



GEOTECHNICAL BORING LOG

Prepared By JST Date 12/16/09Checked By MM Date 12/16/09

SHEET 1 OF 3

BECHTEL PROJECT NO.: 25161		MACTEC PROJECT NO.: 6468-09-2473		COUNTY: Louisa, VA		GEOLOGIST: K. Lloyd							
SITE DESCRIPTION: North Anna 3 Project Supplement 2				DRILLER: D. White/O. Smith		FLUID LEVEL (ft)							
BORING NO.: M-3		DRILL METHOD: Mud Rotary/Rock Core		DRILL MACHINE: CME-55LC Track (RAL)		0 HR. NA							
GROUND ELEV.: 313.9 ft (NAVD88)		NORTHING: 3,909,539 US ft (NAD83)		EASTING: 11,685,679 US ft (NAD83)		24 HR. 17.7							
TOTAL DEPTH: 152.6 ft		SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		ROD TYPE: AWJ		HAMMER (ID): 140-lb. Auto (MEC-02)							
DATE STARTED: 9/9/09		COMPLETED: 9/14/09		HOLE DIA.: 4"		CASING DEPTH: 28.2 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 MOI	SOIL AND ROCK DESCRIPTION	
313.9					Ground Surface							313.9	0.0
												No samples from 0.0 to 9.3 feet due to soft dig utility clearance by Dominion Personnel.	
305.6	8.3	12	25	31						SS-1		305.6	8.3
303.1	10.8	17	16	9						SS-2		RESIDUAL SOIL: Silty SAND (SM), very pale brown (10YR 8/3), very dense, dry, fine to coarse grained sand, few to little feldspar and quartz fragments, relict rock fabric 10.8 ft: Medium dense	
299.1	14.8	19	25	33						SS-3		14.8 ft: Very pale brown (10YR 8/2), very dense, few to little weathered rock fragments	
294.8	19.1	47	53/0.2						SS-4		296.9	17.0	
289.6	24.3	50/0.3						SS-5		WEATHERED ROCK: Severely weathered QUARTZ GNEISS (Sampled as Silty SAND (SM), white (10YR 8/1), very pale brown (10YR 8/3), and yellow (10YR 7/8), very dense, moist, trace mica, few to little rock fragments)			
284.8	29.1	50/0.2						SS-6					
279.8	34.1	50/0.0						SS-7		34.1 ft: SPT Refusal with no penetration, very hard drilling from 34.1 to 39.1 feet.			
274.8	39.1	50/0.0						SS-8		39.1 ft: SPT Refusal with no penetration	39.1		
												HARD ROCK: Yellowish brown to yellowish gray, with orange staining throughout, 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 12/16/09



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ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT						SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION
		0.5ft	0.5ft	0.5ft	0	20	40	60	80	100			
239.1					Continued from previous page								
													238.2 75.7 HARD ROCK: Dark gray-brown to black, moderately severely to moderately weathered, close to moderately close fracturing, medium hard to moderately hard, BIOTITE GNEISS
													232.3 81.6 HARD ROCK: Light gray with orange staining, slightly weathered, close to moderately close fracturing, hard, QUARTZ GNEISS
													223.3 90.6 HARD ROCK: Yellowish brown, yellowish gray, and gray to light gray, with orange staining, slightly to very slightly weathered, moderately close fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS
													201.3 112.6 HARD ROCK: Yellowish brown to yellowish gray, with orange staining, moderately severe to slightly weathered, close to moderately close fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS
													171.3 142.6 HARD ROCK: Yellowish brown with orange staining, slightly weathered, moderately close fracturing, hard, BIOTITE QUARTZ GNEISS

NORTH ANNA 3 BORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/16/09

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ELEV.	DEPTH	BLOW COUNT			BLOWS PER FOOT						SAMP.	MOI	LOG	SOIL AND ROCK DESCRIPTION																					
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	20	40	60	80	100	NO.																								
164.3					Continued from previous page																														
														161.3 152.6 Boring and coring terminated at 152.6 feet. Boring closed by tremie method with cement-bentonite grout. 24 hour water level measured on 9/14/2009 prior to drilling. Borehole was at a depth of 117.6 feet.																					

NORTH ANNA 3 BORE NORTH ANNA 3 PROJECT,GPJ NORTH ANNA 3.GDT 12/16/09



SHEET 1 OF 2

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GROUND ELEV.: 313.9 ft (NAVD88)				NORTHING: 3,909,539 US ft (NAD83)				EASTING: 11,685,679 US ft (NAD83)		24 HR. 17.7				
TOTAL DEPTH: 152.6 ft			SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08						HAMMER (ID): 140-lb. Auto (MEC-02)					
DATE STARTED: 9/9/09			COMPLETED: 9/14/09		CASING DEPTH: 28.2 ft		CORE BARREL TYPE: Wireline HQ3 Triple Tube, series 6 & 10 bits							
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %RQD (ft) %		SAMP. NO.	STRATA REC. (ft) %RQD (ft) %		L O G	DESCRIPTION AND REMARKS				
										Begin Coring @ 39.1 ft				
274.8	39.1	3.5	N=50/0.0 2:59 4:17 4:40	(3.3) 94%	(2.0) 57%	RUN 1	(34.2) 93%	(23.9) 65%		274.8	HARD ROCK: Yellowish brown to yellowish gray, with orange staining throughout, moderately severely to moderately weathered, very close to moderately close fracturing, medium hard to hard, BIOTITE QUARTZ GNEISS (3 joints at 40°, tight; 2 joints at 70°, tight to open with trace clay) (6 joints at 40°, tight; 1 joint at 80-90°, open with clay and orange staining)	39.1		
271.3	42.6	5.0	1:12/0.5 3:55 3:55 3:17 5:18 3:18	(5.0) 100%	(3.4) 68%	RUN 2				(5 joints at 50-60°, tight)				
266.3	47.6	5.0	4:08 4:54 4:18 3:45 3:39	(5.0) 100%	(4.8) 96%	RUN 3				(5 joints at 30°, tight; severely weathered zone with partial recovery from 54.7-56.4 ft)				
261.3	52.6	5.0	2:32 2:02 1:52 3:27 3:36	(3.6) 72%	(2.1) 42%	RUN 4				(4 joints at 30°, tight)				
256.3	57.6	5.0	5:08 3:32 2:59 2:50 2:20	(5.0) 100%	(3.7) 74%	RUN 5				(4 joints at 30°, tight to open)				
251.3	62.6	5.0	6:28 8:54 7:48 4:24 2:57	(4.8) 96%	(3.0) 60%	RUN 6				(6 joints at 30°, tight to open)				
246.3	67.6	5.0	7:44 9:34 3:08 4:45 3:45	(4.4) 88%	(2.4) 48%	RUN 7				(4 joints at 30°, tight to open)				
241.3	72.6	5.0	5:00 4:04 9:10 10:15 2:51	(3.8) 76%	(2.5) 50%	RUN 8				(2.7) 46%	(1.2) 20%	238.2	HARD ROCK: Dark gray-brown to black, moderately severely to moderately weathered, close to moderately close fracturing, medium hard to moderately hard, BIOTITE GNEISS (3 joints at 30°, tight to open)	75.7
236.3	77.6	5.0	3:34 3:40 4:40 7:06 14:15	(3.0) 60%	(2.2) 44%	RUN 9						232.3	HARD ROCK: Light gray with orange staining, slightly weathered, close to moderately close fracturing, hard, QUARTZ GNEISS (3 joints at 30°, tight; 3 joints at 40-50°, open with trace clay)	81.6
231.3	82.6	5.0	3:45 3:01 3:11 3:04 2:04	(5.0) 100%	(3.2) 64%	RUN 10	(9.0) 100%	(6.3) 70%					(4 joints at 30°, tight)	
226.3	87.6	5.0	3:08 3:38 2:39 3:45 5:41	(5.0) 100%	(2.6) 52%	RUN 11						223.3	HARD ROCK: Yellowish brown, yellowish gray, and gray to light gray, with orange staining, slightly to very slightly weathered, moderately close fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS (3 joints at 30°, tight; 2 joints at 60-70°, tight with trace clay)	90.6
221.3	92.6	5.0	4:21 3:37 5:31 4:06 2:50	(5.0) 100%	(3.8) 76%	RUN 12	(22.0) 100%	(16.3) 74%					(2 joints at 10°, open; 2 joints at 45°, tight)	
216.3	97.6	5.0	4:13 4:30 4:12 5:55 6:00	(5.0) 100%	(4.0) 80%	RUN 13							(5 joints at 30-40°, tight)	
211.3	102.6	5.0	3:23 3:11 3:08 3:38 3:03	(5.0) 100%	(4.1) 82%	RUN 14							(2 joints at 30°, tight; 1 joint at 60°, tight with trace clay; 1 joint at 75°, open with clay and orange staining)	
206.3	107.6	5.0	4:55 3:49 3:08 3:52 4:32	(5.0) 100%	(3.9) 78%	RUN 15								
201.3	112.6	5.0	3:37	(4.8)	(2.3)	RUN 16	(27.2)	(19.4)		201.3		112.6		

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

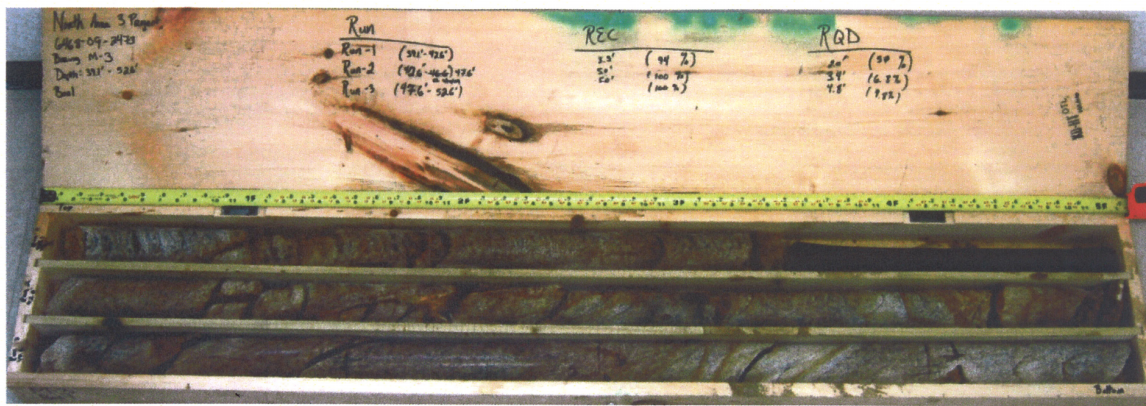


SHEET 2 OF 2

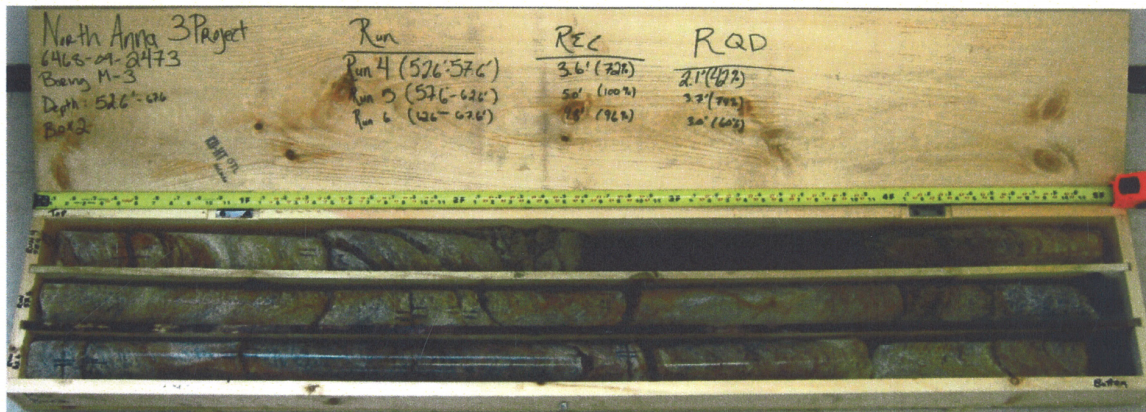
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DATE STARTED: 9/9/09	COMPLETED: 9/14/09	CASING DEPTH: 28.2 ft	CORE BARREL TYPE: Wireline HQ3 Triple Tube, series 6 & 10 bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS
				REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		
										Continued from previous page
196.3	117.6	5.0	2:58 3:19 5:50 5:23	96%	46%		91%	65%		HARD ROCK: Yellowish brown to yellowish gray, with orange staining, moderately severe to slightly weathered, close to moderately close fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS (<i>continued</i>) (3 joints at 30°, tight to open; 1 joint at 80-90°, open with clay; no recovery in severely weathered zone from 117.4-120.2 ft)
191.3	122.6	2.0	9:23 8:11 9:32 6:14 3:45	(2.4) 48%	(2.0) 40%	RUN 17				
189.3	124.6	3.0	4:28 3:47	(2.0) 100%	(1.8) 90%	RUN 18				(2 joints at 30°, open with trace clay; many mechanical fractures)
186.3	127.6	5.0	4:05 6:05 4:02	(3.0) 100%	(2.0) 67%	RUN 19				(3 joints at 10-20°, tight; quartz vein from 125.7-126.1 ft)
181.3	132.6	5.0	4:17 4:05 4:05 5:24 5:57	(5.0) 100%	(3.9) 78%	RUN 20				(2 joints at 15°, tight; 1 joint at 70°, open with trace clay)
176.3	137.6	5.0	3:24 2:28 2:09 3:03 4:16	(5.0) 100%	(4.7) 94%	RUN 21				(2 joints at 30°, open)
171.3	142.6	5.0	3:11 3:30 4:54 4:03 3:28	(5.0) 100%	(2.7) 54%	RUN 22				(8 joints at 10-20°, tight; 1 joint at 30°, tight; 2 joints at 50-60°, open with trace clay)
166.3	147.6	5.0	4:00 4:32 4:01 4:05 3:50	(5.0) 100%	(4.6) 92%	RUN 23	(10.0) 100%	(9.5) 95%		HARD ROCK: Yellowish brown with orange staining, slightly weathered, moderately close fracturing, hard, BIOTITE QUARTZ GNEISS (4 joints at 30°, tight; 2 joints at 90°, tight)
161.3	152.6	5.0	3:13 3:25 2:54 3:01 3:09	(5.0) 100%	(4.9) 98%	RUN 24				(2 joints at 30°, tight; 1 joint at 50°, open with trace clay; quartz + feldspar vein at 45° from 151.9-152.1 ft)
										Boring and coring terminated at 152.6 feet.
										Boring closed by tremie method with cement-bentonite grout.
										24 hour water level measured on 9/14/2009 prior to drilling. Borehole was at a depth of 117.6 feet.

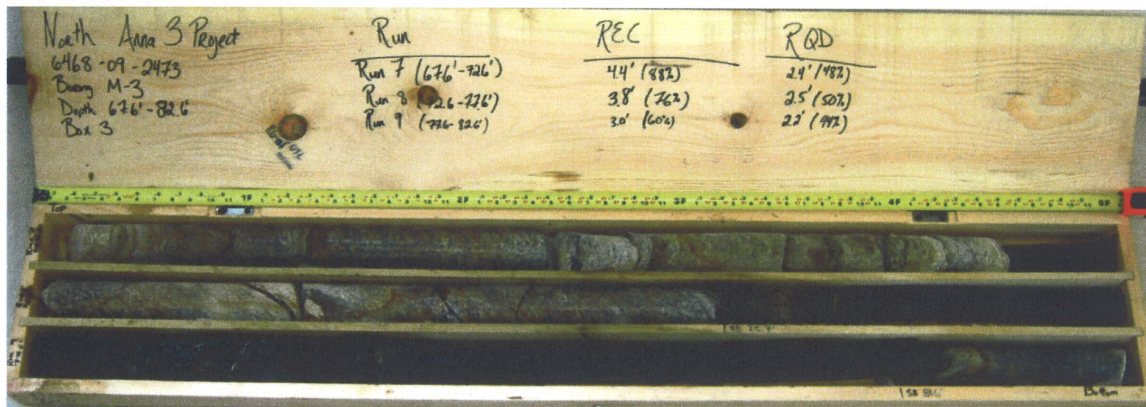
NORTH ANNA 3 CORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/4/09



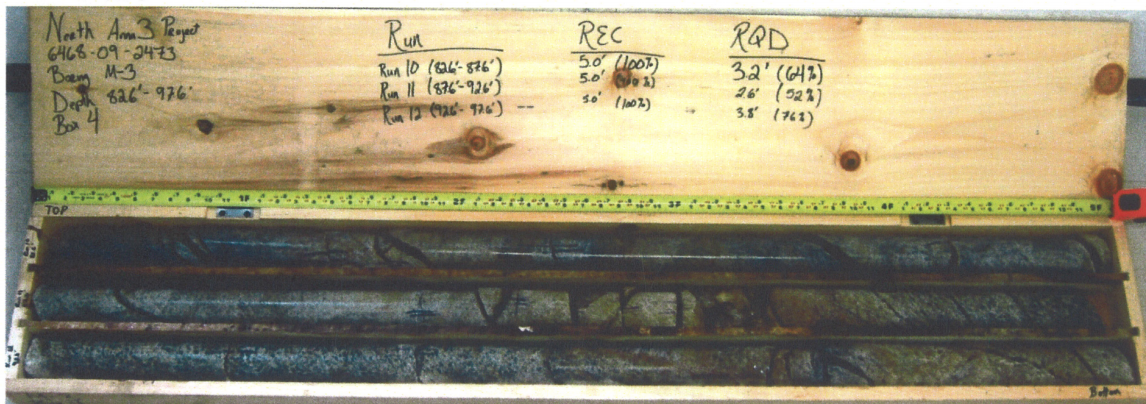
M-3 - Box 1



M-3 - Box 2



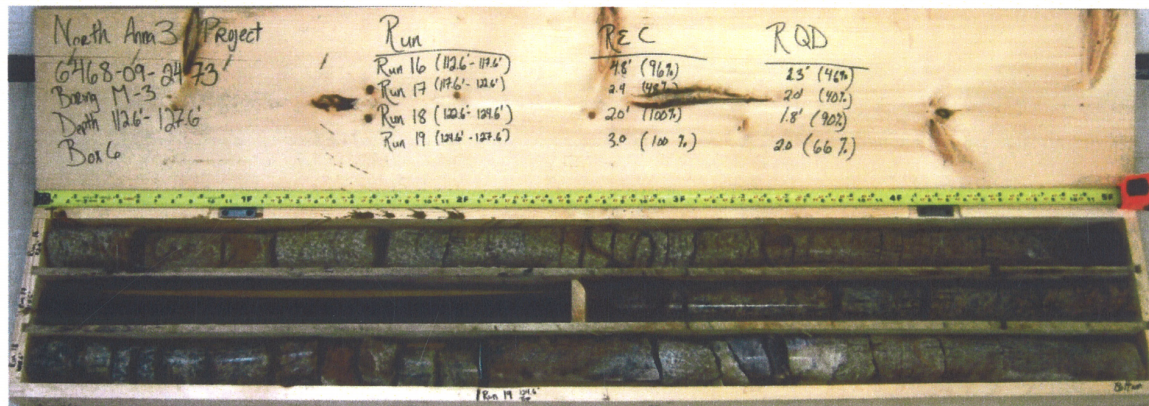
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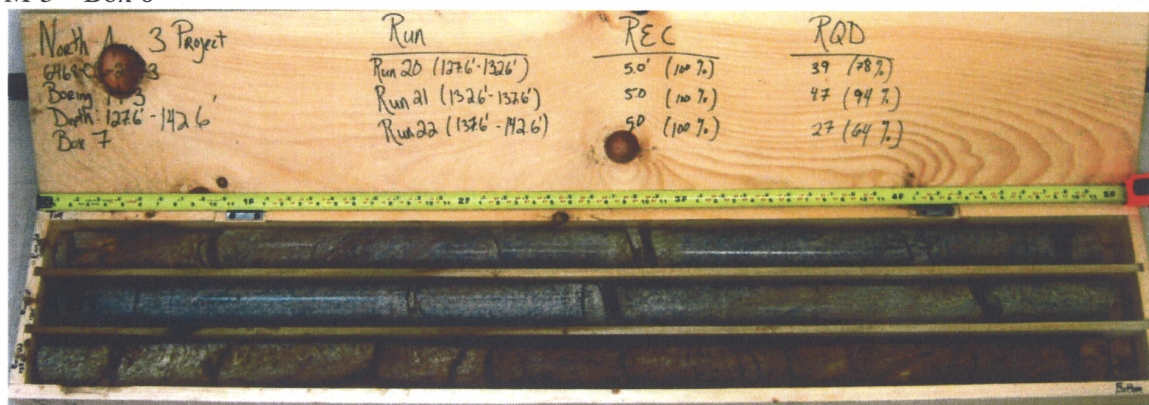
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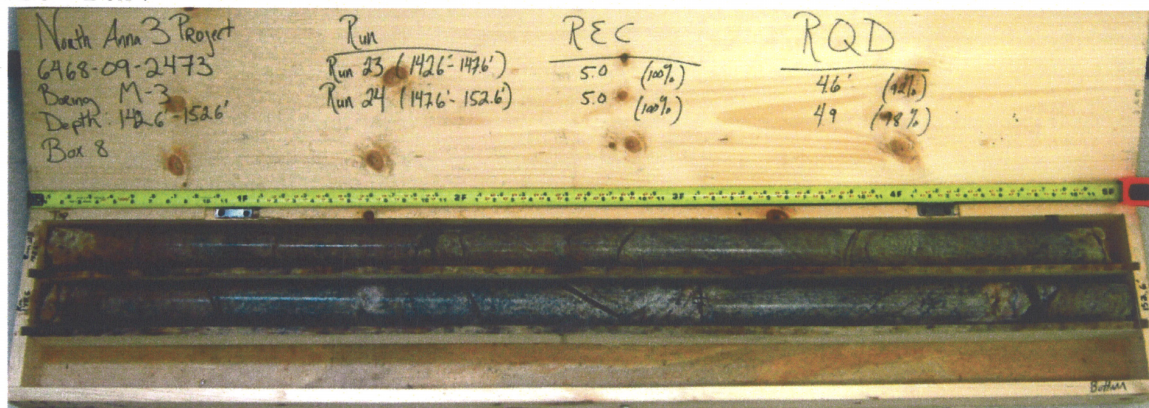
M-3 - Box 5



M-3 - Box 6



M-3 - Box 7



M-3 - Box 8