



GEOTECHNICAL BORING LOG

Prepared By JSS Date 12/16/09Checked By NAL Date 12/16/09

SHEET 1 OF 3

BECHTEL PROJECT NO.: 25161		MACTEC PROJECT NO.: 6468-09-2473		COUNTY: Louisa, VA		GEOLOGIST: R. Clark							
SITE DESCRIPTION: North Anna 3 Project Supplement 2				DRILLER: T. Hahn/R. Hall		FLUID LEVEL (ft)							
BORING NO.: M-30 (DH)		DRILL METHOD: Mud Rotary/Rock Core		DRILL MACHINE: CME-55 Track (RAL)		0 HR. NA							
GROUND ELEV.: 313.3 ft (NAVD88)		NORTHING: 3,909,695 US ft (NAD83)		EASTING: 11,685,382 US ft (NAD83)		24 HR. 25.4							
TOTAL DEPTH: 201.7 ft		SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		ROD TYPE: AWJ		HAMMER (ID): 140-lb. Auto (MEC-21)							
DATE STARTED: 9/1/09		COMPLETED: 9/9/09		HOLE DIA.: 4"		CASING DEPTH: 42.2 ft							
				CORE SIZE: HQ3		BITS USED: 3-7/8" 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	
313.3					Ground Surface							313.3 0.0	
												No sampling from 0.0 to 8.7 ft due to soft dig utility clearance by Dominion Personnel	
304.6	8.7	5	5	5						SS-1		304.6 8.7	
302.2	11.1	4	6	6						SS-2		RESIDUAL SOIL: Silty SAND (SM), yellow (10YR 7/6), loose, moist, fine grained sand, relict rock fabric	
299.6	13.7	4	7	7						SS-3		11.1 ft: Reddish yellow (7.5YR 7/6), medium dense	
294.6	18.7	6	7	6						SS-4		13.7 ft: Yellow (10YR 7/6)	
289.6	23.7	7	8	10						SS-5		18.7 ft: Pale yellow (2.5Y 7/4)	
284.6	28.7	11	14	15						SS-6		23.7 ft: Fine to coarse grained sand	
279.6	33.7	27	52	49/0.5						SS-7		28.7 ft: Yellow (10YR 7/6)	
274.6	38.7	50/0.5									SS-8		WEATHERED ROCK: Severely weathered BIOTITE QUARTZ GNEISS (Sampled as Silty SAND (SM), yellow (10YR 7/6), very dense, moist, fine to coarse grained sand)
269.6	43.7	50/0.0									SS-9		43.7 ft: SPT Refusal with no penetration
										RS-6		HARD ROCK: Light gray with orange staining, moderately to slightly weathered, close fracturing, hard, BIOTITE QUARTZ GNEISS	
												HARD ROCK: Light gray, with trace pink and white, locally with orange staining, very slightly weathered to fresh, close to wide fracturing, hard to very hard, BIOTITE QUARTZ GNEISS with trace magnetite	

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

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SITE DESCRIPTION: North Anna 3 Project Supplement 2		DRILLER: T. Hahn/R. Hall	FLUID LEVEL (ft)
BORING NO.: M-30 (DH)	DRILL METHOD: Mud Rotary/Rock Core	DRILL MACHINE: CME-55 Track (RAL)	0 HR. NA
GROUND ELEV.: 313.3 ft (NAVD88)	NORTHING: 3,909,695 US ft (NAD83)	EASTING: 11,685,382 US ft (NAD83)	24 HR. 25.4
TOTAL DEPTH: 201.7 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb. Auto (MEC-21)
DATE STARTED: 9/1/09	COMPLETED: 9/9/09	CASING DEPTH: 42.2 ft	CORE BARREL TYPE: Wireline HQ3 Triple Tube, series 6 & 10 bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	LOG	DESCRIPTION AND REMARKS
										Begin Coring @ 43.7 ft
269.6	43.7	3.0	N=50/0.0 2:01	(3.0) 100%	(1.9) 63%	RUN 1	(3.0) 100%	(1.9) 63%		269.6 HARD ROCK: Light gray with orange staining, moderately to slightly weathered, close fracturing, hard, BIOTITE QUARTZ GNEISS
266.6	46.7	5.0	2:06 3:12	(5.0) 100%	(4.7) 94%	RUN 2	(154.2) 99%	(148.9) 96%		266.6 (5 joints at 0-10°, tight with iron staining; 1 joint at 90°, tight with iron staining)
261.6	51.7	5.0	2:26 3:20 3:55 4:19 4:47	(5.0) 100%	(4.1) 82%	RUN 3				HARD ROCK: Light gray, with trace pink and white, locally with orange staining, very slightly weathered to fresh, close to wide fracturing, hard to very hard, BIOTITE QUARTZ GNEISS with trace magnetite
256.6	56.7	5.0	5:14 4:24 6:52 5:26 6:57	(5.0) 100%	(5.0) 100%	RUN 4 RS-6				(1 joint at 0°, tight; 2 joints at 60°, tight with trace iron staining; 1 joint at 90°, tight with iron staining)
251.6	61.7	5.0	8:22 8:20 10:41 12:33 15:37	(5.0) 100%	(5.0) 100%	RUN 5				(2 joints at 10°, tight with trace iron staining; 1 joint at 30°, tight with trace iron staining; 1 joint at 90°, tight with iron staining)
250.3	63.0	1.3	6:48/0.2 3:09/0.1 6:24/0.5 4:15/0.2 6:41/0.3	(1.3) 100%	(0.0) 0%	RUN 6				(1 joint at 10°, tight with trace mica)
246.6	66.7	3.7	11:14/0.7 14:29 26:32 31:04	(3.7) 100%	(3.3) 89%	RUN 7 RUN 8 RUN 9				Note: RUN 5 to RUN 9 shown together due to short run lengths. Inner core barrel blocking off due to standard size HQ bit installed after RUN 4 completed (mistaken for HQ3 sized bit). Proper sized HQ3 core bit installed after RUN 9 completed.
241.6	71.7	5.0	11:14/0.7 14:29 26:32 31:04	(5.0) 100%	(4.8) 96%	RUN 10 RUN 11				(2 joints at 10°, tight with iron staining; 1 joint at 30°, tight)
236.6	76.7	5.0	6:48 4:28 4:22 4:40 2:58	(5.0) 100%	(4.9) 98%	RUN 12				(3 joints at 30°, tight with trace iron staining)
231.6	81.7	5.0	2:34 2:46 3:11 3:48 2:43	(5.0) 100%	(5.0) 100%	RUN 13				(1 joint at 0°, tight with iron staining)
227.5	85.8	4.1	3:42 3:45 4:58 4:37 4:55	(4.1) 100%	(4.1) 100%	RUN 14				(Coarse grained/pegmatitic zone from 83.4 to 83.7 ft)
226.6	86.7	0.9	5:58/0.1 21:09	(0.8) 89%	(0.8) 89%	RUN 15				
225.2	88.1	1.4	5:25/0.9 12:50	(1.4) 100%	(1.4) 100%	RUN 16				(0.1 ft thick quartz vein at 40°)
221.6	91.7	3.6	12:34/0.4 8:05/0.6	(3.6) 100%	(3.6) 100%	RUN 17				(Mechanical fractures)
216.6	96.7	5.0	4:12 4:31 5:35	(5.0) 100%	(5.0) 100%	RUN 18				(Mechanical fractures)
211.6	101.7	5.0	2:21 2:35 2:05 1:58 2:35	(5.0) 100%	(5.0) 100%	RS-7				
206.6	106.7	5.0	2:05 2:58 2:32 2:31 2:29	(5.0) 100%	(5.0) 100%	RUN 19				(Pegmatitic quartz + feldspar vein from 96.9-97.3 feet)
201.6	111.7	5.0	2:10 2:25 2:31 2:42 3:10	(5.0) 100%	(5.0) 100%	RUN 20				(No Joints)
196.6	116.7	5.0	2:56 2:07 2:54 1:38 1:52	(5.0) 100%	(5.0) 100%	RUN 21				(No Joints)
		5.0	2:06 2:13 2:32 2:55 2:09	(5.0) 100%	(5.0) 100%	RUN 22				(1 joint at 0°, tight with trace staining; pegmatitic quartz + feldspar vein from 115.0-115.3 feet)
		5.0	2:27 2:28	(4.9) (4.9)		RUN 23				(1 joint at 25°, tight)

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



SHEET 2 OF 3

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TOTAL DEPTH: 201.7 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb. Auto (MEC-21)
DATE STARTED: 9/1/09	COMPLETED: 9/9/09	CASING DEPTH: 42.2 ft	CORE BARREL TYPE: Wireline HQ3 Triple Tube, series 6 & 10 bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	LOG	DESCRIPTION AND REMARKS
										Continued from previous page
191.6	121.7	5.0	2:35 2:28 2:55	98%	98%					HARD ROCK: Light gray, with trace pink and white, locally with orange staining, very slightly weathered to fresh, close to wide fracturing, hard to very hard, BIOTITE QUARTZ GNEISS with trace magnetite (<i>continued</i>) (3 joints at 30°, tight to open with iron staining, moderately weathered zone from 123.7-124.9 ft)
186.6	126.7	5.0	2:04 3:08 1:19 2:27 1:54	(5.0) 100%	(4.2) 84%	RUN 24				
181.6	131.7	5.0	2:28 2:38 2:26 2:38 2:45	(5.0) 100%	(5.0) 100%	RUN 25				(No Joints)
176.6	136.7	5.0	2:38 2:49 3:13 3:13 3:05	(5.0) 100%	(5.0) 100%	RUN 26				(Mechanical Fractures)
171.6	141.7	5.0	3:06 3:22 3:46 4:37 5:01	(5.0) 100%	(5.0) 100%	RUN 27				(1 joint at 45°, tight with trace iron staining; 1 joint at 60°, tight)
166.6	146.7	5.0	7:27 8:37 1:46 2:33 1:42	(4.9) 98%	(4.9) 98%	RUN 28				(1 joint at 75°, tight with trace iron staining)
161.6	151.7	5.0	2:22 2:43 2:45 2:58 2:32	(5.0) 100%	(5.0) 100%	RUN 29				(1 joint at 45°, tight)
156.6	156.7	5.0	3:18 3:12 4:10 5:25 4:41	(5.0) 100%	(4.5) 90%	RUN 30				(2 joints at 80-90°, tight)
152.6	160.7	4.0	2:26 2:38 3:43 5:30	(4.0) 100%	(3.2) 80%	RUN 31				(1 joint at 10°, tight with trace iron staining; 1 joint at 45°, tight)
151.6	161.7	1.0	4:08	(0.6)	(0.6)	RUN 32				(No Joints)
146.6	166.7	5.0	2:57 3:29 3:07 3:29 1:58	60% (4.9) 98%	60% (4.9) 98%	RUN 33				(1 joint at 35°, tight)
141.6	171.7	5.0	2:48 3:18 3:05 2:59 3:28	(5.0) 100%	(4.9) 98%	RUN 34 RS-9				(3 joints at 50°, tight)
136.6	176.7	5.0	2:56 3:22 3:43 4:25 5:13	(5.0) 100%	(5.0) 100%	RUN 35				(No joints; foliation at 45°)
131.6	181.7	5.0	7:22 5:59 6:29 8:07 3:21	(5.0) 100%	(5.0) 100%	RUN 36				(No Joints)
126.6	186.7	5.0	3:08 2:59 3:20 3:34 3:45	(5.0) 100%	(5.0) 100%	RUN 37				(1 joint at 45°, tight with iron staining)
121.6	191.7	5.0	4:01 4:22 4:33 4:46 5:21	(5.0) 100%	(5.0) 100%	RUN 38				(1 joint at 45°, tight with trace iron staining)
		5.0	4:49	(5.0)	(5.0)	RUN 39				(No Joints)

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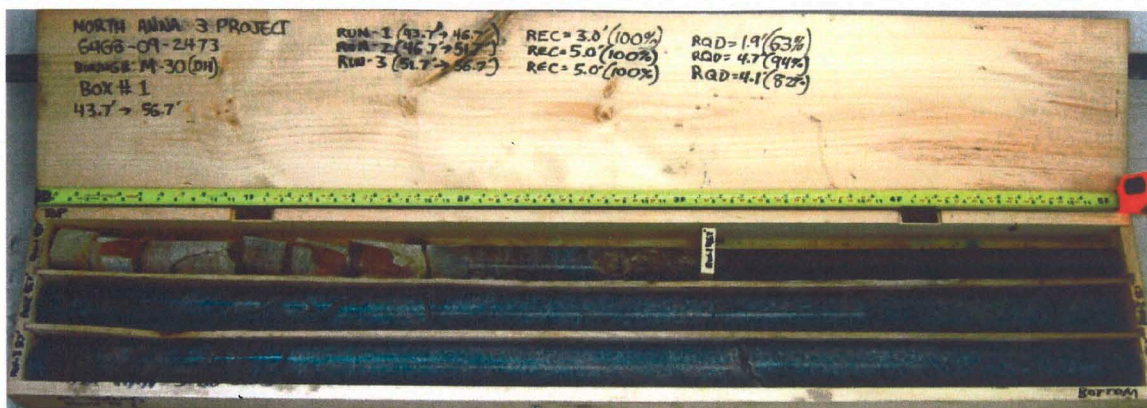


SHEET 3 OF 3

BECHTEL PROJECT NO.: 25161		MACTEC PROJECT NO.: 6468-09-2473		COUNTY: Louisa, VA		GEOLOGIST: R. Clark	
SITE DESCRIPTION: North Anna 3 Project Supplement 2				DRILLER: T. Hahn/R. Hall		FLUID LEVEL (ft)	
BORING NO.: M-30 (DH)		DRILL METHOD: Mud Rotary/Rock Core		DRILL MACHINE: CME-55 Track (RAL)		0 HR. NA	
GROUND ELEV.: 313.3 ft (NAVD88)		NORTHING: 3,909,695 US ft (NAD83)		EASTING: 11,685,382 US ft (NAD83)		24 HR. 25.4	
TOTAL DEPTH: 201.7 ft		SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08				HAMMER (ID): 140-lb. Auto (MEC-21)	
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				REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %				
										Continued from previous page		
116.6	196.7	5.0	4:52 3:05 3:08 3:28	100%	100%						HARD ROCK: Light gray, with trace pink and white, locally with orange staining, very slightly weathered to fresh, close to wide fracturing, hard to very hard, BIOTITE QUARTZ GNEISS with trace magnetite (<i>continued</i>) (No Joints)	
			3:35 2:28 2:36 3:42 3:25	(5.0) 100%	(5.0) 100%	RUN 40 RS-10						
111.6	201.7											
										111.6	201.7	Boring and coring terminated at 201.7 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 171.5 feet.

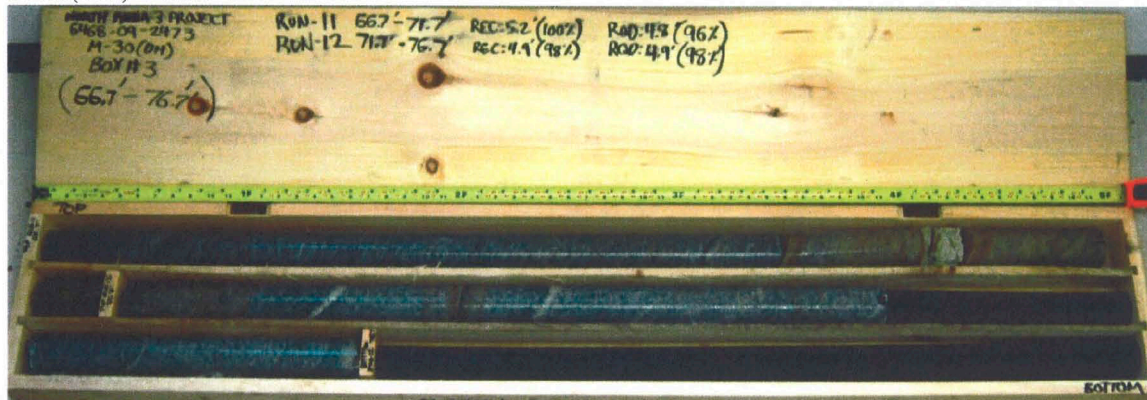
NORTH ANNA 3 CORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/4/09



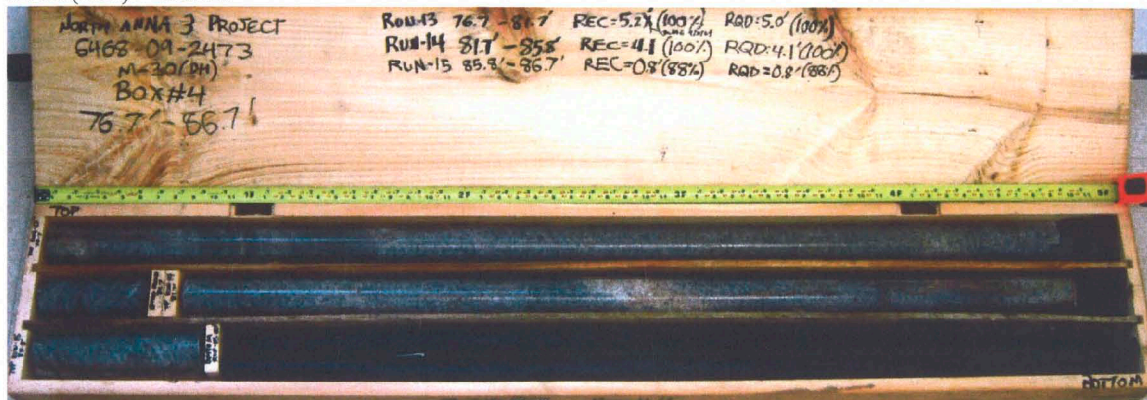
M-30(DH) – Box 1



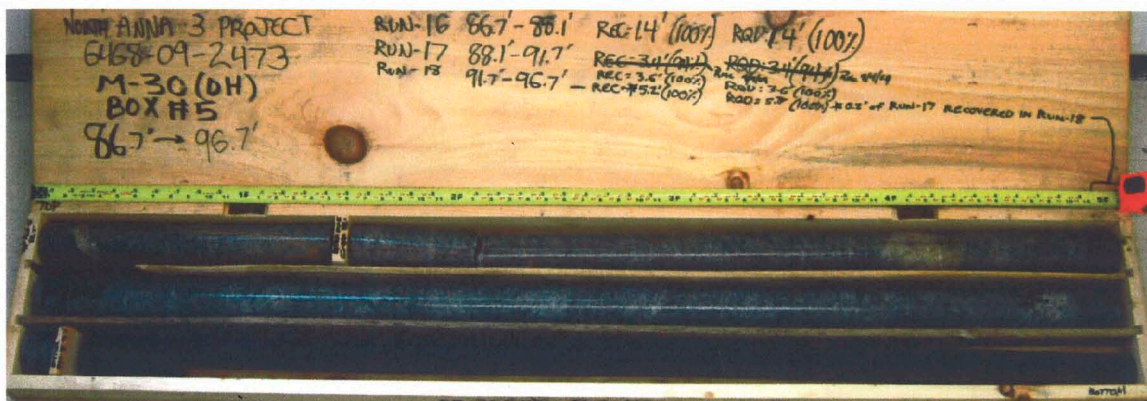
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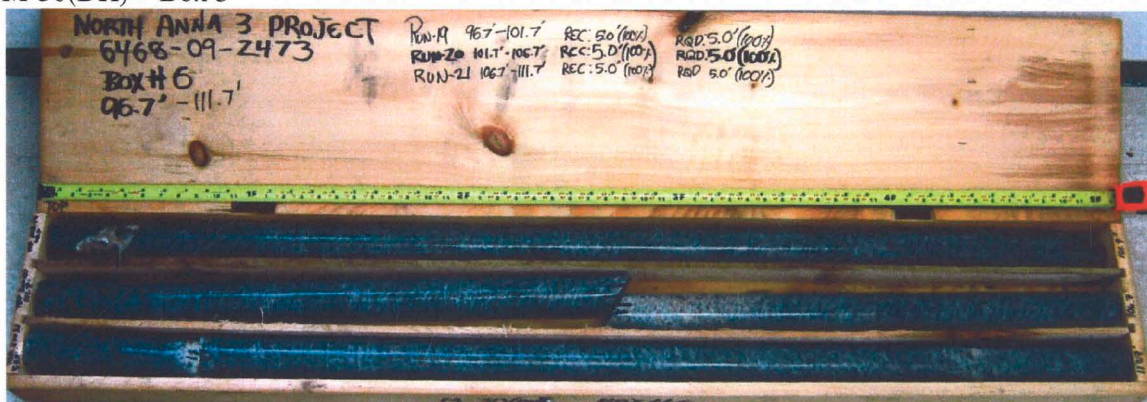
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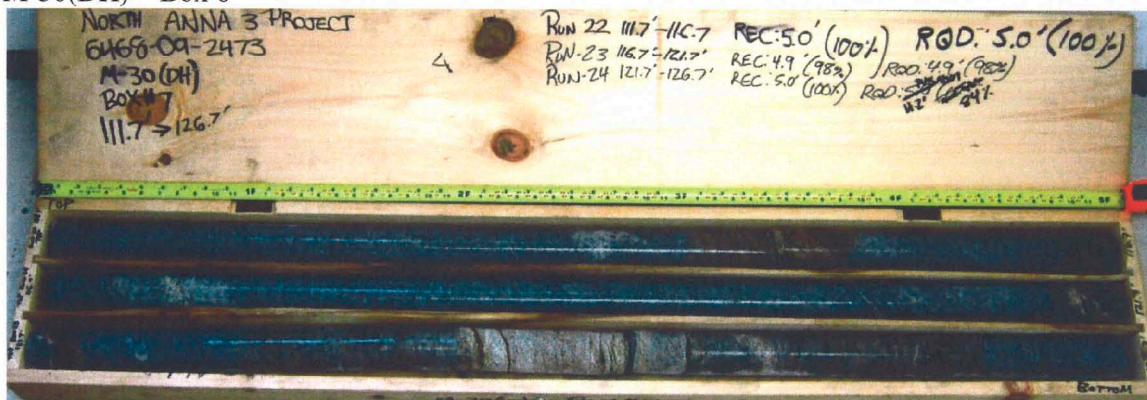
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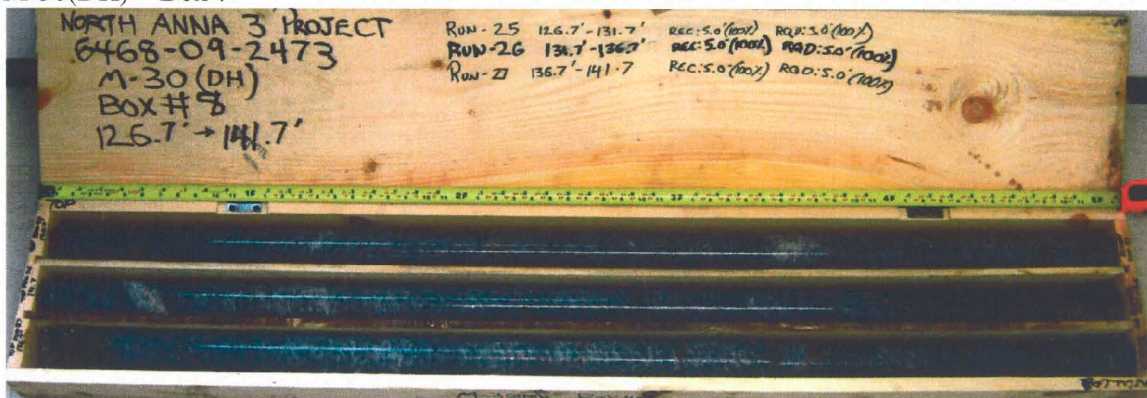
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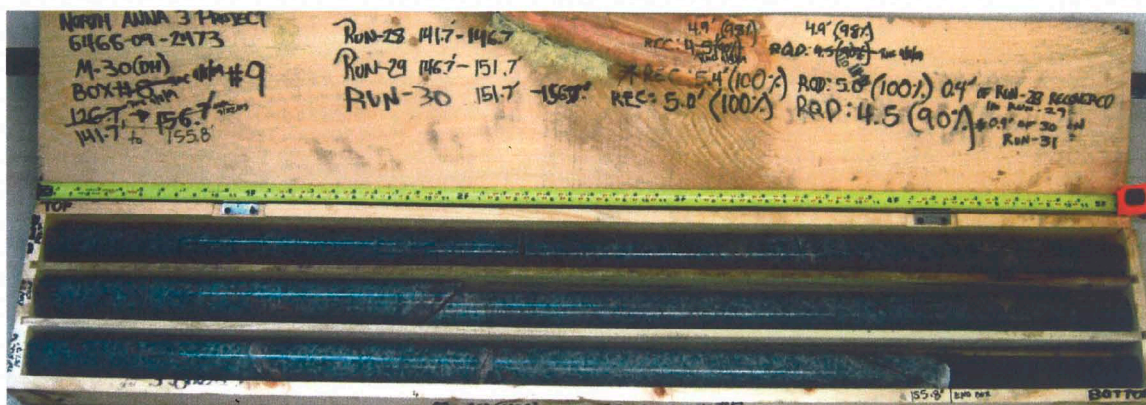
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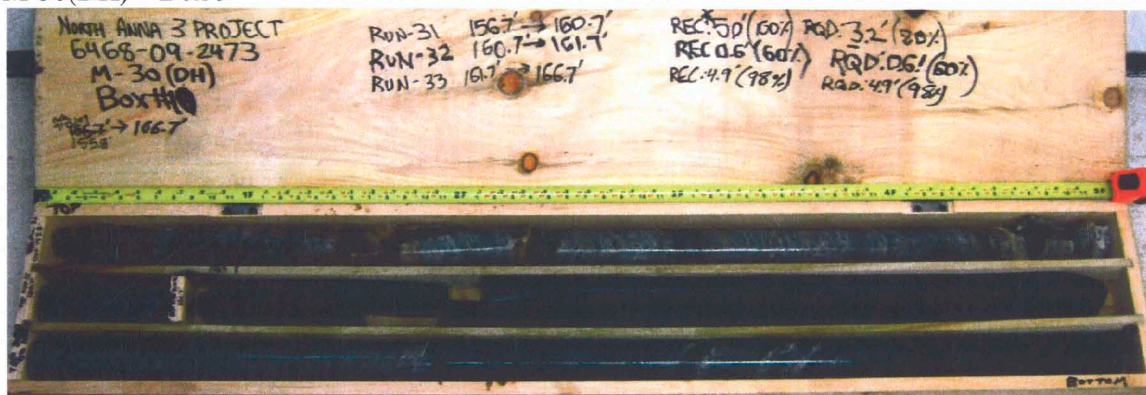
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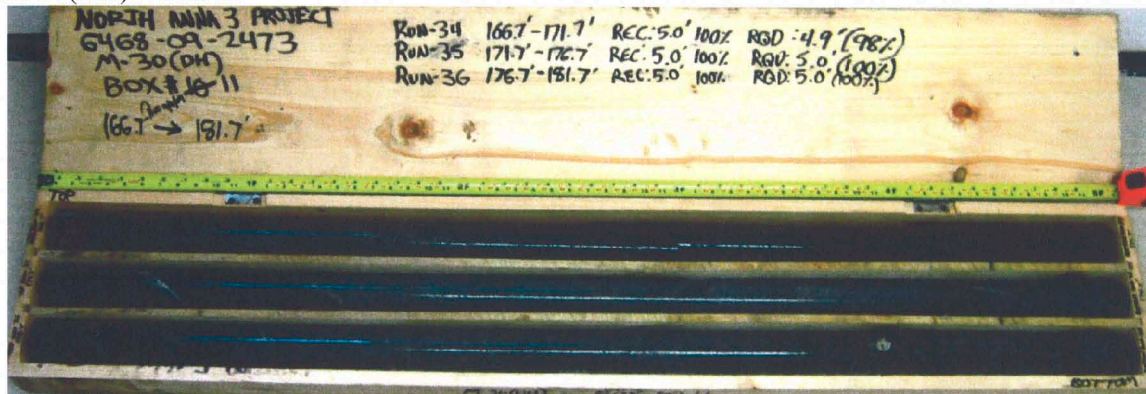
M-30(DH) – Box 8



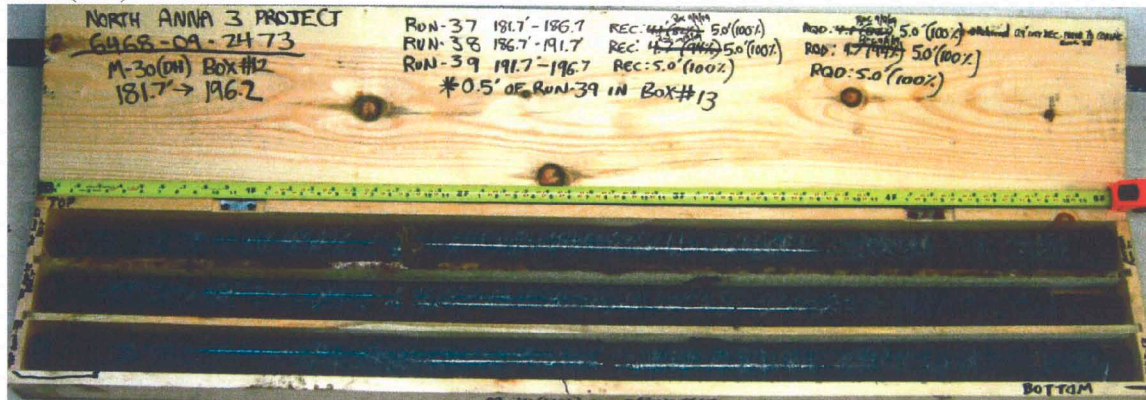
M-30(DH) - Box 9



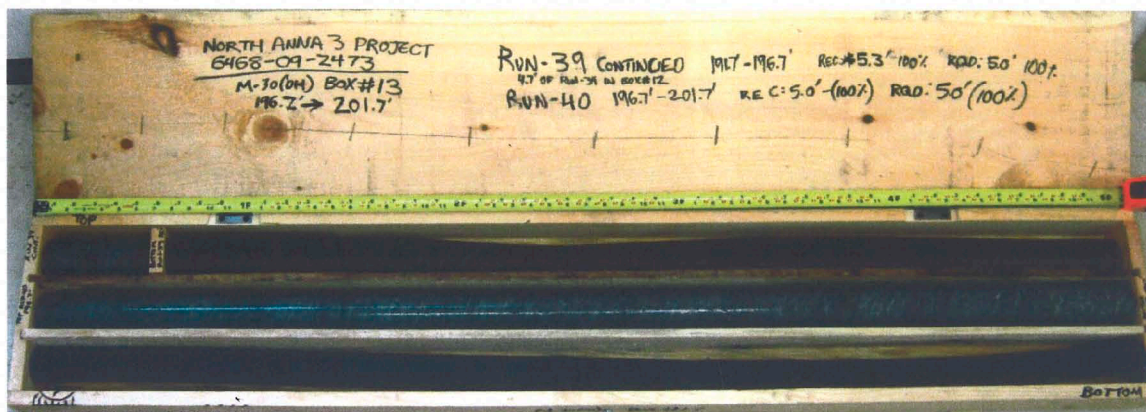
M-30(DH) - Box 10



M-30(DH) - Box 11



M-30(DH) - Box 12



M-30(DH) - Box 13