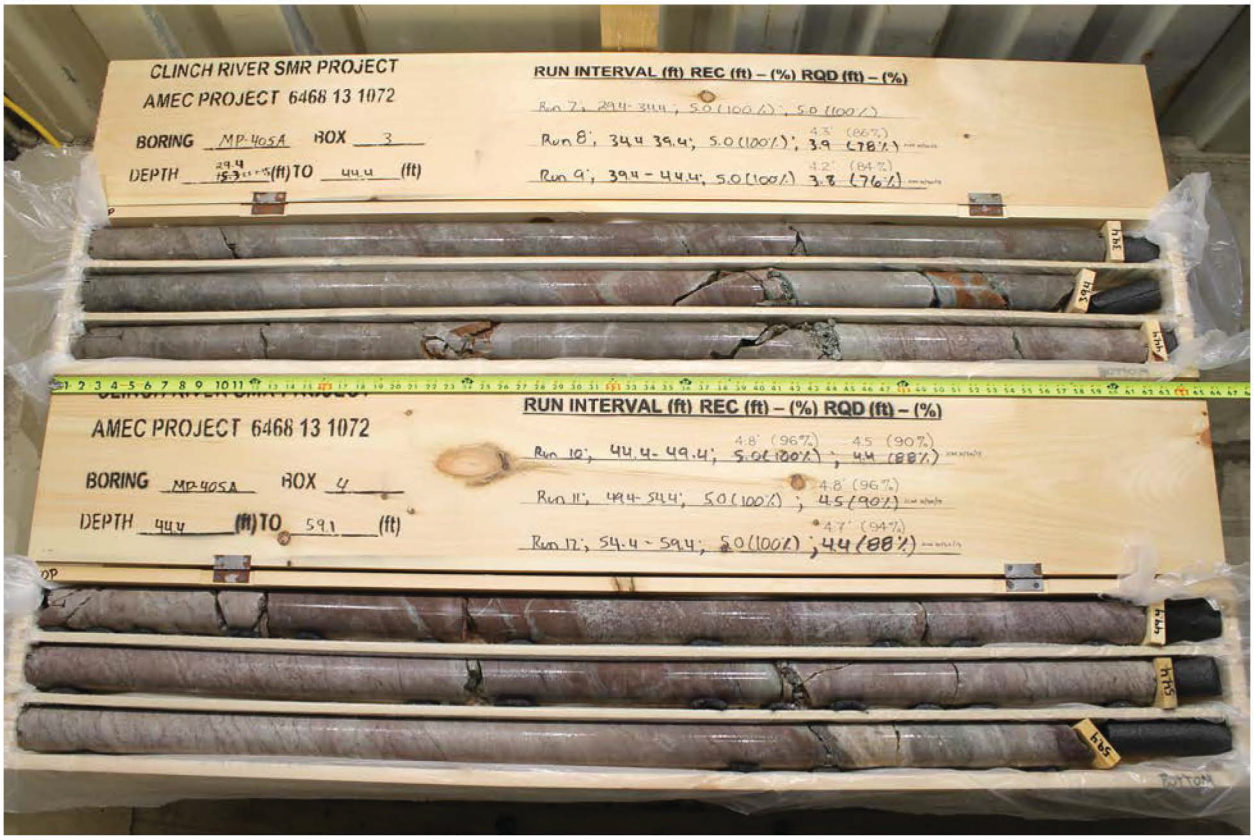
MP-405A – Boxes 1 and 2

MP-405A – Boxes 3 and 4



MP-405A – Boxes 5 and 6

MP-405A – Boxes 7 and 8

MP-405A – Boxes 9 and 10

MP-405A – Boxes 11 and 12

MP-405A – Boxes 13 and 14

GEOTECHNICAL BORING LOG

Prepared By: MBL Date: 3/5/14

Checked By: JCM Date: 3/5/14

BECHTEL NO.: 25847	AMEC PROJECT NO.: 6468-13-1072	COUNTY: Roane, TN	GEOLOGIST: R. Clark
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: S. Snow/D. King	Boring Orientation
BORING NO.: MP-406	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55 (TSD)	Inclination: Vertical
GROUND ELEV.: 855.1 ft (NAVD88)	NORTHING: 571,775 US ft (NAD83)	EASTING: 2,447,966 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 201.3 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08	ROD TYPE: AWJ	HAMMER (ID): 140-lb Auto (373705)
DATE STARTED: 8/27/13	COMPLETED: 9/1/13 / HOLE DIA.: 4" / CASING DEPTH: 61.8 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
855.1					Ground Surface			855.1 0.0
855.1	0.0	2	9	7	16	SS-1		FILL: LEAN CLAY (CL), brown (7.5YR 4/3), very stiff, moist, moderate plasticity fines, few fine to coarse angular to subrounded gravel, few medium to coarse angular sand, weak HCl reaction (PP=1.75 tsf)
853.1	2.0							
852.6	2.5	2	4	12	16	SS-2		RESIDUAL SOIL: FAT CLAY (CH), reddish brown (5R 5/3, 2.5YR 4/3), very stiff to stiff, moist, high plasticity fines, trace to few fine to coarse angular gravel, trace fine to coarse sand, saprolitic, no HCl reaction (PP=1.25-1.75 tsf)
850.1	5.0	2	4	6	10	SS-3		
847.6	7.5	2	34	50/0.4	50/0.4	SS-4		847.1 8.0
845.1	10.0	50/0.4			50/0.4	SS-5		WEATHERED ROCK: CALCAREOUS SILTSTONE, sampled as Sandy SILT with Gravel (ML), weak red (5R 5/2), dry, hard, non-plastic fines, little fine to coarse angular sand, little fine angular gravel, strong HCl reaction; relict rock fabric 10.0ft: As above, sampled as Sandy SILT (ML), weak red (7.5R 5/3), some fine to coarse angular sand, trace fine to coarse angular gravel
842.6	12.5	50/0.4			50/0.4	SS-6		
840.1	15.0	50/0.3			50/0.3	SS-7		839.8 15.3
								Soil drilling halted. Log continues on geotechnical coring log

Observed water levels:
Dry @ 18.6 ft bgs, AM 8/28/13 (tools in the hole)
53.5 ft bgs, AM 8/29/13
57.8 ft bgs, AM 8/30/13
62.9 ft bgs, AM 8/31/13
63.5 ft bgs, AM 9/1/13

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

BECHTEL PROJECT NO.: 25847	**AMEC PROJECT NO.: 6468-13-1072**	**COUNTY: Roane, TN**	**GEOLOGIST: R. Clark**
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		**DRILLER: S. Snow/D. King**	**Boring Orientation**
BORING NO.: MP-406	**DRILL METHOD: Mud Rotary/Core**	**DRILL MACHINE: CME-55 (TSD)**	**Inclination: Vertical**
GROUND ELEV.: 855.1 ft (NAVD88)	**NORTHING: 571,775 US ft (NAD83)**	**EASTING: 2,447,966 US ft (NAD83)**	**Azimuth: NA**
TOTAL DEPTH: 201.3 ft	**SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08**		**HAMMER (ID): 140-lb Auto (373705)**
DATE STARTED: 8/27/13	**COMPLETED: 9/1/13**	**CASING DEPTH: 61.8 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 @ 15.3 ft
839.8	15.3	2.0	3:42	(2.0) 100%	(1.1) 55%	Run 1		839.8 CALCAREOUS SILTSTONE, dusky red (2.5YR 3/2) to dark reddish gray and reddish black (2.5YR 3/1-2.5/1) to light olive gray (5G 6/2), very weak to weak, laminated to thinly and moderately bedded, highly to moderately weathered, interbedded with trace to few, laminated to thin LIMESTONE (MICRITE/WACKESTONE), dark gray to gray (5Y 5/1-4/1) to bluish gray (5PB 6/1), mostly planar to diffuse bedding, and trace very thin to thin chert beds and lenses (dusky red, reddish brown, gray to dark gray); trace bioturbation and burrows, locally completely weathered with zones of no recovery, strong HCl reaction **(Upper Blackford Formation-Unit A)** 15.3
837.8	17.3		3:57					
		5.0	3:14	(2.7) 54%	(0.5) 10%	Run 2		16.0, 16.2,16.4,17.0,17.1,17.2,17.3ft: BJ, 30°, PR-PS, T-O, C, III
			4:41					17.3-22.3ft: FZ, 30° and 45-50°
			1:54					
			3:57					
832.8	22.3		1:49					
		5.0	5:30	(4.2) 84%	(1.0) 20%	Run 3		22.3-27.3ft: FZ, 30-35°, weathered BJ's
			8:32					22.9ft: BJ, 35°, PS, PO, B, IV
			7:47					23.4ft: J, 45°, PS, PO, B, IV
			4:47					
827.8	27.3		5:48					
		4.8	4:48	(4.4) 92%	(2.6) 54%	Run 4		27.3-28.1ft: FZ, 0-30°, SR-PR, O, B-C, II-III, mechanically reduced to rubble
			4:39					28.1,28.5,28.7,29.1,29.2,29.8,30.1,30.8,31.2,31.8ft: BJ, 35°, SR-PR, PO-O, B-C, II-III
			2:38					28.5,29.1,29.3,29.8,30.1,30.8,31.7ft: J, 40-55°, SR, O, B, II
			2:45					
823.0	32.1		2:01/0.8					
		5.0	3:18	(4.1) 82%	(2.5) 50%	Run 5		32.1-32.7,34.3-34.7,35.6-35.7ft: FZ, 35-40°, SR-PR, O, B-C, III
			3:22					
			2:39					
			4:16					
818.0	37.1		2:31					818.9 36.2
817.5	37.6	0.5	0:38/0.5	(0.5) 100%	(0.0) 0%	Run 6		WEATHERED ROCK: CALCAREOUS SILTSTONE, sampled as LEAN CLAY (CL), reddish brown (5YR 4/3) to dark gray (5YR 4/1), moist, very soft, low plasticity fines, no HCl reaction; with relict rock fabric (SS-8: 37.6-38.6ft=WOR-50/0.5'; N=50/0.5'; PP=0.3 tsf)
			N=50/0.5			*SS-8*		
817.0	38.1	4.2	10:34	(2.1) 50%	(0.8) 19%	Run 7		NOTE: SPT SS-8 sampled along fracture from 38.1'-38.6' as observed in recovered core
			5:28					38.1-43.5ft: CALCAREOUS SILTSTONE, dark gray (5YR 4/1) to weak red (5R 4/3, 2.5YR 4/2) and dusky red (2.5YR 3/2), very weak to weak, laminated to very thinly bedded, locally thinly to moderately bedded, moderately to completely weathered, interbedded with trace LIMESTONE (MICRITE/MUDSTONE), pale olive (5Y 6/3) and bluish gray (5PB 6/1); strong HCl reaction
			5:39					
			4:04					
812.8	42.3							
		1.2	0:55/0.2	(0.9) 75%	(0.0) 0%	Run 8		43.5-45.0ft: Sampled as Sandy LEAN CLAY (CL), reddish brown (2.5YR 5/3), stiff, moist, moderate plasticity fines, little coarse angular sand, few fine angular gravel sized rock fragments, no to weak HCl reaction (SS-9: 43.5-45.0ft=11-9-6; N=15; PP=2.0-4.5 tsf)
811.6	43.5		4:25					
			0:33/0.2			*SS-9*		45.0-45.9ft: Sampled as CLAYEY GRAVEL with Sand (GC), reddish brown (2.5YR 5/3), very dense, moist, fine to coarse angular gravel, little medium to coarse angular sand, little low to moderate plasticity fines, weak to strong HCl reaction
			N=15					
			N=50/0.4			*SS-10*		(SS-10: 45.0-45.9ft=9-50/0.4'; N=50/0.4'; PP=1.5-3.0 tsf)
809.2	45.9	1.4	3:51	(0.6) 43%	(0.0) 0%	Run 9		45.9-51.3ft: CALCAREOUS SILTSTONE, reddish brown (5YR 4/3) to gray (10YR 5/1), weak to very weak, thinly bedded, completely to highly weathered, mostly gravel sized rock fragments (siltstone, limestone, chert), some FAT CLAY (CH)
807.8	47.3		1:14/0.4					
		4.0	4:29	(0.6) 15%	(0.0) 0%	Run 10		51.3-54.3ft: Sampled as WELL GRADED GRAVEL with Silt and Sand (GW-GM), gray to dark gray (N 5/-N 4/), loose to very loose, dry to moist, fine to coarse angular gravel, little fine to coarse angular sand, few non-plastic fines, strong HCl reaction (rock fragments as above)
			5:25					
			4:50					
803.8	51.3		6:06					(SS-11: 51.3-52.8ft=5-3-7; N=10 / SS-12: 52.8-54.3ft=5-1-1; N=2; PP=2.5-3.0 tsf)
			N=10			*SS-11*		54.3-55.4ft: Possible cavity/rod drop observed with SPT sampler
			N=2			*SS-12*		55.4-56.5ft: Sampled as Sandy SILT with Gravel (ML), reddish gray to dark reddish gray (2.5YR 5/1-4/1), hard, moist, non-plastic fines, little fine to coarse angular sand, little fine to coarse angular to subangular gravel, strong HCl reaction (SS-13: 55.4-56.5ft=4-25-50/0.1'; N=50/0.1'; PP=4.5 tsf)
			N=50/0.1			*SS-13*		56.5-57.3ft: CALCAREOUS SILTSTONE, dark gray (N 4/) to dark reddish gray (2.5YR 3/1) and gray (5Y 5/1), moderately to highly weathered
798.6	56.5	0.8	6:05/0.8	(0.8) 100%	(0.0) 0%	Run 11		797.8 57.3
797.8	57.3	5.0	7:13	(4.2) 84%	(2.7) 54%	Run 12		CALCAREOUS SILTSTONE, dark reddish brown (2.5YR 3/3), reddish black (2.5YR 2.5/1), and very dark gray (N 3/) to dusky red (2.5YR 3/2), and dark reddish gray to reddish black (2.5YR 4/1-2.5/1), weak to medium strong and strong, very thinly to thickly bedded, moderately to slightly weathered, interbedded with few to little, very thin to thin LIMESTONE (MICRITE/WACKESTONE/GRAINSTONE), greenish gray to dark greenish gray (10Y 5/1-4/1), planar to wispy and diffuse bedding, and few very thin to thin chert beds, lenses, and nodules (reddish black to black and weak red to dusky red, with calcite filled tensional fractures orthogonal to bedding); locally to highly weathered and extremely weak to very weak, slight to moderate bioturbation with trace calcite filled pits and burrows, strong HCl reaction
			6:02					
			4:47					
			5:38					
792.8	62.3		3:53					
		5.0	8:22	(4.6) 92%	(2.8) 56%	Run 13		
			8:29					

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: R. Clark
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: S. Snow/D. King	Boring Orientation
BORING NO.: MP-406	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55 (TSD)	Inclination: Vertical
GROUND ELEV.: 855.1 ft (NAVD88)	NORTHING: 571,775 US ft (NAD83)	EASTING: 2,447,966 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 201.3 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (373705)
DATE STARTED: 8/27/13	COMPLETED: 9/1/13	CASING DEPTH: 61.8 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
787.8	67.3		4:09 4:23 3:25					CALCAREOUS SILTSTONE, dark reddish brown (2.5YR 3/3), reddish black (2.5YR 2.5/1), and very dark gray (N 3/) to dusky red (2.5YR 3/2), and dark reddish gray to reddish black (2.5YR 4/1-2.5/1), weak to medium strong and strong, very thinly to thickly bedded, moderately to slightly weathered, interbedded with few to little, very thin to thin LIMESTONE (MICRITE/WACKESTONE/GRAINSTONE), greenish gray to dark greenish gray (10Y 5/1-4/1), planar to wispy and diffuse bedding, and few very thin to thin chert beds, lenses, and nodules (reddish black to black and weak red to dusky red, with calcite filled tensional fractures orthogonal to bedding); locally to highly weathered and extremely weak to very weak, slight to moderate bioturbation with trace calcite filled pits and burrows, strong HCl reaction *(continued)*
782.8	72.3	5.0	5:40 4:29 5:29 4:38 4:57	(4.7) 94%	(2.6) 52%	Run 14		57.3-58.4,59.8-60.1ft: Highly weathered zone and core loss 59.1-59.8ft: FZ, 20-35° and 50°, PR-SR, PO-O, B-C, II-III 61.2ft: BJ, 35°, PS, T, B, IV 62.7-62.8,62.9,63.1,64.6,66.8,67.2ft: BJ, 30-35°, PR, T-PO, B-C, II-III
777.8	77.3	5.0	3:30 4:37 3:20 3:15 3:38	(4.8) 96%	(3.8) 76%	Run 15		64.1-64.7ft: core loss of 0.4'
773.8	81.3	4.0	5:56 7:24 3:54 4:51	(3.4) 85%	(0.0) 0%	Run 16		63.3-63.7,65.0-65.6ft: FZ, 35° and 60-75°, PS, T, B, II 67.5,67.9,68.0,69.1ft: BJ, 35°, PS, T, B, III 69.6,70.0ft: J, 50-60°, VT, A, I 70.4-70.8ft: FZ, 30° and 0°, SR, O, C, III, highly weathered, core loss likely 70.2ft: BJ, 20-25°, PR-SR, O, C, III 71.1-71.3ft: FZ, 35-40° and 55°, SR, O, B, III 71.5,71.7ft: BJ, 25-30°, PR-SR, PO, C, III 72.3-72.7ft: FZ, core loss 73.7ft: BJ, 35°, PS, T, B, IV
772.8	82.3	1.0	3:07	(0.8) 80%	(0.0) 0%	Run 17		CALCAREOUS SILTSTONE, dark reddish gray (7.5R 4/1, 5R 4/1), weak red (7.5R 4/3, 5R 4/3), reddish gray (5R 5/1), reddish black (2.5YR 2.5/1), and black (N 2.5/), with trace grayish green (5GY 5/2), weak to medium strong and strong, laminated to thinly bedded, slightly weathered, interbedded with little to some, laminated to thin LIMESTONE (MICRITE), gray (N 5/, 5Y 5/1-6/1), mostly planar to diffuse bedding, and few to little, very thin to moderate chert beds, lenses, and nodules (dusky red, reddish brown, reddish gray to black, and jasperoidal, with calcite filled tensional fractures orthogonal to bedding); locally to moderately and highly weathered with core loss, strong HCl reaction
767.8	87.3	5.0	3:42 3:58 4:24 6:24 5:36	(4.6) 92%	(3.5) 70%	Run 18		74.1-74.4ft: FZ, 35-55°, PS, T, B, IV 75.1-75.2ft: BJ, 35°, PS, T, B, III 76.9ft: BJ, 30°, PS-SR, PO, C, III 78.6-78.9ft: SZ, 40°, healed shears 77.3-81.3ft: FZ, 35°, PS, T, B, II-IV 81.3-82.3ft: FZ, 35°, PS, O-PO, B-C, II-III 82.4,84.1,84.4,84.5ft: BJ, 25-30°, PR-SR, PO, B, II 83.7-83.9ft: FZ, 25-30° and 55°, SR, O, C, III
762.8	92.3	5.0	7:38 5:25 3:43 5:18 9:51	(5.0) 100%	(3.8) 76%	Run 19		LIMESTONE (MICRITE/WACKESTONE), gray (5Y 6/1-5/1), strong, laminated to moderately bedded, fresh, interbedded with some to few, laminated to very thin Calcareous SILTSTONE, reddish black (2.5YR 2.5/1), bluish black (5PB 2.5/1), very dark greenish gray (5GY 3/1), and very dark gray (N 3/), planar to wispy/wavy and diffuse bedding, and little to trace, very thin to thin chert beds, lenses, and nodules (jasperoidal-dusky red, reddish black, olive brown, gray to black, most with red specks, and with calcite filled tensional fractures orthogonal to bedding); strong HCl reaction **(Lower Blackford Formation-Unit A)**
757.8	97.3	5.0	5:29 5:13 7:28 5:58 10:23	(5.0) 100%	(4.9) 98%	Run 20		86.4-86.5ft: FZ, 30-35°, PR-SR, O, B, II 86.6ft: BJ, 25-30°, PR-SR, PO, B, II 87.6-87.9ft: FZ, 30° and 70°, PR, PO, B, II 88.2,88.4ft: BJ, 30°, UR, PO-O, C, II 91.0ft: BJ, 35°, PR, PO, B, IV 92.3,93.8ft: BJ, 30°, PR, T-PO, B, II 93.8ft: J, 70°, PS, T, B, IV, intersected by BJ, 35°, PR, T, B, II 99.9,100.0,100.4ft: BJ, 35°, PS, T-O, B, II-III 100.2ft: J, 65°, PS-US, T, B, IV
756.4	98.7	1.4	15:39 16:17/0.4	(1.4) 100%	(1.4) 100%	Run 21		
752.8	102.3	3.6	7:37/2.0 4:12 3:56/0.6	(3.3) 92%	(3.0) 83%	Run 22		
747.8	107.3	5.0	7:38 4:18 4:39 3:53 6:00	(5.0) 100%	(5.0) 100%	Run 23		
742.8	112.3	5.0	6:04 4:38 4:33 5:41 5:04	(4.9) 98%	(4.9) 98%	Run 24		108.1,108.2,109.7ft: BJ, 30-35°, PS, T-O, B, II; slight core loss (mechanical)

781.0 — 74.1

770.4 — 84.7

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: R. Clark
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee			DRILLER: S. Snow/D. King	Boring Orientation
BORING NO.: MP-406	DRILL METHOD: Mud Rotary/Core		DRILL MACHINE: CME-55 (TSD)	Inclination: Vertical
GROUND ELEV.: 855.1 ft (NAVD88)	NORTHING: 571,775 US ft (NAD83)		EASTING: 2,447,966 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 201.3 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08			HAMMER (ID): 140-lb Auto (373705)
DATE STARTED: 8/27/13	COMPLETED: 9/1/13	CASING DEPTH: 61.8 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
		5.0	6:44 5:03 7:41 7:53 8:28	(5.0) 100%	(5.0) 100%	Run 25		112.9-115.2ft: SZ, 10-60°, healed shears 113.5ft: SH, 75°, US, VT, A, I 113.8ft: BJ, 40°, PS, PO, C, II 113.9ft: SH, 20°, PS, VT, A, I, healed with calcite
737.8	117.3							739.1 — 116.0 LIMESTONE (MICRITE), gray (N 6/-N 5/) to very dark gray (N 3/), strong, laminated to very thinly bedded into moderate to thick, fining upward repeating beds, fresh, argillaceous, with trace, laminated clayey Calcareous SILTSTONE, wispy/wavy and diffuse bedding, trace chert lenses and nodules (jasperoidal), and trace coarse sand sized, angular chert fragments through-out (dark gray to dark reddish brown); fenestral with trace calcite filled pits and sparry calcite "bird eyes", locally nodular/disturbed with possible soft sediment deformation, strong HCl reaction 116.9ft: J, 20°, PR, PO, C, III 117.6ft: BJ, 30°, PL, O, C, III 117.6ft: Lost circulation 119.3ft: Circulation returns 120.7ft: BJ, 30°, PR, T, B, II
		5.0	9:28 7:47 6:36 6:13 5:19	(5.0) 100%	(5.0) 100%	Run 26		
732.8	122.3							
		5.0	5:31 4:34 5:56 5:26 4:56	(5.0) 100%	(5.0) 100%	Run 27		
727.8	127.3							
		5.0	5:51 3:56 3:55 4:28 4:19	(5.0) 100%	(5.0) 100%	Run 28		
722.8	132.3							
		5.0	3:23 5:53 4:10 2:55 3:41	(5.0) 100%	(5.0) 100%	Run 29		722.4 — 132.7 DOLOMITIC LIMESTONE (MICRITE), greenish gray to dark greenish gray (10Y 5/1-4/1) to very dark gray (N 3/), grading to reddish black (2.5YR 2.5/1) and dark gray (5Y 4/1), locally mottled, strong, moderately to thickly bedded, fresh, stylolitic, with few coarse sand to fine gravel sized angular chert fragments and trace subrounded clasts of dolomite; trace dolomite filled pits, weak HCl reaction
717.8	137.3							
		5.0	5:12 3:52 3:56 4:33 5:38	(5.0) 100%	(5.0) 100%	Run 30		133.1,134.4,135.4,136.4,136.9ft: BJ, 20-35°, US, T-PO, C, II, stylolites 134.7ft: J, 65°, VT, A, I, with calcite 138.3,139.9,140.6ft: BJ, 20-40°, US-UR, T-PO, C, II, stylolites 140.0,140.4,140.8ft: J, 60°, VT, A, I, with calcite
712.8	142.3							
		5.0	3:38 3:49 4:48 4:17 5:22	(5.0) 100%	(5.0) 100%	Run 31		142.5,145.5,146.1,146.7ft: J, 60°, VT, A, I, with calcite
707.8	147.3							
		5.0	8:18 5:28 4:41 3:20 4:39	(4.8) 96%	(4.6) 92%	Run 32		704.4 — 150.7 DOLOMITIC LIMESTONE (MICRITE), greenish gray (10Y 6/1) and dark gray to gray (10YR 4/1-6/1), strong to very strong, moderately bedded, fresh, with little to some, coarse sand to fine gravel sized angular to subangular clasts of CHERT and CRYSTALLINE DOLOMITE, dark gray to gray (10YR 4/1-5/1), some chert fragments oolitic; weak HCl reaction 150.7ft: BJ, 40°, UR-US, T-PO, C, II, stylolite
702.8	152.3							
		5.0	8:06 3:32 5:56 4:35 3:58	(5.0) 100%	(5.0) 100%	Run 33		700.5 — 154.6 153.2ft: J, 50°, PR, T, C, II, stylolite CRYSTALLINE DOLOMITE, fine grained, gray (5Y 5/1, N 5/), light greenish gray (5GY 6/1) to dark gray (5Y 4/1), with trace weak red (5R 4/3) mottling, grading to weak red (5R 5/2) with greenish gray (10Y 5/1) mottling, strong, very thin to thin, fresh; trace stylolites, weak/delayed to no HCl reaction **(Knox Group-Newala Formation)** 155.5ft: BJ, 30°, US, T, C, II, stylolite 161.2,161.6ft: J, 65°, PS, VT, A, III 158.7ft: Very thin bed of dark greenish gray (5G 4/1), silty (fracture filling/weathered dolomite) 159.7-160.1ft: Fracture filling, dark reddish brown (5YR 2.5/2), clayey/silty, indurated 160.1-160.8ft: CHERT, gray to very dark gray (N 6/ to 10YR 3/1) and reddish black (2.5YR
697.8	157.3							
		5.0	7:37 4:29 5:47 8:59	(5.0) 100%	(5.0) 100%	Run 34		

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: R. Clark
SITE DESCRIPTION: Clinch River SMR Project, Roane County, Tennessee		DRILLER: S. Snow/D. King	Boring Orientation
BORING NO.: MP-406	DRILL METHOD: Mud Rotary/Core	DRILL MACHINE: CME-55 (TSD)	Inclination: Vertical
GROUND ELEV.: 855.1 ft (NAVD88)	NORTHING: 571,775 US ft (NAD83)	EASTING: 2,447,966 US ft (NAD83)	Azimuth: NA
TOTAL DEPTH: 201.3 ft	SAMPLE METHODS: ASTM D 1586-11; 2488-09a; 2113-08; 6032-08		HAMMER (ID): 140-lb Auto (373705)
DATE STARTED: 8/27/13	COMPLETED: 9/1/13	CASING DEPTH: 61.8 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
692.8	162.3		4:40					2.5/1), silicified dolomite, scattered dolomite crystals in matrix
		5.0	5:25	(5.0) 100%	(5.0) 100%	Run 35		CRYSTALLINE DOLOMITE, fine grained, gray (5Y 5/1, N 5/), light greenish gray (5GY 6/1) to dark gray (5Y 4/1), with trace weak red (5R 4/3) mottling, grading to weak red (5R 5/2) with greenish gray (10Y 5/1) mottling, strong, very thin to thin, fresh; trace stylolites, weak/delayed to no HCl reaction **(Knox Group-Newala Formation)** *(continued)*
			5:33					164.5ft: BJ, 10°, US, PO, C, II, stylolite
			5:12					165.1-165.5ft: J, 60° and 75°, PS, VT, A, I
			4:59					165.5ft: BJ, 30°, PS-PR, PO, C, II
687.8	167.3		4:03					688.8 166.3
		5.0	6:06	(5.0) 100%	(4.9) 98%	Run 36		CRYSTALLINE DOLOMITE, fine grained, gray to dark gray (10YR 5/1-4/1) with pinkish gray (5R 7/1) and grayish brown (10YR 5/2) to dark gray (5Y 4/1) mottling, strong, very thinly to thinly bedded, locally moderately to thickly bedded, fresh, trace very thin to thin chert beds, lenses, and nodules (dark gray to gray, red); few healed fractures with dolomite/calcite, trace stylolites, trace dolomite filled pits and vugs (separate/non-touching), weak/delayed to no HCl reaction
			4:06					166.4ft: BJ, 25°, PS, PO, B, II
			3:47					167.6ft: BJ, 25°, US-UR, PO, C, II, stylolite
			3:52					170.0,170.1ft: BJ, 20-25°, PR, O, B, II, mechanically reduced to rubble
682.8	172.3		4:00					170.8ft: BJ, 25°, UR, T, C, II
		5.0	3:04	(5.0) 100%	(4.9) 98%	Run 37		173.6ft: J, 30°, PR, PO, B, II
			5:21					174.1ft: BJ, 25°, PR, T-PO, B, II
			4:59					174.2ft: BJ, 30°, UR, T-PO, C, II, stylolite
			5:29					175.6ft: BJ, 30°, PR-UR, T-PO, B, II
677.8	177.3		5:04					175.0-177.3ft: As above, to dark reddish gray (2.5YR 4/1-3/1) with greenish gray (10Y 5/1) mottling that mimics bedding and pre-dolomitization fractures
		5.0	5:39	(5.0) 100%	(4.7) 94%	Run 38		177.2,177.5ft: BJ, 35°, US, T, B, II, stylolites
			8:35					177.3,177.6ft: BJ, 30°, UR, T-PO, C, II, stylolites
			5:14					
			5:06					
672.8	182.3		5:15					
		5.0	4:20	(5.0) 100%	(5.0) 100%	Run 39		185.2ft: BJ, 35°, PS, PO, B, II
			4:38					670.9 184.2
			5:27					CRYSTALLINE DOLOMITE, fine grained, dusky red (2.5YR 3/2), very dark grayish green (5G 3/2), dark reddish gray (2.5Y 3/1), with dark gray to gray (N 4/-N 6/) mottling, and dark gray (10YR 4/1) to gray (10YR 6/1) mottled, strong, very thinly to thinly bedded, fresh, most bedding disturbed, with few to little, subrounded to subangular, medium to coarse grained quartz sand (reddish brown to dark gray and black) and fine gravel sized clasts of dolomite, very dark gray (N 3/) and chert, red (2.5YR 4/6); trace dolomite filled pits and vugs (separate/non-touching, few partly open), no HCl reaction
			4:43					
667.8	187.3		3:33					667.6 187.5
		5.0	5:51	(5.0) 100%	(5.0) 100%	Run 40		CRYSTALLINE DOLOMITE, grayish brown (10YR 5/2) to dark gray (10YR 4/1), strong, very thinly to thinly bedded, fresh, with trace fine gravel sized chert nodules (very dark gray); trace stylolites, trace dolomite filled pits, weak/delayed HCl reaction
			4:45					
			4:59					
			4:53					663.6 191.5
662.8	192.3		4:48					662.8 CHERT CEMENTED SANDSTONE, light brownish gray (10YR 6/2) to very dark gray (10YR 192.3
		5.0	4:43	(5.0) 100%	(5.0) 100%	Run 41		3/1), extremely strong, moderately bedded, fresh, fine to coarse grained, well rounded to subangular quartz sand; fossiliferous, no HCl reaction
			4:00					CRYSTALLINE DOLOMITE, black (10YR 2/1) grading to dark gray (10YR 4/1) and dark grayish brown (10YR 4/2), strong, very thinly to moderately bedded, fresh; few healed fractures with dolomite/calcite, trace stylolites, trace dolomite filled and lined pits, weak/delayed HCl reaction
			3:42					
			2:46					
657.8	197.3		3:49					
		4.0	3:31	(4.0) 100%	(4.0) 100%	Run 42		199.0ft: J, 60°, VT, A, I, with dolomite
			4:10					198.2-198.7ft: As above to light brownish gray to dark gray (10YR 6/2-4/1), laminated to very thin, disturbed bedding with very thinly bedded quartz sand lenses and scattered, fine to coarse quartz sand grains, and coarse sand to coarse gravel sized dolomite clasts
			3:35					
653.8	201.3		3:50					653.8 201.3
								Boring and coring terminated at 201.3 feet.

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