MACTEC

GEOTECHNICAL BORING LOG

Prepared By JJJ Date 12/16/09
Checked By NAR Date 12/16/09

BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: North Anna 3 Project Supplement 2		DRILLER: P. Pitts/J. Tucker	FLUID LEVEL (ft)
BORING NO.: M-7	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-55 Trailer (RAL)	0 HR. NA
GROUND ELEV.: 326.0 ft (NAVD88)	NORTHING: 3,909,504 US ft (NAD83)	EASTING: 11,685,836 US ft (NAD83)	24 HR. 35.3
TOTAL DEPTH: 151.5 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08	ROD TYPE: AWJ	HAMMER (ID):140-lb. Auto (MEC-425)
DATE STARTED: 9/8/09	COMPLETED: 9/11/09	HOLE DIA.: 3"	CASING DEPTH: 58.7 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
326.0					Ground Surface				
326.0 / 325.5	0.0 / 0.5								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
316.9	9.1								
316.9	9.1								RESIDUAL SOIL: Silty SAND (SM), Reddish yellow (5YR 6/6), medium dense, moist, fine to coarse grained sand, little mica, relict rock fabric
314.4	11.6	5	7	7	14	SS-1			
312.3	13.7	7	8	10	18	SS-2			
306.9	19.1	8	13	15	28	SS-3			13.7 ft: Light gray (10YR 7/2)
302.0	24.0	15	19	12	31	SS-4			19.1 ft: Light brown (7.5YR 6/3), dense
296.9	29.1	23	32	46	78	SS-5			24.0 ft: Very dense
299.0	27.0								WEATHERED ROCK: Severely weathered QUARTZ GNEISS (Sampled as Silty SAND (SM), Brownish yellow (10YR 6/6), very dense, moist, fine to coarse grained sand, little mica)
291.9	34.1	70	30/0.2		100/0.7	SS-6			
287.0	39.0	50/0.4			50/0.4	SS-7	▼		
281.9	44.1	50/0.4			50/0.4	SS-8			
277.0	49.0	50/0.2			50/0.2	SS-9			44.1 ft: No recovery
271.9	54.1	50/0.2			50/0.2	SS-10			
266.9	59.1	50/0.1			50/0.1	SS-11			54.1 ft: No recovery
266.8	59.2								59.1 ft: No recovery
		50/0.1			50/0.1	SS-12			WEATHERED ROCK: Brown and gray, with orange staining, severely weathered, very close fracturing, soft, BIOTITE QUARTZ GNEISS
255.7	70.3								HARD ROCK: Gray and light gray, moderately severely to moderately weathered, very close to moderately close fracturing, medium hard to hard, BIOTITE QUARTZ GNEISS

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

MACTEC

BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: North Anna 3 Project Supplement 2		DRILLER: P. Pitts/J. Tucker	FLUID LEVEL (ft)
BORING NO.: M-7	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-55 Trailer (RAL)	0 HR. NA
GROUND ELEV.: 326.0 ft (NAVD88)	NORTHING: 3,909,504 US ft (NAD83)	EASTING: 11,685,836 US ft (NAD83)	24 HR. 35.3
TOTAL DEPTH: 151.5 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08	ROD TYPE: AWJ	HAMMER (ID):140-lb. Auto (MEC-425)
DATE STARTED: 9/8/09	COMPLETED: 9/11/09	HOLE DIA.: 3"	CASING DEPTH: 58.7 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
251.2					Continued from previous page				
									HARD ROCK: Gray and light gray, moderately severely to moderately weathered, very close to moderately close fracturing, medium hard to hard, BIOTITE QUARTZ GNEISS *(continued)*
									246.0 — 80.0
									WEATHERED ROCK: Grayish brown with orange staining, severely weathered, very close to close fracturing, very soft, QUARTZ BIOTITE GNEISS
									236.7 — 89.3
									HARD ROCK: Gray to grayish brown with orange staining, moderately severely to moderately weathered, very close to close fracturing, medium hard, QUARTZ BIOTITE GNEISS
									227.0 — 99.0
									WEATHERED ROCK: Severely weathered, QUARTZ BIOTITE GNEISS (No Recovery)
									222.0 — 104.0
									HARD ROCK: Orange brown to greenish gray with orange staining, moderately severely to moderately weathered, very close to close fracturing, medium hard to moderately hard, QUARTZ BIOTITE GNEISS (2 joints at 20°, open with clay; 2 joints at 40°, tight; 1 joint at 70°, open)
									219.7 — 106.3
									HARD ROCK: Gray with trace orange staining, slightly weathered, very close to moderately close fracturing, moderately hard, QUARTZ BIOTITE GNEISS
									209.7 — 116.3
									HARD ROCK: Gray to light gray and grayish brown, with orange staining, moderately to slightly weathered, very close to close fracturing, moderately hard, BIOTITE QUARTZ GNEISS
									184.7 — 141.3
									HARD ROCK: White, pink, and gray to light gray, very slightly weathered, close fracturing, hard, BIOTITE QUARTZ GNEISS and pegmatitic, graphic quartz + feldspar vein with trace garnet and magnetite

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

MACTEC

BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: North Anna 3 Project Supplement 2		DRILLER: P. Pitts/J. Tucker	FLUID LEVEL (ft)
BORING NO.: M-7	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-55 Trailer (RAL)	0 HR. NA
GROUND ELEV.: 326.0 ft (NAVD88)	NORTHING: 3,909,504 US ft (NAD83)	EASTING: 11,685,836 US ft (NAD83)	24 HR. 35.3
TOTAL DEPTH: 151.5 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08	ROD TYPE: AWJ	HAMMER (ID):140-lb. Auto (MEC-425)
DATE STARTED: 9/8/09	COMPLETED: 9/11/09	HOLE DIA.: 3"	CASING DEPTH: 58.7 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
176.4					Continued from previous page				
									174.5 151.5

Boring and coring terminated at 151.5 feet.

Boring closed by tremie method with cement-bentonite grout.

24 hour water level measured on 9/11/2009 prior to drilling. Borehole was at a depth of 136.3 feet.

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

MACTEC

BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: North Anna 3 Project Supplement 2		DRILLER: P. Pitts/J. Tucker	FLUID LEVEL (ft)
BORING NO.: M-7	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-55 Trailer (RAL)	0 HR. NA
GROUND ELEV.: 326.0 ft (NAVD88)	NORTHING: 3,909,504 US ft (NAD83)	EASTING: 11,685,836 US ft (NAD83)	24 HR. 35.3
TOTAL DEPTH: 151.5 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb. Auto (MEC-425)
DATE STARTED: 9/8/09	COMPLETED: 9/11/09	CASING DEPTH: 58.7 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 @ 59.2 ft
266.8	59.2	2.1	0:50/1.1	(0.4)	(0.0)	RUN 1	(0.4)	(0.0)		266.8 59.2 WEATHERED ROCK: Brown and gray, with orange staining, severely weathered, very close fracturing, soft, BIOTITE QUARTZ GNEISS
264.7	61.3		1:03	19%	0%		4%	0%		(1 joint at 0°, open)
264.2	61.8	0.5	0:23/0.5	(0.0)	(0.0)	RUN 2				(No Recovery)
		5.0	1:35	0%	0%	RUN 3				(No Recovery)
			1:57							
			2:14	(0.0)	(0.0)					
			2:00	0%	0%					
259.2	66.8		2:15							
		4.5	2:17	(1.0)	(0.0)	RUN 4				
			1:45	22%	0%					
			1:54							
			4:51							255.7 70.3
254.7	71.3		4:00/0.5				(9.5)	(5.7)		HARD ROCK: Gray and light gray, moderately severely to moderately weathered, very close to moderately close fracturing, medium hard to hard, BIOTITE QUARTZ GNEISS
		5.0	3:53	(4.8)	(3.6)	RUN 5	98%	59%		(4 joints at 0°, open; 3 joints at 70-80°, tight)
			3:44	96%	72%					(3 joints at 0°, tight; 2 joints at 60°, tight; 2 joints at 80°, tight)
			3:15							
			3:09							
249.7	76.3		3:09							
		5.0	3:20	(3.7)	(2.1)	RUN 6				(4 joints at 0°, open; 2 joints at 45°, tight; 2 joints at 60-70°, tight)
			3:30	74%	42%					
			3:30							
			3:00							246.0 80.0
244.7	81.3		3:58				(0.2)	(0.0)		WEATHERED ROCK: Grayish brown with orange staining, severely weathered, very close to close fracturing, very soft, QUARTZ BIOTITE GNEISS
		5.0	2:40	(0.2)	(0.0)	RUN 7	2%	0%		(1 joint at 40°, open with clay; poor recovery)
			2:10	4%	0%					
			2:07							
			2:00							
239.7	86.3		3:32							
		5.0	2:37	(2.0)	(0.8)	RUN 8				
			2:43	40%	16%					
			2:32							236.7 89.3
			3:37				(8.2)	(2.4)		HARD ROCK: Gray to grayish brown with orange staining, moderately severely to moderately weathered, very close to close fracturing, medium hard, QUARTZ BIOTITE GNEISS
234.7	91.3		3:28				85%	25%		(4 joints at 50°, tight)
		5.0	3:09	(3.5)	(0.4)	RUN 9				(6 joints at 0°, tight; 4 joints at 60°, tight)
			3:30	70%	8%					
			4:20							
			3:53							
229.7	96.3		3:36							
		5.0	3:20	(2.7)	(1.2)	RUN 10				(4 joints at 10°, tight; 2 joints at 50°, tight; 1 joint at 90°, tight)
			3:08	54%	24%					
			3:20							227.0 99.0
			2:50				(0.0)	(0.0)		WEATHERED ROCK: Severely weathered, QUARTZ BIOTITE GNEISS (No Recovery)
224.7	101.3		1:35				0%	0%		
		5.0	2:55	(2.3)	(1.7)	RUN 11				
			2:14	46%	34%					
			4:30							222.0 104.0
			3:17				(2.3)	(1.7)		HARD ROCK: Orange brown to greenish gray with orange staining, moderately
219.7	106.3		3:28				100%	74%		219.7 106.3 severely to moderately weathered, very close to close fracturing, medium hard
		5.0	3:54	(4.8)	(4.4)	RUN 12	(9.8)	(9.1)		to moderately hard, QUARTZ BIOTITE GNEISS (2 joints at 20°, open with clay;
			3:32	96%	88%		98%	91%		2 joints at 40°, tight; 1 joint at 70°, open)
			3:55							HARD ROCK: Gray with trace orange staining, slightly weathered, very close to
			3:55							moderately close fracturing, moderately hard, QUARTZ BIOTITE GNEISS
214.7	111.3		3:43							(2 joints at 40°, tight; 1 joint at 70°, tight)
		5.0	4:26	(5.0)	(4.7)	RUN 13				(5 joints at 20-30°, tight; 6 joints at 40-50°, tight)
			4:14	100%	94%					
			3:57							
			4:16							
209.7	116.3		4:30							209.7 116.3
		5.0	4:58	(4.7)	(3.4)	RUN 14	(24.7)	(18.5)		HARD ROCK: Gray to light gray and grayish brown, with orange staining, moderately to slightly weathered, very close to close fracturing, moderately hard, BIOTITE QUARTZ GNEISS
			4:38	94%	68%		99%	74%		(1 joint at 20°, tight; 3 joints at 50°, tight; 1 joint at 90°, tight)
			4:40							
			4:00							
204.7	121.3		2:53							
		5.0	2:40	(5.0)	(3.7)	RUN 15				(3 joints at 0-10°, tight to open; 5 joints at 20-30°, tight; 1 joint at 80°, tight)
			2:22	100%	74%					
			2:15							
			2:19							
199.7	126.3		2:27							
		5.0	2:40	(5.0)	(3.4)	RUN 16				(5 joints at 0-10°, tight; 3 joints at 20-30°, tight; 2 joints at 40-50°, tight; 1 joint at 70°, tight)
			2:27	100%	68%					
			3:42							
			3:35							
194.7	131.3		3:33							
		5.0	3:37	(5.0)	(4.7)	RUN 17				(3 joints at 0-10°, tight; 1 joint at 40°, tight; 1 joint at 70°, tight)
			3:34	100%	94%					

MACTEC

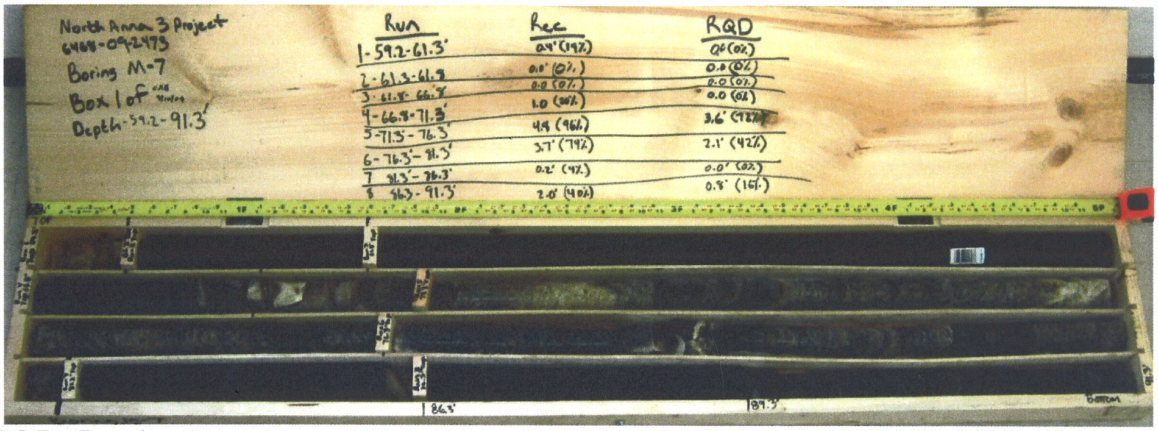
BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: North Anna 3 Project Supplement 2		DRILLER: P. Pitts/J. Tucker	FLUID LEVEL (ft)
BORING NO.: M-7	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-55 Trailer (RAL)	0 HR. NA
GROUND ELEV.: 326.0 ft (NAVD88)	NORTHING: 3,909,504 US ft (NAD83)	EASTING: 11,685,836 US ft (NAD83)	24 HR. 35.3
TOTAL DEPTH: 151.5 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb. Auto (MEC-425)
DATE STARTED: 9/8/09	COMPLETED: 9/11/09	CASING DEPTH: 58.7 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
189.7	136.3	5.0	3:50 3:47 3:18 6:00 5:30 5:45 6:05 8:00	(5.0) 100%	(3.3) 66%	RUN 18				HARD ROCK: Gray to light gray and grayish brown, with orange staining, moderately to slightly weathered, very close to close fracturing, moderately hard, BIOTITE QUARTZ GNEISS *(continued)* (7 joints at 10-20°, tight to open; 4 joints at 30-40°, tight; 1 joint at 70°, tight)
184.7	141.3	5.2	10:40 9:05 8:36 10:43 14:25/1.2	(5.2) 100%	(4.6) 88%	RUN 19	(10.2) 100%	(9.2) 90%		HARD ROCK: White, pink, and gray to light gray, very slightly weathered, close fracturing, hard, BIOTITE QUARTZ GNEISS and pegmatitic, graphic quartz + feldspar vein with trace garnet and magnetite (4 joints at 0-10°, tight; 4 joints at 20-30°, tight)
179.5	146.5	5.0	16:05 11:38 8:52 5:15 10:00	(5.0) 100%	(4.6) 92%	RUN 20				(1 joint at 0°, tight; 3 joints at 20-30°, tight; 3 joints at 40-50°, tight)
174.5	151.5									Boring and coring terminated at 151.5 feet. Boring closed by tremie method with cement-bentonite grout. 24 hour water level measured on 9/11/2009 prior to drilling. Borehole was at a depth of 136.3 feet.

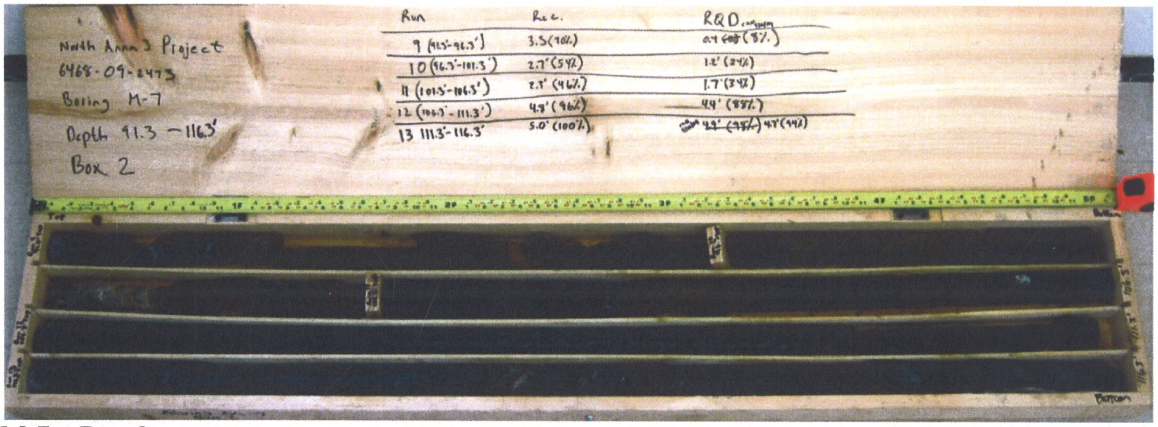
184.7 141.3

174.5 151.5

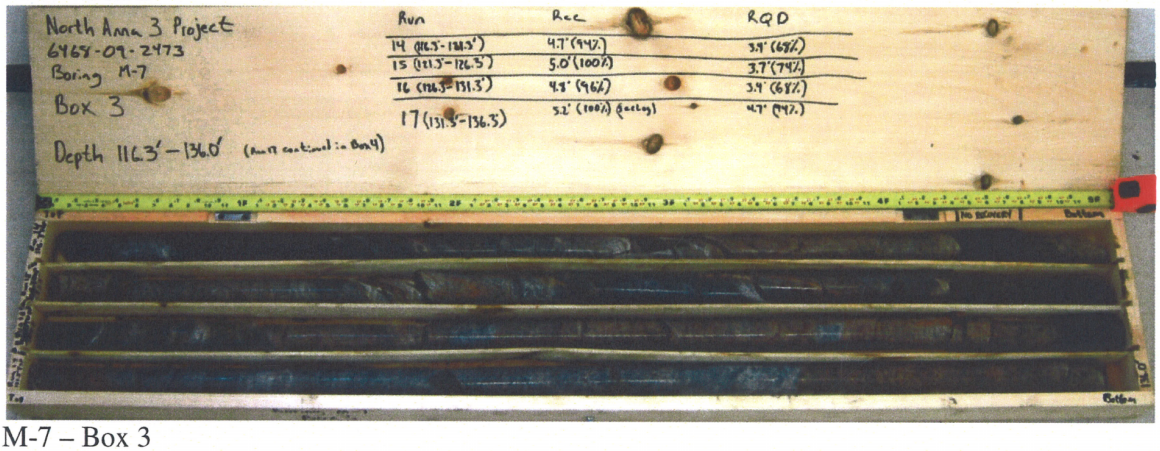
NORTH ANNA 3 CORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/4/09



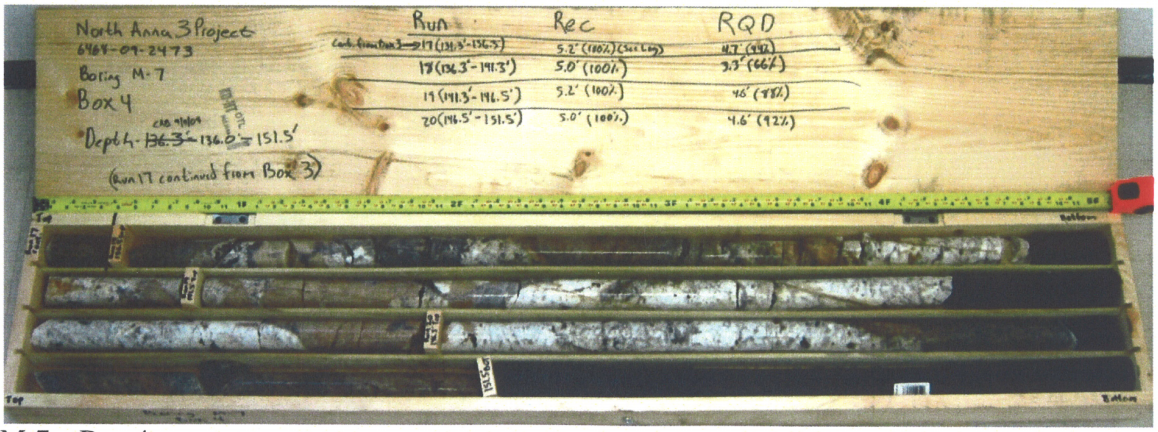
M-7 – Box 1



M-7 – Box 2



M-7 – Box 3



M-7 – Box 4

MACTEC

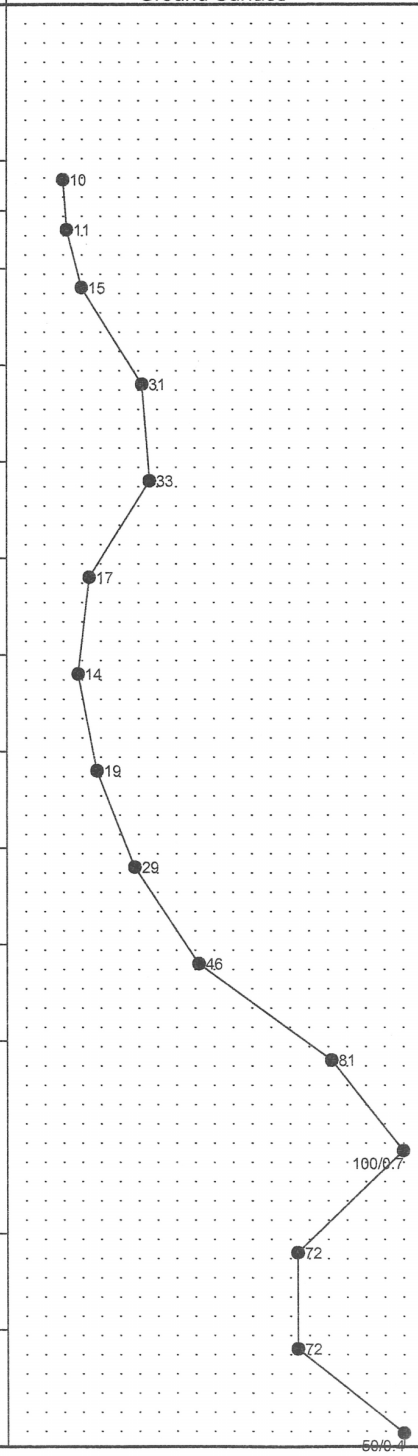
GEOTECHNICAL BORING LOG

Prepared By JSJ Date 12/16/09
Checked By MBL Date 12/16/09

BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: B. Mabie
SITE DESCRIPTION: North Anna 3 Project Supplement 2		DRILLER: D. Rhodes/K. Guy	FLUID LEVEL (ft)
BORING NO.: M-8	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-45C Track (RAL)	0 HR. NA
GROUND ELEV.: 329.3 ft (NAVD88)	NORTHING: 3,909,414 US ft (NAD83)	EASTING: 11,685,847 US ft (NAD83)	24 HR. 33.0
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: 9/1/09	COMPLETED: 9/9/09	HOLE DIA.: 3"	CASING DEPTH: 76.0 ft
CORE SIZE: NQ3	BITS USED: 2-7/8" Tri-Cone		

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	SOIL AND ROCK DESCRIPTION
329.3						Ground Surface
329.3	0.0					No sampling from 0.0 to 8.1 feet due to soft dig utility clearance by Dominion Personnel
321.2	8.1					
318.6	10.7	3	5	5	SS-1	RESIDUAL SOIL: Silty SAND (SM), red (2.5YR 5/8), loose, moist, fine to coarse grained sand, trace mica, relict rock fabric
315.6	13.7	4	5	6	SS-2	RESIDUAL SOIL: Clayey SAND (SC), reddish yellow (5YR 7/8), medium dense, moist, fine to coarse grained sand, trace mica, relict rock fabric
310.6	18.7	5	6	9	SS-3	RESIDUAL SOIL: Silty SAND (SM), reddish yellowish (5YR 7/6), medium dense, moist, fine to coarse grained sand, trace mica, relict rock fabric
305.6	23.7	14	15	16	SS-4	RESIDUAL SOIL: Well graded SAND (SW), brownish yellow (10YR 6/6), dense, moist, fine to coarse grained sand, relict rock fabric
300.6	28.7	19	17	16	SS-5	23.7 ft: Trace mica
295.6	33.7	4	6	11	SS-6	RESIDUAL SOIL: Silty SAND (SM), yellowish brown (10YR 5/6), medium dense, moist, fine grained sand, some mica, green and black staining, relict rock fabric
290.6	38.7	4	7	7	SS-7	33.7 ft: Dark yellowish brown (10YR 4/4)
285.6	43.7	5	8	11	SS-8	
280.6	48.7	13	14	15	SS-9	43.7 ft: Dark greenish gray (10Y 4/1), trace mica
275.6	53.7	14	21	25	SS-10	48.7 ft: Dense, fine to medium grained sand, some mica
270.6	58.7	17	31	50	SS-11	53.7 ft: Very dense, little mica, black staining
265.6	63.7	61	39/0.2		SS-12	WEATHERED ROCK: Severely weathered BIOTITE GNEISS (Sampled as Silty SAND (SM), dark grayish brown (10YR 4/2), very dense, moist, fine to medium grained sand, little mica)
260.6	68.7	16	22	50	SS-13	RESIDUAL SOIL: Silty SAND (SM), dark grayish brown (10YR 4/2), very dense, moist, fine to medium grained sand, some mica, relict rock fabric
255.6	73.7	37	31	41	SS-14	68.7 ft: Yellowish brown (10YR 5/8), fine grained sand
		50/0.4			SS-15	

BLOWS PER FOOT (0, 20, 40, 60, 80, 100)



MOI

LOG

329.3	0.0
321.2	8.1
319.3	10.0
316.3	13.0
313.3	16.0
303.3	26.0
273.3	56.0
268.3	61.0
258.3	71.0

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: B. Mabie
SITE DESCRIPTION: North Anna 3 Project Supplement 2		DRILLER: D. Rhodes/K. Guy	FLUID LEVEL (ft)
BORING NO.: M-8	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-45C Track (RAL)	0 HR. NA
GROUND ELEV.: 329.3 ft (NAVD88)	NORTHING: 3,909,414 US ft (NAD83)	EASTING: 11,685,847 US ft (NAD83)	24 HR. 33.0
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: 9/1/09	COMPLETED: 9/9/09	HOLE DIA.: 3"	CASING DEPTH: 76.0 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
254.5					Continued from previous page				
250.6	78.7	50/0.2			50/0.2	SS-16			WEATHERED ROCK: Severely weathered BIOTITE QUARTZ GNEISS (Sampled as Well Graded SAND (SW), pale brown (10YR 6/3), very dense, wet, fine to coarse grained sand, few to little rock fragments) *(continued)* 78.7 ft: Severely weathered BIOTITE QUARTZ GNEISS (Sampled as Silty SAND (SM), yellowish brown (10YR 5/4), moist, fine grained, some mica, little rock fragments (Hard drilling through entire run)
245.6	83.7	50/0.0			50/0.0	SS-17			
242.9	86.4	50/0.0			50/0.0	SS-18			83.7 ft: No recovery 86.4 ft: No Recovery
									242.9 — 86.4
									HARD ROCK: Light gray with orange staining, moderately severe to moderately weathered, close fracturing, medium hard, BIOTITE QUARTZ GNEISS
									239.1 — 90.2
									WEATHERED ROCK: Severely weathered BIOTITE QUARTZ GNEISS (No Recovery)
									236.1 — 93.2
									HARD ROCK: Light gray, brown, tan, and light brown, with orange staining, moderately to slightly weathered, close fracturing, medium hard to moderately hard, BIOTITE QUARTZ GNEISS
									216.3 — 113.0
									WEATHERED ROCK: Severely weathered BIOTITE QUARTZ GNEISS (No Recovery)
									213.1 — 116.2
									HARD ROCK: Light brown to tan and gray, with orange staining, moderately to slightly weathered, close fracturing, moderately hard, BIOTITE QUARTZ GNEISS
									206.6 — 122.7
									WEATHERED ROCK: Severely weathered BIOTITE QUARTZ GNEISS (No Recovery)
									203.1 — 126.2
									HARD ROCK: Light brown, gray, and light gray, with orange staining, moderately severe to moderately weathered, close fracturing, medium hard to hard, BIOTITE QUARTZ GNEISS

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: B. Mabie
SITE DESCRIPTION: North Anna 3 Project Supplement 2		DRILLER: D. Rhodes/K. Guy	FLUID LEVEL (ft)
BORING NO.: M-8	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-45C Track (RAL)	0 HR. NA
GROUND ELEV.: 329.3 ft (NAVD88)	NORTHING: 3,909,414 US ft (NAD83)	EASTING: 11,685,847 US ft (NAD83)	24 HR. 33.0
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: 9/1/09	COMPLETED: 9/9/09	HOLE DIA.: 3"	CASING DEPTH: 76.0 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
179.7					Continued from previous page				
									178.7 — 150.6

Boring and coring terminated at 150.3 feet.

Boring closed by tremie method with cement-bentonite grout.

24 hour water level measured on 9/09/2009 prior to drilling. Borehole was at a depth of 136.2 feet.

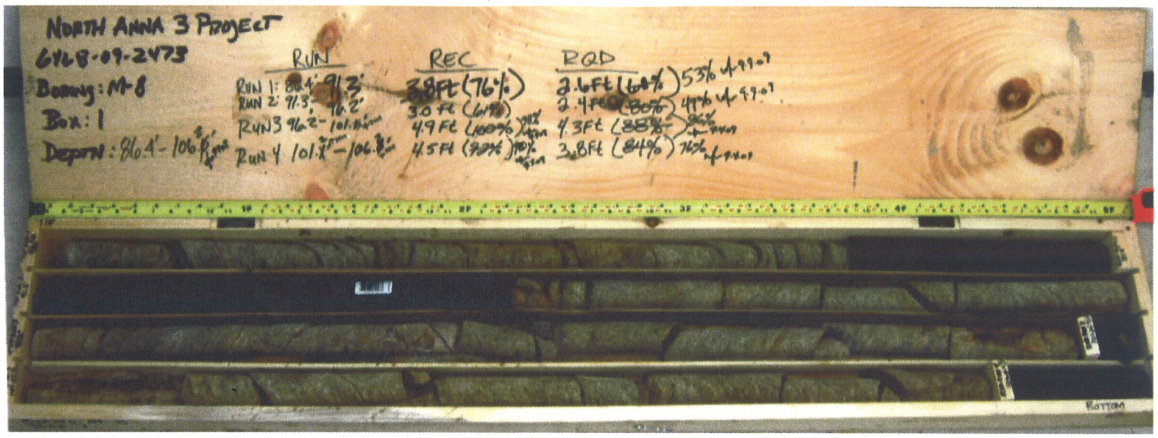
NORTH ANNA 3 BORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/3/09

MACTEC

BECHTEL PROJECT NO.: 25161	MACTEC PROJECT NO.: 6468-09-2473	COUNTY: Louisa, VA	GEOLOGIST: B. Mabie
SITE DESCRIPTION: North Anna 3 Project Supplement 2		DRILLER: D. Rhodes/K. Guy	FLUID LEVEL (ft)
BORING NO.: M-8	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-45C Track (RAL)	0 HR. NA
GROUND ELEV.: 329.3 ft (NAVD88)	NORTHING: 3,909,414 US ft (NAD83)	EASTING: 11,685,847 US ft (NAD83)	24 HR. 33.0
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: 9/1/09	COMPLETED: 9/9/09	CASING DEPTH: 76.0 ft	CORE BARREL TYPE: Wireline NQ3 Triple Tube, series 6 bit

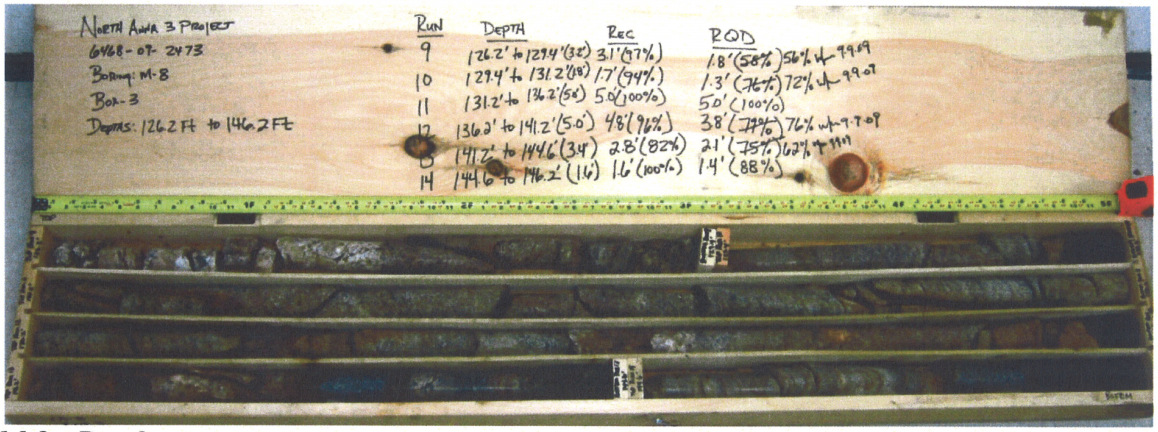
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
										Begin Coring @ 86.4 ft
242.9	86.4	4.9	N=50/0.0 3:35 3:12 3:26 3:01 1:48/0.9	(3.8) 78%	(2.6) 53%	RUN 1	(3.8) 100%	(2.6) 68%		242.9 HARD ROCK: Light gray with orange staining, moderately severe to moderately weathered, close fracturing, medium hard, BIOTITE QUARTZ GNEISS (12 joints at 40-50°, open) 86.4
238.0	91.3						(0.0) 0%	(0.0) 0%		239.1 90.2 WEATHERED ROCK: Severely weathered BIOTITE QUARTZ GNEISS (No Recovery)
		4.9	1:49 2:28 2:08 2:24 2:30/0.9	(3.0) 61%	(2.4) 49%	RUN 2	(19.1) 96%	(15.9) 80%		236.1 93.2 HARD ROCK: Light gray, brown, tan, and light brown, with orange staining, moderately to slightly weathered, close fracturing, medium hard to moderately hard, BIOTITE QUARTZ GNEISS (1 joint at 60°, open; 3 at 90°, open) (9 joints at 20-50°, tight)
233.1	96.2									
		5.0	2:36 2:46 2:21 2:39 2:59	(4.9) 98%	(4.3) 86%	RUN 3				
228.1	101.2									
		5.0	2:30 2:35 2:13 2:33 2:41	(4.5) 90%	(3.8) 76%	RUN 4				(7 joints at 20-30°, tight to open; 1 joint at 90°, tight)
223.1	106.2									
		5.0	2:38 2:46 2:15 2:26 2:29	(4.9) 98%	(4.0) 80%	RUN 5				(10 joints at 0-40°, open to tight)
218.1	111.2									
		5.0	2:37 2:18 1:50 2:12 2:35	(1.8) 36%	(1.4) 28%	RUN 6				216.3 113.0 (3 joints at 0-40°, open)
							(0.0) 0%	(0.0) 0%		WEATHERED ROCK: Severely weathered BIOTITE QUARTZ GNEISS (No Recovery)
213.1	116.2									213.1 116.2
		5.0	2:06 1:53 1:57 2:22 2:50	(4.8) 96%	(3.7) 74%	RUN 7	(6.3) 97%	(5.0) 77%		HARD ROCK: Light brown to tan and gray, with orange staining, moderately to slightly weathered, close fracturing, moderately hard, BIOTITE QUARTZ GNEISS (several joints at 90°, open)
208.1	121.2									
		5.0	2:32 2:29 2:36 3:16 4:17	(1.5) 30%	(1.3) 26%	RUN 8				206.6 122.7 (1 joint at 20°, open)
							(0.0) 0%	(0.0) 0%		WEATHERED ROCK: Severely weathered BIOTITE QUARTZ GNEISS (No Recovery)
203.1	126.2									203.1 126.2
		3.2	3:40 4:01 3:01 1:48/0.2	(3.1) 97%	(1.8) 56%	RUN 9	(21.8) 89%	(17.0) 70%		HARD ROCK: Light brown, gray, and light gray, with orange staining, moderately severe to moderately weathered, close fracturing, medium hard to hard, BIOTITE QUARTZ GNEISS (11 joints at 0-90°, open; quartz vein from 126.2-127.8 ft) (4 joints at 0-30°, tight to open) (2 joints at 20-30°, tight; 3 joints at 80°, tight)
199.9	129.4									
		1.8	2:08/0.8	(1.7) 94%	(1.3) 72%	RUN 10				
198.1	131.2									
		5.0	2:47 2:51 2:46 2:33 2:49 2:55	(5.0) 100%	(5.0) 100%	RUN 11				
193.1	136.2									
		5.0	3:01 2:44 2:39 3:03 3:26	(4.8) 96%	(3.8) 76%	RUN 12				(6 joints at 20-30°, open; 2 joints at 80-90°, open)
188.1	141.2									
		3.4	2:43 2:46 2:33 1:28/0.4	(2.8) 82%	(2.1) 62%	RUN 13				(2 joints at 0-20°, open; 2 joints at 80°, open)
184.7	144.6									
		1.6	2:02/0.6	(1.6) 100%	(1.4) 88%	RUN 14				(4 joints at 20-40°, tight to open)
183.1	146.2									
		4.4	2:13 2:42 2:54 3:26 4:12 1:33/0.4	(2.8) 64%	(1.6) 36%	RUN 15				(7 joints at 20-60°, open)
178.7	150.6									178.7 150.6
										Boring and coring terminated at 150.3 feet. Boring closed by tremie method with cement-bentonite grout. 24 hour water level measured on 9/09/2009 prior to drilling. Borehole was at a depth of 136.2 feet.

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

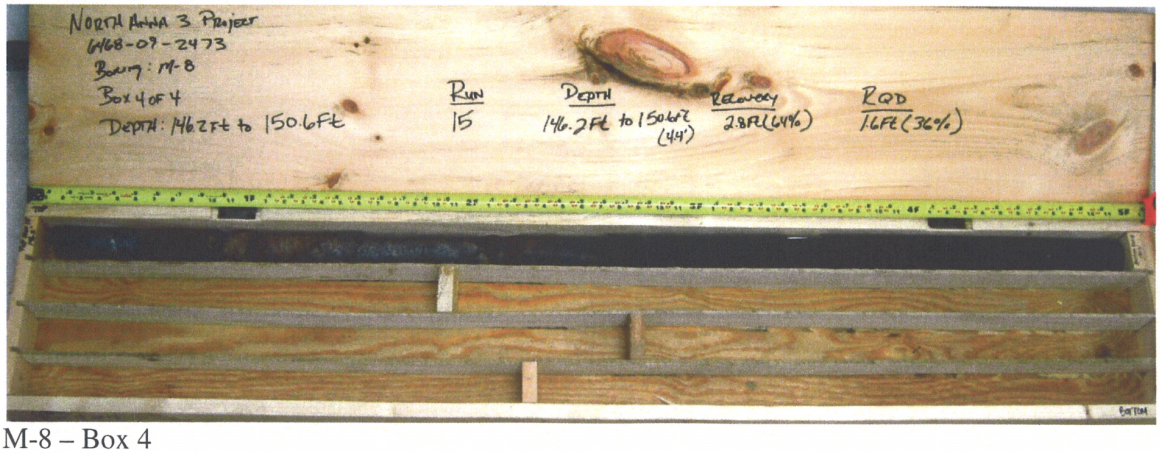


M-8 – Box 1

M-8 – Box 2



M-8 – Box 3



M-8 – Box 4