MACTEC

GEOTECHNICAL BORING LOG

Prepared By NBL 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-9	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-45C Track (RAL)	0 HR. NA
GROUND ELEV.: 320.2 ft (NAVD88)	NORTHING: 3,909,601 US ft (NAD83)	EASTING: 11,686,022 US ft (NAD83)	24 HR. 34.4
TOTAL DEPTH: 151.0 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: 10/20/09	COMPLETED: 10/27/09	HOLE DIA.: 3"	CASING DEPTH: 63.3 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
320.2					Ground Surface				320.2 / 0.0
311.6	8.6								No sampling from 0.0 to 8.6 feet due to soft dig utility clearance by Dominion Personnel
309.7	10.5	7	7	8	15	SS-1			311.6 / 8.6 RESIDUAL SOIL: Silty SAND (SM), reddish yellow (7.5YR 6/6), medium dense, moist, fine to medium grained sand, little mica, relict rock fabric
306.7	13.5	5	5	8	13	SS-2			
301.9	18.3	7	8	12	20	SS-3			
296.9	23.3	8	8	12	20	SS-4			18.3 ft: Brown (7.5YR 5/2)
291.9	28.3	12	15	21	36	SS-5			23.3 ft: Dense
286.9	33.3	26	28	42	70	SS-6			28.3 ft: Pinkish gray (7.5YR 6/2), very dense
281.9	38.3	26	42	58	100/1.0	SS-7	▼		33.3 ft: Brown (7.5YR 5/3)
276.9	43.3	18	24	36	60	SS-8			279.2 / 41.0 WEATHERED ROCK: Severely weathered QUARTZ BIOTITE GNEISS (Sample as Silty SAND (SM), light olive brown (2.5Y 5/4), very dense, moist, fine to medium grained sand, some mica)
271.9	48.3	46	54/0.2		100/0.7	SS-9			274.2 / 46.0 RESIDUAL SOIL: Silty SAND (SM), light olive brown (2.5Y 5/4), very dense, moist, fine to medium grained sand, some mica, relict rock fabric
266.9	53.3	26	33	63	96	SS-10			268.2 / 52.0 WEATHERED ROCK: Severely weathered QUARTZ BIOTITE GNEISS (Sample as Silty SAND (SM), dark yellowish brown (10YR 4/6) and dark grayish brown (2.5Y 4/2), very dense, moist, fine to medium grained sand, some mica)
261.9	58.3	33	66	34/0.2	100/0.7	SS-11			
256.9	63.3	50/0.4			50/0.4	SS-12			259.2 / 61.0 RESIDUAL SOIL: Silty SAND (SM), dark grayish brown (2.5Y 4/2), very dense, moist, fine to medium grained sand, some mica, relict rock fabric
251.9	68.3	21	28	43	71	SS-13			253.2 / 67.0 WEATHERED ROCK: Severely weathered QUARTZ BIOTITE GNEISS (Sample as Silty SAND (SM), dark grayish brown (2.5Y 4/2) and very dark gray (2.5Y 3/1), very dense, moist, fine to medium grained sand, some mica)
246.9	73.3	50/0.3			50/0.3	SS-14			
		50/0.2			50/0.2	SS-15			

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

MACTEC

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-9	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-45C Track (RAL)	0 HR. NA
GROUND ELEV.: 320.2 ft (NAVD88)	NORTHING: 3,909,601 US ft (NAD83)	EASTING: 11,686,022 US ft (NAD83)	24 HR. 34.4
TOTAL DEPTH: 151.0 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: 10/20/09	COMPLETED: 10/27/09	HOLE DIA.: 3"	CASING DEPTH: 63.3 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
245.4					Continued from previous page				
241.9	78.3	50/0.1			50/0.1	SS-16			WEATHERED ROCK: Severely weathered QUARTZ BIOTITE GNEISS (Sample as Silty SAND (SM), dark grayish brown (2.5Y 4/2) and very dark gray (2.5Y 3/1), very dense, moist, fine to medium grained sand, some mica) *(continued)*
236.9	83.3	50/0.1			50/0.1	SS-17			
231.9	88.3	50/0.2			50/0.2	SS-18			
227.9	92.3	50/0.0			50/0.0	SS-19			227.9 — 92.3 WEATHERED ROCK and HARD ROCK: Grayish brown and gray, with orange staining, severely to moderately severely weathered, very close to close fracturing, soft to moderately hard, QUARTZ BIOTITE GNEISS 99.5 ft: Complete loss of drill fluid circulation
									199.2 — 121.0 HARD ROCK: Gray to dark gray, with trace orange staining, moderately weathered, very close to moderately close fracturing, moderately hard, BIOTITE QUARTZ GNEISS
									187.2 — 133.0 HARD ROCK: Gray and dark gray with trace orange staining, moderately weathered, close to moderately close fracturing, moderately hard, QUARTZ BIOTITE GNEISS
									184.2 — 136.0 HARD ROCK: Gray, dark gray, and white, with trace orange staining, moderately to slightly weathered, very close to wide fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS with trace magnetite

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

MACTEC

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-9	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-45C Track (RAL)	0 HR. NA
GROUND ELEV.: 320.2 ft (NAVD88)	NORTHING: 3,909,601 US ft (NAD83)	EASTING: 11,686,022 US ft (NAD83)	24 HR. 34.4
TOTAL DEPTH: 151.0 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: 10/20/09	COMPLETED: 10/27/09	HOLE DIA.: 3"	CASING DEPTH: 63.3 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
170.6					Continued from previous page				
									169.2 151.0
									Boring and coring terminated at 151.0 feet.
									Boring closed by tremie method with cement-bentonite grout.
									24 hour water level measured on 10/27/2009 prior to drilling. Borehole was at a depth of 146.0 feet.

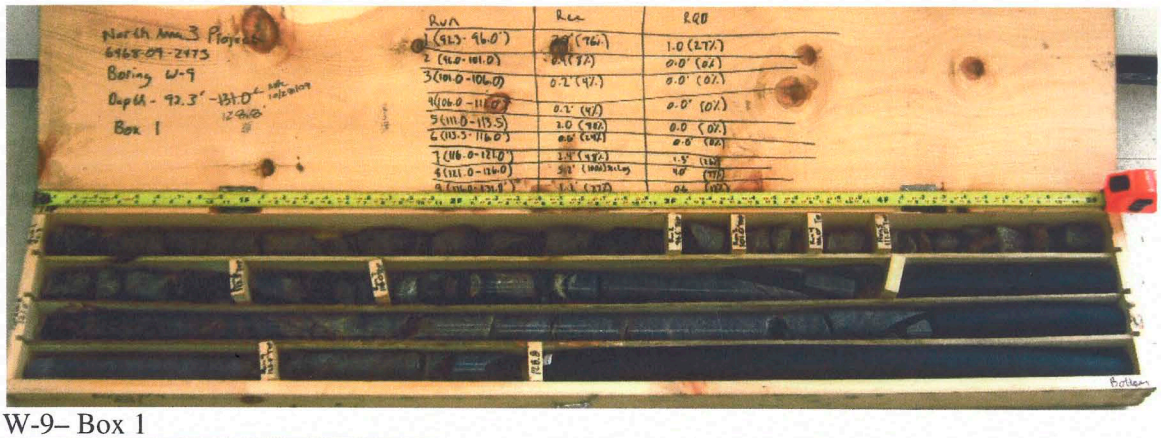
NORTH ANNA 3 BORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09

MACTEC

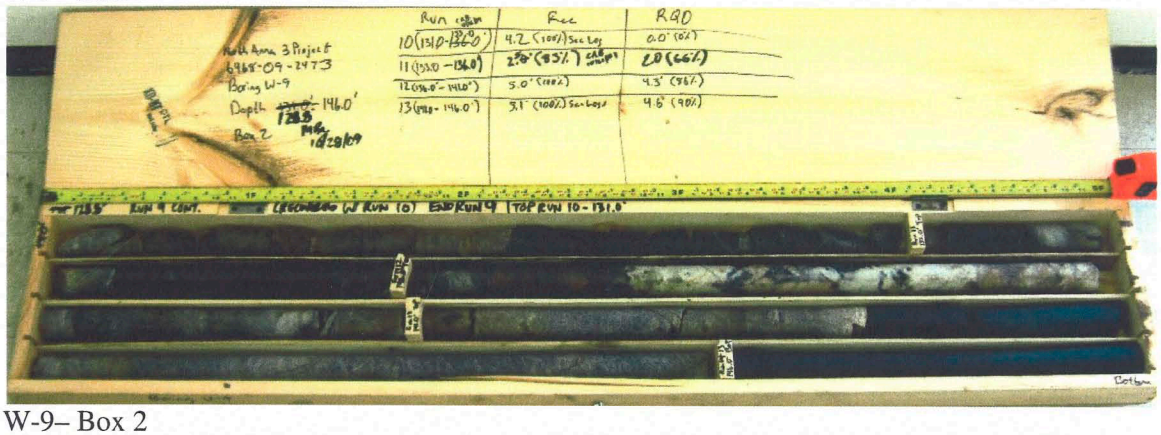
BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: North Anna Power Station, Unit 3		DRILLER: D. Rhodes	FLUID LEVEL (ft)
BORING NO.: W-9	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-45C Track (RAL)	0 HR. NA
GROUND ELEV.: 320.2 ft (NAVD88)	NORTHING: 3,909,601 US ft (NAD83)	EASTING: 11,686,022 US ft (NAD83)	24 HR. 34.4
TOTAL DEPTH: 151.0 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb. Auto (MEC-12)
DATE STARTED: 10/20/09	COMPLETED: 10/27/09	CASING DEPTH: 63.3 ft	CORE BARREL TYPE: Wireline NQ3 Triple Tube, series 6 bit

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 @ 92.3 ft
227.9	92.3	3.7	N=50/0.0 1:28/0.7 1:58 2:00 1:49	(2.8) 76%	(1.0) 27%	RUN 1	(8.8) 31%	(2.3) 8%		227.9 / 92.3 WEATHERED ROCK and HARD ROCK: Grayish brown and gray, with orange staining, severely to moderately severely weathered, very close to close fracturing, soft to moderately hard, QUARTZ BIOTITE GNEISS
224.2	96.0	5.0	2:03 1:45 2:06 3:10 2:35	(0.4) 8%	(0.0) 0%	RUN 2				(3 joints at 50-60°, open) 99.5 ft: Complete loss of drill fluid circulation
219.2	101.0	5.0	4:25 1:49 1:30 1:52 1:45	(0.2) 4%	(0.0) 0%	RUN 3				(1 joint at 10°, open)
214.2	106.0	5.0	1:55 2:19 1:22 1:26 1:30	(0.2) 4%	(0.0) 0%	RUN 4				
209.2	111.0	2.5	3:20 2:38 3:13/0.5	(2.0) 80%	(0.0) 0%	RUN 5				
206.7	113.5	2.5	1:05/0.5 4:09 3:22	(0.6) 24%	(0.0) 0%	RUN 6				(2 joints at 30°, open)
204.2	116.0	5.0	3:43 3:51 3:17 3:53 5:08	(2.6) 52%	(1.3) 26%	RUN 7				(2 joints at 10°, tight to open; 4 joints at 30°, tight to open; 1 joint at 80°, tight)
199.2	121.0	5.0	4:33 4:29 3:32 3:44 3:30	(5.0) 100%	(4.0) 80%	RUN 8	(10.3) 86%	(4.6) 38%		199.2 / 121.0 HARD ROCK: Gray to dark gray, with trace orange staining, moderately weathered, very close to moderately close fracturing, moderately hard, BIOTITE QUARTZ GNEISS (5 joints at 10°, tight; 1 joint at 50°, tight; 1 joint at 70°, tight)
194.2	126.0	5.0	3:44 3:04 2:35 3:01 3:16	(3.3) 66%	(0.6) 12%	RUN 9				(1 joint at 0°, open; 1 joint at 40°, tight; 1 joint at 70°, tight)
189.2	131.0	2.0	2:34 5:32	(2.0) 100%	(0.0) 0%	RUN 10				(1 joint at 70°, tight; many mechanical breaks)
187.2	133.0	3.0	3:22 4:56 3:08	(2.5) 83%	(2.0) 67%	RUN 11	(2.5) 83%	(2.0) 67%		187.2 / 133.0 HARD ROCK: Gray and dark gray with trace orange staining, moderately weathered, close to moderately close fracturing, moderately hard, QUARTZ BIOTITE GNEISS
184.2	136.0	5.0	5:14 4:36 8:16 7:05 5:41	(5.0) 100%	(4.3) 86%	RUN 12	(15.0) 100%	(12.6) 84%		184.2 / 136.0 (6 joints at 0-10°, tight; 1 joint at 30°, tight) HARD ROCK: Gray, dark gray, and white, with trace orange staining, moderately to slightly weathered, very close to wide fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS with trace magnetite
179.2	141.0	5.0	3:29 3:21 3:27 4:52 7:31	(5.0) 100%	(4.6) 92%	RUN 13				(4 joints at 0-10°, tight; quartz + feldspar vein from 137.0-139.1 feet) (4 joints at 0-10°, tight; 1 joint at 50°, tight)
174.2	146.0	5.0	5:39 4:24 5:20 5:07 8:09	(5.0) 100%	(3.7) 74%	RUN 14				(11 joints at 10°, tight; 1 joint at 70°, tight)
169.2	151.0									169.2 / 151.0 Boring and coring terminated at 151.0 feet. Boring closed by tremie method with cement-bentonite grout. 24 hour water level measured on 10/27/2009 prior to drilling. Borehole was at a depth of 146.0 feet.

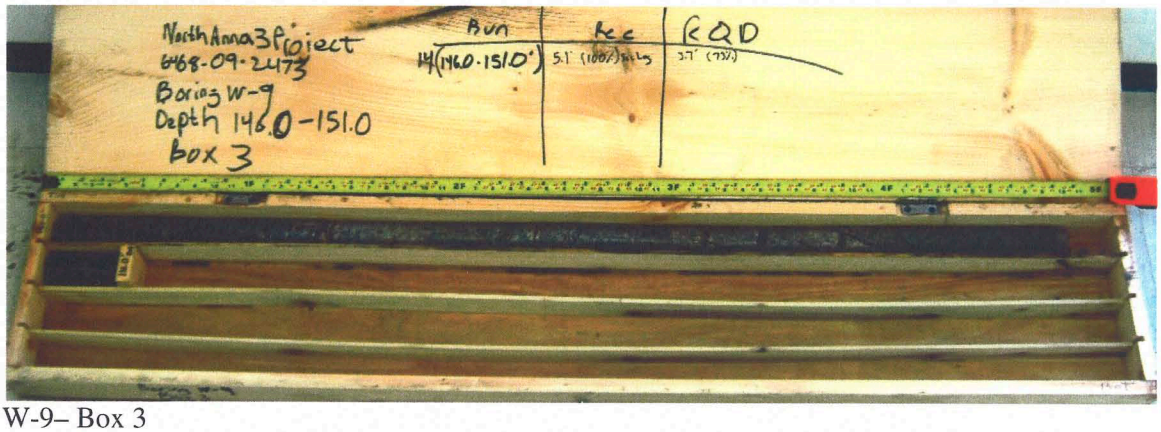
NORTH ANNA 3 CORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09



W-9– Box 1



W-9– Box 2



W-9– Box 3

MACTEC

GEOTECHNICAL BORING LOG

Prepared By NAL Date 12/3/09
Checked By DSC Date 12-3-09

BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: R. Clark
SITE DESCRIPTION: North Anna Power Station, Unit 3		DRILLER: R. Landeros	FLUID LEVEL (ft)
BORING NO.: W-10	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-550X (ATL)	0 HR. NA
GROUND ELEV.: 319.1 ft (NAVD88)	NORTHING: 3,909,599 US ft (NAD83)	EASTING: 11,685,820 US ft (NAD83)	24 HR. 31.5
TOTAL DEPTH: 153.0 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: 10/13/09	COMPLETED: 10/16/09	HOLE DIA.: 3"	CASING DEPTH: 43.0 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
319.1					Ground Surface				319.1 / 0.0
									No sampling from 0.0 to 8.7 feet due to soft dig utility clearance by Dominion Personnel
310.4	8.7								310.4 / 8.7
		8	10	12	22	SS-1			RESIDUAL SOIL: Silty SAND (SM), light yellowish brown (10YR 6/4), medium dense, moist, fine to coarse grained sand, relict rock fabric
307.9	11.2								
		7	11	16	27	SS-2			
305.2	13.9								
		10	12	16	28	SS-3			
301.1	18.0								
		15	12	14	26	SS-4			
296.1	23.0								
		8	10	15	25	SS-5			23.0 ft: Dark yellowish brown (10YR 4/4), some mica
291.1	28.0								
		2	14	56	70	SS-6			28.0 ft: Dark yellowish brown (10YR 4/4) and pale yellow (5Y 8/2), very dense, trace gravel sized, angular quartz rock fragments
286.1	33.0								
		9	12	15	27	SS-7			33.0 ft: Dark yellowish brown (10YR 4/4), medium dense, wet
281.1	38.0								
		10	12	19	31	SS-8			38.0 ft: Yellowish brown (10YR 5/4), dense
									278.1 / 41.0
276.1	43.0								
		50/0.3			50/0.3	SS-9			275.8 / 43.3 WEATHERED ROCK: Severely weathered BIOTITE QUARTZ GNEISS (Sampled as Silty SAND (SM), brown (10YR 4/3), very dense, wet, few gravel sized, angular quartz and rock fragments)
271.1	48.0								
		50/0.0			50/0.0	SS-10			WEATHERED ROCK and HARD ROCK: Light gray, brown, and light pinkish gray, with yellowish brown and reddish brown staining, severely to moderately weathered, close fracturing, soft to moderately hard, BIOTITE QUARTZ GNEISS with trace magnetite

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

MACTEC

BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: R. Clark
SITE DESCRIPTION: North Anna Power Station, Unit 3		DRILLER: R. Landeros	FLUID LEVEL (ft)
BORING NO.: W-10	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-550X (ATL)	0 HR. NA
GROUND ELEV.: 319.1 ft (NAVD88)	NORTHING: 3,909,599 US ft (NAD83)	EASTING: 11,685,820 US ft (NAD83)	24 HR. 31.5
TOTAL DEPTH: 153.0 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: 10/13/09	COMPLETED: 10/16/09	HOLE DIA.: 3"	CASING DEPTH: 43.0 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
244.3					Continued from previous page				
									WEATHERED ROCK and HARD ROCK: Light gray, brown, and light pinkish gray, with yellowish brown and reddish brown staining, severely to moderately weathered, close fracturing, soft to moderately hard, BIOTITE QUARTZ GNEISS with trace magnetite *(continued)*
									236.1 — 83.0
									HARD ROCK: Light gray and light pinkish gray, with orange and reddish brown staining, moderately to slightly weathered, close to wide fracturing, moderately hard to very hard, BIOTITE QUARTZ GNEISS with trace magnetite

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

MACTEC

BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: R. Clark
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DATE STARTED: 10/13/09	COMPLETED: 10/16/09	HOLE DIA.: 3"	CASING DEPTH: 43.0 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
169.5					Continued from previous page				
									166.1 153.0
									Boring and coring terminated at 153.0 feet.
									Boring closed by tremie method with cement-bentonite grout.
									24 hour water level measured on 10/16/2009 prior to drilling. Borehole was at a depth of 128.0 feet.

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

MACTEC

BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: R. Clark
SITE DESCRIPTION: North Anna Power Station, Unit 3		DRILLER: R. Landeros	FLUID LEVEL (ft)
BORING NO.: W-10	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-550X (ATL)	0 HR. NA
GROUND ELEV.: 319.1 ft (NAVD88)	NORTHING: 3,909,599 US ft (NAD83)	EASTING: 11,685,820 US ft (NAD83)	24 HR. 31.5
TOTAL DEPTH: 153.0 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb. Auto (MEC-05)
DATE STARTED: 10/13/09	COMPLETED: 10/16/09	CASING DEPTH: 43.0 ft	CORE BARREL TYPE: Wireline NQ3 Triple Tube, series 6 bit

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 @ 43.3 ft
275.8	43.3	4.7	3:25/0.7 3:39 3:28 3:31 2:20	(3.8) 81%	(2.7) 57%	RUN 1	(22.4) 56%	(12.0) 30%		275.8 43.3 WEATHERED ROCK and HARD ROCK: Light gray, brown, and light pinkish gray, with yellowish brown and reddish brown staining, severely to moderately weathered, close fracturing, soft to moderately hard, BIOTITE QUARTZ GNEISS with trace magnetite
271.1	48.0									(2 joints at 0°, tight; 2 joints at 45°, tight, 1 joint at 65°, tight; 1 joint at 90°, open) (2 joints at 35°, tight)
		5.0	N=50/0.0 1:47 2:25 2:52 2:28 2:31	(1.3) 26%	(0.3) 6%	RUN 2				
266.1	53.0									
		5.0	1:38 1:01 1:30 0:55 1:03	(3.8) 76%	(2.7) 54%	RUN 3				(3 joints at 35°, tight; 4 joints at 45-50°, tight; 1 joint at 90°, tight)
261.1	58.0									
		5.0	1:06 1:15 1:35 1:25 1:30	(3.5) 70%	(2.2) 44%	RUN 4				(5 joints at 30°, tight; 2 joints at 45°, tight)
256.1	63.0									
		5.0	0:45 1:31 1:52 1:55 1:56	(2.5) 50%	(1.3) 26%	RUN 5				(4 joints at 0-10°, tight; 2 joints at 45°, tight)
251.1	68.0									
		5.0	2:02 2:22 1:38 2:55 2:26	(3.1) 62%	(1.9) 38%	RUN 6				(4 joints at 35-45°, tight; 1 quartz vein <0.1 ft thick at 20°)
246.1	73.0									
		5.0	1:55 1:45 1:52 1:57 1:38	(2.2) 44%	(0.6) 12%	RUN 7				(2 joints at 45°, tight; 3 joints at 60°, tight)
241.1	78.0									
		5.0	1:28 1:35 1:38 1:50 1:21	(2.2) 44%	(0.3) 6%	RUN 8				(3 joints at 0°, tight; 2 joints at 45°, tight)
236.1	83.0									236.1 83.0
		5.0	1:21 2:38 2:58 2:20 2:39	(4.1) 82%	(2.0) 40%	RUN 9	(59.4) 85%	(30.0) 43%		HARD ROCK: Light gray and light pinkish gray, with orange and reddish brown staining, moderately to slightly weathered, close to wide fracturing, moderately hard to very hard, BIOTITE QUARTZ GNEISS with trace magnetite (6 joints at 30-45°, tight)
231.1	88.0									
		5.0	2:39 2:08 2:18 2:10 2:10	(4.4) 88%	(1.1) 22%	RUN 10				(11 joints at 0-10°, tight; 3 joints at 45°, tight)
226.1	93.0									
		5.0	1:22 1:29 1:02 1:03 1:22	(4.7) 94%	(2.5) 50%	RUN 11				(6 joints at 0-10°, tight; 2 joints at 45°, tight)
221.1	98.0									
		5.0	2:24 1:54 2:34 2:02 2:03	(4.7) 94%	(2.5) 50%	RUN 12				(4 joints at 0-10°, tight; 7 joints at 45°, tight)
216.1	103.0									
		5.0	2:34 2:45 2:33 2:46 2:50	(4.7) 94%	(2.5) 50%	RUN 13				(4 joints at 0-10°, tight; 3 joints at 45°, tight)
211.1	108.0									
		5.0	1:43 1:38 2:17 2:28 2:34	(4.2) 84%	(3.3) 66%	RUN 14				(4 joints at 10-20°, tight with trace iron staining; 1 joint at 65°, tight with trace iron staining)
206.1	113.0									
		5.0	2:02 2:20 1:53 2:24 2:11	(4.5) 90%	(1.4) 28%	RUN 15				(7 joints at 0-10°, tight with trace iron staining; 2 joints at 45°, tight; 1 joint at 65, tight; 1 joint at 90°, tight)
201.1	118.0									

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

MACTEC

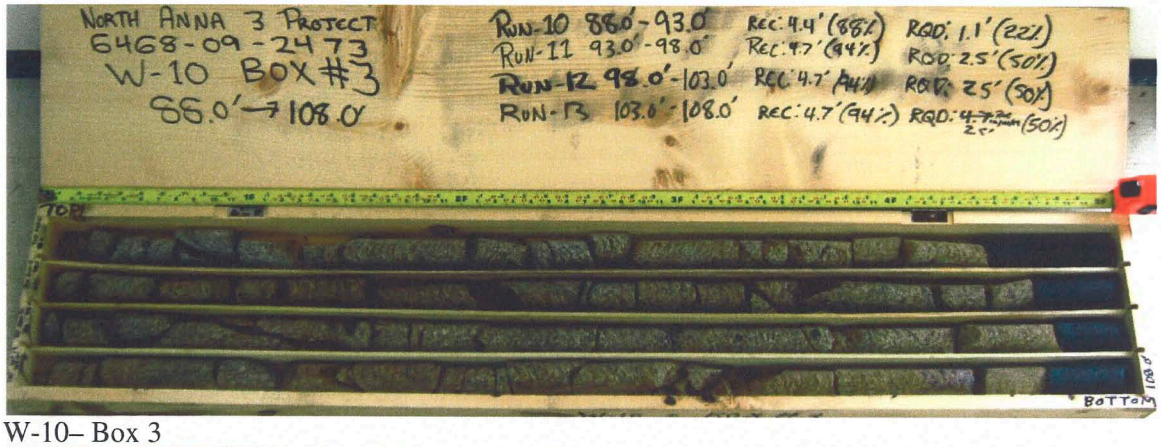
BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: R. Clark
SITE DESCRIPTION: North Anna Power Station, Unit 3		DRILLER: R. Landeros	FLUID LEVEL (ft)
BORING NO.: W-10	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-550X (ATL)	0 HR. NA
GROUND ELEV.: 319.1 ft (NAVD88)	NORTHING: 3,909,599 US ft (NAD83)	EASTING: 11,685,820 US ft (NAD83)	24 HR. 31.5
TOTAL DEPTH: 153.0 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb. Auto (MEC-05)
DATE STARTED: 10/13/09	COMPLETED: 10/16/09	CASING DEPTH: 43.0 ft	CORE BARREL TYPE: Wireline NQ3 Triple Tube, series 6 bit

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
		5.0	2:48 2:25 2:33 2:44 2:52	(2.8) 56%	(1.1) 22%	RUN 16				(5 joints at 0-10°, tight; 3 joints at 45°, tight) HARD ROCK: Light gray and light pinkish gray, with orange and reddish brown staining, moderately to slightly weathered, close to wide fracturing, moderately hard to very hard, BIOTITE QUARTZ GNEISS with trace magnetite *(continued)*
196.1	123.0									
		5.0	1:55 2:06 2:05 2:08 2:11	(4.6) 92%	(2.0) 40%	RUN 17				(4 joints at 0-10°, tight; 2 joints at 65°, tight)
191.1	128.0									
		5.0	2:31 2:49 2:42 2:41 2:47	(4.4) 88%	(3.2) 64%	RUN 18				(2 joints at 0°, tight; 1 joint at 20°, tight; 1 joint at 35°, tight; 1 joint at 65°, tight)
186.1	133.0									
		5.0	2:31 2:28 2:41 2:36 2:28	(5.0) 100%	(1.4) 28%	RUN 19				(6 joints at 0-10°, tight; 1 joint at 45°, tight; 1 joint at 65°, tight; 1 joint at 90°, tight)
181.1	138.0									
		5.0	1:57 2:08 2:10 2:05 3:41	(4.5) 90%	(3.2) 64%	RUN 20				(6 joints at 40°, tight; 3 joints at 60°, tight; 1 joint at 90°, tight; quartz vein from 142.3-143.0 ft)
176.1	143.0									
		5.0	2:11 2:18 3:27 3:21 3:05	(2.2) 44%	(0.0) 0%	RUN 21				(quartz vein from 143.0-144.2 ft; 1 joint at 45°, tight, 1 joint at 90°, tight)
171.1	148.0									
		5.0	4:45 3:07 2:25 3:01 3:08	(4.6) 92%	(3.8) 76%	RUN 22				(5 joints at 45°, tight to open)
166.1	153.0									166.1 153.0
										Boring and coring terminated at 153.0 feet. Boring closed by tremie method with cement-bentonite grout. 24 hour water level measured on 10/16/2009 prior to drilling. Borehole was at a depth of 128.0 feet.

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

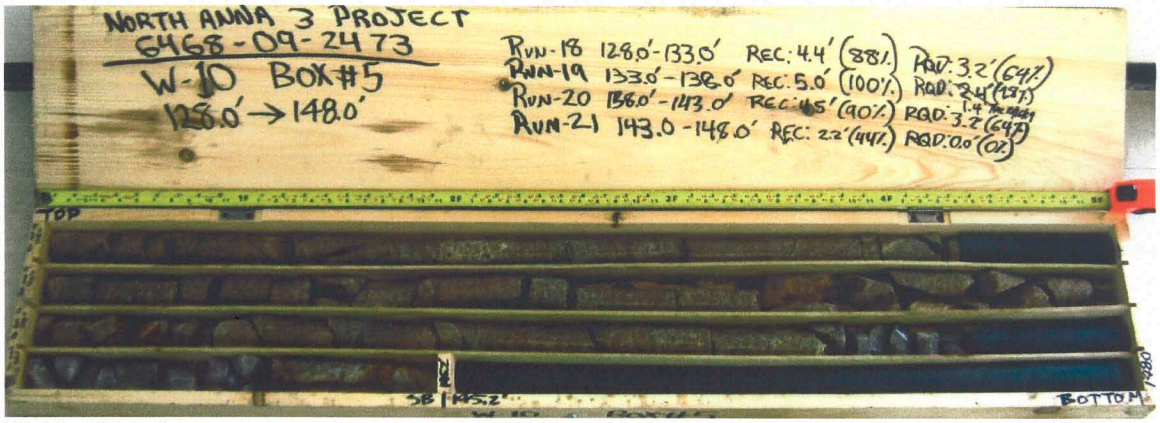
W-10– Box 1

W-10– Box 2



W-10– Box 3

W-10– Box 4


NORTH ANNA 3 PROJECT
6468-09-2473
W-10 BOX#5
128.0' → 148.0'
RUN-18 128.0'-133.0' REC: 4.4' (88%) RQD: 3.2' (64%)
RUN-19 133.0'-138.0' REC: 5.0' (100%) RQD: 3.4' (68%)
RUN-20 138.0'-143.0' REC: 4.5' (90%) RQD: 1.4' (28%)
RUN-21 143.0-148.0' REC: 2.2' (44%) RQD: 0.0' (0%)
TOP
BOTTOM

W-10 – Box 5

NORTH ANNA 3 PROJECT
6468-09-2473
W-20 BOX#6
148.0'-153.0'
RUN-22 148.0'-153.0' REC: 4.6' (92%) RQD: 3.8' (76%)
TOP