MACTEC

GEOTECHNICAL BORING LOG

Prepared By NAR Date 12/3/09

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.	MOI	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	16	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	11	SS-2			13.0 ft: Light yellowish brown (10YR 6/4)
296.9	15.0	5	6	7	13	SS-3			15.0 ft: Yellow (10YR 7/6)
293.9	18.0	6	6	8	14	SS-4			18.0 ft: Brownish yellow (10YR 6/6), fine to coarse grained sand
288.9	23.0	7	7	12	19	SS-5			23.0 ft: Very pale brown (10YR 8/4), dense
283.9	28.0	14	14	21	35	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	28	SS-7			33.0 ft: Dense
273.9	38.0	12	21	27	48	SS-8			275.9 36.0
273.1	38.8	50/0.2			50/0.1	SS-9			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) 273.0 38.9
		50/0.1				SS-10			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
									241.3 70.6

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

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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.	MOI	LOG	SOIL AND ROCK DESCRIPTION
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

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ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
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

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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 REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
										Begin Coring @ 38.9 ft
273.0	38.9	1.7	1:08 0:39/0.7	(1.3) 76%	(0.0) 0%	RUN 1	(10.5) 33%	(2.2) 7%		273.0 38.9 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 (3 joints at 10°, open; 2 joints at 50°, open; 1 joint at 90°, open with clay) (2 joints at 50°, open)
271.3	40.6	5.0	0:55 1:40 1:15 1:40 1:25	(1.5) 30%	(0.9) 18%	RUN 2				
266.3	45.6	5.0	0:56 0:46 1:19 1:55 1:36	(1.6) 32%	(0.0) 0%	RUN 3				(2 joints at 50°, open; 1 joint at 70°, open)
261.3	50.6	5.0	1:49 1:21 1:20 1:27 1:51	(0.4) 8%	(0.0) 0%	RUN 4				(1 joint at 70°, open)
256.3	55.6	5.0	1:23 1:19 1:03 1:25 0:37	(2.1) 42%	(0.0) 0%	RUN 5				(6 joints at 40-50°, open)
251.3	60.6	5.0	1:29 0:55 1:07 1:16 1:09	(2.8) 56%	(0.5) 10%	RUN 6				(5 joints at 0-10°, open; 2 joints at 50°, open)
246.3	65.6	5.0	2:47 2:10 2:17 2:08 1:40	(0.8) 16%	(0.8) 16%	RUN 7				
241.3	70.6	5.0	2:23 1:47 1:29 1:42 1:32	(5.0) 100%	(2.4) 48%	RUN 8	(31.6) 90%	(21.7) 62%		241.3 70.6 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)
236.3	75.6	5.0	1:27 1:50 1:37 1:40 1:29	(5.0) 100%	(4.0) 80%	RUN 9				(3 joints at 10°, open; 2 joints at 50°, open; 1 joint at 70°, open)
231.3	80.6	5.0	1:24 1:13 1:25 1:24 1:19	(5.0) 100%	(4.6) 92%	RUN 10				(3 joints at 10°, tight to open; 5 joints at 30-40°, tight; 1 joint at 60°, tight)
226.3	85.6	5.0	1:40 1:31 1:09 1:26 1:18	(4.6) 92%	(2.7) 54%	RUN 11				(2 joints at 10°, open; 3 joints at 30°, tight to open; 1 joint at 50°, tight)
221.3	90.6	5.0	1:48 1:31 1:24 1:04 0:57	(3.4) 68%	(3.4) 68%	RUN 12				(2 joints at 50°, tight)
216.3	95.6	5.0	1:25 1:36 1:15 0:56 1:10	(3.6) 72%	(2.3) 46%	RUN 13				(5 joints at 10°, open; 3 joints at 30°, tight)
211.3	100.6	5.0	1:46 2:10 1:22 1:53 1:59	(5.0) 100%	(2.3) 46%	RUN 14				(10 joints at 20-30°, open to tight; 1 joint at 40°, tight)
206.3	105.6	5.0	2:26 2:34 1:46 2:00 2:13	(4.8) 96%	(3.4) 68%	RUN 15	(24.7) 99%	(22.9) 92%		206.3 105.6 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)
201.3	110.6	5.0	3:10 2:55 3:29	(5.0) 100%	(5.0) 100%	RUN 16				(No joints)

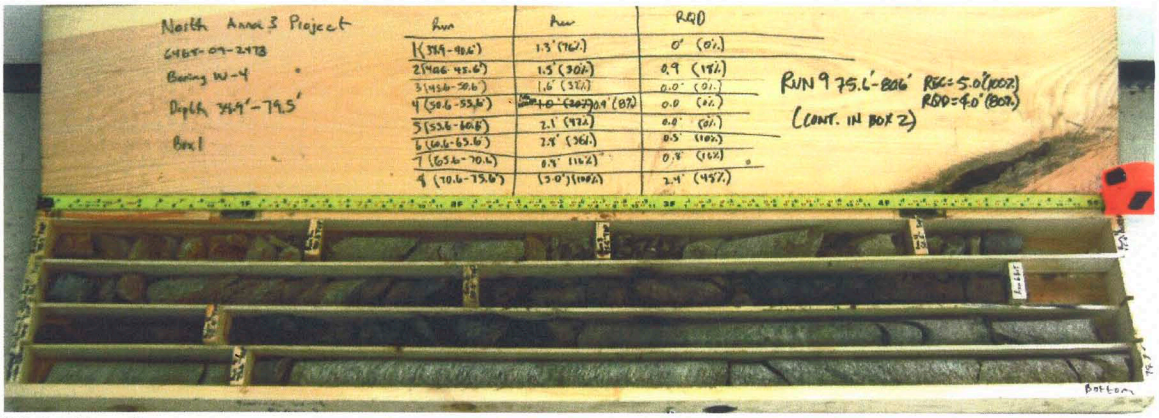
NORTH ANNA 3 CORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09

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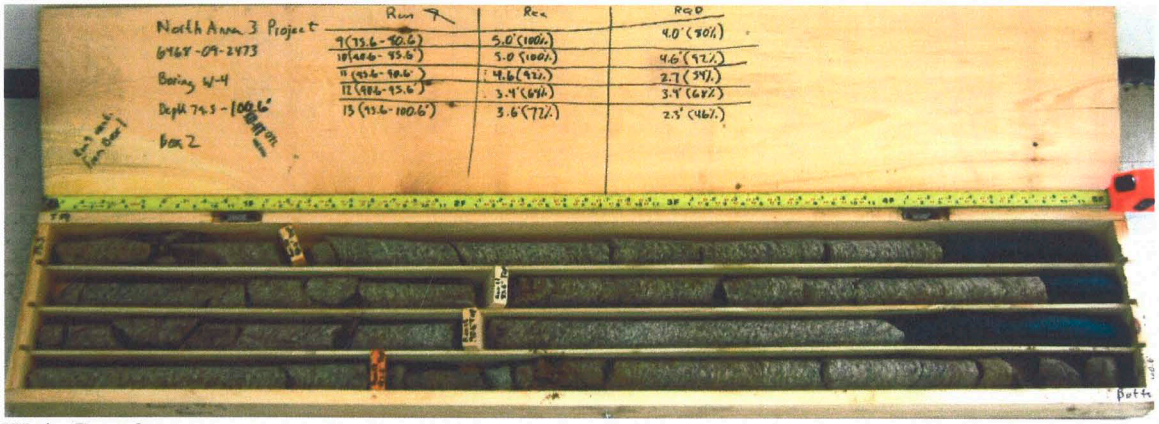
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TOTAL DEPTH: 150.6 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb. Auto (MEC-12)
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ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
										Continued from previous page
196.3	115.6		4:16 3:30							HARD ROCK: Gray with trace orange staining, slightly weathered to fresh, very close to wide fracturing, hard, BIOTITE QUARTZ GNEISS *(continued)* (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	(4.9) 98%	(4.5) 90%	RUN 17				
186.3	125.6	5.0	3:57 3:39 3:50 5:31 5:47	(5.0) 100%	(5.0) 100%	RUN 18				120.6 ft: Complete loss of circulation during core run 18 (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 19				(No joints)
176.3	135.6	5.0	6:29 4:04 3:17 3:48 2:41	(5.0) 100%	(5.0) 100%	RUN 20	(14.7) 98%	(13.7) 91%		181.3 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 21				(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 22				(3 joints at 30°, tight) 166.3
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%		145.6 HARD ROCK: Gray, fresh, moderately close fracturing, hard, BIOTITE QUARTZ GNEISS (1 joint at 40°, tight) 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 CORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09



W-4– Box 1



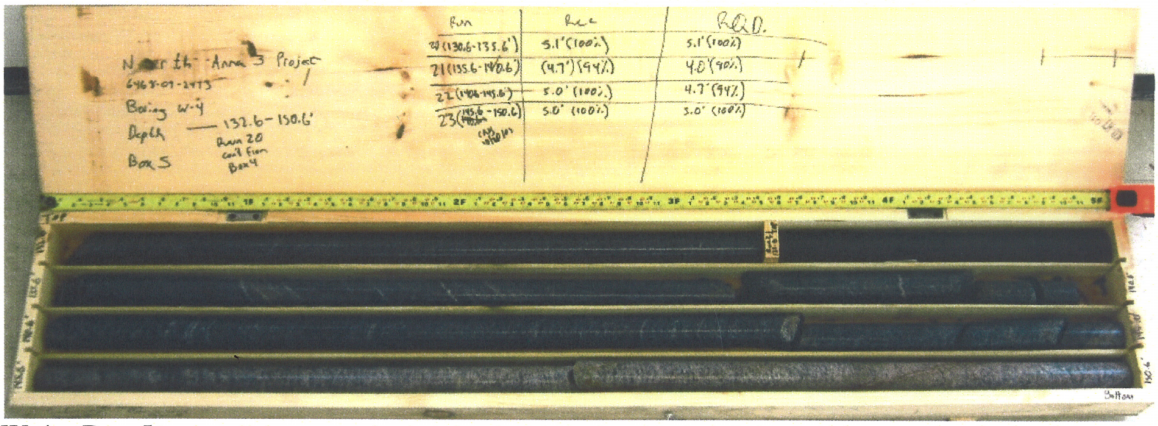
W-4– Box 2



W-4– Box 3



W-4– Box 4


North Anna 3 Project
6468-09-2473
Boring W-4
Depth — 132.6-150.6'
Box 5
Run 20 cont from Box 4
Run
Rec
R.Q.D.
21 (135.6-140.6') 5.1' (100%) 5.1' (100%)
22 (140.6-145.6') (4.7') (94%) 4.0' (90%)
23 (145.6-150.6') 5.0' (100%) 4.7' (94%)
5.0' (100%) 5.0' (100%)
W-4 – Box 5