



GEOTECHNICAL BORING LOG

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

SHEET 1 OF 3

BECHTEL PROJECT NO.: 25161				MACTEC PROJECT NO.: 6468-09-2473				COUNTY: Louisa, VA				GEOLOGIST: A. Mwembeshi				
SITE DESCRIPTION: North Anna 3 Project Supplement 2								DRILLER: R. Landeros/D. Reneau				FLUID LEVEL (ft)				
BORING NO.: M-29				DRILL METHOD: Mud Rotary/Rock Core				DRILL MACHINE: CME-550X (ATL)				0 HR.		NA		
GROUND ELEV.: 309.3 ft (NAVD88)				NORTHING: 3,909,711 US ft (NAD83)				EASTING: 11,685,460 US ft (NAD83)				24 HR.		35.0		
TOTAL DEPTH: 151.2 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: 9/21/09		COMPLETED: 9/23/09		HOLE DIA.: 3"		CASING DEPTH: 41.3 ft		CORE SIZE: NQ3		BITS USED: 2-7/8" Tri-Cone						
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	LOG	SOIL AND ROCK DESCRIPTION			
		0.5ft	0.5ft	0.5ft	0	20	40	60	80	100						
309.3					Ground Surface								309.3	0.0		
														No sampling from 0.0 to 9.3 feet due to soft dig utility clearance by Dominion Personnel		
300.0	9.3												300.0	9.3		
297.4	11.9	14	11	12						SS-1				RESIDUAL SOIL: Silty SAND (SM), reddish yellow (5YR 6/6), medium dense, moist, fine to medium grained sand, trace mica, relict rock fabric		
294.4	14.9	4	5	6						SS-2						
294.4	14.9	4	5	5						SS-3				11.9 ft: Very pale brown (10YR 7/4)		
291.0	18.3	6	5	6						SS-4				14.9 ft: Loose, fine to coarse grained sand		
286.0	23.3	4	8	9						SS-5				18.3 ft: Very pale brown (10YR 8/4), medium dense, fine to medium grained sand		
281.0	28.3	5	8	19						SS-6				23.3 ft: Yellowish brown (10YR 5/4)		
276.0	33.3	50/0.5								SS-7				28.3 ft: Very pale brown (10YR 7/4), fine to coarse grained sand, few mica		
271.0	38.3	25	50/0.3							SS-8				27.3 ft: WEATHERED ROCK: Severely weathered BIOTITE QUARTZ GNEISS (Sampled as Silty SAND (SM), reddish yellow (7.5YR 6/6) to very pale brown (10YR 7/3), very dense, moist, fine to coarse grained sand, few mica)		
268.3	41.0	50/0.0								SS-9				26.3 ft: HARD ROCK: Light gray with brown, moderately to slightly weathered, close to moderately close fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS with trace magnetite		
														255.1 54.2		
														HARD ROCK: Light gray and gray brown, slightly weathered to fresh, 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 12/4/09



SHEET 2 OF 3

BECHTEL PROJECT NO.: 25161			MACTEC PROJECT NO.: 6468-09-2473			COUNTY: Louisa, VA			GEOLOGIST: A. Mwembeshi					
SITE DESCRIPTION: North Anna 3 Project Supplement 2						DRILLER: R. Landeros/D. Reneau			FLUID LEVEL (ft)					
BORING NO.: M-29			DRILL METHOD: Mud Rotary/Rock Core			DRILL MACHINE: CME-550X (ATL)			0 HR. NA					
GROUND ELEV.: 309.3 ft (NAVD88)			NORTHING: 3,909,711 US ft (NAD83)			EASTING: 11,685,460 US ft (NAD83)			24 HR. 35.0					
TOTAL DEPTH: 151.2 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: 9/21/09			COMPLETED: 9/23/09			HOLE DIA.: 3"			CASING DEPTH: 41.3 ft					
						CORE SIZE: NQ3			BITS USED: 2-7/8" Tri-Cone					
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT						SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80	100		MOI		
234.5					Continued from previous page									
														HARD ROCK: Light gray and gray brown, slightly weathered to fresh, close to wide fracturing, moderately hard to very hard, BIOTITE QUARTZ GNEISS with trace magnetite (continued)

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



SHEET 3 OF 3

BECHTEL PROJECT NO.: 25161			MACTEC PROJECT NO.: 6468-09-2473			COUNTY: Louisa, VA			GEOLOGIST: A. Mwembeshi					
SITE DESCRIPTION: North Anna 3 Project Supplement 2						DRILLER: R. Landeros/D. Reneau			FLUID LEVEL (ft)					
BORING NO.: M-29			DRILL METHOD: Mud Rotary/Rock Core			DRILL MACHINE: CME-550X (ATL)			0 HR. NA					
GROUND ELEV.: 309.3 ft (NAVD88)			NORTHING: 3,909,711 US ft (NAD83)			EASTING: 11,685,460 US ft (NAD83)			24 HR. 35.0					
TOTAL DEPTH: 151.2 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: 9/21/09			COMPLETED: 9/23/09			HOLE DIA.: 3"			CASING DEPTH: 41.3 ft					
						CORE SIZE: NQ3			BITS USED: 2-7/8" Tri-Cone					
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				
159.7					Continued from previous page									
													158.1	151.2
													Boring and coring terminated at 151.2 feet. Boring closed by tremie method with cement-bentonite grout. 24 hour water level measured on 9/23/2009 prior to drilling. Borehole was at a depth of 139.2 feet.	

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



SHEET 1 OF 2

BECHTEL PROJECT NO.: 25161			MACTEC PROJECT NO.: 6468-09-2473			COUNTY: Louisa, VA		GEOLOGIST: A. Mwembeshi		
SITE DESCRIPTION: North Anna 3 Project Supplement 2						DRILLER: R. Landeros/D. Reneau			FLUID LEVEL (ft)	
BORING NO.: M-29			DRILL METHOD: Mud Rotary/Rock Core			DRILL MACHINE: CME-550X (ATL)			0 HR.	NA
GROUND ELEV.: 309.3 ft (NAVD88)			NORTHING: 3,909,711 US ft (NAD83)			EASTING: 11,685,460 US ft (NAD83)		24 HR.	35.0	
TOTAL DEPTH: 151.2 ft		SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08						HAMMER (ID): 140-lb. Auto (MEC-05)		
DATE STARTED: 9/21/09		COMPLETED: 9/23/09		CASING DEPTH: 41.3 ft		CORE BARREL TYPE: Wireline NQ3 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) %		
										Begin Coring @ 41.3 ft
268.0	41.3	2.9	2:10/0.9	(2.7)	(2.3)	RUN 1	(12.6)	(11.3)		HARD ROCK: Light gray with brown, moderately to slightly weathered, close to moderately close fracturing, moderately hard to hard, BIOTITE QUARTZ GNEISS with trace magnetite (<i>continued</i>) (3 joints at 30°, open with trace orange staining; 0.1 ft thick quartz vein with trace pyrite) (4 joints at 30-50°, open with trace clay; 0.4 ft thick quartz vein) (4 joints at 30-50°, open with clay and orange staining)
265.1	44.2		4:03	93%	79%		98%	88%		
		5.0	2:49			RUN 2				
			3:06	(4.9)	(4.4)					
			2:24	98%	88%					
			1:54							
260.1	49.2		2:30							
		5.0	2:29	(5.0)	(4.6)	RUN 3				
			2:23	100%	92%					
			2:15							
			2:09							
			1:12							
255.1	54.2		2:56							
		5.0	2:13	(5.0)	(5.0)	RUN 4	(96.7)	(95.8)		HARD ROCK: Light gray and gray brown, slightly weathered to fresh, close to wide fracturing, moderately hard to very hard, BIOTITE QUARTZ GNEISS with trace magnetite (No Joints) (2, 0.2 ft thick quartz veins) (1 joint at 45°, open with trace orange staining; 0.2 ft thick quartz vein at 66.0 ft; 0.3 ft thick quartz vein at 67.0 ft) (1 joint at 45°, tight with trace staining) (No Joints) (No Joints) (1 joint at 75°, open with trace staining) (2 joints at 0-10°, open with orange-brown staining) (1 joint at 75°, tight) (No Joints) (No Joints) (2 joints at 0-10°, open with brown staining) (3, <0.1 ft thick quartz veins)
			1:59	100%	100%		100%	99%		
			2:10							
			2:18							
250.1	59.2		2:26	(4.9)	(4.9)	RUN 5				
		5.0	3:05	98%	98%					
			2:59							
			3:22							
			3:50							
245.1	64.2		4:30	(5.0)	(5.0)	RUN 6				
		5.0	4:28	100%	100%					
			4:52							
			5:45							
			5:48							
240.1	69.2		8:13	(5.0)	(5.0)	RUN 7				
		5.0	2:52	100%	100%					
			3:05							
			3:19							
			2:20							
235.1	74.2		2:16	(5.0)	(5.0)	RUN 8				
		5.0	2:05	100%	100%					
			3:18							
			2:08							
			2:20							
230.1	79.2		3:18	(4.9)	(4.9)	RUN 9				
		5.0	3:23	98%	98%					
			4:12							
			3:04							
			4:38							
225.1	84.2		3:08	(5.0)	(5.0)	RUN 10				
		5.0	2:04	100%	100%					
			2:20							
			2:51							
			2:56							
220.1	89.2		2:50	(5.0)	(4.6)	RUN 11				
		5.0	3:00	100%	92%					
			2:12							
			2:57							
			1:55							
215.1	94.2		1:54	(5.0)	(5.0)	RUN 12				
		5.0	2:19	100%	100%					
			2:25							
			2:14							
			2:09							
210.1	99.2		2:07	(5.0)	(5.0)	RUN 13				
		5.0	1:50	100%	100%					
			2:15							
			2:03							
			1:59							
205.1	104.2		1:49	(5.0)	(5.0)	RUN 14				
		5.0	1:51	100%	100%					
			1:30							
			1:47							
			2:06							
200.1	109.2		2:18	(4.9)	(4.7)	RUN 15				
		5.0	2:40	98%	94%					
			2:49							
			2:40							
			1:58							
195.1	114.2		2:09	(5.0)	(5.0)	RUN 16				
		5.0	2:46							
			2:58							

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

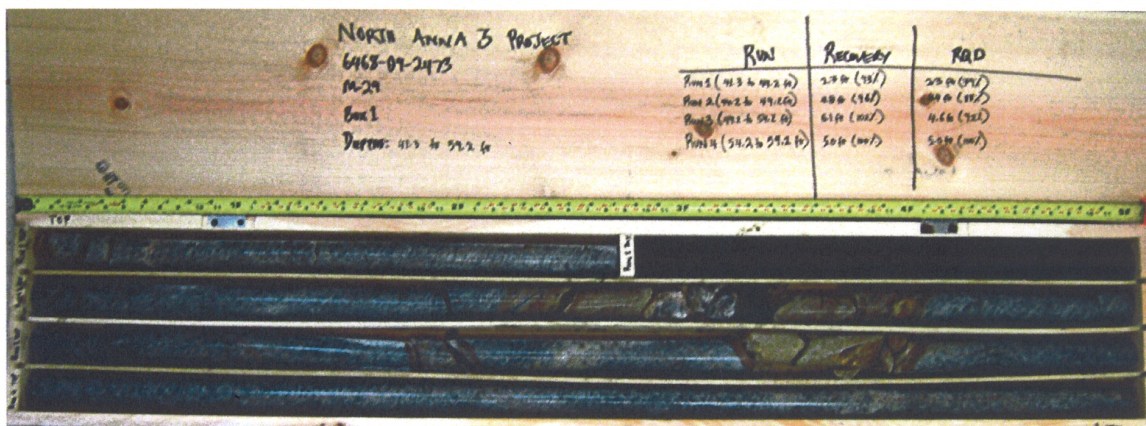


SHEET 2 OF 2

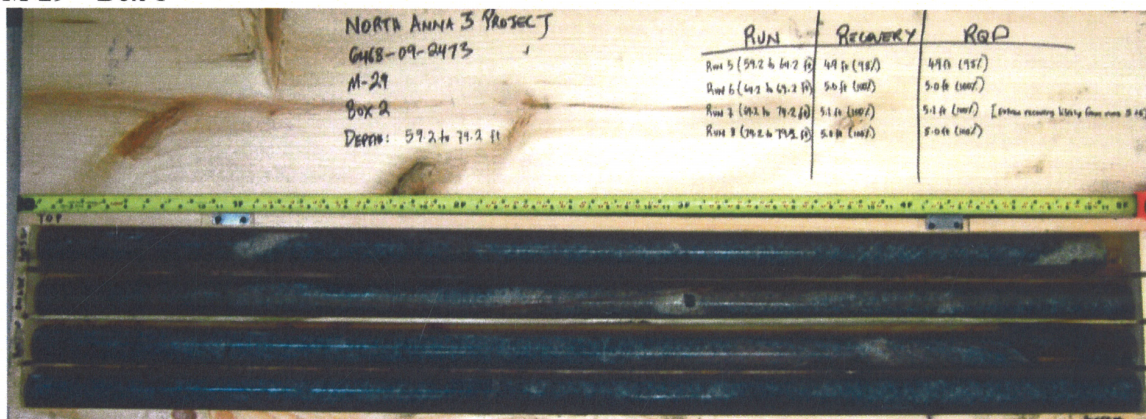
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GROUND ELEV.: 309.3 ft (NAVD88)	NORTHING: 3,909,711 US ft (NAD83)	EASTING: 11,685,460 US ft (NAD83)	24 HR. 35.0
TOTAL DEPTH: 151.2 ft	SAMPLE METHODS: ASTM D 1586-08a; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb. Auto (MEC-05)
DATE STARTED: 9/21/09	COMPLETED: 9/23/09	CASING DEPTH: 41.3 ft	CORE BARREL TYPE: Wireline NQ3 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
190.1	119.2		3:57 3:55 3:41	100%	100%					
		5.0	2:20 3:05 2:55 2:18 2:15	(5.0) 100%	(5.0) 100%	RUN 17				
185.1	124.2	5.0	2:48 1:46 2:45 3:00 2:45	(5.0) 100%	(5.0) 100%	RUN 18				
180.1	129.2	5.0	3:06 5:18 5:29 2:21 2:24	(5.0) 100%	(5.0) 100%	RUN 19				
175.1	134.2	5.0	2:37 2:56 4:04 4:56 5:38	(5.0) 100%	(5.0) 100%	RUN 20				
170.1	139.2	5.0	7:32 12:18 4:34 3:45 2:20	(5.0) 100%	(5.0) 100%	RUN 21				
165.1	144.2	5.0	4:02 3:18 3:55 4:51 5:18	(5.0) 100%	(5.0) 100%	RUN 22				
160.1	149.2	5.0	3:30 4:24	(2.0) 100%	(1.7) 85%	RUN 23				
158.1	151.2	2.0								
										(3 joints at 45°, tight; 0.1 ft thick quartz vein at 127.0 ft) (No Joints) (No Joints) (No Joints) (No Joints) (2 joints at 60-75°, tight with brown staining)
										Boring and coring terminated at 151.2 feet. Boring closed by tremie method with cement-bentonite grout. 24 hour water level measured on 9/23/2009 prior to drilling. Borehole was at a depth of 139.2 feet.

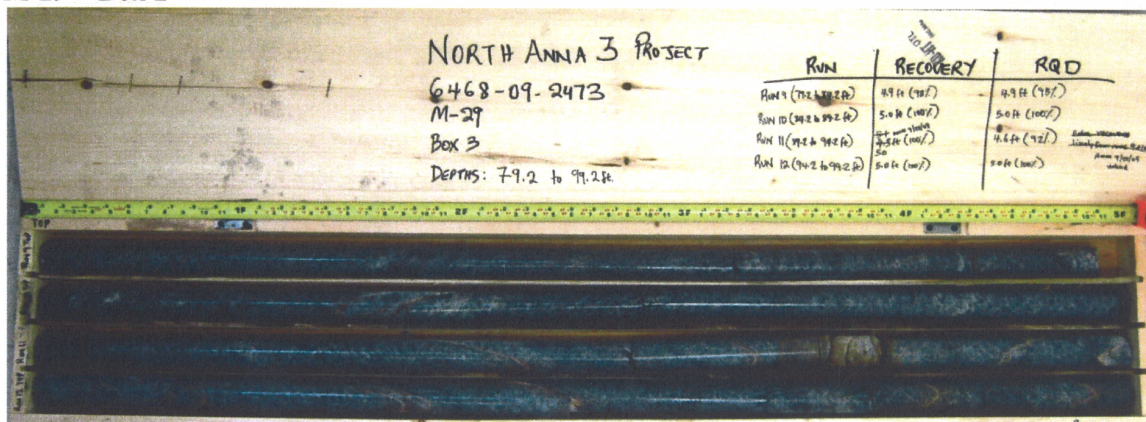
NORTH ANNA 3 CORE NORTH ANNA 3 PROJECT.GPJ NORTH ANNA 3.GDT 12/4/09



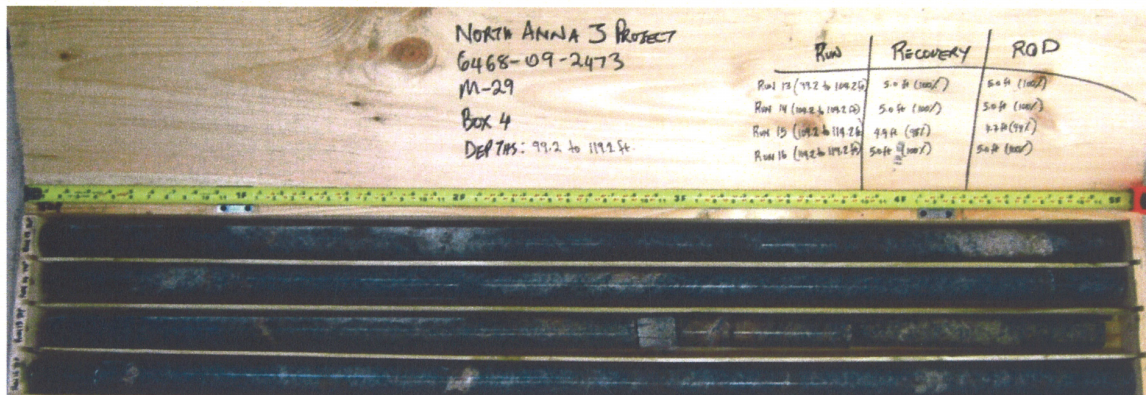
M-29 - Box 1



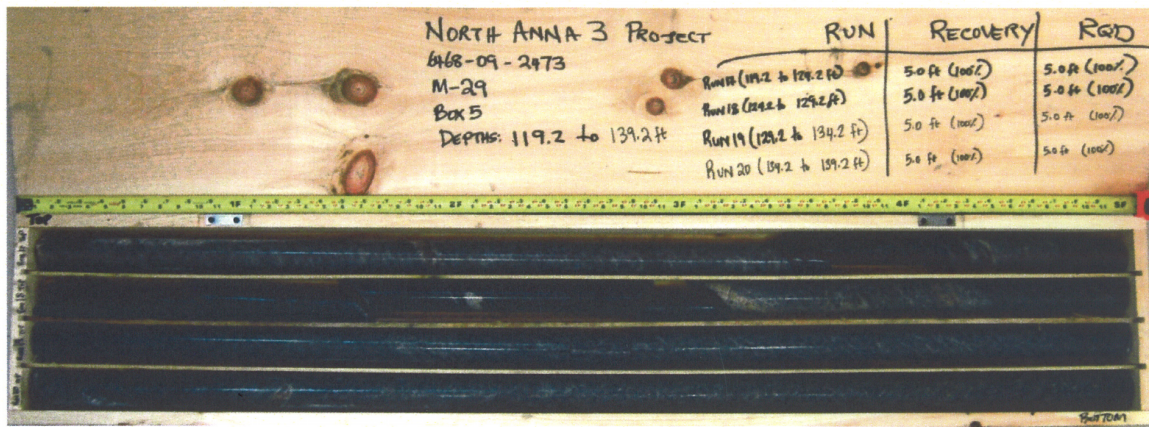
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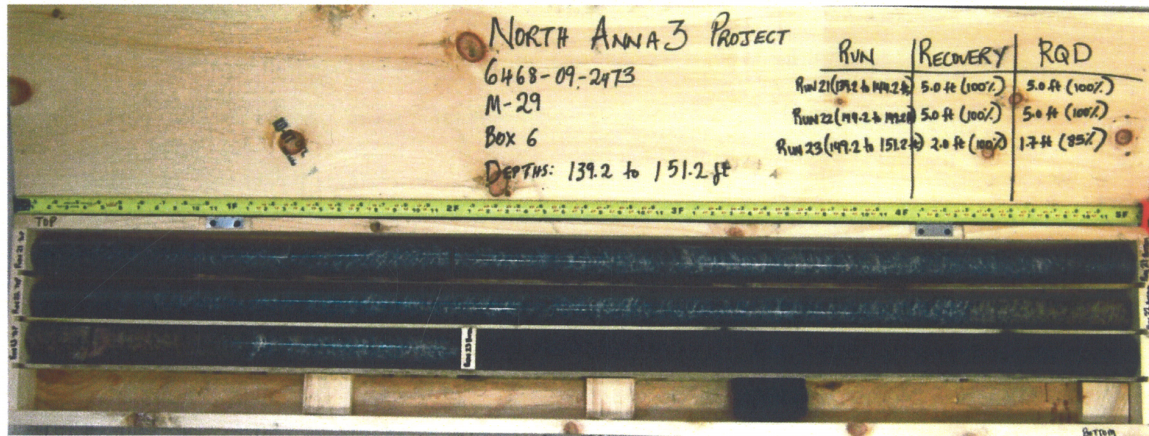
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M-29 - Box 4



M-29 - Box 5



M-29 - Box 6