



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											
																		270.6		9.8											
268.1		9.8		4 2 2								SS-1						270.6		RESIDUAL SOIL: Silty SAND (SM), brownish yellow (10YR 6/6), very loose, moist, fine to coarse grained sand, relict rock fabric 12.5 ft: Wet											
265.6		12.3		2 1 3								SS-2								14.8 ft: Very pale brown (10YR 7/3), loose											
262.1		14.8		2 2 3								SS-3																			
257.1		18.3		3 2 2								SS-4				▼				18.5 ft: Very loose											
252.1		23.3		3 3 4								SS-5								23.3 ft: Very pale brown (10YR 7/4), loose, moist											
247.1		28.3		3 4 6								SS-6								28.3 ft: Light brownish gray (10YR 6/2), little mica											
242.1		33.3		4 5 8								SS-7								33.3 ft: Very pale brown (10YR 7/3), medium dense											
237.1		38.3		6 7 10								SS-8								38.3 ft: Light brownish gray (10YR 6/2), fine to medium grained sand, trace mica											
232.1		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											
227.1		48.3		10 13 17								SS-10								48.3 ft: Very pale brown (10YR 7/4)											
222.1		53.3		10 12 15								SS-11																			
217.1		58.3		19 25 31								SS-12								58.3 ft: Very dense, little mica											
212.1		63.3		21 28 37								SS-13																			
207.4		68.3		22 50/0.3								SS-14								213.8		66.6									
		73.0		50/0.0								SS-15										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									

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								
													<div style="border: 1px solid black; padding: 5px;"> <p>202.0</p> <p>78.4</p> <p>HARD ROCK: Light gray and light brownish gray, slightly weathered to fresh, very close to wide fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS</p> </div>

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

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														
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ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT						SAMP. NO.		LOG	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.														



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) 0 HR. NA 24 HR. 19.0	
BORING NO.: M-19			DRILL METHOD: Mud Rotary/Rock Core			DRILL MACHINE: CME-550X (ATL)				
GROUND ELEV.: 280.4 ft		(NAVD88)	NORTHING: 3,910,053		US ft (NAD83)	EASTING: 11,685,856		US ft (NAD83)		
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) %		
										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							
			7:02/1.1							
191.9	88.5	5.1	3:23	(5.1)	(5.1)	RUN 6				(2 joints at 45°, open; 2 joints at 75°, open)
			3:28	100%	100%					
			3:39							
			3:32							
			3:41/1.1							
186.8	93.6	5.0	3:37	(5.0)	(4.6)	RUN 7				(2 joints at 30-45°, open; 0.5 ft thick quartz vein from 93.6-94.1 feet)
			2:12	100%	92%					
			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

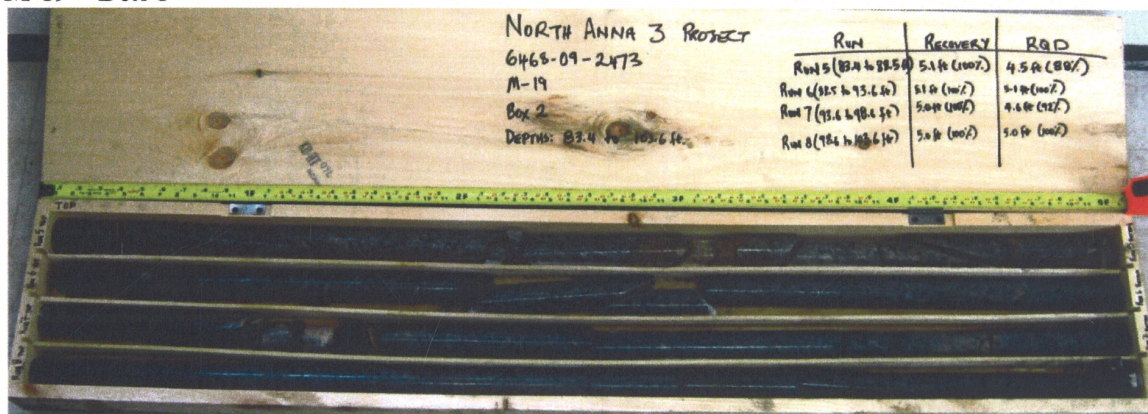
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DATE STARTED: 9/23/09	COMPLETED: 9/29/09	CASING DEPTH: 66.5 ft	CORE BARREL TYPE: Wireline NQ3 Triple Tube, series 6 & 10 bits

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							 <p>HARD ROCK: Light gray and light brownish gray, slightly weathered to fresh, very close to wide fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS (<i>continued</i>) (2 joints at 45°, open with trace clay)</p>
			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									(1 joint at 60°, open with trace clay)
										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.
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NORTH ANNA 3 CORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09



M-19 - Box 1



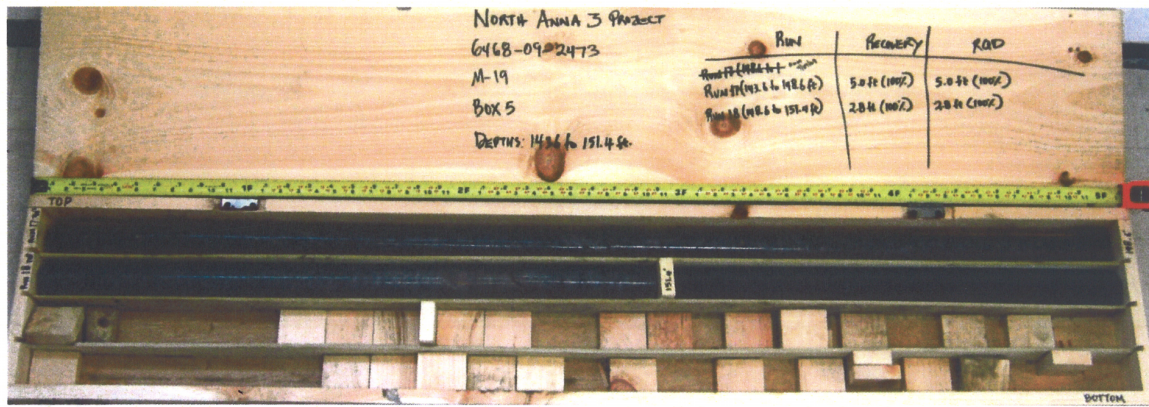
M-19 - Box 2



M-19 - Box 3



M-19 - Box 4



M-19 - Box 5