GEOTECHNICAL CORING LOG

Prepared By: MBL Date: 3/5/14

Checked By: JCM Date: 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**
BORING NO.: MP-122	**DRILL METHOD: Mud Rotary/Core**	**DRILL MACHINE: CME-550X (P)**	**Inclination: Vertical**
GROUND ELEV.: 796.7 ft (NAVD88)	**NORTHING: 570,130 US ft (NAD83)**	**EASTING: 2,448,654 US ft (NAD83)**	**Azimuth: NA**
TOTAL DEPTH: 99.3 ft	**SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08**		**HAMMER (ID): 140-lb Auto (337153)**
DATE STARTED: 6/20/13	**COMPLETED: 6/22/13**	**CASING DEPTH: 28.8 ft**	**CORE BARREL TYPE: HQ3/Diamond Impregnated core bits**

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
								Begin Coring @ 29.4 ft
767.3	29.4	4.9	7:43	(4.5) 92%	(3.4) 69%	Run 1		767.3 WEATHERED ROCK: LIMESTONE (MICRITE), gray (N 6/) to very dark gray (N 3/), very weak, thinly bedded, highly weathered, strong HCl reaction 29.4
			4:41					765.8 29.4-30.9ft: FZ, 10-30°, PR-SR, O, F, III 30.9
			2:55					LIMESTONE (MICRITE), light gray to dark gray (N 7/ to N 4/) and (5Y 5/1 to 5Y 4/1), strong to very strong, very thinly to moderately bedded, slightly weathered to fresh, interbedded with trace to little, mostly laminated to thin, planar to wavy and diffuse Calcareous SILTSTONE, very dark gray (N 3/ and 5Y 3/1) to greenish black (10Y 2.5/1); locally strongly bioturbated with vertical and horizontal burrows, trace to few calcite filled pits and burrows and sparry calcite "bird eyes", trace stylolites, strong HCl reaction
			2:40					
762.4	34.3		3:00/0.9					
		5.0	4:03	(5.0) 100%	(4.9) 98%	Run 2		**(Benbolt Formation-Unit E)**
			3:03					34.6ft: Calcite filled cavity
			2:30					35.2,35.8ft: BJ, 30°, US-SS, T-PO, B, III
			2:30					36.6-37.0ft: J, 60°, PS, VT-T, B-C, III, with pyrite
757.4	39.3		2:37					
		5.0	3:30	(5.0) 100%	(4.7) 94%	Run 3		39.3,44.0ft: BJ, 25-30°, US-PS, T-O, B, II-III
			2:26					42.0ft: J, 45°, PS, T-PO, B, III
			2:25					
			2:36					
752.4	44.3		2:17					
		5.0	2:35	(5.0) 100%	(5.0) 100%	Run 4		
			1:53					
			2:02					
			2:01					
747.4	49.3		1:51					
		5.0	2:43	(5.0) 100%	(4.7) 94%	Run 5		50.4,51.3,51.5,52.2ft: BJ, 30°, PS, T-PO, B, III, with trace calcite
			1:59					51.5ft: J, 60°, PS, T-PO, B-C, III
			2:00					
			1:56					
742.4	54.3		2:00					
		5.0	2:24	(5.0) 100%	(5.0) 100%	Run 6		56.2ft: BJ, 25°, PS, T, A, II
			2:08					
			2:35					
			1:54					
737.4	59.3		2:01					
		5.0	2:58	(5.0) 100%	(4.8) 96%	Run 7		60.9ft: FZ, 5-40°, SS, PO, C, III
			2:04					61.5,62.3ft: BJ, 30°, PS, T-PO, B, III, trace pyrite
			2:29					
			2:23					733.7 63.0
732.4	64.3		2:45			*L3-30*		LIMESTONE (MICRITE), dark gray (N 4/ to 5Y 4/1), strong, mostly laminated to very thinly, trace thinly to moderately bedded, fresh, fossiliferous, interbedded with little to some, laminated to thin, planar to wavy and diffuse Calcareous SILTSTONE, greenish black (10Y 2.5/1) to black (N 2.5/); locally strongly bioturbated with vertical and horizontal burrows, trace to few calcite filled pits and burrows and sparry calcite "bird eyes", strong HCl reaction
		5.0	3:35	(5.0) 100%	(5.0) 100%	Run 8		
			2:02					
			1:54					
			2:17					
727.4	69.3		1:55					
		5.0	3:10	(5.0) 100%	(5.0) 100%	Run 9		
			2:40					
			2:38					
			2:48					
722.4	74.3		2:31					
		5.0	2:20	(5.0) 100%	(5.0) 100%	Run 10		
			1:59					
			1:48					
			1:55					

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
BORING NO.: MP-122	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-550X (P)	Inclination: Vertical
GROUND ELEV.: 796.7 ft (NAVD88)	NORTHING: 570,130 US ft (NAD83)	EASTING: 2,448,654 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 99.3 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (337153)
DATE STARTED: 6/20/13	COMPLETED: 6/22/13	CASING DEPTH: 28.8 ft	CORE BARREL TYPE: HQ3/Diamond Impregnated core bits

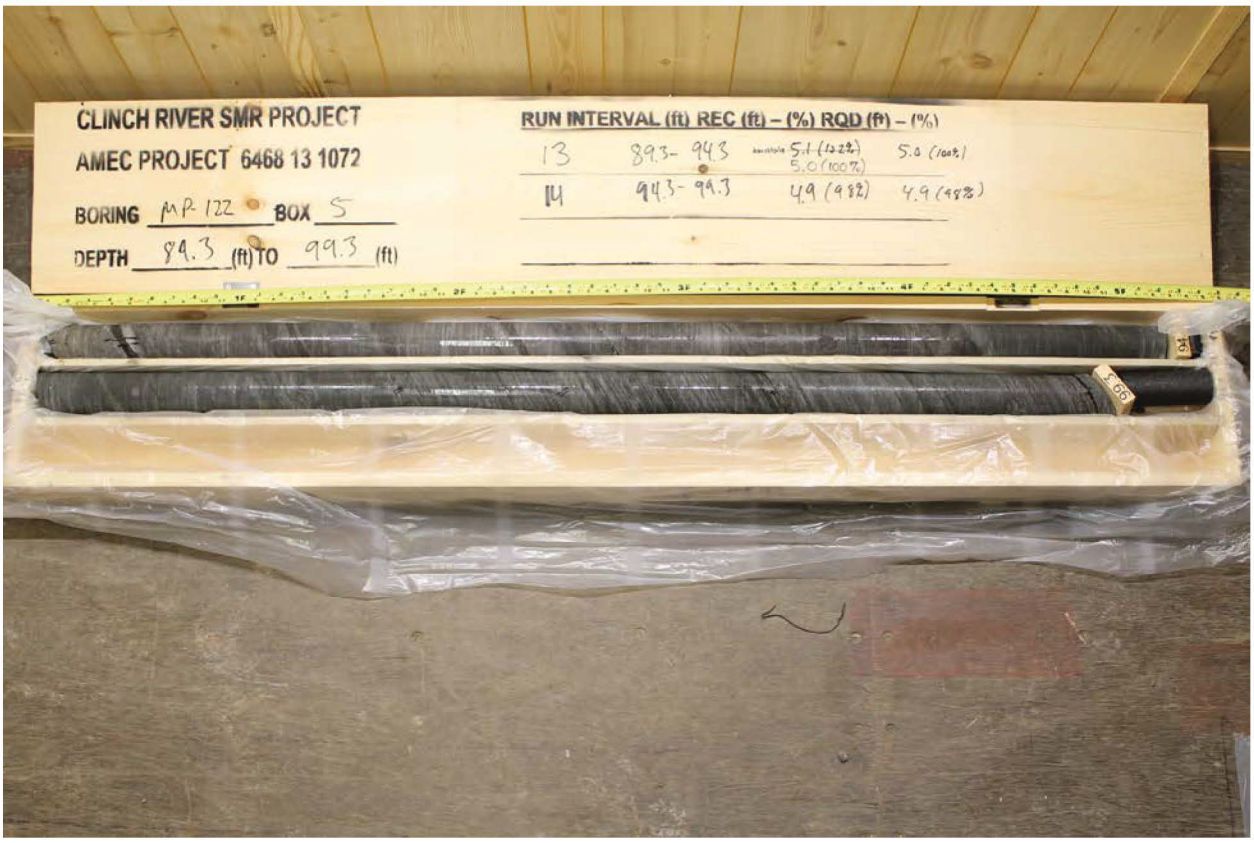
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
								Continued from previous page
717.4	79.3		1:49					LIMESTONE (MICRITE), dark gray (N 4/ to 5Y 4/1), strong, mostly laminated to very thinly, trace thinly to moderately bedded, fresh, fossiliferous, interbedded with little to some, laminated to thin, planar to wavy and diffuse Calcareous SILTSTONE, greenish black (10Y 2.5/1) to black (N 2.5/); locally strongly bioturbated with vertical and horizontal burrows, trace to few calcite filled pits and burrows and sparry calcite "bird eyes", strong HCl reaction *(continued)*
		5.0	3:21	(5.0) 100%	(5.0) 100%	Run 11 *L3-31*		
			1:58					
			2:01					
			1:35					
712.4	84.3		1:55					
		5.0	3:32	(5.0) 100%	(5.0) 100%	Run 12		
			3:31					
			3:16					
			3:04					
707.4	89.3		2:29					
		5.0	3:41	(5.0) 100%	(5.0) 100%	Run 13		91.8ft: SH, 35°, SL, T, C, III, with trace pyrite
			2:13					
			2:03					
			2:40					
702.4	94.3		3:16					703.2 — 93.5
		5.0	4:06	(4.9) 98%	(4.9) 98%	Run 14		CALCAREOUS SILTSTONE, very dark greenish gray (10Y 3/1), weak, thinly to moderately bedded, fresh, interbedded with few laminated to very thin LIMESTONE (MICRITE), dark gray (N 4/); moderate bioturbation, trace calcite filled pits and burrows, strong HCl reaction
			4:03					700.9 — 95.8
			3:28					LIMESTONE (MICRITE), dark gray (N 4/), weak to medium strong, laminated to very thinly bedded, fresh, interbedded with some Calcareous SILTSTONE, very dark greenish gray (10Y 3/1); slight bioturbation with calcite filled pits and burrows, strong HCl reaction
			4:04					
697.4	99.3		3:50					697.4 — 99.3
								Boring and coring terminated at 99.3 feet.

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

MP-122 – Boxes 1 and 2

MP-122 – Boxes 3 and 4

MP-122 – Box 5


CLINCH RIVER SMR PROJECT
AMEC PROJECT 6468 13 1072
BORING MP-122 BOX 5
DEPTH 89.3 (ft) TO 99.3 (ft)
RUN INTERVAL (ft) REC (ft) – (%) RQD (ft) – (%)
13 89.3- 94.3 5.1 (102%) 5.0 (100%) 5.0 (100%)
14 94.3- 99.3 4.9 (98%) 4.9 (98%)

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. Lear
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: B. Woods/G. Akins	Boring Orientation
BORING NO.: MP-122 PS-A	DRILL METHOD: Air Rotary	DRILL MACHINE: Schramm T450 BH (M&W)	Inclination: Vertical
GROUND ELEV.: 796.7 ft (NAVD88)	NORTHING: 570,141 US ft (NAD83)	EASTING: 2,448,638 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 38.7 ft	SAMPLE METHODS: NA-Not Sampled	ROD TYPE: NA	HAMMER (ID):NA
DATE STARTED: 9/4/13	COMPLETED: 9/4/13 / HOLE DIA.: 6" / CASING DEPTH: NA ft	CORE SIZE:NA	BITS USED: 6" Roller 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	SOIL DESCRIPTION AND REMARKS	
796.7					Ground Surface			796.7	0.0
								Note: This boring was drilled for the purpose of collecting P-S velocity data. Test-hole construction: A 6-inch diameter hole was advanced to 38.7 feet below ground surface via air-rotary drilling methods. A 6" roller cone bit was used to the top of weathered rock/rock and a 6" hammer bit was used to advance in rock to the termination depth. 3-inch diameter schedule 40 PVC casing with flush threads was set to the bottom of the borehole at 38.7 feet. Plastic centralizers were installed at approximately 20-foot intervals from the bottom up to keep the PVC casing centered in the drilled boring. The casing was filled with water to keep it in place during the grouting of the annulus. The annulus of the borehole was then tremie-grouted per the specified grout mix (AMEC deviation request CRP-04, Rev 1) to the surface.	778.0 18.7 776.7 20.0
								Soil and rock samples were not collected during the drilling process and no groundwater measurements were made. Following completion of down-hole geophysical testing, the 3-inch PVC casing was left in place and filled with grout (standard grout mix specified for the project). The stratigraphy depicted on this bore log is based on observations of the drilling by the rig geologist and the adjacent boring.	758.0 38.7
								Boring terminated at 38.7 feet.	

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

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. Lear
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: B. Woods/G. Akins	Boring Orientation
BORING NO.: MP-122 PS-B	DRILL METHOD: Air Rotary	DRILL MACHINE: Schramm T450 BH (M&W)	Inclination: Vertical
GROUND ELEV.: 796.6 ft (NAVD88)	NORTHING: 570,118 US ft (NAD83)	EASTING: 2,448,648 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 51.0 ft	SAMPLE METHODS: NA-Not Sampled	ROD TYPE: NA	HAMMER (ID):NA
DATE STARTED: 9/4/13	COMPLETED: 9/4/13 / HOLE DIA.: 6" / CASING DEPTH: NA ft	CORE SIZE:NA	BITS USED: 6" Roller 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	SOIL DESCRIPTION AND REMARKS	
796.6					Ground Surface			796.6	0.0
								Note: This boring was drilled for the purpose of collecting P-S velocity data. Test-hole construction: A 6-inch diameter hole was advanced to 51.0 feet below ground surface via air-rotary drilling methods. A 6" roller cone bit was used to the top of weathered rock/rock and a 6" hammer bit was used to advance in rock to the termination depth. 3-inch diameter schedule 40 PVC casing with flush threads was set to the bottom of the borehole at 51.0 feet. Plastic centralizers were installed at approximately 20-foot intervals from the bottom up to keep the PVC casing centered in the drilled boring. The casing was filled with water to keep it in place during the grouting of the annulus. The annulus of the borehole was then tremie-grouted per the specified grout mix (AMEC deviation request CRP-04, Rev 1) to the surface. Soil and rock samples were not collected during the drilling process and no groundwater measurements were made. Following completion of down-hole geophysical testing, the 3-inch PVC casing was left in place and filled with grout (standard grout mix specified for the project). The stratigraphy depicted on this bore log is based on observations of the drilling by the rig geologist and the adjacent boring.	
								769.3	27.3
								766.6	30.0
								745.6	51.0
								Boring terminated at 51.0 feet.	

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

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: G. Akins/B. Woods	Boring Orientation
BORING NO.: MP-122 UD-A	DRILL METHOD: Hollow-Stem Auger	DRILL MACHINE: D-120 (MW-2)	Inclination: Vertical
GROUND ELEV.: 796.6 ft (NAVD88)	NORTHING: 570,129 US ft (NAD83)	EASTING: 2,448,644 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 14.2 ft	SAMPLE METHODS: ASTM D 1587-08 (2012); 2488-09a	ROD TYPE: AWJ	HAMMER (ID): NA-No SPT Performed
DATE STARTED: 9/12/13	COMPLETED: 9/12/13 / HOLE DIA.: 8" / CASING DEPTH: NA ft	CORE SIZE:NA	BITS USED: 4.25" HSA finger bit

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	LOG	SOIL DESCRIPTION AND REMARKS
796.6					Ground Surface			796.6 — 0.0
								FILL: LEAN CLAY (CL), yellowish red (5YR 5/6), moist, low plasticity fines, trace fine angular gravel, trace fine to coarse sand, with limestone cobbles/boulders (Not Sampled-Described from auger cuttings)
792.0	4.6					ST-1		792.6 — 4.0
								FILL: FAT CLAY with Gravel (CH), reddish yellow (7.5YR 6/6), moist, moderate to high plasticity fines, little fine gravel sized angular rock fragments (limestone and chert), few fine to coarse sand
789.5	7.1					ST-2		
786.9	9.7					ST-3		
784.4	12.2					ST-4		784.6 — 12.0
								FILL: FAT CLAY (CH), reddish yellow (7.5YR 6/6), moist, moderate to high plasticity fines, few fine to coarse sand, trace to few fine gravel sized angular rock fragments (limestone and chert)
								782.4 — 14.2
								Boring terminated at 14.2 feet.

Shelby Tube Samples
ST-1: 4.6-6.6ft; rec=1.5ft; PP=2.25, 2.50, 2.50 tsf
ST-2: 7.1-9.3ft; rec=1.6ft; PP=1.75, 1.50, 1.50 tsf
ST-3: 9.7-11.7ft; rec=1.3ft; PP=2.50, 2.50, 2.50 tsf
ST-4: 12.2-14.2ft; rec=1.3ft; PP=2.00, 2.25, 2.25 tsf

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

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: G. Akins/B. Woods	Boring Orientation
BORING NO.: MP-122 UD-B	DRILL METHOD: Hollow-Stem Auger	DRILL MACHINE: D-120 (MW-2)	Inclination: Vertical
GROUND ELEV.: 797.0 ft (NAVD88)	NORTHING: 570,155 US ft (NAD83)	EASTING: 2,448,671 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 16.6 ft	SAMPLE METHODS: ASTM D 1587-08 (2012); 2488-09a	ROD TYPE: AWJ	HAMMER (ID): NA-No SPT Performed
DATE STARTED: 9/12/13	COMPLETED: 9/12/13 / HOLE DIA.: 8" / CASING DEPTH: NA ft	CORE SIZE:NA	BITS USED: 4.25" HSA finger bit

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	LOG	SOIL DESCRIPTION AND REMARKS
797.0					Ground Surface			797.0 — 0.0
								FILL: LEAN CLAY (CL), yellowish red (5YR 5/6), moist, low plasticity fines, trace fine to coarse sand and fine gravel (Not Sampled-Described from auger cuttings)
793.7	3.3							794.0 — 3.0
						ST-1		FILL: FAT CLAY (CH), brownish yellow (10YR 6/6), moist, moderate to high plasticity fines, trace fine gravel sized angular rock fragments (limestone and chert), trace fine to coarse sand
790.7	6.3					ST-2		
787.8	9.2					ST-3		9.2ft: As above to yellowish red (5YR 5/6)
784.9	12.1					ST-4		785.5 — 11.5 FILL: FAT CLAY with Gravel (CH), light brown (7.5YR 6/4), moist, moderate to high plasticity fines, little fine gravel sized angular rock fragments (limestone and chert), few fine to coarse sand
782.4	14.6					ST-5		780.4 — 16.6
								Boring terminated at 16.6 feet.

Shelby Tube Samples
ST-1: 3.3-5.3ft; rec=0.8ft; PP=2.50, 2.00, 2.50 tsf
ST-2: 6.3-8.3ft; rec=1.2ft; PP=2.00, 2.00, 2.00 tsf
ST-3: 9.2-11.2ft; rec=1.5ft; PP=1.75, 1.75, 1.75 tsf
ST-4: 12.1-14.1ft; rec=0.9ft; PP=2.75, 2.75, 3.00 tsf
ST-5: 14.6-16.6ft; rec=1.5ft; PP=2.00, 2.00, 2.50 tsf

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

GEOTECHNICAL BORING LOG

Prepared By: MBL Date: 4/10/14

Checked By: JCM Date: 4/10/14

SHEET 1 OF 1

BECHTEL NO.: 25847	AMEC PROJECT NO.: 6468-13-1072	COUNTY: Roane, TN	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: D. White/O. Smith	Boring Orientation
BORING NO.: MP-201	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55LC (C)	Inclination: Vertical
GROUND ELEV.: 790.9 ft (NAVD88)	NORTHING: 571,084 US ft (NAD83)	EASTING: 2,447,981 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 420.6 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08	ROD TYPE: AWJ	HAMMER (ID): 140-lb Auto (331145)
DATE STARTED: 7/16/13	COMPLETED: 7/25/13	HOLE DIA.: 4"	CASING DEPTH: 38.3 ft
CORE SIZE: HQ3	BITS USED: 4" Roller 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	SOIL DESCRIPTION AND REMARKS
790.9					Ground Surface			790.9 0.0
790.9	0.0	5	6	4	10	SS-1		FILL: Gravelly LEAN CLAY (CL), red (2.5YR 5/6), stiff to medium stiff, moist to wet, mostly mod. plastic fines, little fine to coarse gravel, few to little fine to coarse sand, strong HCl reaction
787.4	3.5	2	3	3	6	SS-2		
784.9	6.0	2	3	2	5	SS-3		785.4 5.5 FILL: FAT CLAY with gravel (CH), red (2.5YR 5/6), medium stiff to very soft, wet, mostly high plastic fines, little fine to coarse gravel, few fine to coarse sand, strong HCl reaction
782.4	8.5	WOH	3	2	5	SS-4		
779.4	11.5	WOH	WOH	5	5	SS-5A SS-5B		778.4 12.5 FILL: Sandy FAT CLAY with gravel (CH), dark gray (10YR 4/1), medium stiff to stiff, wet, mostly mod. to high plastic fines, little fine to coarse sand, little fine to coarse gravel, strong HCl reaction, trace wood fragments
777.4	13.5	4	4	5	9	SS-6		16.5ft: Driller indicates hard drilling
772.4	18.5	50/0.3			50/0.3	SS-7		774.4 16.5 WEATHERED ROCK: CALCAREOUS SILTSTONE, dusky red (10R 3/3), highly to moderately weathered (Lincolnshire Formation-Fleanor Member-Unit B)
								770.3 20.6 Soil drilling halted. Log continues on geotechnical coring log

Observed water levels:
15.1 ft bgs, AM 7/17/13
17.8 ft bgs, AM 7/18/13
16.8 ft bgs, AM 7/19/13
16.0 ft bgs, AM 7/20/13
17.4 ft bgs, AM 7/21/13
17.5 ft bgs, AM 7/22/13
17.3 ft bgs, AM 7/23/13
13.9 ft bgs, AM 7/24/13
17.0 ft bgs, AM 7/25/13

CLINCH RIVER SMR BORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 4/9/14

GEOTECHNICAL CORING LOG

Prepared By: MBL Date: 4/10/14

Checked By: JCM Date: 4/10/14

BECHTEL PROJECT NO.: 25847	AMEC PROJECT NO.: 6468-13-1072	COUNTY: Roane, TN	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: D. White/O. Smith	Boring Orientation
BORING NO.: MP-201	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55LC (C)	Inclination: Vertical
GROUND ELEV.: 790.9 ft (NAVD88)	NORTHING: 571,084 US ft (NAD83)	EASTING: 2,447,981 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 420.6 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (331145)
DATE STARTED: 7/16/13	COMPLETED: 7/25/13	CASING DEPTH: 38.3 ft	CORE BARREL TYPE: HQ3/Diamond Impregnated core bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
								Begin Coring @ 20.6 ft
770.3	20.6	1.6	4:10	(1.4) 88%	(1.1) 69%	Run 1		770.3 CALCAREOUS SILTSTONE, dusky red (10R 3/3), weak to medium strong, laminated to very thinly bedded, highly to slightly weathered, with trace to few, laminated LIMESTONE (MICRITE) interbeds; trace calcite filled pits, slight to moderate bioturbation, strong HCl reaction **(Lincolnshire Formation-Fleanor Member-Unit B)** 20.6
768.7	22.2		2:10/0.6					
			N=50/0.3			SS-8		
767.4	23.5	2.1	4:02/1.1	(2.1) 100%	(0.9) 43%	Run 2		21.0,21.3ft: BJ, 30°, PR, PO, C, II 22.0-23.5ft: Mod. to highly weathered, SPT SS-8 (22.2-23.5'=13-36-50/0.3') 23.0ft: Loss of drill fluid circulation
765.3	25.6		3:15					
		5.0	2:33	(4.2) 84%	(2.1) 42%	Run 3		23.8,24.7,24.9,25.1,25.3,25.6ft: BJ, 30°, PR, PO, C, III 23.5-23.9ft: FZ, 30-90°, PR, T-O, B-C, II-III, mod. weathered
			2:32					24.1,24.2,24.3ft: BJ/SH, 30°, PS, VT, A, I, healed/intact with calcite
			2:52					25.6-26.2ft: FZ, 30-90°, PR-SR, O, B-C, III
			2:47			L5-11		26.1,26.6,26.9ft: BJ, 35°, PR-UR, T-PO, A-C, I-III 28.2,28.4,28.8ft: BJ, 30°,PR, PO, B, I-II
			3:36					
760.3	30.6							760.3 29.0-30.6ft: FZ, mod. to highly weathered-0.8' Loss of core 30.6
		5.0	3:24	(5.0) 100%	(4.3) 86%	Run 4		CALCAREOUS SILTSTONE, dusky red (10R 3/3), weak to medium strong, laminated to very thinly bedded, slightly weathered to fresh, with few to little, laminated to thinly interbedded LIMESTONE (MICRITE to fine GRAINSTONE), dark greenish gray (10Y 4/1 & 5GY4/1) to dark gray (N 4/); trace calcite filled pits, moderately to strongly bioturbated with vertical and horizontal burrows, strong HCl reaction
			3:32					
			2:51					
			2:55					
			3:12					
755.3	35.6							30.6-31.0ft: Regained drill fluid circulation, complete loss at 31.0' 30.6,30.9ft: BJ, 40°, PR, PO, B, II
		5.0	4:45	(4.8) 96%	(2.8) 56%	Run 5		30.7ft: J, 60°, PR, T, B, III 31.4-31.7, 32.9-33.0ft: FZ, 0-30°, mod. weathered
			3:44					34.0ft: BJ, 30°, PR, T, A, I
			3:01					35.7-35.8ft: FZ, mod. weathered; 0.2' Loss of core
			2:31					35.9,36.1ft: J, 40°, PR, T, B-C, II-III 36.9-37.1ft: FZ, 10-30°, SR, O, K, II
			3:04					37.2,37.4ft: J/SH, 35°, SR-PL, T-PO, B-C, II-III
750.3	40.6							
		5.0	4:37	(4.8) 96%	(3.3) 66%	Run 6		39.3,39.6,40.0ft: BJ, 30°, PR, T-PO, B, II 40.2ft: J, 70°, PR, O, B, III
			2:14					40.2ft: BJ, 40°, PR, T-PO, B, II
			2:40					40.6,41.3ft: BJ, 30-40°, PR, T-PO, B-C, II
			3:24					42.7-44.1ft: FZ, 30°, PR-SR, PO, K, III, mod. to highly weathered, 0.2' Loss of core
			4:13					
745.3	45.6							
		5.0	3:34	(5.0) 100%	(4.8) 96%	Run 7		47.2,47.3,47.4ft: BJ, 30°, PR, T-PO, B, II 47.3ft: J, 65°, SR, T-PO, C, III
			3:49					
			4:47					
			3:43					
			3:10					
740.3	50.6							
		5.0	3:38	(5.0) 100%	(4.8) 96%	Run 8		50.6,53.0ft: BJ, 30°, PR, T-PO, A-C, I-II 53.4,55.1ft: J, 60°, UR-SR, PO-O, C, II-III
			3:40					55.0-55.2ft: FZ, 30°, PR, T-PO, C, III
			3:06					
			3:02			L5-12		
			3:24					
735.3	55.6							
		5.0	3:30	(5.0) 100%	(4.0) 80%	Run 9		55.8,55.9,56.1,56.3,56.5ft: BJ, 30-40°, PR, T-PO, C, III 57.3,57.5,59.6ft: BJ, 30°, PR, T-PO, B, II
			4:20					
			3:20					
			3:40					
			3:30					
730.3	60.6							
		5.0	5:09	(4.9) 98%	(4.5) 90%	Run 10		61.9-62.3ft: FZ, 30°, PR, T-PO, B-C, II, 0.1' Loss of core 63.8ft: BJ, 30°, SR, PO, B, I & J, 60°, PR, T-VT, C, III
			5:27					
			4:04					
			4:00					
			3:00					
725.3	65.6							
		5.0	3:20	(4.9) 98%	(4.5) 90%	Run 11		67.5-68.1ft: FZ (6 BJ's), 30-40°, PR/UR/SR, PO, B, II 69.9-70.0ft: FZ/BJ, 30°, PR, PO, C, III; 0.1' Loss of core
			3:24					
			4:20					
			3:30					

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 4/9/14

BECHTEL PROJECT NO.: 25847	AMEC PROJECT NO.: 6468-13-1072	COUNTY: Roane, TN	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: D. White/O. Smith	Boring Orientation
BORING NO.: MP-201	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55LC (C)	Inclination: Vertical
GROUND ELEV.: 790.9 ft (NAVD88)	NORTHING: 571,084 US ft (NAD83)	EASTING: 2,447,981 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 420.6 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (331145)
DATE STARTED: 7/16/13	COMPLETED: 7/25/13	CASING DEPTH: 38.3 ft	CORE BARREL TYPE: HQ3/Diamond Impregnated core bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
								Continued from previous page
720.3	70.6		3:29					CALCAREOUS SILTSTONE, dusky red (10R 3/3), weak to medium strong, laminated to very thinly bedded, slightly weathered to fresh, with few to little, laminated to thinly interbedded LIMESTONE (MICRITE to fine GRAINSTONE), dark greenish gray (10Y 4/1 & 5GY4/1) to dark gray (N 4/); trace calcite filled pits, moderately to strongly bioturbated with vertical and horizontal burrows, strong HCl reaction *(continued)*
		5.0	2:15	(5.0) 100%	(4.9) 98%	Run 12		
			2:05					
			3:30					
			3:15			*L5-13*		71.8,71.9,72.2,74.6ft: BJ, 30°, PR-UR, T-PO, A-C, I-II
715.3	75.6		3:03					75.0-77.9ft: As above, gradual color change from dusky red (10R 3/3) to greenish black (10Y 2.5/1)
		5.0	3:48	(5.0) 100%	(5.0) 100%	Run 13		75.9ft: J, 45°, SR, PO, B, I 77.7ft: BJ, 30°, PR, PO, B, I
			3:38					
			3:34					713.0 — 77.9
			3:14					CALCAREOUS SILTSTONE, greenish black (10Y 2.5/1), weak to medium strong, laminated to very thinly bedded, fresh, with little to some, laminated to very thinly interbedded LIMESTONE (MICRITE), gray (N 5/) to dark gray (N 4/); strong HCl reaction
710.3	80.6		2:46					
		5.0	3:29	(5.0) 100%	(4.8) 96%	Run 14		81.6,82.5,82.7,85.8ft: BJ, 30°, PR, T-PO, B, II
			3:25					
			2:57					
			2:37					
705.3	85.6		2:08					705.0 — 85.9
		5.0	4:40	(5.0) 100%	(4.5) 90%	Run 15		LIMESTONE (MICRITE), dark gray (N 4/), medium strong, very thinly bedded and nodular, fresh, with some laminated to very thin irregularly interbedded Calcareous SILTSTONE, black (N 2.5/); strong HCl reaction **(Lincolnshire Formation-Eidson Member-Unit A)**
			4:20					703.4 — 87.5
			3:46					LIMESTONE (MICRITE; locally as fine WACKESTONE to GRAINSTONE), gray (N 5/) to dark gray (N 4/), medium strong and strong, laminated to thinly bedded, fresh, argillaceous, with little to some, laminated to thinly interbedded, Calcareous SILTSTONE, planar to irregular and diffuse, greenish black (10Y 2.5/1) to black (N 2.5/) and very dark gray (N 3/ - 5Y 3/1), and few to little, very thin chert lenses and nodules (dark gray to black with calcite healed tensional fractures orthogonal to bedding); trace calcite filled pits, sparry calcite "bird eyes", and stylolites, locally fossilferous, locally with weak to moderate bioturbation, strong HCl reaction
			3:10					
700.3	90.6		3:30					
		5.0	4:31	(5.0) 100%	(5.0) 100%	Run 16		87.6,89.0,89.2,89.3ft: BJ, 30°, PR, T-PO, B, I 89.6ft: BJ, 30°, PR, PO, F, III 92.0ft: J, 60, PR, T-PO, C, III
			3:40					
			2:44					
			3:09					
695.3	95.6		3:20					92.8,93.6,94.3ft: BJ, 30°, PR-UR, PO-T, B, II-I
		5.0	3:58	(5.0) 100%	(4.9) 98%	Run 17		94.6-95.0ft: Mottled with very dusky red (2.5YR 2.5/2) 96.9-97.0ft: FZ, 30°, PR, O, K, III 97.9ft: BJ, 30°, PR, PO, K, III
			3:24					
			3:28					
			4:41					98.4ft: BJ, 30°, PR, PO, A, I 98.9,99.1ft: J, 40°, PR, VT-PO, A-B, I-II
690.3	100.6		3:24					
		5.0	3:15	(5.0) 100%	(5.0) 100%	Run 18		101.7ft: BJ, 30°, PR, PO, C, III, mod. weathered 103.6ft: J, 65°, VT, A, I, Intact/healed with calcite
			2:47					
			2:40					
			3:03					
685.3	105.6		3:03					
		5.0	3:16	(5.0) 100%	(4.4) 88%	Run 19		105.7ft: BJ, 30°, PR, PO, C, III, moderately weathered 108.3ft: BJ, 30°, PR, T-PO, B, II 108.5,108.7ft: BJ, 30°, PR, T-PO, D, III
			3:17					
			3:19					
			3:30					
680.3	110.6		3:10					
		5.0	5:04	(5.0) 100%	(4.7) 94%	Run 20		110.6,110.7,110.9ft: BJ, 30°, PR, T-PO, B-C, II-III 112.5ft: BJ, 20°, PS, T, A, I 113.5ft: BJ, 30°, UR, T, B, I
			3:11					
			2:59					
			2:55					
			3:02			*L5-14*		
675.3	115.6							
		5.0	3:49	(4.8) 96%	(4.2) 84%	Run 21 *L2-12*		116.8,117.0,117.1ft: BJ, 30°, PR, T, B, II & J, 10-30°, SR, O, K, II 119.5,119.6,119.7ft: BJ, 30°, PR, T-PO, B, II
			3:56					

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 4/9/14

BECHTEL PROJECT NO.: 25847	AMEC PROJECT NO.: 6468-13-1072	COUNTY: Roane, TN	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: D. White/O. Smith	Boring Orientation
BORING NO.: MP-201	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55LC (C)	Inclination: Vertical
GROUND ELEV.: 790.9 ft (NAVD88)	NORTHING: 571,084 US ft (NAD83)	EASTING: 2,447,981 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 420.6 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (331145)
DATE STARTED: 7/16/13	COMPLETED: 7/25/13	CASING DEPTH: 38.3 ft	CORE BARREL TYPE: HQ3/Diamond Impregnated core bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
								Continued from previous page
			3:16 2:46 2:50					LIMESTONE (MICRITE; locally as fine WACKESTONE to GRAINSTONE), gray (N 5/) to dark gray (N 4/), medium strong and strong, laminated to thinly bedded, fresh, argillaceous, with little to some, laminated to thinly interbedded, Calcareous SILTSTONE, planar to irregular and diffuse, greenish black (10Y 2.5/1) to black (N 2.5/) and very dark gray (N 3/ - 5Y 3/1), and few to little, very thin chert lenses and nodules (dark gray to black with calcite healed tensional fractures orthogonal to bedding); trace calcite filled pits, sparry calcite "bird eyes", and stylolites, locally fossilferous, locally with weak to moderate bioturbation, strong HCl reaction *(continued)*
670.3	120.6							
		5.0	3:56 3:34 2:14 2:22 2:32	(5.0) 100%	(4.0) 80%	Run 22		120.5,120.6ft: BJ, 30°, PR, PO, A-C, II 124.6,124.7,124.9,125.0,125.2ft: BJ, 30°, PR, T-PO, A-C, I-II
665.3	125.6							665.6 — 125.3
		5.0	2:35 2:19 2:28 2:37 2:29	(5.0) 100%	(5.0) 100%	Run 23		LIMESTONE (WACKESTONE/PACKSTONE), dark gray (N 4/) to very dark gray (N 3/), strong, laminated to mostly thinly bedded, locally nodular, fresh, with little to some, laminated to very thinly interbedded Calcareous SILTSTONE, black (N 2.5/), and few very thin chert beds and lenses (dark gray to black with calcite filled tensional fractures orthogonal to bedding); trace calcite filled pits, strong HCl reaction 125.6-127.4ft: As above to strongly bioturbated with coarse vertical and horizontal burrows filled with sparry calcite and carbonate, fossiliferous
660.3	130.6							126.6,129.7ft: BJ, 20°, PR, T-PO, B-C, I-II 127.4,127.9ft: BJ, 30°, PR, PO, C-D, II-III
		5.0	2:38 2:27 2:27 3:31 5:37	(5.0) 100%	(3.1) 62%	Run 24 *L2-13*		658.8 — 131.6,131.9,ft: BJ, 20°, PR, T-PO, A-C, I-III; slightly weathered — 132.1 LIMESTONE (MICRITE), gray (N 5/ to 2.5Y 5/1) to dark gray (N 4/ to 2.5Y 4/1), strong, laminated to moderately bedded, fresh, with few to little, mostly laminated to very thinly interbedded Calcareous SILTSTONE, very dark gray (N 3/) to black (N 2.5/), and few to little, very thin to moderate chert beds, lenses and nodules (very dark gray to black, with calcite filled tensional fractures orthogonal to bedding); trace calcite filled pits and stylolites, strong HCl reaction
655.3	135.6							
		5.0	5:01 4:25 5:10 5:33 5:29	(4.7) 94%	(3.8) 76%	Run 25		132.1,132.2,132.4,133.2,133.6,133.7,134.6,135.0ft: BJ, 10-20°, UR-PR, T-PO, A-C, I-III 133.7-136.7ft: Healed fractures at 55-65° with calcite 134.9ft: J, 0°, PR, T, B, II 135.5,135.7ft: BJ, 20-30°, PR-SR, PO, C, II 136.9,137.0,137.1,137.2ft: BJ, 15-20°, PR, PO, A-C, I-II
650.3	140.6							138.8,138.9ft: BJ, 30-40°, UR, T-PO, B, II
		5.0	3:56 2:45 3:34 5:10 4:31	(5.0) 100%	(2.0) 40%	Run 26		139.9-140.3ft: FZ, 15-30°, PR, PO, A-C, I-II 140.3-140.6ft: 0.3' Loss of core-mechanical/blocked off 140.7ft: BJ, 25°, PL, T, C, II 141.9-143.3: BJ (9), 20-30°, PR-UR, PO, B-D, II-III 141.8,142.0,142.8,144.3ft: SH, 20-30°, PL, PO, B-D, II-III 143.7-145.6ft: BJ (12), 20°, PR, SR-UR, T-PO, A-D, I-III
645.3	145.6							141.9ft: J, 0°, PL, T, C, II
		5.0	4:34 4:14 3:37 4:05 4:30	(4.8) 96%	(3.5) 70%	Run 27 *L5-15*		143.0-145.5ft: J, 70°, VT, A, I, Intact/healed with calcite 145.6-146.6,147.0,147.4,147.6,148.6-149.2ft: Healed fractures, 50-60°, VT, A, I, with calcite 146.6ft: BJ, 30°, UR, T, B, II 146.7-146.9ft: SZ, 30°, PL, PO-MO, A-C, I-II, with calcite healed gouge 147.2ft: J, 65°, PR, T-PO, B, II 147.2,147.4,148.3,148.7ft: SH, 20-30°, PL, T-PO, A-C, I-II, with calcite
640.3	150.6							148.6ft: J, 0°, PR, PO, C, I, with calcite
		5.0	5:23 5:57 5:43 5:31 5:07	(4.9) 98%	(1.1) 22%	Run 28		149.3-149.6ft: SZ, 30°, PL, T-PO, B, I, with calcite 149.9-150.2ft: FZ, 30°, PR, T-PO, C, II, with calcite, mod. weathered on surfaces 150.6-152.9ft: BJ/SH (10), 35-40°, PL, T-PO, A-D, I-III 152.5-153.5ft: Healed fractures, 50-70°, VT, A, I, with calcite (intact) 153.3ft: BJ, 30°, PR-UR, T-PO, B, II 153.6-154.2ft: SZ, 20-30°, PL, PO, C-D, II-III, with calcite 154.5-155.2ft: SZ, 35°, PL, T-PO, A-D, II-III, with calcite
635.3	155.6							155.0,155.4ft: J, 60°, PR, T-PO, C, II-III
		5.0	5:15 4:00 3:33 3:41 3:36	(4.9) 98%	(3.7) 74%	Run 29		155.4-155.6ft: SZ, 30°, PL, PO-O, C, III, with calcite, 0.1' loss of recovery 156.1-158.1ft: Healed fractures, 60-80°, VT, A, I, with calcite (intact) 156.3,157.3,157.6,157.8,159.1,160.0ft: SH, 30°, PL, T-PO, A-C, I-II, with calcite 156.8ft: J, 60°, UR, T-PO, B-C, II 158.1-158.7ft: SZ, 30°, PL, T-PO, A-C, I-II, 0.1' loss of core in zone 158.9ft: J, 0°, UR, PO, C, II
630.3	160.6							
		5.0	4:08 3:58 3:57 4:30 3:50	(5.0) 100%	(3.6) 72%	Run 30		161.1,162.2,162.4ft: SH, 30°, PL, T-PO, C, I 162.0ft: J, 60°, PR, T-PO, B, I 162.7-163.4,163.9-164.3ft: SZ, 30°, PL, T-PO, C, I-II, with calcite 165.2,165.5,165.7,166.3,168.8ft: BJ, 15-20°, PR, T-PO, A-C, I-II 167.1,167.9,169.1,169.8,170.2ft: SH/BJ, 30°, PL-UL, T-PO, B-C, I 170.4-170.6ft: 0.2' loss of core-mechanical loss, not recovered with/washed away at start of following run
625.3	165.6							
		5.0	5:03	(4.8)	(4.2)	Run 31		

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 4/9/14

BECHTEL PROJECT NO.: 25847	AMEC PROJECT NO.: 6468-13-1072	COUNTY: Roane, TN	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: D. White/O. Smith	Boring Orientation
BORING NO.: MP-201	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55LC (C)	Inclination: Vertical
GROUND ELEV.: 790.9 ft (NAVD88)	NORTHING: 571,084 US ft (NAD83)	EASTING: 2,447,981 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 420.6 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (331145)
DATE STARTED: 7/16/13	COMPLETED: 7/25/13	CASING DEPTH: 38.3 ft	CORE BARREL TYPE: HQ3/Diamond Impregnated core bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
								Continued from previous page
			4:33 4:32 4:27 3:31	96%	84%			LIMESTONE (MICRITE), gray (N 5/ to 2.5Y 5/1) to dark gray (N 4/ to 2.5Y 4/1), strong, laminated to moderately bedded, fresh, with few to little, mostly laminated to very thinly interbedded Calcareous SILTSTONE, very dark gray (N 3/) to black (N 2.5/), and few to little, very thin to moderate chert beds, lenses and nodules (very dark gray to black, with calcite filled tensional fractures orthogonal to bedding); trace calcite filled pits and stylolites, strong HCl reaction *(continued)*
620.3	170.6							
		5.0	5:37 3:33 3:53 3:47 4:01	(5.0) 100%	(4.3) 86%	Run 32		171.0ft: BJ, 30°, PL, T, C, I 171.3,171.4,171.5ft: BJ, 20-30°, PR, T-PO, B, II 172.0-172.1ft: SZ, 30°, PL, T, C, II 172.9,174.1ft: BJ, 30°, PR-UR, T, A-B, I
615.3	175.6							615.6 — 175.3
		5.0	3:37 3:40 2:45 2:35 2:30	(5.0) 100%	(4.9) 98%	Run 33		CALCAREOUS SILTSTONE, gray (5YR 6/1) to black (N 2.5/1) and reddish black (2.5YR 2.5/1), medium strong, laminated to thinly bedded, fresh, with little laminated to thinly bedded, locally diffuse LIMESTONE (MICRITE/WACKESTONE), gray (N 5/) to dark gray (N 4/); trace calcite filled pits, moderately bioturbated, strong HCl reaction **(Upper Blackford Formation-Unit A)** 176.7,176.8ft: BJ, 25°, PR-UR, T-PO, A-C, I-II 177.6ft: SH/BJ, 30°, PL, T, C, I 178.7,179.8ft: BJ, 25-30°, PR, T, A-B, I
610.3	180.6							
		5.0	3:13 3:09 3:15 3:26 2:57	(5.0) 100%	(4.1) 82%	Run 34		
								606.7 — 184.2
605.3	185.6							LIMESTONE (WACKESTONE/PACKESTONE), gray (N 5/) to dark gray (N 4/), strong, laminated to thinly bedded, fresh, with some laminated to very thinly bedded, Calcareous SILTSTONE, black (N 2.5/) to reddish black (2.5YR 2.5/1), and few very thin to thin chert beds and lenses (dark gray to very dark greenish gray, with calcite filled tensional fractures orthogonal to bedding); trace bioturbation, strong HCl reaction
		5.0	3:26 3:29 3:44 3:06 3:17	(5.0) 100%	(3.8) 76%	Run 35 *L2-14*		184.5-184.9ft: FZ, 10-20°, PR-UR, T-PO, B-C, I-II 185.1-185.5ft: FZ, 20-30°, PR, T-PO, B, II 185.7,187.0,187.6,189.1ft: BJ, 30°, PR, T-PO, A-C, I-II 188.1-188.5ft: FZ, 20-35°, PR, T-PO, B, I 189.9-190.6ft: FZ, 25-45°, PR, T-PO, A-C, I-II
600.3	190.6							
		5.0	3:40 4:06 3:23 3:06 3:24	(5.0) 100%	(4.8) 96%	Run 36		191.1ft: J, 20°, PR, T, A, I 191.8ft: BJ, 30°, PR, T, A, I
								598.8 — 192.1
595.3	195.6							CALCAREOUS SILTSTONE, dark gray (N 4/) to black (N 2.5/) to reddish black (2.5YR 2.5/1), medium strong, laminated to thinly bedded, fresh, with few to little laminated, amorphous and diffuse LIMESTONE (MICRITE) interbeds; strongly bioturbated, strong HCl reaction
		5.0	4:39 3:32 3:12 3:48 4:01	(5.0) 100%	(4.7) 94%	Run 37		193.2ft: BJ, 40°, PR, T-PO, A, I 193.3ft: J, 20°, PR, PO, C, II 195.6ft: BJ, 10°, PS, T, A, I
								594.0 — 196.9
590.3	200.6							LIMESTONE (MICRITE), greenish gray (10Y 5/1) to gray (N 5/) and dark gray (N 4/), strong, laminated to moderately bedded, locally nodular, fresh, with little to some laminated to moderately interbedded Calcareous SILTSTONE, very dark gray (N 3/) to black (N 2.5/) and reddish black (2.5YR 2.5/1) to very dark greenish gray (5GY 3/1); and few to little thin chert beds, lenses and nodules (varigated, dark gray to black, reddish black, and olive brown, with calcite filled tensional fractures); trace calcite filled pits, weakly to moderately bioturbated with vertical and horizontal burrows, strong HCl reaction
		5.0	5:25 4:40 4:24 3:33 3:03	(5.0) 100%	(3.7) 74%	Run 38		196.9,198.1,198.8,200.0,200.3ft: BJ, 20-30°, PR, T, A, I 200.3ft: J, 15°, VT, A, I, with calcite (intact) 200.9,201.3ft: BJ/SH, 30°, PL, T-PO, C, I 201.5ft: J, 70°, PR, T-PO, C, II
585.3	205.6							
		5.0	4:01 5:04 4:00 3:55 4:30	(5.0) 100%	(4.2) 84%	Run 39		201.9,203.4,204.8,205.0ft: BJ, 20-30°, PR-UR, T-PO, B, I 206.5,207.3,208.4,209.1ft: BJ, 20-30°, PR-UR, T-PO, B, I-II 207.9ft: J, 60°, PR, PO-MO, C, III
								581.1 — 209.8
580.3	210.6							
		5.0	6:00 5:03 4:37 3:47	(5.0) 100%	(5.0) 100%	Run 40		209.9ft: BJ/SH, 20°, PL, T, C, III 212.1,214.4ft: BJ, 30°, T-PO, B, I-II 212.8ft: BJ/SH, 30°, PL, T-PO, C, III 215.0ft: J, 60°, PR, PO, C, II

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 4/9/14

BECHTEL PROJECT NO.: 25847	AMEC PROJECT NO.: 6468-13-1072	COUNTY: Roane, TN	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: D. White/O. Smith	Boring Orientation
BORING NO.: MP-201	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55LC (C)	Inclination: Vertical
GROUND ELEV.: 790.9 ft (NAVD88)	NORTHING: 571,084 US ft (NAD83)	EASTING: 2,447,981 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 420.6 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (331145)
DATE STARTED: 7/16/13	COMPLETED: 7/25/13	CASING DEPTH: 38.3 ft	CORE BARREL TYPE: HQ3/Diamond Impregnated core bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
								Continued from previous page
575.3	215.6	5.0	4:53 4:22 3:51 4:38 5:17 4:40	(5.0) 100%	(3.8) 76%	Run 41		CALCAREOUS SILTSTONE, black (N 2.5/) to reddish black (10R 2.5/1-2.5YR 2.5/1), very dusky red (10R 2.5/2-2.5YR 2.5/2), and dark greenish gray (5GY 4/1) to very dark greenish gray (5GY 3/1), locally mottled with dark gray (N 4/) to dark greenish gray (10Y 4/1), medium strong to strong, laminated to moderately bedded, fresh, with little to some laminated to moderately interbedded, LIMESTONE (MICRITE/ WACKESTONE/ PACKSTONE), locally nodular, gray (N 6/-N 5/) to greenish gray (10Y 5/1), and dark gray (N 4/) to very dark gray (N 3/); and trace to little, very thin to thin chert beds, lenses and nodules (varigated, dark gray to black, brown, olive, orange, and very dusky red, with calcite filled tensional fractures); moderately to strongly bioturbated with vertical and horizontal burrows, trace calcite filled pits and separate calcite lined (open) vugs, strong HCl reaction *(continued)*
570.3	220.6	5.0	4:31 4:22 3:48 3:31 5:15	(5.0) 100%	(4.8) 96%	Run 42		215.7-216.3ft: FZ (5 BJ's), 20-30°, PR, T-PO, B, I 216.0ft: J, 60°, PR, PO, B, II 219.6, 220.0, 220.1, 220.3, 220.4ft: BJ, 20°, PR, T-PO, A-B, I 221.8,222.3,222.4,223.7ft: BJ, 20-30°, PR, T-PO, A-B, I
565.3	225.6	5.0	5:00 4:21 3:43 3:45 5:52	(4.8) 96%	(4.5) 90%	Run 43		226.3,226.4,227.8,228.2,228.6,229.6,230.2ft: BJ, 30°, PR, T-PO, B, I-II 230.2-230.4ft: 0.2' loss of core-mechanical loss/blocked off
560.3	230.6	5.0	4:18 4:59 4:02 3:26 3:31	(5.0) 100%	(4.7) 94%	Run 44		231.3,232.5,233.2ft: BJ, 30°, PR, T-PO, B, I-II 234.4-234.7ft: FZ, 20-30°, PR-UR, T-PO, C-D, II-III
555.3	235.6	5.0	4:43 4:13 3:52 3:24 4:16	(4.9) 98%	(3.4) 68%	Run 45		235.7,236.6,237.2,240.1ft: BJ, 20-30°, PR, T-PO, B-C, I-II 237.7-238.6ft: FZ (10 BJ's), 20-30°, PR-UR, T-PO, A-B, I-II 239.2-239.7ft: FZ (5 BJ's), 30°, PR, T-PO, B-C, II 239.2ft: J, 0°, UR, PO, B, I
550.3	240.6	5.0	4:56 4:22 3:55 4:08 5:00	(5.0) 100%	(4.8) 96%	Run 46		240.6-240.7ft: FZ/BJ, 30°, PR-SR, O, B, II 242.4,244.2ft: BJ, 20-30°, PR, T, A, I
545.3	245.6	5.0	4:16 4:42 5:13 4:02 4:23	(4.9) 98%	(4.7) 94%	Run 47		245.6-246.6ft: Regained circulation briefy then lost again 245.6,245.7,245.9,247.4ft: BJ, 25-30°, PR, T-PO, A-B, I-II 245.8ft: J, 90°, SR, O, B, II 250.5-250.6ft: 0.1' Loss of core-mechanical loss, left in hole and not recovered/washed away at start of following run
540.3	250.6	5.0	4:22 3:50 3:15 3:45 4:15	(5.0) 100%	(4.9) 98%	Run 48		251.4ft: J, 65°, PR, PO, C, II 253.2,253.9,254.0ft: BJ, 30°, PR, T-PO, A-B, I
535.3	255.6	5.0	3:48 3:23 3:28 3:21 2:48	(5.0) 100%	(5.0) 100%	Run 49		
530.3	260.6	5.0	3:45 3:21 2:39	(5.0) 100%	(3.8) 76%	Run 50		262.7,263.2ft: BJ, 25-30°, PS-PR, T, A-B, I 262.9ft: J, 30°, PR, T-PO, B, II

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 4/9/14

BECHTEL PROJECT NO.: 25847	AMEC PROJECT NO.: 6468-13-1072	COUNTY: Roane, TN	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: D. White/O. Smith	Boring Orientation
BORING NO.: MP-201	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55LC (C)	Inclination: Vertical
GROUND ELEV.: 790.9 ft (NAVD88)	NORTHING: 571,084 US ft (NAD83)	EASTING: 2,447,981 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 420.6 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (331145)
DATE STARTED: 7/16/13	COMPLETED: 7/25/13	CASING DEPTH: 38.3 ft	CORE BARREL TYPE: HQ3/Diamond Impregnated core bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
								Continued from previous page
525.3	265.6		2:17 3:30					CALCAREOUS SILTSTONE, black (N 2.5/) to reddish black (10R 2.5/1-2.5YR 2.5/1), very dusky red (10R 2.5/2-2.5YR 2.5/2), and dark greenish gray (5GY 4/1) to very dark greenish gray (5GY 3/1), locally mottled with dark gray (N 4/) to dark greenish gray (10Y 4/1), medium strong to strong, laminated to moderately bedded, fresh, with little to some laminated to moderately interbedded, LIMESTONE (MICRITE/ WACKESTONE/ PACKSTONE), locally nodular, gray (N 6/-N 5/) to greenish gray (10Y 5/1), and dark gray (N 4/) to very dark gray (N 3/); and trace to little, very thin to thin chert beds, lenses and nodules (varigated, dark gray to black, brown, olive, orange, and very dusky red, with calcite filled tensional fractures); moderately to strongly bioturbated with vertical and horizontal burrows, trace calcite filled pits and separate calcite lined (open) vugs, strong HCl reaction *(continued)*
520.3	270.6	5.0	5:15 4:58 4:06 4:53 5:04	(5.0) 100%	(3.6) 72%	Run 51 *L2-15*		265.6,266.1,266.5,266.8,268.7,269.7,270.1,270.3,270.4,270.5ft: BJ, 30°, PR, T-PO, A-B-C, I-II 265.7,266.0ft: J, 70°, UR, PO, B, II 269.5ft: SH, 30°, PL, T, C, I, with calcite 270.7,271.3,272.3,273.2,273.4,273.5,273.6,274.1ft: BJ, 30°, PR, T-PO, B-C, I-III
515.3	275.6	5.0	4:50 4:09 4:04 4:01 3:47	(5.0) 100%	(4.3) 86%	Run 52		275.8ft: J, 10°, UR, T-PO, B, II 276.3-276.6ft: FZ, 30°, PR, PO-MO,D, III 277.1,277.6,278.4,278.8,279.4,279.9ft: BJ, 25-30°, PR, T-PO, A-B, I 277.5,277.8,278.8ft: J, 50-60°, UR-PR, T-PO, B, I
510.3	280.6	5.0	4:20 4:00 4:09 4:07 3:59	(5.0) 100%	(4.3) 86%	Run 53		280.7,281.0,281.5,281.8,281.9,282.4,283.2,284.2,284.6,285.2ft: BJ, 20-40°, PR, T-PO, A-C, I-II
505.3	285.6	5.0	4:40 4:29 4:47 4:26 4:11	(5.0) 100%	(4.1) 82%	Run 54		286.5,287.4,287.5,287.8,288.3,288.4,288.5,288.7,289.6,289.8,290.0,290.4ft: BJ, 25-30°, PR-UR, T-PO, A-C, I-II 287.0,288.0,288.2,288.5ft: J, 20-40°, PR-SR, T-PO, B-C, II
500.3	290.6	5.0	4:02 4:14 4:20 3:56 3:58	(5.0) 100%	(2.9) 58%	Run 55		292.1,292.2,292.3,292.4,293.0,293.3ft: BJ, 30°, PR, T-PO, A-C, I-II
495.3	295.6	5.0	3:59 4:04 4:20 5:08 5:18	(4.7) 94%	(3.0) 60%	Run 56		497.4 — 293.5 LIMESTONE (MICRITE), gray (N 6/-N 5/), strong, laminated to thinly bedded, fresh, with little to some laminated to thinly bedded Calcareous SILTSTONE, locally diffuse, black (N 2.5/-7.5YR 2.5/1); and little very thin to moderate chert beds and lenses (varigated, dark gray to black, very dusky red, and olive, with calcite filled tensional fractures); trace calcite filled pits, strong HCl reaction
490.3	300.6	5.0	12:21 6:50 3:44 4:17 6:36	(4.1) 82%	(1.7) 34%	Run 57		293.7-294.4ft: FZ (7 BJ's), 30°, PR-SR, A-C, I-II 294.4-295.1ft: FZ (8 BJ's), 30°, PR, T-PO, B, II / J, 60°, PR, O, B, II; 0.3' loss of core 295.5,295.8,300.1ft: BJ, 30°, UR/SR/PR, T-PO, A-B, I-II 296.3-297.8ft: FZ, 30°, PR, PO-O, D-K, II-IV; Mechanically broken rock with loss of recovery 298.1-298.4ft: FZ, 20-40°, PR, PO, C-G, II-III; Mechanically broken rock with loss of recovery
485.3	305.6	5.0	4:11 4:48 3:51 3:31 4:49	(5.0) 100%	(3.7) 74%	Run 58		298.7-299.9ft: FZ, 30°, PR, PO-O, II-IV; Mechanically broken rock with loss of recovery 296.3-299.9ft: 0.8' Loss of recovery in fracture zones 301.1-302.0ft: 5 BJ, 20-30°, PR-UR, T-PO, B-C, II 302.7ft: BJ, 30°, PR, T, B, I 304.1-304.3ft: 5 BJ's, 30°, PR, T-PO, B-C, II 304.7-304.9ft: 3 BJ's, 30°, PR, T-PO, B, II
480.3	310.6	5.0	4:11 4:20 9:12 8:10 9:08	(4.9) 98%	(4.3) 86%	Run 59		306.7,306.8,307.4,307.5ft: BJ, 30°, PR, PO, B-C, I-II 483.2 — 307.7 LIMESTONE (MICRITE), gray (N 6/) to dark greenish gray (5GY 4/1), strong, laminated to thinly bedded, fresh, and CHERT, very dark greenish gray (10Y 3/1) to dark reddish brown (5YR 3/2) with specks of red jasper (7.5R 4/6) through-out; with large entrained clasts of MICRITE and small rip-up clasts of DOLOMITE, weak to strong HCl reaction 481.0 — 309.9
		5.0	3:11 2:30	(5.0) 100%	(4.5) 90%	Run 60		309.5,309.8ft: BJ, 25-30°, PR, PO-MO, B-D, II; 0.1' Loss of core

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 4/9/14

BECHTEL PROJECT NO.: 25847	AMEC PROJECT NO.: 6468-13-1072	COUNTY: Roane, TN	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: D. White/O. Smith	Boring Orientation
BORING NO.: MP-201	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55LC (C)	Inclination: Vertical
GROUND ELEV.: 790.9 ft (NAVD88)	NORTHING: 571,084 US ft (NAD83)	EASTING: 2,447,981 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 420.6 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (331145)
DATE STARTED: 7/16/13	COMPLETED: 7/25/13	CASING DEPTH: 38.3 ft	CORE BARREL TYPE: HQ3/Diamond Impregnated core bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
								Continued from previous page
475.3	315.6		2:11 2:04 2:15					CRYSTALLINE DOLOMITE, gray (2.5Y 6/1-10YR 5/1) to dark gray (2.5Y 4/1-10YR 4/1), strong, thinly to thickly bedded, fresh, fine to medium grained, stylolitic, trace calcite and dolomite filled pits and vugs, trace open vugs (separate/non-touching) lined with calcite and dolomite, weak to no HCl reaction **(Knox Group-Newala Formation)** *(continued)*
470.3	320.6	5.0	2:08 2:17 2:29 2:05 1:55	(4.8) 96%	(4.3) 86%	Run 61		315.6ft: As above, mottled with dark gray (7.5YR 4/1) 313.7-314.3ft: FZ/J, 60°, PR, T-O, C, II, with intersecting BJs, 20-30°, PR, T, B, I 315.7,318.1,318.2,319.0,319.3ft: BJ, 30-40°, PR-SR, PO-MO, A-C, I-II 316.5ft: BJ, 30°, SR, PO, C, II, stylolite 317.5ft: J, 45°, PR, PO, B, I 320.4-320.6ft: 0.2' Loss of core-washed away/not recovered with following run
465.3	325.6	5.0	4:07 2:48 2:16 1:58 2:12	(5.0) 100%	(4.7) 94%	Run 62		320.8ft: BJ, 10°, UR, PO, B, II (Stylolite) 322.4ft: J, 45°, UR, PO, C, II 324.9ft: BJ, 10-30°, UR, PO, B, II (Stylolite) 320.8-322.8ft: Healed fractures, 80°, VT, A, I, intact with greenish gray (5G 5/1) min. (0.3' spacing)
460.3	330.6	5.0	2:47 2:00 1:57 2:05 2:00	(5.0) 100%	(4.9) 98%	Run 63		325.0ft: As above, mottled with dark reddish gray (2.5YR 4/1) 327.6,328.0ft: BJ, 20-35°, PR, T-PO, A, I 328.4ft: J, 50°, PR, T-PO, C, II 328.5ft: J, 10°, SR, T, B, II 326.8-327.2ft: Healed fractures, 30-70°, VT, A, I (intact) 329.9-330.3ft: Healed fractures, 65°, VT, A, I (intact)
455.3	335.6	5.0	2:10 2:04 2:18 2:00 1:45	(5.0) 100%	(5.0) 100%	Run 64		331.1,332.4ft: BJ, 30°, UR, PO, C, II 334.0ft: J, 40°, PR, T, B, II & J, 80°, PR, T-O, B, II 330.6-334.6ft: Healed fractures, 40-80°, VT, A, I (intact) 334.6ft: J, 10°, UR, PO, C, II 330.7-331.9ft: As above, mottled with very dusky red (2.5YR 2.5/2) 334.6-335.7ft: As above, mottled with greenish gray (10Y 5/1) and dark gray (N 4/), few calcite filled pits and vugs (seperate/non-touching)
450.3	340.6	5.0	2:56 1:50 2:20 1:47 1:48	(5.0) 100%	(4.4) 88%	Run 65 L2-16		335.7,335.9ft: BJ, 30°, PR, O, C, II; mechanically abraded 337.6ft: BJ, 20°, PR, MO, E, III 340.0ft: BJ, 30°, PR, T-PO, B, I 340.2ft: BJ, 30°, SR, T, C, II, stylolite 335.6-340.6ft: Healed fractures, 65-70°, VT, A, I (intact, 0.6' spacing) 337.2-337.4ft: SILTSTONE, dark greenish gray (10Y 4/1)
445.3	345.6	5.0	2:19 1:58 1:51 1:41 2:20	(5.0) 100%	(4.5) 90%	Run 66		340.5,340.6,341.1,342.0ft: BJ, 30°, PR, T-PO, A, I 340.4-343.1ft: Healed fractures, 40-90°, VT, A, I (intact, 0.3' spacing)
440.3	350.6	5.0	2:32 2:14 2:42 2:24 3:11	(4.6) 92%	(4.5) 90%	Run 67		345.6-351.6ft: As above, mottled with weak red (2.5YR 4/2) 347.8-348.3ft: FZ, 0.4' loss of core 348.8ft: J, 45°, PR, PO, B, II (possible stylolite) 348.5-349.2ft: Healed fractures, 30-40°, VT, A, I (intact, spaced 0.1')
435.3	355.6	5.0	3:25 3:37 2:55 3:03 2:42	(4.9) 98%	(4.9) 98%	Run 68		351.6-351.7ft: FZ, 30°, PR, PO, B, II; mechanically abraded, 0.1' loss of core rec. 352.9ft: BJ, 30°, SR, PO, B, I (stylolite) 351.6-357.4ft: As above, greenish gray (10Y 5/1) to gray (10YR 5/1) mottled with dark gray (N 4/)
430.3	360.6	5.0	2:42 2:51 2:55 2:49 2:46	(5.0) 100%	(4.7) 94%	Run 69		355.9,357.6ft: BJ, 30°, PR, PO, B-C, I-II 358.5,359.9ft: bJ, 40°, PR, T-MO, A-C, I-II 433.5 — 357.4 432.4 — 358.5 DOLOMITIC LIMESTONE, weak red (7.5YR 4/2) and greenish gray (5GY 5/1), strong, thickly bedded, fresh, strong to weak HCl reaction

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 4/9/14

BECHTEL PROJECT NO.: 25847	AMEC PROJECT NO.: 6468-13-1072	COUNTY: Roane, TN	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: D. White/O. Smith	Boring Orientation
BORING NO.: MP-201	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55LC (C)	Inclination: Vertical
GROUND ELEV.: 790.9 ft (NAVD88)	NORTHING: 571,084 US ft (NAD83)	EASTING: 2,447,981 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 420.6 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (331145)
DATE STARTED: 7/16/13	COMPLETED: 7/25/13	CASING DEPTH: 38.3 ft	CORE BARREL TYPE: HQ3/Diamond Impregnated core bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
								Continued from previous page
		5.0	2:59 2:59 3:37 3:15 2:30	(5.0) 100%	(5.0) 100%	Run 70		CRYSTALLINE DOLOMITE, weak red (7.5YR 4/2) to dark gray (2.5Y 4/1) with greenish gray (5GY 5/1), strong, thickly bedded, fresh, becomes slightly silicified with depth, weak to no HCl reaction (greenish gray mostly along relict dolomite healed fractures at 30-60° to core axis, few along bedding planes) *(continued)*
425.3	365.6							
		5.0	3:33 5:06 3:30 3:10 4:20	(4.8) 96%	(4.3) 86%	Run 71 *L2-17*		362.6,363.8,364.6ft: BJ, 30-40°, PR/PS/SR, T-PO, A-C, I-II 364.4-364.5ft: SZ, 30°, VT, A, I, healed/intact with calcite 362.6-365.3ft: Healed fractures, 60-80°, VT, A, I, 0.1'-0.2' spacing 366.2-366.4ft: FZ, 0-10°, PR, VW, B, II, 0.2' loss of core (mechanically broken)
420.3	370.6							423.5 — 367.4 CHERT, variegated, light gray (N 7/), gray (10YR 5/1), dark reddish brown (2.5YR 3/4), and dark gray (N 4/), very thinly to thinly bedded, strong to very strong, fresh, with little very thin to moderately bedded, chert cemented SANDSTONE; intensely fractured and healed with calcite at 50-70° to core axis; no HCl reaction 367.5,367.7,370.0ft: BJ, 20-30°, PR-SR, T-PO, A-C, I-II 368.3-368.5ft: FZ, 45°, PR, PO, C, II 368.9ft: J, 0°, PR, T, A, I
		5.0	3:34 3:38 3:07 2:41 2:55	(5.0) 100%	(4.7) 94%	Run 72		420.0 — 370.9 CRYSTALLINE DOLOMITE, gray (2.5Y 6/1) to dark gray (2.5Y 4/1) mottled with dark reddish gray (2.5YR 4/1-2.5YR 3/1), strong, very thinly to moderately bedded, fresh, mottling mostly along bedding planes and relict dolomite healed fractures, trace calcite and dolomite filled pits, trace to few stylolites, locally with dark reddish brown (2.5YR 3/3) indurated clay/silt filled fractures, weak to no HCl reaction
415.3	375.6							
		5.0	3:55 3:34 3:14 2:43 2:54	(5.0) 100%	(5.0) 100%	Run 73		370.9,373.8ft: BJ, 30-40°, PR, T-PO, C, I-II, with calcite 373.4-374.2ft: SZ, 30-60°, VT, A, I, intact/healed with dolomite and calcite; spaced<0.1' 370.6-375.6ft: Healed fractures, 30-70°, VT, A, I, intact with dolomite and calcite; spaced 0.2' 375.6-380.6ft: Healed fractures, 30-70°, VT, A, I, intact with dolomite and calcite; spaced 0.2'
410.3	380.6							
		5.0	2:50 3:37 3:30 3:06 3:10	(5.0) 100%	(5.0) 100%	Run 74		380.8ft: BJ, 30°, PR, PO, B, I 385.4ft: SH, 35°, PL-SL, T, C, II 380.6-385.6ft: Healed fractures, 30-70°, VT, A, I, intact with dolomite and calcite; spaced 0.2'
405.3	385.6							
		5.0	2:59 2:51 2:35 2:31 3:08	(5.0) 100%	(5.0) 100%	Run 75		385.6-390.6ft: As above, becomes mostly dark gray (2.5Y 4/1) with some dark reddish brown (5YR 3/2) mottling 388.7ft: BJ, 30°, PR, T-O, C, II, stylolite 389.3ft: J, 50°, PR-SR, PO, C, II 385.6-389.4ft: Healed fractures, 40-85°, VT, A, I, intact with dolomite and calcite; spaced 0.5'
400.3	390.6							
		5.0	3:28 3:36 3:32 3:10 3:24	(5.0) 100%	(5.0) 100%	Run 76		390.6-396.0ft: As above, mostly dark gray (5YR 4/1) to black (5YR 2.5/1) 390.8ft: SH, 50°, UL, T, C, I, with calcite 392.0-393.4ft: Healed fractures, 20-60°, VT, A, I, intact with dolomite and calcite; spaced 0.1'
395.3	395.6							
		5.0	6:10 5:48 3:53 4:10 3:45	(4.8) 96%	(3.3) 66%	Run 77		395.6-395.7ft: Core loss from mechanical abrasion and washing 395.9,396.0,397.6,398.6ft: BJ, 20-30°, PR-UR, PO-MO, B-C, I-II 396.6-397.3ft: FZ, 0-20°, PR, O, B, II, 0.2' loss of core (mechanically broken) 398.4ft: J, 10°, PR, PO, B, I 399.0ft: J, 45°, PR, PO, B, I 396.0ft: As above, becomes mostly dark gray (2.5Y 4/1) with slight very dark gray (5YR 3/1) mottling
390.3	400.6							
		5.0	3:02 3:54 4:00 2:32 2:30	(4.7) 94%	(4.1) 82%	Run 78		400.6-403.2ft: FZ, 20-80°, VT, A, I, intact, healed with dolomite and trace indurated siltstone/clay 401.8-402.4ft: FZ, 0-20°, PR, O, B, I, 0.3' loss of core (mechanically broken) 403.7,405.1ft: BJ, 30°, PR-SR, PO-O, C, I-II, stylolites 404.2,404.7ft: BJ, 20-30°, PR-SR, T-PO, B-C, I-II
385.3	405.6							
		5.0	2:46 2:46 3:01 2:45	(4.7) 94%	(4.7) 94%	Run 79		405.4ft: As above, becomes mostly gray (2.5Y 5/1) to dark gray (2.5Y 4/1) with slight dark reddish gray (2.5YR 4/1-3/1) mottling 407.2,408.9ft: BJ, 30°PR, PO-O, B-C, I 408.3,409.6ft: J, 40°, SR-UR, PO, C, I-II 410.3-410.6ft: 0.3' Loss of core-not recovered with/washed away at start of following run 407.4-408.2ft: Trace subrounded fine quartz sand along laminations

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 4/9/14

BECHTEL PROJECT NO.: 25847	AMEC PROJECT NO.: 6468-13-1072	COUNTY: Roane, TN	GEOLOGIST: C. Baldwin
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: D. White/O. Smith	Boring Orientation
BORING NO.: MP-201	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55LC (C)	Inclination: Vertical
GROUND ELEV.: 790.9 ft (NAVD88)	NORTHING: 571,084 US ft (NAD83)	EASTING: 2,447,981 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 420.6 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (331145)
DATE STARTED: 7/16/13	COMPLETED: 7/25/13	CASING DEPTH: 38.3 ft	CORE BARREL TYPE: HQ3/Diamond Impregnated core bits

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	LOG	ROCK DESCRIPTION AND REMARKS
								Continued from previous page
380.3	410.6		2:32					CRYSTALLINE DOLOMITE, gray (2.5Y 6/1) to dark gray (2.5Y 4/1) mottled with dark reddish gray (2.5YR 4/1-2.5YR 3/1), strong, very thinly to moderately bedded, fresh, mottling mostly along bedding planes and relict dolomite healed fractures, trace calcite and dolomite filled pits, trace to few stylolites, locally with dark reddish brown (2.5YR 3/3) indurated clay/silt filled fractures, weak to no HCl reaction *(continued)*
		5.0	3:22	(5.0) 100%	(5.0) 100%	Run 80		409.4-411.9ft: As above, slightly silicified
			3:03					411.9,414.0ft: BJ, 20-30°, UR, T-PO, A-C, I
			3:03					412.4ft: SH, 20°, UL, PO, C, I
			3:22					413.3ft: J, 20°, UR, PO, B, II
375.3	415.6		3:12					411.9-415.6ft: Healed fractures, 50-90°, VT, A, I, intact with dolomite and calcite; spaced 0.1'
		5.0	5:20	(5.0) 100%	(4.7) 94%	Run 81		414.6ft: BJ, 30°, PR, PO, C, I, stylolite
			4:08					415.6-420.6ft: Trace very thin chert beds and nodules, very dark grayish brown (2.5Y 3/2)
			3:36					415.9,416.3ft: BJ, 20-30°, PR-UR, T-MO, A-C, I-II
			3:18					417.3-419.2ft: Healed fractures, 70°, VT, A, I, intact with dolomite and calcite
370.3	420.6		4:38					370.3 — 420.6
								Boring and coring terminated at 420.6 feet.

CLINCH RIVER SMR CORE FINAL CLINCH FINAL LOGS.GPJ CLINCH BORING DATA TEMPLATE.GDT 4/9/14