83)				24 HR. 19.0												
TOTAL DEPTH: 151.4 ft				SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08				ROD TYPE: AWJ				HAMMER (ID):140-lb. Auto (MEC-05)												
DATE STARTED: 9/23/09				COMPLETED: 9/29/09				HOLE DIA.: 3"				CASING DEPTH: 66.5 ft				CORE SIZE: NQ3				BITS USED: 2-7/8" Tri-Cone				
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT						SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION										
		0.5ft 0.5ft 0.5ft			0 20 40 60 80 100																			
280.4					Ground Surface									280.4	0.0									
															No sampling from 0.0 to 9.8 feet due to soft dig utility clearance by Dominion Personnel									
270.6	9.8													270.6	9.8									
268.1	12.3	4 2 2									SS-1				RESIDUAL SOIL: Silty SAND (SM), brownish yellow (10YR 6/6), very loose, moist, fine to coarse grained sand, relict rock fabric									
265.6	14.8	2 1 3									SS-2				12.5 ft: Wet									
		2 2 3									SS-3				14.8 ft: Very pale brown (10YR 7/3), loose									
262.1	18.3										SS-4				18.5 ft: Very loose									
257.1	23.3	3 2 2																						
		3 3 4									SS-5				23.3 ft: Very pale brown (10YR 7/4), loose, moist									
252.1	28.3																							
		3 4 6									SS-6				28.3 ft: Light brownish gray (10YR 6/2), little mica									
247.1	33.3																							
		4 5 8									SS-7				33.3 ft: Very pale brown (10YR 7/3), medium dense									
242.1	38.3																							
		6 7 10									SS-8				38.3 ft: Light brownish gray (10YR 6/2), fine to medium grained sand, trace mica									
237.1	43.3																							
		7 10 15									SS-9				43.3 ft: Very pale brown (10YR 7/3), fine to coarse grained sand, few quartz rock fragments									
232.1	48.3																							
		10 13 17									SS-10				48.3 ft: Very pale brown (10YR 7/4)									
227.1	53.3																							
		10 12 15									SS-11													
222.1	58.3																							
		19 25 31									SS-12				58.3 ft: Very dense, little mica									
217.1	63.3																							
		21 28 37									SS-13													
212.1	68.3																							
		22 50/0.3									SS-14				HARD ROCK: Light gray and brown, moderately weathered to fresh, very close to moderately close fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS with zones of WEATHERED ROCK: BIOTITE QUARTZ GNEISS									
207.4	73.0																							
		50/0.0									SS-15													

NORTH ANNA 3 BORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09



SHEET 2 OF 3

BECHTEL PROJECT NO.: 25161			MACTEC PROJECT NO.: 6468-09-2473			COUNTY: Louisa, VA			GEOLOGIST: A. Mwembeshi				
SITE DESCRIPTION: North Anna 3 Project Supplement 2						DRILLER: R. Landeros/D. Reneau			FLUID LEVEL (ft)				
BORING NO.: M-19			DRILL METHOD: Mud Rotary/Rock Core			DRILL MACHINE: CME-550X (ATL)			0 HR. NA				
GROUND ELEV.: 280.4 ft (NAVD88)			NORTHING: 3,910,053 US ft (NAD83)			EASTING: 11,685,856 US ft (NAD83)			24 HR. 19.0				
TOTAL DEPTH: 151.4 ft		SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08				ROD TYPE: AWJ		HAMMER (ID): 140-lb. Auto (MEC-05)					
DATE STARTED: 9/23/09		COMPLETED: 9/29/09		HOLE DIA.: 3"		CASING DEPTH: 66.5 ft		CORE SIZE: NQ3		BITS USED: 2-7/8" Tri-Cone			
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT						SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION
		0.5ft	0.5ft	0.5ft	0	20	40	60	80	100			
205.6					Continued from previous page								
													202.0 78.4 HARD ROCK: Light gray and light brownish gray, slightly weathered to fresh, very close to wide fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS

NORTH ANNA 3 BORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09



SHEET 3 OF 3

BECHTEL PROJECT NO.: 25161			MACTEC PROJECT NO.: 6468-09-2473			COUNTY: Louisa, VA			GEOLOGIST: A. Mwembeshi					
SITE DESCRIPTION: North Anna 3 Project Supplement 2						DRILLER: R. Landeros/D. Reneau			FLUID LEVEL (ft)					
BORING NO.: M-19			DRILL METHOD: Mud Rotary/Rock Core			DRILL MACHINE: CME-550X (ATL)			0 HR. NA					
GROUND ELEV.: 280.4 ft (NAVD88)			NORTHING: 3,910,053 US ft (NAD83)			EASTING: 11,685,856 US ft (NAD83)			24 HR. 19.0					
TOTAL DEPTH: 151.4 ft			SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08			ROD TYPE: AWJ			HAMMER (ID): 140-lb. Auto (MEC-05)					
DATE STARTED: 9/23/09			COMPLETED: 9/29/09			HOLE DIA.: 3"			CASING DEPTH: 66.5 ft					
						CORE SIZE: NQ3			BITS USED: 2-7/8" Tri-Cone					
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT						SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80	100				
130.8					Continued from previous page									
													129.0	151.4
													Boring and coring terminated at 151.4 feet. Boring closed by tremie method with cement-bentonite grout. 24 hour water level measured on 9/29/2009 prior to drilling. Borehole was at a depth of 138.6 feet. NOTE: Began coring at 66.6 ft after boring was advanced by mud rotary to 73.0 ft and casing was set at 66.5 ft. SPT sample SS-14 collected at 68.3 ft indicates the roller cone had "walked off" along a weathered fracture zone, as well as difficulty noted by rig geologist advancing SPT sampler to 73.0 ft for SS-15. Core recovery of HARD ROCK from 66.6 ft to 78.4 was 100%, with weathering noted along fractures/joints supporting this conclusion.	

NORTH ANNA 3 BORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09



SHEET 1 OF 2

BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: A. Mwembeshi
SITE DESCRIPTION: North Anna 3 Project Supplement 2		DRILLER: R. Landeros/D. Reneau	FLUID LEVEL (ft)
BORING NO.: M-19	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-550X (ATL)	0 HR. NA
GROUND ELEV.: 280.4 ft (NAVD88)	NORTHING: 3,910,053 US ft (NAD83)	EASTING: 11,685,856 US ft (NAD83)	24 HR. 19.0
TOTAL DEPTH: 151.4 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb. Auto (MEC-05)
DATE STARTED: 9/23/09	COMPLETED: 9/29/09	CASING DEPTH: 66.5 ft	CORE BARREL TYPE: Wireline NQ3 Triple Tube, series 6 & 10 bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	L O G	DESCRIPTION AND REMARKS
										Begin Coring @ 66.6 ft
213.8	66.6	2.1	4:22/1.1	(2.1)	(2.1)	RUN 1	(11.8)	(10.7)		213.8 HARD ROCK: Light gray and brown, moderately weathered to fresh, very close to moderately close fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS with zones of WEATHERED ROCK: BIOTITE QUARTZ GNEISS (1 joint at 0°, open with orange staining; 1 joint at 45°, open with orange staining) (12 joints at 15-45°, open, moderately weathered with trace orange staining) Note: Recovered 0.5 ft of RUN 1 with RUN 2 (3 joints at 15-30°, open with trace orange staining; 1 joint at 45°, open) Note: Recovered 0.5 ft of RUN 2 with RUN 3
211.7	68.7	5.0	N=50/0.3	(5.0)	(3.9)	SS-14	100%	91%		
			2:23	100%	78%	RUN 2				
			2:11							
			2:32							
			2:38							
			2:41							
206.7	73.7	4.7	N=50/0.0	(4.7)	(4.7)	SS-15				
			3:51	100%	100%	RUN 3				
			4:22							
			5:01							
			3:47							
202.0	78.4	5.0	5:02/0.7	(5.0)	(3.8)	RUN 4	(73.0)	(70.1)		202.0 HARD ROCK: Light gray and light brownish gray, slightly weathered to fresh, very close to wide fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS (7 joints at 15-45°, open with iron staining; 0.5 ft thick quartz vein at 80.7 feet) (9 joints at 30-45°, open with orange staining; 2 joints at 75°, open)
			4:40	100%	76%		100%	96%		
			6:01							
			6:26							
			3:56							
			4:02							
197.0	83.4	5.1	4:15	(5.1)	(4.5)	RUN 5				
			4:23	100%	88%					
			4:45							
			4:51							
191.9	88.5	5.1	7:02/1.1	(5.1)	(5.1)	RUN 6				(2 joints at 45°, open; 2 joints at 75°, open)
			3:23	100%	100%					
			3:28							
			3:39							
			3:32							
186.8	93.6	5.0	3:41/1.1	(5.0)	(4.6)	RUN 7				(2 joints at 30-45°, open; 0.5 ft thick quartz vein from 93.6-94.1 feet)
			3:37	100%	92%					
			2:12							
			2:11							
			2:28							
			2:31							
181.8	98.6	5.0	2:39	(5.0)	(5.0)	RUN 8				(3 joints at 30-40°, tight)
			3:17	100%	100%					
			3:55							
			3:48							
			4:09							
176.8	103.6	5.0	4:27	(5.0)	(5.0)	RUN 9				(1 joint at 45°, tight)
			7:28	100%	100%					
			4:58							
			5:20							
			5:23							
171.8	108.6	5.0	3:20	(5.0)	(5.0)	RUN 10				(No Joints) Note: Recovered 0.1 ft of RUN 9 with RUN 10
			2:45	100%	100%					
			3:58							
			3:44							
			4:08							
166.8	113.6	5.0	3:38	(5.0)	(4.9)	RUN 11				(2 joints at 45°, tight with trace orange staining)
			4:10	100%	98%					
			4:05							
			3:58							
			4:20							
161.8	118.6	5.0	2:25	(5.0)	(5.0)	RUN 12				(No Joints) Note: Recovered 0.2 ft of RUN 11 with RUN 12
			3:02	100%	100%					
			3:55							
			3:45							
			4:02							
156.8	123.6	5.0	4:08	(5.0)	(5.0)	RUN 13				(No Joints)
			6:15	100%	100%					
			6:01							
			6:34							
			6:45							
151.8	128.6	5.0	7:22	(5.0)	(5.0)	RUN 14				(No Joints)
			7:20	100%	100%					
			3:49							
			4:28							
			4:57							
146.8	133.6	5.0	3:00	(5.0)	(5.0)	RUN 15				(3 joints at 45-60°, tight)
			1:55	100%	100%					
			1:59							
			2:46							
			2:57							
141.8	138.6	5.0	2:31	(5.0)	(4.4)	RUN 16				(8 joints at 30-45°, open with orange and black staining; 1 joint at 75°, open with orange and black staining; 0.2 ft thick quartz vein at 141.0 feet)
			2:37	100%	88%					
			3:05							

NORTH ANNA 3 CORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09



SHEET 2 OF 2

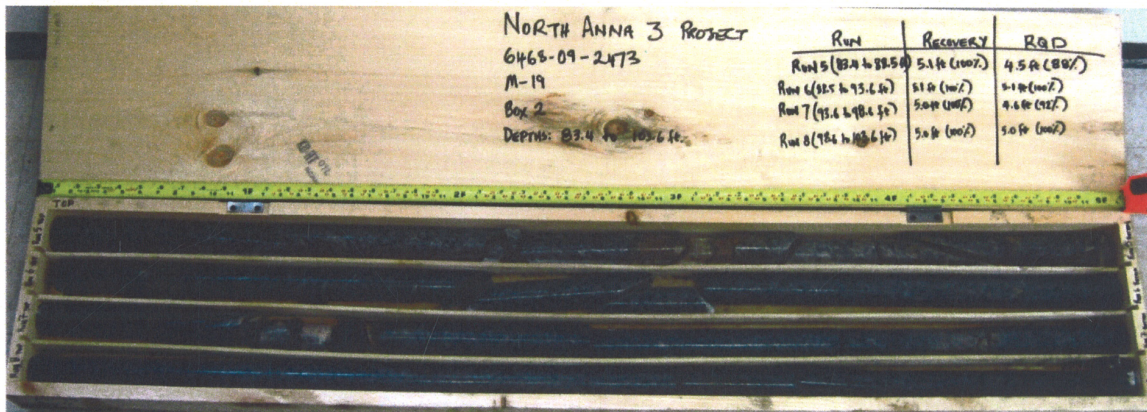
BECHTEL PROJECT NO.: 25161		MACTEC PROJECT NO.: 6468-09-2473		COUNTY: Louisa, VA		GEOLOGIST: A. Mwembeshi	
SITE DESCRIPTION: North Anna 3 Project Supplement 2				DRILLER: R. Landeros/D. Reneau		FLUID LEVEL (ft)	
BORING NO.: M-19		DRILL METHOD: Mud Rotary/Rock Core		DRILL MACHINE: CME-550X (ATL)		0 HR. NA	
GROUND ELEV.: 280.4 ft (NAVD88)		NORTHING: 3,910,053 US ft (NAD83)		EASTING: 11,685,856 US ft (NAD83)		24 HR. 19.0	
TOTAL DEPTH: 151.4 ft		SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08				HAMMER (ID): 140-lb. Auto (MEC-05)	
DATE STARTED: 9/23/09		COMPLETED: 9/29/09		CASING DEPTH: 66.5 ft		CORE BARREL TYPE: Wireline NQ3 Triple Tube, series 6 & 10 bits	

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS
				REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		
										Continued from previous page
136.8	143.6	5.0	4:26 4:49							
			4:38 5:34 4:12 2:21 2:35	(5.0) 100%	(5.0) 100%	RUN 17				
131.8	148.6	2.8	2:43 3:13 3:10/0.8	(2.8) 100%	(2.8) 100%	RUN 18				
129.0	151.4									
										Boring and coring terminated at 151.4 feet. Boring closed by tremie method with cement-bentonite grout. 24 hour water level measured on 9/29/2009 prior to drilling. Borehole was at a depth of 138.6 feet. NOTE: Began coring at 66.6 ft after boring was advanced by mud rotary to 73.0 ft and casing was set at 66.5 ft. SPT sample SS-14 collected at 68.3 ft indicates the roller cone had "walked off" along a weathered fracture zone, as well as difficulty noted by rig geologist advancing SPT sampler to 73.0 ft for SS-15. Core recovery of HARD ROCK from 66.6 ft to 78.4 was 100%, with weathering noted along fractures/joints supporting this conclusion.

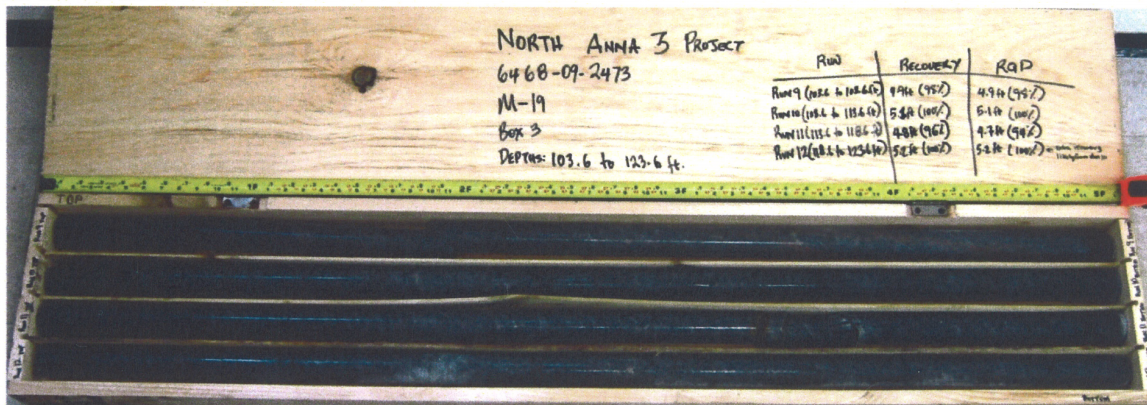
NORTH ANNA 3 CORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09



M-19 - Box 1



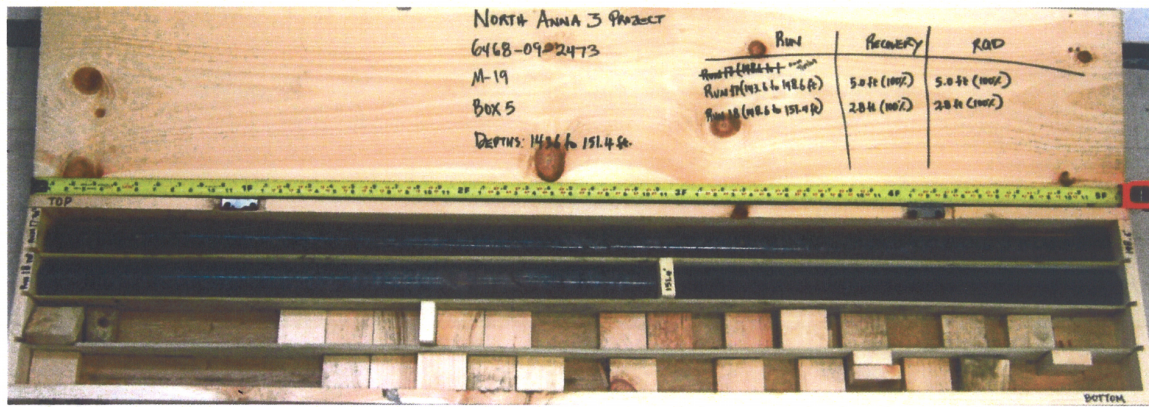
M-19 - Box 2



M-19 - Box 3



M-19 - Box 4



M-19 - Box 5