



## GEOTECHNICAL BORING LOG

Prepared By NAC Date 12/31/09  
Checked By DSC Date 12-3-09

SHEET 1 OF 3

BECHTEL PROJECT NO.: 25161		MACTEC PROJECT NO.: 6468-09-2473		COUNTY: Louisa, VA		GEOLOGIST: C. Baldwin							
SITE DESCRIPTION: North Anna Power Station, Unit 3				DRILLER: D. Rhodes		FLUID LEVEL (ft)							
BORING NO.: W-4		DRILL METHOD: Mud Rotary/Rock Core		DRILL MACHINE: CME-45C Track (RAL)		0 HR. NA							
GROUND ELEV.: 311.9 ft (NAVD88)		NORTHING: 3,909,749 US ft (NAD83)		EASTING: 11,686,002 US ft (NAD83)		24 HR. 20.8							
TOTAL DEPTH: 150.6 ft		SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		ROD TYPE: AWJ		HAMMER (ID): 140-lb. Auto (MEC-12)							
DATE STARTED: 10/16/09		COMPLETED: 10/20/09		HOLE DIA.: 3"		CASING DEPTH: 36.5 ft							
CORE SIZE: NQ3		BITS USED: 2-7/8" Tri-Cone											
ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft 0.5ft 0.5ft			BLOWS PER FOOT 0 20 40 60 80 100					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
311.9					Ground Surface							311.9	0.0
												No sampling from 0.0 to 8.6 feet due to soft dig utility clearance by Dominion Personnel	
303.3	8.6											303.3	8.6
300.9	11.0	16	8	8						SS-1		RESIDUAL SOIL: Silty SAND (SM), very pale brown (10YR 8/4), medium dense, moist, fine to medium grained sand, little mica, relict rock fabric	
298.9	13.0	4	5	6						SS-2		13.0 ft: Light yellowish brown (10YR 6/4)	
296.9	15.0	5	6	7						SS-3		15.0 ft: Yellow (10YR 7/6)	
293.9	18.0	6	6	8						SS-4		18.0 ft: Brownish yellow (10YR 6/6), fine to coarse grained sand	
288.9	23.0	7	7	12						SS-5		23.0 ft: Very pale brown (10YR 8/4), dense	
283.9	28.0	14	14	21						SS-6		28.0 ft: Light gray (10YR 7/1), medium dense, fine to medium grained sand, some mica	
278.9	33.0	19	14	14						SS-7		33.0 ft: Dense	
273.9	38.0	12	21	27						SS-8		WEATHERED ROCK: Severely weathered, BIOTITE QUARTZ GNEISS (Sampled as Silty SAND (SM), light gray (10YR 7/1) and very pale brown (10YR 8/4), very dense, moist, fine to medium grained sand, some mica)	
273.1	38.8	50/0.2								SS-9		WEATHERED ROCK and HARD ROCK: Grayish brown to brown, with trace orange staining, severely to moderately severely weathered, very close to close fracturing, soft to medium hard, BIOTITE QUARTZ GNEISS	
		50/0.1								SS-10			
												241.3	70.6

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: C. Baldwin				
SITE DESCRIPTION: North Anna Power Station, Unit 3						DRILLER: D. Rhodes			FLUID LEVEL (ft)				
BORING NO.: W-4			DRILL METHOD: Mud Rotary/Rock Core			DRILL MACHINE: CME-45C Track (RAL)			0 HR. NA				
GROUND ELEV.: 311.9 ft (NAVD88)			NORTHING: 3,909,749 US ft (NAD83)			EASTING: 11,686,002 US ft (NAD83)			24 HR. 20.8				
TOTAL DEPTH: 150.6 ft		SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08				ROD TYPE: AWJ		HAMMER (ID):140-lb. Auto (MEC-12)					
DATE STARTED: 10/16/09		COMPLETED: 10/20/09		HOLE DIA.: 3"		CASING DEPTH: 36.5 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			
237.1					Continued from previous page								
													HARD ROCK: Grayish brown to light grayish brown, with trace orange staining, moderately severely to moderately weathered, very close to moderately close fracturing, medium to moderately hard, BIOTITE QUARTZ GNEISS (continued)
													206.3 105.6 HARD ROCK: Gray with trace orange staining, slightly weathered to fresh, very close to wide fracturing, hard, BIOTITE QUARTZ GNEISS
													120.6 ft: Complete loss of circulation during core run 18
													181.3 130.6 HARD ROCK: Gray to dark gray, fresh, close to wide fracturing, hard, QUARTZ BIOTITE GNEISS
													166.3 145.6 HARD ROCK: Gray, fresh, moderately close fracturing, 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: C. Baldwin							
SITE DESCRIPTION: North Anna Power Station, Unit 3						DRILLER: D. Rhodes			FLUID LEVEL (ft)							
BORING NO.: W-4			DRILL METHOD: Mud Rotary/Rock Core			DRILL MACHINE: CME-45C Track (RAL)			0 HR. NA							
GROUND ELEV.: 311.9 ft (NAVD88)			NORTHING: 3,909,749 US ft (NAD83)			EASTING: 11,686,002 US ft (NAD83)			24 HR. 20.8							
TOTAL DEPTH: 150.6 ft		SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08				ROD TYPE: AWJ		HAMMER (ID): 140-lb. Auto (MEC-12)								
DATE STARTED: 10/16/09		COMPLETED: 10/20/09		HOLE DIA.: 3"		CASING DEPTH: 36.5 ft		CORE SIZE: NQ3		BITS USED: 2-7/8" Tri-Cone						
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						
162.3					Continued from previous page											
														161.3	150.6	Boring and coring terminated at 150.6 feet.  Boring closed by tremie method with cement-bentonite grout.  24 hour water level measured on 10/20/2009 prior to drilling. Borehole was at a depth of 125.6 feet.

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: C. Baldwin			
SITE DESCRIPTION: North Anna Power Station, Unit 3								DRILLER: D. Rhodes		FLUID LEVEL (ft)			
BORING NO.: W-4				DRILL METHOD: Mud Rotary/Rock Core				DRILL MACHINE: CME-45C Track (RAL)		0 HR.	NA		
GROUND ELEV.: 311.9 ft (NAVD88)				NORTHING: 3,909,749 US ft (NAD83)				EASTING: 11,686,002 US ft (NAD83)		24 HR.	20.8		
TOTAL DEPTH: 150.6 ft			SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08						HAMMER (ID): 140-lb. Auto (MEC-12)				
DATE STARTED: 10/16/09			COMPLETED: 10/20/09		CASING DEPTH: 36.5 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 @ 38.9 ft			
273.0	38.9	1.7	1:08	(1.3)	(0.0)	RUN 1	(10.5)	(2.2)		273.0	WEATHERED ROCK and HARD ROCK: Grayish brown to brown, with trace orange staining, severely to moderately severely weathered, very close to close fracturing, soft to medium hard, BIOTITE QUARTZ GNEISS (3 joints at 10°, open; 2 joints at 50°, open; 1 joint at 90°, open with clay) (2 joints at 50°, open)	38.9	
271.3	40.6	5.0	0:39/0.7	76%	0%	RUN 2	33%	7%					
			0:55	(1.5)	(0.9)								
			1:40	30%	18%								
266.3	45.6	5.0	1:40			RUN 3						(2 joints at 50°, open; 1 joint at 70°, open)	
			1:25	(1.6)	(0.0)								
			0:56	32%	0%								
261.3	50.6	5.0	0:46			RUN 4						(1 joint at 70°, open)	
			1:19	(0.4)	(0.0)								
			1:55	8%	0%								
256.3	55.6	5.0	1:36			RUN 5						(6 joints at 40-50°, open)	
			1:49	(2.1)	(0.0)								
			1:21	42%	0%								
			1:20										
251.3	60.6	5.0	1:27			RUN 6						(5 joints at 0-10°, open; 2 joints at 50°, open)	
			0:37	(2.8)	(0.5)								
			1:29	56%	10%								
246.3	65.6	5.0	1:07			RUN 7							
			1:16	(0.8)	(0.8)								
			1:09	16%	16%								
241.3	70.6	5.0	2:08			RUN 8	(31.6)	(21.7)		241.3	HARD ROCK: Grayish brown to light grayish brown, with trace orange staining, moderately severely to moderately weathered, very close to moderately close fracturing, medium to moderately hard, BIOTITE QUARTZ GNEISS (6 joints at 50°, tight to open)	70.6	
			1:40	(5.0)	(2.4)		90%	62%					
			2:23	100%	48%						(3 joints at 10°, open; 2 joints at 50°, open; 1 joint at 70°, open)		
236.3	75.6	5.0	1:32			RUN 9							
			1:27	(5.0)	(4.0)								
			1:50	100%	80%								
231.3	80.6	5.0	1:37			RUN 10					(3 joints at 10°, tight to open; 5 joints at 30-40°, tight; 1 joint at 60°, tight)		
			1:40	(5.0)	(4.6)								
			1:13	100%	92%								
226.3	85.6	5.0	1:25			RUN 11					(2 joints at 10°, open; 3 joints at 30°, tight to open; 1 joint at 50°, tight)		
			1:24	(4.6)	(2.7)								
			1:19	92%	54%								
221.3	90.6	5.0	1:31			RUN 12					(2 joints at 50°, tight)		
			1:09	(3.4)	(3.4)								
			1:26	68%	68%								
216.3	95.6	5.0	1:04			RUN 13					(5 joints at 10°, open; 3 joints at 30°, tight)		
			0:57	(3.6)	(2.3)								
			1:25	72%	46%								
211.3	100.6	5.0	1:36			RUN 14					(10 joints at 20-30°, open to tight; 1 joint at 40°, tight)		
			1:15	(5.0)	(2.3)								
			0:56	100%	46%								
206.3	105.6	5.0	1:10			RUN 15	(24.7)	(22.9)		206.3	HARD ROCK: Gray with trace orange staining, slightly weathered to fresh, very close to wide fracturing, hard, BIOTITE QUARTZ GNEISS (13 joints at 20-30°, tight)	105.6	
			1:59	(4.8)	(3.4)		99%	92%					
			2:26	96%	68%								
201.3	110.6	5.0	2:34			RUN 16					(No joints)		
			1:46	(5.0)	(5.0)								
			2:00	100%	100%								
			2:13										
			3:10										
			2:55										
			3:29										

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





SHEET 2 OF 2

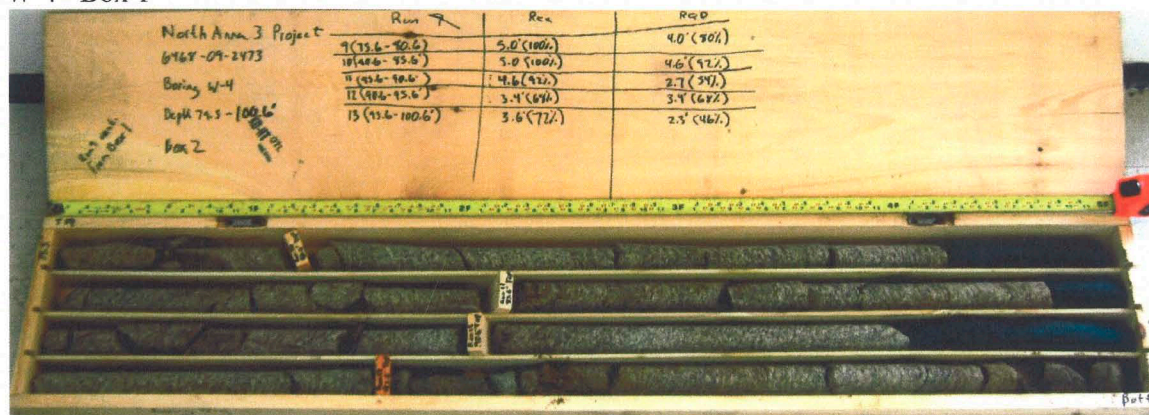
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DATE STARTED: 10/16/09	COMPLETED: 10/20/09	CASING DEPTH: 36.5 ft	CORE BARREL TYPE: Wireline NQ3 Triple Tube, series 6 & 10 bits

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
196.3	115.6	5.0	4:16 3:30	(4.9) 98%	(4.5) 90%	RUN 17				HARD ROCK: Gray with trace orange staining, slightly weathered to fresh, very close to wide fracturing, hard, BIOTITE QUARTZ GNEISS ( <i>continued</i> ) (4 joints at 0°, tight; 2 joints at 30°, tight)
191.3	120.6	5.0	3:47 3:34 2:49 3:40 4:07	(5.0) 100%	(5.0) 100%	RUN 18				120.6 ft: Complete loss of circulation during core run 18 (No joints)
186.3	125.6	5.0	3:57 3:39 3:50 5:31 5:47	(5.0) 100%	(5.0) 100%	RUN 19				(No joints)
181.3	130.6	5.0	6:08 5:46 5:50 7:08 7:35	(5.0) 100%	(5.0) 100%	RUN 20	(14.7) 98%	(13.7) 91%		181.3
176.3	135.6	5.0	6:29 4:04 3:17 3:48 2:41	(5.0) 100%	(5.0) 100%	RUN 21				HARD ROCK: Gray to dark gray, fresh, close to wide fracturing, hard, QUARTZ BIOTITE GNEISS (1 joint at 40°, tight)
171.3	140.6	5.0	4:10 3:18 3:11 2:17 2:48	(4.7) 94%	(4.0) 80%	RUN 22				(3 joints 0-10°, tight; 2 joints at 40-50°, tight)
166.3	145.6	5.0	3:14 2:34 2:34 2:54 2:30	(5.0) 100%	(4.7) 94%	RUN 23				(3 joints at 30°, tight)
161.3	150.6	5.0	3:00 2:34 2:52 3:15 2:59	(5.0) 100%	(5.0) 100%	RUN 23	(5.0) 100%	(5.0) 100%		166.3
										HARD ROCK: Gray, fresh, moderately close fracturing, hard, BIOTITE QUARTZ GNEISS (1 joint at 40°, tight)
										161.3
										Boring and coring terminated at 150.6 feet.
										Boring closed by tremie method with cement-bentonite grout.
										24 hour water level measured on 10/20/2009 prior to drilling. Borehole was at a depth of 125.6 feet.

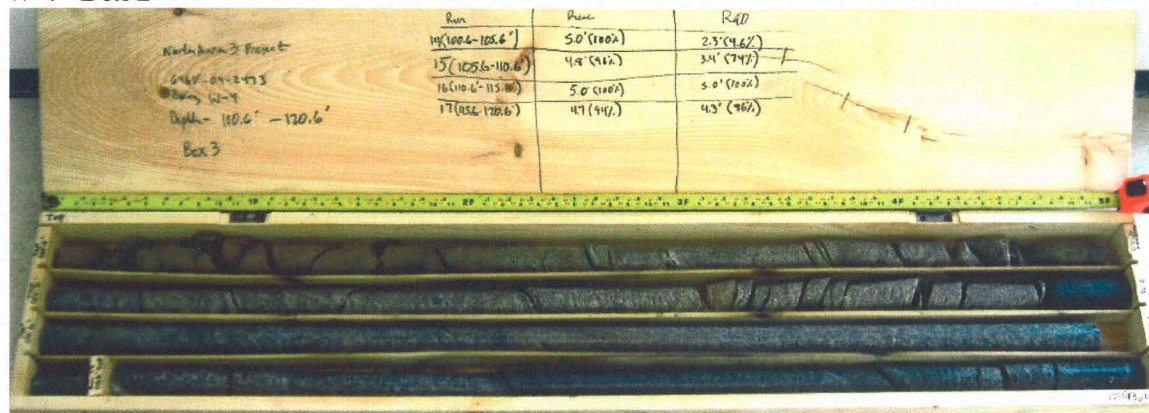
NORTH ANNA 3 CORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09



W-4- Box 1



W-4- Box 2

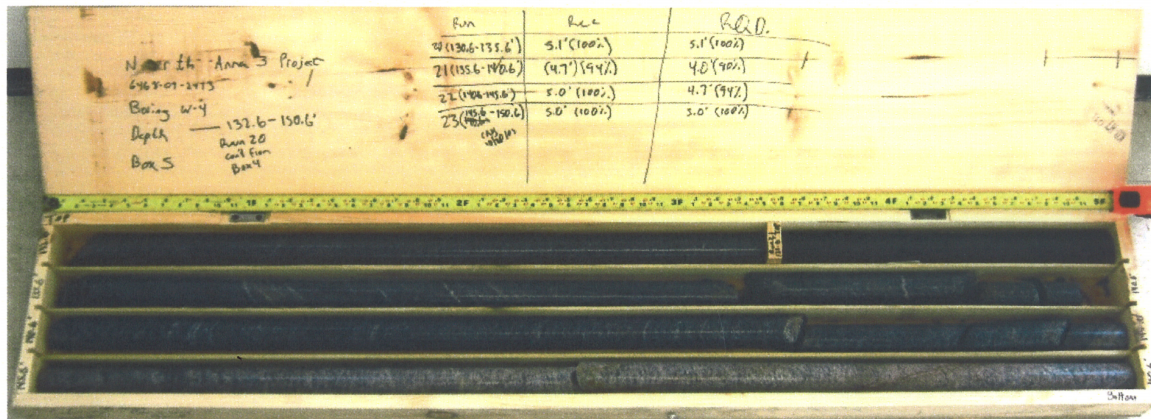


W-4- Box 3



W-4- Box 4





W-4 - Box 5