



BECHTEL PROJECT NO.: 25161				MACTEC PROJECT NO.: 6468-09-2473				COUNTY: Louisa, VA				GEOLOGIST: K. Lloyd			
SITE DESCRIPTION: North Anna 3 Project Supplement 2								DRILLER: D. White/O. Smith				FLUID LEVEL (ft)			
BORING NO.: M-13				DRILL METHOD: Mud Rotary/Rock Core				DRILL MACHINE: CME-55LC Track (RAL)				0 HR.		27.3	
GROUND ELEV.: 326.8 ft (NAVD88)				NORTHING: 3,909,520 US ft (NAD83)				EASTING: 11,686,025 US ft (NAD83)				24 HR.		28.7	
TOTAL DEPTH: 151.6 ft		SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08						ROD TYPE: AWJ		HAMMER (ID): 140-lb. Auto (MEC-02)					
DATE STARTED: 9/18/09		COMPLETED: 9/23/09		HOLE DIA.: 4"		CASING DEPTH: 68.1 ft		CORE SIZE: HQ3		BITS USED: 3-7/8" Tri-Cone					
ELEV.	DEPTH	BLOW COUNT			BLOWS PER FOOT					SAMP.	LOG	SOIL AND ROCK DESCRIPTION			
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	20	40	60	80	100					
326.8					Ground Surface										
317.7	9.1														
315.2	11.6	4	4	6											
312.7	14.1														
		10	11	10											
307.7	19.1														
		12	12	11											
302.8	24.0														
		11	13	11											
297.8	29.0														
		17	30	30											
292.8	34.0														
		7	8	9											
287.8	39.0														
		7	7	14											
282.7	44.1														
		4	5	10											
277.7	49.1														
		7	8	11											
272.7	54.1														
		50/0.4													
267.8	59.0														
		50/0.1													
262.8	64.0														
		50/0.4													
257.8	69.0														
		24	50/0.4												
252.7	74.1														

SS-1

SS-2

SS-3

SS-4

SS-5

SS-6

SS-7

SS-8

SS-9

SS-10

SS-11A/B

SS-12

SS-13

SS-14

326.8

326.3

317.7

315.8

313.3

274.8

257.8

255.8

0.0

0.5

9.1

11.0

13.5

52.0

69.0

71.0

ASPHALT (Parking Lot) to 0.5 ft.
No sampling from 0.0 to 9.1 feet due to soft dig utility clearance by Dominion Personnel

RESIDUAL SOIL: SILT with Sand (ML), yellowish red (5YR 5/8), loose, moist, little to some mica, relict rock fabric

RESIDUAL SOIL: Sandy SILT (ML), very pale brown (10YR 7/3), loose, moist, fine grained sand, little to some mica, relict rock fabric

RESIDUAL SOIL: Silty SAND (SM), very pale brown (10YR 7/3), medium dense, moist, fine to coarse grained sand, little to some mica, relict rock fabric

19.1 ft: Very pale brown (10YR 8/2), trace quartz rock fragments

24.0 ft: Very pale brown (10YR 7/3)

29.0 ft: Pale brown (10YR 6/3), very dense, few to little quartz rock fragments

34.0 ft: Medium dense

39.0 ft: Yellowish brown (10YR 5/6), fine grained sand

44.1 ft: Yellowish brown (10YR 5/8)

49.1 ft: Brownish yellow (10YR 6/8) and grayish green (5G 4/2)

WEATHERED ROCK: Severely weathered, BIOTITE QUARTZ GNEISS (Sampled as SILT with sand (ML), brownish yellow (10YR 6/8), hard, moist, fine grained sand, some mica; and Silty SAND (SM), white (N 8/), brownish yellow (10YR 6/8), and very dark greenish gray (5G 3/1), very dense, moist, fine to coarse grained sand, some mica)

WEATHERED ROCK: Black, severely weathered, very close to close fracturing, very soft, BIOTITE QUARTZ GNEISS

NORTH ANNA 3 BORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/4/09



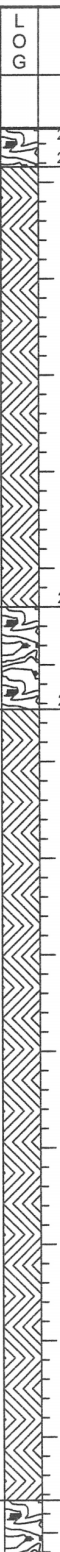
SHEET 3 OF 3

BECHTEL PROJECT NO.: 25161			MACTEC PROJECT NO.: 6468-09-2473			COUNTY: Louisa, VA			GEOLOGIST: K. Lloyd					
SITE DESCRIPTION: North Anna 3 Project Supplement 2						DRILLER: D. White/O. Smith			FLUID LEVEL (ft) 0 HR. 27.3 24 HR. 28.7					
BORING NO.: M-13			DRILL METHOD: Mud Rotary/Rock Core			DRILL MACHINE: CME-55LC Track (RAL)								
GROUND ELEV.: 326.8 ft (NAVD88)			NORTHING: 3,909,520 US ft (NAD83)			EASTING: 11,686,025 US ft (NAD83)								
TOTAL DEPTH: 151.6 ft			SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08						ROD TYPE: AWJ		HAMMER (ID): 140-lb. Auto (MEC-02)			
DATE STARTED: 9/18/09			COMPLETED: 9/23/09		HOLE DIA.: 4"		CASING DEPTH: 68.1 ft		CORE SIZE: HQ3		BITS USED: 3-7/8" 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				
177.2					Continued from previous page									
													175.2	151.6
													Boring and coring terminated at 151.6 feet. Boring closed by tremie method with cement-bentonite grout. NOTE: After boring was advanced to 84.0 ft by mud rotary methods, casing was advanced to 69.0 ft and rock coring began. It is apparent that the roller cone had "walked off" advancing to 84.0 ft, most likely along a high angle joint/fracture or zone of weakness at approximately 68.0 feet. Core recovery of solid, undisturbed HARD ROCK indicates top of rock at 71.0 ft. SPT samples collected between 71.0 to 84.0 feet are in agreement with this conclusion.	

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SHEET 1 OF 2

BECHTEL PROJECT NO.: 25161				MACTEC PROJECT NO.: 6468-09-2473				COUNTY: Louisa, VA		GEOLOGIST: K. Lloyd		
SITE DESCRIPTION: North Anna 3 Project Supplement 2								DRILLER: D. White/O. Smith		FLUID LEVEL (ft)		
BORING NO.: M-13				DRILL METHOD: Mud Rotary/Rock Core				DRILL MACHINE: CME-55LC Track (RAL)		0 HR.	27.3	
GROUND ELEV.: 326.8 ft (NAVD88)				NORTHING: 3,909,520 US ft (NAD83)				EASTING: 11,686,025 US ft (NAD83)		24 HR.	28.7	
TOTAL DEPTH: 151.6 ft			SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08						HAMMER (ID): 140-lb. Auto (MEC-02)			
DATE STARTED: 9/18/09			COMPLETED: 9/23/09		CASING DEPTH: 68.1 ft		CORE BARREL TYPE: Wireline HQ3 Triple Tube, series 6 bit					
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %RQD (ft) %		SAMP. NO.	STRATA REC. (ft) %RQD (ft) %		L O G	DESCRIPTION AND REMARKS		
										Begin Coring @ 69.0 ft		
257.8	69.0	2.6	N=50/0.4 1:14	(1.1)	(0.6)	RUN 1	(0.5)	(0.0)		257.8	WEATHERED ROCK: Black, severely weathered, very close to close fracturing, very soft, BIOTITE QUARTZ GNEISS	69.0
255.2	71.6		1:33	42%	23%		50%	0%		255.8		71.0
		5.0	1:32/0.6	(4.3)	(3.2)	RUN 2	(22.0)	(19.8)			(2 joints at 60°, tight)	
			1:14 1:46 1:44	86%	64%		96%	87%			HARD ROCK: Yellowish brown (10YR 5/4 to 10YR 5/6), with orange staining, moderately severe to moderately weathered, close to moderately close fracturing, medium hard to moderately hard, BIOTITE QUARTZ GNEISS (1 joint at 0-10°, tight)	
250.2	76.6		N=50/0.3 1:52			SS-15					(1 joint at 30°, tight; 3 joints at 60-70°, tight)	
		5.0	1:59	(5.0)	(5.0)	RUN 3					(4 joints at 30-40°, open with trace clay and iron staining; 1 joint at 70°, tight with trace clay and iron staining)	
			2:00 1:39 1:32	100%	100%							
245.2	81.6		N=50/0.1 1:16			SS-16						
		5.0	1:32	(4.9)	(4.9)	RUN 4					(3 joints at 50-60°, tight with trace clay and iron staining)	
			1:38 1:42 1:14	98%	98%							
240.2	86.6		N=50/0.1 1:30			SS-17						
		5.0	1:09	(5.0)	(3.9)	RUN 5					(1 joint at 70°, tight with trace clay and iron stain; 3 joints at 80-90°, tight with trace clay and iron staining)	
			1:39 2:09 1:29 1:18 1:08	100%	78%							
235.2	91.6					RUN 6					(1 joint at 10-20°, open with little iron staining)	
		5.0	1:20	(2.2)	(2.2)						233.0	
			1:24 1:30 1:21 1:14	44%	44%		(0.0)	(0.0)				WEATHERED ROCK: Severely weathered, BIOTITE QUARTZ GNEISS (No Recovery)
230.2	96.6					RUN 7						
		5.0	1:08	(3.5)	(3.0)							
			1:25 1:24 1:36 1:32	70%	60%		(39.6)	(31.8)		227.7		
225.2	101.6					RUN 8	97%	78%			HARD ROCK: Yellowish brown to grayish brown and gray, with orange staining, moderately severe to moderately weathered, close to moderately close fracturing, medium hard to moderately hard, BIOTITE QUARTZ GNEISS (1 joint at 0-10°, tight with trace clay; 2 joints at 60-70°, open with clay)	
		5.0	1:35	(4.8)	(4.4)						(1 joint at 50-60°, tight with trace iron stain)	
			1:44 1:51 2:03 1:56	96%	88%							
220.2	106.6					RUN 9					(2 joints at 20-30°, open with iron staining; 1 joint at 70°, open with clay and iron staining)	
		5.0	1:48	(5.0)	(4.3)						109.6 ft: Complete loss of drill fluid circulation for remainder of boring.	
			1:59 2:36 3:05 2:25	100%	86%							
215.2	111.6					RUN 10					(4 joints at 0-10°, open with iron staining; 2 joints at 70°, tight with trace clay and iron stain)	
		5.0	1:34	(5.0)	(4.4)							
			1:48 1:32 2:06 1:42	100%	88%							
210.2	116.6					RUN 11					(3 joints at 0-15°, open with iron staining; 3 joints at 70°, tight with trace clay and iron staining)	
		5.0	1:54	(4.7)	(4.0)							
			1:54 1:24 1:32 1:47	94%	80%							
205.2	121.6					RUN 12					(3 joints at 30-40°, open with clay and iron staining; 3 joints at 60-70°, tight with trace clay and iron staining; trace magnetite)	
		5.0	2:03	(4.1)	(2.7)							
			3:00 1:56 1:54 2:24	82%	54%							
200.2	126.6					RUN 13					(3 joints at 0-10°, open with iron staining; 2 joints at 30°, open with clay and iron staining; 1 joint at 80°, tight with trace clay and iron staining)	
		5.0	2:38	(5.0)	(4.6)							
			2:57 2:43 2:05 2:26	100%	92%							
195.2	131.6					RUN 14					(7 joints at 30-40°, open with iron staining)	
		5.0	1:42	(4.0)	(2.7)							
			2:06 2:36 2:42 2:47	80%	54%							
190.2	136.6					RUN 15					(8 joints at 0-10°, tight to open with clay and iron staining)	
		5.0	2:56	(3.5)	(1.7)							
			2:15 2:32 2:52 1:49	70%	34%							
185.2	141.6					RUN 16	(0.0)	(0.0)		186.7	WEATHERED ROCK: Severely weathered, BIOTITE QUARTZ GNEISS (No Recovery)	
		5.0	1:51	(2.5)	(1.6)		0%	0%				
			1:21	50%	32%							

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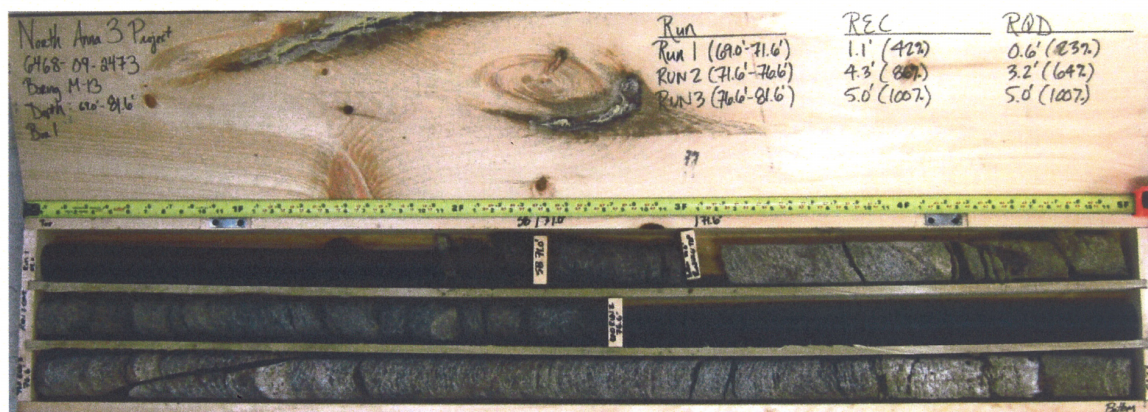


SHEET 2 OF 2

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GROUND ELEV.: 326.8 ft (NAVD88)	NORTHING: 3,909,520 US ft (NAD83)	EASTING: 11,686,025 US ft (NAD83)	24 HR. 28.7
TOTAL DEPTH: 151.6 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb. Auto (MEC-02)
DATE STARTED: 9/18/09	COMPLETED: 9/23/09	CASING DEPTH: 68.1 ft	CORE BARREL TYPE: Wireline HQ3 Triple Tube, series 6 bit

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
				REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		
										Continued from previous page
180.2	146.6		1:29 2:06 1:35				(7.5) 100%	(6.2) 83%		HARD ROCK: Gray with orange staining, moderately to slightly weathered, close to moderately close fracturing, hard, BIOTITE QUARTZ GNEISS
		5.0	2:51 2:49 2:36 2:37 2:10	(5.0) 100%	(4.6) 92%	RUN 17				(4 joints at 0-10°, tight to open with iron staining; 1 joint at 90°, tight with trace clay and iron stain) (3 joints at 10-20°, tight to open with clay and iron staining; 1 joint at 90°, tight with trace clay and orange staining)
175.2	151.6									175.2 151.6
										Boring and coring terminated at 151.6 feet.
										Boring closed by tremie method with cement-bentonite grout.
										NOTE: After boring was advanced to 84.0 ft by mud rotary methods, casing was advanced to 69.0 ft and rock coring began. It is apparent that the roller cone had "walked off" advancing to 84.0 ft, most likely along a high angle joint/fracture or zone of weakness at approximately 68.0 feet. Core recovery of solid, undisturbed HARD ROCK indicates top of rock at 71.0 ft. SPT samples collected between 71.0 to 84.0 feet are in agreement with this conclusion.

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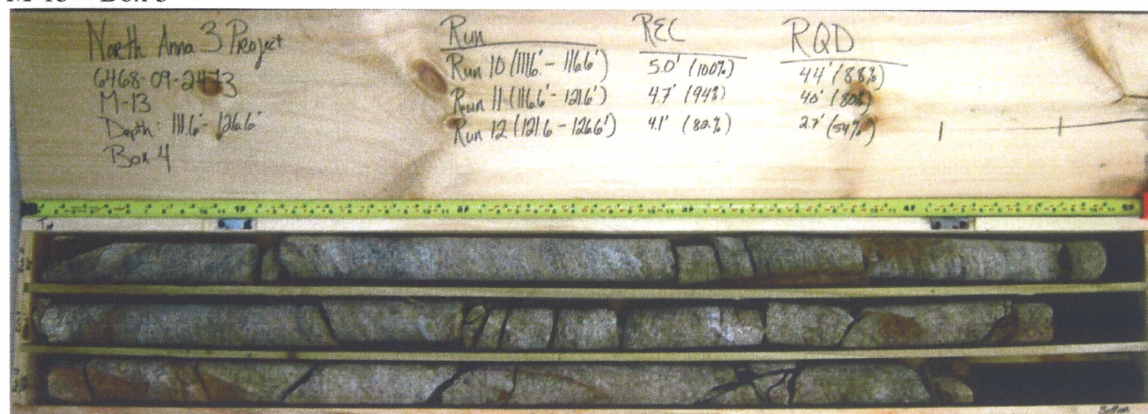
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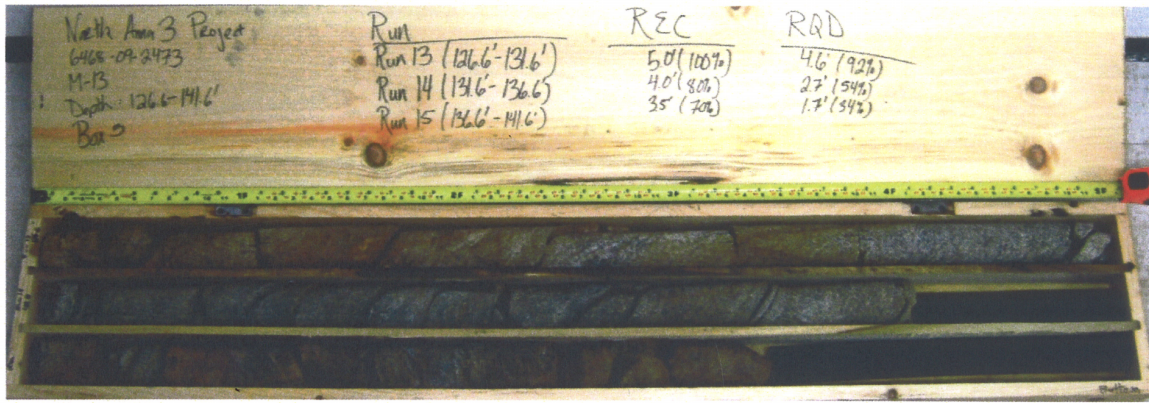
M-13 - Box 2



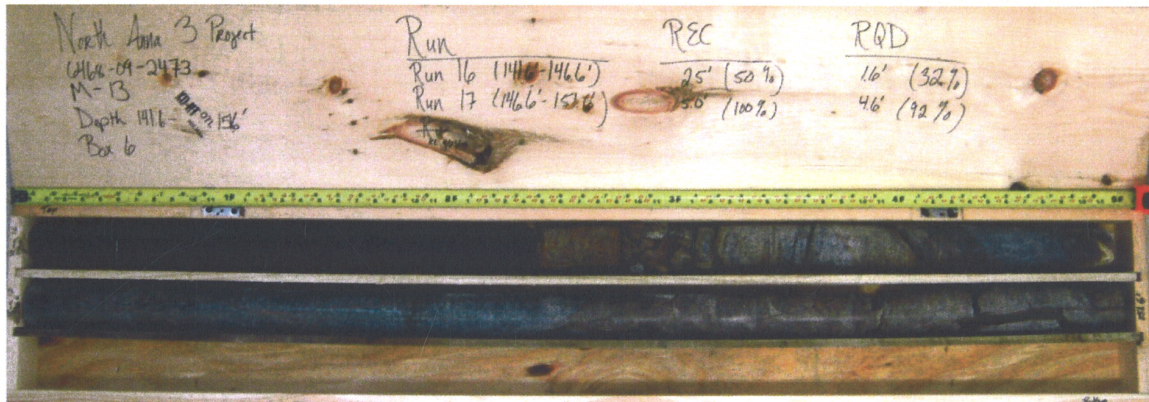
M-13 - Box 3



M-13 - Box 4



M-13 - Box 5



M-13 - Box 6