



GEOTECHNICAL CORING LOG

Prepared By: MBL Date: 3/5/14

Checked By: JCM Date: 3/5/14

SHEET 1 OF 3

BECHTEL PROJECT NO.: 25847				AMEC PROJECT NO.: 6468-13-1072				COUNTY: Roane, TN		GEOLOGIST: M. Flanik	
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee								DRILLER: J. Landeros/N. Molinalara			Boring Orientation Inclination: Vertical Azimuth: NA
BORING NO.: MP-107				DRILL METHOD: Mud Rotary/Core				DRILL MACHINE: CME-550X (P)			
GROUND ELEV.: 801.6 ft (NAVD88)				NORTHING: 570,292 US ft (NAD83)				EASTING: 2,448,285 US ft (NAD83)			
TOTAL DEPTH: 174.6 ft			SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08						HAMMER (ID): 140-lb Auto (337153)		
DATE STARTED: 8/16/13			COMPLETED: 8/19/13		CASING DEPTH: 39.7 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 @ 40.0 ft		
761.6	40.0	4.6	4:50 3:28 3:13 3:51	(4.6) 100%	(3.6) 78%		Run 1		761.6	CALCAREOUS SILTSTONE, greenish black (10Y 2.5/1), weak to medium strong, laminated to thinly bedded, fresh, interbedded with few to little, laminated to thin LIMESTONE (MICRITE/WACKESTONE), dark gray (N 4/), amorphous and diffuse to planar and nodular bedding, fossiliferous; slight bioturbation, trace calcite filled pits and burrows, trace pyrite along bedding laminations, strong HCl reaction (Benbolt Formation-Unit E)	40.0
757.0	44.6	5.0	3:08/0.6 5:19 5:43 2:32 2:38 2:42	(4.7) 94%	(4.6) 92%		Run 2			42.8-43.8ft: FZ, 30-90°, PS-PR, O-PO, B-F, II-III, mechanically abraded from 43.4-43.7' 44.2,44.4,44.5ft: BJ, 30°, PR, T-O, B, II 47.3ft: BJ, 35°, PR, T-PO, F-G, IV 47.9-48.1ft: FZ, PR, 30-75°, T-PO, B, III	
752.0	49.6	5.0	5:30 3:09 3:22 4:28 5:09	(4.9) 98%	(4.3) 86%		Run 3			50.0ft: J, 45°, T, A, I 50.8ft: J, 50°, PR, PO, C, III 52.9-53.3ft: FZ, 30° and 60°, PS, O-T, F, IV	
747.0	54.6	5.0	4:27 1:55 2:53 2:46 3:03	(5.0) 100%	(5.0) 100%		Run 4			56.4ft: BJ, 30°, PS, PO, C, III	
742.0	59.6	5.0	3:39 1:46 1:57 2:03 2:20	(5.0) 100%	(5.0) 100%		Run 5				
737.0	64.6	5.0	2:51 2:03 2:04 1:59 1:56	(5.0) 100%	(4.3) 86%		Run 6		737.0	LIMESTONE (WACKESTONE/MICRITE), gray to dark gray (N 5/-N 4/), medium strong to strong, very thinly to thinly bedded, locally moderately bedded and nodular, fresh, fossiliferous, interbedded with little to some, laminated to very thin Calcareous SILTSTONE, very dark greenish gray to greenish black (10Y 3/1-2.5/1), mostly wavy to irregular and diffuse bedding; locally with few LIMESTONE (PACKSTONE/GRAINSTONE) beds, slight bioturbation, trace calcite filled pits and vugs (separate/non-touching), strong HCl reaction	64.6
732.0	69.6	5.0	2:33 1:46 1:43 1:41 2:02	(5.0) 100%	(5.0) 100%		Run 7			65.6,65.7ft: BJ, 35°, PS-PL, T-PO, B-C, II, and J, 50°, PR, T, B, II 67.3ft: BJ, 30°, PR, T, B, II 67.6ft: J, 60°, SR, T-PO, C, IV 69.2-69.6ft: FZ/BJ, 25-30°, PS-SR, B, II, likely mechanically opened	
727.0	74.6	5.0	2:04 1:30 1:32 1:34 1:50	(5.0) 100%	(4.7) 94%		Run 8			78.7ft: J, 50°, PR, T, B, II 78.8,79.0ft: BJ, 30°, PS-PR, PO, C, II	
722.0	79.6	5.0	2:46 1:38 1:31 1:28 1:35	(5.0) 100%	(5.0) 100%		Run 9				
717.0	84.6	5.0	2:42 1:34 1:54 2:18	(5.0) 100%	(4.9) 98%		Run 10		716.1	85.4-85.5ft: FZ, 30-45°, PR, PO-O, C, III	85.5
									713.6	LIMESTONE (GRAINSTONE), gray (N 6/-N 5/), strong, very thinly to moderately bedded, fresh, fossiliferous, with few laminated Calcareous SILTSTONE partings; trace stylolites, trace calcite filled pits, strong HCl reaction (Rockdell Formation-Unit D)	88.0
										85.8ft: J, 60°, VT, A, I	

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



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SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee				DRILLER: J. Landeros/N. Molinalara			Boring Orientation
BORING NO.: MP-107		DRILL METHOD: Mud Rotary/Core		DRILL MACHINE: CME-550X (P)			Inclination: Vertical
GROUND ELEV.: 801.6 ft (NAVD88)		NORTHING: 570,292 US ft (NAD83)		EASTING: 2,448,285 US ft (NAD83)		Azimuth: NA	
TOTAL DEPTH: 174.6 ft		SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08				HAMMER (ID): 140-lb Auto (337153)	
DATE STARTED: 8/16/13		COMPLETED: 8/19/13	CASING DEPTH: 39.7 ft	CORE BARREL TYPE: HQ3/Diamond Impregnated core bits			

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	L O G	ROCK DESCRIPTION AND REMARKS
								Continued from previous page
712.0	89.6	5.0	2:15 2:22 1:23 1:34 1:41 2:05	(5.0) 100%	(4.5) 90%	Run 11		LIMESTONE (MICRITE/WACKESTONE/PACKSTONE), gray (5Y 5/1, N 5/) to dark gray (N 4/) and bluish gray (10B 6/1), strong, laminated to thinly bedded, locally moderately bedded and nodular, fresh, fossiliferous, interbedded with little to some, laminated to thin Calcareous SILTSTONE, very dark greenish gray to greenish black (10Y 3/1-2.5/1), mostly planar to wavy/irregular and diffuse, and few very thin to thin chert beds, lenses, and irregular nodules (gray to dark gray and black, with calcite filled tensional fractures orthogonal to bedding); locally with slight bioturbation, trace calcite filled pits and burrows, trace sparry calcite "bird eyes", locally argillaceous, strong HCl reaction (continued)
707.0	94.6	5.0	2:22 1:42 2:06 1:42 2:17	(5.0) 100%	(4.3) 86%	Run 12		88.0ft: BJ, 30°, PS, T-PO, B, II 89.7,89.9,91.0,91.7,92.0,92.2ft: J, 45-60°, SR, T-VT, A-B, II 91.0,92.0,92.3,92.4ft: BJ, 30°, PR-PS, T, B, II 93.7ft: J, 25°, VT, A, I, with calcite 96.3ft: BJ, 30°, PS, PO, B, III, with calcite 96.8-96.9,98.3-98.7ft: FZ, 30-90°, PS-SR, T-O, B-F, IV, slightly to moderately weathered 97.5,97.6ft: J, 60°, VT, A, I, with calcite
702.0	99.6	5.0	2:57 2:37 2:22 2:18 2:20	(5.0) 100%	(4.8) 96%	Run 13		101.2,101.3,101.4ft: BJ, 30-35°, PS, PO, B, II-III, with calcite
697.0	104.6	5.0	4:08 4:18 4:50 3:58 3:36	(5.0) 100%	(5.0) 100%	Run 14		107.6ft: J, 50°, PR, T-PO, C, IV
692.0	109.6	5.0	3:43 3:02 2:47 2:39 3:03	(5.0) 100%	(5.0) 100%	Run 15		110.1,114.2ft: J, 60°, VT, A, I, with calcite 114.0ft: SH, 30°, PR-PL, T, B, II
687.0	114.6	5.0	4:08 3:56 5:11 3:29 8:30	(5.0) 100%	(4.3) 86%	Run 16		114.5-114.6,114.9-115.0,116.2-116.4ft: FZft: 30° and 60-65°, PS-PR, O-PO, B-F, III-IV
682.0	119.6	5.0	3:56 3:10 2:56 3:02 3:03	(5.0) 100%	(4.7) 94%	Run 17		124.4ft: BJ, 35°, PS, O, B, II
677.0	124.6	5.0	4:52 3:14 3:24 3:58 4:49	(5.0) 100%	(5.0) 100%	Run 18		125.6ft: J, 70°, SR, T, B, IV 128.3,128.4,128.6,128.9ft: SH, 25-40°, PL, VT, A-C, with calcite, mechanical
672.0	129.6	5.0	11:27 5:36 3:38 4:27 4:11	(4.5) 90%	(3.6) 72%	Run 19		130.0-130.7ft: FZ, 30-90°, SR-PS, O, F, III, mechanically ground to rubble 131.4,131.7,132.1ft: SH, 30° and 50°, PS-PL, T-PO, C, II, with calcite 134.2-134.4ft: FZ/BJ, 30°, PS-PR, O, B, II
667.0	134.6	5.0	5:53 3:52 3:28	(5.0) 100%	(5.0) 100%	Run 20		135.4,135.8,136.1ft: BJ, 30°, PS, PO, B-C, III, with calcite 136.6-139.0ft: J, 40-45°, PR, PO, C, II

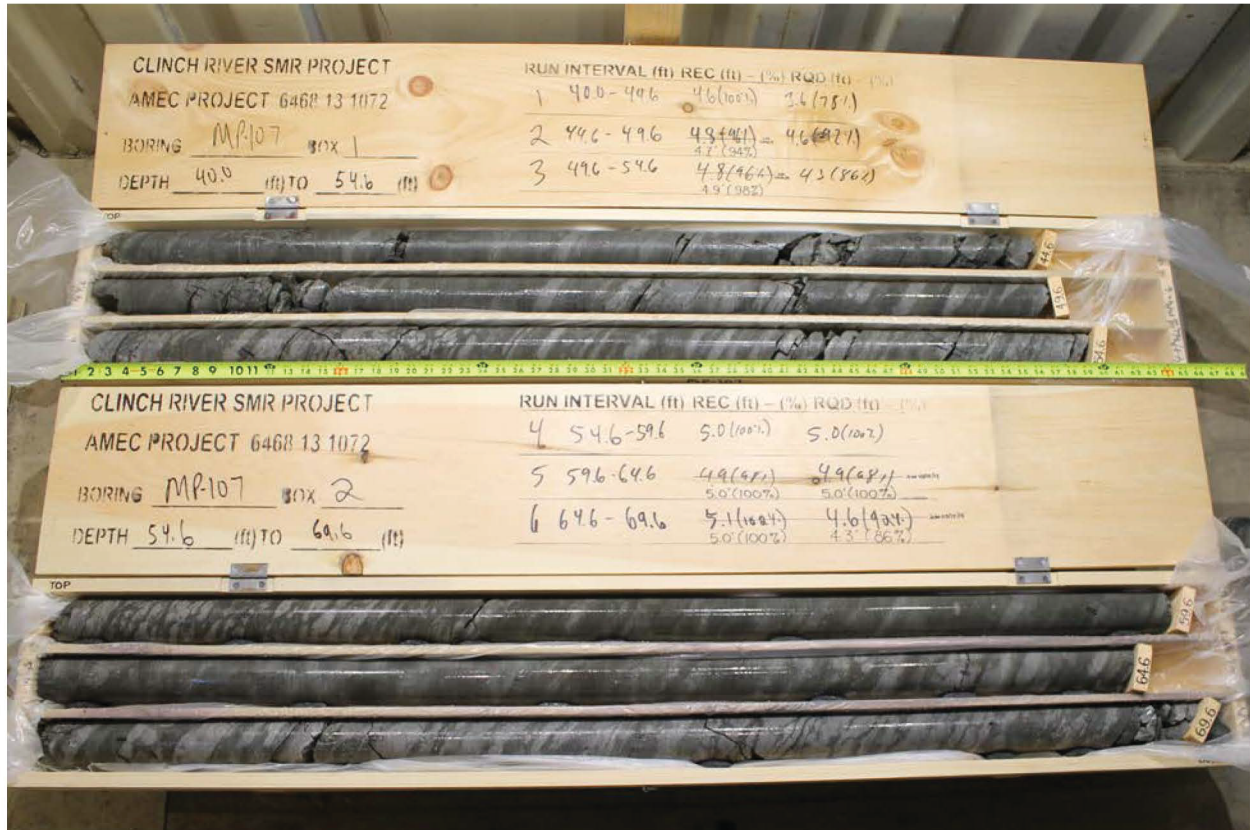
CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 3/5/14



BECHTEL PROJECT NO.: 25847				AMEC PROJECT NO.: 6468-13-1072				COUNTY: Roane, TN		GEOLOGIST: M. Flanik																
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee								DRILLER: J. Landeros/N. Molinalara			Boring Orientation Inclination: Vertical Azimuth: NA															
BORING NO.: MP-107				DRILL METHOD: Mud Rotary/Core				DRILL MACHINE: CME-550X (P)																		
GROUND ELEV.: 801.6 ft (NAVD88)				NORTHING: 570,292 US ft (NAD83)				EASTING: 2,448,285 US ft (NAD83)																		
TOTAL DEPTH: 174.6 ft			SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08						HAMMER (ID): 140-lb Auto (337153)																	
DATE STARTED: 8/16/13			COMPLETED: 8/19/13		CASING DEPTH: 39.7 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																	
									Continued from previous page																	
662.0	139.6	5.0	2:32 3:20 4:15 3:31 3:00 2:48 2:59	(5.0) 100%	(4.8) 96%	Run 21 L3-14			LIMESTONE (MICRITE/WACKESTONE/PACKSTONE), gray (5Y 5/1, N 5/) to dark gray (N 4/) and bluish gray (10B 6/1), strong, laminated to thinly bedded, locally moderately bedded and nodular, fresh, fossiliferous, interbedded with little to some, laminated to thin Calcareous SILTSTONE, very dark greenish gray to greenish black (10Y 3/1-2.5/1), mostly planar to wavy/irregular and diffuse, and few very thin to thin chert beds, lenses, and irregular nodules (gray to dark gray and black, with calcite filled tensional fractures orthogonal to bedding); locally with slight bioturbation, trace calcite filled pits and burrows, trace sparry calcite "bird eyes", locally argillaceous, strong HCl reaction (continued) 142.1ft: J, 25-35°, SR, PO, B, II 144.4ft: BJ, 30°, PR, O, B, II																	
657.0	144.6		4:10 3:12 3:23 3:21 3:36						(5.0) 100%	(4.5) 90%	Run 22			145.2-145.5ft: FZ, 30-45°, PS-PR, O, C, II 146.1ft: BJ, 20°, PS, T, B, II 147.4,148.5ft: J, 50°, PR, T-PO, C, IV 148.1,148.6,148.8ft: SH, 30°, PL, T, C, II, mechanical breaks 149.5-149.6ft: FZ/BJ, 30-35°, PR, T, B, II												
652.0	149.6		4:59 3:56 4:02 3:05 2:40											(5.0) 100%	(5.0) 100%	Run 23			151.1ft: BJ, 35°, US, PO, B, II 151.6ft: J, 45-65°, PR, T-PO, C, IV							
647.0	154.6		3:47 2:18 2:28 2:50 3:05																(5.0) 100%	(5.0) 100%	Run 24			CALCAREOUS SILTSTONE, greenish gray (10Y 6/1-5/1), weak to strong, laminated to thinly bedded, fresh, interbedded with few to little, laminated to thin LIMESTONE (MICRITE/WACKESTONE), gray (N 5/), amorphous and diffuse to irregular bedding, trace fossils and carbonate clasts; slight to moderate bioturbation, trace calcite filled pits and burrows, strong HCl reaction 152.8ft: SH, 30°, PL, T, C, II, with calcite		
642.0	159.6		3:01 2:20 2:38 3:34 4:21																					(4.9) 98%	(4.6) 92%	Run 25 L3-15
637.0	164.6	5:31 5:41 6:23 4:42 4:57	(5.0) 100%	(4.9) 98%	Run 26			170.5-171.9ft: As above, with trace weak red (5R 5/4) 171.9,172.9,173.0ft: SH, 20-30°, PL, T-PO, B-C, II, with calcite 172.9ft: FZ, 30-45°, PS, O-PO, C, II 173.2,174.0ft: BJ, 30°, PR, T-PO, B, II 174.2-174.5ft: FZ, 60°, VT, A, I, spaced at about 0.1'																		
632.0	169.6	5:35 4:13 5:12 7:50 13:50						(4.9) 98%	(4.5) 90%	Run 27																
627.0	174.6												Boring and coring terminated at 174.6 feet.													

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

MP-107 – Boxes 1 and 2



MP-107 – Boxes 3 and 4



MP-107 – Boxes 5 and 6



MP-107 – Boxes 7 and 8



MP-107 – Box 9





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: M. Flanik		
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee						DRILLER: J. Landeros/N. Molinalara			Boring Orientation		
BORING NO.: MP-108			DRILL METHOD: Mud Rotary/Core			DRILL MACHINE: CME-550X (P)			Inclination: Vertical		
GROUND ELEV.: 798.5 ft (NAVD88)			NORTHING: 570,052 US ft (NAD83)			EASTING: 2,448,376 US ft (NAD83)			Azimuth: NA		
TOTAL DEPTH: 174.3 ft			SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08			ROD TYPE: AWJ			HAMMER (ID): 140-lb Auto (337153)		
DATE STARTED: 7/24/13			COMPLETED: 7/31/13			HOLE DIA.: 4"			CASING DEPTH: 7.9 ft		
CORE SIZE: HQ3			BITS USED: 4" Roller Cone								

ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT						SAMP. NO.	LOG	SOIL DESCRIPTION AND REMARKS
		0.5ft	0.5ft	0.5ft	0	20	40	60	80	100			
798.5					Ground Surface								798.5 0.0
798.5	0.0	2	3	4							SS-1		796.0 2.5
795.1	3.4	2	2	3							SS-2		
792.3	6.2	2	3	3							SS-3		
790.4	8.1	50/0.0									SS-4		

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