GEOTECHNICAL BORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	COUNTY Louisa, VA	GEOLOGIST S.Lehman
SITE DESCRIPTION NORTH ANNA COL		GROUND WATER (ft)
BORING NO. B-909	DRILL METHOD: Rotary Wash/Core	SAMPLE METHODS: SPT/CORE
COLLAR ELEV. 304.9 ft (NAVD88)	NORTHING 3,909,695 US ft (NAD83)	EASTING 11,686,107 US ft (NAD83)
TOTAL DEPTH 201.9 ft	DRILL MACHINE CME 55LC Track	DRILLER: D. White
DATE STARTED 8/17/06	COMPLETED 8/24/06	CORE BARREL TYPE: HQ 3 triple tube-wireline

GROUND WATER (ft)	
0 HR.	11.6
24 HR.	12.5

HAMMER TYPE 140 lbs Auto

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
304.9					Ground Surface				304.9 / 0.0
303.4	1.5								Silty SAND (SM) light olive brown (2.5Y 5/4), dark greenish gray (GLEY1 4/10Y), yellowish brown (10YR 4/4), dark greenish gray (10YR 5/6), very dark grayish brown (10YR 3/2), pale yellow (2.5Y 7/3), and yellowish brown (10YR 5/6&5/8), moist to wet, loose to medium dense (Residual Soil)
301.4	3.5	4	3	2	5	909-1			
298.9	6.0	2	2	3	5	909-2			
296.4	8.5	2	2	4	6	909-3			
293.9	11.0	2	2	3	5	909-4			
291.4	13.5	2	2	2	4	909-5			
286.4	18.5	1	2	2	4	909-6			
281.4	23.5	3	5	6	11	909-7			
276.4	28.5	6	6	6	12	909-8			
271.4	33.5	24	50/0.5			909-9			275.9 / 29.0 — Weathered Rock: Light grayish brown to white, severely weathered, QUARTZ-BIOTITE GNEISS
268.0	36.9	50/0.2				909-10			
263.0	41.9	50/0.4				909-11			266.4 / 38.5 — Silty SAND (SM), olive (5Y 4/3), moist, dense (Residual Soil)
258.0	46.9	18	20	26	46	909-12			259.9 / 45.0 — Weathered Rock: Olive green, severely weathered, QUARTZ-BIOTITE GNEISS
248.0	56.9	50/0.3				909-13			254.4 / 50.5 — 253.0 / 51.9 — Hard Rock: Dark gray, moderate severely weathered, closely fractured, moderately hard, QUARTZ-BIOTITE GNEISS; Weathered Rock: Dark greenish gray, severely weathered, soft, BIOTITE GNEISS with quartz
238.0	66.9	50/0.2				909-14			244.9 / 60.0 — Hard Rock-Weathered Rock: Light to dark gray, very severely to moderately weathered, close fracturing, soft to medium hard, QUARTZ-BIOTITE GNEISS
		50/0.3				909-15			

NORTH ANNA COL DATA REPORT REV0.GPJ NORTH ANNA COL.GDT 1/19/07

GEOTECHNICAL BORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	COUNTY Louisa, VA	GEOLOGIST S.Lehman
SITE DESCRIPTION NORTH ANNA COL		GROUND WATER (ft)
BORING NO. B-909	DRILL METHOD: Rotary Wash/Core	SAMPLE METHODS: SPT/CORE
COLLAR ELEV. 304.9 ft (NAVD88)	NORTHING 3,909,695 US ft (NAD83)	EASTING 11,686,107 US ft (NAD83)
TOTAL DEPTH 201.9 ft	DRILL MACHINE CME 55LC Track	DRILLER: D. White
DATE STARTED 8/17/06	COMPLETED 8/24/06	CORE BARREL TYPE: HQ 3 triple tube-wireline

GROUND WATER (ft)	
0 HR.	11.6
24 HR.	12.5

HAMMER TYPE 140 lbs Auto

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
230.1					Continued from previous page				
									Hard Rock-Weathered Rock: Light to dark gray, very severely to moderately weathered, close fracturing, soft to medium hard, QUARTZ-BIOTITE GNEISS *(continued)*
									223.0 — 81.9
									Hard Rock: Light to dark gray, fresh, close to wide fracturing, hard, QUARTZ-BIOTITE GNEISS

GEOTECHNICAL BORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	COUNTY Louisa, VA	GEOLOGIST S.Lehman
SITE DESCRIPTION NORTH ANNA COL		GROUND WATER (ft)
BORING NO. B-909	DRILL METHOD: Rotary Wash/Core	SAMPLE METHODS: SPT/CORE
COLLAR ELEV. 304.9 ft (NAVD88)	NORTHING 3,909,695 US ft (NAD83)	EASTING 11,686,107 US ft (NAD83)
TOTAL DEPTH 201.9 ft	DRILL MACHINE CME 55LC Track	DRILLER: D. White
DATE STARTED 8/17/06	COMPLETED 8/24/06	CORE BARREL TYPE: HQ 3 triple tube-wireline

GROUND WATER (ft)	
0 HR.	11.6
24 HR.	12.5

HAMMER TYPE 140 lbs Auto

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
155.3					Continued from previous page				
									Hard Rock: Light to dark gray, fresh, close to wide fracturing, hard, QUARTZ-BIOTITE GNEISS *(continued)*
									103.0
									Boring and coring terminated at 201.9 ft in Hard Rock: Hard QUARTZ-BIOTITE GNEISS
									201.9

NORTH ANNA COL BORE NORTH ANNA COL DATA REPORT REV0.GPJ NORTH ANNA COL.GDT 1/19/07

GEOTECHNICAL CORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** S.Lehman
SITE DESCRIPTION NORTH ANNA COL		**GROUND WATER (ft)**
BORING NO. B-909	**DRILL METHOD:** Rotary Wash/Core	**SAMPLE METHODS:** SPT/CORE — **0 HR.** 11.6
COLLAR ELEV. 304.9 ft **(NAVD88)**	**NORTHING** 3,909,695 **US ft (NAD83)**	**EASTING** 11,686,107 **US ft (NAD83)** — **24 HR.** 12.5
TOTAL DEPTH 201.9 ft	**DRILL MACHINE** CME 55LC Track	**DRILLER:** D. White — **HAMMER TYPE** 140 lbs Auto
DATE STARTED 8/17/06	**COMPLETED** 8/24/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline
CORE SIZE HQ3	**TOTAL RUN** 165.5 ft	

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 @ 33.7 ft
271.2	33.7	3.2	0:59 1:03 0:58/1.2	(0.0) 0%	(0.0) 0%	1				Weathered Rock: Light grayish brown to white, severely weathered, QUARTZ-BIOTITE GNEISS *(continued)* -No Recovery
268.0	36.9									
267.6	37.3	4.6	N=50/0.4 0:57 1:10 0:49 0:55 1:31/0.6	(0.0) 0%	(0.0) 0%	909-11 2				266.4 -No Recovery 38.5 Silty SAND (SM), olive (5Y 4/3), moist, dense (Residual Soil)
263.0	41.9									
			N=46			909-12				
261.5	43.4	3.5	1:23/0.5 1:21 1:27 1:29	(0.0) 0%	(0.0) 0%	3				259.9 -No Recovery 45.0 Weathered Rock: Olive green, severely weathered, QUARTZ-BIOTITE GNEISS
258.0	46.9									
257.7	47.2	4.7	N=50/0.3 1:36/0.7 2:12 2:16 1:43 1:38	(1.4) 30%	(0.9) 19%	909-13 4				254.4 50.5 253.0 Hard Rock: Dark gray, moderate severely weathered, closely fractured, moderately hard, QUARTZ-BIOTITE GNEISS 51.9
253.0	51.9									
		5.0	2:03 2:44 1:45 1:16 1:24	(0.0) 0%	(0.0) 0%	5				Weathered Rock: Dark greenish gray, severely weathered, soft, BIOTITE GNEISS with quartz -No Recovery
248.0	56.9									
247.8	57.1	4.8	N=50/0.2 2:29/0.8 2:42 2:14 1:51 2:29	(1.9) 40%	(0.4) 8%	909-14 6				244.9 60.0 Hard Rock-Weathered Rock: Light to dark gray, very severely to moderately weathered, close fracturing, soft to medium hard, QUARTZ-BIOTITE GNEISS
243.0	61.9									
		5.0	2:45 2:42 2:26 2:36 1:38	(0.9) 18%	(0.0) 0%	7				
238.0	66.9									
237.7	67.2	4.7	N=50/0.3 1:21/0.7 1:40 2:06 2:40 2:27	(3.2) 68%	(0.9) 19%	909-15 8				(4 joints at 20° weathered with trace clay)
233.0	71.9									
		5.0	1:46 2:39 2:01 2:31 1:54	(3.3) 66%	(0.0) 0%	9				(4 joints at 45°, 1 joint at 70°, and 3 joints at 20°-all with Fe stain and clay)
228.0	76.9									
		5.0	1:50 1:37 1:45 2:10 2:08	(2.9) 58%	(1.1) 22%	10				(1 joint at 20° and 1 join at 70° both severely weathered)
223.0	81.9									223.0 81.9
		5.0	1:56 1:51 2:11 2:10 2:24	(4.9) 98%	(4.9) 98%	UCS-82.4'				Hard Rock: Light to dark gray, fresh, close to wide fracturing, hard, QUARTZ-BIOTITE GNEISS -No Joints
218.0	86.9									
216.2	88.7	1.8	2:27 2:30/0.8	(1.8) 100%	(1.8) 100%	12				-No Joints
213.0	91.9	3.2	0:39/0.2 1:52 2:05 1:47	(3.2) 100%	(3.2) 100%	13				-No Joints
		5.0	2:26 2:08 2:07 2:03 1:46	(4.9) 98%	(4.9) 98%	UC-96.5'				-No Joints
208.0	96.9									
		5.0	1:58 2:00 2:20 3:47 2:59	(5.1) 102%	(3.5) 70%	15				(6 joints at 30° weathered with Fe stain; 1 joint at 70° with clay)
203.0	101.9									
		5.0	2:45 2:47 3:32 3:10 2:42	(4.8) 96%	(4.7) 94%	16				(4 joints at 45° with trace clay; 1 joint at 30° with clay)
198.0	106.9									
		5.0	2:46	(5.1)	(4.9)	UC-107.4'				(3 joints at 30° with trace clay)

NORTH ANNA COL CORE NORTH ANNA COL DATA REPORT REV0.GPJ NORTH ANNA COL.GDT 1/19/07

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** S.Lehman	
SITE DESCRIPTION NORTH ANNA COL			**GROUND WATER (ft)**
BORING NO. B-909	**DRILL METHOD:** Rotary Wash/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 11.6
COLLAR ELEV. 304.9 ft (NAVD88)	**NORTHING** 3,909,695 US ft (NAD83)	**EASTING** 11,686,107 US ft (NAD83)	**24 HR.** 12.5
TOTAL DEPTH 201.9 ft	**DRILL MACHINE** CME 55LC Track	**DRILLER:** D. White	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 8/17/06	**COMPLETED** 8/24/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline	
CORE SIZE HQ3	**TOTAL RUN** 165.5 ft		

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
193.0	111.9		2:28 2:40 2:06 3:05	102%	98%					Hard Rock: Light to dark gray, fresh, close to wide fracturing, hard, QUARTZ-BIOTITE GNEISS *(continued)*
188.0	116.9	5.0	2:43 2:30 2:30 2:43 2:36	(4.9) 98%	(4.9) 98%	18				(1 joint at 30° moderately weathered)
183.0	121.9	5.0	2:26 2:25 2:28 2:24 1:59	(5.0) 100%	(5.0) 100%	19				(1 joint at 70° and 2 joints at 30° slightly to moderately weathered)
178.0	126.9	5.0	2:35 2:33 2:45 3:11 2:38	(5.0) 100%	(5.0) 100%	20				-No Joints
173.0	131.9	5.0	2:38 3:09 3:08 2:41 2:03	(5.0) 100%	(5.0) 100%	UC-127.4'				(1 joint at 80-90°)
168.0	136.9	5.0	2:43 2:28 2:18 2:25 2:14	(5.0) 100%	(5.0) 100%	22				-No Joints
163.0	141.9	5.0	2:48 2:25 2:46 3:12 3:09	(5.0) 100%	(5.0) 100%	23				(2 joints at 45°)
158.0	146.9	5.0	4:27 5:07 5:15 5:25 6:20	(5.0) 100%	(5.0) 100%	24				-No Joints
153.0	151.9	5.0	4:57 5:44 4:48 5:03 4:30	(4.8) 96%	(4.6) 92%	25				(2 joints at 20° weathered with clay)
148.0	156.9	5.0	5:28 5:04 4:42 5:57 5:53	(5.0) 100%	(5.0) 100%	UCS-152.3'				(1 joint at 80° trace clay)
143.0	161.9	5.0	6:40 7:40 4:54 2:54 3:26	(5.0) 100%	(5.0) 100%	27				-No Joints
138.0	166.9	5.0	4:16 4:37 5:01 4:47 4:38	(5.1) 102%	(5.1) 102%	28				-No Joints
133.0	171.9	5.0	3:55 3:50 3:20 3:17 4:58	(5.0) 100%	(5.0) 100%	29				(3 joints at 20° weathered with trace clay)
128.0	176.9	5.0	8:03 6:14 5:25 5:39 5:28	(5.0) 100%	(4.9) 98%	30				-No Joints
123.0	181.9	5.0	5:51 5:50 5:06 2:05 2:30	(5.0) 100%	(4.9) 98%	31				-No Joints
		5.0	2:45	(5.0)	(5.0)	32				-No Joints

GEOTECHNICAL CORING LOG

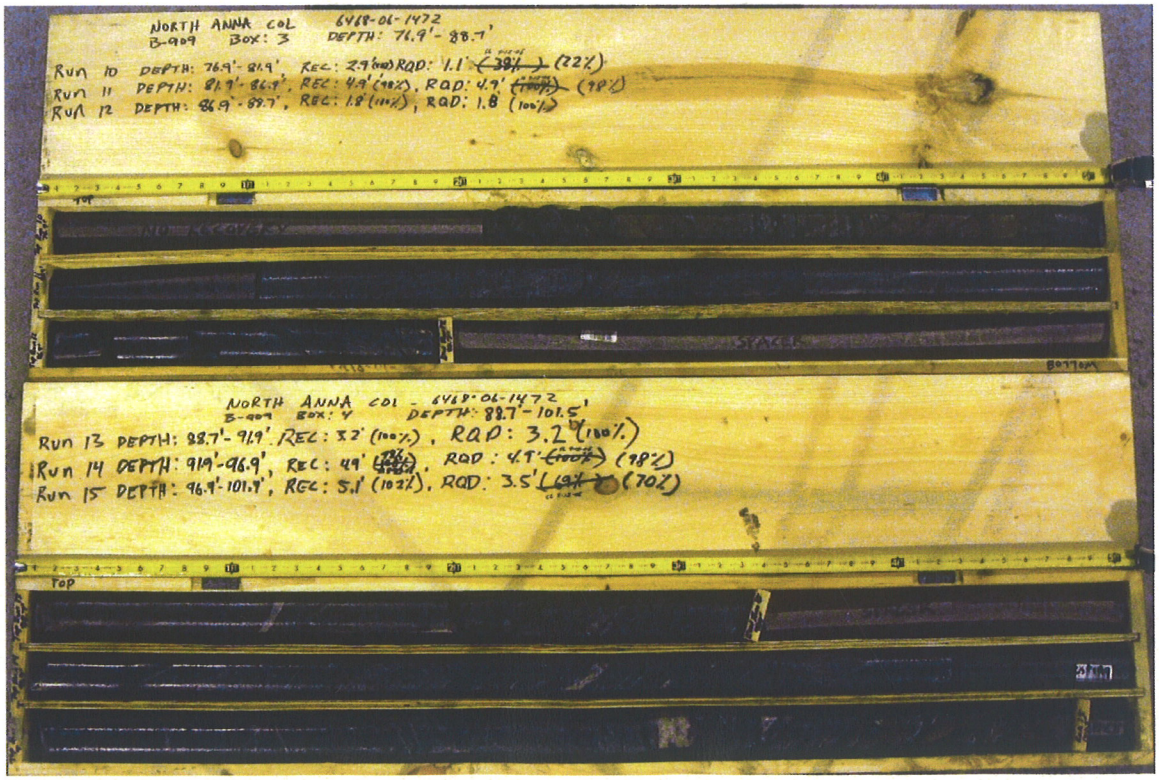
MACTEC

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** S.Lehman
SITE DESCRIPTION NORTH ANNA COL		**GROUND WATER (ft)**
BORING NO. B-909	**DRILL METHOD:** Rotary Wash/Core	**SAMPLE METHODS:** SPT/CORE — **0 HR.** 11.6
COLLAR ELEV. 304.9 ft **(NAVD88)**	**NORTHING** 3,909,695 **US ft (NAD83)**	**EASTING** 11,686,107 **US ft (NAD83)** — **24 HR.** 12.5
TOTAL DEPTH 201.9 ft	**DRILL MACHINE** CME 55LC Track	**DRILLER:** D. White — **HAMMER TYPE** 140 lbs Auto
DATE STARTED 8/17/06	**COMPLETED** 8/24/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline
CORE SIZE HQ3	**TOTAL RUN** 165.5 ft	

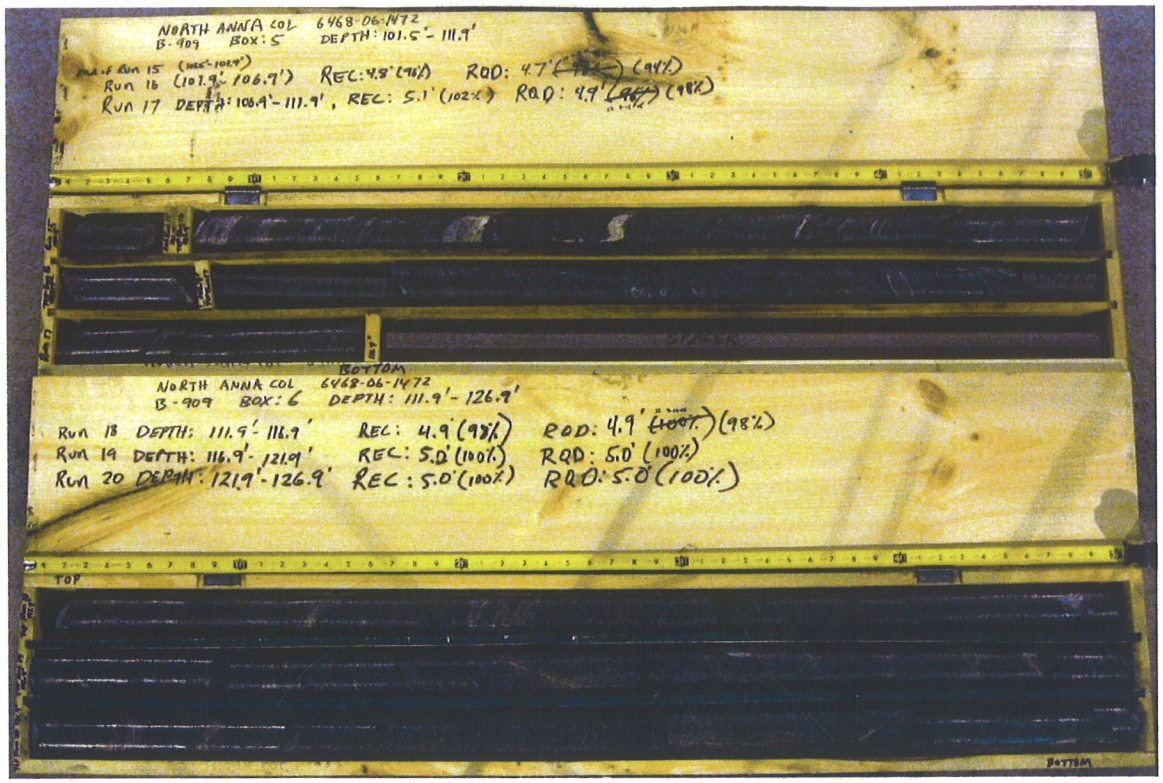
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
										Continued from previous page
118.0	186.9		2:13 1:38 2:16 2:28	100%	100%					Hard Rock: Light to dark gray, fresh, close to wide fracturing, hard, QUARTZ-BIOTITE GNEISS *(continued)*
113.0	191.9	5.0	2:20 2:36 2:39 3:36 3:56	(5.0) 100%	(5.0) 100%	UC-187.3'				-No Joints
108.0	196.9	5.0	2:50 4:02 3:52 3:36 3:25	(5.0) 100%	(5.0) 100%	34				-No Joints
103.0	201.9	5.0	4:08 4:16 4:31 3:47 3:16	(4.8) 96%	(4.8) 96%	35				-No Joints 103.0 — 201.9
										Coring terminated at 201.9 ft in Hard Rock: Hard QUARTZ-BIOTITE GNEISS

NORTH ANNA COL_CORE NORTH ANNA COL DATA REPORT REV0.GPJ NORTH ANNA COL.GDT 1/19/07

B-909 – Box 1
B-909 – Box 2



B-909 – Box 3
B-909 – Box 4



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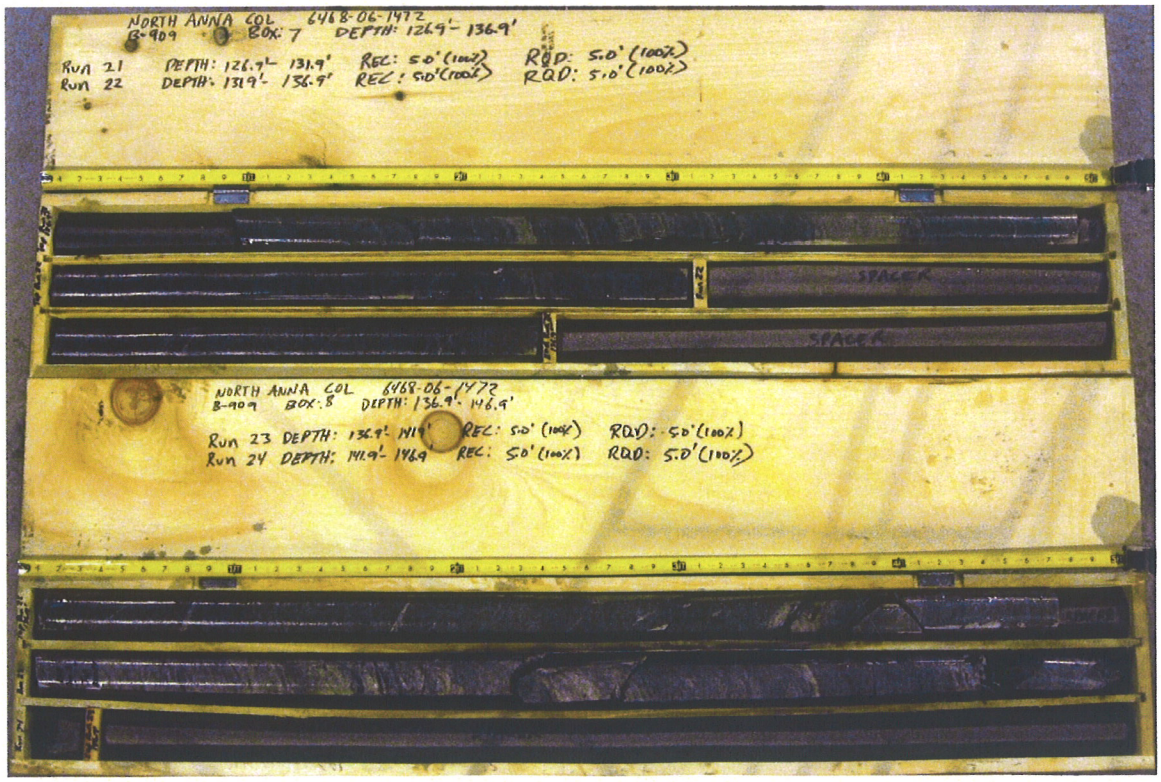
B-909 – Box 6



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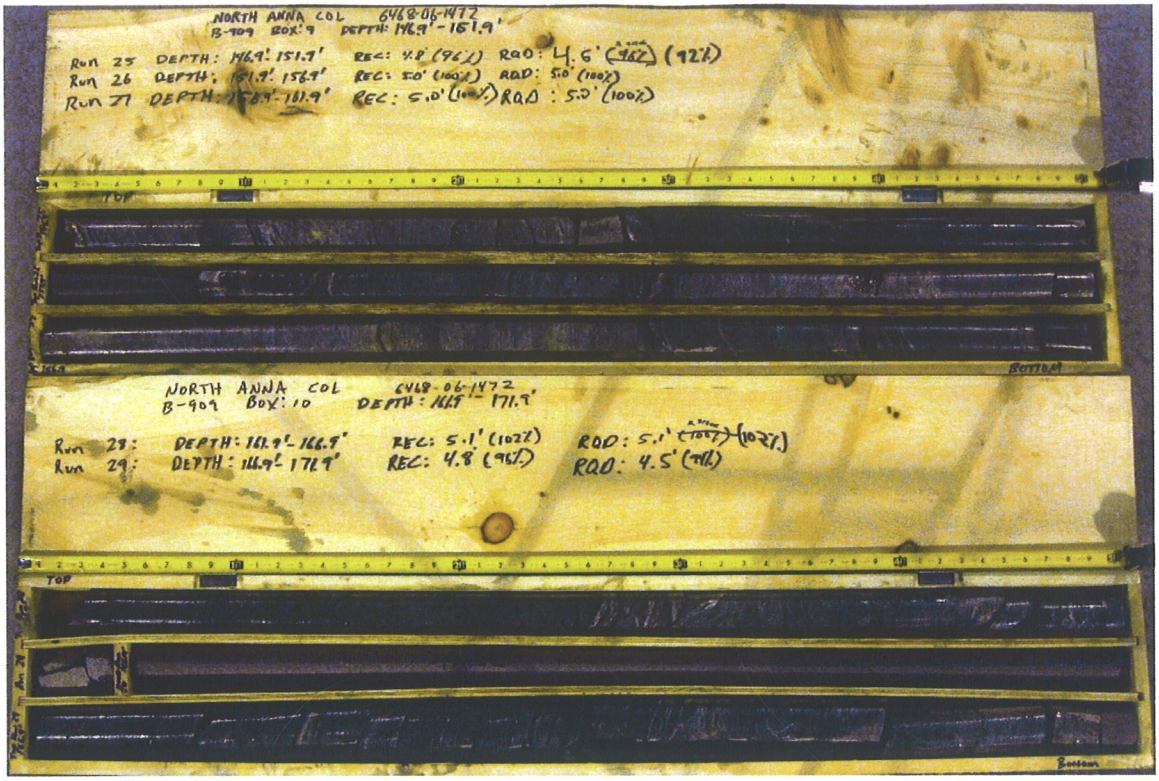
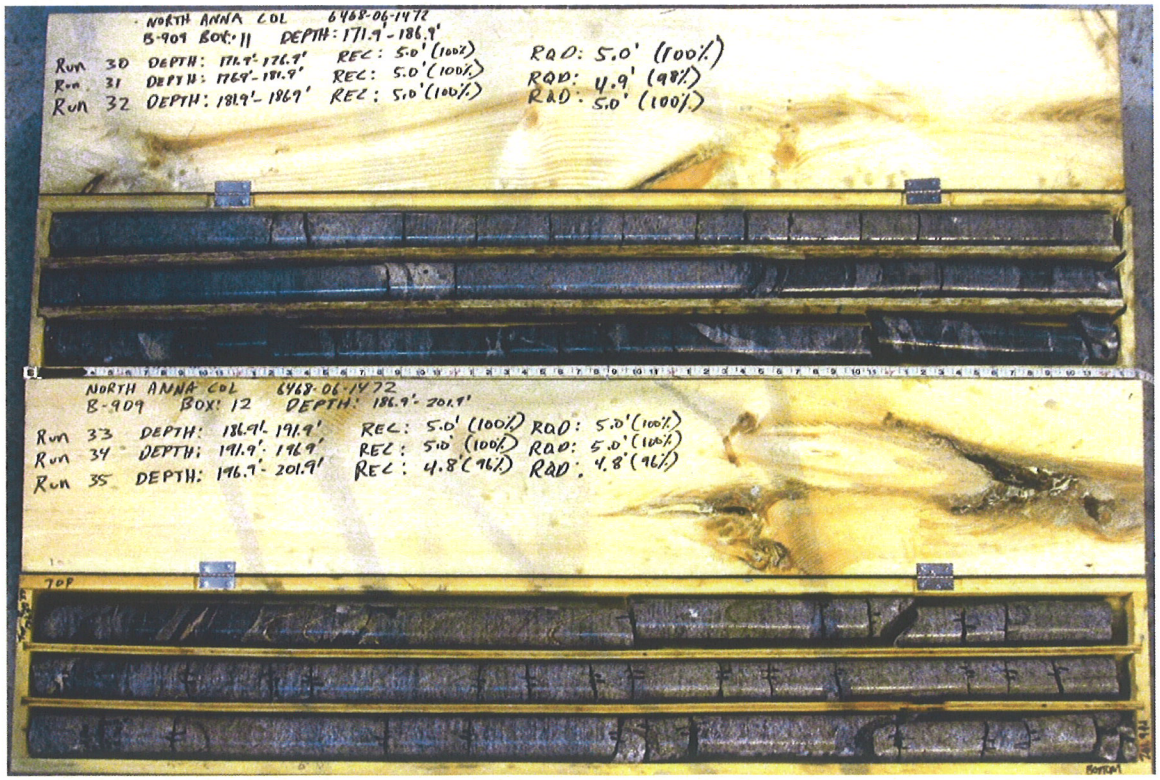
B-909 – Box 8



B-909 – Box 9
B-909 – Box 10



B-909 – Box 11
B-909 – Box 12