



BECHTEL PROJECT NO.: 25847				AMEC PROJECT NO.: 6468-13-1072				COUNTY: Roane, TN		GEOLOGIST: E. Shrum			
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee								DRILLER: B. Akins/J. Criss		Boring Orientation			
BORING NO.: MP-219A				DRILL METHOD: Mud Rotary/Core				DRILL MACHINE: D-120 (MW-1)		Inclination: Vertical			
GROUND ELEV.: 808.6 ft		(NAVD88)		NORTHING: 571,254		US ft (NAD83)		EASTING: 2,448,185		US ft (NAD83)			
TOTAL DEPTH: 269.1 ft		SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08						HAMMER (ID): 140-lb Auto (027)					
DATE STARTED: 7/20/13		COMPLETED: 7/25/13		CASING DEPTH: 24.5 ft		CORE BARREL TYPE: HQ3/Diamond Impregnated core bits							
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %		ROD (ft) %	SAMP. NO.	L O G	ROCK DESCRIPTION AND REMARKS				
									Continued from previous page				
594.5	214.1	5.0	2:56 3:27				Run 44		CALCAREOUS SILTSTONE, very dark gray (10YR 3/1, N 3/) and bluish black (5PB 2.5/1) to very dusky red (5R 2.5/3, 10R 2.5/2), with trace dark greenish gray (5GY 4/1) to very dark greenish gray (5G 3/1), strong, laminated to moderately bedded, locally thickly bedded, fresh, interbedded with little to some, laminated to moderately bedded LIMESTONE (MICRITE/WACKESTONE), gray (N 5/, 10YR 6/1-5/1), trace fossils, and few to little, very thin to moderate chert beds, lenses, and nodules (multicolored-gray, green, reddish brown, to black, with calcite filled tensional fractures orthogonal to bedding); locally moderate to strong bioturbation, strong HCl reaction ( <b>Upper Blackford Formation-Unit A</b> ) (continued) 218.1ft: BJ, 30°, PS, PO, B, II 219.8ft: BJ, 30°, PS, T, B, II				
			3:43	(5.0)	(5.0)								
			2:45	100%	100%								
			2:59										
589.5	219.1	5.0	2:58 1:56				Run 45 L3-54		LIMESTONE (MICRITE), gray (10YR 6/1), strong, laminated to moderately bedded, locally nodular, fresh, interbedded with some, laminated to moderately bedded Calcareous SILTSTONE, very dark gray (10YR 3/1) and very dusky red (10R 2.5/2), and few to little, very thin to thin chert beds, lenses, and nodules (multicolored-greenish gray, gray to dark gray, reddish brown, dusky red, and black, with calcite filled tensional fractures orthogonal to bedding); locally moderate to strong bioturbation, trace calcite filled pits, strong HCl reaction 223.7ft: BJ, 30°, PR, PO, C, II 224.3,224.0ft: BJ, 30°, PS, T, B, II				
			2:55	(5.0)	(4.6)								
			3:05	100%	92%								
			2:38										
584.5	224.1	1.1	2:25 3:00					585.6	223.0				
583.4	225.2	3.9	2:27/0.1	(1.1)	(0.8)	Run 46							
			3:08	100%	73%	Run 47							
			3:11	(3.9)	(3.9)								
579.5	229.1	5.0	3:42 2:29/0.9				Run 48		230.6,231.4,232.0,232.3ft: BJ, 30°, PS, T, B, II				
			3:41	(5.0)	(5.0)								
			3:26	100%	100%								
			3:31										
574.5	234.1	5.0	3:26 3:54				Run 49		234.8,238.4ft: BJ, 30°, PS, T, B, II				
			4:49	(5.0)	(5.0)								
			4:08	100%	100%								
			2:21										
569.5	239.1	5.0	2:38 3:32				Run 50		239.8,240.9,242.1,242.4ft: BJ, 30°, PS, T, B, II				
			2:47	(5.0)	(5.0)								
			2:28	100%	100%								
			3:09										
564.5	244.1	5.0	2:25 3:03				Run 51		246.7ft: BJ, 30°, PS, T, B, II				
			3:12	(5.0)	(5.0)								
			2:31	100%	100%								
			3:35										
559.5	249.1	5.0	3:19 4:19				Run 52	561.2	CALCAREOUS SILTSTONE, very dusky red (10R 3/3) to very dark gray (10YR 3/1), strong, laminated to moderately bedded, locally thickly bedded, fresh, interbedded with trace to little, laminated to moderately bedded LIMESTONE (MICRITE), gray (10YR 6/1), and few to little, very thin to moderate chert beds, lenses, and nodules (multicolored-reddish brown, dusky red, brownish gray, and gray, trace bright red jasperoid specks, with calcite filled tensional fractures orthogonal to bedding); locally moderate to strong bioturbation, trace calcite filled pits, strong HCl reaction 247.4,248.0ft: BJ, 30°, PS, T, B, II 252.9,253.4ft: BJ, 30°, PS, T-PO, C, II				
			2:43	(5.0)	(5.0)								
			2:33	100%	100%								
			2:26										
554.5	254.1	5.0	2:41 3:20				Run 53		255.1ft: BJ, 30°, PS, T, B, II 257.6,258.0ft: BJ, 30°, PS-US, T, B, II				
			2:54	(5.0)	(5.0)								
			3:53	100%	100%								
			3:03										
549.5	259.1	5.0	3:41 4:11				Run 54		260.0ft: BJ, 25°, US, PO, B, II				
			3:45	(5.0)	(5.0)								
			3:50	100%	100%								

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 3/5/14



BECHTEL PROJECT NO.: 25847		AMEC PROJECT NO.: 6468-13-1072		COUNTY: Roane, TN		GEOLOGIST: E. Shrum	
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee				DRILLER: B. Akins/J. Criss		Boring Orientation Inclination: Vertical Azimuth: NA	
BORING NO.: MP-219A		DRILL METHOD: Mud Rotary/Core		DRILL MACHINE: D-120 (MW-1)			
GROUND ELEV.: 808.6 ft (NAVD88)		NORTHING: 571,254 US ft (NAD83)		EASTING: 2,448,185 US ft (NAD83)		HAMMER (ID): 140-lb Auto (027)	
TOTAL DEPTH: 269.1 ft		SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08				CORE BARREL TYPE: HQ3/Diamond Impregnated core bits	
DATE STARTED: 7/20/13		COMPLETED: 7/25/13		CASING DEPTH: 24.5 ft			

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
				REC. (ft) %	RQD (ft) %			
								Continued from previous page
544.5	264.1	5.0	3:30 3:12 3:50	(5.0) 100%	(4.6) 92%	Run 55		CALCAREOUS SILTSTONE, very dusky red (10R 3/3) to very dark gray (10YR 3/1), strong, laminated to moderately bedded, locally thickly bedded, fresh, interbedded with trace to little, laminated to moderately bedded LIMESTONE (MICRITE), gray (10YR 6/1), and few to little, very thin to moderate chert beds, lenses, and nodules (multicolored-reddish brown, dusky red, brownish gray, and gray, trace bright red jasperoid specks, with calcite filled tensional fractures orthogonal to bedding); locally moderate to strong bioturbation, trace calcite filled pits, strong HCl reaction ( <i>continued</i> ) 265.3,265.6,265.7ft: BJ, 30°, PS, T-PO, B, II
539.5	269.1		3:47					Boring and coring terminated at 269.1 feet.

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 3/5/14



## MP-219A – Boxes 1 and 2



## MP-219A – Boxes 3 and 4





# MP-219A – Boxes 5 and 6



# MP-219A – Boxes 7 and 8

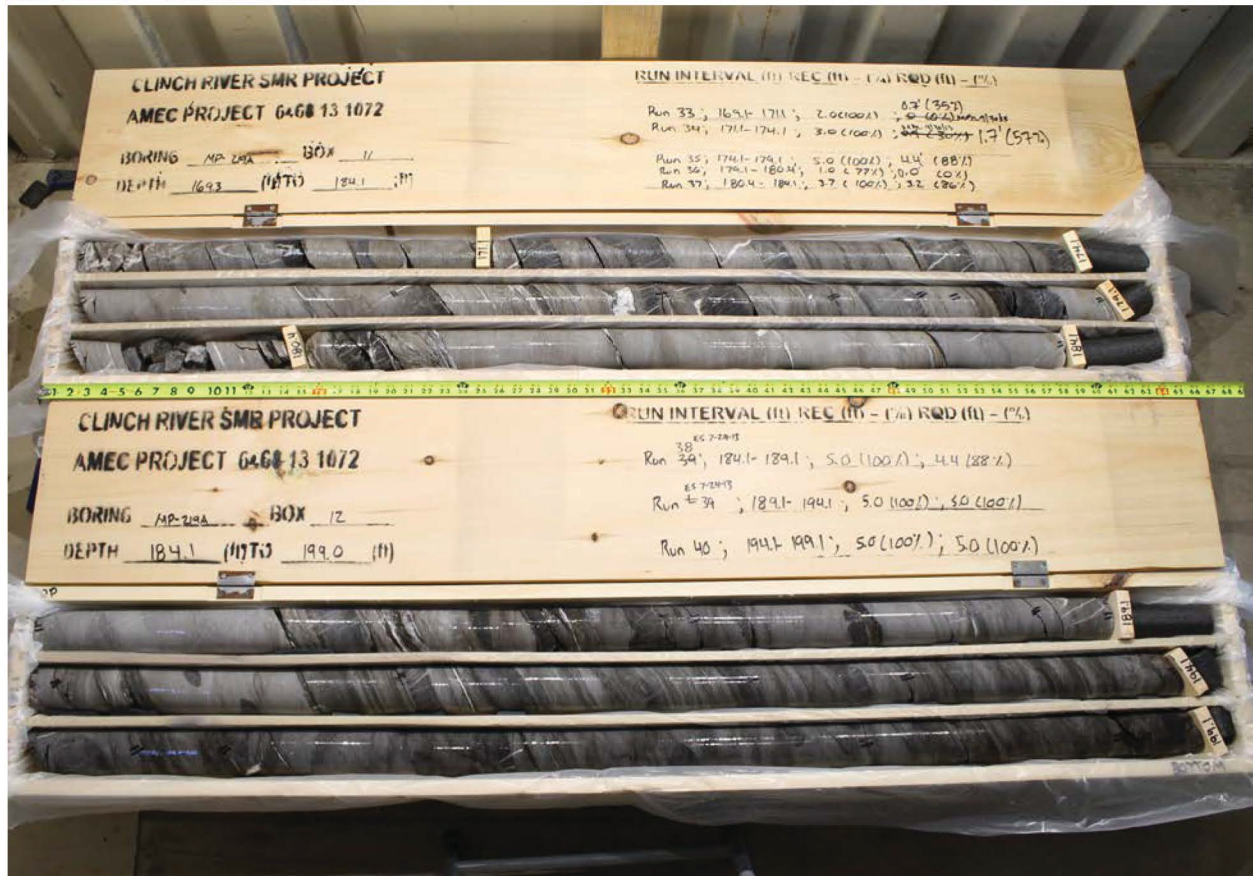




## MP-219A – Boxes 9 and 10

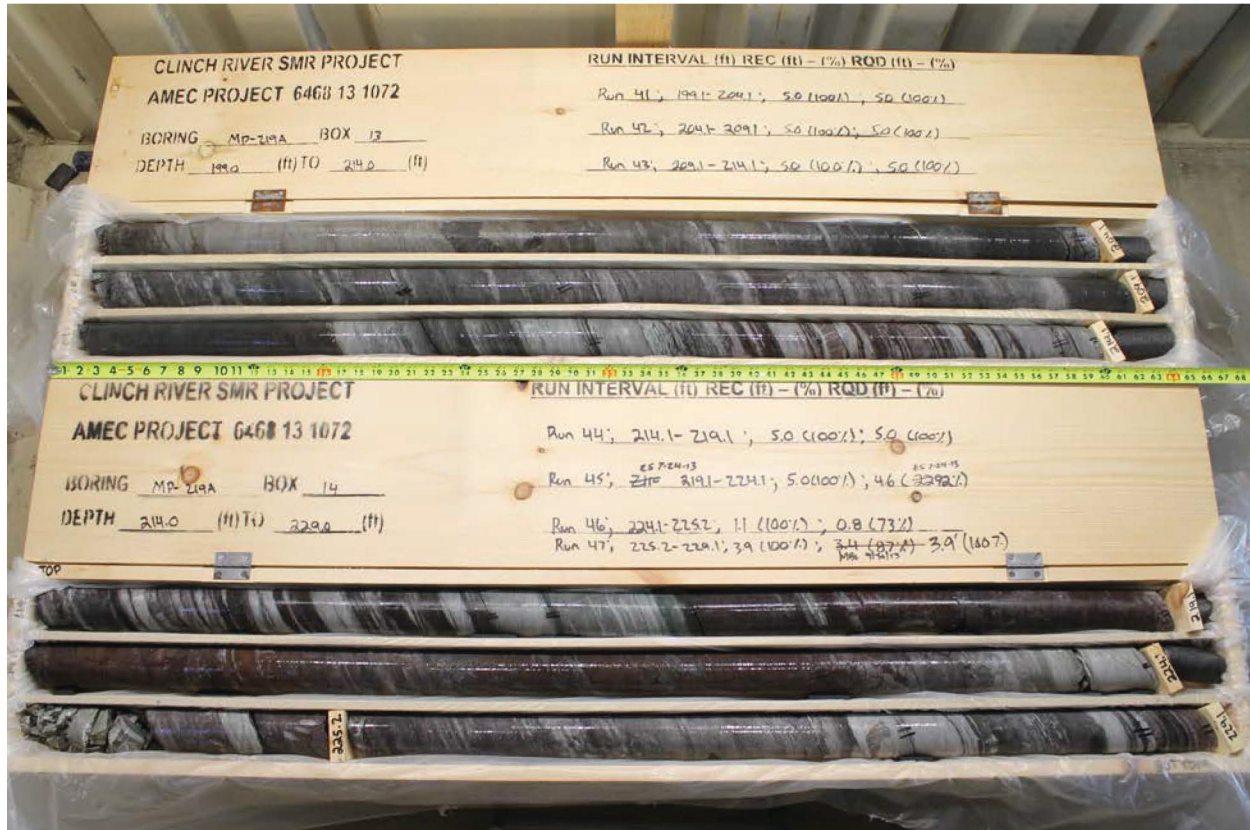


## MP-219A – Boxes 11 and 12

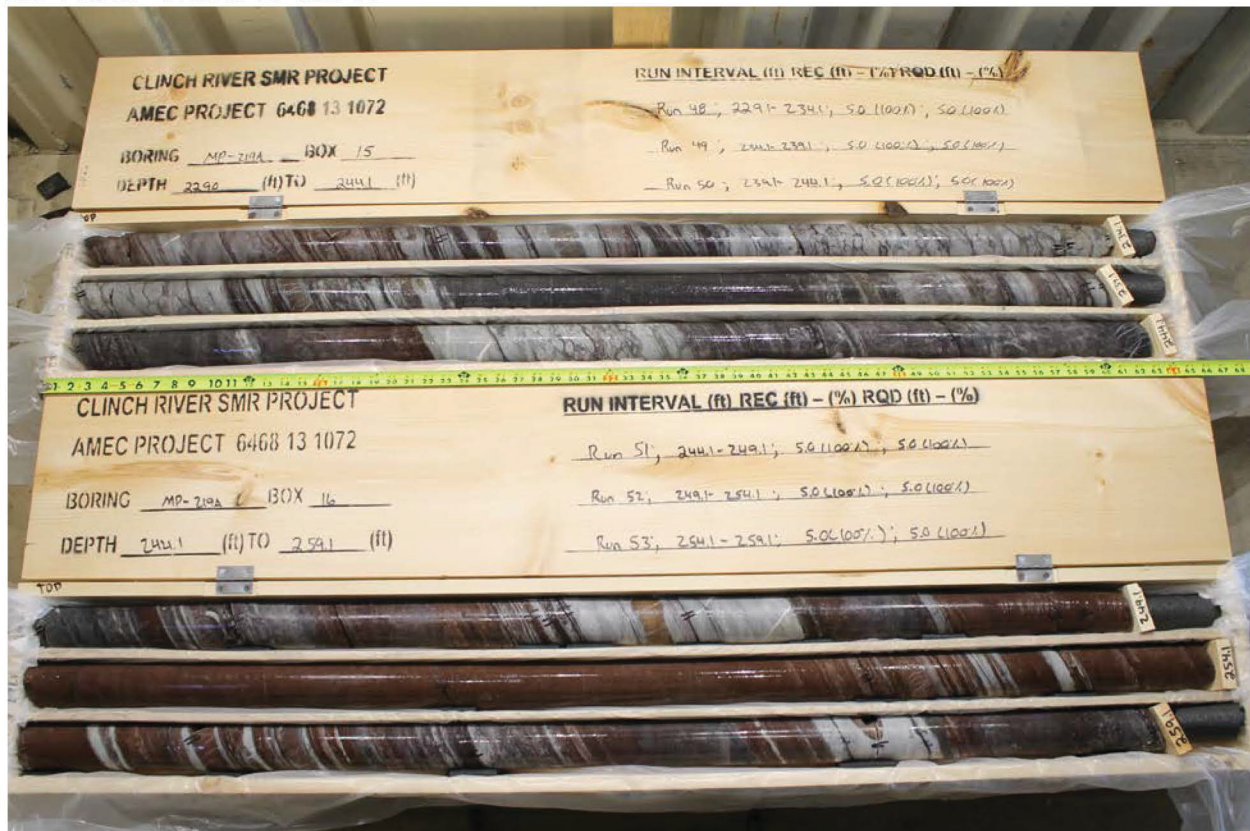




## MP-219A – Boxes 13 and 14



## MP-219A – Boxes 15 and 16



MP-219A – Box 17







# GEOTECHNICAL BORING LOG

Prepared By: MBL Date: 3/5/14

Checked By: JCM Date: 3/5/14

SHEET 1 OF 1

BECHTEL NO.: 25847				AMEC PROJECT NO.: 6468-13-1072				COUNTY: Roane, TN		GEOLOGIST: J. Howard									
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee								DRILLER: A. Martin/D. Rhodes			Boring Orientation								
BORING NO.: MP-220				DRILL METHOD: Mud Rotary/Core				DRILL MACHINE: CME-55 (C)			Inclination: Vertical								
GROUND ELEV.: 813.2 ft (NAVD88)				NORTHING: 571,147 US ft (NAD83)				EASTING: 2,448,232 US ft (NAD83)		Azimuth: NA									
TOTAL DEPTH: 101.3 ft		SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08						ROD TYPE: AWJ		HAMMER (ID): 140-lb Auto (163745)									
DATE STARTED: 7/19/13		COMPLETED: 7/22/13		HOLE DIA.: 4"		CASING DEPTH: 23.7 ft		CORE SIZE:HQ3		BITS USED: 4" Roller Cone									
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL DESCRIPTION AND REMARKS							
		0.5ft	0.5ft	0.5ft	0	20	40	60	80	100									
813.2					Ground Surface							813.2	0.0						
813.2	0.0	8	14	8						SS-1	FILL: SILTY SAND (SM), light reddish brown (2.5Y 6/3), medium dense, dry, fine to coarse sand, some low plasticity fine, trace fine gravel, strong HCl reaction	810.2	3.0						
809.6	3.6	3	2	3												SS-2	RESIDUAL SOIL: Gravelly LEAN CLAY (CL), reddish brown (5YR 5/3) to brown (7.5YR 5/3), medium stiff to soft, moist, low to moderate plasticity fines, little fine angular gravel, little fine to coarse sand, strong HCl reaction	805.2	8.0
807.3	5.9	2	1	3												SS-3			
804.6	8.6	50/0.5														SS-4	WEATHERED ROCK: CALCAREOUS SILTSTONE, sampled as CLAYEY GRAVEL (GC), light greenish gray (5GY 6/2), very dense, moist, fine angular gravel, little moderate plasticity fines, little fine to coarse sand, strong HCl reaction	803.2	10.0
802.3	10.9	50/0.2														SS-5	WEATHERED ROCK: CALCAREOUS SILTSTONE, sampled as Sandy SILT (ML), reddish brown (2.5YR 5/4) and weak red (2.5YR 5/3 - 10R 4/3), hard, dry, non-plastic to moderately plastic fines, little fine to coarse sand, few to little fine angular gravel sized rock fragments, strong HCl reaction		
799.6	13.6	50/0.1														SS-6			
797.4	15.8	50/0.3														SS-7			
794.7	18.5	50/0.3														SS-8			
789.6	23.6	50/0.2														SS-9			
784.6	28.6	50/0.1														SS-10			
														Soil drilling halted. Log continues on geotechnical coring log					
														Observed water levels: 25.9 ft bgs, AM 7/21/13 37.7 ft bgs, AM 7/22/13					

CLINCH RIVER SMR BORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 3/5/14





# GEOTECHNICAL CORING LOG

Prepared By: MBL Date: 3/5/14

Checked By: JCM Date: 3/5/14

SHEET 1 OF 2

BECHTEL PROJECT NO.: 25847				AMEC PROJECT NO.: 6468-13-1072				COUNTY: Roane, TN		GEOLOGIST: J. Howard		
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee								DRILLER: A. Martin/D. Rhodes			Boring Orientation	
BORING NO.: MP-220				DRILL METHOD: Mud Rotary/Core				DRILL MACHINE: CME-55 (C)			Inclination: Vertical	
GROUND ELEV.: 813.2 ft (NAVD88)				NORTHING: 571,147 US ft (NAD83)				EASTING: 2,448,232 US ft (NAD83)		Azimuth: NA		
TOTAL DEPTH: 101.3 ft			SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08						HAMMER (ID): 140-lb Auto (163745)			
DATE STARTED: 7/19/13			COMPLETED: 7/22/13		CASING DEPTH: 23.7 ft		CORE BARREL TYPE: HQ3/Diamond Impregnated core bits					
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %		RQD (ft) %	SAMP. NO.	L O G	ROCK DESCRIPTION AND REMARKS			
									Begin Coring @ 28.7 ft			
784.5	28.7	2.6	6:00	(2.6)	(1.3)	Run 1		784.5	CALCAREOUS SILTSTONE, dusky red (2.5YR 3/2), medium strong to strong, laminated to thinly bedded, locally with moderately bedded appearance, slightly weathered to fresh, interbedded with few to little, mostly laminated to thin, locally to moderately bedded, LIMESTONE (WACKESTONE/MICRITE), bluish gray (5PB 6/1) to greenish gray (10Y 5/1); mod. to strongly bioturbated, strong HCl reaction ( <b>Lincolnshire Formation-Fleanor Member-Unit B</b> )			28.7
781.9	31.3		5:00	100%	50%							
		5.0	3:00/0.6	(5.0)	(3.6)	Run 2						
			6:15	100%	72%							
			4:30									
			5:00									
776.9	36.3		4:45									
		5.0	6:45	(5.0)	(4.8)	Run 3						
			5:00	100%	96%							
			6:30									
			8:00									
			8:30									
771.9	41.3		6:00	(5.0)	(4.7)	Run 4						
		5.0	6:15	100%	94%							
			7:30									
			6:00									
			7:15									
766.9	46.3		7:00	(5.0)	(4.8)	Run 5						
		5.0	8:15	100%	96%							
			4:15									
			6:15									
			8:15									
761.9	51.3		8:00	(5.0)	(4.8)	Run 6						
		5.0	8:00	100%	96%							
			5:00									
			5:30									
			6:15									
756.9	56.3		5:15	(5.0)	(4.2)	Run 7						
		5.0	5:30	100%	84%							
			7:30									
			9:15									
			8:15									
			9:15	(5.0)	(5.0)	Run 8						
		5.0	5:30	100%	100%							
			4:45									
			5:45									
			5:45									
746.9	66.3		6:00	(5.0)	(5.0)	Run 9						
		5.0	6:30	100%	100%							
			4:45									
			4:30									
			4:45									
741.9	71.3		8:00	(5.0)	(4.7)	Run 10						
		5.0	7:00	100%	94%							
			7:00									
			5:15									
			7:15									
			7:00									
736.9	76.3			(5.0)	(5.0)	Run 11						
		5.0	5:45									

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 3/5/14