

# **APPENDIX B – BORING LOGS**

**APPENDIX B.1**  
**BACKGROUND SOIL BORINGS**

# Table of Contents

Subsurface Boring Legend.....	1
CUF-BG01 .....	2
CUF-BG02 .....	4
CUF-BG03.....	5
CUF-BG04 .....	6
CUF-BG05 .....	7
CUF-BG06.....	8
CUF-BG07 .....	9
CUF-BG08 .....	11
CUF-BG09.....	12
CUF-BG10 .....	14
CUF-BG11 .....	15
CUF-BG12.....	16
CUF-BG13.....	17
CUF-BG14 .....	18
CUF-BG15.....	19
CUF-BG16 .....	20
CUF-BG17 .....	21
CUF-201 .....	23
CUF-202 .....	24
CUF-1000ALT.....	25
CUF-1000ALTA .....	26
CUF-1001ALT.....	28
CUF-1001ALT2.....	30
CUF-1004ALT.....	32
CUF-1004ALT2.....	34
CUF-1004ALT2A .....	35

# Subsurface Boring Legend

## Lithology Graphics

Symbol	Lithology
	Fill
	Top Soil
	Gravel
	Well Graded Gravel (GW)
	Poorly Graded Gravel (GP)
	Silty Gravel (GM)
	Silty, Clayey Gravel (GC-GM)
	Clayey Gravel (GC)
	Well Graded Gravel with Silt (GW-GM)
	Well Graded Gravel with Clay (GW-GC)
	Poorly Graded Gravel with Silt (GP-GM)
	Poorly Graded Gravel with Clay (GP-GC)
	Well Graded Sand (SW)
	Poorly Graded Sand (SP)
	Silty Sand (SM)
	Silty, Clayey Sand (SC-SM)
	Clayey Sand (SC)
	Well Graded Sand with Silt (SW-SM)
	Well Graded Sand with Clay (SW-SC)
	Poorly Graded Sand with Silt (SP-SM)
	Poorly Graded Sand with Clay (SP-SC)
	Silt (ML)
	Silty Clay (CL-ML)
	Lean Clay (CL)
	Organic Silt (OL)
	Elastic Silt (MH)
	Fat Clay (CH)
	Organic Clay (OH)
	Shale
	Siltstone
	Coal
	Limestone
	Sandstone

## Other Graphics

Symbol	Description
	Denotes environmental analytical sample interval
	Denotes SS sample interval
	Denotes ST sample interval
	Denotes DP sample interval
	Denotes RS sample interval
	Denotes RC sample interval
	First water level reading
	Second water level reading

## Common Abbreviations

Abbreviation	Definition
DP	Direct Push
HA	Hand Auger
HSA	Hollow Stem Auger
N/A	Not Applicable
NR	Not Recorded
RC	Rock Core
RQD	Rock Quality Designation
RS	Rotary Sonic
SS	Split Spoon
ST	Shelby Tube
WH	Weight of Hammer
WR	Weight of Rod

## General Notes

The boring logs include sample numbering used during drilling. For assigned Environmental Analytical Sample ID numbers, see relevant Environmental Chain-of- Custody forms from the drilling date range listed on each log.

For pH readings and additional field data, see applicable field documentation (e.g., Soil pH Data Form) from the drilling date range listed on each log.











# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-BG01</b>	
Client	Tennessee Valley Authority	Boring Location	730,257.42 N; 1,506,685.31 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	395.7 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	8/27/18	Completed 8/27/18
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	N/A	Date/Time N/A
Inspector	K. Carey	Logger	K. Carey	Depth to Water N/A
Drilling Contractor	S&ME	Drill Rig Type and ID	Geoprobe 7730 DT	
Overburden Drilling and Sampling Tools (Type and Size)	Direct Push - Dual Tube			
Rock Drilling and Sampling Tools (Type and Size)	N/A			
Overdrill Tooling (Type and Size)	N/A	Overdrill Depth	N/A	
Sampler Hammer Type	N/A	Weight	N/A	Drop N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	P. Dunne	Approved By	L. Price	
Efficiency	N/A			

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	395.7	Top of Hole					
1			SILTY LEAN CLAY, CL, 7.5YR 5/8 (strong brown), non-plastic to low plasticity, dry, mottled with gray, friable	HA <sup>1</sup>	HA01	0.0 - 0.5	0.5	
2			Porous, medium grained light gray siltstone with iron staining from 1.5' to 2.0'	1.0/3.0-20180827	DP01	0.0 - 5.0	4.0	N/A
3								
4								
5			Color change to 7.5YR 5/6 (strong brown), dry to moist at 5.0'					
6								
7				6.5/8.5-20180827	DP02	5.0 - 10.0	5.0	N/A
8								
9								
10			Color change to 5YR 5/2 (reddish gray), soft, moist, mottled with orange-red at 10.0'					
11								
12				11.5/13.5-20180827	DP03	10.0 - 15.0	5.0	N/A
13			Color change to 7.5YR 5/6 (strong brown) at 13.0' Mottled with orange-red, dark (iron) red siltstone pebbles from 13.0' to 15.0'					
14								
15								
16								
17			Color change to 5YR 4/2 (dark reddish gray), mottled with tan at 17.5'	16.5/17.5-20180827	DP04	15.0 - 20.0	5.0	N/A
18								

TVA EIP BORING LOG - 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 10/28/19

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-BG01</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,257.42 N; 1,506,685.31 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  395.7 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			SILTY LEAN CLAY, CL, 7.5YR 5/8 (strong brown), non-plastic to low plasticity, dry, mottled with gray, friable <i>(Continued)</i>  Color change to 7.5YR 5/6 (strong brown), mottled with gray at 20.0'  Moist to wet from 21.0' to 22.0'	 21.5/23.5-20180827	 DP05	 20.0 - 25.0	 5.0	 N/A
19								
20								
21								
22								
23								
24								
25	25.0	370.7						

Bedrock Refusal /  
Bottom of Hole at 25.0 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
  G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20180827) sampled using hand auger

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 10/28/19

Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-BG02</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>727,299.39 N; 1,507,668.51 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>367.3 ft</u> Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>	Date Started <u>8/22/18</u> Completed <u>8/22/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>
Inspector <u>K. Carey</u> Logger <u>K. Carey</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor <u>S&amp;ME</u>	Drill Rig Type and ID <u>Geoprobe 7730 DT</u>
Overburden Drilling and Sampling Tools (Type and Size) <u>Direct Push - Dual Tube</u>	
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>	
Overdrill Tooling (Type and Size) <u>N/A</u>	Overdrill Depth <u>N/A</u>
Sampler Hammer Type <u>N/A</u> Weight <u>N/A</u> Drop <u>N/A</u> Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u>	Borehole Inclination (from Vertical) <u>N/A</u>
Reviewed By <u>P. Dunne</u>	Approved By <u>L. Price</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	367.3	<b>Top of Hole</b>					
1			SILTY LEAN CLAY, CL, 5YR 3/3 (dark reddish brown), low to medium plasticity, soft to stiff, dry to moist	HA <sup>4</sup>	HA01	0.0 - 0.5	0.5	
2			Tan and white chert fragments from 1.0' to 3.0'	1.5/3-5.2/180822	DP01	0.0 - 5.0	5.0	N/A
3			Color change to 5YR 4/4 (reddish brown) at 3.0'					
4			Limestone (fragments), fine to medium grained, medium gray from 4.1' to 5.0'					
5			Color change to 7.5YR 4/4 (brown) at 5.0'	5.0/7-6.2/180822	DP02	5.0 - 7.6	1.1	N/A
6								
7	7.6	359.7						

Bedrock Refusal /  
Bottom of Hole at 7.6 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20180822) sampled using hand auger

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT:20190630.GDT 10/28/19

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-BG03</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  726,551.97 N; 1,508,681.80 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  386.1 ft  </u> Elevation Datum <u>  NGVD29  </u>
Project Name <u>  CUF TDEC Order  </u>	Date Started <u>  8/22/18  </u> Completed <u>  8/22/18  </u>
Project Location <u>  Stewart Co, Cumberland City, TN  </u>	Depth to Water <u>  N/A  </u> Date/Time <u>  N/A  </u>
Inspector <u>  K. Carey  </u> Logger <u>  K. Carey  </u>	Depth to Water <u>  N/A  </u> Date/Time <u>  N/A  </u>
Drilling Contractor <u>  S&amp;ME  </u>	Drill Rig Type and ID <u>  Geoprobe 7730 DT  </u>
Overburden Drilling and Sampling Tools (Type and Size) <u>  Direct Push - Dual Tube  </u>	
Rock Drilling and Sampling Tools (Type and Size) <u>  N/A  </u>	
Overdrill Tooling (Type and Size) <u>  N/A  </u> Overdrill Depth <u>  N/A  </u>	
Sampler Hammer Type <u>  N/A  </u> Weight <u>  N/A  </u> Drop <u>  N/A  </u> Efficiency <u>  N/A  </u>	
Borehole Azimuth <u>  N/A  </u> Borehole Inclination (from Vertical) <u>  N/A  </u>	
Reviewed By <u>  P. Dunne  </u>	Approved By <u>  L. Price  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	386.1						
			Top of Hole					
1	1.0	385.1	TOPSOIL	HA <sup>1</sup>	HA01	0.0 - 0.5	0.5	
2			SILTY LEAN CLAY, CL, 10YR 4/6 (dark yellowish brown), non-plastic, stiff to very stiff, dry, brittle	1 2/3 2-20180822	DP01	0.0 - 5.0	4.5	N/A
3								
4			Color change to 7.5YR 4/4 (brown) at 3.8'					
5								
6			Weathered light gray chert pebbles/cobbles at 6.0'	5 2/7 2-20180822	DP02	5.0 - 7.4	2.4	N/A
7	7.4	378.7						

Bedrock Refusal /  
Bottom of Hole at 7.4 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20180822) sampled using hand auger

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT:20190630.GDT 10/28/19

Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-BG04</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>725,508.00 N; 1,509,088.49 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>375.6 ft</u> Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>	Date Started <u>8/23/18</u> Completed <u>8/23/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>
Inspector <u>K. Carey</u> Logger <u>K. Carey</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor <u>S&amp;ME</u>	Drill Rig Type and ID <u>Geoprobe 7730 DT</u>
Overburden Drilling and Sampling Tools (Type and Size) <u>Direct Push - Dual Tube</u>	
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>	
Overdrill Tooling (Type and Size) <u>N/A</u>	Overdrill Depth <u>N/A</u>
Sampler Hammer Type <u>N/A</u> Weight <u>N/A</u> Drop <u>N/A</u> Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u>	Borehole Inclination (from Vertical) <u>N/A</u>
Reviewed By <u>P. Dunne</u>	Approved By <u>L. Price</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	375.6	Top of Hole					
1			SILTY LEAN CLAY, CL, 10YR 3/2 (very dark grayish brown), low to medium plasticity, soft to stiff, dry to moist, brittle, mottled with red-orange	HA <sup>4</sup>	HA01	0.0 - 0.5	0.5	
2				1.5/3.5-20180823		DP01	0.0 - 5.0	5.0
3			Color change to 7.5YR 3/3 (dark brown) at 5.0'					
4				6.5/6.5-20180823		DP02	5.0 - 10.0	5.0
5			7.5YR 4/4 (brown), Color change to 7.5YR 4/4 (brown) at 8.0'					
6				10.0/11.4-20180823		DP03	10.0 - 11.4	1.4
7			Color change to 7.5YR 5/6 (strong brown) at 10.0'					
8								
9			Light tan weathered chert at 11.0'					
10								
11	11.4	364.2	Bedrock Refusal / Bottom of Hole at 11.4 Ft.					

1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
 G = Geotechnical Sample Custody  
 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples  
 3: Depths are reported in feet below ground surface  
 4: Grab sample (0.0/0.5-20180823) sampled using hand auger

TVA/EIP BORING LOG: 175568209\_CUF\_TDEC\_ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 10/28/19

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-BG05</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>725,226.35 N; 1,507,965.60 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>391.1 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>11/29/18</u>	Completed <u>11/29/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Inspector <u>M. Edmunds</u>	Logger <u>M. Edmunds</u>	Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Drilling Contractor <u>S&amp;ME</u>		Drill Rig Type and ID <u>Geoprobe 7730 DT</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>Direct Push - Dual Tube</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>N/A</u>	Weight <u>N/A</u>	Drop <u>N/A</u>	Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>P. Dunne</u>		Approved By <u>L. Price</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	391.1						
1			FAT CLAY SOME SILT, CH, 7.5YR 4/3 (brown), medium plasticity, firm, moist, with trace orange	HA <sup>4</sup>	HA01	0.0 - 0.5	0.5	
2					DP01	0.0 - 5.0	3.9	N/A
3			LEAN CLAY SOME SILT, CL, 7.5YR 5/6 (strong brown), medium plasticity, stiff, moist, with orange, red, trace yellow, and trace gray	2.5/4.5-20181129	DP02	5.0 - 10.0	5.0	N/A
4								
5	5.0	386.1						
6			LEAN CLAY SOME SILT, CL, 7.5YR 4/6 (strong brown), medium plasticity, firm, moist, with brown, orange, red, trace yellow, and trace gray mottling Sand, gravel cobbles towards bottom of DP03	6.5/8.5-20181129	DP03	10.0 - 15.0	5.0	N/A
7								
8								
9			Some manganese concretions from 14.0' to 15.0'	11.5/13.5-20181129	DP04	15.0 - 15.6	0.0	N/A
10	10.0	381.1						
11								
12								
13								
14								
15	15.6	375.5						

Bedrock Refusal /  
Bottom of Hole at 15.6 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20181129) sampled using hand auger

TVA EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 10/28/19

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-BG06</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>731,203.27 N; 1,508,975.10 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>373.6 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>12/4/18</u>	Completed <u>12/4/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Inspector <u>M. Edmunds</u>	Logger <u>M. Edmunds</u>	Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Drilling Contractor <u>S&amp;ME</u>		Drill Rig Type and ID <u>Geoprobe 7730 DT</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>Direct Push - Dual Tube</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>N/A</u> Overdrill Depth <u>N/A</u>			
Sampler Hammer Type <u>N/A</u>		Weight <u>N/A</u>	Drop <u>N/A</u> Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>P. Dunne</u>		Approved By <u>L. Price</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	373.6						
	0.5	373.1						
			Top of Hole					
			Grass, Topsoil, Clay	HA <sup>1</sup> 0.5/2-5:20181204	HA01	0.0 - 0.5	0.5	
1			SILTY LEAN CLAY WITH SAND, CL, 7.5YR 4/6 (strong brown), firm to stiff, moist, trace gravel, mottled					
2								
3					DP01	0.0 - 5.0	3.0	N/A
4								
5	5.0	368.6						
6			SILTY LEAN CLAY TRACE SAND, CL, 7.5YR 4/6 (strong brown), high plasticity, firm, moist, trace gravel, mottled					
7								
8					DP02	5.0 - 8.8	3.8	N/A
	8.8	364.8		6.8/8-8:20181204				

Bedrock Refusal /  
Bottom of Hole at 8.8 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20181204) sampled using hand auger

TVA EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 10/28/19



# SUBSURFACE LOG


Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-BG07</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>728,433.79 N; 1,507,903.41 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>367.7 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>8/21/18</u>	Completed <u>8/21/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Inspector <u>K. Carey</u>	Logger <u>K. Carey</u>	Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Drilling Contractor <u>S&amp;ME</u>		Drill Rig Type and ID <u>Geoprobe 7730 DT</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>Direct Push - Dual Tube</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>N/A</u>	Weight <u>N/A</u>	Drop <u>N/A</u>	Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>P. Dunne</u>		Approved By <u>L. Price</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	367.7						
<b>Top of Hole</b>								
1			SILTY LEAN CLAY, CL, 10YR 3/4 (dark yellowish brown), low to medium plasticity, soft to very stiff, dry to moist, root fragments, tan chert fragments throughout Color change to 7.5YR 5/6 (strong brown) at 0.5' Color change to 10YR 4/6 (dark yellowish brown) at 1.0' medium plasticity, stiff to very stiff, dry to moist, Color change to 5YR 4/6 (yellowish red) at 2.5'	HA <sup>1</sup>	HA01	0.0 - 0.7	0.7	
2				1.5/3.5-20180821	DP01	0.0 - 5.0	4.1	N/A
3								
4								
5	5.0	362.7						
LEAN CLAY, CL, 2.5YR 4/6 (red), low plasticity, very stiff, dry to moist, yellow tan chert fragments/cobbles throughout								
6			Color change to 5YR 4/6 (yellowish red) at 8.6'  Medium plasticity, stiff, moist at 10.0'	6.1/8.1-20180821	DP02	5.0 - 10.0	4.2	N/A
7								
8								
9								
10								
11								
12								
13				11.6/13.6-20180821	DP03	10.0 - 15.0	5.0	N/A
14								

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT:20190630.GDT:10/28/19



Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-BG07</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>728,433.79 N; 1,507,903.41 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>367.7 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
14			LEAN CLAY, CL, 2.5YR 4/6 (red), low plasticity, very stiff, dry to moist, yellow tan chert fragments/cobbles throughout ( <i>Continued</i> ) Color change to 7.5YR 4/6 (strong brown) at 15.0'					
15								
16								
17								
18	18.0	349.7	Color change to 10YR 6/4 (light yellowish brown), medium plasticity, soft, moist, light gray weathered limestone cobbles at 17.5'	15.5177 5:20180821	DP04	15.0 - 18.0	3.0	N/A

Bedrock Refusal /  
Bottom of Hole at 18.0 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.66-20180821) sampled using hand auger

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 10/28/19



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-BG08</b>
Client	Tennessee Valley Authority	Boring Location	727,549.29 N; 1,509,059.83 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	363.2 ft
Project Name	CUF TDEC Order	Elevation Datum	NGVD29
Project Location	Stewart Co, Cumberland City, TN	Date Started	8/24/18
Inspector	K. Carey	Completed	8/24/18
Logger	K. Carey	Depth to Water	N/A
Drilling Contractor	S&ME	Date/Time	N/A
Overburden Drilling and Sampling Tools (Type and Size)	Direct Push - Dual Tube	Depth to Water	N/A
Rock Drilling and Sampling Tools (Type and Size)	N/A	Date/Time	N/A
Overdrill Tooling (Type and Size)	N/A	Drill Rig Type and ID	Geoprobe 7730 DT
Overdrill Depth	N/A		
Sampler Hammer Type	N/A	Weight	N/A
Drop	N/A	Efficiency	N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A
Reviewed By	P. Dunne	Approved By	L. Price

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	363.2	Top of Hole					
1			SILTY LEAN CLAY, CL, 10YR 3/4 (dark yellowish brown), non-plastic to medium plasticity, soft to firm, dry to moist, mottled, brittle	HA <sup>4</sup> 0.9/2-9-20180824	HA01	0.0 - 0.5	0.5	
2			Color change to 10YR 2/2 (very dark brown), mottled with brown, dark organic appearance at 2.4'		DP01	0.0 - 5.0	3.8	N/A
3								
4			Color change to 10YR 4/4 (dark yellowish brown), mottled with orange-red and brown at 5.0' Few light-yellow chert pebbles from 5.0' to 10.0'					
5								
6								
7			Color change to 10YR 3/3 (dark brown), mottled with orange-red and brown at 11.0'					
8								
9								
10								
11								
12	12.0	351.2						

Bedrock Refusal /  
Bottom of Hole at 12.0 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20180824) sampled using hand auger

TVA/EIP BORING LOG: 175568209\_CUF\_TDEC\_ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 10/28/19

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-BG09</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>727,064.53 N; 1,509,948.63 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>424.0 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>8/23/18</u>	Completed <u>8/23/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Inspector <u>K. Carey</u>	Logger <u>K. Carey</u>	Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Drilling Contractor <u>S&amp;ME</u>		Drill Rig Type and ID <u>Geoprobe 7730 DT</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>Direct Push - Dual Tube</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>N/A</u>	Weight <u>N/A</u>	Drop <u>N/A</u>	Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>P. Dunne</u>		Approved By <u>L. Price</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	424.0	Top of Hole					
1			SILTY LEAN CLAY, CL, 7.5YR 4/4 (brown), non-plastic to medium plasticity, soft to very stiff, dry to moist, brittle, friable	HA <sup>1</sup>	HA01	0.0 - 0.5	0.5	
2			Color change to 10R 4/6 (red) at 2.0'					
3			White to light-gray chert gravels with iron staining throughout from 2.0' to 15.0'	1.5/6.5-20180823	DP01	0.0 - 5.0	5.0	N/A
4			Cobbles from 2.6' to 3.0'					
5								
6								
7				6.5/6.5-20180823	DP02	5.0 - 10.0	5.0	N/A
8								
9								
10			Color change to 10R 3/6 (dark red), mottled with orange at 10.0'					
11								
12				11.5/11.5-20180823	DP03	10.0 - 15.0	5.0	N/A
13								
14								
15			Color change to 2.5YR 3/6 (dark red), very stiff, moist, mottled with tan and dark red from 15.0' to 18.5'					
16								
17				16.5/16.5-20180823	DP04	15.0 - 20.0	5.0	N/A
18								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 10/28/19

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-BG09</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  727,064.53 N; 1,509,948.63 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  424.0 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18		/ / / / / / / /	SILTY LEAN CLAY, CL, 7.5YR 4/4 (brown), non-plastic to medium plasticity, soft to very stiff, dry to moist, brittle, friable <i>(Continued)</i> Extremely weathered chert zone from 18.5' to 19.5' Color change to 10YR 5/6 (yellow brown) at 18.6' Color change to 5YR 4/6 (yellowish red) at 20.0' Wet, weathered chert pebbles/cobbles throughout from 20.0' to 20.8'  Bedrock Refusal / Bottom of Hole at 20.8 Ft.	█				
19		/ / / / / / / /						
20	20.8	403.2		DP05	20.0 - 20.8	0.8	N/A	

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20180823) sampled using hand auger

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 10/28/19

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-BG10</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>729,728.49 N; 1,516,833.48 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>418.1 ft</u> Elevation Datum <u>NGVD29</u>	
Project Name <u>CUF TDEC Order</u>		Date Started <u>12/5/19</u> Completed <u>12/5/19</u>	
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Inspector <u>M. Edmunds</u> Logger <u>M. Edmunds</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Drilling Contractor <u>S&amp;ME</u>		Drill Rig Type and ID <u>Geoprobe 7730 DT</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>Direct Push - Dual Tube</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>N/A</u> Overdrill Depth <u>N/A</u>			
Sampler Hammer Type <u>N/A</u> Weight <u>N/A</u> Drop <u>N/A</u> Efficiency <u>N/A</u>			
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>P. Dunne</u>		Approved By <u>L. Price</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0		Top of Hole					
1			SILTY FAT CLAY, CL, 7.5YR 4/4 (brown), firm, moist	HA <sup>4</sup>	HA01	0.0 - 0.5	0.5	
2				1.0/3.0-20181205	DP01	0.0 - 5.0	4.0	N/A
3				0.0 - 5.0				
4								
5	5.0		SILTY LEAN CLAY WITH SAND, CL, 7.5YR 5/6 (strong brown), firm to stiff, moist, Increased sand and gravel content from 6.6' to 7.6'	5.6/7.6-20181205	DP02	5.0 - 7.6	2.6	N/A
6				5.0 - 7.6				
7	7.6							

Bedrock Refusal /  
Bottom of Hole at 7.6 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20181205) sampled using hand auger

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT:20190630.GDT - 10/28/19

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-BG11</b>	
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>736,272.96 N; 1,508,807.72 E NAD27 Plant Local</u>	
Project Number	<u>175568209</u>	Surface Elevation	<u>416.3 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name	<u>CUF TDEC Order</u>	Date Started	<u>12/6/18</u>	Completed <u>12/6/18</u>
Project Location	<u>Stewart Co, Cumberland City, TN</u>	Depth to Water	<u>N/A</u>	Date/Time <u>N/A</u>
Inspector	<u>M. Edmunds</u>	Logger	<u>M. Edmunds</u>	Depth to Water <u>N/A</u>
Drilling Contractor	<u>S&amp;ME</u>	Drill Rig Type and ID	<u>Geoprobe 7730 DT</u>	
Overburden Drilling and Sampling Tools (Type and Size)	<u>Direct Push - Dual Tube</u>			
Rock Drilling and Sampling Tools (Type and Size)	<u>N/A</u>			
Overdrill Tooling (Type and Size)	<u>N/A</u>	Overdrill Depth	<u>N/A</u>	
Sampler Hammer Type	<u>N/A</u>	Weight	<u>N/A</u>	Drop <u>N/A</u>
Borehole Azimuth	<u>N/A</u>	Borehole Inclination (from Vertical)	<u>N/A</u>	
Reviewed By	<u>P. Dunne</u>	Approved By	<u>L. Price</u>	
Efficiency	<u>N/A</u>			

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	416.3						
	0.5	415.8						
1			TOPSOIL, ROOTS, GRAVEL	HA <sup>4</sup>	HA01	0.0 - 0.5	0.5	
2			SILTY CLAYEY GRAVEL WITH SAND, GC, 2.5YR 4/6 (red), non-plastic, firm, moist, sandstone gravel and cobbles throughout		DP01	0.0 - 5.0	4.0	N/A
3								
4			SILTY LEAN CLAY WITH GRAVEL, CL, 5YR 4/6 (yellowish red), medium plasticity, firm, moist, some organics		DP02	5.0 - 10.0	5.0	N/A
5	5.0	411.3						
6								
7			Increased organic material from 10.0' to 14.0'					
8								
9								
10								
11								
12								
13								
14	14.1	402.2						

Bedrock Refusal /  
Bottom of Hole at 14.1 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20181206) sampled using hand auger

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 10/28/19

Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-BG12</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>736,140.13 N; 1,509,301.95 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>416.5 ft</u> Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>	Date Started <u>12/6/18</u> Completed <u>12/6/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>
Inspector <u>M. Edmunds</u> Logger <u>M. Edmunds</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor <u>S&amp;ME</u>	Drill Rig Type and ID <u>Geoprobe 7730 DT</u>
Overburden Drilling and Sampling Tools (Type and Size) <u>Direct Push - Dual Tube</u>	
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>	
Overdrill Tooling (Type and Size) <u>N/A</u>	Overdrill Depth <u>N/A</u>
Sampler Hammer Type <u>N/A</u> Weight <u>N/A</u> Drop <u>N/A</u> Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u>	Borehole Inclination (from Vertical) <u>N/A</u>
Reviewed By <u>P. Dunne</u>	Approved By <u>L. Price</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	416.5						
	0.5	416.0	TOPSOIL AND GRAVEL, black and brown silty clay, roots	HA <sup>4</sup>	HA01	0.0 - 0.5	0.5	
1			SILTY FAT CLAY WITH GRAVEL, CH, 7.5YR 4/6 (strong brown), medium plasticity, firm, moist, with sand, sandstone gravel/cobbles/sand interspersed throughout	2.5/4 5-20181206	DP01	0.0 - 5.0	3.0	N/A
2								
3			Color change to 5YR 4/6 (yellowish red), grading to lean non-plastic clay, sandy with abundant sandstone gravel/cobbles at 5.0'	6.5/6 5-20181206	DP02	5.0 - 10.0	5.0	N/A
4								
5			Limestone gravel within finer matrix from 9.0' to 10.0'	10.6/12 6-20181206	DP03	10.0 - 13.8	4.3	N/A
6								
7			LEAN CLAY WITH GRAVEL, CL, 5YR 4/6 (yellowish red), non-plastic to low plasticity, firm, moist, with limestone, chert, and some sandstone gravel					
8								
9	10.0	406.5						
10			Signs of oxidation on gravel					
11								
12			Vuggy/cherty limestone in shoe					
13	13.8	402.7						

Bedrock Refusal /  
Bottom of Hole at 13.8 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20181206) sampled using hand auger

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 10/28/19

Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-BG13</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>731,053.82 N; 1,508,967.72 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>371.8 ft</u> Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>	Date Started <u>8/28/18</u> Completed <u>8/28/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>
Inspector <u>K. Carey</u> Logger <u>K. Carey</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor <u>S&amp;ME</u>	Drill Rig Type and ID <u>Geoprobe 7730 DT</u>
Overburden Drilling and Sampling Tools (Type and Size) <u>Direct Push - Dual Tube</u>	
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>	
Overdrill Tooling (Type and Size) <u>N/A</u>	Overdrill Depth <u>N/A</u>
Sampler Hammer Type <u>N/A</u> Weight <u>N/A</u> Drop <u>N/A</u> Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u>	Borehole Inclination (from Vertical) <u>N/A</u>
Reviewed By <u>P. Dunne</u>	Approved By <u>L. Price</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	371.8	Top of Hole					
	0.5	371.3	TOPSOIL	HA <sup>1</sup>	HA01	0.0 - 0.5	0.5	
1			SILTY LEAN CLAY, CL, 2.5YR 3/4 (dark reddish brown), low to medium plasticity, firm to very stiff, dry to moist, mottled tan	0.75/2				
2				0.828/0.80828	DP01	0.0 - 5.0	3.5	N/A
3								
4								
5								
6								
7				6.5/8.5	DP02	5.0 - 10.0	5.0	N/A
8								
9								
10	10.1	361.7			DP03	10.0 - 10.1	0.1	N/A

Color change to 2.5YR 3/6 (dark red), moist, with tan mottling at 10.0'

Bedrock Refusal /  
Bottom of Hole at 10.1 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20180828) sampled using hand auger

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC ORDER GPJ DT 20190830 GDT 10/28/19



Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-BG14</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>731,108.85 N; 1,508,309.16 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>405.1 ft</u> Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>	Date Started <u>8/28/18</u> Completed <u>8/28/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>
Inspector <u>K. Carey</u> Logger <u>K. Carey</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor <u>S&amp;ME</u>	Drill Rig Type and ID <u>Geoprobe 7730 DT</u>
Overburden Drilling and Sampling Tools (Type and Size) <u>Direct Push - Dual Tube</u>	
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>	
Overdrill Tooling (Type and Size) <u>N/A</u>	Overdrill Depth <u>N/A</u>
Sampler Hammer Type <u>N/A</u> Weight <u>N/A</u> Drop <u>N/A</u> Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u>	Borehole Inclination (from Vertical) <u>N/A</u>
Reviewed By <u>P. Dunne</u>	Approved By <u>L. Price</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
0	405.1		Top of Hole						
1			SILTY LEAN CLAY, CL, 5YR 4/6 (yellowish red), non-plastic to low plasticity, moist, brittle, mottled brown, very light yellow chert pebbles scattered throughout	HA <sup>4</sup>	HA01	0.0 - 0.5	0.5		
2				1.0/3-0-20180828	DP01	0.0 - 5.0	4.0	N/A	
3									
4									
5									
6									
7					6.5/8-5-20180828	DP02	5.0 - 10.0	5.0	N/A
8									
9									
10									
11					10.3/12.3-20180828	DP03	10.0 - 12.6	2.6	N/A
12	392.5								

Bedrock Refusal /  
Bottom of Hole at 12.6 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20180828) sampled using hand auger

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 10/28/19

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-BG15</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>726,137.34 N; 1,507,658.47 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>379.7 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>11/29/18</u>	Completed <u>11/29/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Inspector <u>M. Edmunds</u>	Logger <u>M. Edmunds</u>	Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Drilling Contractor <u>S&amp;ME</u>		Drill Rig Type and ID <u>Geoprobe 7730 DT</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>Direct Push - Dual Tube</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>N/A</u> Overdrill Depth <u>N/A</u>			
Sampler Hammer Type <u>N/A</u>	Weight <u>N/A</u>	Drop <u>N/A</u>	Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>P. Dunne</u>		Approved By <u>L. Price</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	379.7	Top of Hole					
1			SILTY FAT CLAY WITH SAND, CH, 7.5YR 5/6 (strong brown) and 7.5YR 6/4 (light brown), medium plasticity, firm to stiff, moist, occasional manganese concretions, trace organics	HA <sup>1</sup>	HA01	0.0 - 0.5	0.5	
2								
3			With silt lenses from 3.0' to 5.0'	1.9(3.2-2018)1129	DP01	0.0 - 5.0	4.3	N/A
4								
5								
6			Color change to 10YR 3/6 (dark yellowish brown) at 5.0'	6.5(6.5-2018)1129	DP02	5.0 - 9.4	5.0	N/A
7								
8								
9	9.4	370.3	With limestone gravel beginning at 8.7'					

Bedrock Refusal /  
Bottom of Hole at 9.4 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20181129) sampled using hand auger

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 10/28/19

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-BG16</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  729,849.79 N; 1,506,860.22 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  410.5 ft  </u> Elevation Datum <u>  NGVD29  </u>
Project Name <u>  CUF TDEC Order  </u>	Date Started <u>  12/3/18  </u> Completed <u>  12/3/18  </u>
Project Location <u>  Stewart Co, Cumberland City, TN  </u>	Depth to Water <u>  N/A  </u> Date/Time <u>  N/A  </u>
Inspector <u>  M. Edmunds  </u> Logger <u>  M. Edmunds  </u>	Depth to Water <u>  N/A  </u> Date/Time <u>  N/A  </u>
Drilling Contractor <u>  S&amp;ME  </u>	Drill Rig Type and ID <u>  Geoprobe 7730 DT  </u>
Overburden Drilling and Sampling Tools (Type and Size) <u>  Direct Push - Dual Tube  </u>	
Rock Drilling and Sampling Tools (Type and Size) <u>  N/A  </u>	
Overdrill Tooling (Type and Size) <u>  N/A  </u> Overdrill Depth <u>  N/A  </u>	
Sampler Hammer Type <u>  N/A  </u> Weight <u>  N/A  </u> Drop <u>  N/A  </u> Efficiency <u>  N/A  </u>	
Borehole Azimuth <u>  N/A  </u> Borehole Inclination (from Vertical) <u>  N/A  </u>	
Reviewed By <u>  P. Dunne  </u>	Approved By <u>  L. Price  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	410.5	Top of Hole					
	0.5	410.0	TOPSOIL	HA <sup>4</sup>	HA01	0.0 - 0.5	0.5	
1			SILTY FAT CLAY WITH SAND, CH, 5YR 4/6 (yellowish red), medium plasticity, firm, moist, occasional sand and gravel throughout	0.8/2.8-20181203	DP01	0.0 - 5.0	3.5	N/A
2								
3								
4								
5			Increased sand and gravel at 5.0'	5.0/6.8-20181203	DP02	5.0 - 6.8	1.8	N/A
6	6.8	403.7						

Bedrock Refusal /  
Bottom of Hole at 6.8 Ft.


- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20181203) sampled using hand auger

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 10/28/19



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-BG17</b>	
Client	Tennessee Valley Authority	Boring Location	727,824.69 N; 1,507,971.78 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	360.7 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	11/30/18	Completed 11/30/18
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	N/A	Date/Time N/A
Inspector	M. Edmunds	Logger	M. Edmunds	Depth to Water N/A
Drilling Contractor	S&ME	Drill Rig Type and ID	Geoprobe 7730 DT	
Overburden Drilling and Sampling Tools (Type and Size)	Direct Push - Dual Tube			
Rock Drilling and Sampling Tools (Type and Size)	N/A			
Overdrill Tooling (Type and Size)	N/A	Overdrill Depth	N/A	
Sampler Hammer Type	N/A	Weight	N/A	Drop N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	P. Dunne	Approved By	L. Price	
Efficiency	N/A			

Depth Ft <sup>3</sup>	Lithology		Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	360.7	Top of Hole					
0.5	360.2		GRASS, ROOTS, CLAY	HA	HA01	0.0 - 0.5	0.5	
1			SILTY FAT CLAY SOME SAND, CH, 10YR 4/2 (dark grayish brown), high plasticity, soft to firm, moist, organics throughout	0.75/2.75-20181130				
2					DP01	0.0 - 5.0	3.3	N/A
3								
4								
5			Color change to 7.5YR 4/1 (dark gray) at 5.0'					
6								
7					DP02	5.0 - 10.0	4.0	N/A
8			With sand lenses, trace weathered gravel, and increased organics at bottom of DP02	6.0/8.0-20181130				
9								
10			Color change to 7.5YR 4/2 (brown), with trace silt and sand at 10.0'					
11								
12					DP03	10.0 - 15.0	4.4	N/A
13								
14								

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT:20190630.GDT:10/28/19

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-BG17</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>727,824.69 N; 1,507,971.78 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>360.7 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
14			SILTY FAT CLAY SOME SAND, CH, 10YR 4/2 (dark grayish brown), high plasticity, soft to firm, moist, organics throughout <i>(Continued)</i> With weathered shale and limestone fragments and increased sand from 14.5' to 15.0' Color change to 7.5YR 5/4 (brown), with some sand and gravel at 15.0' Gravel content increases with depth from 15.0' to 16.9'						
15									
16							DP04	15.0 - 16.9	1.9
16.9	343.8								

Bedrock Refusal /  
Bottom of Hole at 16.9 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface
- 4: Grab sample (0.0/0.5-20181130) sampled using hand auger

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 10/28/19

Project Number <u>175565299</u>	Location <u>N36°23'16.63", W87°40'46.48" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-201</b> Total Depth <u>25.1 ft</u>
County <u>Stewart, TN</u>	Surface Elevation <u>396.7 ft (NGVD29)</u>
Project Type <u>Well Installations</u>	Date Started <u>5/11/16</u> Completed <u>5/11/16</u>
Supervisor <u>D. Pleiman</u> Driller <u>G. Thompson</u>	Depth to Water <u>15.1 ft</u> Date/Time <u>5/11/16</u>
Logged By <u>J. Andrew</u>	Depth to Water <u>9.8 ft</u> Date/Time <u>5/11/16</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
396.7	0.0	Top of Hole							
395.7	1.0	Topsoil							4" diameter well installed
		Lean Clay, reddish brown and gray, moist, soft to medium stiff, with chert gravel		SPT-1	2.5 - 4.0	0.4	3-3-5	--	
				SPT-2	5.0 - 6.5	1.0	2-3-4	--	
				SPT-3	7.5 - 9.0	1.0	3-5-8	--	
				SPT-4	10.0 - 11.5	0.3	3-5-9	--	
385.2	11.5	Silt, gray and brown, moist to wet, loose, silty sand with chert gravel		SPT-5	12.5 - 14.0	1.5	1-2-2	--	
				SPT-6	15.0 - 16.5	1.5	2-2-3	--	
				SPT-7	17.5 - 19.0	1.5	2-5-5	--	
				SPT-8	20.0 - 21.5	1.0	13-10-16	--	
				SPT-9	22.5 - 24.0	0.6	3-5-8	--	
371.6	25.1								Water @ 15.1' during drilling

No Refusal /  
Bottom of Hole

STANTECFWISM\_LEGACY\_CUF\_PROJECT.GPJ F:\MSMAGRAPHIC\LOG.GDT 2/3/17

Project Number	175565299	Location	N36°23'12.67", W87°40'34.02" (NAD83)		
Project Name	TVA - CUF Well Installations	Boring No.	<b>CUF-202</b>	Total Depth	18.5 ft
County	Stewart, TN	Surface Elevation	379.5 ft (NGVD29)		
Project Type	Well Installations	Date Started	6/1/16	Completed	6/1/16
Supervisor	D. Pleiman    Driller D. Jessie	Depth to Water	8.3 ft	Date/Time	6/1/16
Logged By	J. Matthews	Depth to Water	5.9 ft	Date/Time	7/22/16

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
379.5	0.0	Top of Hole							
379.0	0.5	Topsoil		SPT-1	0.0 - 1.5	1.4	3-1-1	--	4" diameter well installed
		Gravelly Silt with chert, light brown to brown, moist, stiff to very stiff		SPT-2	2.5 - 4.0	0.8	WOH-1-13	--	
				SPT-3	5.0 - 6.5	1.5	10-9-12	--	
				SPT-4	7.5 - 9.0	1.4	13-9-17	--	
369.0	10.5	Sandy Silt with Gravel, light brown, moist, stiff		SPT-5	10.0 - 11.5	1.5	9-10-10	--	Water @ 8.3' during drilling
				SPT-6	12.5 - 14.0	1.0	7-13-10	--	
		Less gravel below 16.0'		SPT-7	15.0 - 16.5	1.4	6-6-4	--	
361.0	18.5			SPT-8	17.5 - 18.5	0.7	50+/-5	--	

Auger Refusal /  
Bottom of Hole

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1000ALT</b>
Client	Tennessee Valley Authority	Boring Location	729,153.25 N; 1,507,363.51 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	392.3 ft
Project Name	CUF TDEC Order	Elevation Datum	NGVD29
Project Location	Stewart Co, Cumberland City, TN	Date Started	11/29/18
Inspector	G. Budd	Completed	11/29/18
Logger	G. Budd	Depth to Water	N/A
Drilling Contractor	Stantec Consulting Services Inc.	Date/Time	N/A
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 3" SS w/o liners	Depth to Water	N/A
Rock Drilling and Sampling Tools (Type and Size)	N/A	Date/Time	N/A
Overdrill Tooling (Type and Size)	N/A	Drill Rig Type and ID	CME 850XR, #953
Overdrill Depth	N/A		
Sampler Hammer Type	Automatic	Weight	140 lb
Drop	30"	Efficiency	N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A
Reviewed By	D. Norman	Approved By	P. Dunne

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	392.3	Top of Hole					
0.1	392.2		GRASS AND TOPSOIL			0.0 - 1.5	1.4	4-3-4
1	1.5	390.8	LEAN CLAY, CL, 5YR 4/4 (reddish brown), low plasticity, soft, moist, organics and trace fragments of chert		SS01G	0.0 - 1.5	1.4	4-3-4
2					SS02G	1.5 - 3.0	1.5	3-6-7
3	3.0	389.3	LEAN CLAY, CL, 5YR 4/6 (yellowish red), firm, moist, organic material		SS03G	3.0 - 4.5	1.5	6-7-7
4	4.5	387.8	FAT CLAY, CH, 7.5YR 4/6 (strong brown) and 10YR 5/6 (yellowish brown), firm, moist, abundant weathered chert		SS04G	4.5 - 6.0	1.5	5-7-10
5					SS05G	6.0 - 7.5	1.5	4-7-10
6	6.0	386.3	FAT CLAY, CH, 7.5YR 5/6 (strong brown), firm to stiff, dry, abundant weathered chert		SS06G	7.5 - 9.0	1.5	5-8-10
7	7.5	384.8	FAT CLAY, CH, 5YR 5/6 (yellowish red) and 7.5 3/2 (yellowish brown), firm to stiff, moist, trace fragments of weathered chert		SS07G	9.0 - 9.6	0.6	6-50/1"
8								
9	9.0	383.3	FAT CLAY, CH, 5YR 5/6 (yellowish red) and 7.5 3/2 (yellowish brown), stiff, dry, abundant weathered chert					
9.9	382.4		FAT CLAY, CH, 5YR 5/6 (yellowish red) and 7.5 3/2 (yellowish brown), stiff, dry, weathered chert, grading to limestone at 9.6'					

Refusal /  
Bottom of Hole at 9.9 Ft.

Boring abandoned and backfilled with 30% solids bentonite grout from 9.9' BGS to ground surface.

As-drilled boring location not surveyed. Historical coordinates shown based on proposed boring location. Vertical coordinates shown based on 2017 LIDAR surfaces.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT: 20190630 GDT: 11/13/19





# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1000ALTA</b>	
Client	Tennessee Valley Authority	Boring Location	729,161.60 N; 1,507,389.51 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	391.6 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	11/29/18	Completed 11/30/18
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	21.0 ft	Date/Time 11/29/18
Inspector	G. Budd	Logger	G. Budd	Depth to Water N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 850XR, #953	
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 3" SS w/o liners			
Rock Drilling and Sampling Tools (Type and Size)	N/A			
Overdrill Tooling (Type and Size)	8-1/4" HSA overdrill of boring	Overdrill Depth	22.2 ft	
Sampler Hammer Type	Automatic	Weight	140 lb	Drop 30" Efficiency N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	D. Norman	Approved By	P. Dunne	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	391.6	Top of Hole					
0.5	391.1		GRAVEL AND TOPSOIL					
1	1.3	390.3	LEAN CLAY, CL, 7.5YR 4/6 (strong brown), firm, moist	SS01G	0.0 - 1.5	0.0 - 1.5	1.5	5-6-10
1.5	390.1							
2	3.0	388.6	SANDY LEAN CLAY, CL, 7.5YR 4/6 (strong brown), medium plasticity, firm to stiff, dry, fragments of sandstone	SS02G	1.5 - 3.0	1.5 - 3.0	1.2	2-6-8
3	4.5	387.1	SANDY LEAN CLAY, CL, 7.5YR 4/6 (strong brown), medium plasticity, firm, dry, fragments of sandstone, trace manganese	SS03G	3.0 - 4.5	3.0 - 4.5	1.5	10-8-11
4	6.0	385.6	SANDY LEAN CLAY, CL, 10YR 5/6 (yellowish brown), stiff, dry, fragments of sandstone, trace manganese	SS04G	4.5 - 6.0	4.5 - 6.0	1.5	7-8-11
5	7.5	384.1	SANDY LEAN CLAY, CL, 10YR 5/6 (yellowish brown), firm to stiff, moist, fragments of sandstone to 5.5', grading to sand (SP), fine, loose to medium dense, dry	SS05G	6.0 - 7.5	6.0 - 7.5	1.5	9-7-6
6	9.0	382.6	SANDY LEAN CLAY, CL, 10YR 5/6 (yellowish brown), firm, moist, fragments of weathered sandstone to 7.0', grading to clay (CH), 5YR 4/6, 10YR 4/1, medium stiff to stiff, moist, fragments of chert	SS06G	7.5 - 9.0	7.5 - 9.0	1.5	6-7-11
7	10.5	381.1	FAT CLAY, CH, 7.5YR 4/6 (strong brown), firm to stiff, dry, fragments of weathered sandstone, some very fine sand	SS07G	9.0 - 10.5	9.0 - 10.5	1.5	7-9-11
8	12.0	379.6	SANDY FAT CLAY, CH, 7.5YR 4/4 (brown), stiff, dry to moist	SS08G	10.5 - 12.0	10.5 - 12.0	1.5	7-13-15
9	13.5	378.1	FAT CLAY SOME SAND, CH, 7.5YR 4/4 (brown), stiff, moist	SS09G	12.0 - 13.5	12.0 - 13.5	1.5	7-15-36
10	15.0	376.6	FAT CLAY, CH, 7.5YR 5/6 (strong brown), stiff, moist	SS10E	13.5 - 15.0	13.5 - 15.0	1.5	15-17-31
11	16.5	375.1	CLAYEY SAND, SC, 10YR 5/6 (yellowish brown), fine to coarse, medium dense to dense, dry to moist, fragments of sandstone	SS11G	15.0 - 16.5	15.0 - 16.5	1.5	7-13-14
12	18.0	373.6		SS12G	16.5 - 18.0	16.5 - 18.0	1.5	3-3-4

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 11/12/19

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1000ALTA</b>
Client	Tennessee Valley Authority	Boring Location	729,161.60 N; 1,507,389.51 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	391.6 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			SANDY LEAN CLAY, CL, 10YR 5/6 (yellowish brown), firm to stiff, wet to moist, weathered fragments of sandstone					
19	19.5				SS13E	18.0 - 19.5	1.5	2-3-3
20					SS14G	19.5 - 21.0	1.5	2-1-2
21			FAT CLAY WITH SAND, CH, 7.5YR 4/6 (strong brown) and 7.5YR 2.5/2 (very dark brown), soft, moist to wet					
22	22.4		FAT CLAY WITH SAND, CH, 7.5YR 4/6 (strong brown) and 7.5YR 2.5/2 (very dark brown), soft, moist to wet, micro echinoid sanddollar fossils					1-2-50/2"

Refusal /  
Bottom of Hole at 22.4 Ft.

Temporary 1-inch PVC piezometer installed and yielded groundwater. Temporary piezometer removed and conventional 4-inch monitoring well subsequently installed in boring. Refer to monitoring well installation log dated 12/3/2018.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630.GDT 11/12/19



# SUBSURFACE LOG

Client Borehole ID N/A Stantec Boring No. **CUF-1001ALT**  
 Client Tennessee Valley Authority Boring Location 729,989.86 N; 1,514,631.88 E NAD27 Plant Local  
 Project Number 175568209 Surface Elevation 413.4 ft Elevation Datum NGVD29  
 Project Name CUF TDEC Order Date Started 12/12/18 Completed 12/18/18  
 Project Location Stewart Co, Cumberland City, TN Depth to Water N/A Date/Time N/A  
 Inspector G. Budd Logger G. Budd Depth to Water N/A Date/Time N/A  
 Drilling Contractor Stantec Consulting Services Inc. Drill Rig Type and ID CME 850XR, #953  
 Overburden Drilling and Sampling Tools (Type and Size) 4-1/4" HSA, 3" SS w/o liners  
 Rock Drilling and Sampling Tools (Type and Size) N/A  
 Overdrill Tooling (Type and Size) N/A Overdrill Depth N/A  
 Sampler Hammer Type Automatic Weight 140 lb Drop 30" Efficiency N/A  
 Borehole Azimuth N/A Borehole Inclination (from Vertical) N/A  
 Reviewed By A. Blair Approved By P. Dunne

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	413.4	Top of Hole					
	0.3	413.1	GRASS AND TOPSOIL					
1	1.2	412.2	LEAN CLAY, CL, 7.5YR 3/2 (dark brown), soft to firm, dry, organics and abundant bottom ash, limestone gravel, and chert	SS01G	0.0 - 1.5	0.0 - 1.5	1.5	4-5-4
	1.5	411.9						
2	2.3	411.1	LEAN CLAY, CL, 7.5YR 4/6 (strong brown), firm, dry, abundant bottom ash and chert	SS02G	1.5 - 3.0	1.5 - 3.0	1.5	4-6-5
3	3.0	410.4						
	3.5	409.9	LEAN CLAY, CL, 7.5YR 4/6 (strong brown) and 7.5YR 2.5/1 (black), soft to firm, moist to dry	SS03G	3.0 - 4.5	3.0 - 4.5	1.2	14-15-12
4	4.5	408.9						
5			WELL GRADED SAND, SW, 7.5YR 2.5/1 (black), fine to coarse plasticity, loose, dry, [CCR]	SS04G	4.5 - 6.0	4.5 - 6.0	0.4	8-8-10
6	6.0	407.4	LEAN CLAY, CL, 7.5YR 4/6 (strong brown), stiff, moist, bottom ash and chert to 3.5'	SS05G	6.0 - 7.5	6.0 - 7.5	1.3	4-4-6
7	7.5	405.9						
8			LEAN CLAY, CL, 7.5YR 4/6 (strong brown), stiff, dry, fill material with limestone gravel and siltstone fragments and shale fragments	SS06G	7.5 - 9.0	7.5 - 9.0	1.5	5-4-5
9	9.0	404.4						
10			LIMESTONE GRAVEL FILL MATERIAL	SS07G	9.0 - 10.5	9.0 - 10.5	1.0	12-9-9
11	10.5	402.9						
12			FAT CLAY, CH, 10YR 4/4 (dark yellowish brown), soft to firm, moist, with some bottom ash and limestone gravel	SS08G	10.5 - 12.0	10.5 - 12.0	1.5	7-7-8
13	12.0	401.4						
14			FAT CLAY, CH, 10YR 4/2 (dark grayish brown), soft, moist, with abundant bottom ash, limestone gravel, organics, wood pieces	SS09G	12.0 - 13.5	12.0 - 13.5	1.2	8-20-15
15	13.5	399.9						
16			LEAN CLAY, CL, 10YR 4/2 (dark grayish brown), stiff, moist, with fragments of limestone and chert, trace bottom ash	SS10E	13.5 - 15.0	13.5 - 15.0	1.3	6-9-12
17	15.0	398.4						
18			FAT CLAY, CH, 10YR 4/3 (brown), firm, moist, with fragments of limestone and organics	SS11G	15.0 - 16.5	15.0 - 16.5	1.5	6-7-7
19	16.5	396.9						
20			FAT CLAY, CH, 10YR 4/3 (brown), stiff to very stiff, moist, with limestone gravel fill and organics					
21			LEAN CLAY, CL, 10YR 4/3 (brown) and 10YR 4/6 (dark yellowish brown), firm to stiff, moist, with organics					

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 2/12/20

Client Borehole ID   N/A   Stantec Boring No. **CUF-1001ALT**  
 Client   Tennessee Valley Authority   Boring Location   729,989.86 N; 1,514,631.88 E NAD27 Plant Local    
 Project Number   175568209   Surface Elevation   413.4 ft   Elevation Datum   NGVD29  

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
17			FAT CLAY, CH, 5YR 5/6 (yellowish red) and 5YR 5/1 (gray), moist, with fragments of chert and trace organics		SS12G	16.5 - 18.0	1.5	5-7-18
18	18.0	395.4			SS13G	18.0 - 18.9	0.9	17-50/5"
19			FAT CLAY, CH, 10YR 5/6 (yellowish brown), firm to very stiff, dry, with manganese (Continued)					
19.5	393.9							
20			LEAN CLAY, CL, 7.5YR 4/6 (strong brown), stiff to hard, dry, with limestone gravel		SS14E	19.5 - 21.0	1.5	7-19-15
21	21.0	392.4	FAT CLAY, CH, 10YR 5/6 (yellowish brown), very stiff, dry, trace bottom ash to 20.7', limestone fill possible riprap					
21.8	391.6				SS15G	21.0 - 22.5	1.0	34-19-16
22	22.3	391.1	LIMESTONE FILL (RIPRAP)					
22.5	390.9				SS16G	22.5 - 22.8	0.3	50/4"
22.8	390.6							

FAT CLAY, CH, 10YR 5/6 (yellowish brown), very stiff, dry

LIMESTONE FILL (RIPRAP)

FAT CLAY, CH, 10YR 5/6 (yellowish brown), hard, dry, with limestone fragments and chert

Refusal /  
Bottom of Hole at 22.8 Ft.

Monitoring well CUF-1001 was initially installed in the boring, but it yielded insufficient groundwater and the well/location was abandoned. CUF-1001 was subsequently installed in soil boring CUF1001ALT2.

As-drilled boring location not surveyed. Horizontal coordinates shown based on proposed boring location. Vertical coordinates shown based on 2017 LIDAR surfaces.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG: 175568209\_CUF\_TDEC SUBSURF DT: 20190630.GDT: 2/12/20


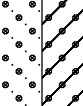
Client Borehole ID <u>  N/A  </u>		Stantec Boring No. <b>CUF-1001ALT2</b>	
Client <u>  Tennessee Valley Authority  </u>		Boring Location <u>  730,376.0 N; 1,513,548.7 E NAD27 Plant Local  </u>	
Project Number <u>  175568209  </u>		Surface Elevation <u>  390.3 ft  </u> Elevation Datum <u>  NGVD29  </u>	
Project Name <u>  CUF TDEC Order  </u>		Date Started <u>  4/9/19  </u> Completed <u>  4/9/19  </u>	
Project Location <u>  Stewart Co, Cumberland City, TN  </u>		Depth to Water <u>  N/A  </u> Date/Time <u>  N/A  </u>	
Inspector <u>  M. Edmunds  </u> Logger <u>  M. Edmunds  </u>		Depth to Water <u>  N/A  </u> Date/Time <u>  N/A  </u>	
Drilling Contractor <u>  Stantec Consulting Services Inc.  </u>		Drill Rig Type and ID <u>  CME 85#1, #950  </u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>  4-1/4" HSA, 2" SS w/o liners  </u>			
Rock Drilling and Sampling Tools (Type and Size) <u>  N/A  </u>			
Overdrill Tooling (Type and Size) <u>  8-1/4" HSA overdrill of boring  </u>		Overdrill Depth <u>  18.1 ft  </u>	
Sampler Hammer Type <u>  Automatic  </u> Weight <u>  140 lb  </u> Drop <u>  30"  </u> Efficiency <u>  N/A  </u>			
Borehole Azimuth <u>  N/A  </u>		Borehole Inclination (from Vertical) <u>  N/A  </u>	
Reviewed By <u>  A. Blair  </u>		Approved By <u>  P. Dunne  </u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	390.3						
Top of Hole								
1			LEAN CLAY TRACE SAND, CL, 5YR 5/4 (reddish brown) to 5YR 3/4 (dark reddish brown), non-plastic, medium stiff, dry to damp, [FILL]		SS01G	0.0 - 1.5	1.5	4-6-6
2	2.2	388.1			SS02G	1.5 - 3.0	1.4	11-11-12
SANDY LEAN CLAY TRACE GRAVEL, CL, 5YR 5/4 (reddish brown) to 5YR 3/4 (dark reddish brown), non-plastic, medium stiff, dry to damp, [FILL]					SS03G	3.0 - 4.5	1.2	10-4-4
5					SS04G	4.5 - 6.0	0.5	3-5-15
6	6.0	384.3			SS05G	6.0 - 7.5	0.4	4-4-4
SILTY FAT CLAY TRACE GRAVEL, CH, 5YR 4/3 (reddish brown), medium plasticity, soft, moist					SS06G	7.5 - 9.0	1.5	4-4-6
8	8.5	381.8			SS07G	9.0 - 10.5	1.5	4-6-8
SILTY FAT CLAY TRACE SAND, CH, 5YR 4/6 (yellowish red), medium plasticity, medium stiff, moist					SS08G	10.5 - 12.0	1.1	5-7-5
12	12.0	378.3			SS09E	12.0 - 13.5	1.5	4-7-9
FAT CLAY, CH, 5YR 4/6 (yellowish red), medium plasticity, medium stiff, moist					SS10E	13.5 - 15.0	1.5	6-6-9

TVA EIP BORING LOG: 175568209.CUF.TDEC.ORDER.GPJ TDEC SUBSURF DT:20190630.GDT:11/22/19

12/01/19 5:20:19/04/19

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1001ALT2</b>
Client	Tennessee Valley Authority	Boring Location	730,376.0 N; 1,513,548.7 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	390.3 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
15			FAT CLAY, CH, 5YR 4/6 (yellowish red), medium plasticity, medium stiff, moist (Continued)		SS11E	15.0 - 16.5	1.4	5-8-20
16	16.2	374.1						
17			CLAYEY WELL GRADED GRAVEL WITH CLAY SOME SAND, GW-GC, 5YR 4/6 (yellowish red), medium to coarse, medium plasticity, loose, saturated, well graded, Fresh-very little to no weathering		SS12G	16.5 - 18.0	1.1	16-16-16
18	18.1	372.2						

Refusal /  
Bottom of Hole at 18.1 Ft.

Boring converted to Well ID CUF-1001. See monitoring well installation log dated 4/10/2019.













- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 11/22/19



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1004ALT</b>	
Client	Tennessee Valley Authority	Boring Location	727,408.35 N; 1,510,613.17 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	390.8 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	12/5/18	Completed 12/5/18
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	N/A	Date/Time N/A
Inspector	G. Budd	Logger	G. Budd	Depth to Water N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 850XR, #953	
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 3" SS w/o liners			
Rock Drilling and Sampling Tools (Type and Size)	N/A			
Overdrill Tooling (Type and Size)	N/A	Overdrill Depth	N/A	
Sampler Hammer Type	Automatic	Weight	140 lb	Drop 30" Efficiency N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	D. Norman	Approved By	P. Dunne	

Depth Ft <sup>3</sup>	Lithology		Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
	Depth Ft <sup>3</sup>	Elevation		Graphic	Rock Core:	RQD %	Run Ft	Rec. Ft
0	0.0	390.8						
	0.3	390.5						
1	1.5	389.3			SS01G	0.0 - 1.5	1.3	WH-3-4
2	3.0	387.8			SS02G	1.5 - 3.0	1.5	3-5-5
3	4.5	386.3			SS03G	3.0 - 4.5	1.5	4-6-7
4	6.0	384.8			SS04G	4.5 - 6.0	1.5	6-9-13
5	7.5	383.3			SS05G	6.0 - 7.5	1.5	8-12-15
6	9.0	381.8			SS06G	7.5 - 9.0	1.5	8-10-12
7	10.5	380.3			SS07G	9.0 - 10.5	1.5	6-10-13
8	12.0	378.8			SS08G	10.5 - 12.0	1.5	9-10-14
9	13.5	377.3			SS09G	12.0 - 13.5	1.5	6-8-12
10	15.0	375.8			SS10G	13.5 - 15.0	1.5	9-12-14
11	16.5	374.3			SS11G	15.0 - 16.5	1.5	10-11-11
12	18.0	372.8			SS12G	16.5 - 18.0	1.5	4-5-4

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 11/13/19

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-1004ALT</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  727,408.35 N; 1,510,613.17 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  390.8 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18	18.5	372.3	LEAN CLAY, CL, 7.5YR 6/8 (reddish yellow), soft, moist					
19	19.5	371.3		SS13G	18.0 - 19.5	1.0	1-4-6	
	19.9	370.9	SANDY LEAN CLAY, CL, 7.5YR 5/6 (strong brown), very fine, soft to firm, moist to wet					
			SANDY LEAN CLAY, CL, 7.5YR 5/6 (strong brown), very fine, very soft, moist to wet, grading to shale, dark gray, hard at 19.9'					

Refusal /  
Bottom of Hole at 19.9 Ft.

Due to the boring being dry, it was abandoned and backfilled with 30% solids bentonite grout to the ground surface.

As-drilled boring location not surveyed. Horizontal coordinates shown based on proposed boring location. Vertical coordinates shown based on 2017 LIDAR surfaces.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG: 175568209.CUF.TDEC.ORDER.GPJ TDEC SUBSURF.DT.20190630.GDT.11/13/19



Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-1004ALT2</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>727,737.61 N; 1,510,547.15 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>381.1 ft</u> Elevation Datum <u>NGVD29</u>
Project Name	<u>CUF TDEC Order</u>	Date Started	<u>12/4/18</u> Completed <u>12/4/18</u>
Project Location	<u>Stewart Co, Cumberland City, TN</u>	Depth to Water	<u>N/A</u> Date/Time <u>N/A</u>
Inspector	<u>G. Budd</u> Logger <u>G. Budd</u>	Depth to Water	<u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor	<u>Stantec Consulting Services Inc.</u>	Drill Rig Type and ID	<u>CME 850XR, #953</u>
Overburden Drilling and Sampling Tools (Type and Size)	<u>4-1/4" HSA, 3" SS w/o liners</u>		
Rock Drilling and Sampling Tools (Type and Size)	<u>N/A</u>		
Overdrill Tooling (Type and Size)	<u>N/A</u>	Overdrill Depth	<u>N/A</u>
Sampler Hammer Type	<u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>		
Borehole Azimuth	<u>N/A</u>	Borehole Inclination (from Vertical)	<u>N/A</u>
Reviewed By	<u>A. Blair</u>	Approved By	<u>P. Dunne</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	381.1						
	0.3	380.8						
1			LEAN CLAY, CL, 5YR 4/6 (yellowish red), soft to stiff, moist, abundant fragments of chert at 2.0'		SS01G	0.0 - 1.5	1.5	2-4-5
2					SS02G	1.5 - 3.0	1.5	4-10-13
3	3.0	378.1			SS03G	3.0 - 4.5	1.5	6-10-16
4			LEAN CLAY, CL, 2.5YR 4/6 (red), stiff to very stiff, dry, abundant fragments of chert		SS04G	4.5 - 6.0	1.5	12-16-18
5					SS05G	6.0 - 6.6	0.6	18-50/1"
6	6.0	375.1			SS06G	7.5 - 8.0	0.5	91
7	7.5	373.6						
8			Chert, gray, weathered, hard Augered to 9.0'					
9	9.0	372.1						

Refusal /  
Bottom of Hole at 9.0 Ft.

Due to the boring being dry, it was abandoned and backfilled with 30% solids bentonite grout to the ground surface.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA EIP BORING LOG - 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 11/13/19

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-1004ALT2A</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>727,751.77 N; 1,510,561.28 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>381.7 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>12/6/18</u>	Completed <u>12/6/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Inspector <u>G. Budd</u>	Logger <u>G. Budd</u>	Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 850XR, #953</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 3" SS w/o liners</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>Automatic</u>	Weight <u>140 lb</u>	Drop <u>30"</u>	Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>D. Norman</u>		Approved By <u>P. Dunne</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	381.7						
	0.3	381.4						
			<b>Top of Hole</b>					
			<b>GRASS AND TOPSOIL</b>					
1			LEAN CLAY, CL, 5YR 5/6 (yellowish red), low plasticity, soft to firm, moist, with organics and weathered chert		SS01G	0.0 - 1.5	1.5	2-5-6
2			Color change to 2.5YR 4/6 (red) at 1.5'		SS02G	1.5 - 3.0	1.5	3-4-6
3			No organics beginning at 1.5'					
4			Color change to 2.5YR 4/8 (red) at 3.0'		SS03G	3.0 - 4.5	1.5	5-6-10
5			Firm to stiff at 3.0'					
6			Stiff, dry beginning at 4.5'		SS04G	4.5 - 6.0	1.5	8-12-14
7					SS05G	6.0 - 7.5	1.5	9-9-15
8			Trace manganese at 7.5'		SS06G	7.5 - 9.0	1.5	15-13-15
9								
10			Color change to 5YR 5/6 (yellowish red) at 10.2'		SS07G	9.0 - 10.5	1.5	8-11-16
11			Color change to 7.5YR 6/8 (reddish yellow) at 10.5'		SS08G	10.5 - 12.0	1.5	8-10-14
12			Firm at 12.0'					
13	13.5	368.2			SS09E	12.0 - 13.5	1.5	6-6-9
14			<b>FAT CLAY, CH, 7.5YR 6/8 (reddish yellow), soft, moist, with weathered chert</b>		SS10G	13.5 - 15.0	1.5	3-2-3
15	15.0	366.7						
16			LEAN CLAY, CL, 5YR 5/6 (yellowish red), soft, moist, with weathered chert		SS11G	15.0 - 16.5	1.2	3-3-2
17					SS12E	16.5 - 18.0	1.5	2-2-3
18								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 6/17/20

 12/013.5-201812/06  
16.5/13.0-201812/06



**APPENDIX B.2**  
**GEOTECHNICAL BORINGS**

# Table of Contents

Subsurface Boring Legend .....	1
CUF-B11 .....	2
CUF-B12 .....	7
CUF-B13 .....	11
CUF-B14 .....	15
CUF-B15 .....	22
CUF-B16 .....	30
CUF-B17 .....	37
CUF-B18 .....	43
CUF-B19 .....	48
CUF-B20 .....	54
CUF-B21 .....	58
CUF-B22 .....	62
CUF-B23 .....	68
CUF-B24 .....	73
CUF-B25 .....	77

# Subsurface Boring Legend

## Lithology Graphics

Symbol	Lithology
	Fill
	Top Soil
	Gravel
	Well Graded Gravel (GW)
	Poorly Graded Gravel (GP)
	Silty Gravel (GM)
	Silty, Clayey Gravel (GC-GM)
	Clayey Gravel (GC)
	Well Graded Gravel with Silt (GW-GM)
	Well Graded Gravel with Clay (GW-GC)
	Poorly Graded Gravel with Silt (GP-GM)
	Poorly Graded Gravel with Clay (GP-GC)
	Well Graded Sand (SW)
	Poorly Graded Sand (SP)
	Silty Sand (SM)
	Silty, Clayey Sand (SC-SM)
	Clayey Sand (SC)
	Well Graded Sand with Silt (SW-SM)
	Well Graded Sand with Clay (SW-SC)
	Poorly Graded Sand with Silt (SP-SM)
	Poorly Graded Sand with Clay (SP-SC)
	Silt (ML)
	Silty Clay (CL-ML)
	Lean Clay (CL)
	Organic Silt (OL)
	Elastic Silt (MH)
	Fat Clay (CH)
	Organic Clay (OH)
	Non-Durable Shale
	Durable Shale
	Coal
	Limestone
	Sandstone

## Other Graphics

Symbol	Description
	Denotes environmental analytical sample interval
	Denotes SS sample interval
	Denotes ST sample interval
	Denotes DP sample interval
	Denotes RS sample interval
	Denotes RC sample interval
	First water level reading
	Second water level reading

## Common Abbreviations

Abbreviation	Definition
DP	Direct Push
HA	Hand Auger
HSA	Hollow Stem Auger
N/A	Not Applicable
NR	Not Recorded
RC	Rock Core
RQD	Rock Quality Designation
RS	Rotary Sonic
SS	Split Spoon
ST	Shelby Tube
WH	Weight of Hammer
WR	Weight of Rod

## General Notes

The boring logs include sample numbering used during drilling. For assigned Environmental Analytical Sample ID numbers, see relevant Environmental Chain-of-Custody forms from the drilling date range listed on each log.

For pH readings and additional field data, see applicable field documentation (e.g., Soil pH Data Form) from the drilling date range listed on each log.



# SUBSURFACE LOG

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-B11</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>733,085.92 N; 1,510,402.97 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>390.1 ft</u> Elevation Datum <u>NGVD29</u>
Project Name	<u>CUF TDEC Order</u>	Date Started	<u>3/20/19</u> Completed <u>3/25/19</u>
Project Location	<u>Stewart Co, Cumberland City, TN</u>	Depth to Water	<u>23.9 ft</u> Date/Time <u>3/25/19</u>
Inspector	<u>M. McDonald</u> Logger <u>T. Greenwell</u>	Depth to Water	<u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor	<u>Stantec Consulting Services Inc.</u>	Drill Rig Type and ID	<u>CME 75#2, #712</u>
Overburden Drilling and Sampling Tools (Type and Size)	<u>4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes</u>		
Rock Drilling and Sampling Tools (Type and Size)	<u>NQ-3 Wireline, Split Barrel, Surface Set Bit</u>		
Overdrill Tooling (Type and Size)	<u>N/A</u>	Overdrill Depth	<u>N/A</u>
Sampler Hammer Type	<u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>		
Borehole Azimuth	<u>N/A</u>	Borehole Inclination (from Vertical)	<u>N/A</u>
Reviewed By	<u>B. Halada</u>	Approved By	<u>A. Welshans</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
0	0.0	390.1	Top of Hole						
1			POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM, 10YR 2/2 (very dark brown), fine to medium, very loose to medium dense, dry, subangular, [CCR]		SS01G	0.0 - 1.5	1.0	1-1-3	
2					SS02G	2.5 - 4.0	1.3	6-10-12	
3					SS03G	5.0 - 6.5	1.2	9-13-13	
4					SS04aG	7.5 - 8.0	1.2	13-14-14	
5					SS04bG	8.0 - 9.0			
6	8.0	382.1		GRAVELLY POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM, 10YR 3/3 (dark brown) to 10YR 2/1 (black), fine to medium, dense to loose, dry to moist, subangular, [CCR]		SS05G	10.0 - 11.5	1.5	25-22-22
7						SS06G	12.5 - 14.0	1.5	11-9-7
8					SS07G	15.0 - 16.5	1.4	4-9-10	
9									
10									

TVA/EIP BORING LOG: 175568209\_CUF\_TDEC\_ORDER.GPJ TDEC SUBSURF DT:20190630.GDT: 3/11/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>		Rec. Ft	Blows/PSI			
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %				
18			GRAVELLY POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM, 10YR 3/3 (dark brown) to 10YR 2/1 (black), fine to medium, dense to loose, dry to moist, subangular, [CCR] <i>(Continued)</i>		SS08G	17.5 - 19.0	17.5 - 19.0	1.3	7-7-8			
19						SS09G	20.0 - 21.5	20.0 - 21.5	1.2	4-3-4		
20							SS10G	22.5 - 24.0	22.5 - 24.0	1.3	5-6-5	
21												
22												
23												
24	365.6											
25					POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM, 10YR 2/1 (black), fine to medium, loose, wet, subangular, [CCR]		SS11G	25.0 - 26.5	25.0 - 26.5	1.1	4-3-2	
26								SS12G	27.5 - 29.0	27.5 - 29.0	1.0	4-4-4
27												
28												
29	360.6		SILTY SAND TRACE GRAVEL, SM, 10YR 2/1 (black) to 10YR 3/2 (very dark grayish brown), medium to coarse, non-plastic, loose, wet, gravel (clinker) up to 1" diameter, [CCR]		SS13G	30.0 - 31.5	30.0 - 31.5	0.4	WH-WH-1			
30						SS14G	32.5 - 34.0	32.5 - 34.0	1.1	2-2-4		
31												
32												
33						SS15G	35.0 - 36.5	35.0 - 36.5	1.4	3-4-4		
34												
35						SS16G	37.5 - 39.0	37.5 - 39.0	1.3	5-5-6		
36												
37												
38												
39												
40												
41	349.1				SS17G	40.0 - 41.5	40.0 - 41.5	1.4	3-2-2			
42												

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER: GJ TDEC SUBSURF DT: 20190630 GDT: 3/11/21



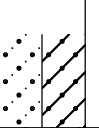
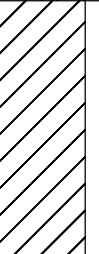
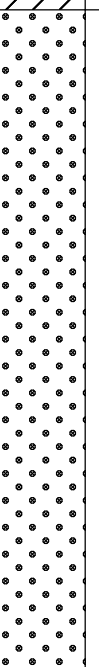
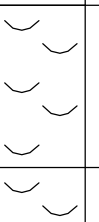
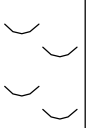
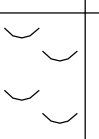

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43			LEAN CLAY TRACE SAND, CL, 10YR 4/3 (brown) with 10YR 6/1 (gray), low to medium plasticity, soft to stiff, wet (Continued)		ST01G	42.5 - 44.5	1.9	300
44					SS18G	45.0 - 46.5	1.5	5-4-7
45					SS19G	47.5 - 49.0	1.5	4-3-5
46					SS20G	50.0 - 51.5	1.5	WH-WH-2
47					SS21aG	52.5 - 53.0	1.5	WH-3-4
48			LEAN CLAY, CL, 10YR 4/3 (brown), low to medium plasticity, very soft, wet, homogeneous		SS21bG	53.0 - 54.0	1.5	WH-3-4
49	49.5	340.6			SS22G	55.0 - 56.5	1.5	3-3-3
50			SANDY LEAN CLAY, CL, 7.5YR 4/4 (brown), fine to medium, loose, wet		SS23G	57.5 - 59.0	1.5	5-7-10
51					SS24G	60.0 - 61.5	0.5	7-8-10
52					SS25G	62.5 - 64.0	0.9	7-9-12
53	53.2	336.9	CLAYEY SAND TRACE GRAVEL, SC, 10YR 4/6 (dark yellowish brown) to 10YR 6/8 (brownish yellow), very fine to medium, loose to medium dense, wet, well graded, increasing percent sand and particle size with depth		SS26G	65.0 - 66.5	1.0	6-10-10
54								
55								
56	56.2	333.9		WELL GRADED SAND WITH CLAY AND GRAVEL, SW-SC, 10YR 6/8 (brownish yellow) to 10YR 6/1 (gray), fine to medium, medium dense, wet, subrounded to subangular				
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								

TVA/EIP BORING LOG: 175568209\_CUF\_TDEC ORDER GPJ\_TDEC SUBSURF DT:20190630.GDT\_3/11/21



# SUBSURFACE LOG

Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-B11</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>733,085.92 N; 1,510,402.97 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>390.1 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
67	67.8	322.3	 LEAN CLAY TRACE SAND, CL, 2.5Y 3/1 (very dark gray), low to medium plasticity, soft, wet, interspersed very fine grained sand lenses					
68				SS27G	67.5 - 69.0	0.6	6-6-9	
69								
70			 SANDY POORLY GRADED GRAVEL, GP, 10YR 4/3 (brown) to 10YR 3/2 (very dark grayish brown), medium to coarse, medium dense to dense, wet, stratified, subangular, with interbedded dark gray lean clay seams (< 3" thick) with trace sand					
71				SS28G	70.0 - 71.5	1.1	1-1-4	
72	72.0	318.1						
73				SS29G	72.5 - 74.0	1.5	9-7-5	
74								
75				SS30G	75.0 - 76.5	1.1	24-14-13	
76								
77				SS31G	77.5 - 79.0	1.2	21-23-21	
78								
79				SS32G	80.0 - 81.5	0.9	14-16-17	
80								
81				SS33G	82.5 - 82.9	0.4	50/5"	
82	82.6	307.5	 Shale, black, very fine grained, soft, very thin bedded, weathered					
83				Augered through shale to 84.0'			Began Core	
84			 Shale, dark brown, very fine grained, soft, very thin to thin bedded, 15° bedding angle, traces of limestone lenses					
85	85.2	304.9		59	84.0 - 87.4 3.4	2.9	85	
86								
87			 Shale, dark brown, very fine grained, soft, very thin to thin bedded, slightly weathered, slight organic odor, 15° bedding angle, traces of limestone lenses up to 0.1'					
88	88.3	301.8		22	87.4 - 92.4 5.0	4.4	88	
89								
90								

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC ORDER GDT 3/11/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B11</b>
Client	Tennessee Valley Authority	Boring Location	733,085.92 N; 1,510,402.97 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	390.1 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
91	91.3	298.8	Shale, dark brown, very fine grained, moderately hard, very thin to thin bedded, slight organic odor, 15° bedding angle, traces of limestone lenses					
92								
93				50	92.4 - 94.0	1.6	100	
94								
95			Shale (80%) With Limestone (20%) Shale, dark brown, very fine grained to fine grained, moderately hard, very thin to medium bedded, no odor, calcareous, 15° bedding angle,					
96								
97	97.1	293.0		76	94.0 - 99.0	5.0	94	
98			Limestone, light gray to gray, very thin to thin bedded					
99								
100								
101								
102				86	99.0 - 104.0	5.0	100	
103								
104	104.0	286.1						

Bottom of Hole at 104.0 Ft.

Top of Rock = 82.6 Ft.  
 Top of Rock Elevation = 307.5 Ft.  
 Begin Core = 84.0 Ft.

Boring backfilled with 30% solids bentonite grout.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
 G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface


TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 3/11/21

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-B12</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>732,974.31 N; 1,511,391.80 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>387.4 ft</u> Elevation Datum <u>NGVD29</u>	
Project Name <u>CUF TDEC Order</u>		Date Started <u>3/14/19</u> Completed <u>3/18/19</u>	
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Inspector <u>T. Greenwell</u> Logger <u>T. Greenwell</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 45T#2, #814</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>NQ-3 Wireline, Split Barrel, Surface Set Bit</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>			
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>B. Halada</u>		Approved By <u>A. Welshans</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	387.4						
	0.5	386.9			SS01aG	0.0 - 0.5		
1			SANDY POORLY GRADED GRAVEL, GP, 7.5YR 3/3 (dark brown) and 7.5YR 2.5/1 (black), fine to medium, medium dense, dry, subrounded, [CCR]		SS1bG	0.5 - 1.5	1.4	5-5-6
2								
	2.7	384.7			SS02G	2.5 - 4.0	1.1	2-3-3
3			GRAVELLY FAT CLAY, CH, 2.5YR 5/6 (red) with 2.5YR 4/1 (dark reddish gray), high plasticity, medium stiff, moist, [FILL]					
4								
5								
6					SS03G	5.0 - 6.5	1.3	2-4-4
7								
8	8.3	379.1			SS04G	7.5 - 9.0	1.2	3-8-11
9			LEAN CLAY TRACE SAND, CL, 7.5YR 5/2 (brown) to 10YR 4/1 (dark gray), medium plasticity, stiff to medium stiff, moist, [FILL]					
10								
11								
12								
13					SS06	12.5 - 14.0	1.0	3-4-5
14	14.5	372.9						
15			FAT CLAY SOME GRAVEL, CH, 7.5YR 5/3 (brown), high plasticity, soft, moist					
16								
17								
18	17.8	369.6			SS07G	15.0 - 16.5	0.3	1-2-1

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT:20190630.GDT:417720

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B12</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  732,974.31 N; 1,511,391.80 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  387.4 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			SANDY LEAN CLAY WITH GRAVEL, CL, 7.5YR 5/3 (brown) to 10YR 5/2 (grayish brown), low to medium plasticity, very soft, moist, slight organic odor, trace organics (fine roots) <i>(Continued)</i>  FAT CLAY TRACE GRAVEL, CH, 10YR 5/3 (brown) with 10YR 5/1 (gray), high plasticity, stiff to very stiff, moist, iron oxide staining, gravelly lenses interspersed throughout  GRAVELLY LEAN CLAY WITH SAND, CL, 7.5YR 5/2 (brown) to 7.5YR 4/6 (strong brown), medium plasticity, stiff to very stiff, moist, iron oxide staining, chert fragments and subangular gravel  FAT CLAY TRACE GRAVEL, CH, 10YR 8/3 (very pale brown) to 10YR 6/6 (brownish yellow), high plasticity, very soft to medium stiff, moist to wet, iron oxide staining, homogeneous, chert fragments		SS08G	17.5 - 19.0	1.5	1-1-3
19				SS09aG	20.0 - 21.0	1.3	1-2-7	
20				SS09bG	21.0 - 21.5			
21	21.0			366.4	SS10G	22.5 - 24.0	1.5	6-6-10
22					SS11G	25.0 - 26.5	1.4	3-5-7
23					SS12G	27.5 - 29.0	1.1	3-4-6
24					SS13G	30.0 - 31.5	1.5	6-7-9
25					SS14G	32.5 - 34.0	1.5	3-4-6
26					SS15G	35.0 - 36.5	1.5	1-2-3
27	27.0			360.4	SS16G	37.5 - 39.0	1.5	1-1-3
28					SS17G	40.0 - 41.5	1.5	1-1-2
29								
30								
31								
32								
33	33.6			353.8				
34								
35								
36								
37								
38								
39								
40								
41								
42								




TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B12</b>
Client	Tennessee Valley Authority	Boring Location	732,974.31 N; 1,511,391.80 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	387.4 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
43			FAT CLAY TRACE GRAVEL, CH, 10YR 8/3 (very pale brown) to 10YR 6/6 (brownish yellow), high plasticity, very soft to medium stiff, moist to wet, iron oxide staining, homogeneous, chert fragments <i>(Continued)</i>		SS18G	42.5 - 44.0	1.5	2-2-3	
44					SS19G	45.0 - 46.5	1.5	1-2-2	
45				O-ring found in sample at 46.0'					
46									
47									
48	48.0	339.4			SS20G	47.5 - 49.0	1.1	1-6-5	
49									
50	50.0	337.4	FAT CLAY WITH GRAVEL, CH, 10YR 8/3 (very pale brown) to 10YR 6/6 (brownish yellow), high plasticity, medium stiff to stiff, wet, iron oxide staining Split-spoon sample SS21G walked downslope or found clay seam adjacent to rock core		SS21G	49.0 - 50.5	1.3	2-2-4	
51								Began Core	
52			Limestone, light gray, finely crystalline to medium crystalline, moderately hard to hard, thin to medium bedded, moderately weathered to slightly weathered, inclined, 45° bedding angle, with very thin shale partings Water stained from 50.1' to 50.9'		92	50.0 - 55.0 5.0	4.9	98	
53									
54									
55	55.0	332.4							
56			Limestone, very light gray to gray, finely crystalline to medium crystalline, hard, thin bedded, slightly weathered, interbedded, 15° to 45° bedding angle, with shale stringers		96	55.0 - 60.0 5.0	5.0	100	
57									
58									
59									
60									
61									
62			Calcite inclusion from 61.8' to 61.9'		100	60.0 - 65.0 5.0	5.0	100	
63									
64									
65									
66	66.3	321.1							

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B12</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  732,974.31 N; 1,511,391.80 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  387.4 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
67			Limestone (90%) With Shale (10%)					
68			Limestone, light gray with gray, finely crystalline to medium crystalline, moderately hard to hard, very thin bedded to thin bedded, freshly weathered, 15° bedding angle,		96	65.0 - 70.0 5.0	4.8	96
69								
70	70.0	317.4						

Shale, dark gray, very fine grained, thin bedded  
*(Continued)*

Bottom of Hole at 70.0 Ft.

Top of Rock = 50.0 Ft.

Top of Rock Elevation = 337.4 Ft.

Begin Core = 50.0 Ft.

Boring backfilled with 30% solids bentonite grout.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
  G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B13</b>	
Client	Tennessee Valley Authority	Boring Location	732,439.01 N; 1,511,388.27 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	394.7 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	3/11/19	Completed 3/13/19
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	N/A	Date/Time N/A
Inspector	T. Greenwell	Logger	T. Greenwell	Depth to Water N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 45T#2, #814	
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes			
Rock Drilling and Sampling Tools (Type and Size)	NQ-3 Wireline, Split Barrel, Impregnated Bit			
Overdrill Tooling (Type and Size)	N/A	Overdrill Depth	N/A	
Sampler Hammer Type	Automatic	Weight	140 lb	Drop 30" Efficiency N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	B. Halada	Approved By	A. Welshans	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	394.7	Top of Hole					
0	0.2	394.5	Crushed stone with silt			0.0 - 1.5	1.2	1-1-2
1			GRAVELLY FAT CLAY, CH, 2.5YR 4/6 (red) to 5YR 5/3 (reddish brown), medium to high plasticity, very soft to medium stiff, moist, homogeneous, [FILL]		SS01G	0.0 - 1.5		
2						2.5 - 4.5	1.1	600
3					ST01G	2.5 - 4.5		
4						5.0 - 6.5	1.4	1-3-6
5					SS02G	5.0 - 6.5		
6						7.5 - 9.0	0.8	6-6-6
7					SS03G	7.5 - 9.0		
8						10.0 - 11.5	0.7	9-7-8
9					SS04G	10.0 - 11.5		
10	12.0	382.7	FAT CLAY WITH GRAVEL, CH, 5YR 5/3 (reddish brown) with 7.5YR 6/4 (light brown), high plasticity, medium stiff to very soft, moist			12.5 - 14.0	1.4	2-3-4
11					SS05G	12.5 - 14.0		
12						15.0 - 16.5	1.5	1-1-1
13					SS06G	15.0 - 16.5		
14								
15								
16								
17								
18								

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 5/13/20



Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
18			FAT CLAY WITH GRAVEL, CH, 5YR 5/3 (reddish brown) with 7.5YR 6/4 (light brown), high plasticity, medium stiff to very soft, moist (Continued)		ST02G	17.5 - 19.5	2.3	300	
20	20.0		374.7	FAT CLAY TRACE GRAVEL, CH, 7.5YR 5/3 (brown) to 5YR 5/3 (reddish brown), high plasticity, very soft, wet, iron oxide staining, homogeneous		SS07G	20.0 - 21.5	1.5	1-1-2
22					SS08G	22.5 - 24.0	1.5	WH-WH-WH	
26	26.5		368.2	Wet at 25.5'		SS09G	25.0 - 26.5	1.3	WH-WH-4
27				Weathered bedrock					
28	28.5	366.2	Auger refusal at 27.5 feet. Casing advanced to 28.5 feet.					Began Core	
29			Limestone, light gray to purple, microcrystalline to medium crystalline, moderately hard to very hard, very thin bedded to thin bedded, moderately weathered to highly weathered, water staining, calcareous, 45° to 60° bedding angle		53	28.5 - 30.0 1.5	1.3	87	
31				Core water loss in fracture at 28.8 feet		20	30.0 - 32.5 2.5	1.6	64
32				Calcite infill of fracture at 29.1 feet, dipping at 45°					
33				Clay seam from 29.8 to 30.5 feet					
34				Casing advanced to 30.8 feet					
35			Open fractures noted at 31.3, 31.8, 32.1, and 32.9 feet		77	32.5 - 35.5 3.0	3.0	100	
36			Open fractures observed at 35.8 and 36.3 feet						
38					46	35.5 - 40.5 5.0	3.1	62	
40	40.0	354.7	Void from 39.1 to 39.6 feet						
41			Clay layer (No sample recovery from coring. Material was washed away.)						

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 5/13/20

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B13</b>
Client	Tennessee Valley Authority	Boring Location	732,439.01 N; 1,511,388.27 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	394.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43	43.0 351.7		Limestone, light gray, microcrystalline to medium crystalline, moderately hard to very hard, very thin bedded to thin bedded, moderately weathered, water staining, calcareous, 45° bedding angle		8	40.5 - 45.5 5.0	0.4	8
44	43.5 351.2			Clay layer (No sample recovery from coring. Material was washed away.)		0	45.5 - 48.5 3.0	0.0
48	48.5 346.2		FAT CLAY TRACE SAND, CH, 5YR 5/3 (reddish brown), high plasticity, very soft, wet					
53					SS10G	50.0 - 55.0	1.1	WH-WH-WH
55	55.0 339.7		SILTY LEAN CLAY WITH SAND, CL, 7.5YR 4/1 (dark gray) to 10YR 5/2 (grayish brown), low to medium plasticity, very soft, wet, slight organic odor		SS11aG	55.0 - 58.5	2.0	WH-WH-WH
57					SS11bG	58.5 - 60.0		
61	60.7 334.0		Limestone, light brown to dark gray, finely crystalline to medium crystalline, very soft to soft, completely weathered to highly weathered, moist, water staining, argillaceous		SS12G	60.0 - 61.5	1.5	WH-28-25
63	63.5 331.2		FAT CLAY TRACE SAND, CH, 7.5YR 4/2 (brown), medium to high plasticity, medium stiff, wet					
65					SS13G	65.0 - 66.5	0.5	1-2-5

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 5/13/20

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B13</b>
Client	Tennessee Valley Authority	Boring Location	732,439.01 N; 1,511,388.27 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	394.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
67	67.0	327.7						
			Weathered Bedrock					
68	68.5	326.2						
			Clay seam					
69	69.5	325.2						
	69.7	325.0	Weathered Bedrock					
70			Limestone, light gray, finely crystalline to medium crystalline, hard, thick bedded, slightly weathered to freshly weathered, horizontal, 0° bedding angle, Healed fractures in upper 2 feet. Close fracture at 78.2 feet.	100		69.7 - 70.5 0.8	0.8	100
71								
72								
73				98		70.5 - 75.5 5.0	4.9	98
74								
75								
76								
77								
78				100		75.5 - 80.5 5.0	5.0	100
79								
80	80.5	314.2						

Bottom of Hole at 80.5 Ft.

Top of Rock = 26.5 Ft.

Top of Rock Elevation = 368.2 Ft.

Begin Core = 28.5 Ft.

Boring backfilled with 30% solids bentonite grout.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 5/13/20



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B14</b>	
Client	Tennessee Valley Authority	Boring Location	731,519.55 N; 1,511,209.75 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	440.8 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	3/26/19	Completed 4/12/19
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	67.5 ft	Date/Time 3/28/19 07:00
Inspector	M. McDonald	Logger	M. McDonald	Depth to Water N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 75#2, #712	
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes			
Rock Drilling and Sampling Tools (Type and Size)	NQ-3 Wireline, Split Barrel, Surface Set Bit			
Overdrill Tooling (Type and Size)	N/A	Overdrill Depth	N/A	
Sampler Hammer Type	Automatic	Weight	140 lb	Drop 30" Efficiency N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	B. Halada	Approved By	A. Welshans	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	440.8		Top of Hole					
1			SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very loose to medium dense, dry to moist, poorly graded, [CCR]		SS01G	0.0 - 1.5	0.6	WH-2-2
2					SS02G	2.5 - 4.0	1.1	9-12-10
5	435.8		SANDY SILT, ML, 5Y 2.5/1 (black), very fine to fine, non-plastic, very soft, dry to moist, well graded, [CCR]		SS03G	5.0 - 6.5	1.5	6-8-9
7					SS04G	7.5 - 8.1	0.6	37-50/1"
8	433.3		POORLY GRADED SAND LITTLE GRAVEL, SP, 10YR 3/2 (very dark grayish brown), fine, non-plastic, very dense, dry to moist, poorly graded, with a little fine subangular gravel, [CCR]		SS05G	10.0 - 10.5	0.5	50/6"
10					SS06G	12.5 - 12.9	0.4	50/5"
11	430.8		SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very dense, dry to moist, poorly graded, [CCR]		SS07G	15.0 - 15.3	0.3	50/4"
13					SS08G	17.5 - 17.8	0.3	50/4"

TVA/EIP BORING LOG: 175568209\_CUF\_TDEC\_ORDER.GPJ TDEC SUBSURF DT:20190630.GDT: 4/13/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B14</b>
Client	Tennessee Valley Authority	Boring Location	731,519.55 N; 1,511,209.75 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	440.8 ft
		Elevation Datum	NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very dense, dry to moist, poorly graded, [CCR] (Continued)			17.5 - 17.8		
19								
20					SS09G	20.0 - 20.4	0.4	50/5"
21								
22					SS10G	22.5 - 22.9	0.4	50/5"
23								
24								
25								
26.0	414.8				SS11G	25.0 - 26.2	1.2	40-48-50/2"
26.2	414.6							
27			POORLY GRADED SAND LITTLE GRAVEL, SP, 10YR 3/2 (very dark grayish brown), very fine to coarse, non-plastic, very dense, dry to moist, poorly graded, with a little fine subangular gravel, [CCR]					
28					SS12G	27.5 - 27.8	0.3	50/4"
29			SILTY SAND TRACE CLAY, SM, 10YR 3/2 (very dark grayish brown), fine to medium, non-plastic, medium dense to very dense, dry to moist, poorly graded, [CCR]					
30								
31					SS13G	30.0 - 31.5	1.5	8-10-12
32								
32.5	408.3							
33			POORLY GRADED SAND LITTLE GRAVEL, SP, 10YR 4/3 (brown) to 10YR 2/1 (black), very fine to coarse, non-plastic, dense, dry to moist, poorly graded, with a little fine subangular gravel, [CCR]					
34					SS14G	32.5 - 34.0	1.2	16-22-22
35			Increased silt content at 35.0'					
36					SS15G	35.0 - 36.5	1.3	13-16-18
37								
38					SS16G	37.5 - 39.0	1.5	16-28-24
39								
40					ST01G	40.0 - 40.4	0.0	1200
41			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, medium stiff to very stiff, dry to moist, with some very fine-grained sand, [CCR]					
42					SS17G	40.4 - 41.9	1.3	14-12-9

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/13/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B14</b>
Client	Tennessee Valley Authority	Boring Location	731,519.55 N; 1,511,209.75 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	440.8 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, medium stiff to very stiff, dry to moist, with some very fine-grained sand, [CCR] <i>(Continued)</i>		SS18G	42.5 - 44.0	0.7	4-4-3
44								
45								
46					ST02G	45.0 - 47.0	2.0	350
47								
48					SS19G	47.5 - 49.0	1.2	3-4-4
49								
50	50.0	390.8						
51			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown) and 10YR 4/3 (brown), very fine to coarse, non-plastic, loose, dry to moist, interbedded silty sand and poorly graded fine to coarse sand, traces of fine subangular gravel, [CCR]		SS20G	50.0 - 51.5	1.3	1-2-3
52	52.5	388.3						
53			POORLY GRADED SAND LITTLE GRAVEL, SP, 10YR 4/3 (brown) to 10YR 2/1 (black), very fine to coarse, non-plastic, dense, dry to moist, poorly graded, with a little fine subangular gravel, [CCR]		SS21G	52.5 - 54.0	1.3	2-3-4
54								
55	55.0	385.8						
56			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, soft to stiff, dry to moist, with some angular fine-grained sand, [CCR] Laminated and red-brown and black fine-grained sand from 55.0' to 55.4'		SS22G	55.0 - 56.5	1.5	1-2-1
57								
58					SS23G	57.5 - 59.0	1.5	5-4-5
59			Fine to coarse-grained sand, black, traces of organic odor from 58.7' to 59.0'					
60	60.0	380.8						
61			SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, stiff, moist to wet, trace of very fine-grained sand, [CCR]		ST03G	60.0 - 62.0	2.0	400
62								
63					SS24G	62.5 - 64.0	1.1	3-5-4
64								
65	65.0	375.8						
66					SS25G	65.0 - 66.5	1.4	2-4-5

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/13/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
67			POORLY GRADED SAND LITTLE GRAVEL, SP, 10YR 2/1 (black), very fine to coarse, loose to medium dense, moist to wet, poorly graded, with a little fine subangular gravel and traces of interbedded silty sand, [CCR] <i>(Continued)</i>					
68				SS26G	67.5 - 69.0	1.0	6-5-4	
69								
70								
71				SS27G	70.0 - 71.5	1.2	3-6-7	
72								
73	73.5	367.3		SS28G	72.5 - 74.0	1.5	3-4-3	
74			SILTY SAND LITTLE CLAY, SM, 2.5Y 4/2 (dark grayish brown), very fine to fine, loose, moist to wet, laminated, [CCR]					
75				SS29G	75.0 - 76.5	1.5	1-1-4	
76								
77				SS30G	77.5 - 79.0	1.5	2-2-4	
78								
79								
80								
81	81.4	359.4		ST04G	80.0 - 81.4	1.4	500	
82			CLAYEY GRAVEL WITH SAND, GC, 5YR 5/6 (yellowish red) and 10YR 5/3 (brown), fine to coarse, medium plasticity, dense, dry to moist, slight organic odor, angular Possible CCR-Alluvial interface at 81.4'					
83				SS31G	82.5 - 84.0	1.2	11-11-14	
84								
85	85.0	355.8						
86			LEAN CLAY TRACE SAND, CL, 5YR 5/6 (yellowish red), medium plasticity, medium stiff, dry to moist, trace of fine-grained sand and with a little fine to medium subrounded gravel					
87				SS32G	85.0 - 86.5	1.3	WH-2-6	
88	87.5	353.3						
89			CLAYEY GRAVEL LITTLE SAND, GC, 5YR 5/6 (yellowish red), medium to coarse, medium plasticity, medium dense, moist to wet, subrounded Poorly graded gravel, N 4/ (dark gray), with slight organic odor from 88.9' to 89.0'					
90				SS33G	87.5 - 89.0	1.2	12-12-8	

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/13/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
91			LEAN CLAY TRACE SAND, CL, 2.5Y 4/3 (olive brown), medium plasticity, medium stiff, moist to wet, slight organic odor, with a little fine to medium subrounded gravel (Continued)		SS34G	90.0 - 91.5	0.9	3-3-4
92								
93					ST05G	92.5 - 94.1	0.0	800
94								
95	95.0	345.8	CLAYEY GRAVEL WITH SAND, GC, 10YR 4/4 (dark yellowish brown) and 10YR 8/6 (yellow), very fine to coarse, dense, moist to wet, slight organic odor, subangular, possible weathered rock, with a little fine-grained sand		SS35G	95.0 - 95.1	0.1	50/1"
96								
97								
98					SS36G	97.5 - 99.0	1.5	12-28-16
99								
100	100.0	340.8	SILTY LEAN CLAY, CL, 5Y 4/2 (olive gray), medium plasticity, very stiff, moist, slight organic odor		SS37aG	100.0 - 101.0	1.5	1-21-20
101	101.0	339.8				SS37bG	101.0 - 101.5	
102			WELL GRADED SAND LITTLE GRAVEL, SW, 2.5Y 4/4 (olive brown), very fine to coarse, dense, moist to wet, slight organic odor, with a little fine to medium subangular gravel up to 1/4" in diameter, traces of wood fragments					
103						SS38G	102.5 - 104.0	1.3
104								
105								
106					SS39G	105.0 - 106.5	1.1	5-12-15
107	107.5	333.3	WELL GRADED SAND TRACE GRAVEL AND SILT, SW, 10YR 5/6 (yellowish brown) with 5GY 4/2 (dark grayish green), medium to coarse, dense, moist to wet, strong organic odor					
108						SS40G	107.5 - 109.0	1.4
109								
110	110.5	330.3	CLAYEY SAND WITH GRAVEL, SC-SM, 5GY 4/1 (dark greenish gray), fine to coarse, medium plasticity, medium dense to dense, moist to wet, strong organic odor, stratified Silty sand at SW and CH interface at 110.5'		SS41aG	110.0 - 110.5	1.3	17-7-7
111						SS41bG	110.5 - 111.5	
112								
113					SS42G	112.5 - 114.0	1.3	20-21-17
114								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 4/13/21









Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-B14</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>731,519.55 N; 1,511,209.75 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>440.8 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
115	115.0	325.8	 FAT CLAY LITTLE SAND, CH, 5GY 4/1 (dark greenish gray), medium to high plasticity, stiff to very stiff, moist, slight organic odor SS43G all lean to fat clay		SS43G	115.0 - 116.5	1.0	2-5-7	
116									
117									
118	118.0	322.8	 WELL GRADED SAND TRACE GRAVEL, SW, 10YR 5/6 (yellowish brown) to 5GY 3/1 (very dark greenish gray), medium to coarse, dense, moist to wet, with some fine subangular gravel and interbedded lean clay		SS44aG	117.5 - 118.0	1.5	27-34-38	
119					SS44bG	118.0 - 119.0			
120									
121						SS45G	120.0 - 121.5	0.9	22-28-7
122									
123	123.4	317.4			SS46G	122.5 - 123.4	0.8	33-50/5"	
124									
125	125.0	315.8	 Limestone, light blue gray with light brown, hard, thin, highly weathered, carbonaceous, 30° bedding angle, 123.4 to 125.0 not sampled, drill able to auger and set casing through material					Began Core	
126			 Limestone, light blue gray with light brown, microcrystalline to very finely crystalline, hard, thin to medium bedded, carbonaceous, 30° bedding angle, with shale streaks, partings, and stringers Bedding fracture, 30°, stepped planarity, rough to smooth, matte surface, Break along shale parting, slightly weathered, at 125.8'		70	125.0 - 129.6 4.6	4.6	100	
127									
128									
129									
130									
131									
132					68	129.6 - 134.6 5.0	4.6	92	
133									
134			Clay Seam, no recovery from 134.0' to 134.4'						
135									
136			Bedding fracture, 45°, infilled, calcite infilling, medium persistence, stepped planarity, Healed 45° fracture from 135.6 to 136.1, at 135.7'		60	134.6 - 138.6 4.0	3.9	98	
137									
138									

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 4/13/21

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B14</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  731,519.55 N; 1,511,209.75 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  440.8 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
139			Limestone, light blue gray with light brown, microcrystalline to very finely crystalline, hard, thin to medium bedded, carbonaceous, 30° bedding angle, with shale streaks, partings, and stringers <i>(Continued)</i>					
140								
141								
142				82	138.6 - 145.1	6.5	6.5	100
143								
144								
145	145.1	295.7						

Bottom of Hole at 145.1 Ft.

Top of Rock = 123.4 Ft.  
 Top of Rock Elevation = 317.4 Ft.  
 Begin Core = 125.0 Ft.

Vibrating wire piezometers installed. See installation log for backfill details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
 G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/13/21

Client Borehole ID <u>  N/A  </u>		Stantec Boring No. <b>CUF-B15</b>	
Client <u>  Tennessee Valley Authority  </u>		Boring Location <u>  730,949.04 N; 1,510,827.32 E NAD27 Plant Local  </u>	
Project Number <u>  175568209  </u>		Surface Elevation <u>  438.3 ft  </u>	Elevation Datum <u>  NGVD29  </u>
Project Name <u>  CUF TDEC Order  </u>		Date Started <u>  4/25/19  </u>	Completed <u>  5/3/19  </u>
Project Location <u>  Stewart Co, Cumberland City, TN  </u>		Depth to Water <u>  65.7 ft  </u>	Date/Time <u>  4/30/19 07:13  </u>
Inspector <u>  L. Eaves  </u>	Logger <u>  L. Eaves  </u>	Depth to Water <u>  N/A  </u>	Date/Time <u>  N/A  </u>
Drilling Contractor <u>  Stantec Consulting Services Inc.  </u>		Drill Rig Type and ID <u>  CME 85#2, #951  </u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>  4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes  </u>			
Rock Drilling and Sampling Tools (Type and Size) <u>  NQ-3 Wireline, Split Barrel, Surface Set Bit  </u>			
Overdrill Tooling (Type and Size) <u>  N/A  </u>		Overdrill Depth <u>  N/A  </u>	
Sampler Hammer Type <u>  Automatic  </u>	Weight <u>  140 lb  </u>	Drop <u>  30"  </u>	Efficiency <u>  N/A  </u>
Borehole Azimuth <u>  N/A  </u>		Borehole Inclination (from Vertical) <u>  N/A  </u>	
Reviewed By <u>  B. Halada  </u>		Approved By <u>  A. Welshans  </u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	438.3	Top of Hole					
1			SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very dense, dry to moist, [CCR]		SS01G	0.0 - 1.5	1.3	7-14-36
2					SS02G	2.5 - 3.1	0.6	25-50/1"
3					SS03G	5.0 - 5.8	0.8	34-50/4"
4					SS04G	7.5 - 8.2	0.7	27-50/2"
5					SS05G	10.0 - 10.9	0.9	10-50/5"
6					SS06G	12.5 - 14.0	1.1	6-7-8
7								
8								
9								
10								
11								
12								
13								
14								
15								
16					ST01G	15.0 - 15.8	0.8	1000
17								

TVA EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20



# SUBSURFACE LOG

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-B15</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>730,949.04 N; 1,510,827.32 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>438.3 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
17			SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very dense, dry to moist, [CCR] (Continued)					
18				SS07G	17.5 - 18.7	1.2	18-42-50/2"	
19								
20								
21				SS08G	20.0 - 21.5	1.2	15-18-20	
22								
23				SS09G	22.5 - 23.3	0.8	28-50/4"	
24								
25				SS10G	25.0 - 25.4	0.4	50/5"	
26								
27								
28				SS11G	27.5 - 28.3	0.8	24-50/4"	
29								
30				SS12G	30.0 - 30.4	0.4	50/5"	
31								
32								
33			SS13G	32.5 - 33.4	0.9	24-50/5"		
34								
35								
36			SS14G	35.0 - 36.1	1.1	13-21-50/1"		
37								
38			SS15G	37.5 - 38.3	0.8	15-50/4"		
39								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
40			SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very dense, dry to moist, [CCR] <i>(Continued)</i>		SS16G	40.0 - 41.2	1.2	16-36-50/2"
41					SS17G	42.5 - 43.3	0.8	40-50/4"
42					SS18G	45.0 - 46.5	1.5	28-40-26
43					SS19G	47.5 - 49.0	1.5	8-10-14
44								
50	50.0	388.3						
51			WELL GRADED SAND LITTLE GRAVEL, SW, 10YR 4/3 (brown) to 10YR 2/1 (black), very fine to coarse, non-plastic, dense, moist to wet, poorly graded, with a little fine subangular gravel, [CCR]		SS20G	50.0 - 51.5	1.3	9-22-26
52								
53	53.5	384.8	Geotextile fabric above gravel layer at 53.5'		SS21aG	52.5 - 53.5	1.5	6-8-8
54			SANDY WELL GRADED GRAVEL, GW, 5YR 5/1 (gray), very fine to coarse, wet, well graded, [FILL]		SS21bG	53.5 - 54.0		
55	55.0	383.3						
56			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, very soft, moist to wet, [CCR]		SS22G	55.0 - 56.5	1.5	10-4-9
57								
58					SS23G	57.5 - 59.0	1.1	WR-WH-1
59								
60								
61					SS24G	60.0 - 61.5	1.5	1-WR-3
62								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 4/17/20

Client Borehole ID <u>  N/A  </u>			Stantec Boring No. <b>CUF-B15</b>						
Client <u>  Tennessee Valley Authority  </u>			Boring Location <u>  730,949.04 N; 1,510,827.32 E NAD27 Plant Local  </u>						
Project Number <u>  175568209  </u>			Surface Elevation <u>  438.3 ft  </u> Elevation Datum <u>  NGVD29  </u>						
Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
63			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, very soft, moist to wet, [CCR] <i>(Continued)</i> Large gravel particle interference with SS at 64'		SS25G	62.5 - 64.0	1.5	WH-WH-14	
64									
65									
66						SS26G	65.0 - 66.5	1.5	1-WH-WH
67									
68						SS27G	67.5 - 69.0	1.5	WR-WR-WH
69									
70									
71						SS28G	70.0 - 71.5	1.5	WR-WR-1
72									
73					SS29G	72.5 - 74.0	1.5	WR-WH-1	
74									
75									
76					SS30G	75.0 - 76.5	1.5	1-WR-WR	
77									
78					ST02G	77.0 - 78.2	1.2	750	
79									
80	80.0	358.3							
81			SILTY SAND, SM, 2.5Y 4/2 (dark grayish brown), very fine to fine, very loose, moist to wet, [CCR]		SS31G	80.0 - 81.5	1.5	1-WH-6	
82									
83						SS32G	82.5 - 84.0	1.5	WH-1-4
84									
85									

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
86			SILTY SAND, SM, 2.5Y 4/2 (dark grayish brown), very fine to fine, very loose, moist to wet, [CCR] <i>(Continued)</i>		SS33G	85.0 - 86.5	1.5	WR-WH-1
87								
88					SS34G	87.5 - 89.0	0.5	WR-WR-WR
89								
90					SS35G	90.0 - 91.5	0.5	WR-WR-WR
91								
92								
93					SS36G	92.5 - 94.0	0.2	WR-WR-1
94								
95								
96					SS37G	95.0 - 96.5	1.5	WR-WR-WR
97	97.5	340.8						
98			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), very fine to fine, non-plastic, soft, wet, moderate organic odor		SS38G	97.5 - 99.0	1.5	WR-1-1
99								
100								
101	101.1	337.2			SS39aG	100.0 - 101.1	1.5	2-4-2
102			LEAN CLAY WITH SAND, CL, 2.5Y 4/3 (olive brown), medium plasticity, firm, moist to wet, slight organic odor		SS39bG	101.1 - 101.5		
103	103.4	334.9			SS40aG	102.5 - 103.4	0.9	7-8-9
104			WELL GRADED SAND LITTLE GRAVEL, SW, 2.5Y 4/4 (olive brown), very fine to coarse, medium dense, moist to wet, slight organic odor		SS40bG	103.4 - 104.0		
105	105.0	333.3						
106			SANDY SILT, ML, 5Y 4/2 (olive gray), medium plasticity, hard, moist, slight organic odor		SS41G	105.0 - 106.5	1.0	3-10-13
107								
108	108.0	330.3						

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B15</b>
Client	Tennessee Valley Authority	Boring Location	730,949.04 N; 1,510,827.32 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	438.3 ft
		Elevation Datum	NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
109			GRAVELLY SILTY SAND, SM, 5GY 4/1 (dark greenish gray) to 10YR 4/2 (dark grayish brown), medium to coarse, medium dense, wet, well graded <i>(Continued)</i>		ST03G	107.5 - 109.5	0.9	1000
110	110.6	327.7			SS42aG	110.0 - 110.5		
111	111.1	327.2	SANDY SILTY GRAVEL, GM, 10YR 4/2 (dark grayish brown), fine to medium, medium dense, wet		SS42bG	110.5 - 111.0	1.5	14-18-8
					SS42cG	111.0 - 111.5		
112	112.3	326.0	CLAYEY SAND WITH GRAVEL, SC, 5GY 4/1 (dark greenish gray) to 10YR 4/2 (dark grayish brown), fine to medium, medium dense, wet					
113			CLAYEY GRAVEL TRACE SAND, GC, 10YR 5/2 (grayish brown) to 10YR 5/6 (yellowish brown), fine to medium, medium dense to dense, wet		SS43G	112.5 - 114.0	1.2	19-18-26
114								
115								
116					SS44G	115.0 - 116.5	0.8	15-19-22
117								
118					SS45G	117.5 - 119.0	0.6	10-8-8
119	119.5	318.8						
120	120.7	317.6	CLAYEY SAND TRACE GRAVEL, SC, 10YR 4/2 (dark grayish brown), fine to medium, very loose, wet		SS46aG	120.0 - 120.5		
121			CLAYEY GRAVEL TRACE SAND, GC, 10YR 5/6 (yellowish brown) to 10YR 3/6 (dark yellowish brown), fine to medium, dense, wet		SS46bG	120.5 - 121.5	1.1	2-11-20
122								
123	123.5	314.8			SS47G	122.5 - 123.7	1.1	18-17-50/2"
124			Limestone, dark gray, moderately hard, highly weathered					
125	125.5	312.8						Began Core
126			Limestone, light gray to gray, microcrystalline, very soft, medium bedded, moderately weathered to slightly weathered, water staining, argillaceous, 45° to 60° bedding angle Fractures at 126.4', 126.6', 126.9', 127.5', 128.1', 128.4', and 128.8'		53	125.5 - 130.2 4.7	3.5	74
127								
128								
129	129.0	309.3	Clay-filled feature					
130								
131								

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT: 20190630 GDT: 4/17/20



Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
132			Clay-filled feature (Continued)						
133									
134									
135									
136	136.3	302.0							
137	137.1	301.2	Weathered bedrock						
138			Limestone, pale gray brown to light gray, very fine grained, moderately hard to hard, thin bedded to medium bedded, highly weathered to slightly weathered, argillaceous, clay infill of fractures		100	137.1 - 137.9 0.8	137.1 - 137.9 0.8	0.8	100
139									
140									
141									
142									
143									
144									
145	144.7	293.6							
146			Clay-filled feature. Driller indicated that it felt like the core barrel was walking down a high angle fracture in bedrock.		36	142.9 - 147.9 5.0	142.9 - 147.9 5.0	1.8	36
147									
148									
149									
150									
151									
152									
153									

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B15</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,949.04 N; 1,510,827.32 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  438.3 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
154		/ / / / /	Clay-filled feature. Driller indicated that it felt like the core barrel was walking down a high angle fracture in bedrock. <i>(Continued)</i>					
155				0	152.9 - 157.9	5.0	152.9 - 157.9	0.0
156			Core barrel broke off of drill string and left in the boring.					
157	157.9	280.4						

Bottom of Hole at 157.9 Ft.

Top of Rock = 123.5 Ft.  
 Top of Rock Elevation = 314.8 Ft.  
 Begin Core = 125.5 Ft.

Vibrating wire piezometers installed. See installation log for backfill details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
    G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-B16</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>730,628.44 N; 1,510,693.12 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>439.7 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>12/6/18</u>	Completed <u>12/12/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>50.5 ft</u>	Date/Time <u>12/11/18 13:30</u>
Inspector <u>M. Aplin</u>	Logger <u>M. Aplin</u>	Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 75#2, #712</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>NQ-3 Wireline, Split Barrel, Impregnated Bit</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>Automatic</u>	Weight <u>140 lb</u>	Drop <u>30"</u>	Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>B. Halada</u>		Approved By <u>A. Welshans</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
0	0.0	439.7	Top of Hole						
1			SILT, ML, 10YR 3/1 (very dark gray) to 7.5YR 3/2 (dark brown), non-plastic, hard, dry to moist, trace fine to medium sand, [CCR]		SS01G	0.0 - 1.5	1.5	5-15-25	
2									
3					SS02G	2.5 - 3.8	1.3	7-11-50/4"	
4									
5					SS03G	5.0 - 6.5	1.5	17-35-20	
6									
7					SS04G	7.5 - 9.0	1.4	17-18-18	
8									
9									
10				SS05G	10.0 - 11.5	1.5	17-15-26		
11									
12									
13				SS06G	12.5 - 14.0	1.5	13-15-18		
14									
15									
16				SS07G	15.0 - 16.5	1.5	5-10-41		
17									
18				SS08G	17.5 - 18.0	0.5	50/6"		

TVA/EIP BORING LOG: 175568209\_CUF\_TDEC\_ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 4/17/20



# SUBSURFACE LOG

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-B16</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>730,628.44 N; 1,510,693.12 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>439.7 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
18			SILT, ML, 10YR 3/1 (very dark gray) to 7.5YR 3/2 (dark brown), non-plastic, hard, dry to moist, trace fine to medium sand, [CCR] <i>(Continued)</i>			17.5 - 18.0			
19									
20						SS09G	20.0 - 20.8	0.8	20-50/4"
21									
22									
23						SS10G	22.5 - 23.4	0.9	21-50/5"
24									
25						SS11G	25.0 - 25.9	0.9	21-50/5"
26									
27									
28						SS12G	27.5 - 28.2	0.7	26-50/2"
29									
30						SS13G	30.0 - 30.9	0.9	25-50/5"
31									
32									
33						SS14G	32.5 - 33.3	0.8	25-50/4"
34									
35					SS15G	35.0 - 35.7	0.7	32-50/2"	
36									
37									
38					SS16G	37.5 - 38.3	0.8	41-50/4"	
39									
40	40.0	399.7							
41			SILTY SAND, SM, 10YR 3/1 (very dark gray) to 7.5YR 3/2 (dark brown), fine to medium, dense to very dense, dry to moist, poorly graded, [CCR]		SS17G	40.0 - 41.5	1.5	26-42-45	
42									

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B16</b>
Client	Tennessee Valley Authority	Boring Location	730,628.44 N; 1,510,693.12 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	439.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
43			SILTY SAND, SM, 10YR 3/1 (very dark gray) to 7.5YR 3/2 (dark brown), fine to medium, dense to very dense, dry to moist, poorly graded, [CCR] <i>(Continued)</i>		SS18G	42.5 - 44.0	1.5	12-13-13	
44									
45									
46									
47									
48					SS19G	47.5 - 48.2	0.7	26-50/2"	
49									
50									
51					SS20G	50.0 - 50.9	0.9	34-50/5"	
52									
53	53.5	386.2			SS21aG	52.5 - 53.5	1.0	13-16-14	
54			WELL GRADED GRAVEL WITH SAND, GW, 5YR 4/1 (dark gray), coarse, loose, dry, [FILL]		SS21bG	53.5 - 54.0			
55	55.3	384.4							
56			SILT, ML, 10YR 4/2 (dark grayish brown), non-plastic to low plasticity, soft, moist to wet, [CCR]		SS22G	55.0 - 56.5	1.0	6-6-7	
57									
58						SS23G	57.5 - 59.0	1.5	4-1-1
59									
60									
61					ST01G	60.0 - 62.0	1.3	NA	
62									
63					SS24G	62.5 - 64.0	1.5	13-6-4	
64									
65									
66					SS25G	65.0 - 66.5	1.5	10-6-5	

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20



# SUBSURFACE LOG

Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-B16</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>730,628.44 N; 1,510,693.12 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>439.7 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
67			SILT, ML, 10YR 4/2 (dark grayish brown), non-plastic to low plasticity, soft, moist to wet, [CCR] (Continued)						
68					SS26G	67.5 - 69.0	67.5 - 69.0	1.5	WR-WH-WH
69									
70									
71					SS27G	70.0 - 71.5	70.0 - 71.5	1.5	WH-WH-1
72									
73					SS28G	72.5 - 74.0	72.5 - 74.0	1.5	WR-WR-2
74									
75									
76					SS29G	75.0 - 76.5	75.0 - 76.5	1.5	2-1-4
77									
78				SS30G	77.5 - 79.0	77.5 - 79.0	1.3	5-3-3	
79									
80									
81				SS31G	80.0 - 81.5	80.0 - 81.5	1.5	5-14-4	
82									
83				SS32G	82.5 - 84.0	82.5 - 84.0	0.6	WH-WH-WH	
84									
85									
86				SS33G	85.0 - 86.5	85.0 - 86.5	1.5	WH-WH-WH	
87									
88				SS34G	87.5 - 89.0	87.5 - 89.0	1.5	WH-WH-1	
89									
90									

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
91			SILT, ML, 10YR 4/2 (dark grayish brown), non-plastic to low plasticity, soft, moist to wet, [CCR] <i>(Continued)</i>		SS35G	90.0 - 91.5	1.5	1-WH-WH	
92									
93						SS36G	92.5 - 94.0	1.5	WH-WH-2
94									
95					SS37G	95.0 - 96.5	1.5	WH-WH-WH	
96									
97									
98	98.8	340.9			SS38G	97.5 - 99.0	1.5	WH-1-1	
99			FAT CLAY, CH, 5YR 3/1 (very dark gray), medium plasticity, soft, wet, strong organic odor, homogeneous, moderate cementation						
100						ST02G	99.0 - 101.0	1.7	NA
101									
102	101.8	337.9			SS39aG	101.0 - 101.8	1.5	6-8-13	
103	102.5	337.2			SS39bG	101.8 - 102.5			
103	103.0	336.7		WELL GRADED SAND WITH GRAVEL, SW, 5YR 4/1 (dark gray) with 7.5YR 6/3 (light brown), medium to coarse, medium dense		SS40aG	102.5 - 103.0	1.2	6-10-14
104			FAT CLAY, CH, 5YR 3/1 (very dark gray), medium plasticity, soft, wet, strong organic odor, homogeneous, moderate cementation		SS40bG	103.0 - 104.0			
105	105.0	334.7							
106			WELL GRADED SAND WITH GRAVEL, SW, 5YR 4/1 (dark gray) with 7.5YR 6/3 (light brown), medium to coarse, medium dense						
106	106.5	333.2				SS41G	105.0 - 106.5	0.8	11-12-10
107			WELL GRADED SAND WITH GRAVEL, SW, 7.5YR 6/3 (light brown), coarse, medium dense, moist, trace saturated light brown clay						
108						ST03G	107.5 - 109.5	1.3	NA
109			FAT CLAY, CH, 5YR 3/1 (very dark gray), medium plasticity, soft, wet, strong organic odor, homogeneous, moderate cementation						
110	110.8	328.9				SS42aG	110.0 - 110.8	1.3	2-4-9
111	111.5	328.2			SS42bG	110.8 - 111.5			
112				WELL GRADED SAND WITH GRAVEL, SW, 5YR 4/1 (dark gray) with 7.5YR 6/3 (light brown), medium to coarse, loose					
113	113.1	326.6			SS43aG	112.5 - 113.1			
114				CLAYEY SAND, SC, 7.5YR 5/1 (gray), fine to medium, medium dense, moist		SS43bG	113.1 - 114.0	1.1	10-12-13






TVA EIP BORING LOG 175568209 CUF TDEC SUBSURF DT 20190630 GDT 4/17/20

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
115	116.5	323.2			SS44G	115.0 - 116.5	0.9	10-14-18		
116										
117	119.0	320.7			SS45G	117.5 - 119.0	0.7	9-12-13		
118										
119	124.0	315.7			SS46G	120.0 - 121.5	0.9	10-13-12		
120										
121										
122										
123					SS47G	122.5 - 123.9	0.9	10-14-50/5"		
124								Began Core		
125										
126										
127										
128					10	124.5 - 129.6 5.1	2.9	57		
129										
130										
131										
132										
133										
134										
135										
136										
137										
138										

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 4/17/20



Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B16</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,628.44 N; 1,510,693.12 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  439.7 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
139			Limestone (90%) With Shale (10%)		95	134.5 - 144.5	9.9	99
140			Limestone, light gray to pale gray, very fine grained to medium grained, moderately hard, laminated to thin bedded, freshly weathered, iron oxide staining, 0° bedding angle,			10.0		
141								
142								
143			Shale, fine grained, highly weathered, dark gray, interbedded with limestone (Continued)					
144	144.5	295.2						

Bottom of Hole at 144.5 Ft.

Top of Rock = 124.0 Ft.  
 Top of Rock Elevation = 315.7 Ft.  
 Begin Core = 124.5 Ft.

Vibrating wire piezometers installed. See installation log for backfill details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
 G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface



# SUBSURFACE LOG

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-B17</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>730,040.74 N; 1,510,810.30 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>443.4 ft</u> Elevation Datum <u>NGVD29</u>
Project Name	<u>CUF TDEC Order</u>	Date Started	<u>11/28/18</u> Completed <u>12/6/18</u>
Project Location	<u>Stewart Co, Cumberland City, TN</u>	Depth to Water	<u>57.5 ft</u> Date/Time <u>11/29/18 18:36</u>
Inspector	<u>M. Aplin</u> Logger <u>M. Aplin</u>	Depth to Water	<u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor	<u>Stantec Consulting Services Inc.</u>	Drill Rig Type and ID	<u>CME 75#2, #712</u>
Overburden Drilling and Sampling Tools (Type and Size)	<u>4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes</u>		
Rock Drilling and Sampling Tools (Type and Size)	<u>NQ-3 Wireline, Split Barrel, Impregnated Bit</u>		
Overdrill Tooling (Type and Size)	<u>N/A</u>	Overdrill Depth	<u>N/A</u>
Sampler Hammer Type	<u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>		
Borehole Azimuth	<u>N/A</u>	Borehole Inclination (from Vertical)	<u>N/A</u>
Reviewed By	<u>B. Halada</u>	Approved By	<u>A. Welshans</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	443.4	Top of Hole					
1			SILT WITH SAND, ML, 2.5Y 3/1 (very dark gray) to 2.5Y 5/1 (gray), very stiff to hard, dry to moist, [CCR]		SS01G	0.0 - 1.5	1.2	3-10-9
2								
3					SS02G	2.5 - 4.0	1.3	8-24-18
4								
5								
6					SS03G	5.0 - 6.5	1.5	9-21-40
7								
8					SS04G	7.5 - 8.7	1.0	6-32-50/2"
9								
10								
11					SS05G	10.0 - 11.5	1.3	6-11-18
12								
13					SS06G	12.5 - 14.0	1.3	9-16-17
14								
15								
16					ST01G	15.0 - 17.0	0.7	N/A
17								
18								

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT:20190630.GDT: 9/11/20



# SUBSURFACE LOG

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B17</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,040.74 N; 1,510,810.30 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  443.4 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
18			SILT WITH SAND, ML, 2.5Y 3/1 (very dark gray) to 2.5Y 5/1 (gray), very stiff to hard, dry to moist, [CCR] <i>(Continued)</i>		SS07G	17.5 - 19.0	1.3	2-7-18	
19									
20									
21						SS08G	20.0 - 21.5	1.2	5-20-44
22									
23						SS09G	22.5 - 24.0	1.3	5-12-19
24									
25									
26						SS10G	25.0 - 25.9	0.8	21-50/5"
27									
28						SS11G	27.5 - 28.4	0.7	9-50/5"
29									
30									
31						SS12G	30.0 - 30.9	0.8	21-50/5"
32									
33						SS13G	32.5 - 33.4	0.7	5-50/5"
34									
35									
36					SS14G	35.0 - 36.0	1.0	17-50	
37									
38					SS15G	37.5 - 39.0	1.3	26-34-49	
39									
40									
41					SS16G	40.0 - 41.3	1.3	7-21-50/4"	
42									

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT: 20190630 GDT: 9/11/20

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43			SILT WITH SAND, ML, 2.5Y 3/1 (very dark gray) to 2.5Y 5/1 (gray), very stiff to hard, dry to moist, [CCR] <i>(Continued)</i>		SS17G	42.5 - 43.9	1.4	12-24-50/5"
44					SS18G	45.0 - 46.2	0.9	6-26-50/2"
45					SS19G	47.5 - 48.4	1.0	5-50/5"
46					SS20G	50.0 - 50.9	1.0	10-50/5"
47					SS21G	52.5 - 53.9	1.4	4-36-50/5"
48								
49								
50								
51								
52								
53								
54								
55	55.0	388.4						
56	56.5	386.9	POORLY GRADED GRAVEL WITH SILT AND SAND, GP-GM, 2.5YR 5/1 (reddish gray), coarse, medium dense, moist, [FILL]		SS22G	55.0 - 56.5	0.7	5-9-11
57			SILTY GRAVEL WITH SAND, GM, 7.5YR 3/2 (dark brown), medium, loose to medium dense, wet, [CCR]		SS23G	57.5 - 59.0	1.5	8-6-1
58					ST02G	60.0 - 62.0	0.5	N/A
59					SS24G	62.5 - 64.0	1.5	1-1-12
60					SS25G	65.0 - 66.5	1.5	WH-3-2
61								
62								
63								
64								
65								
66								

TVA/EIP BORING LOG: 175568209\_CUF\_TDEC ORDER GPJ TDEC SUBSURF DT:20190630.GDT: 9/11/20

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B17</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,040.74 N; 1,510,810.30 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  443.4 ft  </u> Elevation Datum <u>  NGVD29  </u>














Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
66.5	376.9		SANDY SILT, ML, 10YR 3/1 (very dark gray), non-plastic to low plasticity, stiff, wet, [CCR]						
67									
68						SS26G	67.5 - 69.0	1.1	2-24-18
69									
70									
71						SS27G	70.0 - 71.5	1.5	5-11-8
72									
73					SS28G	72.5 - 74.0	1.5	WH-WH-1	
74									
75									
76					SS29G	75.0 - 76.5	1.5	WH-WH-2	
77									
77.5	365.9		SILTY SAND, SM, 7.5YR 3/2 (dark brown), medium, loose to medium dense, wet, well graded, [CCR]						
78									
79					SS30G	77.5 - 79.0	1.1	11-8-6	
79.0	364.4		SILT, ML, 10YR 4/1 (dark gray), low plasticity, very soft, moist to wet, [CCR]						
80									
81						SS31G	80.0 - 81.5	1.5	2-1-1
82									
83						SS32G	82.5 - 84.0	1.5	WH-WH-1
84									
85									
86						SS33G	85.0 - 86.5	1.5	WH-WH-WH
87									
88						SS34G	87.5 - 89.0	1.5	WH-WH-WH
89									
90									

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 9/11/20

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
91			SILT, ML, 10YR 4/1 (dark gray), low plasticity, very soft, moist to wet, [CCR] <i>(Continued)</i>		SS35G	90.0 - 91.5	1.5	WH-WH-WH	
92									
93						SS36G	92.5 - 94.0	1.5	WH-WH-WH
94									
95						SS37G	95.0 - 96.5	1.5	WH-WH-1
96									
97									
98					SS38G	97.5 - 99.0	1.5	WH-1-1	
99									
100									
101					SS39G	100.0 - 101.5	1.5	WH-WH-1	
102	102.5	340.9							
103			LEAN CLAY WITH SAND, CL, 10YR 2/1 (black), low to medium plasticity, stiff to very stiff, moist		SS40G	102.5 - 104.0	1.5	3-10-12	
104									
105					SS41aG	105.0 - 106.0	1.5	8-8-50	
106	106.0	337.4			SS41bG	106.0 - 106.5	1.5	8-8-50	
107	107.5	335.9	SILTY SAND, SM, 7.5YR 4/2 (brown), medium to coarse, very dense, moist, trace fine gravel		SS42G	107.5 - 107.7	0.2	50/2"	
108	108.0	335.4	POORLY GRADED GRAVEL WITH SAND, GP, 2.5Y 6/1 (gray) to 5Y 4/1 (dark gray), coarse, medium dense, moist					Began Core	
109			Limestone (90%) With Shale (10%)		0	108.5 - 109.5	0.9	90	
110						1.0			
111			Limestone, light gray to pale gray, very fine grained to medium grained, moderately hard, laminated to thin bedded, freshly weathered to slightly weathered, iron oxide staining, 0° bedding angle, trace iron oxide staining at fracture faces and calcite at bottom of layer		17	109.5 - 114.1	3.3	72	
112						4.6			
113									
114									

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 9/11/20

Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-B17</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>730,040.74 N; 1,510,810.30 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>443.4 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
115			Shale, fine grained, highly weathered, dark gray Limestone (90%) With Shale (10%)					
116			Limestone, light gray to pale gray, very fine grained to medium grained, moderately hard, laminated to thin bedded, freshly weathered to slightly weathered, iron oxide staining, 0° bedding angle, trace iron oxide staining at fracture faces and calcite at bottom of layer		0	114.1 - 118.5 4.4	3.4	77
117								
118								
119			Shale, fine grained, highly weathered, dark gray (Continued)					
120								
121				37	118.5 - 123.7 5.2	5.2	100	
122								
123								
124								
125								
126				50	123.7 - 128.5 4.8	4.2	88	
127								
128	128.5	314.9						

Bottom of Hole at 128.5 Ft.

Top of Rock = 108.0 Ft.

Top of Rock Elevation = 335.4 Ft.

Begin Core = 108.5 Ft.

Vibrating wire piezometers installed. See installation log for backfill details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 9/11/20

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-B18</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>728,029.16 N; 1,513,769.04 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>395.0 ft</u> Elevation Datum <u>NGVD29</u>
Project Name	<u>CUF TDEC Order</u>	Date Started	<u>4/22/19</u> Completed <u>4/25/19</u>
Project Location	<u>Stewart Co, Cumberland City, TN</u>	Depth to Water	<u>4.1 ft</u> Date/Time <u>4/23/19 08:32</u>
Inspector	<u>L. Eaves</u> Logger <u>L. Eaves</u>	Depth to Water	<u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor	<u>Stantec Consulting Services Inc.</u>	Drill Rig Type and ID	<u>CME 75#2, #712</u>
Overburden Drilling and Sampling Tools (Type and Size)	<u>4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes</u>		
Rock Drilling and Sampling Tools (Type and Size)	<u>NQ-3 Wireline, Split Barrel, Surface Set Bit</u>		
Overdrill Tooling (Type and Size)	<u>N/A</u>	Overdrill Depth	<u>N/A</u>
Sampler Hammer Type	<u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>		
Borehole Azimuth	<u>N/A</u>	Borehole Inclination (from Vertical)	<u>N/A</u>
Reviewed By	<u>B. Halada</u>	Approved By	<u>A. Welshans</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	395.0	Top of Hole					
1	0.7	394.3	WELL GRADED GRAVEL WITH SILT AND SAND, GW-GM, 2.5Y 4/1 (dark gray), medium dense, subangular, road surface, [FILL], [CCR]		SS01G	0.0 - 1.5	1.2	7-6-7
2			FAT CLAY LITTLE GRAVEL, CH, 5YR 4/6 (yellowish red) to 2.5YR 4/8 (red), very fine, medium to high plasticity, medium stiff, dry to moist, trace of angular to subangular chert fragments up to 1/2", [FILL]		SS02G	2.5 - 4.0	0.9	5-2-7
3			Boulder at 2.0'					
4								
5								
6					SS03G	5.0 - 6.5	0.0	3-5-8
7	7.5	387.5						
8			LEAN CLAY, CL, 10YR 5/4 (yellowish brown), very fine, medium plasticity, stiff to very stiff, moist, trace of angular to subangular chert fragments up to 1/2", [FILL]		SS04G	7.5 - 9.0	1.0	9-9-11
9								
10					SS05G	10.0 - 11.5	1.1	4-7-6
11								
12								
13					ST01G	12.0 - 14.0	1.8	100
14								
15	15.0	380.0						
16			LEAN CLAY TRACE SAND, CL, 10YR 5/4 (yellowish brown), very fine, low to medium plasticity, very stiff, moist, trace organics, [FILL]		SS06G	15.0 - 16.5	1.5	5-7-9
17								
18	17.5	377.5						
19								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 3/16/21



Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			SILTY CLAYEY GRAVEL WITH SAND, GC-GM, 7.5YR 5/4 (brown), medium to coarse, loose, [FILL] (Continued)		SS07G	17.5 - 19.0	1.0	7-4-3
20.0	375.0		SILT WITH SAND, ML, 10YR 4/1 (dark gray), non to low plasticity, stiff, wet, laminated, [CCR]		SS08G	20.0 - 21.5	0.7	2-3-7
22.5	367.5		POORLY GRADED SAND TRACE SILT, SP, 10YR 2/1 (black), fine, loose, moist to wet, [CCR]		SS10G	27.5 - 29.0	1.1	4-7-2
23.7	366.5		SILT WITH SAND, ML, 10YR 4/1 (dark gray), non to low plasticity, very soft, wet, laminated, [CCR]		SS11aG	30.0 - 31.1	0.6	5-9-22
24.0	366.5		WELL GRADED GRAVEL, GW, 5Y 4/1 (dark gray), medium to coarse, dense, wet, drainage layer, [FILL]		SS11bG	31.1 - 31.5		
25.0	365.5		LEAN CLAY WITH SAND, CH, 5YR 3/1 (very dark gray), low to medium plasticity, medium stiff, wet, no odor, no staining		SS12G	32.5 - 34.0	0.8	3-3-5
26.0	364.5		POORLY GRADED GRAVEL, GP, 5YR 6/1 (gray), coarse, very dense, wet		SS14G	40.0 - 40.3	0.1	50/4"
27.0	364.0		Weathered rock, used roller bit to advance from 40.4' to 41.0' at bottom of casing					Began Core

TVA/EIP BORING LOG: 175568209\_CUF\_TDEC ORDER GPJ TDEC SUBSURF DT: 20190630 GDT: 3/16/21


















Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
43			Limestone, light gray, finely crystalline, hard, thin to medium bedded, freshly weathered, water staining, carbonaceous (Continued)		97	41.0 - 44.5 3.5	41.0 - 44.5	3.5	100	
44										
45			Limestone, light brown gray, finely crystalline, hard, thin to medium bedded, moderately weathered, carbonaceous, fractures throughout Induced fracture, smooth, at 48.0'		45	44.5 - 48.7 4.2	44.5 - 48.7	4.2	100	
46										
47				Limestone, light gray and light brown gray, finely crystalline, hard, thin to medium bedded, slightly weathered, carbonaceous		82	48.7 - 52.0 3.3	48.7 - 52.0	2.9	88
48	47.9 347.1									
49	49.0 346.0				100	52.0 - 57.0 5.0	52.0 - 57.0	5.0	100	
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										
62	62.6 332.4		Limestone, light bluish gray, finely crystalline, hard to very hard, thin to medium bedded, freshly weathered, carbonaceous		74	57.0 - 62.0 5.0	57.0 - 62.0	5.0	100	
63										
64										
65										
66										

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 3/16/21



# SUBSURFACE LOG


Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B18</b>
Client	Tennessee Valley Authority	Boring Location	728,029.16 N; 1,513,769.04 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	395.0 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
67			Limestone, light bluish gray, finely crystalline, hard to very hard, thin to medium bedded, freshly weathered, carbonaceous (Continued)		100	66.1 - 68.8 2.7	66.1 - 68.8	2.7	100
68							68.8 - 71.7	2.9	100
69							71.7 - 76.8	5.1	100
70							76.8 - 79.5	2.7	100
71							79.5 - 81.3	1.8	100
72							81.3 - 86.4	5.0	98
73							86.4 - 91.4	4.9	98
74									
75									
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89									
90									

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 3/16/21

Client Borehole ID <u>  N/A  </u>			Stantec Boring No. <b>CUF-B18</b>		
Client <u>  Tennessee Valley Authority  </u>			Boring Location <u>  728,029.16 N; 1,513,769.04 E NAD27 Plant Local  </u>		
Project Number <u>  175568209  </u>			Surface Elevation <u>  395.0 ft  </u> Elevation Datum <u>  NGVD29  </u>		

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
91	91.4	303.6						
<p style="text-align: center;">Bottom of Hole at 91.4 Ft.</p> <p style="text-align: center;">Top of Rock = 40.4 Ft. Top of Rock Elevation = 354.6 Ft. Begin Core = 41.0 Ft.</p> <p style="text-align: center;">Boring backfilled with 30% solids bentonite grout.</p> <p style="text-align: center;">1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample) G = Geotechnical Sample Custody 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples 3: Depths are reported in feet below ground surface</p>								

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 3/16/21

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-B19</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>728,064.78 N; 1,513,779.79 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>394.8 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>4/15/19</u>	Completed <u>4/18/19</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>9.1 ft</u>	Date/Time <u>4/15/19 16:35</u>
Inspector <u>L. Eaves</u>	Logger <u>M. McDonald</u>	Depth to Water <u>9.0 ft</u>	Date/Time <u>4/16/19 14:11</u>
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 75#2, #712</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>NQ-3 Wireline, Split Barrel, Surface Set Bit</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>Automatic</u>	Weight <u>140 lb</u>	Drop <u>30"</u>	Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>B. Halada</u>		Approved By <u>A. Welshans</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	394.8	Top of Hole					
1	0.6	394.2	WELL GRADED GRAVEL, GW, 2.5Y 4/1 (dark gray), medium dense, moist, subangular, coarse, roadway well graded aggregate, [FILL]		SS01G	0.0 - 1.5	1.2	8-6-6
2			FAT CLAY LITTLE GRAVEL, CH, 5YR 4/6 (yellowish red) to 2.5YR 4/8 (red), medium to high plasticity, soft to medium stiff, dry to moist, very fine, trace of angular to subangular chert fragments up to 1/2", [FILL]		SS02G	2.5 - 4.0	1.1	3-2-2
5	5.5	389.3	SILTY LEAN CLAY, CL, 10YR 5/4 (yellowish brown), medium to high plasticity, stiff, dry to moist, very fine, trace of angular to subangular chert fragments up to 1/2" and organics, [FILL]		SS03G	5.0 - 6.5	1.5	4-6-9
8					SS04G	7.5 - 9.0	1.2	8-8-10
13			(13.0' to 13.7') Lean clay with organics, (5GY/4/2) greenish gray to black, organic odor		SS05G	12.5 - 14.0	1.4	3-5-7
15	15.0	379.8	LEAN CLAY LITTLE SAND, CL, 10YR 5/4 (yellowish brown), low to medium plasticity, stiff, dry to moist, very fine, trace of organics, fine-grained sand and silt, [FILL]		SS06G	15.0 - 16.5	1.5	3-5-10
16			With zones of angular gravel in SS07G					

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 3/11/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18					SS07G	17.5 - 19.0	0.7	6-7-7
20.0	374.8							
21			SILT WITH SAND, ML, 10YR 4/1 (dark gray), non to low plasticity, very soft, wet, laminated, [CCR]		SS08G	20.0 - 21.5	1.5	1-1-WH
23.5	371.3				SS09aG	22.5 - 23.5	1.5	WR-WR-26
24			POORLY GRADED SAND TRACE SILT, GP, 10YR 2/1 (black), medium dense, moist to wet, fine, [CCR]		SS09bG	23.5 - 24.0		
25.0	369.8							
26			SILT WITH SAND, ML, 10YR 4/1 (dark gray), non to low plasticity, very soft, wet, laminated, with lenses of fine-grained poorly graded sand (10YR/2/1), [CCR]		SS10G	25.0 - 26.5	1.5	1-1-1
28					ST02G	27.5 - 29.5	2.0	100
30.5	364.3				SS11aG	30.0 - 30.5		
31			POORLY GRADED GRAVEL WITH SILT, GP-GM, 5Y 4/1 (dark gray), coarse, medium dense, wet, subangular, drainage layer, [FILL]		SS11bG	30.5 - 31.5	1.2	3-8-13
32.5	362.3							
33			SILTY LEAN CLAY TRACE SAND, CL, 5YR 3/1 (very dark gray), low to medium plasticity, soft, moist to wet, no odor, no staining		SS12G	32.5 - 34.0	0.8	2-2-2
35								
36					ST03G	35.0 - 37.0	0.0	700
37.5	357.3							
38			LEAN CLAY WITH SAND, CL, 5YR 6/1 (gray) with 5YR 5/3 (reddish brown), medium plasticity, stiff, moist to wet, no odor, no staining		SS13G	37.5 - 39.0	1.1	2-3-5
39								
40								
41					SS14G	40.0 - 41.5	1.5	2-3-2
42								

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT:20190630/GDT: 3/11/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
42.5	352.3		SILTY SAND, SM, 10YR 6/4 (light yellowish brown), dense, wet, no odor, no staining, subangular, well graded, very fine to coarse		SS15G	42.5 - 44.0	1.1	11-23-13
44.0	350.8							
45.3	349.5		Weathered rock, used roller bit to advance from 44.0' to 45.3' at bottom of casing					Began Core
46.5	348.3		Limestone, light brown gray, microcrystalline to very finely crystalline, moderately hard, thin bedded to medium bedded, moderately weathered, carbonaceous, occasional fractures		50	45.3 - 47.5 2.2	2.1	95
47			Limestone, light gray, microcrystalline to fine grained, hard, thin to medium bedded, freshly weathered, carbonaceous, occasional fractures		74	47.5 - 51.0 3.5	3.4	97
48								
49					100	51.0 - 54.8 3.8	3.8	100
50								
51					98	54.8 - 59.8 5.0	5.0	100
52								
53					94	59.8 - 64.5 4.7	4.7	100
54								
55			Limestone (80%) With Shale (20%)					
56			Limestone, light gray, fine grained, moderately hard, slightly weathered, occasional fractures					
57			Shale, dark gray, very fine grained, thin bedded					
58								
59			Limestone, light blue gray, microcrystalline to finely crystalline, hard, thin bedded, freshly weathered,					
60								
61								
62	332.8							
63								
64	330.3							
65								
66								

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 3/11/21



# SUBSURFACE LOG

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B19</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  728,064.78 N; 1,513,779.79 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  394.8 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
67			carbonaceous, shale stringers Limestone, light blue gray, microcrystalline to finely crystalline, hard, thin bedded, freshly weathered, carbonaceous, shale stringers (Continued)		100	64.5 - 69.5 5.0	5.0	100	
68									
69									
70									
71									
72						100	69.5 - 74.5 5.0	5.0	100
73									
74									
75									
76									
77	77.2	317.6			100	74.5 - 79.5 5.0	5.0	100	
78			Limestone (70%) With Shale (30%)						
79			Limestone, light gray and dark gray, very finely crystalline to medium crystalline, soft to moderately hard, thin bedded to medium bedded, slightly weathered, 45° bedding angle, occasional fractures						
80	80.1	314.7							
81			Shale, dark gray, very fine grained, thin bedded						
82	82.3	312.5	Limestone, light blue gray, fine grained, hard to moderately hard, thin bedded, freshly weathered, carbonaceous, shale stringers		92	79.5 - 84.5 5.0	5.0	100	
83			Limestone, light blue gray, finely crystalline to coarsely crystalline, hard, thin bedded, freshly weathered, carbonaceous, shale stringers						
84	84.5	310.3							
85	85.6	309.2	Limestone (70%) With Shale (30%)						
86			Limestone, light blue gray and dark gray, very finely crystalline to medium crystalline, soft to moderately hard, thin bedded to medium bedded, slightly weathered, 45° bedding angle, Shale, dark gray, very fine grained, thin bedded		100	84.5 - 89.3 4.8	4.8	100	
87									
88									
89									
90									

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC ORDER GFI TDEC ORDER GFI TDEC ORDER GFI TDEC ORDER GFI 3/11/21









# SUBSURFACE LOG

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-B19</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>728,064.78 N; 1,513,779.79 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>394.8 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
91			Limestone (90%) With Dolomite (10%)					
92			Limestone, light blue gray, medium grained to finely crystalline, hard to very hard, thin bedded to medium bedded, freshly weathered, carbonaceous, shale stringers		100	89.3 - 94.4 5.1	5.1	100
93								
94			Dolomite, blue gray, very hard, finely crystalline, thin bedded, 30° bedding angle (Continued)					
95								
96								
97					100	94.4 - 99.5 5.1	5.1	100
98								
99								
100								
101								
102					100	99.5 - 104.5 5.0	5.0	100
103								
104								
105								
106								
107					100	104.5 - 109.5 5.0	5.0	100
108								
109								
110								
111								
112					100	109.5 - 114.5 5.0	5.0	100
113								
114								

TVA EIP BORING LOG - 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 3/11/21

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-B19</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>728,064.78 N; 1,513,779.79 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>394.8 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
115			Limestone (90%) With Dolomite (10%)					
116			Limestone, light blue gray, medium grained to finely crystalline, hard to very hard, thin bedded to medium bedded, freshly weathered, carbonaceous, shale stringers		100	114.5 - 119.5 5.0	5.0	100
117								
118								
119	119.5	275.3	Dolomite, blue gray, very hard, finely crystalline, thin bedded, 30° bedding angle (Continued)					

Bottom of Hole at 119.5 Ft.

Top of Rock = 44.0 Ft.  
 Top of Rock Elevation = 350.8 Ft.  
 Begin Core = 45.3 Ft.

Boring backfilled with 30% solids bentonite grout.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
 G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 3/11/21



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B20</b>	
Client	Tennessee Valley Authority	Boring Location	732,889.43 N; 1,509,655.34 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	378.8 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	6/11/20	Completed 6/16/20
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	22.6 ft	Date/Time 6/16/20 07:28
Inspector	C. Burton	Logger	C. Burton	Depth to Water N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 55T#1, #709	
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 2" SS w/o liners, 3" SS w/o liners			
Rock Drilling and Sampling Tools (Type and Size)	N/A			
Overdrill Tooling (Type and Size)	N/A	Overdrill Depth	N/A	
Sampler Hammer Type	Automatic	Weight	140 lb	Drop 30" Efficiency N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	B. Halada	Approved By	A. Welshans	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	378.8	Top of Hole					
	0.3	378.5	Topsoil			0.0 - 1.5	0.5	3-4-6
1			FAT CLAY, CH, 7.5YR 5/4 (brown) to 7.5YR 4/4 (brown), medium to high plasticity, firm to hard, moist, iron oxide staining, [FILL]		SS01G	0.0 - 1.5		
2								
3			Per driller - boulder at about 2.5'		SS02G	2.5 - 4.0	1.3	6-4-4
4								
5								
6					SS03G	5.0 - 6.5	1.5	4-3-5
7								
8	8.2	370.6			SS04aG	7.5 - 8.2		
9			FAT CLAY WITH GRAVEL, CH, 10YR 6/3 (pale brown) and 10YR 5/6 (yellowish brown), medium to coarse, high plasticity, firm to very hard, moist to wet, iron oxide staining, angular to sub-angular, [FILL]		SS04bG	8.2 - 9.0	1.3	3-3-5
10								
11					SS05G	10.0 - 11.5	1.5	6-6-5
12					SS06aG	11.5 - 12.2		
13					SS06bG	12.2 - 13.0	1.5	4-5-15
14			Large limestone fragments from 13.2' to 14.1'		SS07G	13.0 - 14.5	1.4	30-8-6
15					SS08G	14.5 - 16.0	1.4	2-4-5
16								
17					SS09G	16.0 - 17.5	1.3	2-3-6
18								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 1/27/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B20</b>
Client	Tennessee Valley Authority	Boring Location	732,889.43 N; 1,509,655.34 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	378.8 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
18			FAT CLAY WITH GRAVEL, CH, 10YR 6/3 (pale brown) and 10YR 5/6 (yellowish brown), medium to coarse, high plasticity, firm to very hard, moist to wet, iron oxide staining, angular to sub-angular, [FILL] <i>(Continued)</i>		SS10G	17.5 - 19.0	1.5	3-2-6	
19					SS11G	19.0 - 20.5	1.4	3-2-3	
20						SS12G	20.5 - 22.0	1.2	1-3-3
21									
22	356.5								
22.3	356.5								
23			FAT CLAY, CH, 2.5Y 5/2 (grayish brown) to 2.5Y 6/3 (light yellowish brown), medium to high plasticity, firm to very hard, moist, [FILL]		SS13G	22.0 - 23.5	0.9	5-9-12	
24					SS14G	23.5 - 25.0	0.3	2-3-2	
25					SS15G	25.0 - 26.5	0.7	2-2-8	
26					SS16G	26.5 - 28.0	1.2	8-4-3	
27					SS17G	28.0 - 29.5	1.5	3-4-4	
28					SS18G	29.5 - 31.0	1.5	4-5-7	
29					SS19G	31.0 - 32.5	1.4	1-2-2	
30					SS20G	32.5 - 34.0	1.5	WH-2-1	
31					SS21G	34.0 - 35.5	0.5	6-5-7	
32					SS22G	35.5 - 37.0	0.9	7-4-33	
33			LEAN CLAY, CL, 2.5Y 5/2 (grayish brown) to 2.5Y 6/3 (light yellowish brown), medium plasticity, hard, moist  Firm to very soft at 37.0'		SS23G	37.0 - 38.5	1.5	5-3-3	
34	344.5					SS24G	38.5 - 40.0	1.4	WH-1-WH
35						SS25G	40.0 - 41.5	1.5	WH-WH-1
36									
37									
38									
39									
40									
41									
42									


TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 12721

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B20</b>
Client	Tennessee Valley Authority	Boring Location	732,889.43 N; 1,509,655.34 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	378.8 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
43			LEAN CLAY, CL, 2.5Y 5/2 (grayish brown) to 2.5Y 6/3 (light yellowish brown), medium plasticity, hard, moist (Continued)		SS26G	41.5 - 43.0	1.5	WH-1-1	
44	44.5	334.3			SS27G	43.0 - 44.5	1.5	WH-2-2	
45			FAT CLAY, CH, 2.5Y 6/3 (light yellowish brown) to 2.5Y 3/1 (very dark gray), medium to coarse, low to medium plasticity, firm to very hard, Layers of sand (0.3" to 0.9") Sand layer from 44.5' to 45.7'		SS28G	44.5 - 46.0	1.5	2-3-2	
46					SS29G	46.0 - 47.5	0.9	2-3-4	
47					SS30G	47.5 - 49.0	1.3	3-9-12	
48					SS31G	49.0 - 50.5	1.5	1-12-6	
49	49.8	329.0	CLAYEY SAND WITH GRAVEL, SP-SC, 2.5Y 4/1 (dark gray) to 2.5Y 6/3 (light yellowish brown), medium to coarse, medium dense to loose, moist to wet, with clay layers 4 to 6 inches thick						
50					SS32G	55.0 - 56.5	1.5	8-4-6	
51									
52									
53									
54									
55			SANDY FAT CLAY WITH GRAVEL, CH, 10YR 4/4 (dark yellowish brown) to 10YR 5/8 (yellowish brown), high plasticity, very hard, moist to wet, fine to coarse gravel						
56	58.5	320.3			SS33G	60.0 - 61.5	1.5	13-6-12	
57									
58									
59									
60									
61									
62									
63									
64									
65									
66					SS34G	65.0 - 66.5	1.5	8-6-10	

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630.GDT 1/27/21

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B20</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  732,889.43 N; 1,509,655.34 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  378.8 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
67			SANDY FAT CLAY WITH GRAVEL, CH, 10YR 4/4 (dark yellowish brown) to 10YR 5/8 (yellowish brown), high plasticity, very hard, moist to wet, fine to coarse gravel <i>(Continued)</i>							
68										
69										
70										
71							SS35G	70.0 - 71.5	1.5	1-2-2
72										
73										
74										
75										
76					SS36G	75.0 - 76.4	1.4	WH-2-50/5"		
76.9	301.9									

Refusal /  
Bottom of Hole at 76.9 Ft.

Boring backfilled with 30% solids bentonite grout.

For SS15G, SS16G, SS17G, SS18G, SS19G, and SS22G, a 3" split spoon was used.

1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody

2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples

3: Depths are reported in feet below ground surface

TVA EIP BORING LOG - 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT-20190630.GDT-12721

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B21</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  732,846.26 N; 1,509,620.12 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  379.4 ft  </u> Elevation Datum <u>  NGVD29  </u>
Project Name <u>  CUF TDEC Order  </u>	Date Started <u>  6/8/20  </u> Completed <u>  6/11/20  </u>
Project Location <u>  Stewart Co, Cumberland City, TN  </u>	Depth to Water <u>  14.4 ft  </u> Date/Time <u>  6/10/20 16:01  </u>
Inspector <u>  C. Burton  </u> Logger <u>  C. Burton  </u>	Depth to Water <u>  N/A  </u> Date/Time <u>  N/A  </u>
Drilling Contractor <u>  Stantec Consulting Services Inc.  </u>	Drill Rig Type and ID <u>  CME 55T#1, #709  </u>
Overburden Drilling and Sampling Tools (Type and Size) <u>  4-1/4" HSA, 2" SS w/o liners, 3" SS w/o liners  </u>	
Rock Drilling and Sampling Tools (Type and Size) <u>  N/A  </u>	
Overdrill Tooling (Type and Size) <u>  N/A  </u> Overdrill Depth <u>  N/A  </u>	
Sampler Hammer Type <u>  Automatic  </u> Weight <u>  140 lb  </u> Drop <u>  30"  </u> Efficiency <u>  N/A  </u>	
Borehole Azimuth <u>  N/A  </u> Borehole Inclination (from Vertical) <u>  N/A  </u>	
Reviewed By <u>  B. Halada  </u>	Approved By <u>  A. Welshans  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	379.4	Top of Hole					
0	0.2	379.2	Topsoil			0.0 - 1.5	0.7	5-5-5
1			LEAN CLAY WITH GRAVEL, CL, 2.5Y 5/1 (gray) and 10YR 6/3 (pale brown), fine to coarse, medium plasticity, hard, moist, rounded to angular, mixed with minor CCR, [FILL]		SS01G	0.0 - 1.5		
2					SS02G	2.5 - 4.0	1.1	5-4-7
3								
5	5.9	373.5	LEAN CLAY WITH GRAVEL, CL, 10YR 6/2 (light brownish gray) with 10YR 5/4 (yellowish brown), fine to coarse, medium plasticity, hard to very hard, moist, angular, [FILL]		SS03aG	5.0 - 5.9	1.3	5-6-9
6					SS03bG	5.9 - 6.5		
7								
8					SS04G	7.5 - 9.0	1.4	10-8-10
9								
10					SS05G	10.0 - 11.5	1.5	6-8-14
11								
12					SS06G	11.5 - 13.0	1.5	6-5-28
13								
14					SS07G	13.0 - 14.5	1.5	9-5-8
15								
15	15.8	363.6			SS08G	14.5 - 16.0	1.3	10-5-5
16								
17					SS09G	16.0 - 17.5	1.4	1-1-2
18								

TVA EIP BORING LOG: 175568209\_CUF\_TDEC\_ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 1/27/21



# SUBSURFACE LOG

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B21</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  732,846.26 N; 1,509,620.12 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  379.4 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
18			FAT CLAY WITH GRAVEL, CH, 10YR 4/4 (dark yellowish brown) with 10YR 6/4 (light yellowish brown), medium to coarse, high plasticity, soft to very hard, moist, angular to subangular, with large pieces of gravel, [FILL] <i>(Continued)</i>		SS10G	17.5 - 18.4	0.6	1-50/5"		
19						SS11G	19.0 - 20.5	0.7	3-6-4	
20						SS12G	20.5 - 22.0	1.5	5-4-5	
21						SS13G	22.0 - 23.5	1.2	8-5-6	
22						SS14G	23.5 - 25.0	1.4	2-3-4	
23						SS15G	25.0 - 26.5	1.5	5-2-5	
24						SS16G	26.5 - 28.0	1.1	2-5-3	
25						SS17G	28.0 - 29.5	0.9	13-5-7	
26						SS18G	29.5 - 31.0	0.5	2-3-3	
27						SS19G	31.0 - 32.5	1.4	2-6-15	
28						SS20G	32.5 - 34.0	0.9	14-9-12	
29						SS21G	34.0 - 35.5	1.5	2-3-4	
30						SS22G	35.5 - 37.0	1.5	3-10-10	
31						SS23G	37.0 - 38.5	1.5	2-2-27	
32	32.5			346.9		SS24G	38.5 - 40.0	1.5	18-10-11	
33					FAT CLAY WITH GRAVEL, CH, 7.5YR 6/6 (reddish yellow) to 10YR 6/3 (pale brown), medium to coarse, high plasticity, firm to very hard, moist, iron oxide staining, angular to subangular, with large pieces of gravel, [FILL]		SS25aG	40.0 - 41.1	1.4	10-5-5
34							SS25bG	41.1 - 41.5		
35										
36										
37										
38										
39										
40										
41	41.1	338.3								
42										

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 12721



Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B21</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  732,846.26 N; 1,509,620.12 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  379.4 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43			LEAN CLAY, CL, 10YR 5/1 (gray) with 10YR 5/4 (yellowish brown), low plasticity, firm to hard, moist, slight organic odor <i>(Continued)</i>		SS26G	41.5 - 43.0	1.5	1-3-4
44					SS27G	43.0 - 44.5	1.4	3-3-6
45			Sand and gravel layer from 44.9' to 46.4'		SS28aG	44.5 - 45.0	1.0	8-10-15
46	46.4	333.0			SS28bG	45.0 - 46.0		
47			FAT CLAY WITH GRAVEL, CH, 10YR 4/6 (dark yellowish brown), firm to very hard, moist		SS29aG	46.0 - 46.4	1.3	7-5-14
48					SS29bG	46.4 - 47.5		
49					SS30G	47.5 - 49.0	1.0	10-10-11
50					SS31G	49.0 - 50.2	0.5	2-10-50/2"
51			Increased gravel content at 55.0'					
52					SS32G	55.0 - 56.5	1.1	24-35-50
53								
54					SS33G	60.0 - 61.5	1.4	45-36-23
55								
56					SS34G	65.0 - 65.9	0.8	18-50/5"
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630.GDT 1/27/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B21</b>
Client	Tennessee Valley Authority	Boring Location	732,846.26 N; 1,509,620.12 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	379.4 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
67			FAT CLAY WITH GRAVEL, CH, 10YR 4/6 (dark yellowish brown), firm to very hard, moist (Continued)							
68										
69										
70										
71							SS35G	70.0 - 71.5	0.9	31-13-8
72										
73										
74							SS36G	73.2 - 74.7	0.3	37-3-1
75										
76							SS37G	75.0 - 76.5	0.0	1-1-4
77										
78										
79	79.5	299.9			SS38G	79.5 - 79.5	0.0	50/0"		

Refusal /  
Bottom of Hole at 79.5 Ft.

Boring backfilled with 30% solids bentonite grout.

For SS19G through SS26G and SS32G through SS36G, a 3" split spoon was used.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 127/21



Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B22</b>	
Client	Tennessee Valley Authority	Boring Location	732,685.32 N; 1,509,524.53 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	379.0 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	6/3/20	Completed 6/5/20
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	25.1 ft	Date/Time 6/5/20 10:29
Inspector	C. Burton	Logger	C. Burton	Depth to Water N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 55T#1, #709	
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 2" SS w/o liners, 3" SS w/o liners			
Rock Drilling and Sampling Tools (Type and Size)	N/A			
Overdrill Tooling (Type and Size)	N/A	Overdrill Depth	N/A	
Sampler Hammer Type	Automatic	Weight	140 lb	Drop 30"
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	B. Halada	Approved By	A. Welshans	
Efficiency	N/A			

Depth Ft <sup>3</sup>	Lithology		Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	379.0	Top of Hole					
0.1	378.9		Topsoil			0.0 - 1.5	0.4	4-4-8
1			FAT CLAY, CH, 7.5YR 5/3 (brown) and 10YR 4/3 (brown), high plasticity, firm to hard, moist, [FILL]		SS01G			
2.8	376.2		LEAN CLAY WITH SAND, CL, 10YR 4/3 (brown) and 7.5YR 4/6 (strong brown), fine to coarse, low plasticity, firm to very hard, moist, iron oxide staining, with weathered shale fragments, [FILL]		SS02G	2.5 - 4.0	1.0	6-7-8
3					SS03G	5.0 - 6.5	0.0	5-5-5
7			Started augering hard at about 7.0' per driller Large piece of wood in end of 7.5' to 9.0' spoon.		SS04G	7.5 - 9.0	0.5	7-8-49
9.5	369.5		LEAN CLAY WITH SAND, CL, 10YR 5/4 (yellowish brown) to 10YR 6/3 (pale brown), fine to coarse, medium plasticity, firm to very hard, moist, iron oxide staining, with large pieces of weathered limestone, chert, and shale fragments, [FILL]		SS05G	10.0 - 11.5	1.2	5-7-10
11					SS06G	11.5 - 13.0	1.1	8-11-9
13					SS07G	13.0 - 14.5	1.2	3-11-6
15					SS08G	14.5 - 16.0	1.5	4-4-7

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 12/27/21


Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
16.7	362.3		LEAN CLAY WITH SAND, CL, 10YR 5/8 (yellowish brown) and 7.5YR 4/6 (strong brown), fine to coarse, low plasticity, very soft to firm, moist, iron oxide staining, with large pieces of weathered limestone, chert, and shale fragments, [FILL]		SS09aG	16.0 - 16.7		
17				SS09bG	16.7 - 17.5	1.0	3-3-4	
18				SS10G	17.5 - 19.0	1.5	1-1-2	
19				SS11G	19.0 - 20.5	1.5	1-1-1	
20				SS12G	20.5 - 22.0	1.0	1-2-4	
21								
22.2	356.8		LEAN CLAY, CL, 10YR 6/4 (light yellowish brown) and 2.5Y 4/3 (olive brown), medium to coarse, medium plasticity, firm, moist, angular to subangular, pieces of gravel, [FILL]		SS13G	22.0 - 23.5	1.3	2-2-3
23				SS14G	23.5 - 25.0	0.6	1-2-3	
24				SS15G	25.0 - 26.5	1.5	1-1-4	
25				SS16G	26.5 - 28.0	1.5	3-5-6	
26				SS17G	28.0 - 29.5	1.5	1-2-2	
26.4	352.6		LEAN CLAY, CL, 10YR 6/6 (brownish yellow) and 10YR 6/2 (light brownish gray), coarse, low plasticity, very soft to hard, moist to wet, angular to subangular, layers of large pieces of limestone and chert gravel		SS18G	29.5 - 31.0	1.5	WH-1-1
27				SS19G	31.0 - 32.5	1.5	WH-1-2	
28				SS20G	32.5 - 34.0	1.4	WH-WH-1	
29				SS21G	34.0 - 35.5	0.7	WH-WH-4	
30				SS22G	35.5 - 37.0	1.4	6-11-15	
31								
33.8	345.2		GRAVELLY FAT CLAY LITTLE SAND, CH, 10YR 7/6 (yellow) to 10YR 6/2 (light brownish gray), fine to coarse, very soft to very hard, moist to wet, angular to subangular, with gravelly layers					
34								
35								
36								
37								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 127721

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
38			GRAVELLY FAT CLAY LITTLE SAND, CH, 10YR 7/6 (yellow) to 10YR 6/2 (light brownish gray), fine to coarse, very soft to very hard, moist to wet, angular to subangular, with gravelly layers (Continued)		SS23G	37.0 - 38.5	0.9	20-26-27		
39						SS24G	38.5 - 40.0	1.5	5-10-18	
40							SS25G	40.0 - 41.5	1.1	13-18-21
41							SS26G	41.5 - 43.0	1.1	17-17-16
42							SS27G	43.0 - 44.5	1.0	16-18-49
43							SS28G	44.5 - 46.0	1.1	20-25-16
44							SS29G	46.0 - 47.5	1.0	8-10-21
45							SS30G	47.5 - 48.9	1.2	21-21-50/5"
46							SS31G	49.0 - 49.2	0.2	50/2"
47							SS32G	50.0 - 51.5	1.2	33-24-50
48										
49										
50										
51										
52										
53										
54										
55	55.0	324.0								
56			SANDY LEAN CLAY WITH GRAVEL, CL, 10YR 7/6 (yellow) to 10YR 6/2 (light brownish gray), fine to coarse, low to medium plasticity, very hard to very soft, moist to wet, angular		SS33G	55.0 - 56.5	1.5	23-13-26		
57										
58										
59										

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT:20190630.GDT:12721

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-B22</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>732,685.32 N; 1,509,524.53 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>379.0 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
60			SANDY LEAN CLAY WITH GRAVEL, CL, 10YR 7/6 (yellow) to 10YR 6/2 (light brownish gray), fine to coarse, low to medium plasticity, very hard to very soft, moist to wet, angular (Continued)					
61				SS34G	60.0 - 61.5	1.1	9-4-9	
62								
63								
64								
65				SS35G	65.0 - 66.5	1.5	5-1-2	
66								
67								
68								
69								
70			SS36G	70.0 - 71.5	1.2	2-7-8		
71								
72								
73								
74								
75			SS37G	75.0 - 76.5	1.5	WR-WR-1		
76								
77								
78								
79								
80			SS38G	80.0 - 81.5	0.8	WR-WR-WH		


TVA EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 1/27/21

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-B22</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>732,685.32 N; 1,509,524.53 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>379.0 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
81			SANDY LEAN CLAY WITH GRAVEL, CL, 10YR 7/6 (yellow) to 10YR 6/2 (light brownish gray), fine to coarse, low to medium plasticity, very hard to very soft, moist to wet, angular (Continued)							
82										
83										
84										
85										
85.9	293.1						SS39aG	85.0 - 85.9	1.4	1-1-1
86					CLAYEY SAND, SC, 10YR 7/3 (very pale brown) to 10YR 6/6 (brownish yellow), fine to coarse, low plasticity, very loose to loose, wet, angular, with large limestone fragments		SS39bG	85.9 - 86.5		
87										
88										
89										
90										
91						SS40G	90.0 - 91.5	1.2	1-7-3	
92										
93										
94										
95										
96					SS41G	95.0 - 96.5	0.4	WR-WR-WR		
97										
98										
99										
100										
101					SS42G	100.0 - 101.5	0.5	6-4-1		
102										

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 12721

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B22</b>
Client	Tennessee Valley Authority	Boring Location	732,685.32 N; 1,509,524.53 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	379.0 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
103			CLAYEY SAND, SC, 10YR 7/3 (very pale brown) to 10YR 6/6 (brownish yellow), fine to coarse, low plasticity, very loose to loose, wet, angular, with large limestone fragments (Continued)						
104									
105									
106						SS43G	105.0 - 106.5	1.3	WR-WR-WR
107	107.2	271.8							

No Refusal /  
Bottom of Hole at 107.2 Ft.

Boring backfilled with 30% solids bentonite grout.

For SS32G, SS33G, SS42G, and SS43G, a 3" split spoon was used.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface





# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B23</b>
Client	Tennessee Valley Authority	Boring Location	729,959.30 N; 1,510,084.20 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	395.3 ft
Project Name	CUF TDEC Order	Elevation Datum	NGVD29
Project Location	Stewart Co, Cumberland City, TN	Date Started	11/5/20
Inspector	C. Burton	Completed	11/9/20
Logger	C. Burton	Depth to Water	12.0 ft
Drilling Contractor	Stantec Consulting Services Inc.	Date/Time	11/9/20 15:21
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 2" SS w/o liners, 3" SS w/o liners		
Rock Drilling and Sampling Tools (Type and Size)	N/A		
Overdrill Tooling (Type and Size)	N/A	Overdrill Depth	N/A
Sampler Hammer Type	Automatic	Weight	140 lb
Drop	30"	Efficiency	N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A
Reviewed By	B. Halada	Approved By	A. Welshans

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
0	0.0	395.3	Top of Hole						
1	1.2	394.1	Crushed stone		SS01G	0.0 - 1.5	1.4	18-18-16	
2			FAT CLAY WITH GRAVEL, CH, 7.5YR 5/8 (strong brown) to 5YR 4/6 (yellowish red), medium to high plasticity, firm to very hard, moist, iron oxide staining, [FILL]		SS02G	2.5 - 4.0	1.1	10-7-9	
3					SS03G	5.0 - 6.5	1.2	5-5-8	
4									
5									
6									
7									
8						SS04G	7.5 - 9.0	0.3	3-2-4
9									
10					SS05G	10.0 - 11.5	0.9	3-5-8	
11									
12									
13					SS06G	12.5 - 14.0	0.7	2-3-3	
14									
15									
16					SS07G	15.0 - 16.5	1.4	3-4-6	

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 3/12/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
17			FAT CLAY WITH GRAVEL, CH, 7.5YR 5/8 (strong brown) to 5YR 4/6 (yellowish red), medium to high plasticity, firm to very hard, moist, iron oxide staining, [FILL] (Continued)		SS08G	16.5 - 18.0	1.5	4-6-9	
18					SS09G	18.0 - 19.5	0.6	7-8-13	
19					SS10G	19.5 - 21.0	1.0	3-9-7	
20	21.0	374.3							
21			SANDY LEAN CLAY WITH GRAVEL, CL, 10YR 4/2 (dark grayish brown) to 7.5YR 5/8 (strong brown), fine to coarse, medium to high plasticity, firm to very hard, moist, iron oxide staining, with coal fragments, [FILL]		SS11G	21.0 - 22.5	1.5	6-8-10	
22					SS12G	22.5 - 24.0	1.5	4-7-10	
23					SS13G	24.0 - 25.5	0.5	9-4-4	
24					SS14G	25.5 - 27.0	0.2	4-3-2	
25					SS15G	27.0 - 28.5	0.4	4-2-3	
26					SS16G	28.5 - 30.0	0.4	4-8-17	
27					SS17G	30.0 - 31.5	1.5	2-3-5	
28	31.0	364.3							
29			SANDY SILT, ML, 10YR 4/2 (dark grayish brown), non-plastic to low plasticity, firm, [CCR]		SS18G	31.5 - 33.0	1.5	2-4-2	
30					SS19G	33.0 - 34.5	0.4	2-3-2	
31					SS20aG	34.5 - 35.7	1.5	1-2-1	
32	35.7			359.6		SS20bG	35.7 - 36.0		
33					SS21G	36.0 - 37.5	0.7	WH-3-4	
34			GRAVELLY LEAN CLAY WITH SAND, CL, 7.5YR 6/6 (reddish yellow), fine to coarse, low to medium plasticity, firm, moist, [FILL]		SS22G	37.5 - 39.0	1.1	WH-2-4	
35									
36									
37									
38									

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 3/12/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
39								
39.8	355.5							
40			CLAYEY GRAVEL WITH SAND, GC, low to high plasticity, very dense, wet, fine to coarse gravel, fine to coarse sand, [FILL] Difficult drilling. Possible boulders / concrete.		SS23G	39.0 - 40.5	0.9	1-10-16
41					SS24G	40.5 - 41.6	1.0	18-4-50/1"
42			Two pieces of metal at 42.0' bgs		SS25G	42.0 - 42.1	0.1	50/1"
43								
44					SS26G	43.5 - 45.0	0.3	2-4-11
45					SS27G	45.0 - 46.5	0.3	4-17-8
46					SS28G	46.5 - 47.9	0.4	3-1-50/5"
47					SS29G	48.0 - 48.2	0.2	50/2"
48.5	346.8							
49			SILTY LEAN CLAY WITH SAND, CL, 10YR 5/2 (grayish brown) to 10YR 5/6 (yellowish brown), non-plastic to low plasticity, firm, moist, slight organic odor, with pieces of wood and roots.		SS30G	49.5 - 51.0	0.9	10-3-2
50					SS31G	51.0 - 52.5	0.9	WH-2-4
51								
52					SS32G	52.5 - 54.0	0.8	3-1-2
53					SS33G	54.0 - 55.5	1.5	5-2-2
54								
55								
56								
57								
58								
59								
60								

TVA EIP BORING LOG - 175568209 CUF TDEC SUBSURF DT: 20190630 GDT: 3/12/21




# SUBSURFACE LOG

Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-B23</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>729,959.30 N; 1,510,084.20 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>395.3 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
61					SS34G	60.0 - 61.5	0.6	6-3-1	
62	62.5	332.8							
63			SANDY POORLY GRADED GRAVEL, GP, 10YR 6/6 (brownish yellow) and 5Y 6/1 (gray), medium to coarse, medium dense to very dense, wet, with silt lenses (maximum thickness of about 0.6')						
64									
65						SS35G	65.0 - 66.5	1.3	17-26-29
66									
67									
68									
69									
70									
71					SS36G	70.0 - 71.5	0.8	10-14-12	
72									
73									
74									
75									
76					SS37G	75.0 - 76.5	1.1	13-16-21	
77									
78									
79									
80									
81					SS38G	80.0 - 81.5	0.5	7-7-5	
82									

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 3/12/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B23</b>
Client	Tennessee Valley Authority	Boring Location	729,959.30 N; 1,510,084.20 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	395.3 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI			
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %			
83			SANDY POORLY GRADED GRAVEL, GP, 10YR 6/6 (brownish yellow) and 5Y 6/1 (gray), medium to coarse, medium dense to very dense, wet, with silt lenses (maximum thickness of about 0.6') <i>(Continued)</i>								
84											
85											
86							SS39G	85.0 - 86.5	85.0 - 86.5	0.9	10-21-12
87											
88											
89											
90											
91							SS40G	90.0 - 90.9	90.0 - 90.9	0.8	4-50/5"
91.5	303.8										

Refusal /  
Bottom of Hole at 91.5 Ft.

Boring backfilled with 30% solids bentonite grout.

For SS16G, SS17G, and SS29G a 3" split spoon was used.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 - CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 3/12/21



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B24</b>
Client	Tennessee Valley Authority	Boring Location	729,803.41 N; 1,510,169.16 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	379.9 ft
Project Name	CUF TDEC Order	Elevation Datum	NGVD29
Project Location	Stewart Co, Cumberland City, TN	Date Started	8/25/20
Inspector	C. Burton	Completed	8/26/20
Logger	C. Burton	Depth to Water	21.3 ft
Drilling Contractor	Stantec Consulting Services Inc.	Date/Time	8/26/20 14:26
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 2" SS w/o liners		
Rock Drilling and Sampling Tools (Type and Size)	N/A		
Overdrill Tooling (Type and Size)	N/A		Overdrill Depth
Sampler Hammer Type	Automatic	Weight	140 lb
Drop	30"		Efficiency
Borehole Azimuth	N/A		Borehole Inclination (from Vertical)
Reviewed By	B. Halada		Approved By
			A. Welshans

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	379.9	Top of Hole					
0	0.2	379.7	Topsoil					
1			LEAN CLAY WITH SAND, CL, 7.5YR 4/4 (brown) to 7.5YR 6/1 (gray), fine to coarse, medium plasticity, firm to very hard, moist, iron oxide staining, with coal and chert fragments, [FILL]		SS01G	0.0 - 1.5	1.2	2-5-8
2								
3					SS02G	2.5 - 4.0	1.5	9-6-5
4								
5								
6					SS03G	5.0 - 6.5	1.5	3-5-11
7								
8					SS04G	7.5 - 9.0	1.5	7-7-9
9								
10								
11					SS05G	10.0 - 11.5	1.3	3-4-3
12								
13								
14					SS06G	12.5 - 14.0	1.4	3-8-9
15								
16					SS07G	15.0 - 16.5	1.4	4-5-5

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT:20190830.GDT:3/11/21

Client Borehole ID     N/A     Stantec Boring No. **CUF-B24**  
 Client     Tennessee Valley Authority     Boring Location     729,803.41 N; 1,510,169.16 E NAD27 Plant Local      
 Project Number     175568209     Surface Elevation     379.9 ft     Elevation Datum     NGVD29    

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI			
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %			
16			LEAN CLAY WITH SAND, CL, 7.5YR 4/4 (brown) to 7.5YR 6/1 (gray), fine to coarse, medium plasticity, firm to very hard, moist, iron oxide staining, with coal and chert fragments, [FILL] (Continued)								
17											
18							SS08G	17.5 - 19.0	1.5	4-4-7	
19											
20											
21							SS09G	20.0 - 21.5	1.5	3-4-7	
22	22.3			357.6			SS10aG	21.5 - 22.3			
23					CLAYEY GRAVEL WITH SAND, GC, 2.5Y 4/2 (dark grayish brown) and 10YR 5/4 (yellowish brown), fine to coarse, low plasticity, medium dense, moist, angular, [FILL]		SS10bG	22.3 - 23.0	1.4	2-4-6	
24							SS11G	23.0 - 24.5	1.1	15-10-5	
25							SS12G	24.5 - 26.0	1.1	5-6-5	
26	26.0			353.9							
27	27.5			352.4	CLAYEY SAND WITH GRAVEL, SC, 2.5Y 6/3 (light yellowish brown) to 2.5Y 3/2 (very dark grayish brown), loose, wet to moist		SS13G	26.0 - 27.5	1.0	3-2-3	
28					LEAN CLAY WITH SAND, CL, 2.5Y 3/2 (very dark grayish brown), fine to coarse, low plasticity, very soft, moist		SS14G	27.5 - 29.0	1.5	2-WH-2	
29											
30	30.5			349.4				SS15G	29.0 - 30.5	1.5	1-1-2
31	31.1			348.8		CLAYEY GRAVEL WITH SAND, GC, 2.5Y 5/4 (light olive brown), low plasticity, loose, moist		SS16aG	30.5 - 31.1		
32					LEAN CLAY, CL, 10YR 5/2 (grayish brown) to 10YR 5/4 (yellowish brown), low plasticity, firm to very hard, moist, iron oxide staining		SS16bG	31.1 - 32.0	1.5	WH-3-3	
33							SS17G	32.0 - 33.5	1.5	3-4-5	
34							SS18G	33.5 - 35.0	1.5	3-2-4	
35											
36							SS19G	35.0 - 36.5	1.5	1-3-4	
37				SS20G		36.5 - 38.0	1.5	2-3-5			

TVA/EIP BORING LOG 175568209 CUF TDEC SUBSURF DT 20190630 GDT 3/11/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
38			LEAN CLAY, CL, 10YR 5/2 (grayish brown) to 10YR 5/4 (yellowish brown), low plasticity, firm to very hard, moist, iron oxide staining (Continued)						
39									
40	40.6	339.3	SILTY CLAYEY SAND WITH GRAVEL, SC-SM, 10YR 5/6 (yellowish brown), low plasticity, loose to medium dense, wet, fine gravel, fine to coarse sand						
41									
42									
43									
44									
45									
46									
47	47.4	332.5							
48				CLAYEY GRAVEL WITH SAND, GP-GC, 10YR 5/6 (yellowish brown), medium to coarse, medium dense to dense, wet, angular					
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 3/11/21



Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-B24</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>729,803.41 N; 1,510,169.16 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>379.9 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
59			CLAYEY GRAVEL WITH SAND, GP-GC, 10YR 5/6 (yellowish brown), medium to coarse, medium dense to dense, wet, angular <i>(Continued)</i> Increased sand content at 60.0'					
60								
61					SS30G	60.0 - 61.5	1.2	19-18-21
62								
63								
64								
65	65.4	314.5			SS31aG	65.0 - 65.4		
66	66.0	313.9			SS31bG SS31cG	65.4 - 66.0 66.0 - 66.3	1.1	11-2-50/4"
67			Limestone					
68								
69					SS32	69.0 - 69.0	0.0	10/0"
69.9	310.0							

Refusal /  
Bottom of Hole at 69.9 Ft.

Top of Rock = 66.0 Ft.  
Top of Rock Elevation = 313.9 Ft.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 3/11/21



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B25</b>	
Client	Tennessee Valley Authority	Boring Location	729,570.80 N; 1,510,405.99 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	378.7 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	8/18/20	Completed 8/20/20
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	N/A	Date/Time N/A
Inspector	C. Burton	Logger	C. Burton	Depth to Water N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 55LCX #714	
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 2" SS w/o liners, 3" SS w/o liners			
Rock Drilling and Sampling Tools (Type and Size)	N/A			
Overdrill Tooling (Type and Size)	N/A	Overdrill Depth	N/A	
Sampler Hammer Type	Automatic	Weight	140 lb	Drop 30" Efficiency N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	B. Halada	Approved By	A. Welshans	

Depth Ft <sup>3</sup>	Lithology		Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
	Depth Ft <sup>3</sup>	Elevation		Graphic	Rock Core:	RQD %	Run Ft	Rec. Ft
0	0.0	378.7						
	0.1	378.6	Topsoil					
1			LEAN CLAY WITH SAND, CL, 7.5YR 5/3 (brown) to 10YR 5/1 (gray), medium plasticity, firm to hard, moist, iron oxide staining, fine to coarse sand, [FILL]		SS01G	0.0 - 1.5	1.1	1-2-4
2								
3					SS02G	2.5 - 4.0	0.2	6-7-8
4								
5					SS03G	5.0 - 6.5	1.1	5-7-7
6								
7	7.0	371.7						
8			FAT CLAY WITH GRAVEL, CH, 7.5YR 5/6 (strong brown) and 7.5YR 6/1 (gray), medium to high plasticity, very hard, moist, iron oxide staining, with chert, [FILL]		SS04G	7.5 - 9.0	1.3	6-9-9
9								
10	10.3	368.4						
11			LEAN CLAY, CL, 2.5Y 5/2 (grayish brown) to 10YR 5/2 (grayish brown), medium plasticity, firm to hard, moist, iron oxide staining, [FILL]		SS05G	10.0 - 11.5	0.7	6-5-5
12								
13					SS06G	12.5 - 14.0	1.5	4-5-6
14								
15								
16					SS07G	15.0 - 16.5	0.9	11-7-7

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF.DT:20190630.GDT:3/11/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
16			LEAN CLAY, CL, 2.5Y 5/2 (grayish brown) to 10YR 5/2 (grayish brown), medium plasticity, firm to hard, moist, iron oxide staining, [FILL] (Continued)					
17								
18				SS08G	17.5 - 19.0	1.5	3-2-4	
19								
20								
21								
22	22.1	356.6						
23			Boulder, difficult to auger through					
24								
25								
26	26.5	352.2						
27			SANDY LEAN CLAY WITH GRAVEL, CL, 10YR 5/6 (yellowish brown), medium plasticity, firm to very hard, moist, fine to coarse sand, fine gravel, [FILL]					
28				SS12G	27.5 - 29.0	1.5	2-3-6	
29								
30				SS13G	29.0 - 30.5	0.7	6-5-10	
31								
32				SS14G	30.5 - 32.0	0.2	3-3-4	
33								
34	34.6	344.1						
35			SILT WITH SAND, ML, 2.5Y 4/3 (olive brown), low plasticity, soft, moist, slight organic odor, fine to medium sand, with organics					
36				SS16aG	33.5 - 34.6	1.4	2-4-2	
37				SS16bG	34.6 - 35.0			
				SS17G	35.0 - 36.5	1.5	2-1-3	
			SS18G	36.5 - 38.0	1.5	2-2-2		

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER: GFJ TDEC SUBSURF DT: 20190630 GDT: 3/11/21



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B25</b>
Client	Tennessee Valley Authority	Boring Location	729,570.80 N; 1,510,405.99 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	378.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
38.8	339.9		SILTY SAND WITH GRAVEL, SM, 10YR 4/2 (dark grayish brown), medium to coarse, loose to dense, wet		SS19aG	38.0 - 38.8	1.5	WH-4-8	
				SS19bG	38.8 - 39.5				
				SS20G	39.5 - 41.0		0.6	5-6-6	
				SS21G	41.0 - 42.5		1.4	3-5-5	
				SS22aG	42.5 - 43.7		1.5	5-9-13	
				SS22bG	43.7 - 44.0				
				SS23G	44.0 - 45.5		1.1	15-18-11	
46.1	332.6			CLAYEY SAND WITH GRAVEL, SC, 10YR 5/4 (yellowish brown), medium plasticity, very hard, moist to wet		SS24aG	45.5 - 46.1	1.0	2-12-9
					SS24bG	46.1 - 47.0			
47.4	331.3				GRAVELLY FAT CLAY WITH SAND, GP-GC, 2.5Y 6/4 (light yellowish brown), fine to medium, loose to medium dense, wet to moist, poorly graded, with sand lenses		SS25aG	47.0 - 47.4	0.9
			SS25bG	47.4 - 48.5					
			SS26G	48.5 - 50.0			1.5	8-6-4	
					SS27G	55.0 - 56.5	1.5	5-7-9	


TVA EIP BORING LOG: 175568209 CUF TDEC ORDER: GFJ TDEC SUBSURF DT: 20190630 GDT: 3/11/21

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B25</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  729,570.80 N; 1,510,405.99 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  378.7 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
59			GRAVELLY FAT CLAY WITH SAND, GP-GC, 2.5Y 6/4 (light yellowish brown), fine to medium, loose to medium dense, wet to moist, poorly graded, with sand lenses <i>(Continued)</i>						
60									
61	61.3			317.4	SS28aG	60.0 - 61.3	60.0 - 61.5	1.5	3-9-5
62			CLAYEY GRAVEL, GP-GC, 10YR 5/8 (yellowish brown), very dense						
63									
64	64.5			314.2	SS28bG	61.3 - 61.5			
65			POORLY GRADED GRAVEL WITH CLAY, GP, very dense						
66	66.0			312.7	SS29G	65.0 - 65.0	65.0 - 65.0	0.0	10/0"
67									
68			FAT CLAY, CH, 7.5YR 5/6 (strong brown), high plasticity, very soft to firm, moist						
69									
70									
71					SS30G	70.0 - 71.5	70.0 - 71.5	1.5	WH-1-2
72									
73									
74									
75									
76					SS31G	75.0 - 76.5	75.0 - 76.5	1.5	WH-4-4
77									
78									
79									
80									

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 3/11/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B25</b>
Client	Tennessee Valley Authority	Boring Location	729,570.80 N; 1,510,405.99 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	378.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
81			FAT CLAY, CH, 7.5YR 5/6 (strong brown), high plasticity, very soft to firm, moist (Continued)		SS32G	80.0 - 81.5	1.4	WR-WR-1
82								
83								
84								
85							SS33aG	85.0 - 85.6
85.6	293.1				SS33bG	85.6 - 85.7		
85.7	293.0							

Shale, light gray, very soft, moderately weathered

Refusal /  
Bottom of Hole at 85.7 Ft.

Top of Rock = 85.6 Ft.  
Top of Rock Elevation = 293.1 Ft.

For SS11G through SS13G, a 3" split spoon was used.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 3/11/21

# **APPENDIX B.3**

## **TEMPORARY WELLS**

## Table of Contents

Subsurface Boring Legend.....	1
CUF-TW01.....	2
CUF-TW02.....	7
CUF-TW03.....	9
CUF-TW04.....	14
CUF-TW05.....	16
CUF-TW06.....	21
CUF-TW07.....	23
CUF-TW08.....	30
CUF-TW09.....	37



# Subsurface Boring Legend

## Lithology Graphics

Symbol	Lithology
	Fill
	Top Soil
	Gravel
	Well Graded Gravel (GW)
	Poorly Graded Gravel (GP)
	Silty Gravel (GM)
	Silty, Clayey Gravel (GC-GM)
	Clayey Gravel (GC)
	Well Graded Gravel with Silt (GW-GM)
	Well Graded Gravel with Clay (GW-GC)
	Poorly Graded Gravel with Silt (GP-GM)
	Poorly Graded Gravel with Clay (GP-GC)
	Well Graded Sand (SW)
	Poorly Graded Sand (SP)
	Silty Sand (SM)
	Silty, Clayey Sand (SC-SM)
	Clayey Sand (SC)
	Well Graded Sand with Silt (SW-SM)
	Well Graded Sand with Clay (SW-SC)
	Poorly Graded Sand with Silt (SP-SM)
	Poorly Graded Sand with Clay (SP-SC)
	Silt (ML)
	Silty Clay (CL-ML)
	Lean Clay (CL)
	Organic Silt (OL)
	Elastic Silt (MH)
	Fat Clay (CH)
	Organic Clay (OH)
	Shale
	Siltstone
	Coal
	Limestone
	Sandstone

## Other Graphics

Symbol	Description
	Denotes environmental analytical sample interval
	Denotes SS sample interval
	Denotes ST sample interval
	Denotes DP sample interval
	Denotes RS sample interval
	Denotes RC sample interval
	First water level reading
	Second water level reading

## Common Abbreviations

Abbreviation	Definition
DP	Direct Push
HA	Hand Auger
HSA	Hollow Stem Auger
N/A	Not Applicable
NR	Not Recorded
RC	Rock Core
RQD	Rock Quality Designation
RS	Rotary Sonic
SS	Split Spoon
ST	Shelby Tube
WH	Weight of Hammer
WR	Weight of Rod

## General Notes

The boring logs include sample numbering used during drilling. For assigned Environmental Analytical Sample ID numbers, see relevant Environmental Chain-of- Custody forms from the drilling date range listed on each log.

For pH readings and additional field data, see applicable field documentation (e.g., Soil pH Data Form) from the drilling date range listed on each log.

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-TW01</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>729,394.08 N; 1,512,993.69 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>426.7 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>2/5/19</u>	Completed <u>2/12/19</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>26.8 ft</u>	Date/Time <u>2/6/19 07:19</u>
Inspector <u>M. McDonald</u>	Logger <u>C. Kocka</u>	Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 75#2, #712</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 3" SS w/o liners, 3" Shelby Tubes</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>NQ-3 Wireline, Split Barrel, Impregnated Bit</u>			
Overdrill Tooling (Type and Size) <u>8-1/4" HSA overdrill of boring</u>		Overdrill Depth <u>52.8 ft</u>	
Sampler Hammer Type <u>Automatic</u>	Weight <u>340 lb</u>	Drop <u>30"</u>	Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>E. Smith</u>		Approved By <u>C. Kocka</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	426.7		Top of Hole					
1			SILTY LEAN CLAY, CL, 10YR 6/1 (gray), low plasticity, very hard, moist, [CCR]		SS01G	0.0 - 1.5	1.5	1-2-6
2				1.5/3.5-20190205	SS02E	1.5 - 3.0	1.5	7-9-13
3			Color change to 10YR 7/1 (light gray) at 3.0'		SS03aE	3.0 - 3.5	1.5	6-23-16
4					SS03bG	3.5 - 4.5	1.5	6-23-16
5					SS04G	4.5 - 6.0	1.5	7-20-23
6				6.0/9.0-20190205	SS05E	6.0 - 7.5	1.5	6-12-16
7					SS06aE	7.5 - 8.0	1.5	7-17-23
8					SS06bG	8.0 - 9.0	1.5	7-17-23
9					SS07G	9.0 - 10.5	1.5	19-29-26
10					SS08G	10.5 - 12.0	1.5	5-14-17
11				12.0/14.0-20190205	SS09E	12.0 - 13.5	1.5	7-17-25
12					SS10aE	13.5 - 14.0	1.5	12-22-28
13					SS10bG	14.0 - 15.0	1.5	12-22-28
14					SS11G	15.0 - 16.5	1.5	19-18-16
15			Color change to 10YR 6/2 (light brownish gray) at 15.0'					
16								
17			Color change to 10YR 7/1 (light gray) and 10YR 5/2					

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 3/11/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW01</b>
Client	Tennessee Valley Authority	Boring Location	729,394.08 N; 1,512,993.69 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	426.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
17			(grayish brown) at 16.5'	16.5/18.5-20190205	SS12E	16.5 - 18.0	1.5	6-6-16	
18			SILTY LEAN CLAY, CL, 10YR 6/1 (gray), low plasticity, very hard, moist, [CCR] (Continued)		SS13aE	18.0 - 18.5	1.5	6-11-9	
19			Color change to 10YR 5/2 (grayish brown) at 18.0'		SS13bG	18.5 - 19.5	1.5		
20					SS14G	19.5 - 21.0	1.5	3-10-17	
21				Wet, color change to 10YR 7/1 (light gray) at 21.0'		SS15G	21.0 - 22.5	1.5	9-11-17
22					SS16E	22.5 - 24.0	1.5	15-26-44	
23					SS17aE	24.0 - 24.5	1.3	12-7-8	
24			Geotextile at 25.0		SS17bG	24.5 - 25.0	1.3		
25	25.0		401.7		SS17cG	25.0 - 25.5	1.5		
25.8	400.9			CLAYEY GRAVEL, GC, 10YR 4/1 (dark gray), coarse, loose, wet, subangular, well graded, [FILL]		SS18aG	25.5 - 25.8	1.5	2-4-3
26				SILTY LEAN CLAY, CL, 10YR 3/1 (very dark gray), low to medium plasticity, firm, wet, [CCR]		SS18bG	25.8 - 27.0	1.5	
27				Moist from 25.8' to 27.0'	27.0/29.0-20190205	SS19E	27.0 - 28.5	1.5	2-2-6
28					SS20aE	28.5 - 29.0	1.5	1-2-8	
29					SS20bG	29.0 - 30.0	1.5		
30				Color change to 10YR 3/2 (very dark grayish brown) at 30.0'		SS21G	30.0 - 31.5	1.5	1-2-3
31					SS22E	31.5 - 33.0	1.5	2-4-5	
32				SS23aE	33.0 - 33.5	1.5	2-4-10		
33				SS23bG	33.5 - 34.5	0.1	750		
34			Color change to 10YR 4/1 (dark gray) and non-plastic to low plasticity at 34.5'		ST01G	34.5 - 34.6	1.4	7-7-12	
35				SS24aG	34.6 - 35.6	1.4			
36				SS24bG	35.6 - 36.0	1.5	2-5-7		
37			Color change to 10YR 3/1 (very dark gray) at 36.5'		SS25E	36.0 - 37.5	1.5		
38			Non-plastic from 36.5' to 39.0'	36.0/40.0-20190206	SS26E	37.5 - 39.0	1.5	1-1-WH	
39			Very soft from 37.5' to 51.5'		SS27aE	39.0 - 40.0			
			Low plasticity from 39.0' to 45.5'						

TVA EIP BORING LOG 175568209 CUF TDEC SUBSURF DT 20190630 GDT 3/11/21



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW01</b>
Client	Tennessee Valley Authority	Boring Location	729,394.08 N; 1,512,993.69 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	426.7 ft
		Elevation Datum	NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
40			SILTY LEAN CLAY, CL, 10YR 3/1 (very dark gray), low to medium plasticity, firm, wet, [CCR] <i>(Continued)</i>		SS27bG	40.0 - 40.5	1.5	WH-1-1		
41						ST02G	40.5 - 42.5	2.0	250	
42										
43						42.545-0-20190206	SS28E	42.5 - 44.0	1.5	WH-WH-WH
44							SS29aE	44.0 - 45.0	1.5	WR-WR-WH
45							SS29bG	45.0 - 45.5		
46					Non-plastic to low plasticity from 45.5' to 53.8'		SS30G	45.5 - 47.0	1.5	1-WH-1
47						47.049-5-20190206	SS31E	47.0 - 48.5	1.5	1-2-1
48							SS32aE	48.5 - 49.5	1.5	1-1-WH
49							SS32bG	49.5 - 50.0		
50					SS33G	50.0 - 51.5	1.5	WR-WR-WH		
51										
52			Soft from 51.5' to 53.8'	51.563-8-20190206	SS34E	51.5 - 53.0	1.5	WH-2-3		
53					SS35aE	53.0 - 53.8	1.5	1-1-2		
54	53.8	372.9	LEAN CLAY, CL, 10YR 4/4 (dark yellowish brown), low to medium plasticity, firm, wet, no odor, [CCR] Color change to 10YR 3/1 (very dark gray) at 54.0' Color change to 7.5YR 5/4 (brown) at 54.8'		SS35bG	53.8 - 54.5				
55						SS36aG	54.5 - 54.8			
56						SS36bG	54.8 - 56.0	1.5	1-2-2	
57						SS37G	56.0 - 57.5	1.5	2-3-4	
58						ST03G	57.5 - 59.5	0.0	300	
59										
60	60.3	366.4	Moist at 59.5'		SS38aG	59.5 - 60.3	1.5	2-3-4		
61			FAT CLAY, CH, 7.5YR 5/3 (brown), medium to high plasticity, hard, moist, no odor, Tan mottling, trace subangular fine chert Color change to 7.5YR 5/6 at 61.0' Color change to 7.5YR 7/6 (reddish yellow) at 62.0'		SS38bG	60.3 - 61.0				
62						SS39aG	61.0 - 62.0	1.5	5-5-4	
					SS39bG	62.0 - 62.5				

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 3/11/21



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW01</b>
Client	Tennessee Valley Authority	Boring Location	729,394.08 N; 1,512,993.69 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	426.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
63	62.7	364.0	Wet with some gravel at 62.0' CLAYEY GRAVEL, GC, 7.5YR 4/4 (brown), very fine to coarse, medium dense, wet, no odor		ST04G	62.5 - 62.7	0.0	750
64					SS40G	62.7 - 64.0	1.3	5-7-6
65	65.5	361.2	GRAVELLY FAT CLAY, CH, 7.5YR 4/4 (brown), very fine to coarse, very hard, wet, no odor, angular		SS41G	64.0 - 65.5	0.8	3-6-23
66	67.0	359.7			SS42G	65.5 - 67.0	1.5	13-23-10
67	67.8	358.9	CLAYEY GRAVEL, GC, 7.5YR 4/4 (brown), very fine to coarse, medium dense, wet, no odor, Auger refusal at 67.8, water at 38.8 feet bgs		SS43G	67.0 - 67.3	0.3	50/4"
68			Weathered bedrock from 67.8' to 70.0': set with casing and not sampled					
69								
70	70.0	356.7	Limestone, light gray, fine, hard, thin bedded, weathered, dry, carbonaceous, with shale partings					Began Core
71					0	70.0 - 72.4	2.2	92
72	72.4	354.3	Limestone (80%) With Shale (20%) Limestone, light gray and black, fine, hard, very thin bedded, weathered, dry, Shale, dark gray, fine grained, very thin bedded					
73					7	72.4 - 77.8	1.6	30
74			Limestone, light gray and orange, fine to very fine, moderately hard to hard, thin to medium bedded, moderately weathered to highly weathered, dry, iron oxide staining, 15° to 45° bedding angle					
75	77.8	348.9			20	77.8 - 79.8	2.0	100
76	79.8	346.9	Limestone, light gray and orange, fine to very fine, moderately hard to hard, thin to medium bedded, freshly weathered to slightly weathered, dry, 0° to 15° bedding angle					
77					0	79.8 - 84.8	0.8	16
78			Iron staining at 84.8'					
79	84.8	341.9						
80								
81								
82								
83								
84								
85								

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 3/11/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW01</b>
Client	Tennessee Valley Authority	Boring Location	729,394.08 N; 1,512,993.69 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	426.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
86			Limestone (85%) With Shale (15%)		64	84.8 - 87.3 2.5	2.5	100
87			Limestone, light gray and light brown orange, fine to microcrystalline, moderately hard to hard, very thin to medium bedded, freshly weathered to highly weathered, dry, 0° to 60° bedding angle, Abundant brecciated cataclasite and secondarily deformed folds		0	87.3 - 88.3 1.0	0.6	60
89			Shale, dark gray, fine grained, very thin bedded		0	88.3 - 90.4 2.1	1.6	76
90	90.4	336.3	<i>(Continued)</i>					

Slightly weathered, 0° to 15° bedding angle from 87.3' to 88.3'  
 Moderately weathered, 0° to 45° bedding angle from 88.3' to 90.4'

Bottom of Hole at 90.4 Ft.

Top of Rock = 67.8 Ft.

Top of Rock Elevation = 358.9 Ft.

Begin Core = 70.0 Ft.

Temporary well CUF-TW01 installed. See well installation log for backfill details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 3/11/21

Client Borehole ID <u>  N/A  </u>		Stantec Boring No. <b>CUF-TW02</b>	
Client <u>  Tennessee Valley Authority  </u>		Boring Location <u>  729,384.58 N; 1,513,010.23 E NAD27 Plant Local  </u>	
Project Number <u>  175568209  </u>		Surface Elevation <u>  427.0 ft  </u>	Elevation Datum <u>  NGVD29  </u>
Project Name <u>  CUF TDEC Order  </u>		Date Started <u>  3/5/19  </u>	Completed <u>  3/6/19  </u>
Project Location <u>  Stewart Co, Cumberland City, TN  </u>		Depth to Water <u>  N/A  </u>	Date/Time <u>  N/A  </u>
Inspector <u>  M. Edmunds  </u>	Logger <u>  M. Edmunds  </u>	Depth to Water <u>  N/A  </u>	Date/Time <u>  N/A  </u>
Drilling Contractor <u>  Stantec Consulting Services Inc.  </u>		Drill Rig Type and ID <u>  CME 75#2, #712  </u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>  4-1/4" HSA, 3" SS w/o liners, 3" Shelby Tubes  </u>			
Rock Drilling and Sampling Tools (Type and Size) <u>  N/A  </u>			
Overdrill Tooling (Type and Size) <u>  N/A  </u>		Overdrill Depth <u>  N/A  </u>	
Sampler Hammer Type <u>  Automatic  </u>	Weight <u>  340 lb  </u>	Drop <u>  30"  </u>	Efficiency <u>  N/A  </u>
Borehole Azimuth <u>  N/A  </u>		Borehole Inclination (from Vertical) <u>  N/A  </u>	
Reviewed By <u>  D. Norman  </u>		Approved By <u>  C. Kocka  </u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
0	0.0	427.0	Top of Hole						
1			SILT, ML, 7.5YR 8/2 (pinkish white) to 2.5YR 8/2 (pinkish white), very fine to medium, non-plastic, hard to very hard, dry, [CCR]		SS01G	0.0 - 1.5	1.5	4-3-5	
2					SS02E	1.5 - 3.0	1.5	6-10-9	
3					SS03aE	3.0 - 3.5			
4					SS03bG	3.5 - 4.5	1.4	7-10-13	
5					ST01G	4.5 - 5.2	0.7	1100	
6					SS04aG	6.0 - 6.5			
7					SS04bE	6.5 - 7.5	1.5	13-16-20	
8					SS05aE	7.5 - 8.5	1.5	10-18-35	
9					SS05bG	8.5 - 9.0			
10				Color change to 7.5YR 8/1 (white) to 2.5Y 8/1 (white) at 9.0'		SS06G	9.0 - 9.8	0.8	35-50+4"
11						SS07E	10.5 - 11.4	0.9	46-50+5"
12					SS08E	12.0 - 12.9	0.9	28-50+5"	
13									
14			Color change to 7.5YR 8/1 (white) to 7.5YR 5/4 (brown) at 13.5'		SS09G	13.5 - 15.0	1.5	20-14-35	
15			Moist beginning at 13.5'						
16					SS10G	15.0 - 16.5	1.5	22-33-40	
17					SS11E	16.5 - 18.0	1.5	15-30-33	
18									

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 3/3/21

Client Borehole ID N/A      Stantec Boring No. **CUF-TW02**  
 Client Tennessee Valley Authority      Boring Location 729,384.58 N; 1,513,010.23 E NAD27 Plant Local  
 Project Number 175568209      Surface Elevation 427.0 ft      Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			SILT, ML, 7.5YR 8/2 (pinkish white) to 2.5YR 8/2 (pinkish white), very fine to medium, non-plastic, hard to very hard, dry, [CCR] <i>(Continued)</i>  Increased plasticity at 20.0'  Color change to 7.5YR 8/1 (white) to 7.5YR 4/3 (brown) at 21.0'  Color change to 7.5YR 8/1 (white) to 7.5YR 7/2 (pinkish gray) at 24.0'  Geotextile fabric encountered at 25.3'  CLAYEY GRAVEL TRACE SILT, GC, 10YR 5/1 (gray) to 10YR 4/2 (dark grayish brown), coarse, loose to dense, wet, subangular, [FILL]		SS12aE	18.0 - 18.5		
19				SS12bG	18.5 - 19.5	1.5	19-30-35	
20				ST02G	19.5 - 20.7	1.2	1200	
21				SS13aG	21.0 - 21.5			
22				SS13bE	21.5 - 22.5	1.5	7-18-24	
23				SS14E	22.5 - 23.3	0.8	47-50+1/4"	
24								
25	25.3	401.7		SS15G	24.0 - 25.5	1.5	44-25-14	
26	26.2	400.8		SS16aG	25.5 - 26.2			
27	27.0	400.0		SS16bG	26.2 - 27.0	1.5	5-7-10	

SILT TRACE GRAVEL, ML, 10YR 3/1 (very dark gray) to 10YR 2/2 (very dark brown), non to low plasticity, soft, moist to wet, [CCR]

No Refusal /  
 Bottom of Hole at 27.0 Ft.

Boring backfilled with 30% solids bentonite grout.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
 G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630.GDT 3/3/21



Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-TW03</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>728,847.22 N; 1,512,494.43 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>424.4 ft</u> Elevation Datum <u>NGVD29</u>	
Project Name <u>CUF TDEC Order</u>		Date Started <u>2/13/19</u> Completed <u>2/19/19</u>	
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>23.2 ft</u> Date/Time <u>2/18/19 12:51</u>	
Inspector <u>M. Edmunds</u> Logger <u>M. Edmunds</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 75#2, #712</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 3" SS w/o liners, 3" Shelby Tubes</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>NQ-3 Wireline, Split Barrel, Impregnated Bit</u>			
Overdrill Tooling (Type and Size) <u>8-1/4" HSA overdrill of boring</u>		Overdrill Depth <u>66.4 ft</u>	
Sampler Hammer Type <u>Automatic</u> Weight <u>340 lb</u> Drop <u>30"</u>		Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>E. Smith</u>		Approved By <u>C. Kocka</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	424.4	Top of Hole					
1			SILT, ML, 10YR 7/3 (very pale brown) to 10YR 8/3 (very pale brown), non to low plasticity, very hard, moist, [CCR]		SS01G	0.0 - 1.5	1.5	2-2-5
2			Trace organic inclusions from 3.0' to 6.0'		SS02E	1.5 - 3.0	1.5	6-14-10
3					SS03aE	3.0 - 3.5	1.5	6-14-28
4			Weak cementation from 6.0' to 13.5' Hydrocarbon staining from 6.0' to 10.5' Some organic inclusions from 6.0' to 12.0'		SS03bG	3.5 - 4.5	1.5	6-14-28
5					SS04G	4.5 - 6.0	1.5	10-21-28
6					SS05aG	6.0 - 6.5	1.5	7-14-21
7					SS05bE	6.5 - 7.5	1.5	7-14-21
8			Non-plastic, very dense from 12.0' to 16.5'		SS06aE	7.5 - 8.5	1.5	10-17-32
9					SS06bG	8.5 - 9.0	1.5	10-17-32
10					SS07G	9.0 - 10.5	1.5	8-20-31
11					SS08aG	10.5 - 11.5	1.5	9-17-21
12			Dry to moist from 16.5' to 18.0'		SS08bE	11.5 - 12.0	1.5	13-28-29
13					SS09E	12.0 - 13.5	1.5	13-28-29
14					SS10G	13.5 - 15.0	1.5	11-22-32
15					SS11G	15.0 - 16.5	1.5	13-28-36
16					SS12E	16.5 - 18.0	1.5	13-19-21
17								
18								

TVA EIP BORING LOG: 175568209\_CUF\_TDEC\_ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 4/12/21

Client Borehole ID     N/A     Stantec Boring No. **CUF-TW03**  
 Client     Tennessee Valley Authority     Boring Location     728,847.22 N; 1,512,494.43 E NAD27 Plant Local      
 Project Number     175568209     Surface Elevation     424.4 ft     Elevation Datum     NGVD29    

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			SILT, ML, 10YR 7/3 (very pale brown) to 10YR 8/3 (very pale brown), non to low plasticity, very hard, moist, [CCR] <i>(Continued)</i> Moist to wet from 18.0' to 21.0' Saturation line at 18.4' 10 YR 8/3 (very pale brown) to 10YR 5/3 (brown) from 19.5' to 21.0' Non-plastic from 21.0' to 23.7'		SS13aE	18.0 - 18.5		
19					SS13bG	18.5 - 19.5	1.5	10-20-23
20					SS14G	19.5 - 21.0	1.5	6-9-36
21					SS15E	21.0 - 22.0	1.0	16-50
22					SS16aE	22.5 - 23.0		
23	400.7				SS16bG	23.0 - 24.0	1.5	15-9-6
24			POORLY GRADED GRAVEL TRACE CLAY, GP, 5YR 4/1 (dark gray), cobbles, very loose, dry to moist, subangular, poorly graded, strong HCL reaction, [FILL]		SS17G	24.0 - 25.5	0.9	1-2-3
25	398.9				SS18aG	25.5 - 26.5	1.5	2-1-1
26			SILT LITTLE CLAY, ML, 7.5YR 4/2 (brown) to 7.5YR 3/2 (dark brown), low plasticity, very soft, moist to wet, [CCR]		SS18bE	26.5 - 27.0		
27					SS19E	27.0 - 28.5	1.5	WH-WH-WH
28					ST01G	28.5 - 30.5	1.3	50
29			Sandy from 33.5' to 35.0'		SS20aG	30.5 - 31.5	1.5	WH-WH-WH
30					SS20bE	31.5 - 32.0		
31					SS21E	32.0 - 33.5	1.5	WH-WH-1
32					SS22G	33.5 - 35.0	1.5	2-1-WH
33			Color change to 7.5YR 4/2 (brown) at 39.5'		SS23G	35.0 - 36.5	1.5	WH-WH-1
34					SS24E	36.5 - 38.0	1.5	WH-WH-WH
35					SS25E	38.0 - 39.5	1.5	WH-1-WH
36					SS26G	39.5 - 41.0	1.5	WR-1-WH
37					SS27E	41.0 - 42.5	1.5	WR-WR-WH

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER: GFI TDEC SUBSURF DT: 20190630 GDT: 4/12/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW03</b>
Client	Tennessee Valley Authority	Boring Location	728,847.22 N; 1,512,494.43 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	424.4 ft
		Elevation Datum	NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43			SILT LITTLE CLAY, ML, 7.5YR 4/2 (brown) to 7.5YR 3/2 (dark brown), low plasticity, very soft, moist to wet, [CCR] (Continued)	41.044-0.20190213	SS28E	42.5 - 44.0	1.5	WR-1-WH
44				SS29G	44.0 - 45.5	1.5	1-WH-1	
45	45.5	378.9	SILT TRACE SAND, ML, 7.5YR 4/2 (brown), [CCR]		SS30a	45.5 - 46.5	0.7	1-2-1
46				SS30bE	46.5 - 47.0			
47	47.0	377.4	SILT, ML, 7.5YR 4/2 (brown) to 7.5YR 4/1 (dark gray), low plasticity, very soft to soft, moist to wet, [CCR]	46.548-5.20190214	SS31E	47.0 - 48.5	1.5	1-WH-WH
48				SS32G	48.5 - 50.0	1.5	1-WH-2	
49				Very hard at 50.0'	SS33G	50.0 - 51.5	1.5	1-8-19
50	51.5	372.9		SILT TRACE CLAY, ML, 7.5YR 4/2 (brown) to 7.5YR 4/1 (dark gray), low plasticity, very soft to soft, moist to wet, [CCR]	51.563-5.20190214	SS34E	51.5 - 53.0	1.5
51			SS35aE		53.0 - 53.5	1.5	WH-1-1	
52			SS35bG		53.5 - 54.5	1.5	WH-2-3	
53			SANDY SILT TRACE CLAY, ML, 7.5YR 4/2 (brown) to 7.5YR 4/1 (dark gray), non-plastic, very soft, moist to wet, [CCR]		SS36G	54.5 - 56.0	1.5	WH-2-3
54				SS37aG	56.0 - 56.5	1.5	1-1-1	
55	57.5	366.9	ML, No recovery. No sample	56.568-5.20190214	SS37bE	56.5 - 57.5	1.1	1-WH-1
56				SS38aE	57.5 - 58.5	1.1	1-WH-1	
57	59.0	365.4	SANDY SILT TRACE CLAY, ML, 7.5YR 4/2 (brown) to 7.5YR 4/1 (dark gray), non to low plasticity, very soft, moist to wet, [CCR]		SS38b	58.5 - 59.0	0.0	WH-WH-WH
58				SS39E	59.0 - 60.5	0.0	WH-WH-WH	
59	60.5	363.9	SILT SOME CLAY, ML, 7.5YR 4/2 (brown) to 7.5YR 4/1 (dark gray), non to low plasticity, very soft, moist to wet, [CCR]		SS40aG	60.5 - 61.5	1.5	WR-WR-WR
60				SS40bE	61.5 - 62.0	1.5	WR-WR-WR	
61	62.0	362.4	SILT SOME CLAY, ML, 7.5YR 4/2 (brown) to 7.5YR 4/1 (dark gray), non to low plasticity, very soft, moist to wet, [CCR]	61.563-5.20190214	SS41E	62.0 - 63.5	1.5	1-WH-1
62				SS42G	63.5 - 65.0	1.5	WR-WH-1	
63	65.0	359.4	ML, very soft, No recovery. No sample		SS43E	65.0 - 66.5	0.0	WR-WR-WR
64								
65								
66								

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/12/21

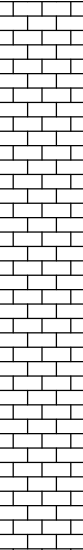


# SUBSURFACE LOG

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
66.5	357.9		SILT SOME CLAY, ML, 7.5YR 4/2 (brown) to 7.5YR 4/1 (dark gray), non to low plasticity, soft, moist to wet, [CCR]  SILTY FAT CLAY, CH, 7.5YR 4/6 (strong brown), medium plasticity, firm to hard, moist, some Manganese concretions, [FILL] Medium to high plasticity from 67.4' to 70.0' Trace sand from 67.4' to 68.0' Low to medium plasticity from 70.0' to 72.5'  Trace gravel from 72.5' to 78.9'						
67	357.0			SS44aG	66.5 - 67.4	66.5 - 68.0	1.5	WH-1-3	
68				SS44bG	67.4 - 68.0	68.0 - 70.0	1.4	750	
69				ST02G	68.0 - 70.0	70.0 - 71.5	1.5	3-5-5	
70						72.5 - 74.0	1.5	2-2-4	
71						75.0 - 76.5	1.5	2-3-4	
72						77.5 - 78.9	1.4	1-4-50/5"	
73									
74									
75									
76			Limestone (70%) With Dolomite (30%)  Limestone, light gray to tan, microcrystalline to cryptocrystalline, moderately hard to hard, laminated to very thin bedded, freshly weathered to slightly weathered, dolomitic, 0° to 60° bedding angle, inclined bedding appears to be folds and/or healed fractures  Dolomite, light grey, off white, cream, very finely crystalline to microcrystalline, moderately hard, laminated to thinly bedded, freshly weathered, trace healed fractures in places. 0° to 15° bedding angle from 82.4' to 89.4'						
78.9	345.5								Began Core
80				81	79.2 - 82.4	79.2 - 82.4	2.6	81	
81				100	82.4 - 89.4	82.4 - 89.4	7.0	100	
82									
83									
84									
85									
86									
87									
88									
89									
89.4	335.0								
90									

TVA/EIP BORING LOG: 175568209\_CUF\_TDEC SUBSURF DT: 20190630 GDT: 4/12/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW03</b>
Client	Tennessee Valley Authority	Boring Location	728,847.22 N; 1,512,494.43 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	424.4 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
91			Limestone, light gray to gray, microcrystalline to cryptocrystalline, moderately hard to hard, laminated to thin bedded, freshly weathered to slightly weathered, dolomitic, 0° to 15° bedding angle, with shale stringers, evidence of mud filled healed fracturing - near vertical, very widely spaced <i>(Continued)</i>		92	89.4 - 97.3 7.9	7.8	99	
92									
93									
94									
95									
96									
97									
98						76	97.3 - 99.4 2.1	2.1	100
99	99.4			325.0					

Bottom of Hole at 99.4 Ft.

Top of Rock = 78.9 Ft.  
 Top of Rock Elevation = 345.5 Ft.  
 Begin Core = 79.2 Ft.

Temporary well CUF-TW03 installed. See well installation log for backfill details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
 G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/12/21

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-TW04</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>728,842.52 N; 1,512,513.05 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>424.0 ft</u> Elevation Datum <u>NGVD29</u>	
Project Name <u>CUF TDEC Order</u>		Date Started <u>3/6/19</u> Completed <u>3/7/19</u>	
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Inspector <u>M. Edmunds</u> Logger <u>M. Edmunds</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 75#2, #712</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 3" SS w/o liners, 3" Shelby Tubes</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>Automatic</u> Weight <u>340 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>			
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>C. Kocka</u>		Approved By <u>P. Dunne</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	424.0		Top of Hole					
1			SILT, ML, 5YR 5/4 (reddish brown) to 7.5YR 8/2 (pinkish white), non-plastic, hard to very hard, dry, [CCR]		SS01G	0.0 - 1.5	1.5	5-10-18
2				1.5/5-20/190306	SS02E	1.5 - 3.0	1.3	11-26-33
3					SS03aE	3.0 - 3.5	1.5	25-42-45
4					SS03bG	3.5 - 4.5	1.5	25-42-45
5					SS04G	4.5 - 6.0	1.5	12-23-22
6			Color change to 7.5YR 8/1 (white) to 7.5YR 8/2 (pinkish white) at 6.0'	6.0/7.9-20/190306	SS05E	6.0 - 6.9	0.9	15-50+/5"
7					SS06E	7.0 - 7.9	0.9	25-50+/5"
8								
9					SS07G	9.0 - 10.2	1.2	15-44-50+/2"
10								
11			Color change to 7.5YR 8/1 (white) to 7.5YR 4/2 (brown) at 10.5'	10.5/12.8-20/190306	SS08E	10.5 - 11.4	0.9	23-50+/5"
12					SS09E	12.0 - 12.8	0.8	43-50+/4"
13								
14					SS10G	13.5 - 14.3	0.8	35-50+/4"
15			Dry to moist at 15.0'					
16					SS11G	15.0 - 16.4	1.4	25-48-50+/5"
17				16.5/18.5-20/190307	SS12E	16.5 - 17.9	1.4	29-43-50+/5"
18								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 2/9/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW04</b>
Client	Tennessee Valley Authority	Boring Location	728,842.52 N; 1,512,513.05 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	424.0 ft
		Elevation Datum	NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			SILT, ML, 5YR 5/4 (reddish brown) to 7.5YR 8/2 (pinkish white), non-plastic, hard to very hard, dry, [CCR] (Continued) Moist to wet at 18.0' Moist at 20.0'		SS13aE	18.0 - 18.5		
19					SS13bG	18.5 - 19.5	1.5	17-41-47
20					ST01G	19.5 - 20.0	0.5	1300
21					SS14G	20.0 - 20.8	0.8	47-50+1/4"
22					SS15E	21.5 - 23.0	1.5	27-36-16
22.9	401.1							
23			CLAYEY GRAVEL, GC, 5YR 4/1 (dark gray), coarse, loose to very dense, wet, subangular, [FILL]		SS16G	23.0 - 24.5	0.9	9-11-10
24								
25					SS17G	24.5 - 26.0	1.3	3-4-6
24.8	399.2							
26	398.0		CLAYEY SILT TRACE GRAVEL, ML, 5YR 4/1 (dark gray) to 5YR 3/1 (very dark gray), very fine, stiff, moist, [CCR]					

No Refusal /  
Bottom of Hole at 26.0 Ft.

Boring backfilled with 30% solids bentonite grout.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 2/9/21



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW05</b>		
Client	Tennessee Valley Authority	Boring Location	729,690.72 N; 1,511,953.03 E NAD27 Plant Local		
Project Number	175568209	Surface Elevation	422.5 ft	Elevation Datum	NGVD29
Project Name	CUF TDEC Order	Date Started	2/19/19	Completed	2/26/19
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	22.2 ft	Date/Time	2/21/19 08:00
Inspector	M. Edmunds	Logger	M. Edmunds	Depth to Water	N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 75#2, #712		
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 3" SS w/o liners, 3" Shelby Tubes				
Rock Drilling and Sampling Tools (Type and Size)	NQ-3 Wireline, Split Barrel, Impregnated Bit				
Overdrill Tooling (Type and Size)	8-1/4" HSA overdrill of boring	Overdrill Depth	57.5 ft		
Sampler Hammer Type	Automatic	Weight	340 lb	Drop	30"
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A		
Reviewed By	C. Kocka	Approved By	P. Dunne		

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	422.5	Top of Hole					
1			SILT, ML, 7.5YR 8/1 (white), non-plastic, firm to very hard, moist, [CCR]		SS01G	0.0 - 1.5	1.5	3-4-5
2					SS02E	1.5 - 3.0	1.4	4-8-8
3			Color change to 7.5YR 8/1 (white) to 7.5YR 7/3 (pink) at 3.0'		SS03aE	3.0 - 3.5	1.5	7-11-11
4					SS03bG	3.5 - 4.5	1.5	7-11-11
5					ST01G	4.5 - 6.5	1.3	1000
6					SS04E	6.5 - 8.0	1.5	6-13-12
7					SS05aE	8.0 - 8.5	1.5	13-19-16
8					SS05bG	8.5 - 9.5	1.5	13-19-16
9			Color change to 7.5YR 8/1 (white) to 2.5YR 8/2 (pale yellow) at 9.5'		SS06G	9.5 - 11.0	1.4	7-7-6
10			Soft at 11.0'		SS07aG	11.0 - 11.5	1.3	3-3-5
11					SS07bE	11.5 - 12.5	1.3	3-3-5
12			Color change to 7.5YR 8/1 (white) to 10YR 6/3 (pale brown) at 12.5'		SS08aE	12.5 - 13.5	1.5	3-8-5
13					SS08bG	13.5 - 14.0	1.5	3-8-5
14			Color change to 7.5YR 8/1 (white) to 7.5YR 6/2 (pinkish gray) at 14.0'		SS09G	14.0 - 15.5	1.4	4-9-16
15					SS10aG	15.5 - 16.5	1.5	9-22-36
16					SS10bE	16.5 - 17.0	1.5	9-22-36
17					SS11E	17.0 - 18.5	1.5	10-21-24

TVA EIP BORING LOG - 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT:20190630.GDT:4/14/21



Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			SILT, ML, 7.5YR 8/1 (white), non-plastic, firm to very hard, moist, [CCR] <i>(Continued)</i>					
19				SS12G	18.5 - 20.0	1.2	12-7-7	
20	20.4	402.1		SS13aG	20.0 - 21.0	1.3	4-3-3	
21	21.0	401.5	SILTY GRAVEL, GM, 10YR (white), fine to coarse, loose, subangular, [FILL]	SS13bG	21.0 - 21.5			
22			SANDY SILT, ML, 10YR 4/1 (dark gray), non-plastic, very soft to firm, moist to wet, lensed, weak cementation, [CCR]	SS14E	21.5 - 23.0	1.4	3-6-5	
23				SS15aE	23.0 - 23.5	1.5	2-1-4	
24			SS15bG	23.5 - 24.5				
25			SS16G	24.5 - 26.0	1.5	1-4-5		
26			SS17aG	26.0 - 26.5	1.5	1-1-3		
27			SS17bE	26.5 - 27.5				
28			SS18aE	27.5 - 28.5	1.5	2-4-5		
29			SS18bG	28.5 - 29.0				
30			ST02G	29.0 - 31.0	0.5	1000		
31			SS19aG	31.0 - 31.5	1.5	1-3-2		
32			SS19bE	31.5 - 32.5				
33			SS20aE	32.5 - 33.5	1.2	1-2-3		
34			SS20b	33.5 - 34.0				
35			SS21G	34.0 - 35.5	1.5	2-1-1		
36			SS22aG	35.5 - 36.5	1.5	1-WH-1		
37			SS22bE	36.5 - 37.0				
38			SS23E	37.0 - 38.5	1.5	2-WH-1		
39			SS24G	38.5 - 40.0	1.5	WR-WH-WH		
40			SS25aG	40.0 - 41.0				
41			SS25bG	41.0 - 41.5	1.5	WR-WR-WR		
42								

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT: 20190630 GDT: 4/14/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43			SANDY SILT, ML, 10YR 4/1 (dark gray), non-plastic, very soft to firm, moist to wet, lensed, weak cementation, [CCR] <i>(Continued)</i>	41.5-44.0-20190221	SS26E	41.5 - 43.0	1.5	WR-WR-WR
44				44.0-44.5	SS27aE	43.0 - 44.0	1.5	WR-WR-WR
45				44.5-46.0	SS27bG	44.0 - 44.5		
46				46.0-47.5	SS28G	44.5 - 46.0	1.5	WH-2-2
47				47.5-49.0	SS29E	46.0 - 47.5	1.5	4-3-6
48				49.0-50.5	SS30E	47.5 - 49.0	1.5	5-8-6
49				50.5-52.0	SS31G	49.0 - 50.5	1.5	1-WH-1
50				52.0-53.5	SS32aG	50.5 - 51.5	1.5	WH-WH-1
51				53.5-55.0	SS32bE	51.5 - 52.0	1.5	WH-WH-1
52				55.0-56.5	SS33E	52.0 - 53.5	1.2	WR-WR-1
53				56.5-58.0	SS34G	53.5 - 55.0	1.0	3-5-2
54				58.0-58.5	SS35G	55.0 - 56.5	1.5	13-7-5
55				58.5-59.5	SS36E	56.5 - 58.0	1.5	1-WH-1
56				59.5-61.5	SS37aE	58.0 - 58.5	1.5	1-3-4
57				61.5-63.0	SS37bG	58.5 - 59.5	1.5	1-3-4
58	58.6	363.9	LEAN CLAY TRACE GRAVEL, CL, 7.5YR 5/4 (brown) with 7.5YR 6/1 (gray), medium plasticity, soft, moist, organics	59.5-61.5	ST03G	59.5 - 61.5	0.0	350
59			SILTY FAT CLAY TRACE GRAVEL, CH, 7.5YR 5/4 (brown) with 7.5YR 6/1 (gray), medium to high plasticity, soft, moist, trace manganese concretions throughout	61.5-63.0	SS38G	61.5 - 63.0	1.5	3-3-5
60				63.0-64.5	SS39G	63.0 - 64.5	1.5	2-2-3
61	63.0	359.5						
62								
63								
64								
65								
66								

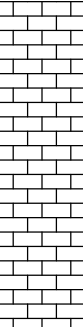
TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630.GDT 4/14/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW05</b>
Client	Tennessee Valley Authority	Boring Location	729,690.72 N; 1,511,953.03 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	422.5 ft
		Elevation Datum	NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
67			SILTY FAT CLAY TRACE GRAVEL, CH, 7.5YR 5/4 (brown) with 7.5YR 6/1 (gray), medium to high plasticity, soft, moist, trace manganese concretions throughout (Continued)		ST04G	65.5 - 67.5	1.7	700
68					SS40G	68.0 - 69.5	1.5	3-4-4
69					SS41G	70.5 - 72.0	1.5	3-4-4
70					SS42G	73.0 - 74.5	1.5	1-1-2
71								
72								
73								
74	74.3 74.5	348.2 348.0						
75			GRAVELLY FAT CLAY TRACE SILT, CH, 7.5YR 6/8 (reddish yellow) to 10YR 7/1 (light gray), medium plasticity, soft, moist, some saprolitic structure visible					Began Core
76			Limestone, light gray to gray, microcrystalline to medium crystalline, moderately hard to hard, laminated to medium bedded, freshly weathered, dry, dolomitic, 0° to 45° bedding angle, calcite healed fractures	100	75.0 - 77.5	2.5	100	
77								
78								
79								
80								
81								
82					99	77.5 - 85.5	7.9	99
83								
84								
85								
86								
87								
88					100	85.5 - 90.2	4.7	100
89								
90								

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/14/21

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-TW05</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  729,690.72 N; 1,511,953.03 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  422.5 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
91 92 93 94 95			Limestone, light gray to gray, microcrystalline to medium crystalline, moderately hard to hard, laminated to medium bedded, freshly weathered, dry, dolomitic, 0° to 45° bedding angle, calcite healed fractures <i>(Continued)</i>					
					100	90.2 - 95.7 5.5	5.5	100
95.7	326.8						90.2 - 95.7	

Bottom of Hole at 95.7 Ft.

Top of Rock = 74.5 Ft.  
 Top of Rock Elevation = 348.0 Ft.  
 Begin Core = 75.0 Ft.

Temporary monitoring well CUF-TW05 was installed in soil boring CUF-TW05 on 4/23/19. Refer to the CUF-TW05 Well Installation Detail form for additional information.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
    G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

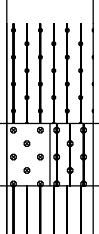
TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/14/21

Client Borehole ID <u>  N/A  </u>		Stantec Boring No. <b>CUF-TW06</b>	
Client <u>  Tennessee Valley Authority  </u>		Boring Location <u>  729,685.25 N; 1,511,968.30 E NAD27 Plant Local  </u>	
Project Number <u>  175568209  </u>		Surface Elevation <u>  422.0 ft  </u>	Elevation Datum <u>  NGVD29  </u>
Project Name <u>  CUF TDEC Order  </u>		Date Started <u>  3/7/19  </u>	Completed <u>  3/7/19  </u>
Project Location <u>  Stewart Co, Cumberland City, TN  </u>		Depth to Water <u>  N/A  </u>	Date/Time <u>  N/A  </u>
Inspector <u>  T. Greenwell  </u>	Logger <u>  M. Edmunds  </u>	Depth to Water <u>  N/A  </u>	Date/Time <u>  N/A  </u>
Drilling Contractor <u>  Stantec Consulting Services Inc.  </u>		Drill Rig Type and ID <u>  CME 45T#2, #814  </u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>  4-1/4" HSA, 3" SS w/o liners, 3" Shelby Tubes  </u>			
Rock Drilling and Sampling Tools (Type and Size) <u>  N/A  </u>			
Overdrill Tooling (Type and Size) <u>  N/A  </u>		Overdrill Depth <u>  N/A  </u>	
Sampler Hammer Type <u>  Automatic  </u>	Weight <u>  340 lb  </u>	Drop <u>  30"  </u>	Efficiency <u>  N/A  </u>
Borehole Azimuth <u>  N/A  </u>		Borehole Inclination (from Vertical) <u>  N/A  </u>	
Reviewed By <u>  C. Kocka  </u>		Approved By <u>  P. Dunne  </u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	422.0	Top of Hole					
1			SILT, ML, 7.5YR 8/1 (white) to 7.5YR 4/2 (brown), non-plastic, hard to very hard, dry, laminated, [CCR]		SS01aG	0.0 - 1.0		
					SS01bE	1.0 - 1.5	1.4	2-8-13
2					SS02E	1.5 - 3.0	1.5	14-17-21
3					SS03aE	3.0 - 4.0	1.5	15-22-19
4					SS03bG	4.0 - 4.5		
5					SS04G	4.5 - 6.0	1.5	7-15-19
6					SS05aG	6.0 - 6.5		
7				Color change to 7.5YR 7/1 (light gray) to 7.5YR 6/4 (light brown) at 6.5'	SS05bE	6.5 - 7.5	1.5	16-24-45
8				moist at 6.5'	SS06aE	7.5 - 8.5	1.5	27-45-49
9					SS06bG	8.5 - 9.0		
10				SS07G	9.0 - 10.5	1.5	22-25-24	
11				ST01G	10.5 - 12.3	1.3	1200	
12								
13					SS08E	12.5 - 14.0	1.5	5-7-9
14	14.2	407.8			SS09aE	14.0 - 14.2		
15	14.8	407.2	SILTY LEAN CLAY, CL, 7.5YR 2.5/1 (black), low to medium plasticity, very soft, moist, homogeneous, [CCR]		SS09bG	14.2 - 15.5	1.5	1-1-2
16	15.5	406.5	SANDY SILT, ML, 7.5YR 2/2 (black), low plasticity, very soft, moist, homogeneous, [CCR]		SS10aG	15.5 - 16.0		
					SS10b	16.0 - 16.5	1.0	19-47-50+/5"
					SS10cE	16.5 - 16.9		
17					SS11E	17.0 - 17.9	0.9	23-50/5"

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190330 GDT 3/9/20

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW06</b>
Client	Tennessee Valley Authority	Boring Location	729,685.25 N; 1,511,968.30 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	422.0 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
18			SILTY SAND, SM, 10YR 8/1 (white) to 7.5YR 7/4 (pink), very fine to medium, very dense, moist, laminated, [CCR] <i>(Continued)</i> Geotextile fabric encountered at 19.6'						
19	19.6			402.4		SS12aE	18.5 - 19.0	1.5	20-11-11
20	20.6			401.4		SS12bG	19.0 - 20.0		
21	21.5			400.5		SS13aG	20.0 - 20.6		
					SS13bG	20.6 - 21.5	1.3	6-7-9	

SANDY SILT, ML, 7.5YR 3/1 (very dark gray) to 7.5YR 2.5/3 (very dark brown), non to low plasticity, stiff, moist, stratified, [CCR]

No Refusal /  
Bottom of Hole at 21.5 Ft.

Boring backfilled with 30% solids bentonite grout.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 3/9/20

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-TW07</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>731,283.83 N; 1,510,951.08 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>438.3 ft</u> Elevation Datum <u>NGVD29</u>	
Project Name <u>CUF TDEC Order</u>		Date Started <u>12/13/18</u> Completed <u>1/8/19</u>	
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>50.1 ft</u> Date/Time <u>1/3/19</u>	
Inspector <u>M. Edmunds</u> Logger <u>M. Edmunds</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 75#2, #712</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 3" SS w/o liners, 3" Shelby Tubes</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>NQ-3 Wireline, Split Barrel, Impregnated Bit</u>			
Overdrill Tooling (Type and Size) <u>8-1/4" HSA overdrill of boring</u>		Overdrill Depth <u>93.0 ft</u>	
Sampler Hammer Type <u>Automatic</u> Weight <u>340 lb</u> Drop <u>30"</u>		Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>C. Kocka</u>		Approved By <u>P. Dunne</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	438.3		Top of Hole					
1			WELL GRADED SAND WITH GRAVEL, SW, 5YR 3/1 (very dark gray) to 5YR 4/3 (reddish brown), medium dense, moist, subangular, with silt, [CCR]		SS01G	0.0 - 1.5	1.5	10-9-12
2			Dense at 1.5'		SS02E	1.5 - 3.0	1.5	13-15-15
3			Abruptly changes to silt with sand, trace gravel at 2.3'		SS03aE	3.0 - 3.5	1.5	7-12-19
4			Medium dense at 3.0'		SS03bG	3.5 - 4.5	1.5	7-12-19
5	433.8		SILT, ML, 5YR 4/3 (reddish brown), very dense, moist, [CCR]		SS04G	4.5 - 6.0	1.5	7-30-38
6					SS05E	6.0 - 7.5	1.5	30-78-56
7			Gravel lens, sand with gravel and trace silt at 7.5'		SS06aE	7.5 - 8.0	1.5	14-48-86
8					SS06bG	8.0 - 9.0	1.5	14-48-86
9	429.3		SANDY WELL GRADED GRAVEL WITH SILT, GW, 7.5YR 2.5/2 (very dark brown), medium dense, dry, well graded, [CCR]		SS07G	9.0 - 10.5	1.5	8-9-8
10	427.8				SS08E	10.5 - 12.0	1.5	5-6-5
11			SAND WITH GRAVEL, SW, 5YR 3/4 (dark reddish brown), medium dense, dry, well graded, [CCR]		SS09aE	12.0 - 12.5	1.5	16-9-11
12	426.3				SS09bG	12.5 - 13.5	1.5	16-9-11
13			SILTY SAND, SM, 5YR 2.5/1 (black), very dense, dry, poorly graded, [CCR]	SS10G	13.5 - 15.0	1.5	11-125-186	
14				SS11G	15.0 - 15.8	0.9	62-100/4"	
15			Color change to 7.5YR 2.5/1 (black) at 15.0'	SS12E	16.5 - 17.9	1.5	25-55-100/5"	
16								
17								
18	420.3							

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 4/14/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW07</b>
Client	Tennessee Valley Authority	Boring Location	731,283.83 N; 1,510,951.08 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	438.3 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
18			SAND WITH GRAVEL, SW, 5YR 3/1 (very dark gray), very dense, dry, well graded, [CCR]		SS13aE	18.0 - 18.5	1.5	23-48-100/4"	
19					SS13bG	18.5 - 19.3			
20					SS14G	19.5 - 20.4			
21	21.0	417.3	SILT, ML, 7.5YR 2.5/1 (black), medium dense, dry, [CCR]	21.023-4-20181213	SS15E	21.0 - 21.6	0.6	52-100/1"	
22	22.5	415.8			SS16E	22.5 - 23.4	0.9	16-100/5"	
23			GRAVELLY SAND TRACE SILT, SW, 5YR 2.5/2 (dark reddish brown), loose, dry, well graded, [CCR]		SS17G	24.0 - 24.8	0.8	59-100/4"	
24					SS18G	25.5 - 25.9	0.4	100/5"	
25					SS19E	27.0 - 27.8	0.8	56-100/4"	
26					SS20aE	28.5 - 29.0	1.5	12-15-30	
27	27.0			411.3	SS20bG	29.0 - 30.0	1.3	21-25-100/4"	
28			SILT, ML, 2.5YR 3/1 (dark reddish gray), medium dense to very dense, dry, poorly graded, [CCR]	27.029-0-20181213	SS21G	30.0 - 31.3	1.3	21-25-100/4"	
29						SS22E	31.5 - 33.0	1.5	15-19-24
30						SS23aE	33.0 - 33.5	1.5	14-24-22
31	31.5				406.8	SS23bG	33.5 - 34.5	1.5	14-17-20
32						SS24G	34.5 - 36.0	1.5	8-16-22
33						SS25aG	36.0 - 36.5	1.5	12-13-16
34						SS25bE	36.5 - 37.5	1.5	12-13-16
35			GRAVELLY SAND WITH SILT, SW, 5YR 2.5/2 (dark reddish brown), dense, dry, [CCR]	31.533-5-20181213	SS26aE	37.5 - 38.5	1.5	12-13-16	
36						SS26bG	38.5 - 39.0	1.5	12-13-16
37						SS27aG	40.5 - 41.5	1.5	14-24-25
38						SS27bE	41.5 - 42.0	1.5	14-24-25
39									
40									
41									
42									

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/14/21



Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43	43.5	394.8	GRAVELLY SAND WITH SILT, SW, 5YR 2.5/2 (dark reddish brown), dense, dry, [CCR] (Continued)	41.5-43.5-20181213	SS28E	42.0 - 43.5	1.5	15-22-25
44			POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM, 5YR 2.5/2 (dark reddish brown), medium dense, dry, trace silt, [CCR]		SS29G	43.5 - 45.0	1.5	11-13-15
45					SS30G	45.0 - 46.5	1.5	12-13-13
46					SS31E	46.5 - 48.0	1.5	8-7-6
47	48.0	390.3	SILT TRACE SAND, ML, 5YR 2.5/2 (dark reddish brown), soft to firm, [CCR]	46.5-48.0-20181217	SS32aE	48.0 - 48.5	1.5	5-10-8
48					SS32bG	48.5 - 49.5		
49	49.5	388.8	SILTY SAND, SM, 5YR 2.5/2 (dark reddish brown), medium dense, moist, [CCR]		SS33G	49.5 - 51.0	1.5	11-11-12
50					SS34aG	51.0 - 51.5	1.5	2-3-5
51					SS34bE	51.5 - 52.5		
52	52.0	386.3	With siltstone, shale, limestone gravel cobbles at 51.5'	51.5-52.5-20181217	SS35E	52.5 - 54.0	0.9	2-3-5
53	54.0	384.3	GRAVEL WITH SILT, GW, 5YR 2.5/2 (dark reddish brown), loose, wet, roots and organics, [FILL]		SS36aE	54.0 - 54.5	1.5	5-7-6
54				SS36bG	54.5 - 55.5			
55	55.5	382.8	SILT WITH GRAVEL, ML, 5YR 4/1 (dark gray), dense, moist, occasional sand, [CCR]		SS37aG	55.5 - 56.0	1.5	3-2-6
56				SS37bE	56.0 - 57.0			
57			Soft, moist to wet at 57.0'	56.5-57.0-20181217	SS38E	57.0 - 58.5	1.5	3-1-2
58	58.5	379.8	SILT TRACE GRAVEL, ML, 5YR 4/1 (dark gray), medium plasticity, soft, wet, [CCR]		SS39G	58.5 - 60.0	1.5	WH-1-1
59					ST02G	60.0 - 62.0	0.9	350
60					SS40E	62.0 - 63.5	1.5	WH-WH-1
61				62.0-64.0-20181218	SS41aE	63.5 - 64.0	1.5	1-1-1
62					SS41bG	64.0 - 65.0		
63			Slightly more poorly graded at 65.0'		SS42aG	65.0 - 66.0	1.5	WR-WR-1
64								
65								
66								

TVA/EIP BORING LOG 175568209 CUF TDEC SUBSURF DT 20190630 GDT 4/14/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW07</b>
Client	Tennessee Valley Authority	Boring Location	731,283.83 N; 1,510,951.08 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	438.3 ft
		Elevation Datum	NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
67	68.0	370.3	SILT TRACE GRAVEL, ML, 5YR 4/1 (dark gray), medium plasticity, soft, wet, [CCR] <i>(Continued)</i>	66.0/68.5-20181218	SS42bE	66.0 - 66.5		
68					SS43E	66.5 - 68.0	1.5	WR-WR-WR
69	69.5	368.8	GRAVELLY SAND, SW, 5YR 3/1 (very dark gray), very loose, wet, well graded, [CCR]	68.0-69.5	SS44aE	68.0 - 68.5		
70					SS44bG	68.5 - 69.5	1.2	WR-WR-2
71	71.0	367.3	WELL GRADED SAND WITH SILT AND GRAVEL, SW-SM, 5YR 3/1 (very dark gray) to 5YR 3/2 (dark reddish brown), loose, wet, well graded, [CCR]	69.5-71.0	SS45G	69.5 - 71.0		1-2-2
72					SS46aG	71.0 - 71.5	1.5	2-1-2
73	72.5	365.8	SILT, ML, 5YR 4/1 (dark gray), soft, wet, Occasional gravel and sand, [CCR]	71.5-72.5	SS46bE	71.5 - 72.5		
74					SS47aE	72.5 - 73.5	1.5	4-5-1
75	74.0	364.3	SAND WITH GRAVEL, SW, 5YR 4/1 (dark gray), medium to coarse, loose, wet, [CCR]	73.5-74.0	SS47bG	73.5 - 74.0		
76					SS48G	74.0 - 75.5	1.5	WR-WR-1
77	75.5	364.3	SILT, ML, 5YR 4/1 (dark gray), soft, wet, [CCR]	75.5-77.0	SS49aG	75.5 - 76.5		WR-WR-1
78					SS49bE	76.5 - 77.0	1.5	WR-1-WH
79	77.0	364.3	SILT, ML, 5YR 4/1 (dark gray), soft, wet, [CCR]	77.0-78.5	SS50E	77.0 - 78.5		WR-1-WH
80					SS51G	78.5 - 80.0	1.5	WR-1-WH
81	78.5	364.3	SILT, ML, 5YR 4/1 (dark gray), soft, wet, [CCR]	80.0-81.5	SS52G	80.0 - 81.5		1-1-1
82					SS53	81.5 - 83.0	0.2	WR-1-WH
83	79.5	364.3	SILT, ML, 5YR 4/1 (dark gray), soft, wet, [CCR]	83.0-84.5	SS54	83.0 - 84.5		WR-WR-1
84					SS55aG	84.5 - 85.0	1.5	WR-WH-1
85	80.0	364.3	SILT, ML, 5YR 4/1 (dark gray), soft, wet, [CCR]	85.0-86.0	SS55bE	85.0 - 86.0		WR-WH-1
86					SS56aE	86.0 - 87.0	1.5	WH-WH-1
87	81.0	364.3	SILT, ML, 5YR 4/1 (dark gray), soft, wet, [CCR]	87.0-87.5	SS56bG	87.0 - 87.5		
88					SS57G	87.5 - 89.0	1.3	1-WH-WH
89	82.0	364.3	SILT, ML, 5YR 4/1 (dark gray), soft, wet, [CCR]	89.0-90.5	SS58G	89.0 - 90.5		WH-WH-1
90								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/14/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
91			SILT, ML, 5YR 4/1 (dark gray), soft, wet, [CCR] <i>(Continued)</i>		SS59aG	90.5 - 91.0		
92			SS60 sank to a depth of 94.0 feet under the weight of the NWJ rods	91.084-0.20181218	SS59bE	91.0 - 92.0	1.5	WR-WR-1
93					SS60E	92.0 - 94.0	1.9	WR-WR-WR
94			Transitional layer between CCR and foundation soil at 94.0'		SS61G	94.0 - 95.5	1.5	WR-WR-1
96	96.2	342.1			SS62aG	95.5 - 96.2		
97			LEAN CLAY, CL, 5YR 3/1 (very dark gray), soft, angular to subrounded gravel, trace organics		SS62bG	96.2 - 97.0	1.5	1-WH-2
98					ST03G	97.0 - 98.3	0.0	
99	99.0	339.3	Gas pocket encountered at 98.3'		SS63aG	98.5 - 99.0		
100			POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM, 5YR 3/1 (very dark gray), medium dense, wet, angular to subrounded gravel, trace organics		SS63bG	99.0 - 100.0	1.5	8-4-6
101					SS64G	100.0 - 101.5	1.5	5-8-9
102					SS65G	101.5 - 103.0	1.5	5-9-5
103					SS66G	103.0 - 104.5	1.5	6-6-8
104					SS67G	104.5 - 106.0	1.5	10-9-7
105					SS68aG	106.0 - 107.0	1.5	6-2-3
107	107.0	331.3			SS68bG	107.0 - 107.5		
108	107.5	330.8	HIGHLY ORGANIC SOILS WITH SAND, OH, 10YR 2/1 (black), non-plastic, soft, moist, organic odor, gas pocket hit at 107.5'		SS69aG	107.5 - 108.3	1.3	2-2-1
109	108.3	330.0			SS69bG	108.3 - 109.0		
110	109.9	328.4	WELL GRADED SAND WITH GRAVEL, SW, 5YR 3/1 (very dark gray), very loose to loose, wet, angular to subrounded		SS70aG	109.0 - 109.9	1.5	3-5-7
111	110.5	327.8	Gas pocket encountered at 107.5'		SS70bG	109.9 - 110.5		
112	111.9	326.4	SANDY LEAN CLAY, CL, 5YR 3/1 (very dark gray), low to medium plasticity, soft to firm, moist to wet		SS71aG	110.5 - 111.1	1.5	3-4-8
113	111.9	326.4			SS71bG	111.1 - 112.0		
114	113.5	324.8	WELL GRADED SAND WITH GRAVEL, SW, 5YR 3/1 (very dark gray), loose to medium dense, wet, angular to subrounded		SS72aG	112.0 - 113.0	1.5	1-5-3
115	114.0	324.3	SANDY LEAN CLAY, CL, 5YR 3/1 (very dark gray), low to medium plasticity, soft to firm, moist to wet		SS72bG	113.0 - 113.5		
116	114.0	324.3			SS73aG	113.5 - 114.0	1.5	1-9-14

TVA EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT:20190630.GDT 4/14/21










# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW07</b>
Client	Tennessee Valley Authority	Boring Location	731,283.83 N; 1,510,951.08 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	438.3 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
115			WELL GRADED SAND WITH GRAVEL, SW, 5YR 3/1 (very dark gray), loose to medium dense, wet, angular to subrounded		SS73bG	114.0 - 115.0				
116			SANDY SILT, SM, 7.5YR 3/2 (dark brown), fine, low plasticity, stiff, moist		SS74G	115.0 - 116.5	1.5	2-6-9		
117			WELL GRADED GRAVEL WITH SILT AND SAND, GW-GM, 5YR 3/1 (very dark gray), medium dense, wet, angular to subrounded (Continued)		SS75G	116.5 - 118.0	1.5	5-5-8		
118	118.0 320.3		SANDY POORLY GRADED GRAVEL WITH CLAY AND SAND, GP-GC, 7.5YR 5/2 (brown), medium dense, wet, subangular to subrounded		SS76G	118.0 - 119.5	1.5	9-9-8		
119					SS77G	119.5 - 121.0	0.9	2-6-13		
120					SS78G	121.0 - 122.5	1.5	10-13-12		
121					SS79G	122.5 - 124.0	1.5	10-12-7		
122					SS80G	124.0 - 125.2	1.2	10-7-50/2"		
123								Began Core		
124	125.5 312.8									
125			Limestone (90%) With Shale (10%)							
126			Limestone, light gray to pale gray, very fine to medium, moderately hard, freshly to slightly weathered		0	125.5 - 129.5	4.0	2.4	60	
127			Shale, fine grained, highly weathered, dark gray, interbedded with limestone							
128										
129										
130										
131										
132						0	129.5 - 134.5	5.0	3.0	60
133										
134										
135										
136					74	134.5 - 138.0	3.5	3.3	94	
137										
138										

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 4/14/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW07</b>
Client	Tennessee Valley Authority	Boring Location	731,283.83 N; 1,510,951.08 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	438.3 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
139			Limestone (90%) With Shale (10%)					
140			Limestone, light gray to pale gray, very fine to medium, moderately hard, freshly to slightly weathered					
141								
142					81	138.0 - 145.5	6.7	89
143			Shale, fine grained, highly weathered, dark gray, interbedded with limestone (Continued)			7.5		
144								
145	145.5							

Bottom of Hole at 145.5 Ft.

Top of Rock = 125.5 Ft.

Top of Rock Elevation = 312.8 Ft.

Begin Core = 125.5 Ft.

Temporary monitoring well CUF-TW07 was installed in soil boring CUF-TW07 on 2/18/19. Refer to the CUF-TW07 Well Installation Detail form for additional information.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-TW08</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>731,314.89 N; 1,510,074.98 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>435.7 ft</u> Elevation Datum <u>NGVD29</u>	
Project Name <u>CUF TDEC Order</u>		Date Started <u>1/9/19</u> Completed <u>1/18/19</u>	
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>67.1 ft</u> Date/Time <u>1/17/19</u>	
Inspector <u>M. Edmunds</u> Logger <u>M. Edmunds</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 75#2, #712</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 3" SS w/o liners, 3" Shelby Tubes</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>NQ-3 Wireline, Split Barrel, Impregnated Bit</u>			
Overdrill Tooling (Type and Size) <u>8-1/4" HSA overdrill of boring</u>		Overdrill Depth <u>84.1 ft</u>	
Sampler Hammer Type <u>Automatic</u> Weight <u>340 lb</u> Drop <u>30"</u>		Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>E. Smith</u>		Approved By <u>C. Kocka</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
0	0.0	435.7	Top of Hole						
1			POORLY GRADED SAND WITH GRAVEL, SP, 5YR 2.5/1 (black), medium to coarse, medium dense, dry, transitions to fine grained silt, [CCR] With trace sand and gravel from 1.5' to 2.2'	1.04-0.20190109	SS01aG	0.0 - 1.0	0.0-1.5	1.5	2-6-13
					SS01bE	1.0 - 1.5			
2					SS02E	1.5 - 3.0			
3	3.0	432.7							
4			POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM, 5YR 3/1 (very dark gray), medium dense, dry, above silt grades to gravel and abruptly transitions to silt with gravel at 3.9', [CCR]	6.57-8.20190109	SS03aE	3.0 - 4.0	3.0-4.5	1.3	4-7-8
5	4.5	431.2			SS03bG	4.0 - 4.5			
6			POORLY GRADED SAND WITH GRAVEL, SP, 5YR 2.5/1 (black), medium to coarse, dense, dry, [CCR] SILTY SAND, SM, 5YR 2.5/1 (black) to 5YR 3/1 (very dark gray), non-plastic, very hard, dry, with trace sand and gravel in places, [CCR]	11.5715.0-20190109	SS04G	4.5 - 6.0	4.5-6.0	1.5	7-9-23
7	6.0	429.7			SS05aG	6.0 - 6.5			
8					SS05bE	6.5 - 7.5			
9			SS06E	7.5 - 7.8	7.5-7.8	0.4	50/4"		
10			SS07G	9.0 - 9.9				9.0-9.9	1.1
11			SS08E	10.5 - 10.9	10.5-10.9	0.4	50/5"		
12			SS09E	12.0 - 12.1				12.0-12.1	0.1
13	13.5	422.2							
14			POORLY GRADED SAND WITH GRAVEL, SP, 5YR 2.5/1 (black), medium to coarse, medium dense, dry, some silt, subangular to subrounded, [CCR] SILT, ML, 5YR 3/1 (very dark gray), very hard, dry, trace gravel throughout, [CCR]	16.5715.5-20190109	SS10E	13.5 - 15.0	13.5-15.0	1.5	7-15-12
15	15.0	420.7			SS11G	15.0 - 15.6			
16									
17			No gravel inclusions from 16.5' to 18.5'		SS12E	16.5 - 17.3	16.5-17.3	0.8	13-50/4"
18									

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 2/16/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW08</b>
Client	Tennessee Valley Authority	Boring Location	731,314.89 N; 1,510,074.98 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	435.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			SILT, ML, 5YR 3/1 (very dark gray), very hard, dry, trace gravel throughout, [CCR] <i>(Continued)</i>		SS13E	18.0 - 18.5	0.5	50
19				SS14G	19.5 - 19.9	0.4	50/5"	
20				SS15E	21.0 - 21.6	0.6	28-50/1"	
21				SS16E	22.5 - 23.0	0.5	50	
22				SS17G	24.0 - 24.6	0.6	29-50/1"	
23				SS18E	25.5 - 25.9	0.4	50/5"	
24				SS19E	27.0 - 27.5	0.5	50	
25				SS20E	28.5 - 28.8	0.3	50/4"	
26				SS21E	30.0 - 30.4	0.4	50/5"	
27	27.0	408.7		WELL GRADED SAND WITH SILT, SW-SM, 5YR 3/1 (very dark gray), medium to coarse, very dense, moist, trace gravel, subangular to subrounded, [CCR]		SS22E	31.5 - 33.0	1.5
28	28.5	407.2	SILT, ML, 5YR 2.5/1 (black), very hard, dry, [CCR]		SS23E	33.0 - 34.5	1.5	11-13-15
29					SS24G	34.5 - 36.0	1.5	13-20-21
30					SS25aG	36.0 - 36.5	1.5	16-19-19
31					SS25bE	36.5 - 37.5	1.5	16-19-19
32					SS26E	37.5 - 39.0	1.5	16-17-20
33					SS27G	39.0 - 40.5	1.5	13-16-17
34					SS28aG	40.5 - 41.5	1.5	10-12-13
35					SS28bE	41.5 - 42.0	1.5	10-12-13
36								
37								
38								
39								
40								
41								
42								

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 2/16/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43			WELL GRADED SAND WITH SILT, SW-SM, 5YR 3/1 (very dark gray), medium to coarse, medium dense, dry, subangular to subrounded, [CCR] (Continued)	41.543-5-20190110	SS29E	42.0 - 43.5	1.5	6-13-16
44				42.0 - 43.5	SS30G	43.5 - 44.9	1.4	15-17-50/5"
45				43.5 - 44.9				
46	46.5	389.2	Increased silt from 45.0' to 46.5'		SS31G	45.0 - 46.5	1.5	36-23-13
47			WELL GRADED GRAVEL WITH SAND, GW, 5YR 2.5/1 (black), medium to coarse, loose, dry to moist, subangular to subrounded, coarsens with depth, [CCR] Wet at 48.3'	46.548-5-20190110	SS32E	46.5 - 48.0	1.5	7-6-5
48				46.5 - 48.0	SS33aE	48.0 - 48.5	1.5	3-3-7
49				48.0 - 48.5	SS33bG	48.5 - 49.5	1.5	3-4-5
50				48.5 - 49.5	SS34G	49.5 - 51.0	1.5	2-5-3
51	51.0			384.7	SILT, ML, 5YR 3/1 (very dark gray), very fine to fine, firm, wet, [CCR]	51.054-0-20190110	SS35E	51.0 - 52.5
52	52.5	383.2	Gypsum lens from 52.3' to 52.4'		SS36E	52.5 - 54.0	1.5	1-WH-WH
53			SILT, ML, 5YR 3/1 (very dark gray), very fine to fine, low plasticity, very soft, wet, [CCR]		SS37G	54.0 - 55.5	1.3	WR-WH-1
54					SS38aG	55.5 - 56.5	1.5	WR-WR-WH
55					SS38bE	56.5 - 57.0	1.5	1-1-1
56					SS39E	57.0 - 58.5	1.4	WH-2-2
57					SS40G	58.5 - 60.0	1.2	WR-WR-WH
58					SS41G	60.0 - 61.5	1.1	WH-WH-WH
59					SS42E	61.5 - 63.0		
60					SS43aE	63.0 - 63.5		
61			SS43bG	63.5 - 64.5				
62			SS44G	64.5 - 66.0				

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 2/16/21



Client Borehole ID N/A      Stantec Boring No. **CUF-TW08**  
 Client Tennessee Valley Authority      Boring Location 731,314.89 N; 1,510,074.98 E NAD27 Plant Local  
 Project Number 175568209      Surface Elevation 435.7 ft      Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
67			SILT, ML, 5YR 3/1 (very dark gray), very fine to fine, low plasticity, very soft, wet, [CCR] <i>(Continued)</i>	66.0/69.0-20190111	SS45E	66.0 - 67.5	0.8	WH-WH-WH
68				SS46E	67.5 - 69.0	1.5	WR-WR-1	
69			Moist at 72.5'	71.0/74.0-20190111	ST01G	69.0 - 71.0	0.0	
70				SS47E	71.0 - 72.5	1.3	WR-WH-1	
71			Moist at 72.5'		SS48E	72.5 - 74.0	1.5	WH-1-1
72				SS49G	74.0 - 75.5	1.5	1-1-3	
73	75.5	360.2	SILT, ML, 5YR 4/1 (dark gray), very fine to fine, low plasticity, very soft to firm, moist to wet, [CCR]	76.5/78.5-20190114	SS50aG	75.5 - 76.5	1.5	2-2-3
74				SS50bE	76.5 - 77.0			
75			Trace sand inclusions from 78.0' to 78.5'		SS51E	77.0 - 78.5	1.5	1-3-2
76				SS52G	78.5 - 80.0	1.5	1-WH-WH	
77			With soft fat clay at 81.5'		SS53aG	80.0 - 81.0	1.5	WR-WR-WR
78				SS53bE	81.0 - 81.5			
79	82.7	353.0	LEAN CLAY, CL, medium to high plasticity, firm, moist, organic odor, trace manganese accretions and organic matter in places		SS54E	81.5 - 83.0	1.5	WH-1-WH
80				SS55G	83.0 - 84.5	1.4	1-2-2	
81	84.5	351.2	SILTY LEAN CLAY WITH SAND, CL, 7.5YR 7/1 (light gray) and 7.5YR 5/3 (brown), low to medium plasticity, firm, moist		ST02G	84.5 - 86.5	0.0	
82				SS56G	86.5 - 88.0	1.5	3-3-3	
83					ST03G	88.0 - 90.0	1.7	
84								
85								
86								
87								
88								
89								
90								

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 2/16/21

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
91			SILTY LEAN CLAY WITH SAND, CL, 7.5YR 7/1 (light gray) and 7.5YR 5/3 (brown), low to medium plasticity, firm, moist (Continued) Near vertical bedding, with manganese and light brown (7.5YR 6/4) sand at 90.0'		SS57G	90.0 - 91.5	1.5	3-3-5	
92				SS58G	91.5 - 93.0	1.5	2-3-4		
93				SS59G	93.0 - 94.5	1.5	2-4-4		
94				SS60G	94.5 - 96.0	1.5	3-4-4		
95				SS61G	96.0 - 97.5	1.5	3-3-3		
96				SS62G	97.5 - 99.0	1.5	2-3-3		
97				SS63G	99.0 - 100.5	1.5	1-2-3		
98				SS64G	100.5 - 102.0	1.5	WH-WH-2		
99				SS65G	102.0 - 103.5	1.5	1-2-3		
100	100.5 335.2			SS66G	103.5 - 105.0	1.5	2-2-3		
101			SILTY SAND WITH GRAVEL, SM, 7.5YR 5/2 (brown), fine to coarse, medium dense, wet, subrounded to subangular sand, subangular gravel		SS67G	105.0 - 106.5	1.5	3-6-8	
102				SS68G	106.5 - 108.0	1.5	5-5-5		
103			Lens of fat clay, gray, high plasticity, stiff from 108.6' to 108.8'		SS69G	108.0 - 109.5	1.5	5-10-11	
104				SS70aG	109.5 - 110.5	1.5	5-18-21		
105	105.8 329.9		CLAYEY SAND WITH GRAVEL, SC, 7.5YR 5/1 (gray), dense, wet		SS70bG	110.5 - 111.0	1.5	5-18-21	
106				SS71G	111.0 - 112.5	1.1	12-9-15		
107			WELL GRADED GRAVEL WITH SAND, GW, 7.5YR 5/2 (brown), medium dense to dense, wet, subangular to angular		SS72G	112.5 - 114.0	1.2	10-9-9	
108									
109									
110	110.5 325.2								
111									
112									
113									
114									

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 2/16/21



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW08</b>
Client	Tennessee Valley Authority	Boring Location	731,314.89 N; 1,510,074.98 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	435.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
115			WELL GRADED GRAVEL WITH SAND, GW, 7.5YR 5/2 (brown), medium dense to dense, wet, subangular to angular (Continued)  With clay from 120.0' to 123.0'		SS73G	114.0 - 115.5	1.3	7-10-10		
116				SS74G	115.5 - 117.0	1.3	10-12-9			
117				SS75G	117.0 - 118.5	1.4	10-11-14			
118				SS76G	118.5 - 120.0	1.5	14-14-8			
119				SS77G	120.0 - 121.5	1.4	15-19-23			
120				SS78G	121.5 - 123.0	1.5	15-18-18			
121				SS79G	123.0 - 124.5	1.5	15-18-22			
122				SS80G	124.5 - 126.0	1.3	11-13-16			
123				SS81G	126.0 - 127.5	1.5	12-15-17			
124				SS82G	127.5 - 127.6	0.1	50/1"			
128	128.3			307.4						Began Core
129					Limestone (90%) With Shale (10%)					
130		Limestone, light gray to gray, brecciated, very fine crystalline with shale stringers	88		128.4 - 132.5	4.1	100			
131										
132		Shale, fine grained, highly weathered, dark gray, interbedded with limestone								
133										
134										
135				59	132.5 - 138.4	5.9	100			
136										
137										
138										

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 2/16/21

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW08</b>
Client	Tennessee Valley Authority	Boring Location	731,314.89 N; 1,510,074.98 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	435.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
139			Limestone (90%) With Shale (10%)					
140			Limestone, light gray to gray, brecciated, very fine crystalline with shale stringers					
141								
142								
143			Shale, fine grained, highly weathered, dark gray, interbedded with limestone (Continued)					
144								
144.8	290.9							
145			Limestone, dark gray, moderately hard to hard, finely crystalline, fossiliferous					
145.6	290.1							
146			Limestone (90%) With Shale (10%)					
147			Limestone, light gray to gray, brecciated, very fine crystalline with shale stringers					
148								
148.5	287.2							

Shale, fine grained, highly weathered, dark gray, interbedded with limestone

Bottom of Hole at 148.5 Ft.

Top of Rock = 128.3 Ft.  
 Top of Rock Elevation = 307.4 Ft.  
 Begin Core = 128.4 Ft.  
 Temporary well CUF-TW08 installed. See well installation log for backfill details.

1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
 G = Geotechnical Sample Custody  
 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples  
 3: Depths are reported in feet below ground surface

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 2/16/21



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW09</b>	
Client	Tennessee Valley Authority	Boring Location	730,542.31 N; 1,510,294.38 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	442.1 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	1/22/19	Completed 2/5/19
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	51.0 ft	Date/Time 1/24/19
Inspector	M. McDonald	Logger	C. Kocka	Depth to Water N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 75#2, #712	
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 3" SS w/o liners, 3" Shelby Tubes			
Rock Drilling and Sampling Tools (Type and Size)	NQ-3 Wireline, Split Barrel, Impregnated Bit			
Overdrill Tooling (Type and Size)	8-1/4" HSA overdrill of boring	Overdrill Depth	91.0 ft	
Sampler Hammer Type	Automatic	Weight	340 lb	Drop 30" Efficiency N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	C. Kocka	Approved By	P. Dunne	

Depth Ft <sup>3</sup>	Lithology		Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	442.1						
			Top of Hole					
1			SILTY LEAN CLAY WITH SAND, CL, 10YR 2/2 (very dark brown), very fine, hard, dry, [CCR]		SS01G	0.0 - 1.5	1.0	1-3-5
2	2.0	440.1			SS02E	1.5 - 3.0	1.5	5-14-14
3	3.0	439.1	WELL GRADED SAND, SW, 10YR 2/1 (black), fine to coarse, dense, dry, [CCR]		SS03aE	3.0 - 3.5	1.5	37-30-28
4			SANDY SILT, ML, 10YR 2/2 (very dark brown), very fine, non-plastic, very hard, dry to moist, [CCR]		SS03bG	3.5 - 4.5		
5					SS04G	4.5 - 5.4	0.9	14-50/5"
6					SS05aG	6.0 - 6.5		
7					SS05bE	6.5 - 7.2	1.2	16-40-50/2"
8					SS06aE	7.5 - 8.5	1.5	17-21-16
9	8.8	433.3			SS06bG	8.5 - 9.0		
	9.2	432.9	WELL GRADED SAND, SW, 10YR 2/2 (very dark brown), coarse, moist, [CCR]		SS07G	9.0 - 9.7	0.7	20-50/2"
10	9.7	432.4			SS08G	10.5 - 11.4	0.9	19-50/5"
11	11.4	430.7	SILTY LEAN CLAY, CL, 10YR 2/2 (very dark brown), very fine, very hard, moist, [CCR]		SS09E	12.0 - 12.7	0.7	20-50/2"
12			SILTY LEAN CLAY, CL, 5YR 3/3 (dark reddish brown), very fine, very hard, dry, [CCR]		SS10E	13.5 - 15.0	1.5	18-28-22
13			SILTY LEAN CLAY, CL, 10YR 3/1 (very dark gray), very fine, very hard, wet, [CCR]		SS11G	15.0 - 16.5	1.5	7-13-11
14								
15	15.0	427.1						
16			SILTY SAND WITH GRAVEL, SM, 10YR 3/3 (dark brown), coarse, medium dense, dry, [CCR]					
17								

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Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-TW09</b>
Client	Tennessee Valley Authority	Boring Location	730,542.31 N; 1,510,294.38 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	442.1 ft
		Elevation Datum	NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
17				16.5/18.5-20190122	SS12E	16.5 - 18.0	1.3	7-10-13	
18	18.0	424.1	SILT WITH SAND, ML, 10YR 3/2 (very dark grayish brown), very fine, non-plastic, hard to very hard, [CCR]		SS13aE	18.0 - 18.5	1.1	6-27-50/1"	
19					SS13bG	18.5 - 19.1			
20						SS14G	20.0 - 20.9	0.9	33-50/5"
21						SS15E	21.5 - 22.4	0.9	33-50/5"
22					21.5/23.7-20190122	SS16E	23.0 - 23.7	0.7	21-50/2"
23						SS17G	24.5 - 26.0	1.5	23-32-31
24						SS18E	26.0 - 27.5	1.5	4-5-6
25					26.0/29.8-20190122	SS19E	27.5 - 28.5	1.0	14-50
26						SS20E	29.0 - 29.8	0.8	18-50/4"
27						SS21G	30.5 - 31.0	0.5	50
28					32.0/34.0-20190122	SS22E	32.0 - 32.8	0.8	17-50/4"
29						SS23aE	33.5 - 34.0	1.3	6-16-14
30						SS23bG	34.0 - 35.0		
31						SS24aG	35.0 - 35.5	1.5	4-8-12
32	35.7	406.4		WELL GRADED SAND WITH SILT AND GRAVEL, SW-SM, 10YR 3/2 (very dark grayish brown), coarse, medium dense to dense, dry, [CCR]		SS24bG	35.5 - 36.5		
33					SS25E	36.5 - 38.0	1.5	16-22-19	
34					36.5/38.5-20190122	SS26aE	38.0 - 38.5	1.3	9-11-12
35						SS26bG	38.5 - 39.5		

TVA EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/13/21

Client Borehole ID N/A      Stantec Boring No. **CUF-TW09**  
 Client Tennessee Valley Authority      Boring Location 730,542.31 N; 1,510,294.38 E NAD27 Plant Local  
 Project Number 175568209      Surface Elevation 442.1 ft      Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
40			WELL GRADED SAND WITH SILT AND GRAVEL, SW-SM, 10YR 3/2 (very dark grayish brown), coarse, medium dense to dense, dry, [CCR] <i>(Continued)</i> Lens of silty lean clay, CL, 10YR 3/1, medium dense from 41.2' to 41.7' Very dense at 41.7'		SS27G	39.5 - 41.0	1.5	7-13-16		
41						SS28E	41.0 - 42.5	1.5	15-15-13	
42							SS29aE	42.5 - 43.0	1.3	9-13-50/4"
43							SS29bG	43.0 - 43.8		
44	44.0	398.1	SILTY LEAN CLAY, CL, 10YR 3/1 (very dark gray), very fine, loose, dry, [CCR]  Wet at 50.0'		SS30G	44.0 - 44.9	0.9	31-50/5"		
45						SS31E	45.5 - 47.0	1.5	14-10-8	
46						SS32aE	47.0 - 47.5	1.5	3-1-2	
47						SS32bG	47.5 - 48.5			
48						SS33G	48.5 - 50.0	1.5	1-1-1	
49						SS34G	50.0 - 51.5	1.5	1-WH-WH	
50						SS35E	51.5 - 53.0	1.5	1-WH-WH	
51						SS36aE	53.0 - 53.5	1.5	WR-WR-3	
52						SS36bG	53.5 - 54.5			
53						SS37aG	54.5 - 55.8	1.5	5-9-12	
54					SS37bG	55.8 - 56.0	1.5	1-1-1		
55	55.8	386.3			SS38E	56.0 - 57.5				
56	56.4	385.7	SILT, ML, tan to white, non-plastic, soft, [CCR]		SS39E	57.5 - 59.0	1.5	WH-WH-1		
57			SILTY LEAN CLAY, CL, 10YR 4/3 (brown), very fine, soft to firm, wet, [CCR]		SS40G	59.0 - 60.5	1.5	WH-4-4		
58						SS41E	60.5 - 62.0	1.5	1-1-1	
59						SS42aF	62.0 - 63.0			
60										
61										
62										

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFIJ TDEC SUBSURF DT 20190630 GDT 4/13/21

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Client <u>Tennessee Valley Authority</u>	Boring Location <u>730,542.31 N; 1,510,294.38 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>442.1 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
63			SILTY LEAN CLAY, CL, 10YR 4/3 (brown), very fine, soft to firm, wet, [CCR] <i>(Continued)</i>		SS42bG	63.0 - 63.5	1.5	WH-WH-1
64					ST01G	63.5 - 65.5	0.6	NR
65	65.5	376.6	SILTY LEAN CLAY, CL, 10YR 4/1 (dark gray), very fine, medium plasticity, soft to firm, wet, [CCR]		SS43G	65.5 - 67.0	1.5	WH-WH-1
66				SS44E	67.0 - 68.5	1.5	WR-WR-WR	
67				SS45aE	68.5 - 69.5	1.5	WR-WR-WR	
68				SS45bG	69.5 - 70.0			
69				ST02G	70.0 - 72.0	0.0	100	
70				SS46E	72.0 - 73.5	1.5	WR-WR-WR	
71				SS47aE	73.5 - 74.5	1.5	WR-WR-WH	
72				SS47bG	74.5 - 75.0			
73				SS48G	75.0 - 76.5	1.5	WR-WR-WR	
74				SS49E	76.5 - 78.0	1.5	3-1-1	
75				SS50aE	78.0 - 79.0	1.5	1-WH-WH	
76				SS50bG	79.0 - 79.5			
77			SS51G	79.5 - 81.0	1.5	1-WH-1		
78			SS52E	81.0 - 82.5	1.2	WR-WR-1		
79			SS53aE	82.5 - 83.5	1.5	1-1-WH		
80			SS53bG	83.5 - 84.0				
81			SS54G	84.0 - 85.5	1.5	WR-WH-WH		

Increased silt content from 79.5' to 81.0'

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT: 20190630 GDT: 4/13/21



Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI				
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %				
86			SILTY LEAN CLAY, CL, 10YR 4/1 (dark gray), very fine, medium plasticity, soft to firm, wet, [CCR] <i>(Continued)</i>	85.5-88.0-20190125	SS55E	85.5 - 87.0	1.5	WR-1-1				
87					SS56aE	87.0 - 88.0	1.5	WR-WR-1				
88					SS56bG	88.0 - 88.5						
89					SS57G	88.5 - 90.0	1.5	2-2-2				
90												
91												
92	92.0				350.1	LEAN CLAY, CL, 10YR 3/2 (very dark grayish brown) to 10YR 4/4 (dark yellowish brown), low plasticity, firm to hard, wet		SS58G	90.0 - 91.5	1.5	WR-WR-WR	
93									SS59a	91.5 - 92.0		
94									SS59bG	92.0 - 93.0	1.5	WR-2-3
95									SS60G	93.0 - 94.5	1.5	2-4-4
96									ST03G	94.5 - 96.5	1.6	250
97									SS61G	96.5 - 98.0	1.5	3-3-5
98												
99					SS62G		98.5 - 100.0	1.5	3-4-5			
100												
101					SS63G		100.0 - 101.5	1.5	2-3-4			
102												
103					SS64G	102.5 - 104.0	1.5	3-3-3				
104												
105												
106					SS65G	105.0 - 106.5	1.5	1-2-4				
107												
108					SS66aG	107.5 - 108.6						

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER: GFJ TDEC SUBSURF DT: 20190630 GDT: 4/13/21

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Client	Tennessee Valley Authority	Boring Location	730,542.31 N; 1,510,294.38 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	442.1 ft
		Elevation Datum	NGVD29






Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
108.6	333.5		POORLY GRADED GRAVEL WITH CLAY AND SAND, GP-GC, 10YR 3/4 (dark yellowish brown), loose to medium dense, wet					
109				SS66bG	108.6 - 109.0	107.5 - 109.0	1.5	1-4-4
110								
111				SS67G	110.0 - 111.5	110.0 - 111.5	1.0	1-4-6
112								
113				SS68G	112.5 - 114.0	112.5 - 114.0	1.0	6-5-4
114								
115				SS69G	115.0 - 116.5	115.0 - 116.5	1.1	3-7-5
116								
117				SS70G	117.5 - 119.0	117.5 - 119.0	1.5	6-8-7
118								
119								
120								
121			SS71G	120.0 - 121.5	120.0 - 121.5	1.2	3-7-13	
122								
123			SS72G	122.5 - 124.0	122.5 - 124.0	1.3	8-5-4	
124								
125	317.1		CLAYEY GRAVEL WITH SAND, GC, 10YR 4/1 (dark gray), low plasticity, loose, wet					
126				SS73G	125.0 - 126.5	126.0 - 126.5	1.5	WH-WH-5
127								
128	314.6		CLAYEY SAND WITH GRAVEL, SC, 10YR 4/2 (dark grayish brown), loose, wet					
129				SS74G	127.5 - 129.0	127.5 - 129.0	0.8	2-2-WH
130								
131			SS75G	130.0 - 131.5	130.0 - 131.5	1.3	WH-7-7	

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Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
132			CLAYEY SAND WITH GRAVEL, SC, 10YR 4/2 (dark grayish brown), loose, wet (Continued)					
133	133.0	309.1			SS76G	132.5 - 133.7	1.2	29-21-50/2"
134			Limestone, gray to light gray, weathered, easily cut with 4" casing					
135								
136								
137	137.2	304.9						Began Core 100
138			Limestone, light gray, fine to microcrystalline, hard, thin bedded, with healed fractures and chert bonding		100	137.2 - 137.7 0.5	0.5	
139			Filled fracture in limestone at 138.5'					
140								
141			Possible loss, fractured zoned (weathered/stained) from 140.3' to 140.4'		50	137.7 - 142.7 5.0	4.5	90
142			Fractured zone from 141.5' to 141.6'					
143			High fractured zone at 142.2					
144	143.5	298.6						
145			Limestone, gray, fine to microcrystalline, hard, healed fractures					
146			Calcite vein at 144.8'		72	142.7 - 147.7 5.0	5.0	100
147	147.0	295.1						
148			Limestone, gray, fine to microcrystalline, hard, partly weathered, healed fractures					
149			Highly fractured, weathered from 147.7' to 147.8'					
150			Slightly weathered with 30° fractures at 148.1' and 148.6'					
151					94	147.7 - 152.7 5.0	5.0	100
152	152.0	290.1						
153			Limestone, gray, fine to microcrystalline, hard, healed fractures, 60° fractures		0	152.7 - 153.2 0.5	0.5	100

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Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>730,542.31 N; 1,510,294.38 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>442.1 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
154			Limestone, gray, fine to microcrystalline, hard, healed fractures, 60° fractures (Continued)					
155					100	153.2 - 157.7	4.5	100
156						4.5		
157								
157.7	284.4							

Bottom of Hole at 157.7 Ft.

Top of Rock = 133.0 Ft.  
 Top of Rock Elevation = 309.1 Ft.  
 Begin Core = 137.2 Ft.

Temporary monitoring well CUF-TW09 was installed in soil boring CUF-TW09 on 2/25/19. Refer to the CUF-TW09 Well Installation Detail form for additional information.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
 G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/13/21

# **APPENDIX B.4**

## **PIEZOMETERS**

## Table of Contents

B-2.....	1
B-6.....	3
B-49.....	5
B-50 B.....	7
B-53 A.....	9
B-53 B.....	12
B-54 A.....	14
B-57 A.....	16
B-58 A.....	17
CUF-DAS-A-1 .....	19
CUF-DAS-A-2 .....	20
CUF-DAS-C-1 .....	21
CUF-DAS-D-1 .....	22
CUF-DAS-D-2.....	23
CUF-DAS-D-3.....	24
CUF-DAS-G-1.....	25
CUF-DAS-G-2.....	26
CUF-DAS-INT-1.....	27
CUF-DAS-INT-2.....	28
CUF-DAS-X-1 .....	29
CUF-DAS-X-2 .....	30
CUF-GSA-G-1.....	31
CUF-GSA-G-2.....	32
CUF-GSA-INT-1.....	33
CUF-GSA-INT-2.....	34
CUF-GSA-J-1.....	35
CUF-GSA-K-1 .....	36
CUF-GSA-L-1 .....	37
CUF-GSA-M-1 .....	38
CUF-GSA-M-2 .....	39

CUF-B14.....	40
CUF-B15.....	47
CUF-B16.....	55
CUF-B17.....	62
CUF-BASHP-4D .....	68
CUF-C-2D.....	70
CUF-C-2F-2.....	74
CUF-F-2A .....	76
CUF-F-2B .....	80
CUF-F-2C .....	84
CUF-F-4E .....	87
CUF-H-2A .....	90
CUF-H-2B.....	94
CUF-H-2C.....	97
CUF-K-2D .....	100
CUF-K-2E .....	103
CUF-K-2F .....	105
CUF-N-2A .....	107
CUF-N-2B.....	110
CUF-N-2C.....	112
CUF-P-2C .....	114
CUF-R-2B.....	116
CUF-S-2A .....	119
STN-3A.....	122
STN-9 .....	124
STN-15A.....	126
STN-21 A.....	128
STN-21 .....	130
STN-22 A.....	132
STN-28 .....	134
STN-29 .....	136
STN-36 .....	138

STN-37 .....	140
STN-42 .....	142
STN-43 .....	144
STN-100 .....	146



Project Number	175657150	Location	N 732,851.53, E 1,510,485.17		
Project Name	Process Water Basins Design	Boring No.	<b>B-2</b>	Total Depth	51.5 ft
County	Stewart County, Tennessee	Surface Elevation	394.5 ft		
Project Type	Geotechnical Exploration	Date Started	11/1/17	Completed	11/2/17
Supervisor	W. Modrall	Driller	E. Caudill	Depth to Water	24.0 ft
Logged By	W. Modrall	Depth to Water	21.4 ft	Date/Time	11/6/17

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
394.5	0.0	Top of Hole							
		Bottom Ash (placed), black, dry to wet, medium dense to dense, (SP-SM)		SPT-1	2.5 - 4.0	1.1	8-10-9	9	
			SPT-2	5.0 - 6.5	1.1	11-12-10	9		
			SPT-3	7.5 - 9.0	1.3	7-10-15	9		
			ST-1	10.0 - 12.0	1.1		--		Down Pressure 1000 psi
			SPT-4	12.5 - 14.0	0.8	24-50+/ 0.4	13		
			SPT-5	15.0 - 16.5	1.2	11-20-18	19		
			SPT-6	17.5 - 19.0	1.5	6-15-21	10		
			ST-2	20.0 - 22.0	1.6		--		Down Pressure 400 psi
			SPT-7	22.5 - 24.0	1.5	16-20-18	17		
			SPT-8	25.0 - 26.5	1.0	12-12-12	21		
366.5	28.0	Bottom Ash (sluiced), black, wet, very loose to loose, (SM)		SPT-9	26.5 - 28.0	1.5	9-7-6	21	
			SPT-10	28.0 - 29.5	1.1	2-3-3	20		Begin use of HSA center plug to reduce blow-back
			SPT-11	29.5 - 31.0	0.8	2-3-3	23		
			SPT-12	32.5 - 34.0	1.0	19-16-8	23		
		SPT-13	35.0 - 36.5	1.0	10-2-3	21			
		Lean Clay, light brown to brown, wet, medium stiff to very stiff, (CL)		SPT-14	37.5 - 39.0	0.8	9-3-3	20	
353.0	41.5		SPT-15	40.0 - 41.5	0.8	11-4-2	24		(LL = 40, PI = 20)
			SPT-16	41.5 - 43.0	0.6	4-3-4	26		
				ST-3	45.0 - 47.0	1.7		--	Down Pressure 150 psi

STANTEC\FM\LEGACY\_175657150\_BORING\_LOGS\GPU\_FMS\MAGRAPHIC\LOG.GDT\_1/27/18

Project Number <u>175657150</u>	Location <u>N 732,851.53, E 1,510,485.17</u>
Project Name <u>Process Water Basins Design</u>	Boring No. <u>B-2</u> Total Depth <u>51.5 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
343.0	51.5	No Refusal / Bottom of Hole		SPT-17	50.0 - 51.5	1.0	7-8-9	25	Boring Terminated. Sodium bentonite pellets backfilled to elevation 353.5. #7 sand backfilled from 353.5 to 365.5, Slotted PVC PZ from 354.5 to 364.5 Sand pack capped with Sodium bentonite pellets to elevation 367.5, boring backfilled from 367.5 to ground surface with cement bentonite grout.

STANTEC\FWSM\LEGACY\_175657150\_BORING\_LOGS.GPJ\_FWSM\GRAPHIC\LOG.GDT\_1/27/18

Project Number		175558210		Location		N 732560.49, E 1510390.76	
Project Name		CUF MAP IMP		Boring No.		B-6 Total Depth 40.0 ft	
County		Stewart County, Tennessee		Surface Elevation		365.5 ft	
Project Type		Geotechnical Exploration		Date Started		3/29/21 Completed 3/30/21	
Supervisor		M. Broaddus Driller E. Caudill		Depth to Water		N/A Date/Time 3/30/21	
Logged By		M. Broaddus		Depth to Water		N/A Date/Time N/A	

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
365.5	0.0	Top of Hole							
362.5	3.0	Cased Hole through Crushed Stone Access Pad							12" HDPE casing installed to 3.0 feet
		FLY ASH (ML), gray to black, moist to wet, very soft							WOH: Weight of Hammer WOR: Weight of Rod
				SPT-1	12.0 - 13.5	1.0	WOH- WOH- WOH	--	
				ST-1	14.0 - 16.5	2.5		42	ST-1: Non-plastic
				SPT-2	16.5 - 18.0	0.6	WOH-1-1	--	
				SPT-3	18.0 - 19.5	0.6	WOH- WOH-1	--	
				SPT-4	19.5 - 21.0	1.1	WOH-1-1	--	
				SPT-5	21.0 - 22.5	1.1	WOH- WOH- WOH	--	TPZ-34A installed at 22.5'
				SPT-6	22.5 - 24.0	1.2	WOH- WOH- WOH	36	SPT-6: Non-plastic
				SPT-7	24.0 - 25.5	1.1	WOH- WOH- WOH	38	SPT-7: Non-plastic
				SPT-8	25.5 - 27.0	0.6	WOH- WOH- WOH	--	
337.8	27.7	LEAN CLAY (CL), gray to brown, moist to wet, very soft		ST-2	27.5 - 30.0	2.5	WOR- WOR- WOH	43	ST-2: LL = 47, PI = 27
				SPT-9	30.0 - 31.5	1.0	WOH- WOH- WOH	44	SPT-9: LL = 43, PI = 18
				SPT-10	31.5 - 33.0	1.0	WOH- WOH- WOH	--	
331.0	34.5			SPT-11	33.0 - 34.5	1.0	WOH- WOH- WOH	--	

STANTEC\FM\LEGACY\_175558210\_STAGE\_1B\_BORING\_LOGS.GPJ TDEC SUBSURF DT 20190630.GDT 6/6/21

Project Number <u>175558210</u>	Location <u>N 732560.49, E 1510390.76</u>
Project Name <u>CUF MAP IMP</u>	Boring No. <u><b>B-6</b></u> Total Depth <u>40.0 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
328.5	37.0	SAND WITH GRAVEL, light brown to brown, wet, very loose <i>(Continued)</i>		SPT-12	34.5 - 36.0	0.9	WOH- WOH-2	--	TPZ-34B installed at 38.0'
				SPT-13	36.0 - 37.5	0.9	1-1-1 1-3-3	--	
325.5	40.0	SILTY SAND WITH GRAVEL, light brownish gray to gray, wet, medium dense		SPT-14	37.5 - 39.0	1.0	8-17-8	25	
		No Refusal / Bottom of Hole							

LL = Liquid Limit  
PI = Plasticity  
Index

STANTEC\FM\LEGACY\_175558210\_STAGE\_1B\_BORING\_LOGS.GPJ TDEC SUBSURF DT 20190530.GDT 6/6/21

Project Number		175539016		Location		Cumberland Fossil				
Project Name		Ash Ponds		Boring No.		<b>B-49</b>		Total Depth		64.1 ft
County		Stewart, TN		Surface Elevation		379.2 ft				
Project Type		HSA 4.25		Date Started		7/21/09		Completed		7/22/09
Supervisor		D. Rogers		Driller		Jerry Huntoon		Depth to Water		44.0 ft
Logged By		Anthony Aloti		Date/Time		7/22/09		Depth to Water		30.5 ft
Date/Time		7/22/09		Date/Time		7/22/09		Date/Time		7/22/09

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
379.2	0.0	Top of Hole							
		Lean Clay, red brown to brown, trace sand and gravel, moist, stiff to medium stiff (CL)		SPT-1	0.0 - 1.5	0.9	5-5-6	24	PZ installed, Screen 47-57
			SPT-2	1.5 - 3.0	0.9	4-5-5	28		
			SPT-3	3.0 - 4.5	1.0	5-7-7	22		
			SPT-4	4.5 - 6.0	0.7	5-4-4	20		
			SPT-5	6.0 - 7.5	0.3	3-6-6	20		
			SPT-6	7.5 - 9.0	1.4	3-4-5	23		
			SPT-7	9.0 - 10.5	1.3	3-5-5	22		
			SPT-8	10.5 - 12.0	1.2	3-5-5	27		
			SPT-9	12.0 - 13.5	1.0	2-3-3	27		
			SPT-10	13.5 - 15.0	1.2	2-3-3	24		
364.2	15.0	Lean Clay, gray, trace sand, moist, medium stiff to soft (CL)		SPT-11	15.0 - 16.5	1.5	2-2-3	31	gravel block shoe
			SPT-12	16.5 - 18.0	1.5	1-1-2	31		
			SPT-13	18.0 - 19.5	0.9	1-2-2	29		
359.5	19.7	Lean Clay, gray with brown mottles, trace sand and gravel, moist, soft, with cobble zones (CL)		SPT-14	19.5 - 21.0	1.1	2-1-1	31	Organic rich zone 20.0-21.2
			SPT-15	21.0 - 22.5	0.9	1-1-2	29		
			SPT-16	22.5 - 24.0	0.9	1-2-3	32	cobble zone 23.2-25.0	
			SPT-17	24.0 - 25.5	0.7	2-2-4	33		
			SPT-18	26.0 - 27.5	1.5	2-2-3	31		
			SPT-19	28.5 - 30.0	1.5	1-2-1	32		
			SPT-20	31.0 - 32.5	1.5	2-2-3	32		
			SPT-21	33.5 - 35.0	1.5	2-2-3	32		

STANTEC\FNSM\_LEGACY\_175539016-CLF.GPJ\_FNSM.GRAPHIC.LOG.GDT\_1/27/10

Project Number		175539016			Location		Cumberland Fossil			
Project Name		Ash Ponds			Boring No.		B-49	Total Depth		64.1 ft
Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks	
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth		
333.2	46.0	Lean Clay, gray with brown mottles, trace sand and gravel, moist, soft, with cobble zones (CL) <i>(Continued)</i>		SPT-22	36.0 - 37.5	1.5	2-2-2	28	water encountered, rise to 30.5	
				SPT-23	38.5 - 40.0	1.5	2-1-2	32		
				SPT-24	41.0 - 42.5	1.5	1-1-1	25		
				SPT-25	43.5 - 45.0	0.9	0-1-1	27		
325.2	54.0	Silty Sand, grayish brown, wet, loose to medium dense, medium to fine grained (SM)		SPT-26	46.0 - 47.5	1.3	2-2-4	37		
				SPT-27	48.5 - 50.0	0.9	7-11-13	27		
				SPT-28	51.0 - 52.5	0.7	5-4-5	36		
317.7	61.5	Lean Clay, gray, wet, little sand and gravel, very stiff, some weathered rock fragments (CL)		SPT-29	53.5 - 55.0	1.5	5-7-5	28		
				SPT-30	56.0 - 57.5	1.5	5-8-21	26		
				SPT-31	58.5 - 60.0	1.3	8-11-19	21		
315.1	64.1	Weathered limestone		SPT-32	61.0 - 62.5	1.0	12-13-8	20	some weathered rock fragments	
				SPT-33	63.5 - 64.1	0.3	42-	11		
		Auger Refusal / Bottom of Hole				50+/-0.1				
		Top of Rock = 61.5 Elevation (317.7)								

STANTEC/FNSM\_LEGACY\_175539016-CUF.GPJ\_FNSM\_GRAPHIC.LOG.GDT\_1/27/10

Project Number	175539016	Location	Cumberland Fossil		
Project Name	Ash Ponds	Boring No.	<b>B-50 B</b>	Total Depth	39.0 ft
County	Stewart, TN	Surface Elevation	394.5 ft		
Project Type	HSA 4.25	Date Started	7/28/09	Completed	7/28/09
Supervisor	D. Rogers	Driller	Jerry Huntoon	Depth to Water	Dry
Logged By	D. Chapman	Depth to Water	N/A	Date/Time	7/28/09
		Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
394.5	0.0	Top of Hole							
393.9	0.6	Crushed stone (road bed)							
		Sandy Lean Clay, trace small gravel, red brown, moist, medium stiff to very stiff (CL)							
				ST-1	8.0 - 10.0	0.0		--	Tube Crushed
				ST-2	15.0 - 17.0	1.5		--	
375.0	19.5	Clayey Gravel With Sand, very dark gray to olive brown, wet, loose to medium dense (GC)							
				ST-3	23.0 - 25.0	0.0		--	Tube Crushed
				ST-4	27.0 - 29.0	0.0		--	Tube Crushed
				ST-5	31.0 - 33.0	0.0		--	Tube Crushed

STANTEC\FNSM\_LEGACY\_175539016-CLF.GPJ\_FNSM.GRAPHIC.LOG.GDT\_1/27/10

Project Number <u>175539016</u>	Location <u>Cumberland Fossil</u>
Project Name <u>Ash Ponds</u>	Boring No. <b>B-50 B</b> Total Depth <u>39.0 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
356.5	38.0								
355.5	39.0	Cobbles (Augered)							

No Refusal /  
Bottom of Hole

STANTEC/FNSM\_LEGACY\_175539016-CUF.GPJ\_FNSM\_GRAPHIC.LOG.GDT\_1/27/10



Project Number	175539016	Location	Cumberland Fossil		
Project Name	Ash Ponds	Boring No.	<b>B-53 A</b>	Total Depth	96.0 ft
County	Stewart, TN	Surface Elevation	376.0 ft		
Project Type	HSA 4.25	Date Started	7/23/09	Completed	7/24/09
Supervisor	D. Rogers	Driller	Jerry Huntoon	Depth to Water	12.0 ft
Logged By	D. Chapman	Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
376.0	0.0	Top of Hole							
		Lean Clay, trace sand to fine gravel, red brown to mottled light greenish gray and olive brown, moist, soft to very stiff (CL)							See log B-53 for descriptions of SPT samples from 0 - 27' below ground surface
				ST-1	8.0 - 10.0	1.5		--	Shelby tube 8'-10'
				ST-2	22.5 - 24.5	0.0		--	Shelby tube attempted 22.5' - 24.5'. No recovery.
				ST-3	24.5 - 26.5	0.0		--	Shelby tube attempted 24.5' - 26.5'. No recovery.
				SPT-1	29.5 - 31.0	1.5	5-8-7	26	
				SPT-2	31.0 - 32.5	1.5	3-8-2	22	
				SPT-3	33.5 - 35.0	1.5	2-1-2	28	
345.0	31.0	Lean Clay, dark olive to dark gray, moist, soft to stiff (CL)							

STANTEC\FNSM\_LEGACY\_175539016-CLIF.GPJ\_FNSM.GRAPHIC.LOG.GDT\_1/27/10

Project Number		175539016			Location		Cumberland Fossil			
Project Name		Ash Ponds			Boring No.		B-53 A	Total Depth		96.0 ft
Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks	
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth		
326.5	49.5	Lean Clay, dark olive to dark gray, moist, soft to stiff (CL) <i>(Continued)</i>		SPT-4	38.5 - 40.0	1.5	1-2-4	27	Shelby tube 43' - 45'	
				SPT-5	41.0 - 42.5	1.5	1-2-2	25		
	ST-4		43.0 - 45.0	1.5	--					
	SPT-6		46.0 - 47.5	0.2	1-2-3	26				
	SPT-7		48.5 - 50.0	1.5	1-1-1	36	Dark olive			
	SPT-8		51.0 - 52.5	1.5	4-8-3	33				
	SPT-9		53.5 - 55.0	1.5	6-7-8	20				
		Silty Sand, Silty sand, some fine gravel, dark olive to olive yellow, wet, very loose to dense (SM)		SPT-10	56.0 - 57.5	1.5	5-11-14	22	Silty clay layer 58' - 60'	
	SPT-11		58.5 - 60.0	0.8	7-2-1	22				
	SPT-12		61.0 - 62.5	0.6	5-10-11	29				
	SPT-13		63.5 - 65.0	0.5	3-7-9	26				
	SPT-14		66.0 - 67.5	1.5	9-12-14	19				
	SPT-15		68.5 - 70.0	1.0	8-10-11	19				
	SPT-16		71.0 - 72.5	1.3	5-5-11	31				
	SPT-17		73.5 - 75.0	1.4	8-23-17	25	Dark olive			
	SPT-18		76.0 - 77.5	1.3	10-12-16	25				

STANTEC/FNSM\_LEGACY\_175539016-CJF.GPJ\_FNSM.GRAPHIC.LOG.GDT\_1/27/10

Project Number		175539016			Location		Cumberland Fossil			
Project Name		Ash Ponds			Boring No.		B-53 A	Total Depth		96.0 ft
Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks	
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth		
280.0	96.0	Silty Sand, Silty sand, some fine gravel, dark olive to olive yellow, wet, very loose to dense (SM) <i>(Continued)</i>		SPT-19	78.5 - 80.0	0.7	1-1-7	35		
				SPT-20	81.0 - 82.5	0.7	1-1-2	29		
				SPT-21	83.5 - 85.0	1.0	0-0-0	36		
				SPT-23	88.5 - 80.0	1.5		44		
				SPT-22	86.0 - 87.5	1.5	0-0-0	44		
				SPT-24	91.0 - 92.5	1.5	0-8-3	43	Cobble & boulder layer 92' - 96'	
				SPT-25	93.5 - 95.0	1.5	0-0-0	55		
		Auger Refusal / Bottom of Hole							Bottom of boring at 96' at auger refusal on apparent limestone bedrock. Installed a piezometer screened from 55' - 65' below ground surface	
		Top of Rock = 96.0 Elevation (280.0)								

STANTEC/FNSM\_LEGACY\_175539016-CUF.GPJ FNSM.GRAPHIC.LOG.GDT 1/27/10



# SUBSURFACE LOG

Project Number	175539016	Location	Cumberland Fossil		
Project Name	Ash Ponds	Boring No.	<b>B-53 B</b>	Total Depth	43.0 ft
County	Stewart, TN	Surface Elevation	376.0 ft		
Project Type	HSA 4.25	Date Started	7/24/09	Completed	7/24/09
Supervisor	D. Rogers	Driller	Jerry Huntoon	Depth to Water	Dry
Logged By	D. Chapman	Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
376.0	0.0	Top of Hole							
		Lean Clay, trace sand to fine gravel, red brown to mottled light greenish gray and olive brown, moist, soft to very stiff (CL)							
345.0	31.0	Lean Clay, dark olive to dark gray, moist, soft to stiff (CL)							

STANTEC/FNSM\_LEGACY\_175539016-CUF.GPJ\_FNSM-GRAPHIC.LOG.GDT\_1/27/10

Project Number	175539016	Location	Cumberland Fossil	
Project Name	Ash Ponds	Boring No.	<b>B-53 B</b>	Total Depth 43.0 ft

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
333.0	43.0	Lean Clay, dark olive to dark gray, moist, soft to stiff (CL) <i>(Continued)</i>							
		No Refusal / Bottom of Hole							Bottom of boring at 43'. No refusal. Installed a piezometer screened from 33' - 43' below ground surface.

STANTEC/FNSM\_LEGACY\_175539016-CUF.GPJ\_FNSM.GRAPHIC.LOG.GDT\_1/27/10

Project Number	175539016	Location	Cumberland Fossil		
Project Name	Ash Ponds	Boring No.	<b>B-54 A</b>	Total Depth	52.5 ft
County	Stewart, TN	Surface Elevation	395.0 ft		
Project Type	HSA 4.25	Date Started	7/28/09	Completed	7/29/09
Supervisor	D. Rogers	Driller	J. Felts	Depth to Water	Dry
Logged By	James Felts	Depth to Water	N/A	Date/Time	7/29/09
		Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core						
395.0	0.0	Top of Hole							
394.1	0.9	Crushed stone							
		Fat Clay, dark red-brown, with sand and chert gravel, damp to moist, stiff (CH)							
				ST-2	8.0 - 9.4	0.5		--	
377.0	18.0								
374.5	20.5	Lean Clay, Silty clay, brown with gray lenses, very stiff, damp, trace flyash 18-18.3 (CL)							
		Lean Clay, Silty clay, brown-gray mottled, trace gravel, moist to wet, stiff to very stiff (CL)							
				ST-3	22.0 - 24.0	1.4		--	
				ST-4	30.0 - 32.0	1.8		--	
359.0	36.0								

STANTEC\FNSM\_LEGACY\_175539016-CLF.GPJ\_FNSM.GRAPHIC.LOG.GDT\_1/27/10

Project Number <u>175539016</u>	Location <u>Cumberland Fossil</u>
Project Name <u>Ash Ponds</u>	Boring No. <u>B-54 A</u> Total Depth <u>52.5 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
342.5	52.5	Lean Clay, dark gray, damp to wet, very stiff to very soft, zones of sand and gravel (CL) <i>(Continued)</i>		ST-5	45.0 - 47.0	2.0		--	

No Refusal /  
Bottom of Hole

STANTEC\FNSM\_LEGACY\_175539016-CUF.GPJ\_FNSM.GRAPHIC.LOG.GDT\_1/27/10

Project Number	175539016	Location	Cumberland Fossil		
Project Name	Ash Ponds	Boring No.	<b>B-57 A</b>	Total Depth	21.0 ft
County	Stewart, TN	Surface Elevation	381.5 ft		
Project Type	HSA 3.25	Date Started	8/6/09	Completed	8/6/09
Supervisor	D. Rogers	Driller	Mark Martin	Depth to Water	Dry
Logged By	Z. Massey	Depth to Water	N/A	Date/Time	8/6/09
		Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
381.5	0.0	Top of Hole							
381.0	0.5	Crushed stone							
378.0	3.5	Lean Clay, with gravel, damp to moist, gray to brown, very stiff (CL)							
		Sandy Lean Clay, gray to brown, moist, very stiff (CL)		ST-1	5.0 - 7.0	2.0		--	PZ Installed Screen 10'-20'
				ST-2	10.0 - 12.0	2.0		--	
360.5	21.0	No Refusal / Bottom of Hole							

STANTEC\FNSM\_LEGACY\_175539016-CLF.GPJ\_FNSM.GRAPHIC.LOG.GDT\_1/27/10





# SUBSURFACE LOG

Project Number	175539016	Location	Cumberland Fossil		
Project Name	Ash Ponds	Boring No.	<b>B-58 A</b>	Total Depth	47.0 ft
County	Stewart, TN	Surface Elevation	394.8 ft		
Project Type	HSA 3.25	Date Started	8/3/09	Completed	8/4/09
Supervisor	D. Rogers	Driller	Mark Martin	Depth to Water	34.0 ft
Logged By	Z. Massey	Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
394.8	0.0	Top of Hole							
394.6	0.2	Crushed Stone							
		Sandy Fat Clay, red brown, damp to moist, very stiff, with coarse sand, little gravel (CH)		ST-1	5.0 - 7.0	1.0		--	PZ installed Screen 35.5'-45.5'
378.8	16.0	Lean Clay, brown gray, damp to moist, very stiff, with coarse sand, trace gravel, mottled (CL)		ST-2	15.0 - 17.0	1.0		--	
				ST-3	25.0 - 27.0	1.7		--	
363.7	31.1	Silty Sand With Gravel, brown, wet, medium dense, (SM)		ST-4	35.0 - 37.0	1.7		--	

STANTEC\FNSM\_LEGACY\_175539016-CLIF.GPJ FNSM.GRAPHIC.LOG.GDT 1/27/10

Project Number <u>175539016</u>	Location <u>Cumberland Fossil</u>
Project Name <u>Ash Ponds</u>	Boring No. <b>B-58 A</b> Total Depth <u>47.0 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
354.8	40.0	Silty Sand With Gravel, brown, wet, medium dense, (SM) <i>(Continued)</i>							
347.8	47.0	Clayey Sand With Gravel, dark gray brown to gray brown, wet, medium dense, mottled (SC)		ST-5	45.0 - 47.0	1.2		--	

No Refusal /  
Bottom of Hole

STANTEC\FNSM\_LEGACY\_175539016-CUF.GPJ\_FNSM\_GRAPHIC.LOG.GDT\_1/27/10

# BORING LOG NO. CUF-DAS-A-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 731842.09 E 1510659.75	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 388.0	TOTAL DEPTH 109.5 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN	
LOGGER M. Aplin		DISTURBED 3	UNDISTURBED 0
SUPERVISOR: M. Aplin	TVA CONTACT: M. Bishop	HAMMER TYPE Automatic	EFFICIENCY: 92.4% CALIBRATION: 1/24/2018
DATE STARTED 9/10/2017	DATE COMPLETED 9/19/2017	DRILL RIG TYPE: CME 55 Track	DRILL RIG ID: 709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105		2.75" (O.D.) Slope Inclinerometer Casing Cement / Bentonite Grout  PZ installed at 32.0'  PZ installed at 53.0'  PZ installed at 95.0'				
	35.9 <b>SILT (ML)</b> , dark gray, moist, stiff, ash.	35			1	1.4 / 1.5	3-4-5 N=9	
	36.5 <b>FAT CLAY (CH)</b> , light brown, moist, stiff.	36.5						
	56.5 <b>SILT (ML)</b> , dark gray, damp, medium stiff, ash.	55			2	1.4 / 1.5	WH-WH-5 N=5	
	76.5 <b>WELL GRADED GRAVEL (GW)</b> , brown and gray, moist, very dense.	75			3	1 / 1.5	16-22-28 N=50	
	109.5 Rock.	107.5						

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.  
WH = Weight of Hammer

# BORING LOG NO. CUF-DAS-A-2

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 731746.31 E 1510658.71	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 412.9	TOTAL DEPTH 120.5 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN DISTURBED <b>5</b> UNDISTURBED <b>0</b>	
LOGGER M. Aplin		HAMMER TYPE Automatic EFFICIENCY: 92.4% CALIBRATION: 1/24/2018	
SUPERVISOR: M. Aplin		TVA CONTACT: M. Bishop	
DATE STARTED 9/20/2017		DATE COMPLETED 9/23/2017	
		DRILL RIG TYPE: CME 55 Track DRILL RIG ID: 709	

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120		2.75" (O.D.) Slope Inclinomater Casing Cement / Bentonite Grout				
		20						
	<b>FAT CLAY (CH)</b> , brown, dry, stiff.	20.7			1	1 / 1.5	3-2-6 N=8	
	<b>SANDY SILT (ML)</b> , dark gray, moist, stiff, gravelly, ash.	21.5						
		40						
	<b>SILT (ML)</b> , light gray, wet, soft, ash.	41.5		PZ installed at 39.5'	2	1.4 / 1.5	1-1-1 N=2	
		60						
	<b>SILT (ML)</b> , light gray, moist, medium stiff, ash.	61.5		PZ installed at 59.5'	3	1.4 / 1.5	2-2-3 N=5	
		80						
	<b>SILT (ML)</b> , dark gray to black, moist, medium stiff, ash.	81.5		PZ installed at 84.5'	4	0.7 / 1.5	4-2-3 N=5	
		100						
	<b>WELL GRADED GRAVEL (GW)</b> , brown gray, moist, very dense.	101.5		PZ installed at 104.5'	5	1.4 / 1.5	32-33-32 N=65	
		118.5						
	Rock.	120.5						

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.

# BORING LOG NO. CUF-DAS-C-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 731507.31 E 1509327.23	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 377.7	TOTAL DEPTH 33.5 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN DISTURBED      2      UNDISTURBED      0	
LOGGER M. Aplin		HAMMER TYPE    Automatic    EFFICIENCY:    92.4%    CALIBRATION:    1/24/2018	
SUPERVISOR: M. Aplin		TVA CONTACT: M. Bishop	
DATE STARTED 9/9/2017		DATE COMPLETED 9/9/2017	
		DRILL RIG TYPE:    CME 55 Track                      DRILL RIG ID:    709	

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5		1.0" Diameter Sch. 40 PVC				
10	<b>FAT CLAY (CH)</b> , reddish-brown to light brown, dry, medium stiff.	10			1	1.4 / 1.5	2-3-3 N=6	
11.5		15		-Cement / Bentonite Grout				
20		20		PZ installed at 18.3'				
21.5	<b>SANDY LEAN CLAY (CL)</b> , dark gray, dry, stiff.	20			2	1.4 / 1.5	3-4-4 N=8	
33.5		30		PZ installed at 30.8'				
		33.5						Bedrock at 33.5'.

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.

# BORING LOG NO. CUF-DAS-D-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 730673.23 E 1509341.18	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 379.6	TOTAL DEPTH 41.1 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN DISTURBED <b>4</b> UNDISTURBED <b>0</b>	
LOGGER M. Aplin		HAMMER TYPE Automatic EFFICIENCY: 92.4% CALIBRATION: 1/24/2018	
SUPERVISOR: M. Aplin		TVA CONTACT: M. Bishop	
DATE STARTED 9/8/2017		DATE COMPLETED 9/8/2017	
		DRILL RIG TYPE: CME 55 Track	DRILL RIG ID: 709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5		1.0" Diameter Sch. 40 PVC				
	<b>SANDY LEAN CLAY (CL)</b> , light brown, dry, medium stiff.	6.5			1	1.1 / 1.5	4-3-4 N=7	
		10		-Cement / Bentonite Grout				
		15						
	<b>FAT CLAY (CH)</b> , light brown, damp, soft.	16.5		PZ installed at 16.4'	2	1.4 / 1.5	1-1-1 N=2	
		20						
		25						
	<b>SANDY LEAN CLAY (CL)</b> , light brown, dry, very stiff.	26.5		PZ installed at 26.4'	3	1.4 / 1.5	7-8-7 N=15	
		30						
		35						
	<b>FAT CLAY (CH)</b> , light brown, damp, very stiff.	36.5			4	1.4 / 1.5	7-11-10 N=21	
		40		PZ installed at 38.1'				
	41.1 Rock.							

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.

# BORING LOG NO. CUF-DAS-D-2

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 730737.58 E 1509494.34	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 398.7	TOTAL DEPTH 60.1 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN	
LOGGER M. Aplin		DISTURBED 4	UNDISTURBED 0
SUPERVISOR: M. Aplin	TVA CONTACT: M. Bishop	HAMMER TYPE Automatic	EFFICIENCY: 92.4% CALIBRATION: 1/24/2018
DATE STARTED 9/9/2017	DATE COMPLETED 9/10/2017	DRILL RIG TYPE: CME 55 Track	DRILL RIG ID: 709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5		2.75" (O.D.) Slope Inclinometer Casing				
		10						
		15		-Cement / Bentonite Grout				
		20						
	21.5 <b>SILT (ML)</b> , dark gray, wet, soft, ash.	20		PZ installed at 22.0'	1	0.5 / 1.5	4-1-1 N=2	
		25						
		30						
	31.5 <b>SILT (ML)</b> , dark gray, moist, soft, ash.	30		PZ installed at 33.0'	2	1.5 / 1.5	2-1-1 N=2	
		35						
		40						
		45						
	46.5 <b>SILT (ML)</b> , light gray to brown, dry, very stiff, ash.	45			3	1.5 / 1.5	10-9-11 N=20	
		50						
		55						
	56.5 <b>FAT CLAY (CH)</b> , light brown, dry, very stiff.	55		PZ installed at 54.0'	4	1.4 / 1.5	17-28-31 N=59	
	57 Rock	57						
	60.1	60						

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.

# BORING LOG NO. CUF-DAS-D-3

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 730783.71 E 1509585.65	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 427.2	TOTAL DEPTH 90.3 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN DISTURBED      3      UNDISTURBED      0	
LOGGER M. Aplin		TOTAL NO. OF SAMPLES TAKEN DISTURBED      3      UNDISTURBED      0	
SUPERVISOR: M. Aplin	TVA CONTACT: M. Bishop	HAMMER TYPE    Automatic	EFFICIENCY:    92.4%    CALIBRATION:    1/24/2018
DATE STARTED 9/6/2017	DATE COMPLETED 9/7/2017	DRILL RIG TYPE:    CME 55 Track	DRILL RIG ID:    709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5		2.75" (O.D.) Slope Inclinometer Casing				
		10		Cement / Bentonite Grout				
		15						
		20						
		25		PZ installed at 25.3'				
	26.5 SILT (ML), dark gray to black, moist, very stiff, ash.	26.5			1	0.8 / 1.5	6-10-8 N=18	
		30						
		35		PZ installed at 35.3'				
	36.5 SILT (ML), dark gray to black, moist, stiff, ash.	36.5			2	1 / 1.5	4-4-4 N=8	
		40						
		45						
		50						
		55		PZ installed at 55.3'				
	56.5 SILT (ML), dark gray to black, wet, soft, gravelly, ash.	56.5			3	0.8 / 1.5	1-1-1 N=2	
		60						
		65		PZ installed at 66.3'				
		70						
		75						
		80						
		85		PZ installed at 85.3'				
	88	88						
	90.3 Rock.	90.3						

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.



# BORING LOG NO. CUF-DAS-G-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 730075.64 E 1511239.06	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 405.5	TOTAL DEPTH 74.9 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN	
LOGGER B. Herries		DISTURBED 3	UNDISTURBED 0
SUPERVISOR: B. Herries	TVA CONTACT: M. Bishop	HAMMER TYPE Automatic	EFFICIENCY: 92.4% CALIBRATION: 1/24/2018
DATE STARTED 10/2/2017	DATE COMPLETED 10/3/2017	DRILL RIG TYPE: CME 55 Track	DRILL RIG ID: 709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20 25 30 35 40 45 50 55 60 65 70		2.75" (O.D.) Slope Inclinometer Casing  Cement / Bentonite Grout				
26	27.5 <b>SILT (ML)</b> , gray, moist, soft, ash.	25		PZ installed at 25.9'	1	1.5 / 1.5	2-1-1 N=2	
		40		PZ installed at 40.9'	2	0 / 1.5	1-1-1 N=2	SPT-2 No recovery
65	66.5 <b>FAT CLAY (CH)</b> , gray with tan, medium stiff, trace gravel.	65		PZ installed at 64.9'	3	0.6 / 1.5	6-3-3 N=6	Roller bit at 67.3'
73	74.9 Rock.	70						

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.

# BORING LOG NO. CUF-DAS-G-2

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 730138.31 E 1511119.21	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 439.1	TOTAL DEPTH 124.5 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN	
LOGGER B. Herries		DISTURBED	6 UNDISTURBED 0
SUPERVISOR: B. Herries	TVA CONTACT: M. Bishop	HAMMER TYPE Automatic	EFFICIENCY: 92.4% CALIBRATION: 1/24/2018
DATE STARTED 10/4/2017	DATE COMPLETED 10/5/2017	DRILL RIG TYPE: CME 55 Track	DRILL RIG ID: 709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120		2.75" (O.D.) Slope Inclinerometer Casing Cement / Bentonite Grout PZ installed at 20.0' PZ installed at 43.0' PZ installed at 67.0' PZ installed at 90.0' PZ installed at 105.0'				
20	21.5 <b>SILT (ML)</b> , gray to dark gray, very stiff, fly and bottom ash.	20			1	0.2 / 1.5	50+ / 0.2' N=50+	Apparent gravel at 29' and 31'
43	44.5 <b>SILT (ML)</b> , gray, moist, very stiff, fly ash.	45			2	1.5 / 1.5	31-35-31 N=66	
67	68.5 <b>SILT (ML)</b> , moist, soft, clayey, trace sand, fly ash.	70			3	1.4 / 1.5	1-2-1 N=3	Apparent gravel from 50' to 53'
90	91.5 <b>FAT CLAY (CH)</b> , orange brown to tan, very stiff, some gravel.	90			4	1.3 / 1.5	5-9-12 N=21	
96	97.5 <b>FAT CLAY (CH)</b> , light orange brown, very stiff, some gravel.	97.5			5	1.5 / 1.5	4-5-11 N=16	
117	118.5 <b>GRAVELLY CLAY</b> , light orangish tan, loose.	118.5			6	1.3 / 1.5	6-8-8 N=16	
122.5	124.5 Rock.	124.5						

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.

# BORING LOG NO. CUF-DAS-INT-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 730437.75 E 1510738.81	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 439.1	TOTAL DEPTH 120.0 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN	
LOGGER B. Herries		DISTURBED 6	UNDISTURBED 0
SUPERVISOR: B. Herries	TVA CONTACT: M. Bishop	HAMMER TYPE Automatic	EFFICIENCY: 92.4% CALIBRATION: 1/24/2018
DATE STARTED 10/5/2017	DATE COMPLETED 10/7/2017	DRILL RIG TYPE: CME 55 Track	DRILL RIG ID: 709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20		2.75" (O.D.) Slope Inclinometer Casing Cement / Bentonite Grout				
25 26.5	<u>SILT (ML)</u> , gray, dry, very stiff, fly ash.	25 30 35 40		PZ installed at 25.0'	1	0.8 / 1.5	25-50+ / 0.3' / N=50+	
45 46.5	<u>SILT (ML)</u> , gray, dry, very stiff, fly ash.	45 50 55		PZ installed at 45.0'	2	0.4 / 1.5	50+ / 0.4' / N=50+	
60 61.5	<u>SILT (ML)</u> , gray, moist, stiff, fly ash.	60 65 70 75 80		PZ installed at 60.0'	3	1.2 / 1.5	17-8-4 / N=12	
86 87.5 90	<u>SILT (ML)</u> , gray, moist, soft, fly ash.	85 90 95		PZ installed at 92.0'	4 5	1.5 / 1.5 / 1.5	1-1-2 / N=3 WH-1-3 / N=4	
91.5 120	<u>SILT (ML)</u> , gray, moist, soft, fly ash.	100 105 110 115 120		PZ installed at 117.0'				Apparent gravel from 110' onward Bedrock at 120.0'

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.  
WH = Weight of Hammer

# BORING LOG NO. CUF-DAS-INT-2

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 731036.36 E 1510397.40	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 434.5	TOTAL DEPTH 124.0 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN	
LOGGER B. Herries		DISTURBED 6	UNDISTURBED 0
SUPERVISOR: B. Herries	TVA CONTACT: M. Bishop	HAMMER TYPE Automatic	EFFICIENCY: 92.4% CALIBRATION: 1/24/2018
DATE STARTED 10/7/2017	DATE COMPLETED 10/9/2017	DRILL RIG TYPE: CME 55 Track	DRILL RIG ID: 709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120		2.75" (O.D.) Slope Incliner Casing Cement / Bentonite Grout				
	25 26.5 <u>SILT (ML)</u> , gray, dry, very stiff, fly ash.			PZ installed at 25.0'	1	0.9 / 1.5	20-50+ / 0.4' / N=50+	
	50 51.5 <u>SILT (ML)</u> , grayish tan with black, wet, soft, fly ash.			PZ installed at 46.0' PZ installed at 50.0'	2	1.5 / 1.5	WR-WR-3 / N=3	
	60 61.5 <u>SILT (ML)</u> , gray, wet, very soft, fly ash.				3	1.5 / 1.5	WH-WH-WH / N=2	
	90 91.5 <u>FAT CLAY (CH)</u> , orange brown to tan, moist, stiff.			PZ installed at 85.0'	4	1.5 / 1.5	5-7-8 / N=15	
	110 111.5 <u>GRAVEL with Clay and Sand</u> , brown to gray, wet, very dense.				5	1.3 / 1.5	10-23-19 / N=42	Roller bit at 110'
	115 116.5 <u>GRAVEL with Sand</u> , tan to brown, wet, very dense.				6	1 / 1.5	25-30-42 / N=72	
	124			PZ installed at 121.0'				Bedrock at 124.0'

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.  
 WH = Weight of Hammer  
 WR = Weight of Rods

# BORING LOG NO. CUF-DAS-X-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 731513.16 E 1511429.96	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 393.6	TOTAL DEPTH 48.7 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN	
LOGGER M. Aplin		DISTURBED 2	UNDISTURBED 0
SUPERVISOR: M. Aplin	TVA CONTACT: M. Bishop	HAMMER TYPE Automatic	EFFICIENCY: 92.4% CALIBRATION: 1/24/2018
DATE STARTED 9/23/2017	DATE COMPLETED 9/24/2017	DRILL RIG TYPE: CME 55 Track	DRILL RIG ID: 709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5		2.75" (O.D.) Slope Inclinator Casing				Used roller bit 5' - 15'
		10		-Cement / Bentonite Grout				
		15						
		20		PZ installed at 19.7'	1	0.7 / 1.5	4-3-7 N=10	
	21.5 <b>FAT CLAY (CH)</b> , light brown to black, dry, stiff.	20						
		25						
		30		PZ installed at 29.7'				
		35						
		40						Gravel from 40' - 42'
		45		PZ installed at 44.7'	2	1.3 / 1.5	1-6-8 N=14	
	45 <b>FAT CLAY (CH)</b> , light brown to red, dry, stiff.	45						
	46.5 <b>FAT CLAY (CH)</b> , light brown to red, dry, stiff.	46.5						
	47 Rock.	47						
	48.7 Rock.	48.7						

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.

# BORING LOG NO. CUF-DAS-X-2

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 731487.77 E 1511324.23	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 421.4	TOTAL DEPTH 100.4 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4" Mud Rotary Upward Discharge Bit	DEPTH GROUND WATER N/A
DRILLER E. Caudill		TOTAL NO. OF SAMPLES TAKEN DISTURBED      0      UNDISTURBED      0	
LOGGER M. Aplin		TOTAL NO. OF SAMPLES TAKEN DISTURBED      0      UNDISTURBED      0	
SUPERVISOR: M. Aplin	TVA CONTACT: M. Bishop	HAMMER TYPE    Automatic	EFFICIENCY:    92.4%    CALIBRATION:    1/24/2018
DATE STARTED 9/24/2017	DATE COMPLETED 9/26/2017	DRILL RIG TYPE:    CME 55 Track	DRILL RIG ID:    709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100		2.75" (O.D.) Slope Inclinometer Casing  Cement / Bentonite Grout →				
	20 21.5 <b>SILT (ML)</b> , dark gray to black, moist, medium stiff, ash.			PZ installed at 20.4'	1	0.8 / 1.5	3-4-6 N=10	
	30 31.5 <b>SILT (ML)</b> , dark gray to black, moist, medium stiff, ash.				2	0.8 / 1.5	6-4-6 N=10	
	45 46.5 <b>SILT (ML)</b> , dark gray to black, wet, medium stiff, ash.			PZ installed at 45.4'	3	0.8 / 1.5	3-3-3 N=6	
	60 61.5 <b>FAT CLAY (CH)</b> , light brown, dry, very stiff.			PZ installed at 65.4'	4	0.5 / 1.5	4-6-11 N=17	
	98 100.4 Rock			PZ installed at 95.4'				

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.

# BORING LOG NO. CUF-GSA-G-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 729976.18 E 1511434.87	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 413.3	TOTAL DEPTH 87.2 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4.25" HSA	DEPTH GROUND WATER N/A
DRILLER D. Jessie			
LOGGER W. Padgett		TOTAL NO. OF SAMPLES TAKEN DISTURBED 9 UNDISTURBED 0	
SUPERVISOR: W. Padgett	TVA CONTACT: G. Black	HAMMER TYPE Automatic	EFFICIENCY: 90% CALIBRATION: 10/18/2017
DATE STARTED 1/30/2018	DATE COMPLETED 1/30/2018	DRILL RIG TYPE: CME 1050	DRILL RIG ID: 952

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85		2.75" (O.D.) Slope Incliner Casing  Cement / Bentonite Grout				
	26	27.5			1	1.5 / 1.5	4-1-2 N=3	
				PZ installed at 28.7'				
	36	37.5			2	1.5 / 1.5	WR-1-1 N=2	
	46				3	0.9 / 1.5	5-2-1 N=3	
				PZ installed at 48.7'	4	1.5 / 1.5	WR N=0	
					5	1.5 / 1.5	WH-WH-1 N=1	
					6	1.5 / 1.5	WH-2 N=2	
	61	62.5			7	1.5 / 1.5	WH-WH-1 N=1	
					8	1.5 / 1.5	WR-WH-WH N=0	
				PZ installed at 68.7'	9	1.3 / 1.5	3-7-7 N=14	
	85.5	87.2						

**Notes**

Select soil samples collected to verify stratigraphy for instrument installation locations.  
 Augers charged with a water/polymer mixture.  
 WR = Weight of Rods  
 WH = Weight of Hammer

# BORING LOG NO. CUF-GSA-G-2

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 729935.04 E 1511506.76	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 428.2	TOTAL DEPTH 102.0 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4.25" HSA	DEPTH GROUND WATER N/A
DRILLER D. Jessie			
LOGGER W. Padgett		TOTAL NO. OF SAMPLES TAKEN DISTURBED <b>11</b> UNDISTURBED <b>0</b>	
SUPERVISOR: W. Padgett	TVA CONTACT: G. Black	HAMMER TYPE Automatic	EFFICIENCY: 90% CALIBRATION: 10/18/2017
DATE STARTED 1/29/2018	DATE COMPLETED 1/29/2018	DRILL RIG TYPE: CME 1050	DRILL RIG ID: 952

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100		2.75" (O.D.) Slope Inclinerometer Casing  Cement / Bentonite Grout				
	30 31.5 <b>SILT (ML)</b> , dark gray, moist, medium stiff, ash.				1	0.7 / 1.5	2-3-4 N=7	
	40 41.5 <b>SILT (ML)</b> , dark gray, moist, stiff, ash.			PZ installed at 40.0'	2	1.5 / 1.5	2-3-5 N=8	
	55 <b>SILT (ML)</b> , dark gray, moist, very stiff to soft, ash.				3	1.1 / 1.5	27-28-31 N=59	
	62.5 <b>SILT (ML)</b> , dark gray, wet, very soft to medium stiff, ash.			PZ installed at 65.0'	4	1.5 / 1.5	5-9-9 N=18	
					5	1.5 / 1.5	12-6-5 N=11	
					6	1.5 / 1.5	WR-1-1 N=2	
					7	1.5 / 1.5	WR-WR-WR N=0	
	75 76.5 <b>LEAN CLAY (CL)</b> , light brown to gray, dry, stiff.			PZ installed at 90.0'	8	1.5 / 1.5	3-2-3 N=5	
					9	1.5 / 1.5	2-1-4 N=5	
					10	1.5 / 1.5	WR-WR-WR N=0	
					11	1.2 / 1.5	5-6-8 N=14	
	99 102 <b>BEDROCK</b> .							

**Notes**

Augers charged with water/polymer mixture.  
WR = Weight of Rods



# BORING LOG NO. CUF-GSA-INT-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 729063.02 E 1512013.42	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 423.1	TOTAL DEPTH 78.7 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4.25" HSA	DEPTH GROUND WATER N/A
DRILLER D. Jessie		TOTAL NO. OF SAMPLES TAKEN	
LOGGER W. Modrall		DISTURBED	4
SUPERVISOR: W. Modrall		TVA CONTACT: G. Black	UNDISTURBED
DATE STARTED 2/5/2018		DATE COMPLETED 2/6/2018	0
		HAMMER TYPE Automatic	EFFICIENCY: 90%
		CALIBRATION: 10/18/2017	
		DRILL RIG TYPE: CME 1050	DRILL RIG ID: 952

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75		1.0" Diameter Sch. 40 PVC  Cement / Bentonite Grout				
	30	30		PZ installed at 30.0'	1	1.5 / 1.5	WH-WH-WH N=0	
	31.5							SILT (ML), gray to black, wet, very soft, fly ash.
		35 40 45 50		PZ installed at 40.0'  PZ installed at 50.0'				
	55	55		PZ installed at 60.0'	2	0.8 / 1.5	17-6-3 N=9	
	56.5							SILT (ML), gray to black, wet, stiff, silty sand, fly and bottom ash.
		60 65 70		PZ installed at 75.0'				
	70	70			3	0.8 / 1.5	3-6-7 N=13	
	71.5							LEAN CLAY (CL), tan to gray, wet, stiff.
		75						
	78.5	78.5			4	0.2 / 0.2	50+/0.2"/2" N=50+	
	78.7							WEATHERED LIMESTONE, yellow.

**Notes**

Augers charged with water/polymer mixture.  
WH = Weight of Hammer

# BORING LOG NO. CUF-GSA-INT-2

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 729205.68 E 1512988.51	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 420.3	TOTAL DEPTH 50.2 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4.25" HSA	DEPTH GROUND WATER N/A
DRILLER D. Jessie		TOTAL NO. OF SAMPLES TAKEN	
LOGGER W. Modrall		DISTURBED	3
SUPERVISOR: W. Modrall		TVA CONTACT: G. Black	UNDISTURBED
DATE STARTED 2/6/2018		DATE COMPLETED 2/6/2018	0
		HAMMER TYPE Automatic	EFFICIENCY: 90%
		CALIBRATION: 10/18/2017	
		DRILL RIG TYPE: CME 1050	DRILL RIG ID: 952

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5		1.0" Diameter Sch. 40 PVC				
		10		Cement / Bentonite Grout				
		15						
		20						
		25						
		30		PZ installed at 30.0'	1	1.5 / 1.5	3-3-3 N=6	
	31.5 <b>SILT (ML)</b> , dark gray and black, moist, medium stiff, fly ash.	31.5						
		35						
		40		PZ installed at 40.0'				
		45						
		48						
	48.4 WEATHERED SHALE/LIMESTONE, brown to dark brown, moist, very stiff.	48.4			2	0.4 / 0.4	50+/0.4'/5" N=50+	
		50		PZ installed at 50.0'	3	0.2 / 0.2	50+/0.2'/2" N=50+	
	50.2	50.2						

**Notes**

Augers charged with water/polymer mixture.

# BORING LOG NO. CUF-GSA-J-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 728157.75 E 1512693.93	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 379.6	TOTAL DEPTH 35.5 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4.25" HSA	DEPTH GROUND WATER N/A
DRILLER D. Jessie			
LOGGER W. Padgett		TOTAL NO. OF SAMPLES TAKEN DISTURBED <b>2</b> UNDISTURBED <b>0</b>	
SUPERVISOR: W. Padgett	TVA CONTACT: G. Black	HAMMER TYPE Automatic	EFFICIENCY: 92.4% CALIBRATION: 1/24/2018
DATE STARTED 1/25/2018	DATE COMPLETED 1/25/2018	DRILL RIG TYPE: CME 55 Track	DRILL RIG ID: 709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5	1.0" Diameter Sch. 40 PVC				
		10					
		15	Cement / Bentonite Grout				
		20	PZ installed at 20.0'	1	0.75 / 1.5	4-7-10 N=17	
	<b>LEAN CLAY (CL)</b> , light brown, dry, very stiff.	21.5					
		25					
		30					
		33	PZ installed at 33.0'	2	1.5 / 1.5	3-5-3 N=8	
	<b>LEAN CLAY WITH GRAVEL (CL)</b> , light brown, dry, medium stiff.	34.5					
		35.5					

**Notes**

Augers charged with water/polymer mixture.

# BORING LOG NO. CUF-GSA-K-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 728090.86 E 1513838.69	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 379.0	TOTAL DEPTH 22.8 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4.25" HSA	DEPTH GROUND WATER N/A
DRILLER D. Jessie			
LOGGER W. Padgett		TOTAL NO. OF SAMPLES TAKEN DISTURBED <b>2</b> UNDISTURBED <b>0</b>	
SUPERVISOR: W. Padgett	TVA CONTACT: G. Black	HAMMER TYPE Automatic	EFFICIENCY: 92.4% CALIBRATION: 1/24/2018
DATE STARTED 1/25/2018	DATE COMPLETED 1/25/2018	DRILL RIG TYPE: CME 55 Track	DRILL RIG ID: 709

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5		1.0" Diameter Sch. 40 PVC				
14	<b>LEAN CLAY (CL)</b> , light brown, dry, medium stiff.	15		Cement / Bentonite Grout PZ installed at 14.0'	1	1.4 / 1.5	3-2-4 N=6	
22.2 22.7 22.8	ROCK, cherty, light brown, hard. B.O.H..	20		PZ installed at 22.2'	2	0.1 / 0.1	50+ / 0.1' / 1" N=50+	Bedrock at 22.7'

**Notes**

Augers charged with water/polymer mixture.

# BORING LOG NO. CUF-GSA-L-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 728782.77 E 1513695.37	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 430.3	TOTAL DEPTH 80.0 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4.25" HSA	DEPTH GROUND WATER N/A
DRILLER D. Jessie		TOTAL NO. OF SAMPLES TAKEN	
LOGGER W. Padgett		DISTURBED 9	UNDISTURBED 0
SUPERVISOR: W. Padgett	TVA CONTACT: G. Black	HAMMER TYPE Automatic	EFFICIENCY: 90% CALIBRATION: 10/18/2017
DATE STARTED 1/28/2018	DATE COMPLETED 1/28/2018	DRILL RIG TYPE: CME 1050	DRILL RIG ID: 952

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80		1.0" Diameter Sch. 40 PVC  Cement / Bentonite Grout  PZ installed at 21.0'  PZ installed at 36.0'  PZ installed at 48.0'  PZ installed at 61.0'  PZ installed at 79.0'				
	21 22.5 <b>LEAN CLAY (CL)</b> , dark brown, dry, stiff.				1	1.3 / 1.5	12-8-5 N=13	
	36 37.5 <b>SILT (ML)</b> , dark gray, dry, stiff, ash.				2	1.5 / 1.5	3-4-7 N=11	
	48 49.5 <b>SILT (ML)</b> , dark gray, wet, very soft, ash.				3	1.5 / 1.5	1-1-1 N=2	
	61 62.5 <b>SILT (ML)</b> , dark gray, dry, very stiff, ash.				4	1.2 / 1.5	20-21-28 N=49	
	66 67.5 <b>SILT (ML)</b> , dark gray, wet, very soft, ash.				5	1.5 / 1.5	WH-WH-1 N=1	Native clay encountered at bottom of SPT-7
	68.5 <b>SILT (ML)</b> , dark gray, dry, stiff, ash.				6	1.5 / 1.5	2-4-5 N=9	
	73.5 <b>LEAN CLAY (CL)</b> , brown-gray, dry, stiff.				7	1.1 / 1.5	3-3-5 N=8	
	75 <b>LEAN CLAY (CL)</b> , brown-gray, dry, stiff.				8	1.1 / 1.5	WH-4-5 N=9	
	80 <b>BEDROCK</b> .							

**Notes**

Augers charged with water/polymer mixture.  
WH = Weight of Hammer

# BORING LOG NO. CUF-GSA-M-1

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 729772.46 E 1513379.26	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 410.0	TOTAL DEPTH 32.0 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4.25" HSA	DEPTH GROUND WATER N/A
DRILLER D. Jessie			
LOGGER W. Padgett		TOTAL NO. OF SAMPLES TAKEN DISTURBED <b>3</b> UNDISTURBED <b>0</b>	
SUPERVISOR: W. Padgett	TVA CONTACT: G. Black	HAMMER TYPE Automatic	EFFICIENCY: 90% CALIBRATION: 10/18/2017
DATE STARTED 1/28/2018	DATE COMPLETED 1/28/2018	DRILL RIG TYPE: CME 1050	DRILL RIG ID: 952

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	SAMPLE TYPE	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5		1.0" Diameter Sch. 40 PVC				
		10		Cement / Bentonite Grout				
		15		PZ installed at 16.0'	1	1.5 / 1.5	3-8-8 N=16	
	16 <b>SILT (ML)</b> , dark gray, dry, very stiff, ash.	17.5						
		20						
		25						
		28		PZ installed at 28.0'	2	1.5 / 1.5	WR-2-4 N=6	
	28 <b>SILT (ML)</b> , dark gray, wet, medium stiff, ash.	29.5						
		30						
		32						

**Notes**

Augers charged with water/polymer mixture.  
WR = Weight of Rods

# BORING LOG NO. CUF-GSA-M-2

PROJECT NAME CUF Partial Closure Instrumentation		BORING LOCATION (Coordinates and/or Station) If Available N 729670.56 E 1513323.64	
PROJECT LOCATION TVA Cumberland Fossil Plant		ELEVATION 430.3	TOTAL DEPTH 54.8 Ft.
DRILLING AGENCY Stantec		ADVANCEMENT METHOD 4.25" HSA	DEPTH GROUND WATER N/A
DRILLER D. Jessie			
LOGGER W. Padgett		TOTAL NO. OF SAMPLES TAKEN DISTURBED <b>7</b> UNDISTURBED <b>0</b>	
SUPERVISOR: W. Padgett	TVA CONTACT: G. Black	HAMMER TYPE Automatic	EFFICIENCY: 90% CALIBRATION: 10/18/2017
DATE STARTED 1/27/2018	DATE COMPLETED 1/27/2018	DRILL RIG TYPE: CME 1050	DRILL RIG ID: 952

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (Ft.)	INSTALLATION DETAILS	SAMPLE NUMBER	RECOVERY / LENGTH (Ft.)	FIELD TEST RESULTS	REMARKS
Depth (Ft.)		5 10 15 20 25 30 35 40 45 50	1.0" Diameter Sch. 40 PVC  Cement / Bentonite Grout →				
	20	21.5	PZ installed at 20.0'	1	1 / 1.5	6-25-36 N=61	
		35	PZ installed at 35.0'	2	0.9 / 1.5	7-10-10 N=20	
	36.5	45	PZ installed at 50.0'	3	1.5 / 1.5	3-6-7 N=13	
		54		4	1.5 / 1.5	5-12-21 N=33	
	54.7	54.8		5	1.5 / 1.5	7-5-7 N=12	
				6	0.75 / 1.5	5-10-12 N=22	
				7	0.1 / 0.1	50+ / 0.1' / 1" N=50+	

**Notes**

Augers charged with water/polymer mixture.

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-B14</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>731,519.55 N; 1,511,209.75 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>440.8 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>3/26/19</u>	Completed <u>4/12/19</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>67.5 ft</u>	Date/Time <u>3/28/19 07:00</u>
Inspector <u>M. McDonald</u>	Logger <u>M. McDonald</u>	Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 75#2, #712</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>NQ-3 Wireline, Split Barrel, Surface Set Bit</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>Automatic</u>	Weight <u>140 lb</u>	Drop <u>30"</u>	Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>B. Halada</u>		Approved By <u>A. Welshans</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	440.8		Top of Hole					
1			SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very loose to medium dense, dry to moist, poorly graded, [CCR]		SS01G	0.0 - 1.5	0.6	WH-2-2
2					SS02G	2.5 - 4.0	1.1	9-12-10
3					SS03G	5.0 - 6.5	1.5	6-8-9
4	435.8		SANDY SILT, ML, 5Y 2.5/1 (black), very fine to fine, non-plastic, very soft, dry to moist, well graded, [CCR]		SS04G	7.5 - 8.1	0.6	37-50/1"
5					SS05G	10.0 - 10.5	0.5	50/6"
6	433.3		POORLY GRADED SAND LITTLE GRAVEL, SP, 10YR 3/2 (very dark grayish brown), fine, non-plastic, very dense, dry to moist, poorly graded, with a little fine subangular gravel, [CCR]		SS06G	12.5 - 12.9	0.4	50/5"
7					SS07G	15.0 - 15.3	0.3	50/4"
8	430.8		SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very dense, dry to moist, poorly graded, [CCR]		SS08G	17.5 - 17.8	0.3	50/4"
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 4/13/21



Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B14</b>
Client	Tennessee Valley Authority	Boring Location	731,519.55 N; 1,511,209.75 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	440.8 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
18			SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very dense, dry to moist, poorly graded, [CCR] (Continued)			17.5 - 17.8			
19									
20						SS09G	20.0 - 20.4	0.4	50/5"
21									
22						SS10G	22.5 - 22.9	0.4	50/5"
23									
24									
25									
26.0	414.8				SS11G	25.0 - 26.2	1.2	40-48-50/2"	
26.2	414.6								
27			POORLY GRADED SAND LITTLE GRAVEL, SP, 10YR 3/2 (very dark grayish brown), very fine to coarse, non-plastic, very dense, dry to moist, poorly graded, with a little fine subangular gravel, [CCR]						
28					SS12G	27.5 - 27.8	0.3	50/4"	
29			SILTY SAND TRACE CLAY, SM, 10YR 3/2 (very dark grayish brown), fine to medium, non-plastic, medium dense to very dense, dry to moist, poorly graded, [CCR]						
30									
31					SS13G	30.0 - 31.5	1.5	8-10-12	
32									
32.5	408.3								
33			POORLY GRADED SAND LITTLE GRAVEL, SP, 10YR 4/3 (brown) to 10YR 2/1 (black), very fine to coarse, non-plastic, dense, dry to moist, poorly graded, with a little fine subangular gravel, [CCR]						
34					SS14G	32.5 - 34.0	1.2	16-22-22	
35			Increased silt content at 35.0'						
36					SS15G	35.0 - 36.5	1.3	13-16-18	
37									
38					SS16G	37.5 - 39.0	1.5	16-28-24	
39									
40					ST01G	40.0 - 40.4	0.0	1200	
41			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, medium stiff to very stiff, dry to moist, with some very fine-grained sand, [CCR]						
42					SS17G	40.4 - 41.9	1.3	14-12-9	

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/13/21

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B14</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  731,519.55 N; 1,511,209.75 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  440.8 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, medium stiff to very stiff, dry to moist, with some very fine-grained sand, [CCR] <i>(Continued)</i>		SS18G	42.5 - 44.0	0.7	4-4-3
44					ST02G	45.0 - 47.0	2.0	350
45					SS19G	47.5 - 49.0	1.2	3-4-4
50	50.0	390.8						
51			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown) and 10YR 4/3 (brown), very fine to coarse, non-plastic, loose, dry to moist, interbedded silty sand and poorly graded fine to coarse sand, traces of fine subangular gravel, [CCR]		SS20G	50.0 - 51.5	1.3	1-2-3
52	52.5	388.3						
53		●●●●●	POORLY GRADED SAND LITTLE GRAVEL, SP, 10YR 4/3 (brown) to 10YR 2/1 (black), very fine to coarse, non-plastic, dense, dry to moist, poorly graded, with a little fine subangular gravel, [CCR]		SS21G	52.5 - 54.0	1.3	2-3-4
54	55.0	385.8						
55			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, soft to stiff, dry to moist, with some angular fine-grained sand, [CCR] Laminated and red-brown and black fine-grained sand from 55.0' to 55.4'		SS22G	55.0 - 56.5	1.5	1-2-1
56					SS23G	57.5 - 59.0	1.5	5-4-5
57								
58			Fine to coarse-grained sand, black, traces of organic odor from 58.7' to 59.0'					
59	60.0	380.8						
60			SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, stiff, moist to wet, trace of very fine-grained sand, [CCR]		ST03G	60.0 - 62.0	2.0	400
61					SS24G	62.5 - 64.0	1.1	3-5-4
62								
63								
64								
65	65.0	375.8						
66		●●●●●			SS25G	65.0 - 66.5	1.4	2-4-5

TVA EIP BORING LOG, 175568209, CUF, TDEC ORDER, GPJ, TDEC SUBSURF DT, 20190630, GDT, 4/13/21

Client Borehole ID   N/A   Stantec Boring No. **CUF-B14**  
 Client   Tennessee Valley Authority   Boring Location   731,519.55 N; 1,511,209.75 E NAD27 Plant Local    
 Project Number   175568209   Surface Elevation   440.8 ft   Elevation Datum   NGVD29  

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
67			POORLY GRADED SAND LITTLE GRAVEL, SP, 10YR 2/1 (black), very fine to coarse, loose to medium dense, moist to wet, poorly graded, with a little fine subangular gravel and traces of interbedded silty sand, [CCR] (Continued)					
68					SS26G	67.5 - 69.0	1.0	6-5-4
69								
70								
71					SS27G	70.0 - 71.5	1.2	3-6-7
72								
73	73.5	367.3			SS28G	72.5 - 74.0	1.5	3-4-3
74			SILTY SAND LITTLE CLAY, SM, 2.5Y 4/2 (dark grayish brown), very fine to fine, loose, moist to wet, laminated, [CCR]					
75					SS29G	75.0 - 76.5	1.5	1-1-4
76								
77					SS30G	77.5 - 79.0	1.5	2-2-4
78								
79								
80								
81	81.4	359.4			ST04G	80.0 - 81.4	1.4	500
82			CLAYEY GRAVEL WITH SAND, GC, 5YR 5/6 (yellowish red) and 10YR 5/3 (brown), fine to coarse, medium plasticity, dense, dry to moist, slight organic odor, angular Possible CCR-Alluvial interface at 81.4'					
83					SS31G	82.5 - 84.0	1.2	11-11-14
84								
85	85.0	355.8						
86			LEAN CLAY TRACE SAND, CL, 5YR 5/6 (yellowish red), medium plasticity, medium stiff, dry to moist, trace of fine-grained sand and with a little fine to medium subrounded gravel					
87					SS32G	85.0 - 86.5	1.3	WH-2-6
88	87.5	353.3						
89			CLAYEY GRAVEL LITTLE SAND, GC, 5YR 5/6 (yellowish red), medium to coarse, medium plasticity, medium dense, moist to wet, subrounded Poorly graded gravel, N 4/ (dark gray), with slight organic odor from 88.9' to 89.0'					
90	90.0	350.8			SS33G	87.5 - 89.0	1.2	12-12-8

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 4/13/21



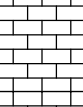
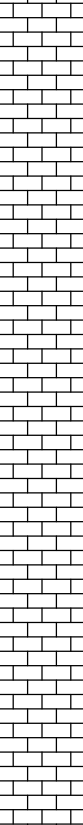
Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
91			LEAN CLAY TRACE SAND, CL, 2.5Y 4/3 (olive brown), medium plasticity, medium stiff, moist to wet, slight organic odor, with a little fine to medium subrounded gravel (Continued)		SS34G	90.0 - 91.5	0.9	3-3-4	
92									
93					ST05G	92.5 - 94.1	0.0	800	
94									
95	95.0	345.8	CLAYEY GRAVEL WITH SAND, GC, 10YR 4/4 (dark yellowish brown) and 10YR 8/6 (yellow), very fine to coarse, dense, moist to wet, slight organic odor, subangular, possible weathered rock, with a little fine-grained sand		SS35G	95.0 - 95.1	0.1	50/1"	
96									
97									
98					SS36G	97.5 - 99.0	1.5	12-28-16	
99									
100	100.0	340.8	SILTY LEAN CLAY, CL, 5Y 4/2 (olive gray), medium plasticity, very stiff, moist, slight organic odor		SS37aG	100.0 - 101.0	1.5	1-21-20	
101	101.0	339.8				SS37bG	101.0 - 101.5		
102			WELL GRADED SAND LITTLE GRAVEL, SW, 2.5Y 4/4 (olive brown), very fine to coarse, dense, moist to wet, slight organic odor, with a little fine to medium subangular gravel up to 1/4" in diameter, traces of wood fragments						
103						SS38G	102.5 - 104.0	1.3	10-12-22
104									
105					SS39G	105.0 - 106.5	1.1	5-12-15	
106									
107	107.5	333.3	WELL GRADED SAND TRACE GRAVEL AND SILT, SW, 10YR 5/6 (yellowish brown) with 5GY 4/2 (dark grayish green), medium to coarse, dense, moist to wet, strong organic odor		SS40G	107.5 - 109.0	1.4	15-14-20	
108									
109									
110	110.5	330.3	CLAYEY SAND WITH GRAVEL, SC-SM, 5GY 4/1 (dark greenish gray), fine to coarse, medium plasticity, medium dense to dense, moist to wet, strong organic odor, stratified Silty sand at SW and CH interface at 110.5'		SS41aG	110.0 - 110.5	1.3	17-7-7	
111						SS41bG	110.5 - 111.5		
112									
113					SS42G	112.5 - 114.0	1.3	20-21-17	
114									

TVA EIP BORING LOG 175568209 CUF TDEC ORDER/GPJ TDEC SUBSURF DT 20190630/GDT 4/13/21









# SUBSURFACE LOG

Client Borehole ID N/A Stantec Boring No. **CUF-B14**  
 Client Tennessee Valley Authority Boring Location 731,519.55 N; 1,511,209.75 E NAD27 Plant Local  
 Project Number 175568209 Surface Elevation 440.8 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
115	115.0	325.8	 FAT CLAY LITTLE SAND, CH, 5GY 4/1 (dark greenish gray), medium to high plasticity, stiff to very stiff, moist, slight organic odor SS43G all lean to fat clay		SS43G	115.0 - 116.5	1.0	2-5-7	
116									
117									
118	118.0	322.8	 WELL GRADED SAND TRACE GRAVEL, SW, 10YR 5/6 (yellowish brown) to 5GY 3/1 (very dark greenish gray), medium to coarse, dense, moist to wet, with some fine subangular gravel and interbedded lean clay		SS44aG	117.5 - 118.0	1.5	27-34-38	
119						SS44bG			118.0 - 119.0
120									
121						SS45G	120.0 - 121.5	0.9	22-28-7
122									
123	123.4	317.4	 Limestone, light blue gray with light brown, hard, thin, highly weathered, carbonaceous, 30° bedding angle, 123.4 to 125.0 not sampled, drill able to auger and set casing through material		SS46G	122.5 - 123.4	0.8	33-50/5"	
124									
125	125.0	315.8	 Limestone, light blue gray with light brown, microcrystalline to very finely crystalline, hard, thin to medium bedded, carbonaceous, 30° bedding angle, with shale streaks, partings, and stringers Bedding fracture, 30°, stepped planarity, rough to smooth, matte surface, Break along shale parting, slightly weathered, at 125.8'					Began Core	
126									
127						70	125.0 - 129.6 4.6	4.6	100
128									
129									
130									
131									
132					68	129.6 - 134.6 5.0	4.6	92	
133									
134									
135									
136									
137					60	134.6 - 138.6 4.0	3.9	98	
138									

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFIJ TDEC SUBSURF DT 20190630.GDT 4/13/21

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B14</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  731,519.55 N; 1,511,209.75 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  440.8 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
139			Limestone, light blue gray with light brown, microcrystalline to very finely crystalline, hard, thin to medium bedded, carbonaceous, 30° bedding angle, with shale streaks, partings, and stringers <i>(Continued)</i>					
140								
141								
142				82	138.6 - 145.1	6.5	6.5	100
143								
144								
145	145.1	295.7						

Bottom of Hole at 145.1 Ft.

Top of Rock = 123.4 Ft.  
 Top of Rock Elevation = 317.4 Ft.  
 Begin Core = 125.0 Ft.

Vibrating wire piezometers installed. See installation log for backfill details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
    G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630.GDT 4/13/21



# SUBSURFACE LOG

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-B15</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>730,949.04 N; 1,510,827.32 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>438.3 ft</u> Elevation Datum <u>NGVD29</u>
Project Name	<u>CUF TDEC Order</u>	Date Started	<u>4/25/19</u> Completed <u>5/3/19</u>
Project Location	<u>Stewart Co, Cumberland City, TN</u>	Depth to Water	<u>65.7 ft</u> Date/Time <u>4/30/19 07:13</u>
Inspector	<u>L. Eaves</u> Logger <u>L. Eaves</u>	Depth to Water	<u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor	<u>Stantec Consulting Services Inc.</u>	Drill Rig Type and ID	<u>CME 85#2, #951</u>
Overburden Drilling and Sampling Tools (Type and Size)	<u>4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes</u>		
Rock Drilling and Sampling Tools (Type and Size)	<u>NQ-3 Wireline, Split Barrel, Surface Set Bit</u>		
Overdrill Tooling (Type and Size)	<u>N/A</u>	Overdrill Depth	<u>N/A</u>
Sampler Hammer Type	<u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>		
Borehole Azimuth	<u>N/A</u>	Borehole Inclination (from Vertical)	<u>N/A</u>
Reviewed By	<u>B. Halada</u>	Approved By	<u>A. Welshans</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	438.3	Top of Hole					
1			SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very dense, dry to moist, [CCR]		SS01G	0.0 - 1.5	1.3	7-14-36
2								
3					SS02G	2.5 - 3.1	0.6	25-50/1"
4								
5					SS03G	5.0 - 5.8	0.8	34-50/4"
6								
7								
8					SS04G	7.5 - 8.2	0.7	27-50/2"
9								
10					SS05G	10.0 - 10.9	0.9	10-50/5"
11								
12								
13					SS06G	12.5 - 14.0	1.1	6-7-8
14								
15								
16					ST01G	15.0 - 15.8	0.8	1000
17								

TVA EIP BORING LOG, 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 4/17/20



# SUBSURFACE LOG

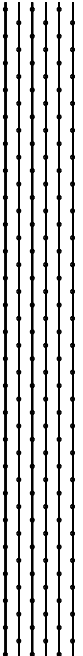


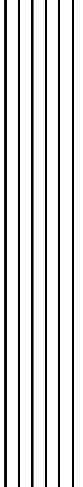
Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-B15</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>730,949.04 N; 1,510,827.32 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>438.3 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
17			SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very dense, dry to moist, [CCR] (Continued)					
18				SS07G	17.5 - 18.7	17.5 - 18.7	1.2	18-42-50/2"
19								
20								
21				SS08G	20.0 - 21.5	20.0 - 21.5	1.2	15-18-20
22								
23				SS09G	22.5 - 23.3	22.5 - 23.3	0.8	28-50/4"
24								
25				SS10G	25.0 - 25.4	25.0 - 25.4	0.4	50/5"
26								
27								
28				SS11G	27.5 - 28.3	27.5 - 28.3	0.8	24-50/4"
29								
30				SS12G	30.0 - 30.4	30.0 - 30.4	0.4	50/5"
31								
32								
33		SS13G	32.5 - 33.4	32.5 - 33.4	0.9	24-50/5"		
34								
35								
36		SS14G	35.0 - 36.1	35.0 - 36.1	1.1	13-21-50/1"		
37								
38		SS15G	37.5 - 38.3	37.5 - 38.3	0.8	15-50/4"		
39								

TVA EIP BORING LOG, 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 4/17/20



Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B15</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,949.04 N; 1,510,827.32 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  438.3 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
40			SILTY SAND TRACE GRAVEL, SM, 5Y 2.5/1 (black), very fine to fine, non-plastic, very dense, dry to moist, [CCR] <i>(Continued)</i>		SS16G	40.0 - 41.2	1.2	16-36-50/2"	
41					SS17G	42.5 - 43.3	0.8	40-50/4"	
42						SS18G	45.0 - 46.5	1.5	28-40-26
43						SS19G	47.5 - 49.0	1.5	8-10-14
44									
50	50.0	388.3							
51			WELL GRADED SAND LITTLE GRAVEL, SW, 10YR 4/3 (brown) to 10YR 2/1 (black), very fine to coarse, non-plastic, dense, moist to wet, poorly graded, with a little fine subangular gravel, [CCR]		SS20G	50.0 - 51.5	1.3	9-22-26	
52									
53	53.5	384.8	Geotextile fabric above gravel layer at 53.5'		SS21aG	52.5 - 53.5	1.5	6-8-8	
54			SANDY WELL GRADED GRAVEL, GW, 5YR 5/1 (gray), very fine to coarse, wet, well graded, [FILL]		SS21bG	53.5 - 54.0			
55	55.0	383.3							
56			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, very soft, moist to wet, [CCR]		SS22G	55.0 - 56.5	1.5	10-4-9	
57									
58						SS23G	57.5 - 59.0	1.1	WR-WH-1
59									
60									
61						SS24G	60.0 - 61.5	1.5	1-WR-3
62									

TVA EIP BORING LOG, 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 4/17/20

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
63			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), non-plastic, very soft, moist to wet, [CCR] <i>(Continued)</i> Large gravel particle interference with SS at 64'		SS25G	62.5 - 64.0	1.5	WH-WH-14	
64									
65									
66						SS26G	65.0 - 66.5	1.5	1-WH-WH
67									
68						SS27G	67.5 - 69.0	1.5	WR-WR-WH
69									
70						SS28G	70.0 - 71.5	1.5	WR-WR-1
71									
72						SS29G	72.5 - 74.0	1.5	WR-WH-1
73									
74					SS30G	75.0 - 76.5	1.5	1-WR-WR	
75									
76					ST02G	77.0 - 78.2	1.2	750	
77									
78									
79									
80	80.0	358.3	SILTY SAND, SM, 2.5Y 4/2 (dark grayish brown), very fine to fine, very loose, moist to wet, [CCR]		SS31G	80.0 - 81.5	1.5	1-WH-6	
81									
82									
83						SS32G	82.5 - 84.0	1.5	WH-1-4
84									
85									

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER/GPJ TDEC SUBSURF DT 20190630/GDT 4/17/20

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B15</b>
Client	Tennessee Valley Authority	Boring Location	730,949.04 N; 1,510,827.32 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	438.3 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
86			SILTY SAND, SM, 2.5Y 4/2 (dark grayish brown), very fine to fine, very loose, moist to wet, [CCR] <i>(Continued)</i>		SS33G	85.0 - 86.5	1.5	WR-WH-1		
87						SS34G	87.5 - 89.0	0.5	WR-WR-WR	
88							SS35G	90.0 - 91.5	0.5	WR-WR-WR
89										
90										
91										
92										
93							SS36G	92.5 - 94.0	0.2	WR-WR-1
94										
95							SS37G	95.0 - 96.5	1.5	WR-WR-WR
96										
97	97.5	340.8								
98			SANDY SILT, ML, 2.5Y 4/2 (dark grayish brown), very fine to fine, non-plastic, soft, wet, moderate organic odor		SS38G	97.5 - 99.0	1.5	WR-1-1		
99										
100										
101	101.1	337.2			SS39aG	100.0 - 101.1	1.5	2-4-2		
102			LEAN CLAY WITH SAND, CL, 2.5Y 4/3 (olive brown), medium plasticity, firm, moist to wet, slight organic odor		SS39bG	101.1 - 101.5				
103	103.4			334.9			SS40aG	102.5 - 103.4	0.9	7-8-9
104			WELL GRADED SAND LITTLE GRAVEL, SW, 2.5Y 4/4 (olive brown), very fine to coarse, medium dense, moist to wet, slight organic odor		SS40bG	103.4 - 104.0				
105	105.0			333.3						
106			SANDY SILT, ML, 5Y 4/2 (olive gray), medium plasticity, hard, moist, slight organic odor		SS41G	105.0 - 106.5	1.0	3-10-13		
107										
108	108.0	330.3								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 4/17/20

Client Borehole ID N/A      Stantec Boring No. **CUF-B15**  
 Client Tennessee Valley Authority      Boring Location 730,949.04 N; 1,510,827.32 E NAD27 Plant Local  
 Project Number 175568209      Surface Elevation 438.3 ft      Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
109			GRAVELLY SILTY SAND, SM, 5GY 4/1 (dark greenish gray) to 10YR 4/2 (dark grayish brown), medium to coarse, medium dense, wet, well graded <i>(Continued)</i>		ST03G	107.5 - 109.5	0.9	1000
110	110.6	327.7			SS42aG	110.0 - 110.5		
111	111.1	327.2	SANDY SILTY GRAVEL, GM, 10YR 4/2 (dark grayish brown), fine to medium, medium dense, wet		SS42bG	110.5 - 111.0	1.5	14-18-8
					SS42cG	111.0 - 111.5		
112	112.3	326.0	CLAYEY SAND WITH GRAVEL, SC, 5GY 4/1 (dark greenish gray) to 10YR 4/2 (dark grayish brown), fine to medium, medium dense, wet					
113			CLAYEY GRAVEL TRACE SAND, GC, 10YR 5/2 (grayish brown) to 10YR 5/6 (yellowish brown), fine to medium, medium dense to dense, wet		SS43G	112.5 - 114.0	1.2	19-18-26
114								
115								
116					SS44G	115.0 - 116.5	0.8	15-19-22
117								
118					SS45G	117.5 - 119.0	0.6	10-8-8
119	119.5	318.8						
120	120.7	317.6	CLAYEY SAND TRACE GRAVEL, SC, 10YR 4/2 (dark grayish brown), fine to medium, very loose, wet		SS46aG	120.0 - 120.5		
121			CLAYEY GRAVEL TRACE SAND, GC, 10YR 5/6 (yellowish brown) to 10YR 3/6 (dark yellowish brown), fine to medium, dense, wet		SS46bG	120.5 - 121.5	1.1	2-11-20
122								
123	123.5	314.8			SS47G	122.5 - 123.7	1.1	18-17-50/2"
124			Limestone, dark gray, moderately hard, highly weathered					
125	125.5	312.8						Began Core
126			Limestone, light gray to gray, microcrystalline, very soft, medium bedded, moderately weathered to slightly weathered, water staining, argillaceous, 45° to 60° bedding angle Fractures at 126.4', 126.6', 126.9', 127.5', 128.1', 128.4', and 128.8'		53	125.5 - 130.2 4.7	3.5	74
127								
128								
129	129.0	309.3	Clay-filled feature					
130								
131								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 4/17/20

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
132			Clay-filled feature (Continued)					
133								
134								
135								
136	136.3	302.0						
137	137.1	301.2	Weathered bedrock					
138			Limestone, pale gray brown to light gray, very fine grained, moderately hard to hard, thin bedded to medium bedded, highly weathered to slightly weathered, argillaceous, clay infill of fractures	100	137.1 - 137.9	0.8	0.8	100
139								
140								
141								
142								
143								
144								
145	144.7	293.6						
146			Clay-filled feature. Driller indicated that it felt like the core barrel was walking down a high angle fracture in bedrock.	36	142.9 - 147.9	5.0	1.8	36
147								
148								
149								
150								
151								
152								
153								

TVA EIP BORING LOG, 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF.DT, 20190630.GDT, 4/17/20

Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-B15</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>730,949.04 N; 1,510,827.32 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>438.3 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
154			Clay-filled feature. Driller indicated that it felt like the core barrel was walking down a high angle fracture in bedrock. <i>(Continued)</i>					
155					0	152.9 - 157.9	0.0	0
156					5.0			
157			Core barrel broke off of drill string and left in the boring.					
157.9	280.4							

Bottom of Hole at 157.9 Ft.

Top of Rock = 123.5 Ft.  
 Top of Rock Elevation = 314.8 Ft.  
 Begin Core = 125.5 Ft.

Vibrating wire piezometers installed. See installation log for backfill details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
 G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630.GDT 4/17/20

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-B16</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>730,628.44 N; 1,510,693.12 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>439.7 ft</u> Elevation Datum <u>NGVD29</u>	
Project Name <u>CUF TDEC Order</u>		Date Started <u>12/6/18</u> Completed <u>12/12/18</u>	
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>50.5 ft</u> Date/Time <u>12/11/18 13:30</u>	
Inspector <u>M. Aplin</u> Logger <u>M. Aplin</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 75#2, #712</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>NQ-3 Wireline, Split Barrel, Impregnated Bit</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u>		Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>B. Halada</u>		Approved By <u>A. Welshans</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	439.7	Top of Hole					
1			SILT, ML, 10YR 3/1 (very dark gray) to 7.5YR 3/2 (dark brown), non-plastic, hard, dry to moist, trace fine to medium sand, [CCR]		SS01G	0.0 - 1.5	1.5	5-15-25
2								
3					SS02G	2.5 - 3.8	1.3	7-11-50/4"
4								
5					SS03G	5.0 - 6.5	1.5	17-35-20
6								
7					SS04G	7.5 - 9.0	1.4	17-18-18
8								
9								
10				SS05G	10.0 - 11.5	1.5	17-15-26	
11								
12								
13				SS06G	12.5 - 14.0	1.5	13-15-18	
14								
15								
16				SS07G	15.0 - 16.5	1.5	5-10-41	
17								
18				SS08G	17.5 - 18.0	0.5	50/6"	

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 4/17/20

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-B16</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>730,628.44 N; 1,510,693.12 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>439.7 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
18			SILT, ML, 10YR 3/1 (very dark gray) to 7.5YR 3/2 (dark brown), non-plastic, hard, dry to moist, trace fine to medium sand, [CCR] <i>(Continued)</i>			17.5 - 18.0			
19							20.0 - 20.8	0.8	20-50/4"
20						SS09G	20.0 - 20.8		
21							22.5 - 23.4	0.9	21-50/5"
22						SS10G	22.5 - 23.4		
23							25.0 - 25.9	0.9	21-50/5"
24						SS11G	25.0 - 25.9		
25							27.5 - 28.2	0.7	26-50/2"
26						SS12G	27.5 - 28.2		
27							30.0 - 30.9	0.9	25-50/5"
28						SS13G	30.0 - 30.9		
29							32.5 - 33.3	0.8	25-50/4"
30						SS14G	32.5 - 33.3		
31							35.0 - 35.7	0.7	32-50/2"
32						SS15G	35.0 - 35.7		
33							37.5 - 38.3	0.8	41-50/4"
34						SS16G	37.5 - 38.3		
35						40.0 - 41.5	1.5	26-42-45	
36					SS17G	40.0 - 41.5			
37									
38									
39									
40	40.0	399.7							
41			SILTY SAND, SM, 10YR 3/1 (very dark gray) to 7.5YR 3/2 (dark brown), fine to medium, dense to very dense, dry to moist, poorly graded, [CCR]						
42									

TVA EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 4/17/20



Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B16</b>
Client	Tennessee Valley Authority	Boring Location	730,628.44 N; 1,510,693.12 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	439.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43			SILTY SAND, SM, 10YR 3/1 (very dark gray) to 7.5YR 3/2 (dark brown), fine to medium, dense to very dense, dry to moist, poorly graded, [CCR] <i>(Continued)</i>		SS18G	42.5 - 44.0	1.5	12-13-13
44					SS19G	47.5 - 48.2	0.7	26-50/2"
45					SS20G	50.0 - 50.9	0.9	34-50/5"
46					SS21aG	52.5 - 53.5	1.0	13-16-14
47					SS21bG	53.5 - 54.0		
48	53.5	386.2	WELL GRADED GRAVEL WITH SAND, GW, 5YR 4/1 (dark gray), coarse, loose, dry, [FILL]		SS22G	55.0 - 56.5	1.0	6-6-7
49	55.3	384.4				SS23G	57.5 - 59.0	1.5
50			SILT, ML, 10YR 4/2 (dark grayish brown), non-plastic to low plasticity, soft, moist to wet, [CCR]		ST01G	60.0 - 62.0	1.3	NA
51					SS24G	62.5 - 64.0	1.5	13-6-4
52					SS25G	65.0 - 66.5	1.5	10-6-5
53								
54								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630.GDT 4/17/20



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-B16</b>
Client	Tennessee Valley Authority	Boring Location	730,628.44 N; 1,510,693.12 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	439.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
67			SILT, ML, 10YR 4/2 (dark grayish brown), non-plastic to low plasticity, soft, moist to wet, [CCR] (Continued)					
68				SS26G	67.5 - 69.0	67.5 - 69.0	1.5	WR-WH-WH
69								
70								
71				SS27G	70.0 - 71.5	70.0 - 71.5	1.5	WH-WH-1
72								
73				SS28G	72.5 - 74.0	72.5 - 74.0	1.5	WR-WR-2
74								
75								
76				SS29G	75.0 - 76.5	75.0 - 76.5	1.5	2-1-4
77								
78			SS30G	77.5 - 79.0	77.5 - 79.0	1.3	5-3-3	
79								
80								
81			SS31G	80.0 - 81.5	80.0 - 81.5	1.5	5-14-4	
82								
83			SS32G	82.5 - 84.0	82.5 - 84.0	0.6	WH-WH-WH	
84								
85								
86			SS33G	85.0 - 86.5	85.0 - 86.5	1.5	WH-WH-WH	
87								
88			SS34G	87.5 - 89.0	87.5 - 89.0	1.5	WH-WH-1	
89								
90								

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 4/17/20

Client Borehole ID N/A      Stantec Boring No. **CUF-B16**  
 Client Tennessee Valley Authority      Boring Location 730,628.44 N; 1,510,693.12 E NAD27 Plant Local  
 Project Number 175568209      Surface Elevation 439.7 ft      Elevation Datum NGVD29






Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
91			SILT, ML, 10YR 4/2 (dark grayish brown), non-plastic to low plasticity, soft, moist to wet, [CCR] <i>(Continued)</i>		SS35G	90.0 - 91.5	1.5	1-WH-WH		
92										
93							SS36G	92.5 - 94.0	1.5	WH-WH-2
94										
95							SS37G	95.0 - 96.5	1.5	WH-WH-WH
96										
97										
98							SS38G	97.5 - 99.0	1.5	WH-1-1
98.8	340.9									
99					FAT CLAY, CH, 5YR 3/1 (very dark gray), medium plasticity, soft, wet, strong organic odor, homogeneous, moderate cementation		ST02G	99.0 - 101.0	1.7	NA
100										
101					WELL GRADED SAND WITH GRAVEL, SW, 5YR 4/1 (dark gray) with 7.5YR 6/3 (light brown), medium to coarse, medium dense		SS39aG	101.0 - 101.8	1.5	6-8-13
102										
102.5	337.2				FAT CLAY, CH, 5YR 3/1 (very dark gray), medium plasticity, soft, wet, strong organic odor, homogeneous, moderate cementation		SS39bG	101.8 - 102.5		
103							SS40aG	102.5 - 103.0	1.2	6-10-14
103.0	336.7		WELL GRADED SAND WITH GRAVEL, SW, 5YR 4/1 (dark gray) with 7.5YR 6/3 (light brown), medium to coarse, medium dense		SS40bG	103.0 - 104.0				
104										
105			WELL GRADED SAND WITH GRAVEL, SW, 7.5YR 6/3 (light brown), coarse, medium dense, moist, trace saturated light brown clay		SS41G	105.0 - 106.5	0.8	11-12-10		
106										
106.5	333.2		FAT CLAY, CH, 5YR 3/1 (very dark gray), medium plasticity, soft, wet, strong organic odor, homogeneous, moderate cementation		ST03G	107.5 - 109.5	1.3	NA		
107										
108			WELL GRADED SAND WITH GRAVEL, SW, 5YR 4/1 (dark gray) with 7.5YR 6/3 (light brown), medium to coarse, loose		SS42aG	110.0 - 110.8	1.3	2-4-9		
109										
110			CLAYEY SAND, SC, 7.5YR 5/1 (gray), fine to medium, medium dense, moist		SS42bG	110.8 - 111.5				
111										
111.5	328.2				SS43aG	112.5 - 113.1				
112										
113					SS43bG	113.1 - 114.0	1.1	10-12-13		
113.1	326.6									
114										

TVA EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 4/17/20

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
115	116.5	323.2			SS44G	115.0 - 116.5	0.9	10-14-18	
116									
117	119.0	320.7			SS45G	117.5 - 119.0	0.7	9-12-13	
118									
119	124.0	315.7			SS46G	120.0 - 121.5	0.9	10-13-12	
120									
121									
122									
123					SS47G	122.5 - 123.9	0.9	10-14-50/5"	
124									
125									
126									
127			Limestone (90%) With Shale (10%)  Limestone, light gray to pale gray, very fine grained to medium grained, moderately hard, laminated to thin bedded, freshly weathered, iron oxide staining, 0° bedding angle,  Shale, fine grained, highly weathered, dark gray, interbedded with limestone		10	124.5 - 129.6 5.1	2.9	57	
128									
129									
130									
131									
132					61	129.6 - 134.5 4.9	4.8	98	
133									
134									
135									
136									
137									
138									

TVA EIP BORING LOG - 175568209 CUF TDEC ORDER:GPJ TDEC SUBSURF DT: 20190630.GDT - 4/17/20

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B16</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,628.44 N; 1,510,693.12 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  439.7 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
139			Limestone (90%) With Shale (10%)  Limestone, light gray to pale gray, very fine grained to medium grained, moderately hard, laminated to thin bedded, freshly weathered, iron oxide staining, 0° bedding angle,  Shale, fine grained, highly weathered, dark gray, interbedded with limestone <i>(Continued)</i>		95	134.5 - 144.5 10.0	9.9	99
140								
141								
142								
143								
144	144.5	295.2						

Bottom of Hole at 144.5 Ft.

Top of Rock = 124.0 Ft.  
 Top of Rock Elevation = 315.7 Ft.  
 Begin Core = 124.5 Ft.

Vibrating wire piezometers installed. See installation log for backfill details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
    G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA EIP BORING LOG, 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 4/17/20

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-B17</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>730,040.74 N; 1,510,810.30 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>443.4 ft</u> Elevation Datum <u>NGVD29</u>	
Project Name <u>CUF TDEC Order</u>		Date Started <u>11/28/18</u> Completed <u>12/6/18</u>	
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>57.5 ft</u> Date/Time <u>11/29/18 18:36</u>	
Inspector <u>M. Aplin</u> Logger <u>M. Aplin</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 75#2, #712</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>NQ-3 Wireline, Split Barrel, Impregnated Bit</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u>		Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>B. Halada</u>		Approved By <u>A. Welshans</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
0	0.0	443.4	Top of Hole						
1			SILT WITH SAND, ML, 2.5Y 3/1 (very dark gray) to 2.5Y 5/1 (gray), very stiff to hard, dry to moist, [CCR]		SS01G	0.0 - 1.5	1.2	3-10-9	
2					SS02G	2.5 - 4.0	1.3	8-24-18	
3					SS03G	5.0 - 6.5	1.5	9-21-40	
4					SS04G	7.5 - 8.7	1.0	6-32-50/2"	
5					SS05G	10.0 - 11.5	1.3	6-11-18	
6					SS06G	12.5 - 14.0	1.3	9-16-17	
7					ST01G	15.0 - 17.0	0.7	N/A	
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 9/11/20



# SUBSURFACE LOG

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B17</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,040.74 N; 1,510,810.30 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  443.4 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
18			SILT WITH SAND, ML, 2.5Y 3/1 (very dark gray) to 2.5Y 5/1 (gray), very stiff to hard, dry to moist, [CCR] (Continued)		SS07G	17.5 - 19.0	1.3	2-7-18	
19									
20									
21						SS08G	20.0 - 21.5	1.2	5-20-44
22									
23						SS09G	22.5 - 24.0	1.3	5-12-19
24									
25									
26						SS10G	25.0 - 25.9	0.8	21-50/5"
27									
28						SS11G	27.5 - 28.4	0.7	9-50/5"
29									
30									
31						SS12G	30.0 - 30.9	0.8	21-50/5"
32									
33						SS13G	32.5 - 33.4	0.7	5-50/5"
34									
35									
36					SS14G	35.0 - 36.0	1.0	17-50	
37									
38					SS15G	37.5 - 39.0	1.3	26-34-49	
39									
40									
41					SS16G	40.0 - 41.3	1.3	7-21-50/4"	
42									

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 9/11/20

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B17</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,040.74 N; 1,510,810.30 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  443.4 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43			SILT WITH SAND, ML, 2.5Y 3/1 (very dark gray) to 2.5Y 5/1 (gray), very stiff to hard, dry to moist, [CCR] <i>(Continued)</i>		SS17G	42.5 - 43.9	1.4	12-24-50/5"
44					SS18G	45.0 - 46.2	0.9	6-26-50/2"
45					SS19G	47.5 - 48.4	1.0	5-50/5"
46					SS20G	50.0 - 50.9	1.0	10-50/5"
47					SS21G	52.5 - 53.9	1.4	4-36-50/5"
48								
49								
50								
51								
52								
53								
54								
55	55.0	388.4						
56	56.5	386.9	POORLY GRADED GRAVEL WITH SILT AND SAND, GP-GM, 2.5YR 5/1 (reddish gray), coarse, medium dense, moist, [FILL]		SS22G	55.0 - 56.5	0.7	5-9-11
57								
58			SILTY GRAVEL WITH SAND, GM, 7.5YR 3/2 (dark brown), medium, loose to medium dense, wet, [CCR]		SS23G	57.5 - 59.0	1.5	8-6-1
59								
60								
61					ST02G	60.0 - 62.0	0.5	N/A
62								
63					SS24G	62.5 - 64.0	1.5	1-1-12
64								
65					SS25G	65.0 - 66.5	1.5	WH-3-2
66								

TVA EIP BORING LOG, 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630.GDT, 9/11/20
















Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
66.5	376.9		SANDY SILT, ML, 10YR 3/1 (very dark gray), non-plastic to low plasticity, stiff, wet, [CCR]						
67									
68						SS26G	67.5 - 69.0	1.1	2-24-18
69									
70									
71					SS27G	70.0 - 71.5	1.5	5-11-8	
72									
73					SS28G	72.5 - 74.0	1.5	WH-WH-1	
74									
75									
76					SS29G	75.0 - 76.5	1.5	WH-WH-2	
77									
77.5	365.9		SILTY SAND, SM, 7.5YR 3/2 (dark brown), medium, loose to medium dense, wet, well graded, [CCR]						
78									
79					SS30G	77.5 - 79.0	1.1	11-8-6	
80			SILT, ML, 10YR 4/1 (dark gray), low plasticity, very soft, moist to wet, [CCR]						
81									
82						SS31G	80.0 - 81.5	1.5	2-1-1
83									
84						SS32G	82.5 - 84.0	1.5	WH-WH-1
85									
86					SS33G	85.0 - 86.5	1.5	WH-WH-WH	
87									
88					SS34G	87.5 - 89.0	1.5	WH-WH-WH	
89									
90									

TVA/EIP BORING LOG, 175568209 CUF TDEC ORDER/GPJ TDEC SUBSURF DT 20190630/GDT 9/11/20

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
91			SILT, ML, 10YR 4/1 (dark gray), low plasticity, very soft, moist to wet, [CCR] (Continued)		SS35G	90.0 - 91.5	1.5	WH-WH-WH	
92									
93						SS36G	92.5 - 94.0	1.5	WH-WH-WH
94									
95						SS37G	95.0 - 96.5	1.5	WH-WH-1
96									
97									
98					SS38G	97.5 - 99.0	1.5	WH-1-1	
99									
100									
101					SS39G	100.0 - 101.5	1.5	WH-WH-1	
102	102.5	340.9							
103			LEAN CLAY WITH SAND, CL, 10YR 2/1 (black), low to medium plasticity, stiff to very stiff, moist		SS40G	102.5 - 104.0	1.5	3-10-12	
104									
105					SS41aG	105.0 - 106.0	1.5	8-8-50	
106	106.0	337.4			SS41bG	106.0 - 106.5	1.5	8-8-50	
107	107.5	335.9			SS42G	107.5 - 107.7	0.2	50/2"	
108	108.0	335.4							
109			POORLY GRADED GRAVEL WITH SAND, GP, 2.5Y 6/1 (gray) to 5Y 4/1 (dark gray), coarse, medium dense, moist		0	108.5 - 109.5	0.9	Began Core 90	
110			Limestone (90%) With Shale (10%)			1.0			
111			Limestone, light gray to pale gray, very fine grained to medium grained, moderately hard, laminated to thin bedded, freshly weathered to slightly weathered, iron oxide staining, 0° bedding angle, trace iron oxide staining at fracture faces and calcite at bottom of layer						
112					17	109.5 - 114.1	3.3	72	
113						4.6			
114									

TVA EIP BORING LOG 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 9/11/20

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-B17</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,040.74 N; 1,510,810.30 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  443.4 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
115			Shale, fine grained, highly weathered, dark gray Limestone (90%) With Shale (10%)					
116			Limestone, light gray to pale gray, very fine grained to medium grained, moderately hard, laminated to thin bedded, freshly weathered to slightly weathered, iron oxide staining, 0° bedding angle, trace iron oxide staining at fracture faces and calcite at bottom of layer		0	114.1 - 118.5 4.4	3.4	77
117								
118								
119			Shale, fine grained, highly weathered, dark gray (Continued)					
120								
121					37	118.5 - 123.7 5.2	5.2	100
122								
123								
124								
125								
126					50	123.7 - 128.5 4.8	4.2	88
127								
128	128.5	314.9						

Bottom of Hole at 128.5 Ft.

Top of Rock = 108.0 Ft.

Top of Rock Elevation = 335.4 Ft.

Begin Core = 108.5 Ft.

Vibrating wire piezometers installed. See installation log for backfill details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA EIP BORING LOG - 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT 20190630.GDT 9/11/20



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Acton, MA  
TEL 9786350012

# TEST BORING REPORT

HOLE ID

## CUF-BASHP-4D

PAGE 1 OF 2

PROJECT NAME: **Cumberland Seismic Assessment - DFAS & GDC**  
CLIENT: **Tennessee Valley Authority**  
DRILLING CONTRACTOR: **Stantec**

PROJECT NUMBER: **220782**  
PROJECT LOCATION: **Cumberland City, TN**  
SURFACE EL.: **404.672 ft**  
BORING LOC.: **N1511841.808/E730855.205**

### DRILLING EQUIPMENT & PROCEDURES

CASING TYPE N/A	SAMPLER TYPE SPT	BARREL TYPE N/A	RIG MAKE & MODEL CME 1050 ATV	START DATE 12/14/17 03:30 PM
CASING ID (in) N/A	SAMPLER ID (in) 1.25	BARREL ID (in) N/A	BIT TYPE N/A	FINISH DATE 12/15/17 08:55 AM
CASING HAMMER WT. (lb) N/A	SAMPLER HAMMER WT. (lb) 140		DRILL MUD N/A	DRILLER Dan Jessie
CASING HAMMER FALL (in) N/A	SAMPLER HAMMER FALL (in) 30		DRILLING METHOD HSA	GEOCOMP REP Ryan Lavorati
			HOIST/HAMMER Auto	CHECKED BY

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 3/27/18 09:26 - \HAL1\GCCCONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0								
10.0						10.0		394.7
11.5	SPT 1	12-9-9	75		█	11.5	Top 10.5" - black/brown BOTTOM ASH, medium dense, dry Bottom 3" - black/brown BOTTOM ASH with clay, dry	393.2
15.0						15.0		389.7
16.5	SPT 2	3-3-3	83		█	16.5	black/brown BOTTOM ASH, loose, moist	388.2
25.0						25.0		379.7
26.5	SPT 3	7-9-10	83		█	26.5	black/brown BOTTOM ASH, medium dense, moist	378.2
30								

REMARKS  
1. Boring was performed using hollow stem augers  
2. Boring terminated at 50.1 feet  
3. Boring was grouted to ground surface upon completion

SUMMARY  
Overburden (ft): **50.1**  
Rock Cored (ft): **0.0**  
Samples: **SPT=7**

WATER LEVEL DATA			
Date/Time	Bot. of Casing	Bot. of Hole	Depth to Water

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID  
**CUF-BASHP-4D**



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# TEST BORING REPORT

HOLE ID

## CUF-BASHP-4D

PAGE 2 OF 2

PROJECT NAME: **Cumberland Seismic Assessment - DFAS & GDC**  
 CLIENT: **Tennessee Valley Authority**  
 DRILLING CONTRACTOR: **Stantec**

PROJECT NUMBER: **220782**  
 PROJECT LOCATION: **Cumberland City, TN**  
 SURFACE EL.: **404.672 ft**  
 BORING LOC.: **N1511841.808/E730855.205**

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 3/27/18 09:26 - \\\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30								
	SPT 4	5-6-6	83			32.0		372.7
						33.5	brown CLAY, stiff, moist	371.2
35								
40	SPT 5	3-6-5	83			40.0	brown CLAY, stiff, moist	364.7
						41.5		363.2
45	SPT 6	39-5-5	61			43.6		361.1
						45.1	Top 5" - brown GRAVEL, some clay, moist Bottom 6" - brown CLAY, stiff, moist	359.6
50	SPT 7	50/1"	0			50.1	No Recovery	354.6

Bottom of borehole at 50.1 feet.

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID

**CUF-BASHP-4D**



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# TEST BORING REPORT

HOLE ID  
**CUF-C-2D**  
PAGE 1 OF 4

PROJECT NAME  
**Cumberland Seismic Assessment - DFAS & GDC**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

PROJECT NUMBER  
**220782**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
**436.116 ft**

BORING LOC.  
**N1509679.831/E731451.188**

DRILLING EQUIPMENT & PROCEDURES				RIG MAKE & MODEL	START DATE
CASING TYPE N/A	SAMPLER TYPE SPT	BARREL TYPE N/A	BIT TYPE N/A	CME 1050 ATV	11/5/17 01:11 PM
CASING ID (in) N/A	SAMPLER ID (in) 1.25	BARREL ID (in) N/A	DRILL MUD Water		FINISH DATE 11/6/17 12:12 PM
CASING HAMMER WT. (lb) N/A	SAMPLER HAMMER WT. (lb) 140		DRILLING METHOD HSA		DRILLER Dan Jessie
CASING HAMMER FALL (in) N/A	SAMPLER HAMMER FALL (in) 30		HOIST/HAMMER Auto		GEOCOMP REP Ryan Lavorati
					CHECKED BY Nicolas Betancur

GEOCOMP BOREHOLE LOG - GCGGINTV1.GDT - 9/26/18 10:43 - \\\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\SUM WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0								
5								
10								
15								
20								
25								
30						30.0		406.1

REMARKS

- Boring was performed using hollow stem augers with water filling the augers.
- Boring terminated at 112.2 feet
- Boring was grouted to ground surface upon completion

SUMMARY			
Overburden (ft): <b>112.2</b>		Rock Cored (ft): <b>0.0</b>	
Samples: <b>SPT=7</b>			
WATER LEVEL DATA		Depth (ft) to:	
Date/Time	Bot. of Casing	Bot. of Hole	Depth to Water

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID  
**CUF-C-2D**

(Continued Next Page)



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# TEST BORING REPORT

HOLE ID		<b>CUF-C-2D</b>	
PAGE 2 OF 4			
PROJECT NAME	Cumberland Seismic Assessment - DFAS & GDC	PROJECT NUMBER	220782
CLIENT	Tennessee Valley Authority	PROJECT LOCATION	Cumberland City, TN
DRILLING CONTRACTOR	Stantec	SURFACE EL.	436.116 ft
		BORING LOC.	N1509679.831/E731451.188

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 9/26/18 10:43 - \\\HAL1\GCCCONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30	SPT 1	32-26-22	83			31.5	black FLY ASH, dense, dry [Stacked Ash]	404.6
35								
40								
45								
50								
55	SPT 2	27-15-12	94			55.0		381.1
56.5						black FLY ASH, some bottom ash, trace gypsum, medium dense, moist [Stacked Ash]	379.6	
60								
65								
70								

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID	<b>CUF-C-2D</b>
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(Continued Next Page)



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# TEST BORING REPORT

HOLE ID  
**CUF-C-2D**  
PAGE 3 OF 4

PROJECT NUMBER  
**220782**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
436.116 ft

BORING LOC.  
N1509679.831/E731451.188

PROJECT NAME  
**Cumberland Seismic Assessment - DFAS & GDC**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 9/26/18 10:43 - \\HAL1\GCCCONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
70								
						73.0		363.1
	SPT 3	6-2-2	17			74.5	black FLY ASH, loose, moist [Sluiced Ash]	361.6
75								
						85.0		351.1
	SPT 4	4-6-9	100			85.8	Top 9" - brown FLY ASH, moist [Sluiced Ash]	350.3
						86.5	Bottom 9" - brown/orange CLAY, very stiff, moist [Alluvial Clay]	349.6
80								
						97.5		338.6
	SPT 5	3-4-7	100			99.0	orange/red CLAY, stiff, moist [Alluvial Clay]	337.1
85								
						102.5		333.6
	SPT 6	5-7-11	100			103.3	Top 10" - brown CLAY, moist	332.8
						104.0	Bottom 8" - brown SAND, some silt, medium dense, moist [Alluvial Sandy Clay]	332.1
90								
95								
100								
105								
110								

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID  
**CUF-C-2D**

(Continued Next Page)





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# TEST BORING REPORT

HOLE ID	<b>CUF-C-2D</b>
PAGE 4 OF 4	
PROJECT NAME	Cumberland Seismic Assessment - DFAS & GDC
PROJECT NUMBER	220782
CLIENT	Tennessee Valley Authority
PROJECT LOCATION	Cumberland City, TN
DRILLING CONTRACTOR	Stantec
SURFACE EL.	436.116 ft
BORING LOC.	N1509679.831/E731451.188

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 9/26/18 10:43 - \\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
110	SPT 7	50/3"	67				gray/white ROCK FRAGMENTS, very dense [Alluvial Sandy Clay]	
						112.2		323.9

Bottom of borehole at 112.2 feet.  
 Auger refusal at 112.2 feet

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID	<b>CUF-C-2D</b>
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# TEST BORING REPORT

HOLE ID  
**CUF-C-2F-2**  
PAGE 1 OF 2

PROJECT NAME  
**Cumberland Seismic Assessment - DFAS & GDC**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

PROJECT NUMBER  
**220782**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
**393.821 ft**

BORING LOC.  
**N1509375.541/E731499.979**

DRILLING EQUIPMENT & PROCEDURES				RIG MAKE & MODEL	START DATE
CASING TYPE N/A	SAMPLER TYPE SPT	BARREL TYPE N/A	BIT TYPE CME 1050 ATV	FINISH DATE 9/21/17 03:00 PM	DRILLER Dan Jessie
CASING ID (in) 5"	SAMPLER ID (in) 1.25	BARREL ID (in) N/A	DRILL MUD Bentonite	DRILLING METHOD Mud Rotary	GEOCOMP REP Ryan Lavorati
CASING HAMMER WT. (lb) 140	SAMPLER HAMMER WT. (lb) 140		HOIST/HAMMER Auto	CHECKED BY Nicolas Betancur	
CASING HAMMER FALL (in) 30	SAMPLER HAMMER FALL (in) 30				

GEOCOMP BOREHOLE LOG - GCGGINTV1.GDT - 9/26/18 10:43 - \\\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0							No samples taken	
5								
10								
15								
20								
23.5								370.3
25	SPT 1	0-0-0	67			23.5	brown Sandy Fat CLAY (CH), about 8.1% gravel, 26.5% sand, and 65.4% fines, PI=39, very soft, moist [Dike]	
29.0						29.0		364.8
30	SPT	1-2-1	28				brown, Gravel, about 44.2% gravel, 25.4% sand, and 30.4% fines, soft, moist [Dike]	

REMARKS

- Drilling Mud Densities (lb/gal): 0'-9.1, 23.5'-9.1, 33.5'-9.3, 40'-9.0, 45.5'-9.3, 55'-9.3
- Boring terminated at 59.3 feet for piezometer install
- Piezometers installed at the following depths: PZ1 - 58', PZ2 - 47', PZ3 - 38', PZ4 - 29', PZ5 - 16'
- Boring was grouted to ground surface upon completion

SUMMARY			
Overburden (ft): <b>59.3</b>		Rock Cored (ft): <b>0.0</b>	
Samples: <b>SPT=6</b>			
WATER LEVEL DATA			
Depth (ft) to:			
Date/Time	Bot. of Casing	Bot. of Hole	Depth to Water

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID  
**CUF-C-2F-2**

(Continued Next Page)



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# TEST BORING REPORT

HOLE ID

## CUF-C-2F-2

PAGE 2 OF 2

PROJECT NAME: **Cumberland Seismic Assessment - DFAS & GDC**  
CLIENT: **Tennessee Valley Authority**  
DRILLING CONTRACTOR: **Stantec**

PROJECT NUMBER: **220782**  
PROJECT LOCATION: **Cumberland City, TN**  
SURFACE EL.: **393.821 ft**  
BORING LOC.: **N1509375.541/E731499.979**

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 9/26/18 10:43 - \\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30	2					31.0		362.8
35	SPT 3	0-1-1	72				brown Lean CLAY (CL), about 0.3% gravel, 5.2% sand, and 94.5% fines, PI=25, soft, moist [Alluvial Clay]	
	ST 1		98				red/brown CLAY, moist [Alluvial Clay]	
40								
	SPT 4	0-0-0	28				brown Lean CLAY (CL), about 2.9% gravel, 4.5% sand, and 92.6% fines, PI=15, very soft, moist [Alluvial Clay]	
	ST 2		72				brown and gray CLAY, moist [Alluvial Clay]	
45								
	ST 3		28				brown CLAY, moist [Alluvial Clay]	
50						50.0		343.8
	ST 4		38				brown CLAY, moist [Alluvial Sandy Clay]	
						53.5		340.3
	SPT 5	0-1-1	100				brown Fat CLAY (CH), about 1.8% sand, 98.2% fines, PI=42, soft, moist [Alluvial Sandy Clay]	
55						56.0		337.8
	ST 5		65				reddish brown CLAY, moist [Alluvial Sandy Clay]	
						59.3		334.5

SPT 6 50/0" Spoon Tip - red ROCK FRAGMENT, very dense, moist [Alluvial Sandy Clay]  
Bottom of borehole at 59.3 feet.  
Casing refusal at 59.3 feet

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID: **CUF-C-2F-2**



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# BORING NUMBER CUF-F-2A

**CLIENT** Tennessee Valley Authority (TVA) **PROJECT NAME** 2012 Supplemental Site Exploration Program  
**PROJECT NUMBER** 20329 **PROJECT LOCATION** Cumberland City, Tennessee (CUF)  
**DATE STARTED** 4/23/12 **COMPLETED** 4/26/12 **GROUND ELEVATION** 433.56 ft **HOLE SIZE** 4 inches  
**DRILLING CONTRACTOR** Stantec **BORING LOCATION:**  
**DRILLING METHOD** Mud Rotary **NORTHING** 729871.03 ft  
**LOGGED BY** Mir Karim **CHECKED BY** Vanita Patel **EASTING** 1510539.05 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)
								20	40	60	
0								PL 20	MC 40	LL 80	
12	SS 1	12	2-4-12-12 (16)				silty clay, hard, dry, reddish brown (DIKE 2 - CLAY)				
8	SS 2	8	4-6-7-7 (13)				silty lean clay, firm, moist, dark olive brown (FLY ASH - STACKED)				430
5	SS 3	21	6-8-10-14 (18)				4' : grades to hard in consistency				
	SS 4	9	18-28-50/2"				6' : grades to very hard in consistency				>>
	SS 5	12	13-50-0/4"								>>
10	SS 6	19	34-35-38-50 (73)								>>
	SS 7	23	23-33-48-50/1"								>>
15	SS 8	7	20-50-0/2"								>>
	ST 9	0									>>
	SS 10	3	23-38-40-50/4"								>>
	SS 11	20	48-50-0/3"				silt, very hard, very moist, dark grayish brown (FLY ASH - STACKED)				>>
20	SS 12	10	8-14-50/4"		PZ-4						>>
	SS 13	13	12-24-28-30 (52)								>>
25	ST	0									>>
	SS 14	12	16-18-12-9 (30)				26' : grades to hard in consistency				>>
	SS 15	17	14-15-15-16 (30)								405

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# BORING NUMBER CUF-F-2A

PAGE 2 OF 4

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)
								20	40	60	
30								PL 20	MC 40	LL 80	
	SS 16	14	8-9-8-8 (17)				silt, very hard, very moist, dark grayish brown (FLY ASH - STACKED) (continued)				
	ST 17	11									400
35	SS 18	14	22-38-50/4"				34' - 35.3' : very hard in consistency				
	SS 19	13	13-9-8-7 (17)								
	SS 20	11	4-5-6-4 (11)				38' : grades to firm in consistency				395
40	SS 21	7	4-5-6-6 (11)		PZ-3						
	SS 22	16	6-16-50/4"				42' - 43.3' : very hard in consistency				390
	SS 23	14	4-6-6-6 (12)				silty lean clay, firm, wet, dark olive brown (FLY ASH - SLUICED)				
45	ST 24	24		FVST @ 47.5' : Exceeded Torque Wrench Capacity							
	SS 25	24	2-1-1-2 (2)				48' : grades to soft in consistency				385
50	SS 26	19	2-1-2-2 (3)								
	SS 27	6	1-1-1-1 (2)								380
55	SS 28	24	1-1-2-2 (3)	FVST @ 54.0' : Exceeded Torque Wrench Capacity							
				FVST @ 56.0' : Exceeded Torque Wrench Capacity Casing sank 56' to 59.5'							
				FVST @ 58.0' : Exceeded Torque Wrench Capacity							375
60	SS 29	18	4-5-5 (10)	FVST @ 60.0' : Su = 2315 psf (Sensitivity = 3.0)			59.5' - 61' : firm in consistency				
				Casing sank 61' to 66' FVST @ 62.0' : Su = 2058 psf (Sensitivity = 1.8) FVST @ 64.0' : Exceeded Torque Wrench Capacity			silt with m-f sand, very soft, wet, dark grayish brown, medium dry strength, rapid dilatancy (FLY ASH - SLUICED)				370

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# BORING NUMBER CUF-F-2A

PAGE 3 OF 4

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)
								20	40	60	
65	ST 30	24					silt with m-f sand, very soft, wet, dark grayish brown, medium dry strength, rapid dilatancy (FLY ASH - SLUICED) (continued)				
68' - 70'	SS 31	24	2-3-4-4 (7)				soft in consistency				365
70'	SS 32	24	0-0-0-2 (0)	FVST @ 71.0' : Exceeded Torque Wrench Capacity							
	SS 33	24	0-0-0-2 (0)								360
75'	SS 34	24	1-0-0-1 (0)	FVST @ 75.3' : Su = 1543 psf (Sensitivity = 1.2)							
	ST 35	24		FVST @ 77.3' : Exceeded Torque Wrench Capacity							
	SS 36	24	1-2-2-2 (4)	FVST @ 79.3' : Exceeded Torque Wrench Capacity							355
80'	SS 37	24	2-2-2-2 (4)	FVST @ 81.3' : Exceeded Torque Wrench Capacity Casing sank 82' to 84' FVST @ 82.8' : Exceeded Torque Wrench Capacity	PZ-2						350
	SS 38	24	0-0-1-2 (1)	FVST @ 84.8' : Exceeded Torque Wrench Capacity							
	SS 39	24	7-7-5-5 (12)	Casing sank 88' to 90'							345
90'	ST 40	22		FVST @ 91.0' : Exceeded Torque Wrench Capacity							
	SS 41	14	16-16-13-11 (29)								340
	SS 42	15	11-14-18-18 (32)								
95'	SS 43	12	6-21-18-10 (39)				silty sand with c-f gravel, med dense to dense, moist, yellowish brown, rounded angularity (ALLUVIAL GRANULAR)				335

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# BORING NUMBER CUF-F-2A

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

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DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲		ELEV. (ft)	
								20	40 60 80		
100	SS 44	14	10-15-13-9 (28)				silty sand with c-f gravel, med dense to dense, moist, yellowish brown, rounded angularity (ALLUVIAL GRANULAR) (continued)  104' : reddish brown in color	20	40 60 80		
	SS 45	11	8-12-12-10 (24)								
	SS 46	7	10-10-10-9 (20)								
105	SS 47	6	6-5-20-18 (25)								330
	SS 48	14	33-24-28-16 (52)								
	SS 49	6	12-11-10-10 (21)								325
110	SS 50	12	15-18-12-50 (30)		PZ-1						
	SS 51	6	12-24-28-26 (52)							320	

Refusal at 114.0 feet.  
 Bottom of borehole at 114.0 feet.



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# BORING NUMBER CUF-F-2B

**CLIENT** Tennessee Valley Authority (TVA) **PROJECT NAME** 2012 Supplemental Site Exploration Program  
**PROJECT NUMBER** 20329 **PROJECT LOCATION** Cumberland City, Tennessee (CUF)  
**DATE STARTED** 4/27/12 **COMPLETED** 5/2/12 **GROUND ELEVATION** 412.09 ft **HOLE SIZE** 4 inches  
**DRILLING CONTRACTOR** Stantec **BORING LOCATION:**  
**DRILLING METHOD** Mud Rotary **NORTHING** 729814.4 ft  
**LOGGED BY** Mir Karim **CHECKED BY** Vanita Patel **EASTING** 1510479.34 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)
								20	40	60	
0								PL 20	MC 40	LL 80	
0	SS 1	8	2-4-6-8 (10)				silty clay, firm, dry, reddish brown (DIKE 2 CLAY)				410
1	SS 2	14	20-44-50/2"				silt, very hard, moist, dark gray (FLY ASH - STACKED)				>>
2											>>
3	SS 3	20	27-50/4"								>>
4											>>
5	SS 4	17	11-9-9-8/0"								>>
6											>>
7	SS 5	12	24-30-28-24/0"								>>
8											>>
9	SS 6	16	31-45-30-50/4"								>>
10											>>
11	SS 7	12	36-34-24-20 (58)								>>
12											>>
13	SS 8	14	6-7-7-9 (14)				silt, firm, wet, brownish gray, medium dry strength, rapid dilatancy (FLY ASH - SLUICED)				>>
14											>>
15	ST 9	10									395
16											>>
17	SS 10	20	2-2-2-2 (4)	FVST @ 19.0' : Su = 238 psf			18' : grades to soft in consistency				>>
18											>>
19	SS 11	10	3-2-1-1 (3)		PZ-5						>>
20											>>
21	SS 12	24	27-50/1"	FVST @ 22.8' : Su = 1824 psf (Sensitivity = 2.4)							>>
22											>>
23	SS 13	23	4-3-4-3 (7)								>>
24											>>
25	ST 14	24		FVST @ 27.3' : Exceeded Torque Wrench Capacity							385
26											>>
27	SS 15	24	1-1-2-9 (3)								>>
28											>>
29											>>
30											>>

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# BORING NUMBER CUF-F-2B

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)		
								20	40	60		80	
30								PL 20	MC 40	LL 80			
30-31	SS 16	12	16-21-24-30 (45)		PZ-4	[Cross-hatched pattern]	silt, firm, wet, brownish gray, medium dry strength, rapid dilatancy (FLY ASH - SLUICED) (continued)				380		
31-32	SS 17	14	20-18-10-22 (28)				30' : grades to very hard in consistency						
32-33	SS 18	14	15-20-15-13 (35)										
33-34	SS 19	15	18-20-50/3"									>>	375
34-35	SS 20	7	50/5"									>>	
35-36	ST 21	17							40' : grades to soft in consistency				370
36-37	SS 22	24	3-3-3-4 (6)	FVST @ 43.7' : Su = refusal									
37-38	SS 23	24	3-4-8-9 (12)										
38-39	SS 24	6	1-1-1-2 (2)										365
39-40	SS 25	24	24-28-24-20 (52)						48' - 50.6' : very hard in consistency				
40-41	SS 26	24	35-50/1"	Sample slipped							>>	360	
41-42	SS 27	24	1-2-2-3 (4)		PZ-3	[Cross-hatched pattern]							
42-43	ST 28	24											
43-44	SS 29	24	1-1-2-4 (3)										355
44-45	SS 30	24	5-8-4-3 (12)	FVST @ 59.7' : Su = 122 psf (Sensitivity = 4.0)									
45-46	SS 31	24	1-1-1-2 (2)	FVST @ 61.7' : Su = 183 psf (Sensitivity = 6.0)									350
46-47	SS 32	24	1-2-2-4 (4)	FVST @ 63.7' : Su = 670 psf (Sensitivity = 11.0)			58' - 60' : firm in consistency						

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# BORING NUMBER CUF-F-2B

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)		
								20	40	60		80	
65				Casing sank 64' to 69.2'			64' : Grades to very soft in consistency silt, firm, wet, brownish gray, medium dry strength, rapid dilatancy (FLY ASH - SLUICED) (continued)				345		
70	ST 32	22		FVST @ 70.9' : Exceeded Torque Wrench Capacity	PZ-2						340		
	SS 33	24	2-2-3-4 (5)										
	SS 34	12	10-9-10-11 (19)				silty sand, med dense, moist, dark yellowish brown, rounded angularity, hard (ALLUVIAL GRANULAR)						
75	SS 35	14	15-14-12-10 (26)								335		
	SS 36	14	10-8-2-12 (10)										
80	SS 37	12	10-14-14-8 (28)										
	SS 38	12	7-6-5-5 (11)				sandy lean clay, firm, moist, gray, very high dry strength, slow dilatancy, low toughness (ALLUVIAL GRANULAR)				330		
	SS	0	17-8-7-7 (15)										
85	SS 39	16	6-10-12-11 (22)										
	SS 40	10	16-28-30-28 (58)				clayey gravel with c-f sand, med dense, dry, yellowish brown, angular (ALLUVIAL CLAY)				325		
90	SS 41	10	11-11-12-13 (23)		PZ-1								
	SS 42	10	7-14-12-11 (26)										320
	SS 43	10	7-6-18-16 (24)										
95	SS 44	11	9-8-8-12 (16)										
	SS 45	12	12-11-8-6 (19)										315

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# BORING NUMBER CUF-F-2B

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲		ELEV. (ft)
								20	40 60 80	
								PL	MC	LL
								20	40 60 80	80

Refusal at 99.0 feet.  
 Bottom of borehole at 99.0 feet.



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# BORING NUMBER CUF-F-2C

**CLIENT** Tennessee Valley Authority (TVA) **PROJECT NAME** 2012 Supplemental Site Exploration Program  
**PROJECT NUMBER** 20329 **PROJECT LOCATION** Cumberland City, Tennessee (CUF)  
**DATE STARTED** 4/17/12 **COMPLETED** 4/18/12 **GROUND ELEVATION** 379.39 ft **HOLE SIZE** 4 inches  
**DRILLING CONTRACTOR** Stantec **BORING LOCATION:**  
**DRILLING METHOD** Mud Rotary **NORTHING** 729659.11 ft  
**LOGGED BY** Michael Dagher **CHECKED BY** Vanita Patel **EASTING** 1510319.32 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)	
								PL	MC	LL		
0								20	40	60	80	
	SS 1	13	3-5-7 (12)				clay with f gravel, firm to hard, moist, reddish brown (DIKE 1 CLAY)					
	SS 2A & 2B	14	8-9-9 (18)									
5	ST 3	18		FVST @ 4.6' : Exceeded Torque Wrench Capacity								375
	SS 4	12	7-6-7 (13)									
	SS 5	12	6-9-10 (19)									
10	ST 6	13		FVST @ 10.0' : Exceeded Torque Wrench Capacity								370
	SS 7	17	4-7-8 (15)									
	SS 8	13	5-9-10 (19)									
15	SS 9	18	3-4-4 (8)				13.5' to 15.5' : gray in color					365
	SS 10A & 10B	18	5-5-7 (12)	FVST @ 14.5' : Exceeded Torque Wrench Capacity								
	SS 11	18	3-5-7 (12)		PZ-3		15.5' : grades to yellowish brown in color					
	SS 12	13	4-8-9 (17)									360
20	ST 13	19		FVST @ 21.0' : Exceeded Torque Wrench Capacity								
	SS 14	12	4-5-6 (11)									
	SS 15	12	5-5-6 (11)				clayey gravel with c-f sand, med dense to dense, moist, olive brown, rounded angularity (DIKE 1 CLAY)					355
25	SS 16	12	11-9-15 (24)									
	SS 17	10	12-20-19 (39)									
	SS 18A & 18B	16	35-7-4 (11)									
30	SS 19	18	4-2-3 (5)				lean clay, soft, moist, yellowish brown, very high dry strength, slow dilatancy, low toughness (ALLUVIAL CLAY)					350

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# BORING NUMBER CUF-F-2C

PAGE 2 OF 3

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)		
								20	40	60		80	
30	ST 20	0		FVST @ 30.0' : Su = 1622 psf (Sensitivity = 1.9)	PZ-2		silt, soft, moist, grayish olive brown (ALLUVIAL SILT)						
	SS 21	18	2-2-3 (5)										
35	ST 22	4		FVST @ 33.5' : Su = 2495 psf (Sensitivity = 2.9)	PZ-1		silty sand with f gravel, med dense, moist, yellowish brown (ALLUVIAL GRANULAR)				345		
	ST 23	24		FVST @ 35.5' : Su = 1198 psf (Sensitivity = 2.8)									
	SS 24A & 24B	18	2-15-13 (28)	FVST @ 37.5' : Su = 998 psf (Sensitivity = 2.4)									
	SS 25	10	7-8-9 (17)										
	SS 26	11	10-6-6 (12)										
	SS 27	6	5-3-5 (8)										
	SS 28	7	10-12-8 (20)	FVST @ 43.5' : Exceeded Torque Wrench Capacity									
	SS 29	7	3-4-7 (11)										
	SS 30	16	15-12-11 (23)										
	SS 31	6	9-8-10 (18)										
50	SS 32	13	11-14-13 (27)										
	SS 33	8	8-15-16 (31)										
	SS 34	0	12-13-11 (24)										
55	SS 35	12	12-12-7 (19)										
	SS 36	0	9-10-9 (19)										
	SS 37	8	7-9-9 (18)										
	SS 38	10	9-6-14 (20)										
60	SS 39	8	5-13-16 (29)										
	SS 40	11	8-12-9 (21)										
	SS 41	10	3-7-8 (15)										

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# BORING NUMBER CUF-F-2C

PAGE 3 OF 3

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲		ELEV. (ft)
								20	40 60 80	
65	SS 42	8	8-9-12 (21)				silty sand with f gravel, med dense, moist, yellowish brown (ALLUVIAL GRANULAR) (continued)	20	40 60 80	315
	SS 43	1	50				shale and limestone, highly weathered, gray (BEDROCK)			

Refusal at 66.6 feet.  
 Bottom of borehole at 66.6 feet.



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# TEST BORING REPORT

HOLE ID  
**CUF-F-4E**  
PAGE 1 OF 3

PROJECT NAME  
**Cumberland Seismic Assessment - DFAS & GDC**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

PROJECT NUMBER  
**220782**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
**389.344 ft**

BORING LOC.  
**N1510381.89/E729759.033**

DRILLING EQUIPMENT & PROCEDURES				RIG MAKE & MODEL	START DATE
CASING TYPE N/A	SAMPLER TYPE SPT	BARREL TYPE N/A	BIT TYPE CME 1050 ATV	FINISH DATE 9/26/17 02:30 PM	9/24/17 07:00 AM
CASING ID (in) 5"-56', 4"-79.5'	SAMPLER ID (in) 1.25	BARREL ID (in) N/A	DRILL MUD Up Draft Toothbit; Rollerbit Bentonite	DRILLER Dan Jessie	
CASING HAMMER WT. (lb) 140	SAMPLER HAMMER WT. (lb) 140		DRILLING METHOD Mud Rotary	GEOCOMP REP Ryan Lavorati	
CASING HAMMER FALL (in) 30	SAMPLER HAMMER FALL (in) 30		HOIST/HAMMER Auto	CHECKED BY Nicolas Betancur	

GEOCOMP BOREHOLE LOG - GCGGINTV1.GDT - 9/26/18 10:43 - \\\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\SUM WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0								
1.2	SPT 1	1-2-2	83			1.2	Top 2" - brown/red, CLAY, moist Bottom 13" - black, FLY ASH, loose, moist [Drainage Layer]	388.1
5	ST 1		75				dark gray FLY ASH, moist [Sluiced Ash]	
10	ST 2		99				black FLY ASH, moist [Sluiced Ash]	
15	ST 3		28				black FLY ASH, moist [Sluiced Ash]	
15.5						15.5		373.8
20	ST 4		97				Top - black FLY ASH, moist Bottom - brown, CLAY, moist [Dike 2]	
23.0	ST 5		37				brown CLAY, moist [Dike 2]	
23.0						23.0		366.3
25	SPT 2	1-1-3	100				black/brown FLY ASH, some bottom ash, loose, moist [Sluiced Ash]	
25.5	ST 6		0				No Recovery	363.8
29.5						29.5		359.8

REMARKS

- Drilling Mud Densities (lb/gal): 0'-9.0, 19.5'-9.1, 36'-9.3, 53.5'-9.3, 60'-9.0, 66.5'-9.3, 75.5'-9.1, 79'-9.2
- At 56-feet, hole was cased with 4-inch casing inside 5-inch casing to help prevent gravel from getting into casing
- Boring terminated at 81.5 feet for piezometer and slope inclinometer install
- Piezometers installed at the following depths: PZ1 - 61', PZ2 - 44', PZ3 - 32', PZ4 - 26', PZ5 - 9'
- Boring was grouted to ground surface upon completion

SUMMARY			
Overburden (ft): <b>79.5</b>			
Rock Cored (ft): <b>2</b>			
Samples: <b>SPT=12 RC=1</b>			
WATER LEVEL DATA		Depth (ft) to:	
Date/Time	Bot. of Casing	Bot. of Hole	Depth to Water
	79.5	81.5	

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID  
**CUF-F-4E**

(Continued Next Page)



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# TEST BORING REPORT

HOLE ID

## CUF-F-4E

PAGE 2 OF 3

PROJECT NAME **Cumberland Seismic Assessment - DFAS & GDC**

PROJECT NUMBER **220782**

CLIENT **Tennessee Valley Authority**

PROJECT LOCATION **Cumberland City, TN**

DRILLING CONTRACTOR **Stantec**

SURFACE EL. **389.344 ft**

BORING LOC. **N1510381.89/E729759.033**

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 9/26/18 10:43 - \\\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\SUM WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30	ST 7		100				black/gray FLY ASH, moist [Sluiced Ash]	
35	ST 8		100				black/gray FLY ASH, moist [Sluiced Ash]	
40	ST 9		103				black/gray FLY ASH, moist [Sluiced Ash]	
						41.0		348.3
	ST 10		103				Top - black/gray FLY ASH, moist Bottom - brown CLAY, moist [Alluvial Clay]	
45	ST 11		73				brown CLAY, moist [Alluvial Clay]	
						48.5		340.8
50	SPT 3	3-2-2	50				brown SAND, some gravel, some silt, loose, moist [Alluvial Silty Gravel]	
	SPT 4	3-2-2	61				brown SILTY GRAVEL, some sand, loose, moist [Alluvial Silty Gravel]	
55	SPT 5	2-2-2	39				brown SILTY GRAVEL, loose, moist [Alluvial Silty Gravel]	
						57.5		331.8
	ST 12		0				No Recovery	
	ST 12A		0				No Recovery	
60	SPT 6	7-5-4	0				No Recovery	
						65.5		323.8
65	SPT 7	2-3-6	33				brown SILTY GRAVEL, loose, moist [Alluvial Silty Gravel]	
						69.0		320.3
70	ST		0				No Recovery	

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID

**CUF-F-4E**

(Continued Next Page)





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# TEST BORING REPORT

HOLE ID

## CUF-F-4E

PAGE 3 OF 3

PROJECT NAME **Cumberland Seismic Assessment - DFAS & GDC**

PROJECT NUMBER **220782**

CLIENT **Tennessee Valley Authority**

PROJECT LOCATION **Cumberland City, TN**

DRILLING CONTRACTOR **Stantec**

SURFACE EL. **389.344 ft**

BORING LOC. **N1510381.89/E729759.033**

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Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
70						70.5		318.8
	SPT 8	2-4-4	11				brown SILTY GRAVEL, trace sand, loose, moist [Alluvial Silty Gravel]	
	SPT 9	2-2-2	22				brown SILTY GRAVEL, loose, moist [Alluvial Silty Gravel]	
75	SPT 10	1-1-1	14				brown SILTY GRAVEL, loose, moist [Alluvial Silty Gravel]	
	SPT 11	10-7-3	42				brown SILTY GRAVEL, medium dense, moist [Alluvial Silty Gravel]	
	SPT 12 RC	50/0"	0			79.5	No Recovery; Spoon tip brown ROCK FRAGMENT, very dense [Alluvial Silty Gravel] No samples taken	309.8
80					81.5			307.8

Bottom of borehole at 81.5 feet.  
Casing refusal at 81.5 feet

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID

**CUF-F-4E**



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# BORING NUMBER CUF-H-2A

**CLIENT** Tennessee Valley Authority (TVA)      **PROJECT NAME** 2012 Supplemental Site Exploration Program  
**PROJECT NUMBER** 20329      **PROJECT LOCATION** Cumberland City, Tennessee (CUF)  
**DATE STARTED** 4/23/12      **COMPLETED** 4/26/12      **GROUND ELEVATION** 423.97 ft      **HOLE SIZE** 4 inches  
**DRILLING CONTRACTOR** Stantec      **BORING LOCATION:**  
**DRILLING METHOD** Mud Rotary      **NORTHING** 728851.75 ft  
**LOGGED BY** Michael Dagher      **CHECKED BY** Vanita Patel      **EASTING** 1511082.52 ft

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DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)	
								PL	MC	LL		
0								20	40	60	80	
17	SS 1	17	0-12-14-13 (26)			[Cross-hatched pattern]	clayey silt with f gravel, hard, moist, light brownish white, medium dry strength, rapid dilatancy (GYPSUM)					
19	SS 2	19	8-7-6-6 (13)			[Cross-hatched pattern]	2' - 4' : firm in consistency					
24	SS 3	24	17-35-49-70 (84)			[Cross-hatched pattern]	4' : grades to very hard in consistency					
18	SS 4	18	31-69-95 (164)			[Cross-hatched pattern]	5.2' : geotextile observed					
11	SS 5	11	29-50/5"			[Cross-hatched pattern]						
8	ST 6	8				[Cross-hatched pattern]						
6	ST 7	6				[Cross-hatched pattern]						
17	SS 8	17	39-50-50/5"			[Cross-hatched pattern]	16' : grades to very dark brown with mottles in color					
17	SS 9	17	20-35-50/5"			[Cross-hatched pattern]	18' to 20' : trace of organics					
20	SS 10	20	25-25-31-41 (56)			[Cross-hatched pattern]						
5	SS 11	5	50/5"			[Cross-hatched pattern]						
0	ST 12	0				[Cross-hatched pattern]	24.4' : geotextile observed					
14	SS 13A & 13B	14	7-7-8-10 (15)			[Bubbles pattern]	m-f gravel, med dense, wet, grey (DRAINAGE LAYER)					
12	SS 14A & 14B	12	5-8-14-11 (22)			[Cross-hatched pattern]						
24	SS 15	24	7-15-17-19 (32)	Extra sample taken		[Cross-hatched pattern]	silt, very hard, moist, grayish brown, low dry strength, rapid dilatancy (FLY ASH - SLUICED)					

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# BORING NUMBER CUF-H-2A

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲		ELEV. (ft)		
								PL	MC		LL	
30								20	40	60	80	
	ST 16	24					silt, very hard, moist, grayish brown, low dry strength, rapid dilatancy (FLY ASH - SLUICED) (continued)					
				Extra sample taken								
	SS 17	24	2-2-4-11 (6)				32' : grades to very soft to soft in consistency					390
35	SS 18A & 18B	24	1-0-2-0 (2)	FVST @ 34.0' : Exceeded Torque Wrench Capacity	PZ-4							
	ST 19	24		FVST @ 36.0' : Su = 2065 psf (Sensitivity = 1.9)								
	SS 20A & 20B	24	1-0-1-1 (1)	FVST @ 38.0' : Su = 1960 psf (Sensitivity = 2.1)								385
40	ST 21	24		FVST @ 40.0' : Su = 2744 psf (Sensitivity = 3.4)								
	SS 22	24	1-1-1-0 (2)	FVST @ 42.0' : Exceeded Torque Wrench Capacity								380
45	SS 23	16	0-0-0-0 (0)	FVST @ 44.0' : Exceeded Torque Wrench Capacity								
	SS 24	24	1-0-2-8 (2)	FVST @ 46.0' : Exceeded Torque Wrench Capacity								
	SS 25	24	5-1-6-1 (7)									375
50	ST 26	24					50' : ash exhibits medium dry strength					
	SS 27	24	2-3-3-4 (6)									
	SS 28	24	1-0-0-2 (0)	FVST @ 54.0' : Exceeded Torque Wrench Capacity								370
55	SS 29	24	0-7-1-1 (8)	FVST @ 56.0' : Su = 2744 psf (Sensitivity = 2.1)								
	SS 30	24	0-0-0-0 (0)	FVST @ 58.0' : Exceeded Torque Wrench Capacity								365
60	ST 31	18										
	SS 32	24	1-3-5-5 (8)	FVST @ 62.0' : Exceeded Torque Wrench Capacity FVST @ 64.0' : Exceeded Torque Wrench Capacity								360

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# BORING NUMBER CUF-H-2A

PAGE 3 OF 4

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

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DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)
								20	40	60	
65	SS 33	24	0-0-5-6 (5)	FVST @ 66.0' : Exceeded Torque Wrench Capacity	PZ-3		silt, very hard, moist, grayish brown, low dry strength, rapid dilatancy (FLY ASH - SLUICED) (continued)				355
	SS 34	24	0-1-1-2 (2)								
	SS 35	7	0-0-0-0 (0)	FVST @ 68.0' : Exceeded Torque Wrench Capacity	PZ-2		clay, very soft, moist, dark gray (ALLUVIAL CLAY)				350
70	ST 36	24		FVST @ 70.0' : Exceeded Torque Wrench Capacity							
	SS 37	18	3-5-8-9 (13)	FVST @ 72.0' : Exceeded Torque Wrench Capacity							
	SS 38	19	8-11-12-14 (23)	FVST @ 74.0' : Exceeded Torque Wrench Capacity							
	SS 39	16	6-8-9-9 (17)	FVST @ 80.0' : Exceeded Torque Wrench Capacity	PZ-2		74' : grades to hard in consistency				345
80	ST 40	24									
	ST 41	24		FVST @ 82.0' : Exceeded Torque Wrench Capacity	PZ-1		silty c-f gravel with sand, med dense, moist, yellowish brown, rounded angularity (ALLUVIAL GRANULAR)				340
	SS 42	18	9-13-16-18 (29)	84' - 86' : dense in consistency							
85	SS 43	10	5-18-17-21 (35)								
	SS 44	13	7-14-13-17 (27)								
	SS 45	14	2-3-7-11 (10)								
90	SS 46	16	9-10-9-7 (19)								
	SS 47	17	27-27-26-30 (53)	92' : grades to dense in consistency							
95	SS 48	12	14-21-21-22 (42)								
	SS 49	11	12-16-21-16 (37)								

(Continued Next Page)



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# BORING NUMBER CUF-H-2A

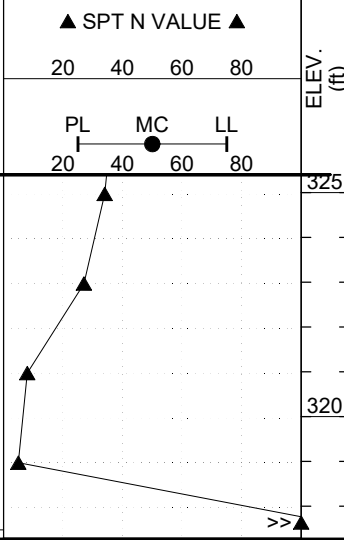
CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲		ELEV. (ft)
								20	40 60 80	
100	SS 50	19	6-15-19-20 (34)				silty c-f gravel with sand, med dense, moist, yellowish brown, rounded angularity (ALLUVIAL GRANULAR) (continued)	20	40 60 80	325
	SS 51	14	16-14-13-14 (27)				100' - 102' : med dense in consistency			
	SS 52	6	9-5-3-8 (8)				102' - 106' : loose in consistency			
105	SS 53	7	3-3-2-13 (5)				limestone, slightly weathered, light gray (BEDROCK)			320
	SS 54	8	20-50/2"				Refusal at 106.7 feet. Bottom of borehole at 106.7 feet.			>>



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# BORING NUMBER CUF-H-2B

**CLIENT** Tennessee Valley Authority (TVA) **PROJECT NAME** 2012 Supplemental Site Exploration Program  
**PROJECT NUMBER** 20329 **PROJECT LOCATION** Cumberland City, Tennessee (CUF)  
**DATE STARTED** 5/1/12 **COMPLETED** 5/8/12 **GROUND ELEVATION** 410.7 ft **HOLE SIZE** 4 inches  
**DRILLING CONTRACTOR** Stantec **BORING LOCATION:**  
**DRILLING METHOD** Mud Rotary **NORTHING** 728805.14 ft  
**LOGGED BY** Michael Dagher **CHECKED BY** Vanita Patel **EASTING** 1510977.52 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)		
								PL	MC	LL			
0								20	40	60	80	410	
1	SS 1	20	4-12-16-11 (28)				clayey c-f gravel with sand, med dense, moist, yellowish brown, very high dry strength, slow dilatancy, low toughness (DIKE 3 CLAY)						
2	SS 2	10	6-8-8-8 (16)										
3	SS 3	16	4-11-21-23 (32)										
4	SS 4	18	7-12-14-36 (26)										
5	SS 5	14	6-8-13-4 (21)										
6	SS 6	0	7-6-9-8 (15)										
7	SS 7	5	8-11-32-26 (43)					12' - 14' : dense in consistency					
8	SS 8	12	9-7-7-13 (14)										
9	SS 9	1	4-18-15-51 (33)					c-f gravel with sand, dense, moist, gray (DRAINAGE LAYER)					
10	SS 10A & 10B	11	6-14-38-13 (52)										
11	SS 11	1	6-6-6-7 (12)					sandy lean clay with f gravel, firm, moist, brown, very high dry strength, slow dilatancy, low toughness (DIKE 3 CLAY)					
12	SS 12	5	1-1-1-3 (2)					22' - 24' : soft in consistency					
13	SS 13A & 13B	14	4-7-5-10 (12)										
14	SS 14	1	50/4"	Excessive mud loss in hole. Seepage through adjacent slope. 6" casing driven to 36.5' before resuming sampling	PZ-4			silt with c gravel, very soft, wet, gray (FLY ASH - SLUICED)					

(Continued Next Page)



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# BORING NUMBER CUF-H-2B

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲		ELEV. (ft)		
								PL	MC		LL	
30								20	40	60	80	
							silt with c gravel, very soft, wet, gray (FLY ASH - SLUICED) (continued)					380
							well-graded sand with silt and f gravel, med dense, wet, dark yellowish brown, rounded angularity, hard, medium dry strength, rapid dilatancy (BOTTOM ASH - SLUICED)					375
35												370
40	SS 15	7	1-3-7-6 (10)									
	SS 16	8	7-7-6-8 (13)									
	SS 17	12	1-5-5-6 (10)									
45	SS 18	20	2-10-48-50/2"				44' : grades to very dense in consistency					
	SS 19	20	7-31-26-20 (57)									
	SS 20	24	3-15-8-21 (23)				48' : grades to med dense in consistency					
50	SS 21A & 21B	24	4-4-4-5 (8)				50' : grades to loose in consistency					
	SS 22	24	2-1-1-3 (2)									
55	ST 23	24		FVST @ 54.0' : Su = 1895 psf (Sensitivity = 3.8)								
				FVST @ 56.0' : Exceeded Torque Wrench Capacity Casing sank 56' to 58'	PZ-3							
	SS 24A & 24B	24	0-0-2-3 (2)	FVST @ 58.0' : Su = 2652 psf (Sensitivity = 2.6)			lean clay, soft, moist, olive brown, very high dry strength, slow dilatancy, low toughness (ALLUVIAL CLAY)					
60	ST 25	24		FVST @ 60.0' : Exceeded Torque Wrench Capacity								
	SS 26	24	1-4-5-8 (9)	FVST @ 62.0' : Exceeded Torque Wrench Capacity			62' : grades to firm in consistency					

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# BORING NUMBER CUF-H-2B

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 3/18/13 10:43 - Z:\CONSULTING\ACTIVE PROJECTS\20329 - TVA\_CCP\_EPA\REPORT\GINT\PROJECTS\TVA-CUF.GPJ

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)	
								20	40	60		80
65	ST 27	24		FVST @ 64.0' : Su = 2905 psf (Sensitivity = 1.9)	PZ-2		lean clay, soft, moist, olive brown, very high dry strength, slow dilatancy, low toughness (ALLUVIAL CLAY) (continued)				345	
	SS 28	24	1-6-5-7 (11)	FVST @ 66.0' : Exceeded Torque Wrench Capacity								
	SS 29A & 29B	14	5-10-12-12 (22)		PZ-1		sand with silt and gravel, med dense, moist, brownish yellow, rounded angularity, hard (ALLUVIAL GRANULAR)				340	
70	SS 30	16	8-12-10-9 (22)									
	SS 31A & 31B	14	15-14-16-17 (30)									
75	SS 32	7	6-4-8-13 (12)									
	SS 33A & 33B	16	15-19-25-10 (44)	76' : grades to dense in consistency								
	SS 34	14	20-20-22-25 (42)									
80	SS 35	17	20-24-25-16 (49)									
	SS 36	10	16-13-9-11 (22)	82' - 84' : med dense in consistency								
85	SS 37	14	16-20-21-16 (41)									
	SS 38	14	10-28-25-30 (53)									
	SS 39	8	8-18-11-12 (29)									
90	SS 40	7	9-20-22-14 (42)									
	SS 41	7	6-11-50/1"									

limestone, slightly weathered, light gray (BEDROCK)  
 Refusal at 93.1 feet.  
 Bottom of borehole at 93.1 feet.





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# BORING NUMBER CUF-H-2C

PAGE 1 OF 3

**CLIENT** Tennessee Valley Authority (TVA) **PROJECT NAME** 2012 Supplemental Site Exploration Program  
**PROJECT NUMBER** 20329 **PROJECT LOCATION** Cumberland City, Tennessee (CUF)  
**DATE STARTED** 4/18/12 **COMPLETED** 4/20/12 **GROUND ELEVATION** 395.32 ft **HOLE SIZE** 4 inches  
**DRILLING CONTRACTOR** Stantec **BORING LOCATION:**  
**DRILLING METHOD** Mud Rotary **NORTHING** 728783.67 ft  
**LOGGED BY** Francisco Trejo **CHECKED BY** Vanita Patel **EASTING** 1510876.1 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲			ELEV. (ft)			
								PL	MC	LL				
0								20	40	60	80	395		
1	SS 1	11	7-7-6 (13)	FVST @ 3.0' : Exceeded Torque Wrench Capacity	PZ-5	[Cross-hatched pattern]	clay with sand, firm, moist, yellowish red, very high dry strength, slow dilatancy, low toughness (DIKE 2 CLAY)	▲				395		
2	SS 2	17	7-7-9 (16)					▲				394		
3	SS 3	9	4-4-6 (10)					▲				393		
4	SS 4	8	3-5-7 (12)					▲				392		
5	ST 5	6		FVST @ 7.0' : Exceeded Torque Wrench Capacity						●		390		
6	SS 6	11	6-11-12 (23)	FVST @ 9.0' : Exceeded Torque Wrench Capacity						▲		389		
7	SS 7	4	4-8-11 (19)	FVST @ 11.0' : Exceeded Torque Wrench Capacity						▲		388		
8	ST 8	8		FVST @ 13.0' : Exceeded Torque Wrench Capacity								387		
9	SS 9	14	7-8-11 (19)	FVST @ 15.0' : Exceeded Torque Wrench Capacity						▲		386		
10	ST 10	18										385		
11	SS 11	11	7-8-9 (17)	FVST @ 20.0' : Exceeded Torque Wrench Capacity	PZ-4	[Cross-hatched pattern]	silty sand, loose, moist, black, no dry strength, rapid dilatancy (BOTTOM ASH - SLUICED)	▲				384		
12	SS 12	8	6-5-4 (9)					▲				383		
13	SS 13	4	3-2-2 (4)				▲				382			
14	SS 14	0	3-3-5 (8)				▲				381			
15	SS 15	7	6-4-5 (9)	FVST @ 24.0' : Su = 2551 psf (Sensitivity = 5.0)						●		380		
16	SS 16	14	10-7-3 (10)	FVST @ 28.0' : Su = 612 psf (Sensitivity = 1.6)					lean clay, soft to firm, moist, reddish brown, very high dry strength, slow dilatancy, low toughness (DIKE 1 CLAY)	▲				379
17	SS 17	12	2-3-3 (6)				▲					378		
18	ST 18	17					●					377		
19					PZ-3			●		376				

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# BORING NUMBER CUF-H-2C

PAGE 2 OF 3

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲		ELEV. (ft)
								20	40 60 80	
30	SS 19	18	5-6-8 (14)				lean clay, soft to firm, moist, reddish brown, very high dry strength, slow dilatancy, low toughness (DIKE 1 CLAY) (continued)	20	40 60 80	365
	ST 20	21								
35	SS 21	6	6-11-16 (27)	FVST @ 34.0' : Exceeded Torque Wrench Capacity			clay with sand, hard to very hard, moist, grayish black, very high dry strength, slow dilatancy, low toughness (ALLUVIAL CLAY)			360
	SS 22	5	3-4-7 (11)				34.5' -36' : firm in consistency			
	SS 23	14	5-10-31 (41)	FVST @ 36.0' : Exceeded Torque Wrench Capacity			36' : grades to olive brown in color			
	SS 24	12	16-17-18 (35)							
40	SS 25	7	12-26-17 (43)							355
	SS 26	6	9-15-17 (32)							
	SS 27	6	9-10-28 (38)							
45	SS 28	14	5-8-6 (14)				clayey silt, firm, moist, brownish gray (ALLUVIAL SILT)			350
	ST 29	24								
	ST 30	24								
50	SS 31	18	0-2-3 (5)				49' - grades to soft in consistency			345
	SS 32A & 32B	18	1-4-8 (12)				silty well-graded sand, med dense, wet, light olive brown, rounded angularity (ALLUVIAL GRANULAR)			
	SS 33	18	3-5-12 (17)				51.3' to 52' : pocket of silt with organics, firm, very moist, grayish brown, very high dry strength, slow dilatancy, low toughness			
55	SS 34	12	2-11-5 (16)							340
	SS 35	10	10-11-13 (24)							
	SS 36	8	11-11-14 (25)							
60	SS 37	11	15-14-12 (26)							
	SS 38	3	4-8-21 (29)				60' : grades to dense in consistency; grades to yellowish brown in color			335
	SS 39	10	14-15-19 (34)							
	SS 40	10	14-17-19 (36)							

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# BORING NUMBER CUF-H-2C

CLIENT Tennessee Valley Authority (TVA)

PROJECT NAME 2012 Supplemental Site Exploration Program

PROJECT NUMBER 20329

PROJECT LOCATION Cumberland City, Tennessee (CUF)

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in)	BLOW COUNTS (N VALUE)	REMARKS	VWPZ	GRAPHIC LOG	MATERIAL DESCRIPTION	▲ SPT N VALUE ▲		ELEV. (ft)				
								20	40 60 80					
65	SS 41	12	22-21-29 (50)				silty well-graded sand, med dense, wet, light olive brown, rounded angularity (ALLUVIAL GRANULAR) (continued)	20	40 60 80	330				
	SS 42	8	11-20-25 (45)											
	SS 43	10	12-15-14 (29)											
	SS 44	11	11-17-17 (34)											
70	SS 45	8	16-20-12 (32)										325	
	SS 46	12	14-11-19 (30)											
	SS 47	17	2-3-4 (7)								clayey silt with sand, soft, moist, gray (DECOMPOSED BEDROCK)			
75	SS 48	8	7-12-50/1"										320	

limestone, slightly weathered, light gray (BEDROCK)

Refusal at 75.8 feet.  
 Bottom of borehole at 75.8 feet.

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# TEST BORING REPORT

HOLE ID  
**CUF-K-2D**  
PAGE 1 OF 3

PROJECT NAME	<b>Cumberland Seismic Assessment - DFAS &amp; GDC</b>	PROJECT NUMBER	<b>220782</b>
CLIENT	<b>Tennessee Valley Authority</b>	PROJECT LOCATION	<b>Cumberland City, TN</b>
DRILLING CONTRACTOR	<b>Stantec</b>	SURFACE EL.	<b>423.677 ft</b>
		BORING LOC.	<b>N1513406.857/E728301.807</b>

DRILLING EQUIPMENT & PROCEDURES				RIG MAKE & MODEL	START DATE
CASING TYPE	SAMPLER TYPE	BARREL TYPE	BIT TYPE	CME 1050 ATV	12/17/17 12:13 PM
N/A	SPT	N/A	N/A		
CASING ID (in)	SAMPLER ID (in)	BARREL ID (in)	DRILL MUD	Water	FINISH DATE
N/A	1.25	N/A			12/18/17 09:34 AM
CASING HAMMER WT. (lb)	SAMPLER HAMMER WT. (lb)	DRILLING METHOD	GEOCOMP REP	HSA	Dan Jessie
N/A	140		Ryan Lavorati	HOIST/HAMMER	
CASING HAMMER FALL (in)	SAMPLER HAMMER FALL (in)	CHECKED BY	Nicolas Betancur	Auto	
N/A	30				

GEOCOMP BOREHOLE LOG - GCGGINTV1.GDT - 11/8/19 14:38 - \HAL-1\GCOCONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0							Drilled to 21.0 feet below ground surface to start sampling. Sampling for installation of piezometers.	
5								
10								
15								
20								
21.0						21.0		402.7
22.5	SPT 1	7-8-5	56			22.5	light gray Silty GRAVEL (GM), 66.2% gravel, 11.6% sand, and 22.2% fines, medium dense, 6.8% moisture [Drainage Layer]	401.2
25								
30								

REMARKS	SUMMARY
1. Boring was performed using hollow stem augers with water filling the augers. 2. Boring terminated at 81 feet 3. Boring was grouted to ground surface upon completion 4. Piezometers installed at the following depths: PZ1 - 78', PZ2 - 69', PZ3 - 55', PZ4 - 40', PZ5 - 21.5'	Overburden (ft): <b>81</b> Rock Cored (ft): <b>0.0</b> Samples: <b>6 SPT</b>
	WATER LEVEL DATA
	Depth (ft) to:
	Date/Time
	Bot. of Casing
	Bot. of Hole
	Depth to Water

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM D2488 classification symbol and name presented on the boring logs are based on visual-manual procedures. The ASTM D2487 classification symbol and name are presented with the laboratory gravel, sand, and fines contents. Plasticity index only on samples with PI>0.

HOLE ID  
**CUF-K-2D**



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# TEST BORING REPORT

HOLE ID  
**CUF-K-2D**  
PAGE 2 OF 3

PROJECT NAME  
**Cumberland Seismic Assessment - DFAS & GDC**

PROJECT NUMBER  
**220782**

CLIENT  
**Tennessee Valley Authority**

PROJECT LOCATION  
**Cumberland City, TN**

DRILLING CONTRACTOR  
**Stantec**

SURFACE EL.  
**423.677 ft**

BORING LOC.  
**N1513406.857/E728301.807**

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 11/18/19 14:38 - \\HAL1\GCO\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30								
35								
40	SPT 2	1-1-1	100			39.5 41.0	brown/black FLY ASH, very loose, moist [Sluiced Ash]	384.2 382.7
45								
50	ST 1		80			50.0	brown/black FLY ASH, moist [Sluiced Ash]	373.7
55	ST 2 SPT 3	6-3-3	58 100				brown/black FLY ASH, moist [Sluiced Ash] (cap from previous tube sample inside top of tube) brown/black FLY ASH, some layered bottom ash, loose, moist [Sluiced Ash]	
60	ST 3		100			60.0	brown/black FLY ASH, moist [Sluiced Ash]	363.7
65								
70	SPT 4	2-6-5	72			68.5 70.0	brown/gray Lean CLAY (CL), stiff, moist [Alluvial Clay]	355.2 353.7

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM D2488 classification symbol and name presented on the boring logs are based on visual-manual procedures. The ASTM D2487 classification symbol and name are presented with the laboratory gravel, sand, and fines contents. Plasticity index only on samples with PI>0.

HOLE ID  
**CUF-K-2D**



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# TEST BORING REPORT

HOLE ID	<b>CUF-K-2D</b>
PAGE 3 OF 3	
PROJECT NAME	<b>Cumberland Seismic Assessment - DFAS &amp; GDC</b>
PROJECT NUMBER	<b>220782</b>
CLIENT	<b>Tennessee Valley Authority</b>
PROJECT LOCATION	<b>Cumberland City, TN</b>
DRILLING CONTRACTOR	<b>Stantec</b>
SURFACE EL.	<b>423.677 ft</b>
BORING LOC.	<b>N1513406.857/E728301.807</b>

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 11/18/19 14:38 - \\HAL1\GCO\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
70								
75								
						77.5		346.2
	SPT 5	0-1-2	78			79.0	brown/gray Lean CLAY (CL), soft, moist [Alluvial Clay]	344.7
80								
						81.0		342.7

SPT 6 50/0"

No Recovery  
Spoon Tip - brown CLAY, some rock fragments, hard, moist  
Bottom of borehole at 81.0 feet.  
Auger refusal at 81 feet

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM D2488 classification symbol and name presented on the boring logs are based on visual-manual procedures. The ASTM D2487 classification symbol and name are presented with the laboratory gravel, sand, and fines contents. Plasticity index only on samples with PI>0.

HOLE ID	<b>CUF-K-2D</b>
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# TEST BORING REPORT

HOLE ID  
**CUF-K-2E**  
PAGE 1 OF 2

PROJECT NAME: **Cumberland Seismic Assessment - DFAS & GDC**  
PROJECT NUMBER: **220782**  
CLIENT: **Tennessee Valley Authority**  
PROJECT LOCATION: **Cumberland City, TN**  
DRILLING CONTRACTOR: **Stantec**  
SURFACE EL.: **410.185 ft**  
BORING LOC.: **N1513684.753/E728139.832**

DRILLING EQUIPMENT & PROCEDURES				RIG MAKE & MODEL	START DATE
CASING TYPE	SAMPLER TYPE	BARREL TYPE	BIT TYPE	CME 1050 ATV	12/1/17 02:45 PM
N/A	SPT	N/A	N/A		12/2/17 01:45 PM
CASING ID (in)	SAMPLER ID (in)	BARREL ID (in)	DRILL MUD	Water	DRILLER
N/A	1.25	N/A			Dan Jessie
CASING HAMMER WT. (lb)	SAMPLER HAMMER WT. (lb)		DRILLING METHOD	HSA	GEOCOMP REP
N/A	140				Ryan Lavorati
CASING HAMMER FALL (in)	SAMPLER HAMMER FALL (in)		HOIST/HAMMER	Auto	CHECKED BY
N/A	30				Nicolas Betancur

GEOCOMP BOREHOLE LOG - GCGGINTV1.GDT - 11/18/19 14:38 - \\HAL1\GCOCONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0						0.3	Top 3" - brown Fat CLAY (CH), some grass, moist	409.9
	SPT 1	4-4-7	67			1.0	Bottom 9" - white GYPSUM, medium dense, moist	409.2
	SPT 2	3-3-3	72				dark reddish brown Fat CLAY with Sand (CH), 2.4% gravel, 22.4% sand, and 75.2% fines, PI=37, medium stiff, 21% moisture [Dike 3]	
5						5.0		405.2
	ST 1		50				reddish brown SILT with Sand (ML), 6.2% gravel, 14.6% sand, and 79.2% fines, 39.5% moisture [Dike 3]	
						7.5		402.7
	SPT 3	4-6-9	17				brown/red Fat CLAY with Gravel (CH), stiff, moist [Dike 3] (gravel stuck in shoe)	
10						10.5		399.7
	ST 2	5-6-4	22				brown/red Fat CLAY with Gravel (CH), moist [Dike 3]	
	SPT 4						brown Clayey GRAVEL with Sand (GC), 38.4% gravel, 23.5% sand, and 38.1% fines, PI=23, stiff, 22.5% moisture [Dike 3] (gravel stuck in shoe)	
						13.5		396.7
	ST 3	4-6-6	25				Cobble stuck in bottom of tube - sample bagged [Dike 3]	
15						17.0	brown Lean CLAY with sand (CL), 10.3% gravel, 17.2% sand, and 72.5% fines, PI=26, stiff, 22.5% moisture [Dike 3]	393.2
	SPT 5		64					
						18.5	No Recovery	391.7
	ST 4		0			18.7		391.5
20							Top 2" - brown/red Fat CLAY with Gravel (CH), moist [Dike 3]	
	SPT 6	4-20-9	78				Bottom 12" - black BOTTOM ASH, medium dense, moist [Sluiced Ash]	
						20.5		389.7
	SPT 7	3-4-4	53				brown/black FLY ASH, trace bottom ash, loose, moist [Sluiced Ash]	
	SPT 8	1-3-7	100				very dark gray SILT (ML), 3.8% sand and 96.2% fines, medium dense, 43.5% moisture [Sluiced Ash]	
25								
	SPT 9	3-2-5	89				brown/black FLY ASH, loose, moist [Sluiced Ash]	
	SPT 10	1-2-1	100				brown/black FLY ASH, very loose, moist [Sluiced Ash]	
30								

REMARKS

- Boring was performed using hollow stem augers with water filling the augers.
- Boring terminated at 57.1 feet
- Boring was grouted to ground surface upon completion
- Piezometers installed at the following depths: PZ1 - 55.5', PZ2 - 48', PZ3 - 37', PZ4 - 25.5', PZ5 - 16'

SUMMARY			
Overburden (ft):		57.1	
Rock Cored (ft):		0.0	
Samples:		14 SPT	
WATER LEVEL DATA			
Depth (ft) to:			
Date/Time	Bot. of Casing	Bot. of Hole	Depth to Water

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM D2488 classification symbol and name presented on the boring logs are based on visual-manual procedures. The ASTM D2487 classification symbol and name are presented with the laboratory gravel, sand, and fines contents. Plasticity index only on samples with PI>0.

HOLE ID: **CUF-K-2E**



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TEL 9786350012

# TEST BORING REPORT

HOLE ID

## CUF-K-2E

PAGE 2 OF 2

PROJECT NAME	Cumberland Seismic Assessment - DFAS & GDC	PROJECT NUMBER	220782
CLIENT	Tennessee Valley Authority	PROJECT LOCATION	Cumberland City, TN
DRILLING CONTRACTOR	Stantec	SURFACE EL.	410.185 ft
		BORING LOC.	N1513684.753/E728139.832

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 11/18/19 14:38 - \HAL1\GCOCONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\SIEMFIELD WORKBORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30	ST 5		100				brown/black FLY ASH, moist [Sluiced Ash]	
35	SPT 11 ST 6	4-2-1	83 30				brown/black FLY ASH, moist [Sluiced Ash] brown/black FLY ASH, very loose, moist [Sluiced Ash]	
	SPT 12	10-7-10	44				very dark gray SILT (ML), 8.0% sand and 92.0% fines, medium dense, 47.9% moisture [Sluiced Ash]	
40	SPT 13	0-2-4	44				brown/black FLY ASH, loose, moist [Sluiced Ash]	
45	ST 7		72				brown/black FLY ASH, moist [Sluiced Ash]	
	ST 8		97				brown FLY ASH, 49.7% moisture [Sluiced Ash]	
50	ST 9		97			51.0	Top - brown FLY ASH, moist [Sluiced Ash] Bottom - brown/black Lean CLAY (CL), moist [Alluvial Clay]	359.2
55	ST 10		87				olive gray Lean CLAY (CL), 6.3% sand and 93.7% fines, PI=25, 24.1% moisture [Alluvial Clay]	
	SPT 14 ST 11	50/1"	0 50			57.0 57.1	brown/black/tan Lean CLAY (CL), moist [Alluvial Clay] Spoon Tip - tan/brown Lean CLAY (CL), hard, moist [Alluvial Clay] Bottom of borehole at 57.1 feet. Auger refusal at 57.1 feet	353.2 353.1

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HOLE ID

## CUF-K-2E





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# TEST BORING REPORT

HOLE ID  
**CUF-K-2F**  
PAGE 1 OF 2

PROJECT NAME <b>Cumberland Seismic Assessment - DFAS &amp; GDC</b>	PROJECT NUMBER <b>220782</b>
CLIENT <b>Tennessee Valley Authority</b>	PROJECT LOCATION <b>Cumberland City, TN</b>
DRILLING CONTRACTOR <b>Stantec</b>	SURFACE EL. <b>395.156 ft</b>
	BORING LOC. <b>N1513795.956/E728110.867</b>

DRILLING EQUIPMENT & PROCEDURES				RIG MAKE & MODEL CME 1050 ATV	START DATE 11/7/17 09:00 AM
CASING TYPE N/A	SAMPLER TYPE SPT	BARREL TYPE N/A	BIT TYPE N/A	FINISH DATE 11/14/17 07:33 AM	
CASING ID (in) N/A	SAMPLER ID (in) 1.25	BARREL ID (in) N/A	DRILL MUD Water	DRILLER Dan Jessie	
CASING HAMMER WT. (lb) N/A	SAMPLER HAMMER WT. (lb) 140		DRILLING METHOD HSA	GEOCOMP REP Ryan Lavorati	
CASING HAMMER FALL (in) N/A	SAMPLER HAMMER FALL (in) 30		HOIST/HAMMER Auto	CHECKED BY Nicolas Betancur	

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 11/8/19 14:38 - \\HAL1\GCO\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0						0.3	Top 4" - brown Silty SAND with GRAVEL (SM), moist Bottom 8" - red Fat CLAY (CH), medium stiff, moist [Dike 2]	394.9
	SPT 1	4-3-3	67				red/orange Fat CLAY (CH), medium stiff, moist [Dike 2]	
	SPT 2	3-2-3	72				reddish brown Fat CLAY with Sand (CH), 7.4% gravel, 7.6% sand, and 85.0% fines, PI=34, stiff, 19% moisture [Dike 2]	
5	SPT 3	2-4-9	78				brown/orange Fat CLAY (CH), stiff, moist [Dike 2]	
	SPT 4	5-6-8	61				brown/orange Fat CLAY (CH), stiff, moist [Dike 2]	
10	ST 1		15				brown/orange Fat CLAY (CH), stiff, moist [Dike 2]	
	ST 2		88			brown/orange Fat CLAY (CH), stiff, moist [Dike 2]		
15	ST 3		25			brown/orange Fat CLAY (CH), stiff, moist [Dike 2]		
20	ST 4		100			Cobble lodged in tip of tube		
						20.5		374.7
						24.0		371.2
25	SPT 5	25-34-8	100				dark gray Sandy SILT (ML), 6.9% gravel, 31.7% sand, 61.4% fines, dense, 40% moisture [Sluiced Ash]	
	ST 5		37				black/brown FLY ASH, moist [Sluiced Ash]	
30						30.0		365.2

REMARKS 1. Boring was performed using hollow stem augers with water filling the augers. 2. Boring terminated at 46 feet 3. Boring was grouted to ground surface upon completion 4. Piezometers installed at the following depths: PZ1 - 43', PZ2 - 34', PZ3 - 28', PZ4 - 22', PZ5 - 19'	SUMMARY Overburden (ft): <b>46</b> Rock Cored (ft): <b>0.0</b> Samples: <b>8 SPT</b>							
	WATER LEVEL DATA Depth (ft) to:							
	<table border="1"> <tr> <th>Date/Time</th> <th>Bot. of Casing</th> <th>Bot. of Hole</th> <th>Depth to Water</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Date/Time	Bot. of Casing	Bot. of Hole	Depth to Water			
Date/Time	Bot. of Casing	Bot. of Hole	Depth to Water					

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM D2488 classification symbol and name presented on the boring logs are based on visual-manual procedures. The ASTM D2487 classification symbol and name are presented with the laboratory gravel, sand, and fines contents. Plasticity index only on samples with PI>0.

HOLE ID  
**CUF-K-2F**



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# TEST BORING REPORT

HOLE ID

## CUF-K-2F

PAGE 2 OF 2

PROJECT NAME	Cumberland Seismic Assessment - DFAS & GDC	PROJECT NUMBER	220782
CLIENT	Tennessee Valley Authority	PROJECT LOCATION	Cumberland City, TN
DRILLING CONTRACTOR	Stantec	SURFACE EL.	395.156 ft
		BORING LOC.	N1513795.956/E728110.867

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 11/8/19 14:38 - \HAL-1\GCCOCONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\SIEMFIELD WORKBORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30	ST 6		0				No Recovery	
						33.5		361.7
35	SPT 6	7-4-4	44				grayish brown Lean CLAY with Gravel (CL), 17.4% gravel, 8.7% sand, and 73.9% fines, PI=25, medium stiff, 21% moisture [Alluvial Clay]	
							brown Gravelly Lean CLAY (CL), moist [Alluvial Clay]	
	ST 7		11			39.5		355.7
40	SPT 7	4-2-2	78				grayish brown Fat CLAY with Sand (CH), 10.6% gravel, 16.3% sand, and 73.1% fines, PI=32, soft, 24% moisture [Alluvial Clay]	
						42.0		353.2
	SPT 8	50	63				grayish brown Lean CLAY with Sand (CL), 2.0% gravel, 13.7% sand, and 84.3% gravel, PI=25, hard, 24% moisture [Alluvial Clay]	
						44.0		351.2
45								
						46.0		349.2

Bottom of borehole at 46.0 feet.

Auger refusal at 46 feet

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HOLE ID

**CUF-K-2F**



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# TEST BORING REPORT

HOLE ID  
**CUF-N-2A**  
PAGE 1 OF 3

PROJECT NAME <b>Cumberland Seismic Assessment - DFAS &amp; GDC</b>	PROJECT NUMBER <b>220782</b>
CLIENT <b>Tennessee Valley Authority</b>	PROJECT LOCATION <b>Cumberland City, TN</b>
DRILLING CONTRACTOR <b>Stantec</b>	SURFACE EL. <b>430.217 ft</b>
	BORING LOC. <b>N1512417.977/E730262.461</b>

DRILLING EQUIPMENT & PROCEDURES				RIG MAKE & MODEL	START DATE
CASING TYPE N/A	SAMPLER TYPE SPT	BARREL TYPE N/A	BIT TYPE N/A	CME 1050 ATV	11/27/17 12:00 PM
CASING ID (in) N/A	SAMPLER ID (in) 1.25	BARREL ID (in) N/A	DRILL MUD Water		FINISH DATE 11/29/17 07:20 AM
CASING HAMMER WT. (lb) N/A	SAMPLER HAMMER WT. (lb) 140		DRILLING METHOD HSA		DRILLER Dan Jessie
CASING HAMMER FALL (in) N/A	SAMPLER HAMMER FALL (in) 30		HOIST/HAMMER Auto		GEOCOMP REP Ryan Lavorati
					CHECKED BY Nicolas Betancur

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 11/18/19 14:39 - \\\HALL1\GCOCONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0								
	SPT 1	5-9-12	94		◇		white GYPSUM, medium dense, dry [Gypsum]	
5	SPT 2	9-24-31	94		◇		white/brown GYPSUM, very dense, dry [Gypsum]	
10	SPT 3	12-32-45	100		◇		white/brown GYPSUM, very dense, dry [Gypsum]	
15	SPT 4	10-28-31	78		◇		white/brown GYPSUM, very dense, moist [Gypsum]	
	SPT 5	29-50/3"	100		◇		white/brown GYPSUM, very dense, moist [Gypsum]	
20	SPT 6	18-38-50/4"	100		◇		pale brown SILT (ML), 2.0% sand and 98.0% fines, very dense, 16.2% moisture [Gypsum]	
	SPT 7	14-13-15	44		◇		white/brown GYPSUM, moist [Gypsum]	
25	ST 1		33		◇		white/brown GYPSUM, medium dense, moist [Gypsum]	
	SPT 8	31-36-50/5"	100		◇		light gray GYPSUM, very dense, 15.7% moisture [Gypsum]	
30					◇			

REMARKS 1. Boring was performed using hollow stem augers with water filling the augers. 2. Boring terminated at 87 feet 3. Boring was grouted to ground surface upon completion 4. Piezometers installed at the following depths: PZ1 - 82', PZ2 - 71', PZ3 - 64', PZ4 - 55', PZ5 - 38', PZ6 - 29'	SUMMARY Overburden (ft): <b>87</b> Rock Cored (ft): <b>0.0</b> Samples: <b>22 SPT</b>							
	WATER LEVEL DATA Depth (ft) to:							
	<table border="1"> <tr> <th>Date/Time</th> <th>Bot. of Casing</th> <th>Bot. of Hole</th> <th>Depth to Water</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Date/Time	Bot. of Casing	Bot. of Hole	Depth to Water			
Date/Time	Bot. of Casing	Bot. of Hole	Depth to Water					

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM D2488 classification symbol and name presented on the boring logs are based on visual-manual procedures. The ASTM D2487 classification symbol and name are presented with the laboratory gravel, sand, and fines contents. Plasticity index only on samples with PI>0.

HOLE ID  
**CUF-N-2A**



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# TEST BORING REPORT

HOLE ID

## CUF-N-2A

PAGE 2 OF 3

PROJECT NAME	Cumberland Seismic Assessment - DFAS & GDC	PROJECT NUMBER	220782
CLIENT	Tennessee Valley Authority	PROJECT LOCATION	Cumberland City, TN
DRILLING CONTRACTOR	Stantec	SURFACE EL.	430.217 ft
		BORING LOC.	N1512417.977/E730262.46

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 11/18/19 14:39 - \\HAL1\GCOCONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30						30.3	Top 4" - white/brown GYPSUM, moist [Gypsum] Bottom 9" - black FLY ASH, some bottom ash, medium dense, moist [Sluiced Ash] (geosynthetic separating gypsum and fly ash)	399.9
	SPT 9	6-11-14	72					
	SPT 10	7-5-9	89				black FLY ASH, some bottom ash, medium dense, moist [Sluiced Ash]	
35	ST 2		93				black FLY ASH, some bottom ash, moist [Sluiced Ash]	
	ST 3		88				black FLY ASH, some bottom ash, moist [Sluiced Ash]	
	SPT 11	7-7-5	100				very dark gray SILT (ML), 0.4% gravel, 10.4% sand, and 89.2% fines, medium dense, 30.4% moisture [Sluiced Ash]	
45	ST 4 SPT 12	0-1-1	0 100				No Recovery brown/black FLY ASH, very loose, moist [Sluiced Ash]	
	ST 5		100				brown FLY ASH, moist [Sluiced Ash]	
50						51.5	black/brown BOTTOM ASH and FLY ASH, very dense, moist [Bottom Ash]	378.7
	SPT 13	8-40-20	100				black/brown BOTTOM ASH and FLY ASH, very dense, moist [Bottom Ash]	
55	SPT 14	9-36-35	100				very dark gray Silty SAND (SM), 8.2% gravel, 74.7% sand, and 17.1% fines, medium dense, 31.9% moisture [Bottom Ash]	
	SPT 15	7-13-8	100				black/brown BOTTOM ASH and FLY ASH, medium dense, moist [Bottom Ash]	
60	SPT 16	2-12-12	89					
	SPT 17	15-16-14	50			61.5	very dark brown Silty GRAVEL with Sand (GM), 40.8% gravel, 33.6% sand, and 25.6% fines, medium dense, 17.2% moisture [Alluvial Gravel]	368.7
	ST 6		20			63.0	brown/black Poorly Graded GRAVEL (GP), moist [Alluvial Gravel]	367.2
65	SPT 18	5-4-4	33				brown/gray Poorly Graded GRAVEL (GP), loose, moist [Alluvial Gravel]	
	SPT 19	5-6-5	58				brown/gray Poorly Graded GRAVEL (GP), medium dense, moist [Alluvial Gravel]	
	ST 7		0				No Recovery	
	SPT 20	0-5-6	100			67.5	brown/black Lean CLAY (CL), stiff, moist [Alluvial Clay]	362.7
70								

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HOLE ID

CUF-N-2A



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# TEST BORING REPORT

HOLE ID  
**CUF-N-2A**  
 PAGE 3 OF 3

PROJECT NAME  
**Cumberland Seismic Assessment - DFAS & GDC**

PROJECT NUMBER  
**220782**

CLIENT  
**Tennessee Valley Authority**

PROJECT LOCATION  
**Cumberland City, TN**

DRILLING CONTRACTOR  
**Stantec**

SURFACE EL.  
**430.217 ft**

BORING LOC.  
**N1512417.977/E730262.461**

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 11/18/19 14:39 - \\\HAL-1\GCO\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
70	ST 8		95				dark brownish gray Lean CLAY (CL), 7.7% sand and 92.8% fines, PI=17, 23.4% moisture [Alluvial Clay]	
75	ST 9 SPT 21	4-4-6	50 94			77.0	brown/black Lean CLAY (CL), moist [Alluvial Clay] brown/black Lean CLAY (CL), stiff, moist [Alluvial Clay]	
80	ST 10		90				brown Fat CLAY (CH), 3.5% sand and 96.5% fines, PI=41, 33.0% moisture [Alluvial Clay]	353.2
	ST 11		83				brown/black Fat CLAY (CH), moist [Alluvial Clay]	
85	SPT 22 ST 12	15-50/1"	86 0			85.0 87.0	No Recovery brown/gray Poorly Graded GRAVEL (GP), some ROCK FRAGMENTS, very dense, moist	345.2 343.2

Bottom of borehole at 87.0 feet.

Auger refusal at 87 feet

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM D2488 classification symbol and name presented on the boring logs are based on visual-manual procedures. The ASTM D2487 classification symbol and name are presented with the laboratory gravel, sand, and fines contents. Plasticity index only on samples with PI>0.

HOLE ID  
**CUF-N-2A**



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# TEST BORING REPORT

HOLE ID  
**CUF-N-2B**  
PAGE 1 OF 2

PROJECT NAME	<b>Cumberland Seismic Assessment - DFAS &amp; GDC</b>	PROJECT NUMBER	<b>220782</b>
CLIENT	<b>Tennessee Valley Authority</b>	PROJECT LOCATION	<b>Cumberland City, TN</b>
DRILLING CONTRACTOR	<b>Stantec</b>	SURFACE EL.	<b>411.362 ft</b>
		BORING LOC.	<b>N1512480.706/E730375.378</b>

DRILLING EQUIPMENT & PROCEDURES				RIG MAKE & MODEL	START DATE
CASING TYPE	SAMPLER TYPE	BARREL TYPE	BIT TYPE	CME 1050 ATV	11/16/17 08:25 AM
N/A	SPT	N/A	N/A		11/17/17 07:30 AM
CASING ID (in)	SAMPLER ID (in)	BARREL ID (in)	DRILL MUD	Water	DRILLER
N/A	1.25	N/A			Dan Jessie
CASING HAMMER WT. (lb)	SAMPLER HAMMER WT. (lb)		DRILLING METHOD	HSA	GEOCOMP REP
N/A	140				Ryan Lavorati
CASING HAMMER FALL (in)	SAMPLER HAMMER FALL (in)		HOIST/HAMMER	Auto	CHECKED BY
N/A	30				Nicolas Betancur

GEOCOMP BOREHOLE LOG - GCGGINTV1.GDT - 11/18/19 14:39 - \\HAL1\GCO\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0								
	SPT 1	6-7-3	56			1.5	brown Silty SAND with Gravel (SM), medium dense, dry [Dike 3]	409.9
5	SPT 2	2-3-3	56			7.0	dark brown Clayey GRAVEL with Sand (GC), 49.2% gravel, 19.6% sand, 31.2% fines, PI=35, soft, 12.5% moisture [Dike 3]	404.4
	SPT 3	7-6-19	33			10.5	brown Poorly Graded GRAVEL with Silt and Sand (GP-GM), 64.4% gravel, 23.6% sand, 12.0% fines, medium dense, 2.8% moisture [Dike 3]	400.9
10	ST 1 SPT 4	5-5-3	40 33			13.0	brown/orange Gravelly Lean CLAY, moist (Bottom of tube warped) [Dike 3] black/brown Clayey GRAVEL (GC), loose, moist [Dike 3] (after osterberg push)	398.4
15	ST 2 ST 2A SPT 5	10-5-6	50			16.0	No Recovery; sampler did not push brown Silty GRAVEL with Sand (GM), 56.6% gravel, 21.3% sand, 22.1% fines, medium dense, 16% moisture [Dike 3]	395.4
20	ST 3 SPT 6	2-2-5	23 33			21.0	brown/black Silty GRAVEL (GM), moist [Dike 3] black/brown Clayey GRAVEL (GC), loose, moist [Dike 3]	390.4
25	SPT 7	4-10-14	100			24.5	Top 3" - brown Fat CLAY (CH), moist [Dike 3] Bottom 15" - brown FLY ASH, medium dense, moist [Sluiced Ash]	386.9
	SPT 8	6-3-3	100				brown FLY ASH, loose, moist [Sluiced Ash]	
30							brown FLY ASH, moist [Sluiced Ash]	

REMARKS 1. Boring was performed using hollow stem augers with water filling the augers. 2. Boring terminated at 62.9 feet 3. Boring was grouted to ground surface upon completion 4. Piezometers installed at the following depths: PZ1 - 60', PZ2 - 48', PZ3 - 38', PZ4 - 29', PZ5 - 21'	SUMMARY	Overburden (ft): <b>62.9</b> Rock Cored (ft): <b>0.0</b> Samples: <b>16 SPT</b>		
	WATER LEVEL DATA	Depth (ft) to:		
	Date/Time	Bot. of Casing	Bot. of Hole	Depth to Water

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM D2488 classification symbol and name presented on the boring logs are based on visual-manual procedures. The ASTM D2487 classification symbol and name are presented with the laboratory gravel, sand, and fines contents. Plasticity index only on samples with PI>0.

HOLE ID  
**CUF-N-2B**



Geocomp Corporation  
125 Nagog Park  
Acton, MA  
TEL 9786350012

# TEST BORING REPORT

HOLE ID  
**CUF-N-2B**  
PAGE 2 OF 2

PROJECT NUMBER  
**220782**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
**411.362 ft**

BORING LOC.  
**N1512480.706/E730375.378**

PROJECT NAME  
**Cumberland Seismic Assessment - DFAS & GDC**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 11/8/19 14:39 - \\HAL1\GCO\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30	ST 4		67					
35	ST 5		93				brown FLY ASH, moist [Sluiced Ash]	
36.0						36.0		375.4
	SPT 9	12-22-34	83				black BOTTOM ASH, very dense, moist [Bottom Ash]	
40	SPT 10	23-20-4	72				very dark gray Silty SAND (SM), 6.2% gravel, 69.1% sand, and 24.7% fines, very dense, 29.2% moisture [Bottom Ash]	
41.0						41.0		370.4
	SPT 11	3-2-2	89				brown FLY ASH, loose, moist [Sluiced Ash]	
43.5						43.5		367.9
45	SPT 12	50/1"	0				Spoon Tip - brown/black Lean CLAY with Gravel (CL), hard, moist [Alluvial Clay]	
	SPT 13	12-11-7	56				brown/black Lean CLAY with Gravel (CL), very stiff, moist [Alluvial Clay]	
	ST 6		22				brown Lean CLAY with Gravel (CL), moist [Alluvial Clay]	
50	SPT 14	4-3-5	89				brown/black Lean CLAY (CL), medium stiff, moist [Alluvial Clay]	
52.0						52.0		359.4
	ST 7		70				dark brown Fat CLAY (CH), 2.4% sand and 97.6% fines, PI=41, 27.9% moisture [Alluvial Clay]	
55	ST 8		67				brown/black Fat CLAY (CH), moist [Alluvial Clay]	
60	ST 9		23				brown/black Fat CLAY (CH), moist [Alluvial Clay]	
	SPT 15	3-5-5	22				brown/black Fat CLAY with Gravel (CH), stiff, moist [Alluvial Clay]	
62.5						62.5		348.9
62.9	SPT 16	50/1"	0			62.9	Spoon Tip - gray/white ROCK FRAGMENTS	348.5

Bottom of borehole at 62.9 feet.  
Auger refusal at 62.9 feet

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM D2488 classification symbol and name presented on the boring logs are based on visual-manual procedures. The ASTM D2487 classification symbol and name are presented with the laboratory gravel, sand, and fines contents. Plasticity index only on samples with PI>0.

HOLE ID  
**CUF-N-2B**





Geocomp Corporation  
125 Nagog Park  
Acton, MA  
TEL 9786350012

# TEST BORING REPORT

HOLE ID  
**CUF-N-2C**  
PAGE 1 OF 2

PROJECT NAME <b>Cumberland Seismic Assessment - DFAS &amp; GDC</b>	PROJECT NUMBER <b>220782</b>
CLIENT <b>Tennessee Valley Authority</b>	PROJECT LOCATION <b>Cumberland City, TN</b>
DRILLING CONTRACTOR <b>Stantec</b>	SURFACE EL. <b>397.349 ft</b>
	BORING LOC. <b>N1512554.422/E730469.698</b>

DRILLING EQUIPMENT & PROCEDURES				RIG MAKE & MODEL CME 1050 ATV	START DATE 11/14/17 08:15 AM
CASING TYPE N/A	SAMPLER TYPE SPT	BARREL TYPE N/A	BIT TYPE N/A	FINISH DATE 11/15/17 10:16 AM	
CASING ID (in) N/A	SAMPLER ID (in) 1.25	BARREL ID (in) N/A	DRILL MUD Water	DRILLER Dan Jessie	
CASING HAMMER WT. (lb) N/A	SAMPLER HAMMER WT. (lb) 140		DRILLING METHOD HSA	GEOCOMP REP Ryan Lavorati	
CASING HAMMER FALL (in) N/A	SAMPLER HAMMER FALL (in) 30		HOIST/HAMMER Auto	CHECKED BY Nicolas Betancur	

GEOCOMP BOREHOLE LOG - GCGGINTV1.GDT - 11/18/19 14:39 - \\\HALL1\GCO\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\FIELD WORK\BORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0								
	SPT 1	5-4-6	78			1.5	black BOTTOM ASH, medium dense, dry [Dike 2]	395.8
5	SPT 2	3-4-4	89				Top 2" - black BOTTOM ASH, medium dense, dry Bottom 14" - red/orange CLAY, trace gravel, medium stiff, moist [Dike 2]	
	SPT 3	3-4-6	83				red/orange Lean CLAY (CL), stiff, moist [Dike 2]	
10	ST 1		23				red/orange Lean CLAY (CL), moist [Dike 2]	
	ST 2		45				orange/brown Lean CLAY (CL), moist [Dike 2]	
15	ST 3		27				orange/brown Lean CLAY (CL), moist [Dike 2] (Spoon taken at 15.4 to collect any fallin)	
	ST 4		102				orange/brown Lean CLAY (CL), moist [Dike 2] (Shelby Tube pushed)	
20	SPT 5	2-1-4	72			22.1	Top 7" - orange/brown Lean CLAY (CL), moist [Dike 2] Bottom 5" - brown/black Lean CLAY (CL), medium stiff, moist [Alluvial Clay]	375.2
25	ST 5		67				brown/black Lean CLAY (CL), moist [Alluvial Clay] (Shelby Tube pushed)	
	SPT 6	2-3-3	50				dark brown Lean CLAY (CL), 5.6% gravel, 4.2% sand, and 90.2% fines, PI=23, medium stiff, 25.3% moisture [Alluvial Clay]	
30								

REMARKS  
1. Boring was performed using hollow stem augers with water filling the augers.  
2. Boring terminated at 41 feet  
3. Boring was grouted to ground surface upon completion  
4. Piezometers installed at the following depths: PZ1 - 39', PZ2 - 25', PZ3 - 18'

SUMMARY	Overburden (ft): <b>41</b> Rock Cored (ft): <b>0.0</b> Samples: <b>10 SPT</b>
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WATER LEVEL DATA			
Depth (ft) to:			
Date/Time	Bot. of Casing	Bot. of Hole	Depth to Water

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM D2488 classification symbol and name presented on the boring logs are based on visual-manual procedures. The ASTM D2487 classification symbol and name are presented with the laboratory gravel, sand, and fines contents. Plasticity index only on samples with PI>0.

HOLE ID  
**CUF-N-2C**





Geocomp Corporation  
125 Nagog Park  
Acton, MA  
TEL 9786350012

# TEST BORING REPORT

HOLE ID

## CUF-N-2C

PAGE 2 OF 2

PROJECT NAME	Cumberland Seismic Assessment - DFAS & GDC	PROJECT NUMBER	220782
CLIENT	Tennessee Valley Authority	PROJECT LOCATION	Cumberland City, TN
DRILLING CONTRACTOR	Stantec	SURFACE EL.	397.349 ft
		BORING LOC.	N1512554.422/E730469.698

GEOCOMP BOREHOLE LOG - GCCGINTV1.GDT - 11/18/19 14:39 - \\\HAL1\GCO\CONSULTING\ACTIVE PROJECTS\220782 - CUF DFAS & GYPSUM POND\SFIELD WORKBORING LOGS\CUMBERLAND LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30	SPT 7	3-6-6	39				brown/black Lean CLAY (CL), stiff, moist [Alluvial Clay]	
	SPT 8	1-1-1	89				brown/black Lean CLAY (CL), very soft, moist [Alluvial Clay]	
35	SPT 9	0-3-2	94				brown/black Lean CLAY (CL), medium stiff, moist [Alluvial Clay]	
	SPT 10	4-8-3	78				brown Lean CLAY (CL), 2.2% gravel, 12.1% sand, and 85.7% fines, PI=23, stiff, 29.6% moisture [Alluvial Clay]	
40	SPT 11	2-50/0"	133				dark brown Lean CLAY (CL), hard, moist [Alluvial Clay] Spoon Tip - gray/white ROCK FRAGMENTS	356.8 356.3
							40.5 41.0	Bottom of borehole at 41.0 feet.
							Auger refusal at 41 feet	

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HOLE ID

## CUF-N-2C



# TEST BORING REPORT

HOLE ID  
**CUF-P-2C**  
PAGE 1 OF 2

PROJECT NAME  
**Cumberland Fossil Plant Seismic Assessment**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

PROJECT NUMBER  
**220583**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
**395.0 ft NGVD 29**

BORING LOC.  
**N732344.9/E1509486.4**

DRILLING EQUIPMENT & PROCEDURES			RIG MAKE & MODEL	START DATE
CASING TYPE <b>HSA</b>	SAMPLER TYPE <b>SPT &amp; Osterberg/ST</b>	BARREL TYPE <b>N/A</b>	<b>CME-75</b>	<b>11/17/15</b>
CASING ID (in) <b>4.25</b>	SAMPLER ID (in) <b>1.5 &amp; 3/2.875</b>	BARREL ID (in) <b>N/A</b>	BIT TYPE <b>HSA</b>	FINISH DATE <b>11/17/15</b>
CASING HAMMER WT. (lb) <b>N/A</b>	SAMPLER HAMMER WT. (lb) <b>140</b>		DRILL MUD <b>Bentonite &amp; Barite</b>	DRILLER <b>Dan Jessie</b>
CASING HAMMER FALL (in) <b>N/A</b>	SAMPLER HAMMER FALL (in) <b>30</b>		DRILLING METHOD <b>HSA</b>	GEOCOMP REP <b>Justin Robichaud</b>
			HOIST/HAMMER <b>Auto</b>	CHECKED BY <b>Martha Hofmann</b>

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0							Drilled to 25 feet to sample below refusal point in CUF-P-2B (El. 367.2 ft)	
5								
10								
15								
20								
25						25.0	reddish-brown CLAY, medium stiff, moist [Dike]	370.0
	SPT 1	2-2-3	39			27.5		
	SPT 2	4-5-10	22			30.0	brown silty GRAVEL (GM), about 23.2% sand and 17.4% fines, medium dense, non-plastic, 11.3% moisture [Dike]	367.5
30						30.0		365.0

REMARKS

1. Drilling mud used with augers. One batch of mud mixed to 9.1 lbs/gal. This was then added to augers everytime they were advanced.
2. Upon completion of the boring 4 piezometers were installed at the following depths: PZ1-52', PZ2-34', PZ3-28', PZ4-17'.
3. Boring was grouted to ground surface upon installation of the piezometers
4. Auger refusal at 53.5' BGS and SPT refusal at 53.8' BGS

SUMMARY			
Overburden (ft):		<b>53.8</b>	
Rock Cored (ft):		<b>0.0</b>	
Samples:		<b>SPT=8 ST=3</b>	
WATER LEVEL DATA			
Depth (ft) to:			
Date/Time	Depth to Water	Bot. of Casing	Bot. of Hole
11/17/2016	0	N/A	53.8

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HOLE ID  
**CUF-P-2C**

(Continued Next Page)

GCC VERSION 1.3 - GCCGINTV1.GDT - 8/8/16 14:20 - \\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220583 - TVA CUF SEISMIC ASSESSMENT\FIELD WORK\LOGS\CUF GINT LOGS.GPJ



# TEST BORING REPORT

HOLE ID  
**CUF-P-2C**  
PAGE 2 OF 2

PROJECT NAME  
**Cumberland Fossil Plant Seismic Assessment**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

PROJECT NUMBER  
**220583**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
395.0 ft NGVD 29

BORING LOC.  
N732344.9/E1509486.4

GCC VERSION 1.3 - GCCGINTV1.GDT - 8/8/16 14:21 - \\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220583 - TVA CUF SEISMIC ASSESSMENT\FIELD WORK\LOGS\CUF GINT LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30	SPT 3	4-20-16	22			30.0	reddish-brown GRAVEL with CLAY, dense, moist [Dike]	
						32.5		362.5
	SPT 4	1-2-4	33				dark brown lean CLAY (CL), about 12.8% sand and 1% gravel, medium stiff, PI=30, 23.1% moisture [Subgrade-Fill]	
35								
	SPT 5	3-2-3	78				brown CLAY, some coarse Sand, medium stiff, moist [Subgrade-Fill]	
						37.5		357.5
	ST 1		0				No Recovery	
40						41.5		353.5
	SPT 6	3-5-7	100				red sandy fat CLAY (CH), about 37.1% sand and 4.7% gravel, stiff, PI=41, 41.5% moisture [Alluvium]	
						44.0		351.0
45	ST 2		65				brown lean CLAY (CL), about 8.8% sand, PI=22, moist [Alluvium]	
	SPT 7	3-5-5	100				brown CLAY, stiff, moist [Alluvium]	
50						50.0		345.0
	ST 3		52				brown fat CLAY (CH), about 2.9% sand, PI=63, moist [Alluvium]	
	SPT 8	50/4"	75			53.8	brown CLAY, trace Sand, very stiff, moist [Alluvium]	341.2
							Bottom of borehole at 53.8 feet.	

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HOLE ID  
**CUF-P-2C**



# TEST BORING REPORT

HOLE ID  
**CUF-R-2B**  
PAGE 1 OF 3

PROJECT NAME  
**Cumberland Fossil Plant Seismic Assessment**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

PROJECT NUMBER  
**220583**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
**395.0 ft NGVD 29**

BORING LOC.  
**N733226.6/E1510124.4**

DRILLING EQUIPMENT & PROCEDURES			RIG MAKE & MODEL	START DATE
CASING TYPE <b>HSA</b>	SAMPLER TYPE <b>SPT &amp; Osterberg/ST</b>	BARREL TYPE <b>N/A</b>	<b>CME-75</b>	<b>12/04/15</b>
CASING ID (in) <b>4.25</b>	SAMPLER ID (in) <b>1.5 &amp; 3/2.875</b>	BARREL ID (in) <b>N/A</b>	BIT TYPE <b>HSA</b>	FINISH DATE <b>12/06/15</b>
CASING HAMMER WT. (lb) <b>N/A</b>	SAMPLER HAMMER WT. (lb) <b>140</b>		DRILL MUD <b>Bentonite &amp; Barite</b>	DRILLER <b>Dan Jessie</b>
CASING HAMMER FALL (in) <b>N/A</b>	SAMPLER HAMMER FALL (in) <b>30</b>		DRILLING METHOD <b>HSA</b>	GEOCOMP REP <b>Justin Robichaud</b>
			HOIST/HAMMER <b>Auto</b>	CHECKED BY <b>Martha Hofmann</b>

GCC VERSION 1.3 - GCCGINTV1.GDT - 8/8/16 14:21 - \\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220583 - TVA CUF SEISMIC ASSESSMENT\FIELD WORK\LOGS\CUF GINT LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0								
	SPT 1	7-5-7	67				reddish-brown CLAY with Gravel, stiff, dry [Dike]	
	SPT 2	4-4-6	78			reddish-brown CLAY with Gravel, stiff, dry [Dike]		
5	SPT 3	4-3-3	67			reddish-brown CLAY with Gravel, medium stiff [Dike]		
	SPT 4	3-6-6	61			red sandy fat CLAY (CH), about 25.7% sand and 7.6% gravel, stiff, PI=33, 31.5% moisture [Dike]		
10	SPT 5	4-4-9	33			reddish-brown CLAY with Gravel, stiff, moist [Dike]		
	SPT 6	6-6-6	72			reddish-brown CLAY with Gravel, stiff, moist [Dike]		
15						15.0		380.0
	ST 1		12				brown lean CLAY (CL), about 13.3% sand and 0.8% gravel, PI=27, 21.5% moisture [Dike]	
20	ST 2		11			brown lean CLAY (CL) with Sand, about 14.9% sand and 14.9% gravel, PI=24, 12.1% moisture [Dike]		373.5
							No Samples Taken From 21.5 to 36 Feet Below Ground Surface	
25								
30								

REMARKS 1. Drilling Mud used with augers. One batch of mud mixed to 9.1 lbs/gal. This was then added to the augers everytime they were advance. 2. Upon completion of the boring 5 piezometers were installed at the following depths: PZ1-85', PZ2 - 75', PZ3-65', PZ4-46', PZ5-30'. 3. Boring was grouted to ground surface upon installtion of the piezometers 4. Bit refusal at 88.3' and SPT refusal met at 89'.	SUMMARY Overburden (ft): <b>89</b> Rock Cored (ft): <b>0.0</b> Samples: <b>SPT=14 ST=9</b>							
	WATER LEVEL DATA							
	<table border="1"> <thead> <tr> <th>Date/Time</th> <th>Depth to Water</th> <th>Bot. of Casing</th> <th>Bot. of Hole</th> </tr> </thead> <tbody> <tr> <td>12/6/2015</td> <td>0</td> <td>N/A</td> <td>89</td> </tr> </tbody> </table>	Date/Time	Depth to Water	Bot. of Casing	Bot. of Hole	12/6/2015	0	N/A
Date/Time	Depth to Water	Bot. of Casing	Bot. of Hole					
12/6/2015	0	N/A	89					

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HOLE ID  
**CUF-R-2B**

(Continued Next Page)



# TEST BORING REPORT

HOLE ID  
**CUF-R-2B**  
PAGE 2 OF 3

PROJECT NAME  
**Cumberland Fossil Plant Seismic Assessment**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

PROJECT NUMBER  
**220583**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
395.0 ft NGVD 29

BORING LOC.  
N733226.6/E1510124.4

GCC VERSION 1.3 - GCCGINTV1.GDT - 9/28/16 11:04 - \\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220583 - TVA CUF SEISMIC ASSESSMENT\FIELD WORK\LOGS\CUF GINT LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
30								
35								
36.0	ST 3		72			36.0	light olive gray lean CLAY (CL), about 8.2% sand, 0.6% gravel, PI=22, moist [Dike]	359.0
40.0	SPT 7	50/3"	0			40.0	No Recovery	355.0
40.3						40.3		354.8
45.0	SPT 8	15-15-10	39			45.0	brown GRAVEL, about 24.5% sand and 21.6% fines, medium, moist [Subgrade-Fill]	350.0
45.0	ST 4		86			47.0	light olive brown clayey SAND (SC) with Gravel, about 40.7% fines and 17% gravel, PI=23, 20.5% moisture [Subgrade-Fill]	348.0
50.0	ST 5		0			51.0	No Recovery	344.0
55.0	ST 6		52			55.0	brown lean CLAY (CL), about 4.4% sand and 1.1% gravel, PI=25, moist [Alluvium]	
55.0	ST 7		76				brown lean CLAY (CL), about 5.6% sand, PI=13, moist [Alluvium]	
60.0	ST 8		88			63.5	brown sandy lean CLAY, about 37.9% sand, PI=8, moist [Alluvium]	331.5
65.0	ST 9		0			67.0	No Recovery	328.0
65.0	SPT 9	6-6-2	67			70.0	brown silty SAND (SM) with Gravel, about 28.5% gravel and 22.1% fines, loose, non-plastic, 23.3% moisture [Alluvium]	325.0
70.0								

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HOLE ID  
**CUF-R-2B**

(Continued Next Page)



# TEST BORING REPORT

HOLE ID  
**CUF-R-2B**  
PAGE 3 OF 3

PROJECT NAME  
**Cumberland Fossil Plant Seismic Assessment**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

PROJECT NUMBER  
**220583**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
395.0 ft NGVD 29

BORING LOC.  
N733226.6/E1510124.4

GCC VERSION 1.3 - GCCGINTV1.GDT - 8/8/16 14:21 - \\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220583 - TVA CUF SEISMIC ASSESSMENT\FIELD WORK\LOGS\CUF GINT LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
70	SPT 10	4-2-12	61				brown sandy lean CLAY (CL), about 34.8% sand and 10.5% gravel, PI=17, medium dense, 22.9% moisture [Alluvium]	
75	SPT 11	9-10-11	39			75.0	brown silty GRAVEL (GM) with Sand, about 32.5% sand and 12.6% fines, medium dense, non-plastic, moist [Alluvium]	320.0
80	SPT 12	6-5-8	33				brown silty GRAVEL (GM) with Sand, about 30.1% sand and 20.6% fines, medium dense, non-plastic, 12% moisture [Alluvium]	
85	SPT 13	13-8-4	22			85.0	brown silty SAND (SM), about 25.1% fines, medium dense, non-plastic, 40.5% moisture [Alluvium]	310.0
	SPT 14	8-50/2"	0			89.0	Weathered rock fragment in tip of split spoon Bottom of borehole at 89.0 feet.	306.0

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HOLE ID  
**CUF-R-2B**



# TEST BORING REPORT

HOLE ID  
**CUF-S-2A**  
PAGE 1 OF 3

PROJECT NAME  
**Cumberland Fossil Plant Seismic Assessment**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

PROJECT NUMBER  
**220583**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
**394.7 ft NGVD 29**

BORING LOC.  
**N733481.65/E1510452.3**

DRILLING EQUIPMENT & PROCEDURES				RIG MAKE & MODEL	START DATE
CASING TYPE HSA	SAMPLER TYPE SPT & Osterberg/ST	BARREL TYPE N/A	BIT TYPE CME-75	FINISH DATE 12/09/15	
CASING ID (in) 4.25	SAMPLER ID (in) 1.5 & 3/2.875	BARREL ID (in) N/A	DRILL MUD Bentonite & Barite	DRILLER Dan Jessie	
CASING HAMMER WT. (lb) N/A	SAMPLER HAMMER WT. (lb) 140		DRILLING METHOD HSA	GEOCOMP REP Justin Robichaud	
CASING HAMMER FALL (in) N/A	SAMPLER HAMMER FALL (in) 30		HOIST/HAMMER Auto	CHECKED BY Martha Hofmann	

GCC VERSION 1.3 - GCCGINTV1.GDT - 8/8/16 14:25 - \\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220583 - TVA CUF SEISMIC ASSESSMENT\FIELD WORK\LOGS\CUF GINT LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
0								
	SPT 1	7-5-5	39				reddish-brown CLAY with Gravel, some sand, stiff, dry [Dike]	
	SPT 2	4-4-4	50			reddish-brown CLAY with Gravel, some sand, stiff, dry [Dike]		
5	SPT 3	3-2-4	39			reddish-brown CLAY with Gravel, some sand, medium stiff, moist [Dike]		
	SPT 4	5-5-4	44			reddish-brown CLAY with Gravel, some sand, stiff, moist [Dike]		
10	SPT 5	3-5-12	61			reddish-brown CLAY with Gravel, some sand, very stiff, moist [Dike]	12.5	
	SPT 6	3-3-3	44			reddish-gray sandy fat CLAY (CH), about 27.3% sand and 3.4% gravel, PI=37, medium stiff, 29.7% moisture [Dike]	15.0	
15	ST 1		18			dark red sandy lean CLAY (CL), about 26.8% sand and 3.4% gravel, PI=28, moist [Dike]		
	SPT 7	11-10-12	44			reddish-brown CLAY with Gravel, some sand, very stiff, moist [Dike]	21.0	
20	SPT 8	12-23-50/4"	50			gray GRAVEL with Clay, very dense, moist [Dike]	23.5	
	SPT 9	2-2-17	33			red fat CLAY (CH) with Gravel, some sand, very stiff, PI=41, moist [Dike]	26.0	
25	SPT 10	3-5-7	33			brown silty GRAVEL (GM) with Sand, about 22.2% fines and 19% sand, stiff, moist [Dike]	28.5	
	SPT 11	3-2-3	39		brown lean CLAY (CL) with Sand, about 13.6% sand and 3.5% gravel, medium stiff, PI=21, moist [Dike]			
30								

REMARKS 1. Drilling Mud used with augers. One batch of mud mixed to 9.2 lbs/gal. This was then added to the augers everytime they were advanced. 2. Upon completion of the boring 5 piezometers were installed at the following depths: PZ1-95', PZ2-80', PZ3-67', PZ4-45', PZ5-24'. 3. Boring was grouted to ground surface upon installation of the piezometers 4. Auger refusal at 102.5' BGS and SPT refusal at 102.6' BGS	SUMMARY Overburden (ft): <b>102.6</b> Rock Cored (ft): <b>0.0</b> Samples: <b>SPT=28 ST=10</b>							
	WATER LEVEL DATA Depth (ft) to:							
	<table border="1"> <thead> <tr> <th>Date/Time</th> <th>Depth to Water</th> <th>Bot. of Casing</th> <th>Bot. of Hole</th> </tr> </thead> <tbody> <tr> <td>12/9/2015</td> <td>0</td> <td>N/A</td> <td>102.6</td> </tr> </tbody> </table>	Date/Time	Depth to Water	Bot. of Casing	Bot. of Hole	12/9/2015	0	N/A
Date/Time	Depth to Water	Bot. of Casing	Bot. of Hole					
12/9/2015	0	N/A	102.6					

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID  
**CUF-S-2A**

(Continued Next Page)



# TEST BORING REPORT

HOLE ID  
**CUF-S-2A**  
PAGE 2 OF 3

PROJECT NAME  
**Cumberland Fossil Plant Seismic Assessment**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

PROJECT NUMBER  
**220583**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
394.7 ft NGVD 29

BORING LOC.  
N733481.65/E1510452.3

GCC VERSION 1.3 - GCCGINTV1.GDT - 8/8/16 14:25 - \\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220583 - TVA CUF SEISMIC ASSESSMENT\FIELD WORK\LOGS\CUF GINT LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
	ST 2		100				gray CLAY, some Silt, trace gravel, trace sand, moist [Dike]	
35	ST 3		54			37.5	olive lean CLAY (CL), about 10.4% sand, PI=18, 21.1% moisture [Dike]	357.2
40	ST 4		0			40.5	No Recovery	354.2
45	SPT 12	3-2-4	100				brown fat CLAY (CH), about 5.2% sand and 0.3% gravel, medium stiff, PI=38, moist [Subgrade-Fill]	
	SPT 5		47			47.5	grayish brown CLAY, some coarse grained Sand, moist [Subgrade-Fill]	347.2
50	ST 6		0			50.5	No Recovery	344.2
55	SPT 13	3-4-5	100				dark brown lean CLAY (CL), about 4.3% sand and 1% gravel, stiff, PI=23, moist [Alluvium]	
	SPT 14	2-4-4	89				dark brown lean CLAY (CL), about 1.6% sand, stiff, PI=20, 24.8% moisture [Alluvium]	
60	ST 7		67				grayish brown CLAY, some coarse grained Sand, moist [Alluvium]	
	ST 8		13				grayish brown CLAY, some coarse grained Sand, moist [Alluvium]	
65	SPT 15	2-4-4	100				brown lean CLAY (CL), about 9.1% sand, stiff, PI=10, 24.2% moisture [Alluvium]	
	ST 9		92				brown and gray mottled CLAY with Silt, 23.6% moisture [Alluvium]	
70	ST 10		100				olive lean CLAY (CL) with Sand, about 27.2% sand and 1.2% gravel, PI=10, moist [Alluvium]	

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID  
**CUF-S-2A**

(Continued Next Page)





# TEST BORING REPORT

HOLE ID  
**CUF-S-2A**  
PAGE 3 OF 3

PROJECT NAME  
**Cumberland Fossil Plant Seismic Assessment**

CLIENT  
**Tennessee Valley Authority**

DRILLING CONTRACTOR  
**Stantec**

PROJECT NUMBER  
**220583**

PROJECT LOCATION  
**Cumberland City, TN**

SURFACE EL.  
394.7 ft NGVD 29

BORING LOC.  
N733481.65/E1510452.3

GCC VERSION 1.3 - GCCGINTV1.GDT - 8/8/16 14:25 - \\HAL1\GCC\CONSULTING\ACTIVE PROJECTS\220583 - TVA CUF SEISMIC ASSESSMENT\FIELD WORK\LOGS\CUF GINT LOGS.GPJ

Depth (ft)	Sample # Type	Blow Counts (N Value)	Recovery %	Casing (b/ft) Coring (min/ft)	Graphic Log	Depth (ft)	Material Description	Elevation (ft)
75	ST 11		89			75.5	gray CLAY with Silt, some fine grained sand, moist [Alluvium]	319.2
	SPT 16	8-11-9	33				grayish brown SAND, some Gravel, trace fines, medium dense, moist [Alluvium]	
80	SPT 17	13-23-21	67			80.5	brown SAND with Gravel, trace fines, dense, moist [Alluvium]	314.2
	SPT 18	11-8-3	56			83.0	brown silty GRAVEL (GM) with Sand, about 38.4% sand and 23% fines, medium dense, non-plastic, 15% moisture [Alluvium]	311.7
85	SPT 19	10-10-21	56			85.5	brown, dense SAND with Gravel, some silt, trace clay, moist [Alluvium]	309.2
	SPT 20	13-9-10	39				brown GRAVEL, about 36.5% sand and 14.1% fines, medium dense, moist [Alluvium]	
90	SPT 21	8-8-16	50			90.5	brown GRAVEL, about 36.4% sand and 17.4% fines, medium dense, 12.9% moisture [Alluvium]	304.2
	SPT 22	7-18-7	61			93.0	gray SAND with Gravel, medium dense, moist [Alluvium]	301.7
95	SPT 23	4-4-5	89			95.5	brown clayey GRAVEL (GC) with Sand, about 37.5% fines and 20.1% sand, PI=24, loose, 36.8% moisture [Alluvium]	299.2
	SPT 24	12-23-13	39			98.0	gray SAND with Gravel, some clay, dense, moist [Alluvium]	296.7
100	SPT 25	22-4-20	33			100.5	brown poorly-graded SAND (SP-SM) with Silt and Gravel, about 34.1% gravel and 11.6% fines, medium dense, non-plastic, 18% moisture [Alluvium]	294.2
	SPT 26	2-4-22	28			102.6	brown GRAVEL, medium dense, moist [Alluvium]	292.1
	SPT 27	50/1"	0				No Recovery	

Bottom of borehole at 102.6 feet.

Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of ground water may occur due to other factors than those present at the time measurements were made. The ASTM 2488 classification symbol and name presented on the boring logs are based on visual-manual procedures.

HOLE ID  
**CUF-S-2A**

Project Number	175539009	Location	Cumberland Fossil		
Project Name	CUF	Boring No.	<b>STN-3A</b>	Total Depth	38.0 ft
County	Stewart, TN	Surface Elevation	394.8 ft		
Project Type	HSA	Date Started	7/15/09	Completed	7/15/09
Supervisor	D. Rogers	Driller	J. Felts	Depth to Water	Dry
Logged By	D. Rogers	Depth to Water	N/A	Date/Time	7/15/09
		Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
394.8	0.0	Top of Hole							
		Bottom Ash, dark brown-gray, damp, loose, some flyash intermixed							
390.5	4.3	Fat Clay, dark brown, damp, stiff, (CH)							
383.0	11.8	Lean Clay, light brown, damp, medium stiff, (CL)		ST-1	8.0 - 10.0	2.0		--	PZ installed screen 27.5-37.5
372.9	21.9	Lean Clay, light brown, stiff, with rock fragments, some boulders (CL)		ST-2	14.0 - 16.0	2.0		--	
360.9	33.9	Lean Clay, red brown, wet, very stiff, with coarse sand, some gravel (CL)							
358.8	36.0	Lean Clay, red brown, wet, very stiff, with coarse sand, some gravel (CL)							

STANTEC\FNSM\_LEGACY\_175539009-CUF.GPJ FNSM-GRAPHIC.LOG.GDT 11/12/09

Project Number <u>175539009</u>	Location <u>Cumberland Fossil</u>
Project Name <u>CUF</u>	Boring No. <b>STN-3A</b> Total Depth <u>38.0 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
356.8	38.0	Lean Clay, gray with brown, moist, stiff, (CL) <i>(Continued)</i>							
		No Refusal / Bottom of Hole							

STANTEC\FMSM\_LEGACY\_175539009-CUF.GPJ\_FMSM\_GRAPHIC.LOG.GDT 11/12/09

Project Number		175539009		Location		Cumberland Fossil				
Project Name		CUF		Boring No.		<b>STN-9</b>		Total Depth		56.8 ft
County		Stewart, TN		Surface Elevation		394.7 ft				
Project Type		HSA 3.25		Date Started		5/4/09		Completed		5/5/09
Supervisor		D. Rogers		Driller		Mark Martin		Depth to Water		17.5 ft
Date/Time								Date/Time		5/4/09
Logged By		Ryan J Riker		Depth to Water		N/A		Date/Time		N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks	
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth		
394.7	0.0	Top of Hole								
		Fat Clay, reddish brown, plastic, moist, firm to very stiff, (CH)		SPT-1	0.0 - 1.5	1.0	3-5-6	22	PZ install 46.5-56.5 screened zone.  Bulk samples from 0.0-6.0, 9.0-12.0	
				SPT-2	1.5 - 3.0	1.2	7-8-10	20		
				SPT-3	3.0 - 4.5	1.4	4-3-3	22		
				SPT-4	4.5 - 6.0	1.5	5-8-8	18		
				SPT-5	6.0 - 7.5	1.4	8-7-10	21		
387.7	7.0	Lean Clay, brown, plastic, moist to wet, firm to very stiff, (CL)		SPT-6	7.5 - 9.0	0.8	9-8-7	20		
	SPT-7		9.0 - 10.5	1.2	7-9-12	27				
	SPT-8		10.5 - 12.0	1.2	9-11-13	25				
	SPT-9		12.0 - 13.5	1.4	13-14-14	20				
	SPT-10		13.5 - 15.0	0.9	4-3-6	22				
	SPT-11		15.0 - 16.5	1.1	4-6-9	27				
	SPT-12		16.5 - 18.0	1.5	11-17-19	21				
	SPT-13		18.0 - 19.5	1.2	8-9-10	17				
	SPT-14		19.5 - 21.0	0.9	7-6-9	20				
	SPT-15		21.0 - 22.5	0.5	12-7-10	26				
	SPT-16		22.5 - 24.0	0.7	5-4-4	21				
	SPT-17		24.0 - 25.5	0.6	2-3-12	17				
	SPT-18		25.5 - 27.0	0.5	3-3-3	15				
	SPT-19		27.0 - 28.5	0.8	2-6-7	32				
	SPT-20		28.5 - 30.0	0.1	8-2-1	4				
363.2	31.5		Lean Clay, gray, slightly plastic, moist, soft to very stiff, organic odor 31'-35' (CL)		SPT-21	30.0 - 31.5	0.4	2-3-2		21
	SPT-22			31.5 - 33.0	0.8	1-2-2	27			
	SPT-23	33.0 - 34.5		1.1	1-2-3	28				
	SPT-24	35.0 - 36.5		1.1	0-3-2	26				

STANTEC/FNSM\_LEGACY\_175539009\_CUF.GPJ\_FNSM\_GRAPHIC.LOG.GDT\_11/12/09

Project Number	175539009	Location	Cumberland Fossil	
Project Name	CUF	Boring No.	<b>STN-9</b>	Total Depth 56.8 ft

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
		Lean Clay, gray, slightly plastic, moist, soft to very stiff, organic odor 31'-35' (CL) <i>(Continued)</i>		SPT-25	37.5 - 39.0	1.5	6-6-11	22	
				SPT-26	40.0 - 41.5	1.1	8-12-18	19	
				SPT-27	42.5 - 44.0	1.5	8-9-13	25	
				SPT-28	45.0 - 46.5	1.3	6-7-11	20	
				SPT-29	47.5 - 49.0	1.5	9-9-12	25	
				SPT-30	50.0 - 51.5	1.1	8-8-11	25	
				SPT-31	52.5 - 54.0	1.3	8-6-7	26	
				SPT-32	55.0 - 56.5	1.0	14-21-49	17	
338.2	56.5								
337.9	56.8	Weathered limestone, gray to light gray, moderately hard.							
		Auger Refusal / Bottom of Hole							
		Top of Rock = 56.5 Elevation (338.2)							

STANTEC\FNSM\_LEGACY\_175539009-CUF.GPJ\_FNSM.GRAPHIC.LOG.GDT 11/12/09



# SUBSURFACE LOG

Project Number	175539009	Location	Cumberland Fossil		
Project Name	CUF	Boring No.	<b>STN-15 A</b>	Total Depth	40.0 ft
County	Stewart, TN	Surface Elevation	395.0 ft		
Project Type	HSA 3.25	Date Started	5/13/09	Completed	5/13/09
Supervisor	D. Rogers	Driller	Mark Martin	Depth to Water	Dry
Logged By	Ryan J Riker	Depth to Water	N/A	Date/Time	5/13/09
		Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
395.0	0.0	Top of Hole							
394.7	0.3	Crushed stone							PZ installed. Screen from 28.5'-38.5' sand placed from 39.9 to 26.6'
		Fat Clay, reddish brown, moist to wet, very stiff, some chert gravel (CH)							
380.7	14.3	Lean Clay, brown, moist to wet, stiff, some gravel (CL)							
366.5	28.5	Lean Clay, brown to gray, wet, medium stiff to stiff, mottled, with some gravel (CL)							

STANTEC/FNSM\_LEGACY\_175539009-CUF.GPJ\_FNSM.GRAPHIC.LOG.GDT\_11/12/09

Project Number <u>175539009</u>	Location <u>Cumberland Fossil</u>
Project Name <u>CUF</u>	Boring No. <b>STN-15 A</b> Total Depth <u>40.0 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
355.0	40.0								

No Refusal /  
Bottom of Hole

STANTEC\FMSM\_LEGACY\_175539009-CUF.GPJ\_FMSM\_GRAPHIC.LOG.GDT 11/12/09

Project Number	175539009	Location	Cumberland Fossil		
Project Name	CUF	Boring No.	<b>STN-21 A</b>	Total Depth	48.0 ft
County	Stewart, TN	Surface Elevation	395.1 ft		
Project Type	HSA 4.25	Date Started	5/7/09	Completed	5/8/09
Supervisor	D. Rogers	Driller	Mark Martin	Depth to Water	5.0 ft
Logged By	Ryan J Riker	Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
395.1	0.0	Top of Hole							
388.9	6.2	Fat Clay, reddish brown, moist, medium stiff to very stiff, (CH)		ST-1	3.0 - 5.0	0.8		--	SI Installed to 48.0'
		Lean Clay, gray, moist to wet, stiff to very stiff, (CL)		ST-2	13.5 - 15.5	0.0		--	
376.6	18.5	Bottom Ash, dark gray to gray, wet, loose, with fly ash below 25 feet		ST-3	20.5 - 22.5	1.3		--	ST 2 Crushed
362.1	33.0	Gravel With Clay, gray to brown, wet, medium dense to very dense, (GC)		ST-4	33.0 - 35.0	1.0		--	

STANTEC\FNSM\_LEGACY\_175539009\_CUF.GPJ\_FNSM\_GRAPHIC.LOG.GDT 11/12/09



Project Number <u>175539009</u>	Location <u>Cumberland Fossil</u>
Project Name <u>CUF</u>	Boring No. <b>STN-21 A</b> Total Depth <u>48.0 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
351.6	43.5	Gravel With Clay, gray to brown, wet, medium dense to very dense, (GC) <i>(Continued)</i>							
347.1	48.0	Boulder (augered)							

Auger Refusal /  
Bottom of Hole

STANTEC\FMSM\_LEGACY\_175539009-CUF.GPJ\_FMSM\_GRAPHIC.LOG.GDT\_11/12/09

Project Number		175539009		Location		Cumberland Fossil				
Project Name		CUF		Boring No.		<b>STN-21</b>		Total Depth		43.5 ft
County		Stewart, TN		Surface Elevation		395.1 ft				
Project Type		HSA 3.25		Date Started		4/29/09		Completed		4/30/09
Supervisor		D. Rogers		Driller		Mark Martin		Depth to Water		12.0 ft
Logged By		Ryan J Riker		Date/Time		4/29/09		Depth to Water		4.8 ft
Date/Time		4/30/09		Date/Time		4/30/09		Date/Time		4/30/09

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
395.1	0.0	Top of Hole							
388.9	6.2	Fat Clay, reddish brown, moist, medium stiff to very stiff, (CH)		SPT-1	0.0 - 1.5	1.3	21-18-9	13	
				SPT-2	1.5 - 3.0	1.1	8-8-8	24	
				SPT-3	3.0 - 4.5	1.0	3-4-3	29	
				SPT-4	4.5 - 6.0	0.9	2-5-4	29	
376.6	18.5	Lean Clay, gray, moist to wet, stiff to very stiff, (CL)		SPT-5	6.0 - 7.5	1.0	5-5-11	21	
				SPT-6	7.5 - 9.0	1.5	4-7-11	18	
				SPT-7	9.0 - 10.5	1.2	8-11-17	16	
				SPT-8	10.5 - 12.0	1.5	10-14-14	18	
				SPT-9	12.0 - 13.5	1.1	15-14-13	25	
				SPT-10	13.5 - 15.0	1.4	4-5-4	19	
				SPT-11	15.0 - 16.5	1.3	12-12-15	21	
				SPT-12	16.5 - 18.0	0.7	10-10-12	29	
362.1	33.0	Bottom Ash, dark gray to gray, wet, loose, with fly ash below 25 feet		SPT-13	18.0 - 19.5	0.9	4-5-5	12	
				SPT-14	19.5 - 21.0	0.9	3-4-3	30	
				SPT-15	21.0 - 22.5	0.9	4-2-3	22	
				SPT-16	22.5 - 24.0	1.0	3-3-4	26	
				SPT-17	24.0 - 24.4	0.8	3-4-4	22	
				SPT-18	25.5 - 27.0	1.0	3-5-4	23	
				SPT-19	27.0 - 28.5	1.2	5-4-3	26	
				SPT-20	28.5 - 30.0	1.1	5-1-2	57	
				SPT-21	30.0 - 31.5	0.5	4-4-4	22	
				SPT-22	31.5 - 33.0	0.4	24-17-8	14	
				SPT-23	33.0 - 34.5	0.7	3-4-5	24	
	SPT-24	34.5 - 36.0	0.1	2-6-8	21				
		Gravel With Clay, gray to brown, wet, meduim d to very dense, (GC)							

STANTEC\FMSM\_LEGACY\_175539009\_CUF.GPJ\_FMSM\_GRAPHIC.LOG.GDT\_11/12/09

Project Number <u>175539009</u>	Location <u>Cumberland Fossil</u>
Project Name <u>CUF</u>	Boring No. <b>STN-21</b> Total Depth <u>43.5 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
351.6	43.5	Gravel With Clay, gray to brown, wet, meduim d to very dense, (GC) <i>(Continued)</i>		SPT-25	36.0 - 37.5	0.5	5-9-9	24	
				SPT-26	37.5 - 39.0	0.9	5-6-9	22	
				SPT-27	39.0 - 40.1	1.5	8-20-13	21	
				SPT-28	40.5 - 41.2	1.1	13-34-40	17	
				SPT-29	42.0 - 43.5	0.5	12-33-50+	9	
		Auger Refusal / Bottom of Hole							

STANTEC\FMSM\_LEGACY\_175539009-CUF.GPJ\_FMSM\_GRAPHIC.LOG.GDT\_11/12/09

Project Number	175539009	Location	Cumberland Fossil		
Project Name	CUF	Boring No.	<b>STN-22 A</b>	Total Depth	60.7 ft
County	Stewart, TN	Surface Elevation	410.2 ft		
Project Type	HSA 3.25	Date Started	5/5/09	Completed	5/6/09
Supervisor	D. Rogers	Driller	J. Felts	Depth to Water	18.9 ft
Logged By	Ryan J Riker	Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core						
410.2	0.0	Top of Hole							
		Bottom Ash, dark brown to gray, damp, medium dense							
406.2	4.0	Clayey Gravel, gray to dark gray, moist to wet, medium stiff to very stiff, (GC)		ST-1	5.5 - 5.6	0.0		--	ST-1 Refused
				ST-2	7.5 - 9.5	0.0		--	ST-2 Crushed
				ST-3	13.5 - 15.5	0.0		--	Sample not recovered
382.2	28.0	Fly Ash, dark brown to gray, wet, very soft to very stiff, few lenses of bottom ash							
				ST-4	34.5 - 36.5	0.0		--	Sample not recovered

STANTEC\FNSM\_LEGACY\_175539009-CUF.GPJ\_FNSM-GRAPHIC.LOG.GDT\_11/12/09

Project Number		175539009			Location		Cumberland Fossil			
Project Name		CUF			Boring No.		<b>STN-22 A</b>		Total Depth	60.7 ft
Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks	
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth		
		Fly Ash, dark brown to gray, wet, very soft to very stiff, few lenses of bottom ash <i>(Continued)</i>		ST-5	45.0 - 45.2	0.0		--	Refused	
353.2	57.0		ST-6	55.0 - 57.0	0.0		--	Sample not recovered		
349.5	60.7		ST-7	58.0 - 60.0	0.0		--	Sample not recovered		
		No Refusal / Bottom of Hole								

STANTEC\FMSM\_LEGACY\_175539009-CUF.GPJ\_FMSM\_GRAPHIC.LOG.GDT 11/12/09

Project Number	175539009	Location	Cumberland Fossil		
Project Name	CUF	Boring No.	<b>STN-28</b>	Total Depth	71.2 ft
County	Stewart, TN	Surface Elevation	410.6 ft		
Project Type	HSA 3.25	Date Started	5/18/09	Completed	5/19/09
Supervisor	D. Rogers	Driller	Mark Martin	Depth to Water	18.0 ft
Logged By	Ryan J Riker	Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks	
Elevation	Depth		Rock Core							RQD
410.6	0.0	Top of Hole								
409.5	1.1	Bottom Ash, dark gray to black, damp, medium dense		SPT-1	0.0 - 1.5	1.2	7-11-8	10		
		Clayey Gravel, reddish brown to brown, moist to wet, stiff to very stiff, (GC)		SPT-2	1.5 - 3.0	0.8	18-12-18	14		
			SPT-3	3.0 - 4.5	0.8	7-11-15	17			
			SPT-4	4.5 - 6.0	0.6	10-17-13	11			
			SPT-5	6.0 - 7.5	0.7	5-5-7	15			
			SPT-6	7.5 - 9.0	0.5	3-6-7	18			
			SPT-7	9.0 - 10.5	1.2	10-7-7	16			
			SPT-8	10.5 - 12.0	1.0	4-8-12	13			
			SPT-9	12.0 - 13.5	1.1	11-30-25	11			
			SPT-10	13.5 - 15.0	0.6	11-8-13	16			
			SPT-11	15.0 - 16.5	1.0	25-17-12	20			
			SPT-12	16.5 - 18.0	0.6	7-11-7	22			
391.2	19.4		Fly Ash, gray, wet, soft to very stiff		SPT-13	18.0 - 19.5	0.6	4-3-3	20	
				SPT-14	19.5 - 21.0	1.5	2-2-3	46		
		SPT-15		21.0 - 22.5	1.5	1-1-1	38			
		SPT-16		25.0 - 26.5	1.5	3-3-4	31			
		SPT-17		27.5 - 29.0	1.5	0-0-0	35			
		SPT-18		30.0 - 31.5	1.5	2-2-3	33			
		SPT-19		32.5 - 34.0	0.7	9-10-12	34			
		SPT-20		35.0 - 36.5	0.8	8-4-6	41			

STANTEC\FNSM\_LEGACY\_175539009\_CUF.GPJ\_FNSM\_GRAPHIC.LOG.GDT\_11/12/09

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
356.9	53.7	Fly Ash, gray, wet, soft to very stiff (Continued)		SPT-21	37.5 - 39.0	1.5	3-2-5	48	
				SPT-22	40.0 - 41.5	1.5	1-2-3	46	
				SPT-23	42.5 - 44.0	1.5	4-8-50	43	
				SPT-24	45.0 - 46.5	1.1	30-21-21	34	
				SPT-25	47.5 - 49.0	1.5	5-12-17	38	
				SPT-26	50.0 - 51.5	1.4	7-10-10	35	
				SPT-27	52.5 - 54.0	1.5	1-1-5	38	
339.4	71.2	Lean Clay, gray to brown, moist, stiff to very stiff, occasional gravel, zones brown mottled (CL)		SPT-28	55.0 - 56.5	0.8	8-11-15	20	
				SPT-29	57.5 - 59.0	1.2	4-9-11	21	
				SPT-30	60.0 - 61.5	1.3	5-8-11	21	sample 34 split into samples 34 and 35. sample 35 is 0.2' weathered rock.
				SPT-31	62.5 - 64.0	1.5	7-8-9	23	
				SPT-32	65.0 - 66.5	1.5	6-7-10	24	
				SPT-33	67.5 - 69.0	1.5	5-6-7	25	
	SPT-34/35	70.0 - 71.2	1.2	4-17-50+	26				
		No Refusal / Bottom of Hole							
		Top of Rock = 71.0 Elevation (339.6)							

STANTEC/FNSM\_LEGACY\_175539009-CUF.GPJ\_FNSM\_GRAPHIC.LOG.GDT\_11/12/09

Project Number		175539009			Location		Cumberland Fossil						
Project Name		CUF			Boring No.		<b>STN-29</b>		Total Depth	60.3 ft			
County		Stewart, TN			Surface Elevation		395.2 ft						
Project Type		HSA 3.25			Date Started		5/14/09	Completed		5/15/09			
Supervisor		D. Rogers			Driller		Mark Martin		Depth to Water		20.2 ft	Date/Time	5/14/09
Logged By		Ryan J Riker			Depth to Water		N/A		Date/Time		N/A		

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core						
395.2	0.0	Top of Hole							
		Fat Clay, reddish brown, moist, stiff, some chert gravel (CH)		SPT-1	0.0 - 1.5	0.5	9-8-14	22	0.2 Crushed Stone
				SPT-2	1.5 - 3.0	0.8	11-13-13	19	
				SPT-3	3.0 - 4.5	1.5	5-8-11	25	
				SPT-4	4.5 - 6.0	0.8	6-3-5	24	
				SPT-5	6.0 - 7.5	0.5	5-7-5	19	
387.7	7.5	Lean Clay, brown, moist to wet, stiff to very stiff, some gravel (CL)		SPT-6	7.5 - 9.0	1.1	5-13-23	22	PZ Installed Screen 44.0-54.0
				SPT-7	9.0 - 10.5	0.6	11-11-7	18	
				SPT-8	10.5 - 12.0	0.7	4-5-13	20	
				SPT-9	12.0 - 13.5	1.4	14-13-19	39	
				SPT-10	13.5 - 15.0	0.9	18-17-17	16	
				SPT-11	15.0 - 16.5	1.5	9-14-14	19	
				SPT-12	16.5 - 18.0	0.9	11-12-15	23	
				SPT-13	18.0 - 19.5	1.2	2-5-5	26	
375.7	19.5	Bottom Ash, dark gray, moist to wet, dense to loose, Bottom Ash, dark blackish-gray, moist to wet, dense to loose, some fines		SPT-14	19.5 - 21.0	0.7	4-5-22	42	Safety Hammer through SPT 12 Auto hammer afterwards
				SPT-15	21.0 - 22.5	1.5	4-3-7	47	
				SPT-16	22.5 - 24.0	1.0	5-2-1	52	
				SPT-17	24.0 - 25.5	1.5	2-2-2	45	
				SPT-18	25.5 - 27.0	1.5	0-0-0	49	
368.2	27.0	Lean Clay With Gravel, brown to gray, wet, medium stiff to very stiff, mottled (CL)		SPT-19	27.0 - 28.5	0.8	13-5-3	27	
				SPT-20	28.5 - 30.0	0.7	2-2-4	23	
				SPT-21	30.0 - 31.5	0.3	3-7-6	32	
				SPT-22	31.5 - 33.0	0.3	7-12-15	32	
				SPT-23	35.0 - 36.5	1.5	8-10-10	28	
358.7	36.5								

STANTEC\FNSM\_LEGACY\_175539009-CUF.GPJ\_FNSM-GRAPHIC.LOG.GDT\_11/12/09



Project Number	175539009	Location	Cumberland Fossil	
Project Name	CUF	Boring No.	<b>STN-29</b>	Total Depth 60.3 ft

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
		Lean Clay, gray, wet, very stiff to soft, trace sand (CL) <i>(Continued)</i>		SPT-24	37.5 - 39.0	1.3	8-13-12	19	
				SPT-25	40.0 - 41.5	1.5	7-6-7	24	
				SPT-26	42.5 - 44.0	1.5	5-5-7	26	
				SPT-27	45.0 - 46.5	1.5	6-6-10	24	
				SPT-28	47.5 - 49.0	1.5	5-6-6	24	
				SPT-29	50.0 - 51.5	1.1	3-3-2	27	
				SPT-30	52.5 - 54.0	1.0	0-0-0	45	
339.7	55.5			SPT-31	55.0 - 55.8	0.3	2-50+/0.3	22	Began Core
339.4	55.8	Shale (Augered)							
		Shale interbedded with Limestone Shale is light gray, calcareous, moderately hard, laminated Limestone is light gray, hard, turbulent bedded							
334.9	60.3			62	4.5	4.5	100	60.3	
		Bottom of Hole  Top of Rock = 55.5 Elevation (339.7)							

STANTEC/FNSM\_LEGACY\_175539009-CUF.GPJ\_FNSM.GRAPHIC.LOG.GDT\_11/12/09

Project Number	175539009	Location	Cumberland Fossil		
Project Name	CUF	Boring No.	<b>STN-36</b>	Total Depth	51.7 ft
County	Stewart, TN	Surface Elevation	411.2 ft		
Project Type	HSA 3.25	Date Started	5/17/09	Completed	5/17/09
Supervisor	D. Rogers	Driller	Mark Martin	Depth to Water	17.4 ft
Logged By	D. Rogers	Depth to Water	N/A	Date/Time	N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core						
411.2	0.0	Top of Hole							
409.4	1.8	Bottom Ash, dark blackish brown, damp, medium dense, little silt		SPT-1	0.0 - 1.5	1.5	4-10-11	13	layers bottom ash in clay PZ Installed, Screen 38-48  sample wet
		Clayey Gravel, reddish brown to brown, damp, dense to very dense, some sand, and cobbles (GC)		SPT-2	1.5 - 3.0	1.2	3-4-48	25	
			SPT-3	3.0 - 4.5	1.1	14-9-28	12		
			SPT-4	4.5 - 6.0	0.8	14-48-36	56		
			SPT-5	6.0 - 7.5	1.0	14-16-20	15		
			SPT-6	7.5 - 9.0	1.2	5-20-49	9		
			SPT-7	9.0 - 10.5	1.5	30-29-40	10		
			SPT-8	10.5 - 11.4	0.6	22-50+	11		
			SPT-9	12.0 - 13.5	1.5	12-10-13	16		
396.5	14.7		SPT-10	13.5 - 15.0	1.5	10-19-49	13		
		Clayey Gravel, gray to black, moist, dense to medium dense, some bottom ash lenses (GC)		SPT-11	15.0 - 16.5	1.5	14-18-12	11	geotextile 14.8 + 19.0  clayey lens 26.5  zones softer, mildly plastic 28-32
			SPT-12	16.5 - 18.0	0.7	9-15-14	11		
391.2	20.0		SPT-13	18.0 - 19.5	0.3	3-3-10	14		
		Flyash, dark brown gray, wet, stiff, laminated with clay		SPT-14	19.5 - 21.0	1.5	9-3-3	43	
			SPT-15	21.0 - 22.5	1.1	6-19-23	34		
			SPT-16	22.5 - 24.0	1.5	12-13-13	40		
			SPT-17	24.0 - 25.5	1.5	3-11-25	45		
			SPT-18	25.5 - 27.0	1.5	9-19-18	42		
			SPT-19	27.5 - 29.0	1.5	1-2-1	45		
			SPT-20	30.0 - 31.5	1.5	0-2-2	47		
			SPT-21	32.5 - 34.0	1.5	5-3-7	47		
			SPT-22	35.0 - 36.5	1.5	4-4-5	48		

STANTEC\FNSM\_LEGACY\_175539009-CUF.GPJ\_FNSM\_GRAPHIC.LOG.GDT\_11/12/09

Project Number		175539009			Location		Cumberland Fossil			
Project Name		CUF			Boring No.		<b>STN-36</b>	Total Depth		51.7 ft
Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks	
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth		
363.0	48.2	Flyash, dark brown gray, wet, stiff, laminated with clay (Continued)		SPT-23	37.5 - 39.0	1.5	4-5-8	47	less lenses 35-42  alternating zones-lensed and homogeneous ash and clay lensed 47.9-48.2	
				SPT-24	40.0 - 41.5	1.5	2-2-5	53		
				SPT-25	42.5 - 44.0	1.5	3-2-3	42		
				SPT-26	45.0 - 46.5	1.5	2-1-2	48		
				SPT-27	47.5 - 49.0	1.5	4-10-14	25		
360.4	50.8	Lean Clay, red brown, wet, very stiff, (CL)		SPT-28	50.0 - 50.8	0.8	14-50+	26		
359.5	51.7	Rock (Augered)								
Auger Refusal / Bottom of Hole  Top of Rock = 50.8 Elevation (360.4)										

STANTEC\FNSM\_LEGACY\_175539009-CUF.GPJ\_FNSM.GRAPHIC.LOG.GDT 11/12/09

Project Number	175539009	Location	Cumberland Fossil		
Project Name	CUF	Boring No.	<b>STN-37</b>	Total Depth	38.3 ft
County	Stewart, TN	Surface Elevation	395.2 ft		
Project Type	HSA 3.25	Date Started	5/16/09	Completed	5/17/09
Supervisor	D. Rogers	Driller	Mark Martin	Depth to Water	18.2 ft
Logged By	D. Rogers	Depth to Water	18.2 ft	Date/Time	5/17/09

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core						
395.2	0.0	Top of Hole							
394.7	0.5	Crushed Stone		SPT-1	0.0 - 1.5	1.5	9-5-10	18	
		Fat Clay, reddish brown, moist, stiff, (CH)		SPT-2	1.5 - 3.0	1.2	6-6-7	23	
			SPT-3	3.0 - 4.5	1.4	5-8-15	26		
			SPT-4	4.5 - 6.0	0.8	36-22-14	23		trace sand large gravel
389.1	6.1			SPT-5	6.0 - 7.5	1.3	6-8-7	20	
		Lean Clay, brown with gray, damp to moist, very stiff, some cobbles, mottled, grading lighter in color (CL)		SPT-6	7.5 - 9.0	1.5	8-12-16	25	
			SPT-7	9.0 - 10.5	1.2	9-15-21	23		wood fragments 10-12
			SPT-8	10.5 - 12.0	1.5	5-8-16	22		
			SPT-9	12.0 - 13.5	1.5	10-12-15	20		
			SPT-10	13.5 - 15.0	1.5	5-11-13	26		
			SPT-11	15.0 - 16.5	1.5	6-6-7	25		
			SPT-12	16.5 - 18.0	1.0	5-9-17	21		
			SPT-13	18.0 - 19.5	0.3	4-4-4	23		
			SPT-14	19.5 - 21.0	0.8	2-2-3	28		
374.0	21.2			SPT-15	21.0 - 22.5	1.5	5-6-6	48	
		Flyash, dark gray, wet, stiff		SPT-16	22.5 - 24.0	0.1	6-5-5	--	
			SPT-17	24.0 - 25.5	1.5	2-2-3	66		
			SPT-18	25.5 - 27.0	1.5	1-2-1	39		
			SPT-19	27.0 - 28.5	1.5	5-6-7	49		large gravel 28.5
366.7	28.5			SPT-20	28.5 - 30.0	1.5	16-6-7	26	
366.2	29.0	Crushed stone							PZ Installed, Screen 18-28
		Lean Clay, dark gray-brown, stiff, little sand, mottled (CL)		SPT-21	30.0 - 31.5	1.5	3-5-7	23	
363.2	32.0			SPT-22	31.5 - 33.0	1.5	8-12-13	25	
361.9	33.3	Lean Clay, reddish brown, wet, very stiff, little sand (CL)		SPT-23	33.0 - 33.4	4.0	50+	27	
		Limestone, very light gray, hard, close fracture spacing							

STANTEC\FMSM\_LEGACY\_175539009-CUF.GPJ\_FMSM-GRAPHIC.LOG.GDT\_11/12/09

Project Number <u>175539009</u>	Location <u>Cumberland Fossil</u>
Project Name <u>CUF</u>	Boring No. <b>STN-37</b> Total Depth <u>38.3 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
356.9	38.3			88	4.9	4.6	94	38.3	

Bottom of Hole

Top of Rock = 33.3  
Elevation (361.9)

STANTEC\FMSM\_LEGACY\_175539009-CUF.GPJ FMSM.GRAPHIC.LOG.GDT 11/12/09

Project Number		175539009		Location		Cumberland Fossil				
Project Name		CUF		Boring No.		<b>STN-42</b>		Total Depth		42.6 ft
County		Stewart, TN		Surface Elevation		396.2 ft				
Project Type		HSA		Date Started		6/13/09		Completed		6/14/09
Supervisor		D. Rogers		Driller		James Felts		Depth to Water		Dry
Logged By		D. Rogers		Date/Time		6/14/09		Depth to Water		N/A
Date/Time		N/A		Date/Time		N/A		Date/Time		N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core						
396.2	0.0	Top of Hole							
395.2	1.0	Bottom Ash, black gray, moist, medium		SPT-1	0.0 - 1.5	1.2	13-18-5	8	
		Fat Clay, red brown, moist, stiff, and rock fragments (CH)		SPT-2	1.5 - 3.0	1.3	2-3-6	18	
			SPT-3	3.0 - 4.5	1.5	3-6-8	24		
391.7	4.5			SPT-4	4.5 - 6.0	1.5	5-6-8	20	few cobbles
		Lean Clay With Sand, red brown with gray, moist, stiff, and rock fragments, mottled (CL)		SPT-5	6.0 - 7.5	1.5	8-6-8	22	
			SPT-6	7.5 - 9.0	1.2	4-10-13	20		
			SPT-7	9.0 - 10.5	1.5	2-3-4	29		pz installed
			SPT-8	10.5 - 12.0	1.5	1-4-5	21		screen 29.0-39.0
			SPT-9	12.0 - 13.5	1.5	3-4-5	24		13.5 water in layer
			SPT-10	13.5 - 15.0	1.5	1-4-5	25		
			SPT-11	15.0 - 16.5	1.5	1-5-9	21		
			SPT-12	16.5 - 18.0	1.5	7-8-9	22		17.0-17.1
			SPT-13	18.0 - 19.5	1.5	5-6-7	22		19.9-20.3 sand lens
			SPT-14	19.5 - 21.0	1.5	3-4-6	26		19.4 wood fragments
375.3	20.9				SPT-15	21.0 - 22.5	1.5	3-4-5	23
		Lean Clay, brown with dark gray, moist to wet, stiff to medium stiff, trace sand, mottled (CL)		SPT-16	22.5 - 24.0	0.9	2-2-2	23	
			SPT-17	25.0 - 26.5	1.5	2-2-2	23		
			SPT-18	27.5 - 29.0	1.1	2-4-6	23		
			SPT-19	30.0 - 31.5	1.5	0-2-9	32		
			SPT-20	32.5 - 34.0	1.5	2-28-5	32		cobble 33 0-33.5
			SPT-21	35.0 - 35.0					boulder cored
									34.7-37 broke through at 38.0

STANTEC/FNSM\_LEGACY\_175539009\_CUF.GPJ\_FNSM\_GRAPHIC.LOG.GDT\_11/12/09

Project Number <u>175539009</u>	Location <u>Cumberland Fossil</u>
Project Name <u>CUF</u>	Boring No. <b>STN-42</b> Total Depth <u>42.6 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
355.7	40.5	Lean Clay, brown with dark gray, moist to wet, stiff to medium stiff, trace sand, mottled (CL) <i>(Continued)</i>		SPT-21	38.0 - 39.5	1.5	0-2-3	30	
			SPT-22	39.5 - 39.9	0.4	50+	39		
353.6	42.6	Rock (augered)							

Auger Refusal /  
Bottom of Hole

Top of Rock = 40.5  
Elevation (355.7)

STANTEC\FMSM\_LEGACY\_175539009-CUF.GPJ\_FMSM\_GRAPHIC.LOG.GDT 11/12/09

Project Number		175539009		Location		Cumberland Fossil				
Project Name		CUF		Boring No.		<b>STN-43</b>		Total Depth		62.0 ft
County		Stewart, TN		Surface Elevation		411.3 ft				
Project Type		HSA		Date Started		6/15/09		Completed		6/16/09
Supervisor		D. Rogers		Driller		James Felts		Depth to Water		Dry
Logged By		D. Rogers		Date/Time		6/16/09		Depth to Water		N/A
Date/Time		N/A		Date/Time		N/A		Date/Time		N/A

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks		
Elevation	Depth		Rock Core							RQD	Run
411.3	0.0	Top of Hole									
408.9	2.4	Bottom Ash, black gray, damp, medium		SPT-1	0.0 - 1.5	1.3	5-10-10	10	boulders 8.1-9.4 + 13.5-14.9		
				SPT-2	1.5 - 3.0	1.2	5-3-2	22			
		Clayey Gravel, brown, moist, loose to dense, some sand (GC)	SPT-3	3.0 - 4.5	1.2	2-8-5	24				
			SPT-4	4.5 - 6.0	0.9	3-3-4	19				
			SPT-5	6.0 - 7.5	1.0	4-4-7	21				
			SPT-6	7.5 - 8.1	0.5	23-50+	14				
			SPT-7	9.5 - 10.5	1.0	7-12	16				
			SPT-8	10.5 - 12.0	1.5	4-7-16	13				
			SPT-9	12.0 - 13.5	0.6	3-14-33	13				
			SPT-10	15.0 - 16.5	0.4	3-4-3	12				
			SPT-11	16.5 - 18.0	1.2	2-1-2	21				
			SPT-12	18.0 - 19.5	1.3	1-1-2	22				
		388.7	22.6	Fly Ash, dark gray, wet, medium stiff	SPT-13	19.5 - 21.0	0.6	2-1-5		20	gravel block spoon
					SPT-14	21.0 - 22.5	0.3	17-12-10		4	
SPT-15	22.5 - 24.0				1.3	6-1-2	20				
375.3	36.0		SPT-16	24.0 - 25.5	1.5	14-13-8	26				
			SPT-17	25.5 - 27.0	1.5	3-5-6	24				
			SPT-18	27.0 - 28.5	1.5	1-4-7	32				
			SPT-19	28.5 - 30.0	1.5	2-2-3	32				
			SPT-20	30.0 - 31.5	1.5	6-1-4	35				
			SPT-21	31.5 - 33.0		1-2-2	43				
			SPT-22	33.0 - 34.5	1.5	1-0-1	42				
			SPT-23	34.5 - 36.0	1.5	0-1-1	45				

STANTEC\FNSM\_LEGACY\_175539009-CUF.GPJ\_FNSM.GRAPHIC.LOG.GDT\_11/12/09



Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
371.8	39.5	Bottom Ash, black gray, wet, dense (Continued)		SPT-24	36.0 - 37.5	1.5	21-18-20	28	several cobbles
				SPT-25	37.5 - 39.0	1.5	10-12-11	25	
368.6	42.7	Fly Ash, gray, wet, stiff		SPT-26	39.0 - 40.5	1.5	12-5-2	49	
				SPT-27	40.5 - 42.0	1.5	2-2-3	35	
349.9	61.4	Lean Clay, brown and gray, wet, very stiff, some sand, little gravel (CL)		SPT-28	42.0 - 43.5	1.5	0-17-26	11	
				SPT-29	43.5 - 45.0	1.5	12-14-18	16	
				SPT-30	45.0 - 46.5	1.5	16-9-9	18	
				SPT-31	47.5 - 49.0	0.3	9-7-6	16	
				SPT-32	50.0 - 51.5	1.5	1-3-5	25	
				SPT-33	52.5 - 54.0	1.5	9-7-6	25	
				SPT-34	55.0 - 56.5	1.5	5-7-7	24	
				SPT-35	57.5 - 59.0	1.5	3-5-7	25	
349.3	62.0			SPT-36	60.0 - 61.5	1.5	5-7-20	31	
		Shale, brown, soft, (augered)							
		Auger Refusal / Bottom of Hole							
		Top of Rock = 61.4 Elevation (349.9)							

STANTEC\FNSM\_LEGACY\_175539009-CUF.GPJ\_FNSM\_GRAPHIC.LOG.GDT 11/12/09

Project Number		175552005		Location		N=732555.67 ft, E=1509526.03 ft				
Project Name		CUF PZ Installation		Boring No.		<b>STN-100</b>		Total Depth		78.6 ft
County		Stewart, TN		Surface Elevation		395.0 ft				
Project Type				Date Started		10/8/12		Completed		10/8/12
Supervisor		D. Rogers		Driller		M. Wethington		Depth to Water		18.0 ft
Logged By		M. Jones		Depth to Water		N/A		Date/Time		N/A
Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks	
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth		
395.0	0.0	Top of Hole								
		Lean Clay With Gravel, reddish brown, moist, very stiff		SPT-1	5.0 - 6.5	0.8	7-18-10	--		
			SPT-2	10.0 - 11.5	0.5	6-6-12	--			
380.0	15.0	Lean Clay, brown to grayish brown, moist, stiff		SPT-3	15.0 - 16.5	0.7	3-5-8	--		
377.0	18.0									
		Gravel With Sand, gray, wet, medium dense, trace clay		SPT-4	20.0 - 21.5	0.1	7-7-8	--	free water encountered during drilling at 18' Cobbles 18' to 23'	
370.0	25.0									
		Lean Clay With Gravel, yellowish brown, wet, medium stiff, trace gravel		SPT-5	25.0 - 26.5	1.0	3-3-5	--	Cobbles 27' to 29.5	
365.5	29.5									
		Lean Clay, brown to grayish brown, moist to wet, stiff		SPT-6	30.0 - 31.5	1.2	9-6-7	--		
360.0	35.0									
				SPT-7	35.0 - 36.5	1.2	4-4-4	--		

STANTECFINSL\_LEGACY\_175552005.GPJ FINSL-GRAPHIC.LOG.GDT\_11/14/12

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core						
355.0	40.0	Lean Clay, gray with yellowish brown, wet, medium stiff, trace organics <i>(Continued)</i>							
		Lean Clay, yellowish brown mottled gray, moist, very stiff		SPT-8	40.0 - 41.5	1.5	12-14-18	--	
350.0	45.0								
		Lean Clay With Sand, reddish brown, wet, stiff, trace gravel		SPT-9	45.0 - 46.5	0.3	10-6-6	--	
				SPT-10	50.0 - 51.5	1.5	10-17-24	--	
				SPT-11	55.0 - 56.5	1.5	8-14-14	--	
334.5	60.5								
		Fat Clay, reddish brown to greenish gray, moist, stiff to very stiff, sand lenses at 76.4'		SPT-12	60.0 - 61.5	1.5	8-14-17	--	
				SPT-13	65.0 - 66.5	1.5	7-10-15	--	
				SPT-14	70.0 - 71.5	1.0	7-6-5	--	
				SPT-15	75.0 - 76.5	1.5	3-4-6	--	

STANTECFINSM\_LEGACY\_175552005.GPJ FINSM-GRAPHIC.LOG.GDT 11/14/12

Project Number <u>175552005</u>	Location <u>N=732555.67 ft, E=1509526.03 ft</u>
Project Name <u>CUF PZ Installation</u>	Boring No. <b>STN-100</b> Total Depth <u>78.6 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
316.4	78.6	Auger Refusal / Bottom of Hole Installed piezometer in borehole Top of Rock = 78.6 Elevation (316.4)							

STANTECFMISM\_LEGACY\_175552005.GPJ\_FMISM-GRAPHIC.LOG.GDT\_11/14/12

# **APPENDIX B.5**

## **PERMANENT WELLS**

# Table of Contents

Subsurface Boring Legend.....	1
CUF-93-1 .....	2
CUF-93-1d.....	4
CUF-93-2.....	11
CUF-93-2R .....	13
CUF-93-3.....	16
CUF-93-4.....	18
CUF-101 .....	19
CUF-102.....	20
CUF-120.....	21
CUF-201 .....	22
CUF-202.....	23
CUF-205.....	24
CUF-206.....	25
CUF-207.....	28
CUF-208.....	31
CUF-209.....	33
CUF-210.....	35
CUF-211.....	37
CUF-212.....	39
CUF-213.....	41
CUF-1000ALT.....	43
CUF-1000ALTA .....	44
CUF-1001ALT.....	46
CUF-1001ALT2.....	48
CUF-1002ALT2.....	50
CUF-1003 .....	52
CUF-1003A.....	54
CUF-1003B.....	56
CUF-1004ALT.....	58

CUF-1004ALT2.....	60
CUF-1004ALT2A .....	61
CUF-1005 .....	63
CUF-1006 .....	65

# Subsurface Boring Legend

## Lithology Graphics

Symbol	Lithology
	Fill
	Top Soil
	Gravel
	Well Graded Gravel (GW)
	Poorly Graded Gravel (GP)
	Silty Gravel (GM)
	Silty, Clayey Gravel (GC-GM)
	Clayey Gravel (GC)
	Well Graded Gravel with Silt (GW-GM)
	Well Graded Gravel with Clay (GW-GC)
	Poorly Graded Gravel with Silt (GP-GM)
	Poorly Graded Gravel with Clay (GP-GC)
	Well Graded Sand (SW)
	Poorly Graded Sand (SP)
	Silty Sand (SM)
	Silty, Clayey Sand (SC-SM)
	Clayey Sand (SC)
	Well Graded Sand with Silt (SW-SM)
	Well Graded Sand with Clay (SW-SC)
	Poorly Graded Sand with Silt (SP-SM)
	Poorly Graded Sand with Clay (SP-SC)
	Silt (ML)
	Silty Clay (CL-ML)
	Lean Clay (CL)
	Organic Silt (OL)
	Elastic Silt (MH)
	Fat Clay (CH)
	Organic Clay (OH)
	Shale
	Siltstone
	Coal
	Limestone
	Sandstone

## Other Graphics

Symbol	Description
	Denotes environmental analytical sample interval
	Denotes SS sample interval
	Denotes ST sample interval
	Denotes DP sample interval
	Denotes RS sample interval
	Denotes RC sample interval
	First water level reading
	Second water level reading

## Common Abbreviations

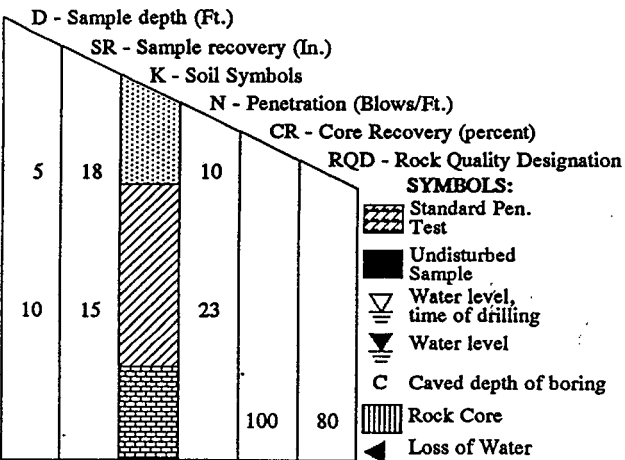
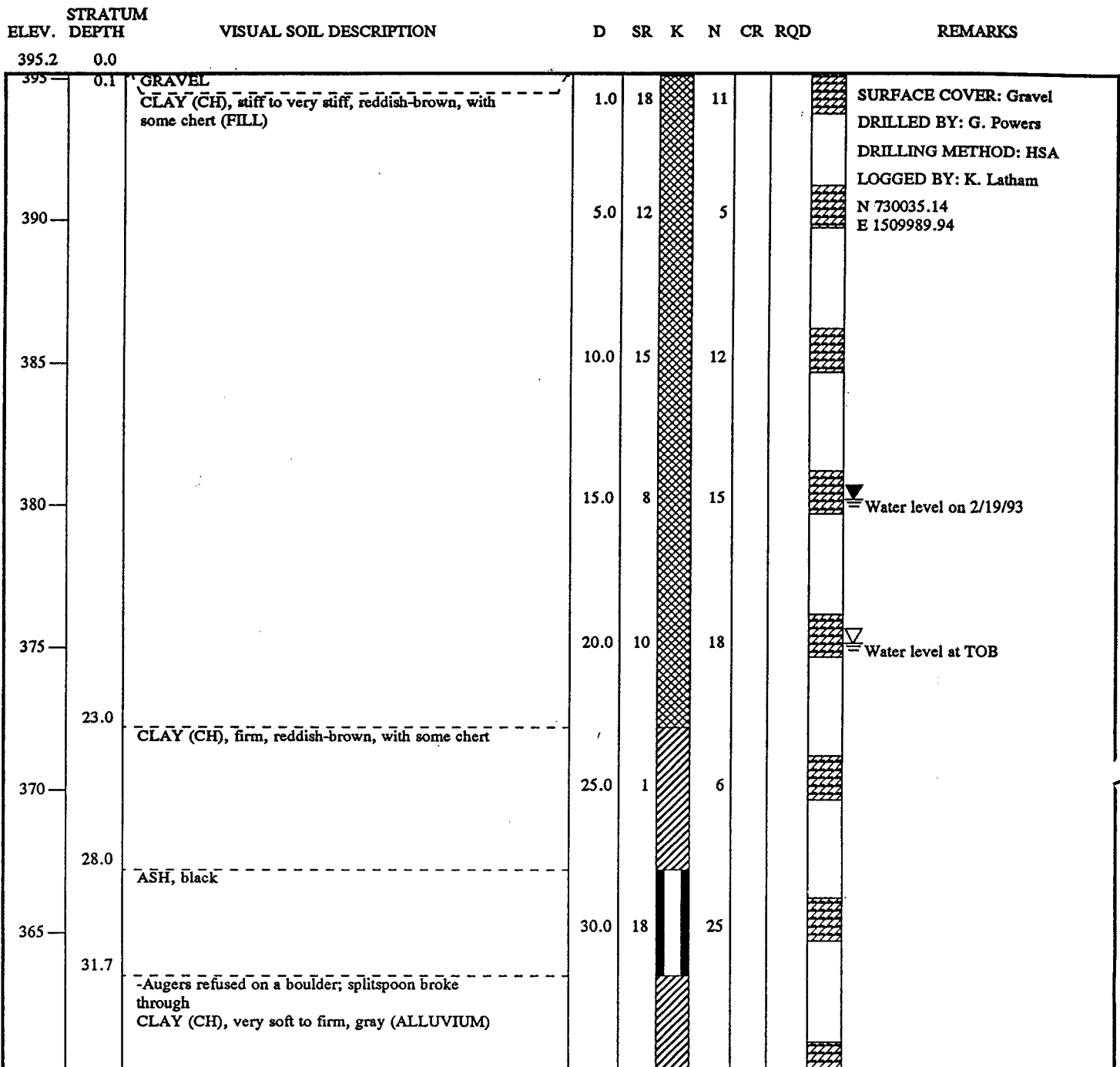
Abbreviation	Definition
DP	Direct Push
HA	Hand Auger
HSA	Hollow Stem Auger
N/A	Not Applicable
NR	Not Recorded
RC	Rock Core
RQD	Rock Quality Designation
RS	Rotary Sonic
SS	Split Spoon
ST	Shelby Tube
WH	Weight of Hammer
WR	Weight of Rod

## General Notes

The boring logs include sample numbering used during drilling. For assigned Environmental Analytical Sample ID numbers, see relevant Environmental Chain-of-Custody forms from the drilling date range listed on each log.

For pH readings and additional field data, see applicable field documentation (e.g., Soil pH Data Form) from the drilling date range listed on each log.





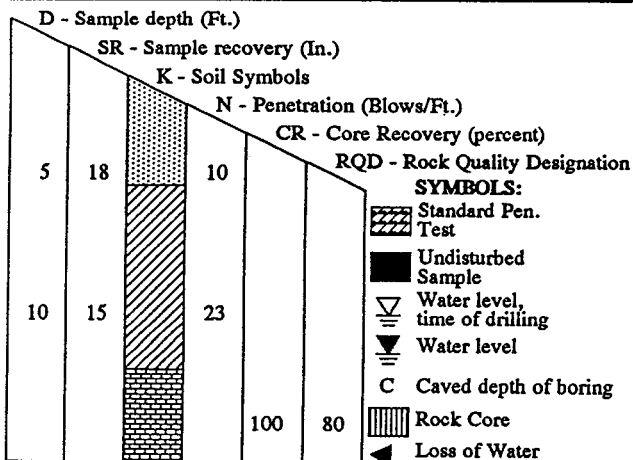
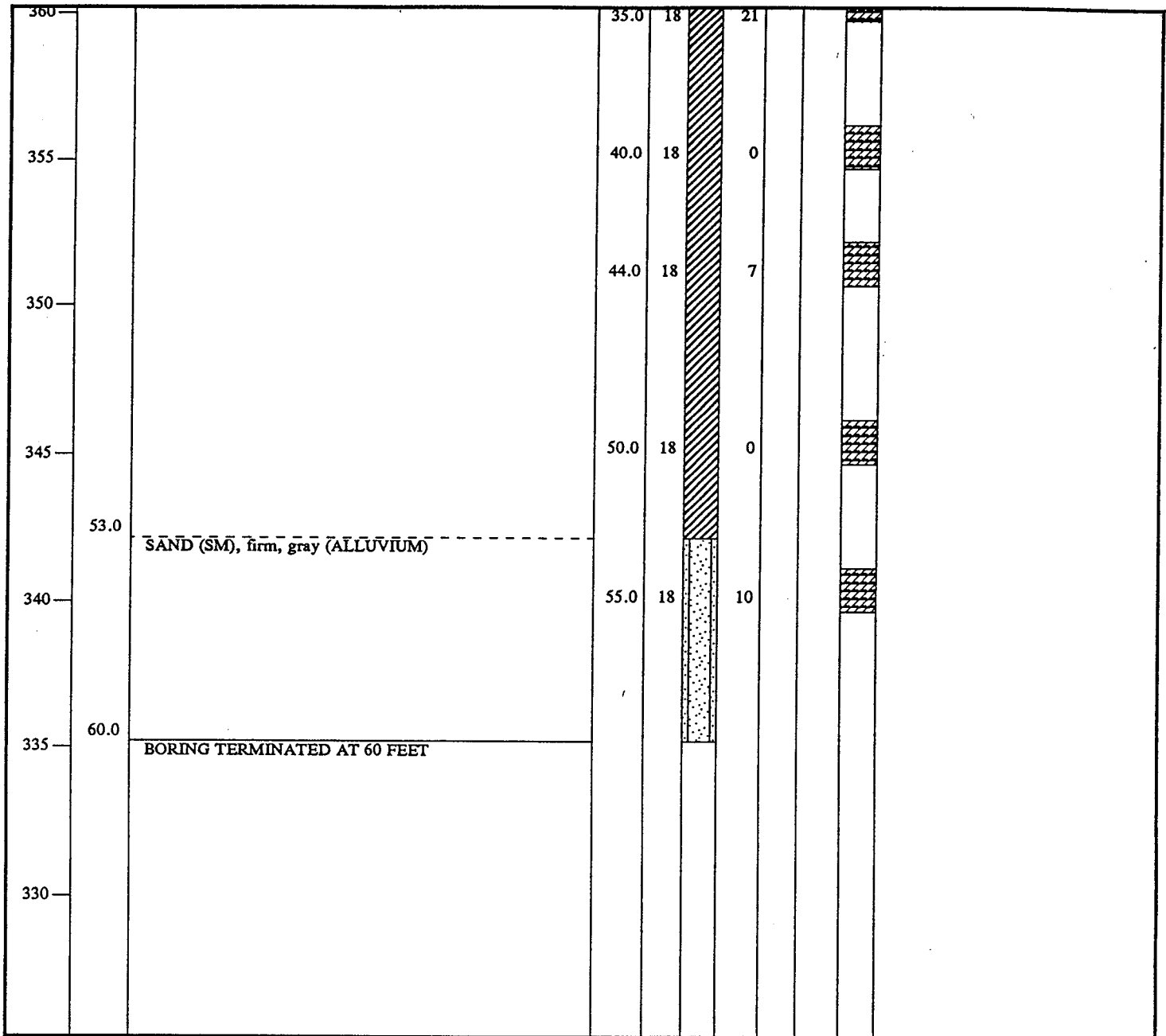
TEST BORING RECORD	
BORING NUMBER	93-1
DATE DRILLED	February 19, 1993
PROJECT NUMBER	417.93368.01
PROJECT	CUMBERLAND STEAM
PAGE 1 OF 2	
LAW ENGINEERING	

STRATUM  
ELEV. DEPTH

VISUAL SOIL DESCRIPTION

D SR K N CR RQD

REMARKS



TEST BORING RECORD	
BORING NUMBER	93-1
DATE DRILLED	February 19, 1993
PROJECT NUMBER	417.93368.01
PROJECT	CUMBERLAND STEAM
PAGE 2 OF 2	

Note: This well installation log represents well construction details as documented at the time of installation and may vary from well details presented in more recent tables or documents based on downhole video logging conducted in 2016.



# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>93-1D</b>	
Client	Tennessee Valley Authority	Boring Location	730,125.13 N; 1,509,887.11 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	395.1 ft	Elevation Datum NGVD29
Project Name	CUF State Wells	Date Started	12/20/18	Completed 1/15/19
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	32.2 ft	Date/Time 4/19/19 13:20
Inspector	G. Budd	Logger	D. Mihalek	Depth to Water 37.2 ft
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 850XR, #953	
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 2" SS w/o liners			
Rock Drilling and Sampling Tools (Type and Size)	NQ-3 Wireline, Split Barrel, PCD Bit			
Overdrill Tooling (Type and Size)	4" x 9" Sonic	Overdrill Depth	93.0 ft	
Sampler Hammer Type	Automatic	Weight	140 lb	Drop 30" Efficiency N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	B. Evans	Approved By	C. Millhollin	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	395.1						
			Top of Hole					
1			WELL GRADED GRAVEL, GW, loose, dry, crusher run, No. 57 stone road base, [FILL]		SS01G	0.0 - 1.5	0.6	4-3-2
2					SS02G	1.5 - 3.0	0.4	4-5-6
3	2.8	392.3						
	3.0	392.1	LEAN CLAY, CL, 7.5YR 3/4 (dark brown), soft, dry, chert fragments throughout		SS03G	3.0 - 4.5	1.5	4-5-4
4					SS04G	4.5 - 6.0	1.4	2-2-4
5	4.5	390.6	LEAN CLAY, CL, 5YR 4/6 (yellowish red), soft to firm, dry, chert fragments throughout		SS05G	6.0 - 7.5	1.1	5-3-6
6			FAT CLAY, CH, 5YR 4/6 (yellowish red), high plasticity, soft, moist, chert fragments throughout		SS06G	7.5 - 9.0	1.3	5-2-3
7			FAT CLAY, CH, 5YR 4/6 (yellowish red), high plasticity, soft to firm, moist, chert and limestone fragments		SS07G	9.0 - 10.5	1.4	6-4-5
8					SS08G	10.5 - 12.0	1.0	3-8-9
9	9.0	386.1	LEAN CLAY, CL, 5YR 4/6 (yellowish red), medium plasticity, firm, moist, with chert fragments throughout		SS09G	12.0 - 13.5	1.4	5-5-10
10					SS10G	13.5 - 15.0	1.5	9-11-15
11	10.5	384.6	FAT CLAY, CH, 5YR 4/6 (yellowish red), high plasticity, soft to firm, moist, chert and limestone fragments throughout		SS11G	15.0 - 16.5	1.4	13-13-13
12			LEAN CLAY, CL, 7.5YR 4/6 (strong brown)		SS12G	16.5 - 18.0	1.5	8-14-19
13	13.5	381.6	LEAN CLAY, CL, 7.5YR 5/3 (brown), low plasticity, stiff, dry, chert, coarse fragments throughout					
14								
15	15.0	380.1	LEAN CLAY, CL, 7.5YR 4/2 (brown), low plasticity, stiff, dry, chert and black ash fragments throughout					
16								
17	16.5	378.6						
18								
19	18.0	377.1						







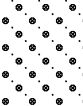
TVA EIP BORING LOG\_CUF\_STATE\_WELLS.GPJ\_TDEC SUBSURF DT 20190630.GDT 4/13/22

Client Borehole ID N/A      Stantec Boring No. **93-1D**  
 Client Tennessee Valley Authority      Boring Location 730,125.13 N; 1,509,887.11 E NAD27 Plant Local  
 Project Number 175568209      Surface Elevation 395.1 ft      Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			LEAN CLAY, CL, 7.5YR 5/4 (brown), low plasticity, stiff, chert, limestone, and bottom ash fragments					
19	19.5	375.6		SS13G	18.0 - 19.5	1.5	15-11-10	
20			LEAN CLAY, CL, 7.5YR 4/4 (brown), medium plasticity, firm to stiff, ash, chert fragments  Chert cobbles, loose, dry, with ash fragments at 21.0'					
21				SS14G	19.5 - 21.0	1.5	6-7-9	
22	22.5	372.6	SS15G	21.0 - 22.5	0.4	50+5"		
23			FAT CLAY, CH, 5YR 4/6 (yellowish red), high plasticity, soft, wet, with chert gravel					
24				SS16G	22.5 - 24.0	1.1	6-2-1	
25	25.5	369.6	SS17G	24.0 - 25.5	0.4	1-WH-1		
26			FAT CLAY, CH, 7.5YR 4/6 (strong brown), high plasticity, soft, wet, chert pebbles throughout					
27	27.0	368.1		SS18G	25.5 - 27.0	1.1	WH-3-2	
28			FAT CLAY, CH, 7.5YR 4/6 (strong brown), high plasticity, wet, limestone cobbles throughout					
29				SS19G	27.0 - 28.5	1.2	5-5-3	
30	30.0	365.1	SS20G	28.5 - 30.0	1.0	1-1-2		
31			FAT CLAY, CH, 7.5YR 4/6 (strong brown), high plasticity, wet, medium coarse chert pebbles throughout					
32	31.5	363.6		SS21G	30.0 - 31.5	1.0	2-2-3	
33			FAT CLAY, CH, 7.5YR 4/4 (brown), soft, moist					
34	33.0	362.1	SS22G	31.5 - 33.0	0.6	3-5-8		
35			NO RECOVERY					
36	34.5	360.6	SS23G	33.0 - 34.5	0.0	11-9-8		
37			FAT CLAY WITH GRAVEL, CH, 7.5YR 4/6 (strong brown), stiff, moist, trace sand with silt					
38	36.0	359.1		SS24G	34.5 - 36.0	1.2	11-8-9	
39			SILTY FAT CLAY WITH GRAVEL, CH, 7.5YR 4/6 (strong brown), stiff, moist					
40	37.5	357.5		SS25G	36.0 - 37.5	1.5	8-10-12	
41			FAT CLAY WITH SAND, CH, 7.5YR 4/6 (strong brown), stiff, moist, trace gravel					
42	39.0	356.1		SS26G	37.5 - 39.0	1.5	5-6-8	
43			SILTY FAT CLAY, CH, 7.5YR 5/6 (strong brown), firm, occasional gravel					
44	40.5	354.6		SS27G	39.0 - 40.5	1.1	6-7-7	
45			SILTY FAT CLAY, CH, 7.5YR 5/6 (strong brown), firm, occasional gravel					
46	42.0	352.1		SS28G	40.5 - 42.0	1.5	4-5-5	

TVA EIP BORING LOG\_CUF\_STATE\_WELLS.GPJ\_TDEC SUBSURF DT 20190630.GDT 4/13/22

Client Borehole ID     N/A     Stantec Boring No. **93-1D**  
 Client     Tennessee Valley Authority     Boring Location     730,125.13 N; 1,509,887.11 E NAD27 Plant Local      
 Project Number     175568209     Surface Elevation     395.1 ft     Elevation Datum     NGVD29    

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
43	43.5	351.6	 Increased gravel at 42.0' SILTY FAT CLAY, CH, 7.5YR 5/6 (strong brown), firm, occasional gravel <i>(Continued)</i>		SS29G	42.0 - 43.5	0.3	4-5-5
44	45.0	350.1		SILTY FAT CLAY, CH, 7.5YR 5/1 (gray), soft, moist		SS30G	43.5 - 45.0	1.5
45			 SILTY FAT CLAY, CH, 7.5YR 4/1 (dark gray), soft, moist		SS31G	45.0 - 46.5	1.5	WH-3-3
46				Trace organic inclusions from 48.0' to 49.5'		SS32G	46.5 - 48.0	1.5
47			 Some sand at 49.5'		SS33G	48.0 - 49.5	1.4	WH-2-3
48				SILTY FAT CLAY SOME SAND, CH, 7.5YR 4/1 (dark gray), firm, moist		SS34G	49.5 - 51.0	1.5
49	51.0	344.1	 FAT CLAY WITH SILT, CH, firm, moist to wet, sand and gravel, organic inclusions throughout		SS35G	51.0 - 52.5	1.4	WH-1-2
50	52.5	342.6		NO RECOVERY		SS36G	52.5 - 54.0	1.5
51	54.0	341.1	 SANDY FAT CLAY WITH GRAVEL, CH, 5YR 4/1 (dark gray), soft, moist		SS37G	54.0 - 55.5	0.0	5-7-6
52	57.0	338.1		SANDY WELL GRADED GRAVEL TRACE CLAY, GW, loose, wet		SS38G	55.5 - 57.0	1.5
53			 Increased clay content beginning at 58.5'		SS39G	57.0 - 58.5	0.4	6-1-WH
54				Increased gravel cobble size at 61.5'		SS40G	58.5 - 60.0	1.0
55			 WELL GRADED GRAVEL WITH SAND, GW, 10YR 5/3 (brown), medium to coarse, loose, wet, subrounded to subangular		SS41G	60.0 - 61.5	0.8	8-10-10
56						SS42G	61.5 - 63.0	0.6
57	64.5	330.6			SS43G	63.0 - 64.5	1.0	6-11-9
58					SS44G	64.5 - 66.0	0.6	7-6-4

TVA/EIP BORING LOG\_CUF\_STATE\_WELLS.GPJ\_TDEC SUBSURF DT 20190630 GDT 4/13/22






















# SUBSURFACE LOG

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI		
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %		
67	69.0	326.1	Additional chert and limestone gravel at 66.0' WELL GRADED GRAVEL WITH SAND, GW, 10YR 5/3 (brown), medium to coarse, loose, wet, subrounded to subangular (Continued)		SS45G	66.0 - 67.5	0.9	7-6-5		
68					SS46G	67.5 - 69.0	1.0	13-18-15		
69	76.0	319.1	GRAVELLY WELL GRADED SAND, SW, 10YR 5/1 (gray) and 10YR 5/3 (brown), medium to coarse, loose, wet, subrounded to subangular		SS47G	69.0 - 70.5	1.0	5-17-16		
70					SS48G	70.5 - 72.0	0.8	11-15-15		
71					Slightly increased gravel cobble size at 72.0'		SS49G	72.0 - 73.5	0.5	9-10-9
72					Gravel begins to grade with depth, also includes some sandstone cobbles at 73.5'		SS50G	73.5 - 75.0	0.6	8-5-7
73					SS51G	75.0 - 76.0	1.0	12-13-50+		
74	79.2	315.9	Limestone, gray, fine, very hard, medium bedded, weathered, stained, microfracturing throughout Healed fracture zone from 76.9' to 77.1' Open joint with calcite on surface at 77.3'					Began Core		
75										
76					Fracture zone from 78.8' to 79.2'		0	76.9 - 78.8 1.9	0.7	37
77					Limestone, gray, fine, very hard, medium bedded, shale stringers and partings throughout		0	78.8 - 81.5 2.7	0.4	15
78							21	81.5 - 83.2 1.7	1.4	82
79	84.2	84.6	Void from 84.2' to 84.6'							
80										
81							25	83.2 - 86.2 3.0	2.0	67
82	86.2	91.2								
83										
84							70	86.2 - 91.2 5.0	5.0	100

TVA/EIP BORING LOG\_CUF\_STATE\_WELLS.GPJ\_TDEC SUBSURF DT:20190630.GDT 4/13/22

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>93-1D</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,125.13 N; 1,509,887.11 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  395.1 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
91			Limestone, gray, fine, very hard, medium bedded, shale stringers and partings throughout (Continued)						
92									
93									
94						94	91.2 - 96.2 5.0	5.0	100
95									
96									
97									
98									
99						96	96.2 - 101.2 5.0	5.0	100
100									
101									
102									
103									
104						100	101.2 - 106.4 5.2	5.2	100
105									
106									
107									
108									
109					96	106.4 - 111.4 5.0	5.0	100	
110									
111									
112									
113									
114					100	111.4 - 116.3 4.9	4.9	100	

TVA/EIP BORING LOG\_CUF\_STATE\_WELLS.GPJ\_TDEC SUBSURF DT:20190630.GDT\_4/13/22



# SUBSURFACE LOG

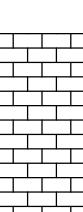
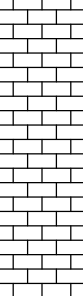
Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>93-1D</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  730,125.13 N; 1,509,887.11 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  395.1 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
115			Limestone, gray, fine, very hard, medium bedded, shale stringers and partings throughout (Continued)					
116	116.3	278.8						
117			Dolomite Limestone, light gray and blueish gray, fine, very hard, medium bedded, crystalline, with finely granular oolitic chert and shale partings and stringers with stylolites throughout					
118								
119					100	116.3 - 121.2 4.9	4.9	100
120								
121								
122								
123								
124					100	121.2 - 126.3 5.1	5.1	100
125								
126	126.3	268.8						
127			Dolomite Limestone, light gray and blueish gray, fine, very hard, medium bedded, interbedded dolomite, crystalline, with some light brown chert and stylolites throughout					
128								
129					90	126.3 - 131.5 5.2	5.2	100
130								
131								
132								
133								
134					100	131.5 - 136.5 5.0	5.0	100
135								
136								
137								
138								

TVA/EIP BORING LOG\_CUF\_STATE\_WELLS.GPJ\_TDEC SUBSURF DT 20190630 GDT 4/13/22



Client Borehole ID	N/A	Stantec Boring No.	<b>93-1D</b>
Client	Tennessee Valley Authority	Boring Location	730,125.13 N; 1,509,887.11 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	395.1 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
139			Dolomite Limestone, light gray and blueish gray, fine, very hard, medium bedded, interbedded dolomite, crystalline, with some light brown chert and stylolites throughout (Continued)		100	136.5 - 141.5 5.0	5.0	100	
140									
141									
142									
143									
144							100	141.5 - 146.4 4.9	4.9
145									
146	146.4	248.7							

Bottom of Hole at 146.4 Ft.

Top of Rock = 76.0 Ft.

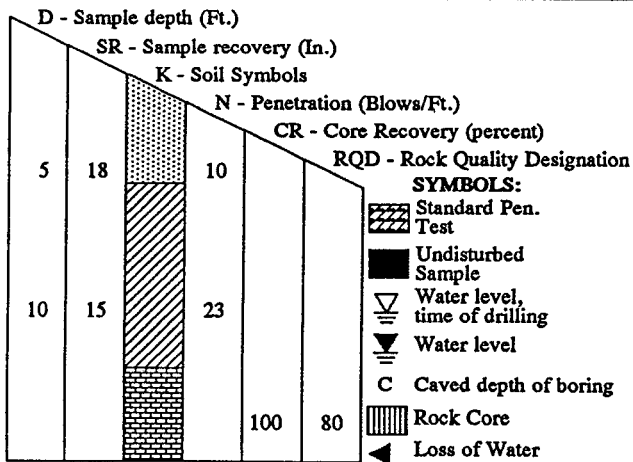
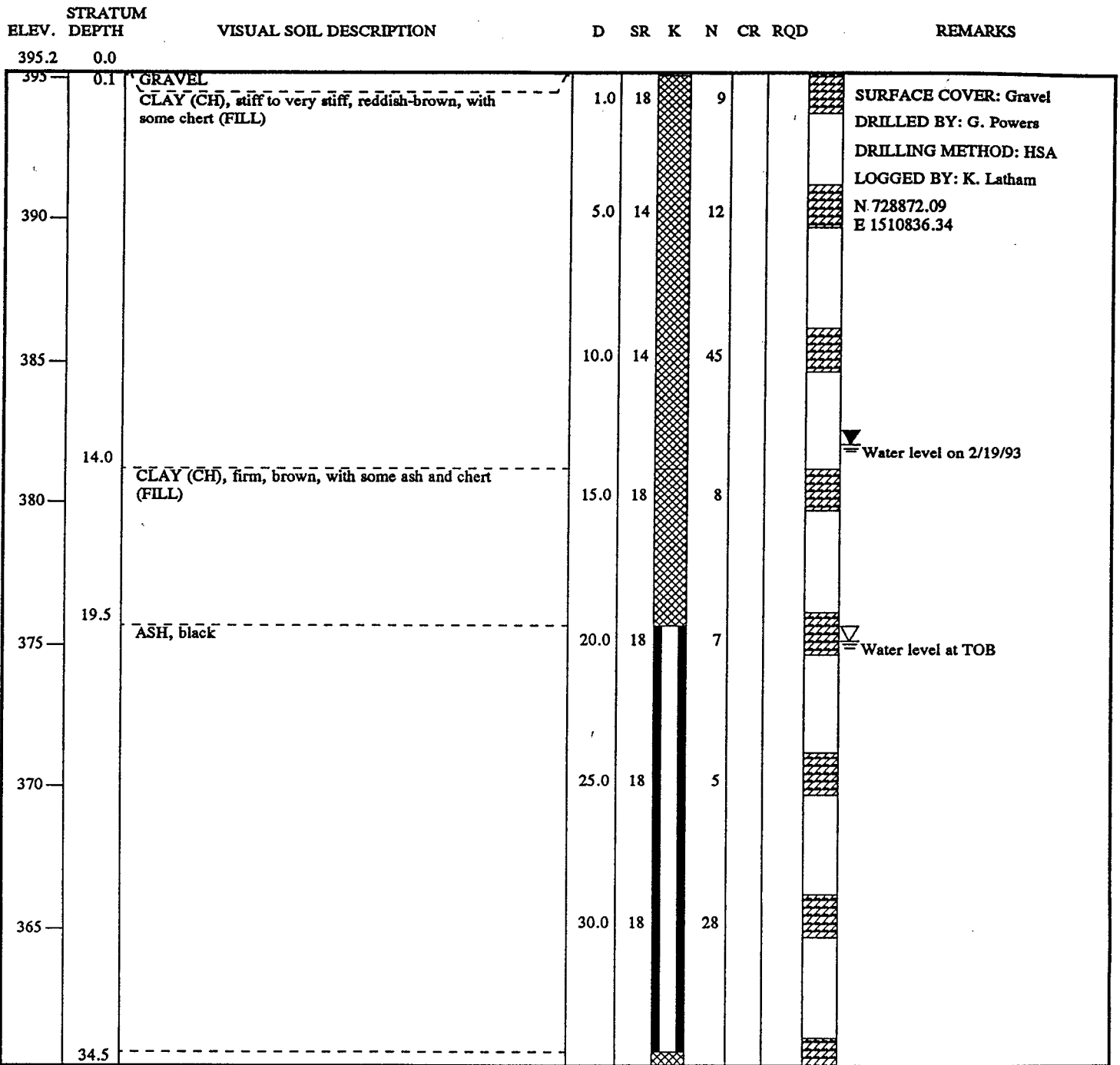
Top of Rock Elevation = 319.1 Ft.

Begin Core = 76.9 Ft.

Monitoring well CUF-93-1D was installed in the boring.  
Refer to the CUF-93-1D Well Installation Detail, dated 04/19/2019, for well construction information.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

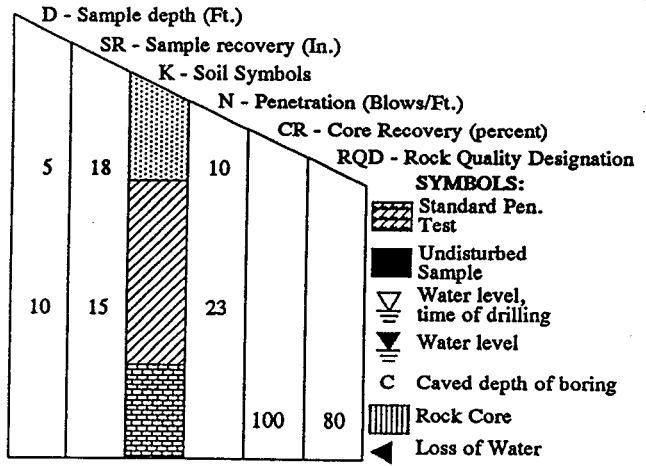
TVA/EIP BORING LOG\_CUF\_STATE\_WELLS.GPJ\_TDEC SUBSURF DT 20190630.GDT 4/13/22



TEST BORING RECORD	
BORING NUMBER	93-2
DATE DRILLED	February 16, 1993
PROJECT NUMBER	417.93368.01
PROJECT	CUMBERLAND STEAM
PAGE 1 OF 2	
<b>LAW ENGINEERING</b>	

STRATUM  
 ELEV. DEPTH VISUAL SOIL DESCRIPTION D SR K N CR RQD REMARKS

360	CLAY (CH), firm, brown, with some alluv gravels (FILL)	35.0	18		16					
39.0										
355	CLAY (CH), reddish-brown, with some chert and limestone (RESIDUAL)	40.0	18		18					
43.0	AUGER REFUSAL AT 43 FEET; BORING TERMINATED	43.0	0		*					* 50/0,-,-
350										
345										
340										
335										
330										



TEST BORING RECORD	
BORING NUMBER	93-2
DATE DRILLED	February 16, 1993
PROJECT NUMBER	417.93368.01
PROJECT	CUMBERLAND STEAM
PAGE 2 OF 2	
<b>LAW ENGINEERING</b>	

Boring Log

Project: TVA's Cumberland Fossil Plant Cumberland City, Tennessee		BORING 93-2R	
Project No.: 1432-05-673	Elevation: Unknown	Notes:	
Designed by: R.L. Russell, R.G. (TN Reg. Geo. Lic. #4979)	Depth: 70'	Descriptions based on visual	
Drilled by: S&ME, Inc. (Tim Hall - TN Driller #813)	Start: September 26, 2005	observation of obtained samples.	
Equipment: CME 55 with 4 1/4" and 6 5/8" augers	Complete: September 29, 2005		

Depth (ft)	Elevation (ft)	Lithology	Boring	Run Length	Recovered	% Recovered	RQD	Lithologic Description
1								Top of 8" vertical well box - 3 feet above ground surface Top of 2" dia. PVC casing - 2.5 feet above ground surface
0	Unknown							Ground Surface
1								Clay - Fill material (0.0' - 38.0')
2								Saturated Conditions at 2'
3								
4								
5								
6								
7								
8								
9								
10								2" dia. PVC casing Grout
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

93-2R  
 x                      y  
 1510792.88      728957.52  
 TN State Plane  
 NAD27 (Ft)



Boring Log

Project: TVA's Cumberland Fossil Plant Cumberland City, Tennessee					BORING		93-2R	
Project No.: 1432-05-673					Elevation: Unknown		Notes:	
Designed by: R.L. Russell, R.G. (TN Reg. Geo. Lic. #4979)					Depth: 70'		Descriptions based on visual	
Drawn by: S&ME, Inc. (Tim Hall - TN Driller #813)					Start: September 26, 2005		observation of obtained samples.	
Equipment: CME 55 with 4 1/4" and 6 5/8" augers					Complete: September 29, 2005			
Depth (ft)	Elevation (ft)	Lithology	Boring	Run Length	Recovered	% Recovered	RQD	Lithologic Description
31								Clay - Fill material (0.0' - 38.0')
32								
33								
34								
35								
36								
37								
38								Boulders and gravel - intermixed with residual clay, sand and river cobbles (alluvial material) (38.0' - 41.0')
39								
40								
41								Clay - intermixed with sands and river cobbles (alluvial material) (41.0' - 73.0')
42								
43								
44								
45								
46								
47								
48								
49								
50								
51								Grout
52								2" dia. PVC casing
53								Hydrated bentonite seal
54								
55								
56								
57								Sand filter
58								
59								
60								2" dia. PVC screen with pre-pack sand filter



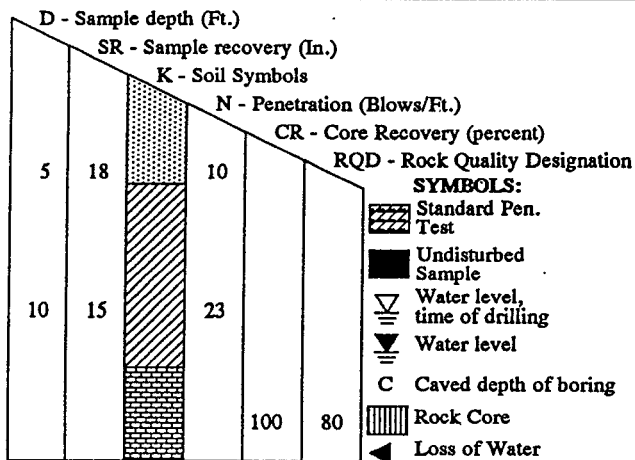
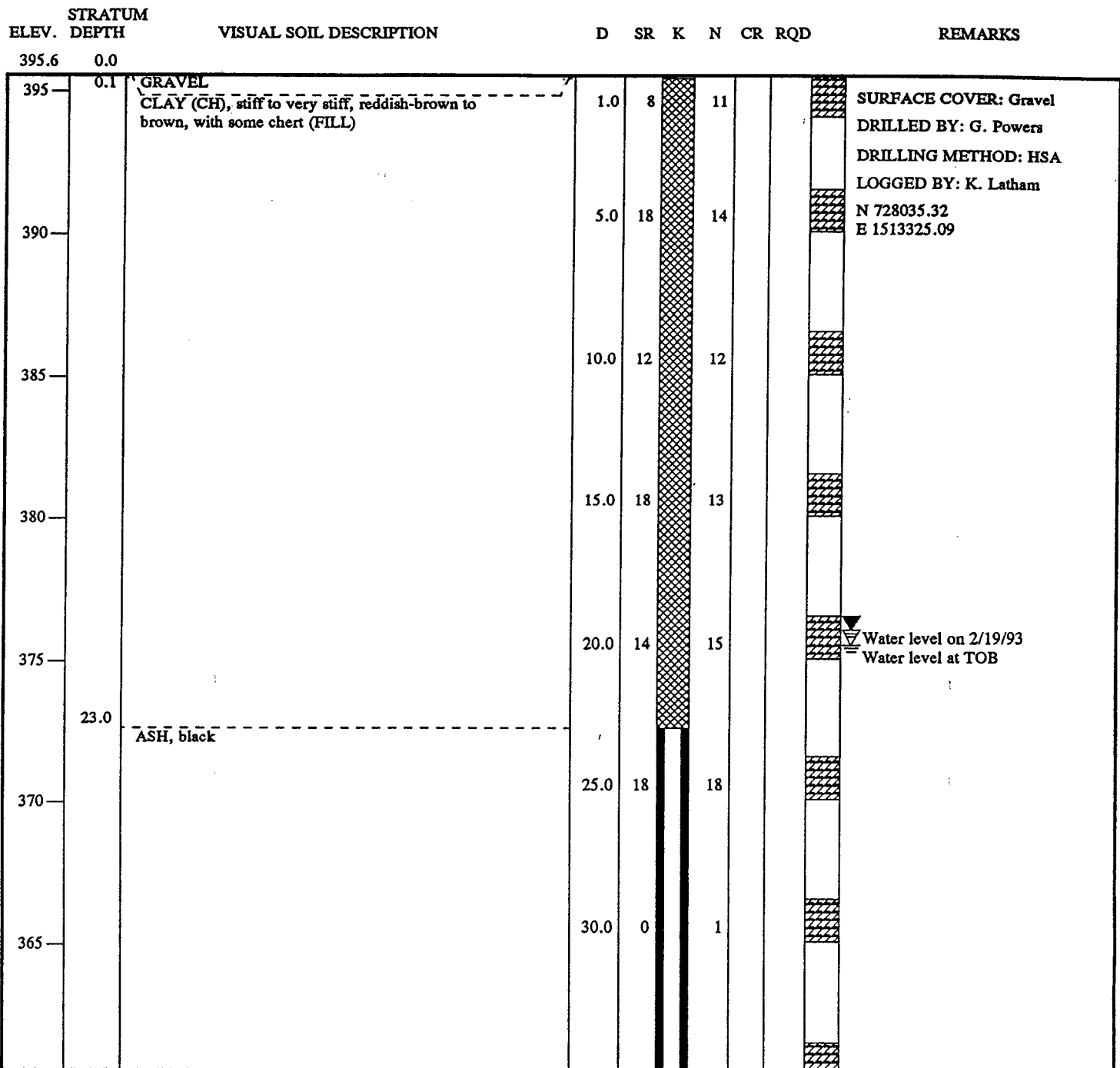
Boring Log

Project:		TVA's Cumberland Fossil Plant Cumberland City, Tennessee					BORING		93-2R	
Project No.:		1432-05-673					Elevation:		Unknown	
Designed by:		R.L. Russell, R.G. (TN Reg. Geo. Lic. #4979)					Depth:		70'	
Installed by:		S&ME, Inc. (Tim Hall - TN Driller #813)					Start:		September 26, 2005	
Equipment:		CME 55 with 4 1/4" and 6 5/8" augers					Complete:		September 29, 2005	
Notes:		Descriptions based on visual observation of obtained samples.								
Depth (ft)	Elevation (ft)	Lithology	Boring	Run Length	Recovered	% Recovered	RQD	Lithologic Description		
61								Clay - intermixed with sands and river cobbles (residual alluvial material) (41.0' - 73.0')		
62										
63								2" dia. PVC screen with pre-pack sand filter		
64										
65								Sand filter		
66										
67										
68										
69										
70								Boring Terminated - bottom of boring at 70.0'		
71										
72										
73										
74										
75										
76										
77										
78										
79										
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84										
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86										
87										
88										
89										
90										



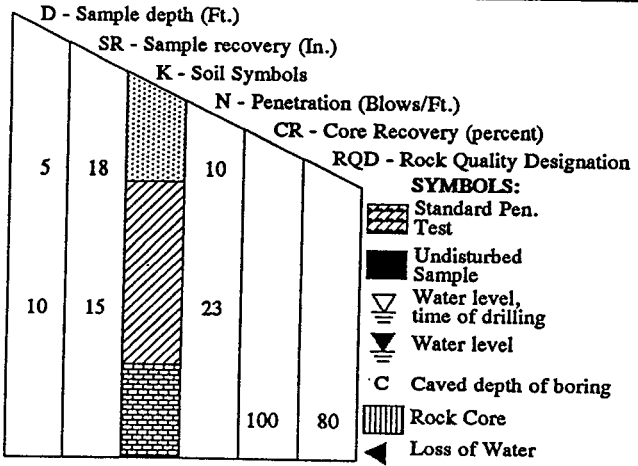
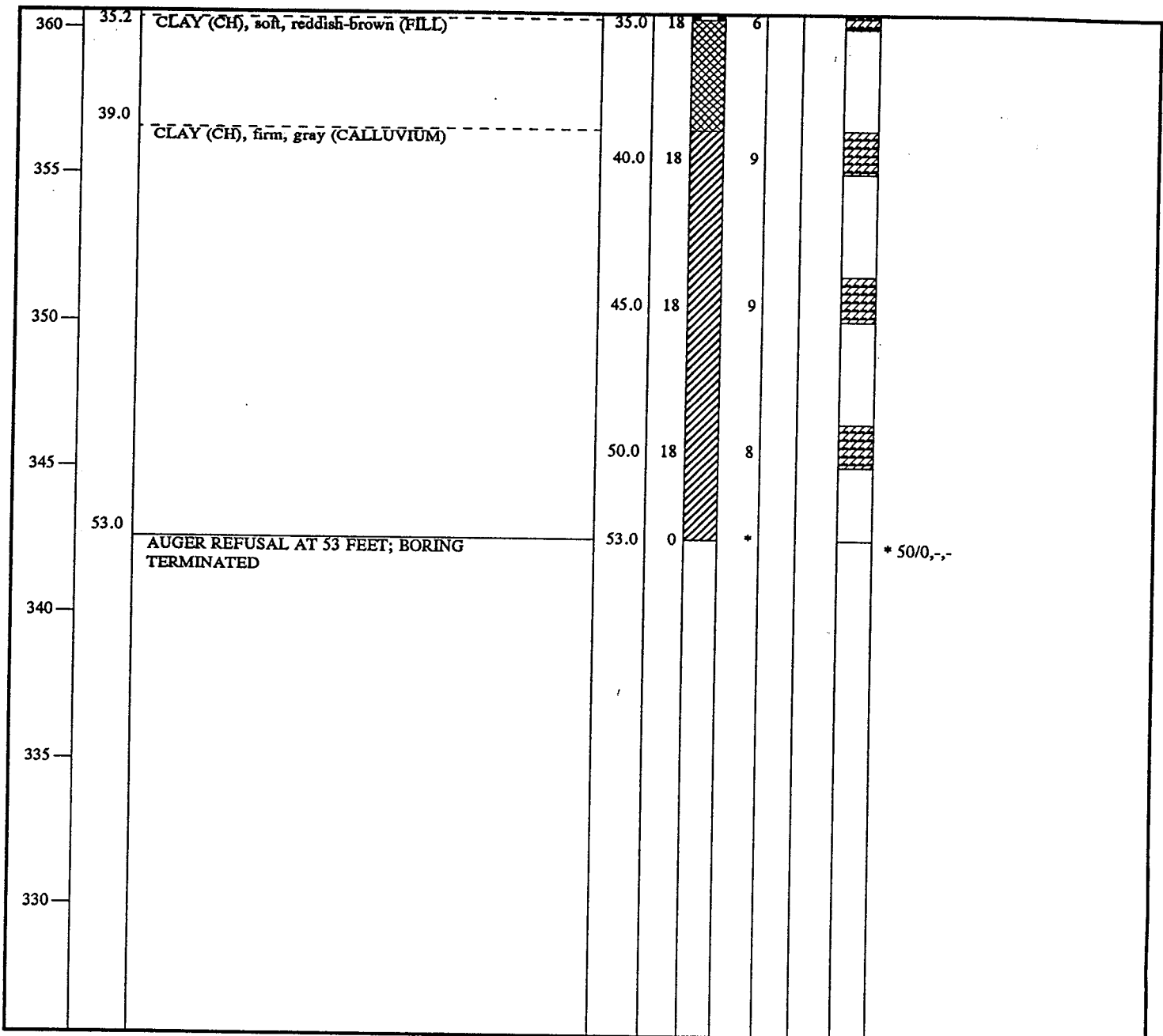
Note: This well installation log represents well construction details as documented at the time of installation and may vary from well details presented in more recent tables or documents based on downhole video logging conducted in 2016.





TEST BORING RECORD	
BORING NUMBER	93-3
DATE DRILLED	February 18, 1993
PROJECT NUMBER	417.93368.01
PROJECT	CUMBERLAND STEAM
PAGE 1 OF 2	
<b>LAW ENGINEERING</b>	

STRATUM  
 ELEV. DEPTH VISUAL SOIL DESCRIPTION D SR K N CR RQD REMARKS

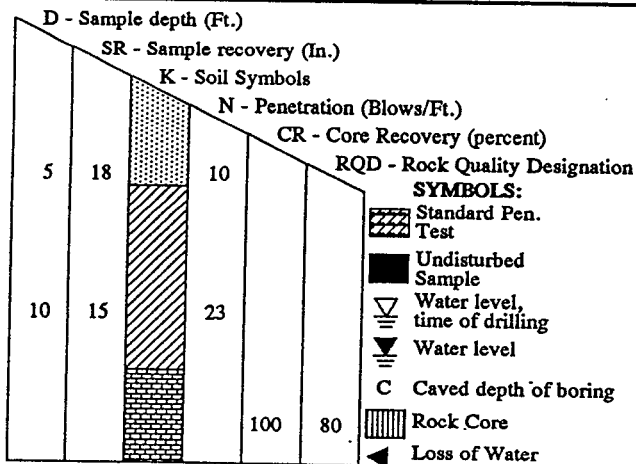
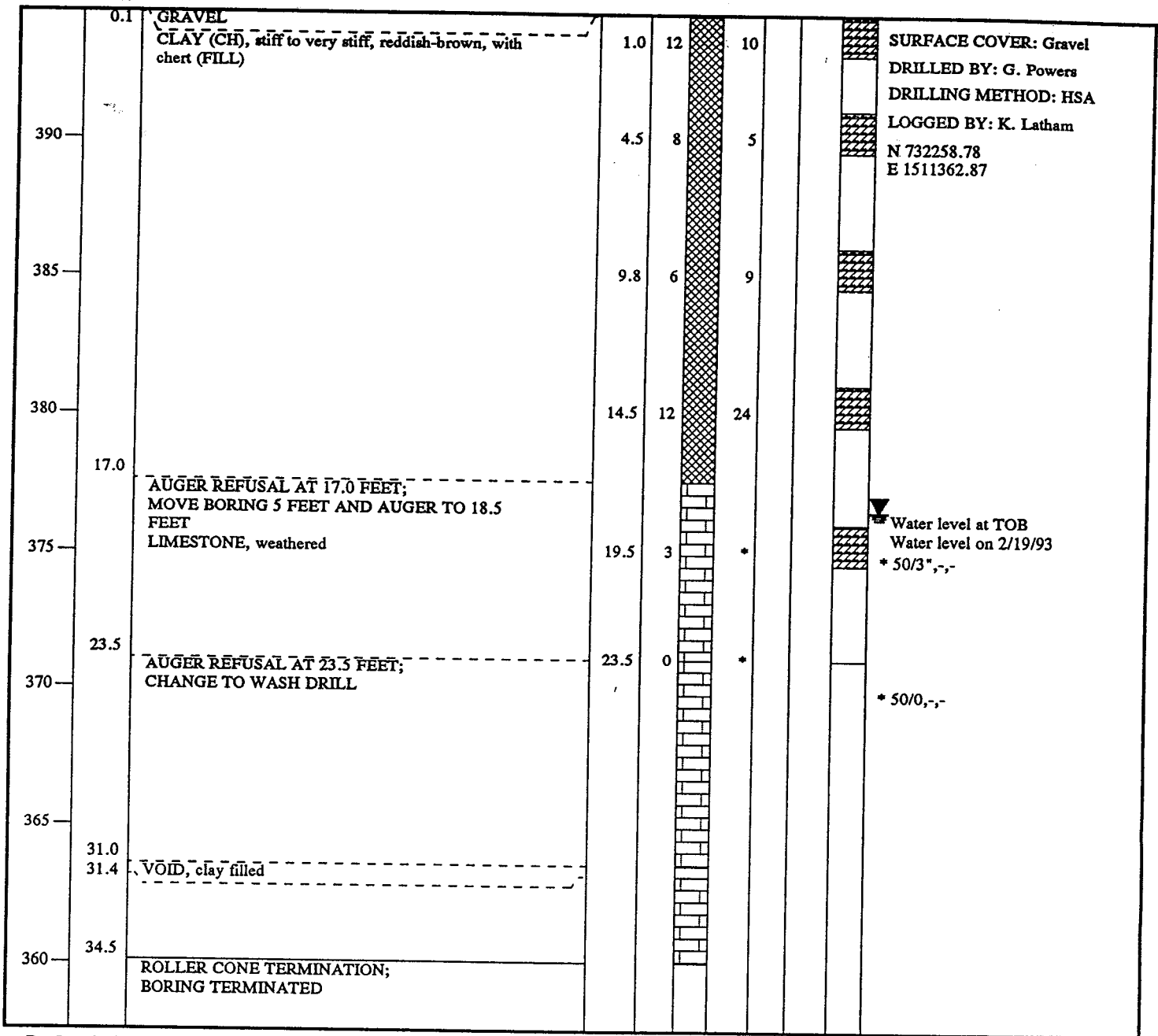


TEST BORING RECORD	
BORING NUMBER	93-3
DATE DRILLED	February 18, 1993
PROJECT NUMBER	417.93368.01
PROJECT	CUMBERLAND STEAM
PAGE 2 OF 2	
 <b>LAW ENGINEERING</b>	

Note: This well installation log represents well construction details as documented at the time of installation and may vary from well details presented in more recent tables or documents based on downhole video logging conducted in 2016.

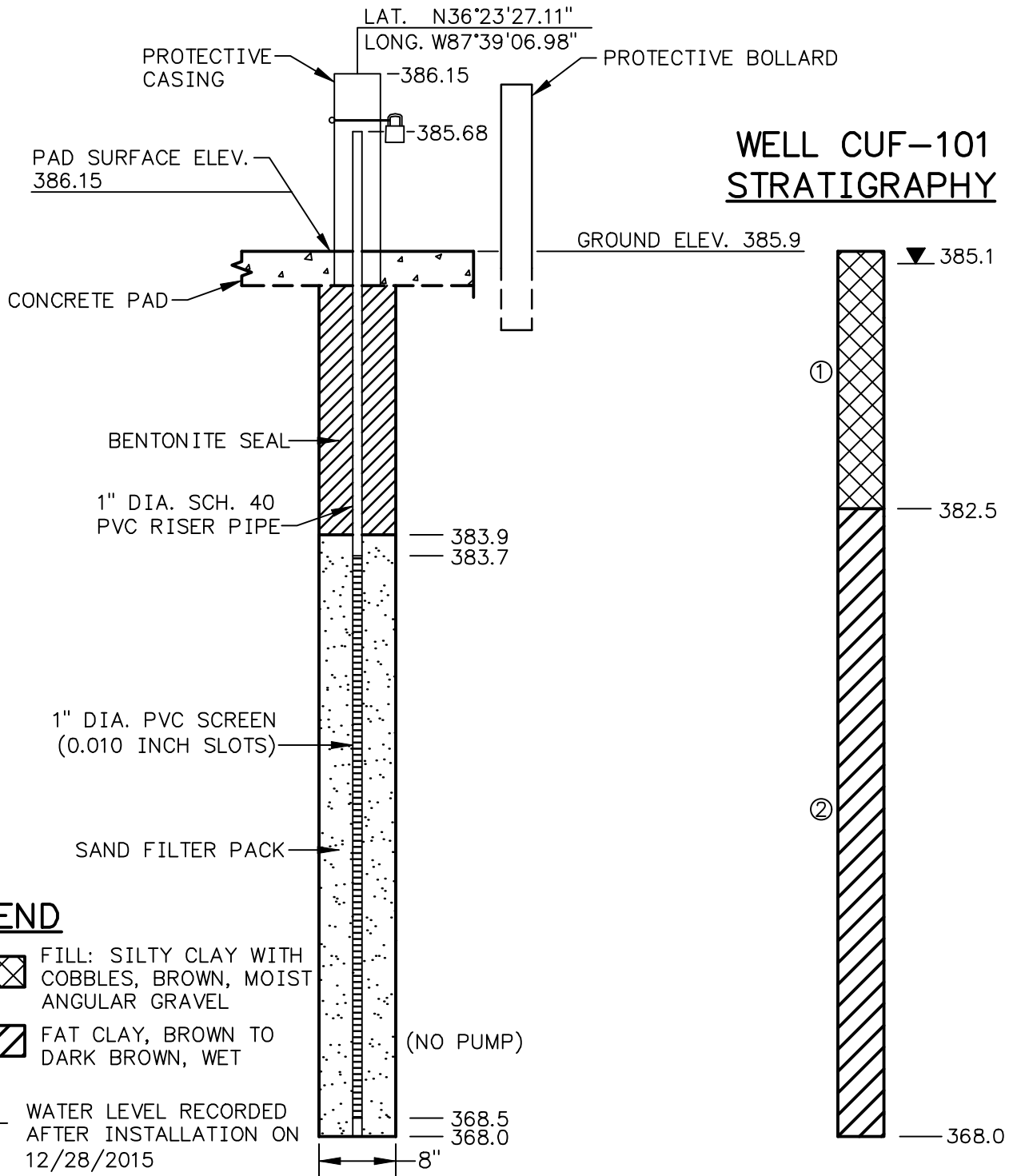


STRATUM  
 ELEV. DEPTH VISUAL SOIL DESCRIPTION D SR K N CR RQD REMARKS



TEST BORING RECORD	
BORING NUMBER	93-4
DATE DRILLED	February 17, 1993
PROJECT NUMBER	417.93368.01
PROJECT	CUMBERLAND STEAM
PAGE 1 OF 1	
LAW ENGINEERING	

Note: This well installation log represents well construction details as documented at the time of installation and may vary from well details presented in more recent tables or documents based on downhole video logging conducted in 2016.



### LEGEND

- ① FILL: SILTY CLAY WITH COBBLES, BROWN, MOIST ANGULAR GRAVEL
- ② FAT CLAY, BROWN TO DARK BROWN, WET
- WATER LEVEL RECORDED AFTER INSTALLATION ON 12/28/2015

### NOTES:

1. SUBSURFACE STRATIGRAPHY BASED ON BORING LOG CUF-101 BY AECOM ON 11/24/2015.
2. SURVEY INFORMATION PROVIDED BY STANTEC (NAD83/NGVD29 SHOWN).
3. WELL INSTALLED ON 11/24/2015 BY AECOM
4. SCREEN INTERVAL AND WELL DEPTH BASED ON VIDEO LOGGING (STANTEC, 10/10/2016).

## CUF-101 OBSERVATION WELL INSTALLATION DETAIL TVA CUMBERLAND FOSSIL PLANT CUMBERLAND CITY, STEWART COUNTY, TN

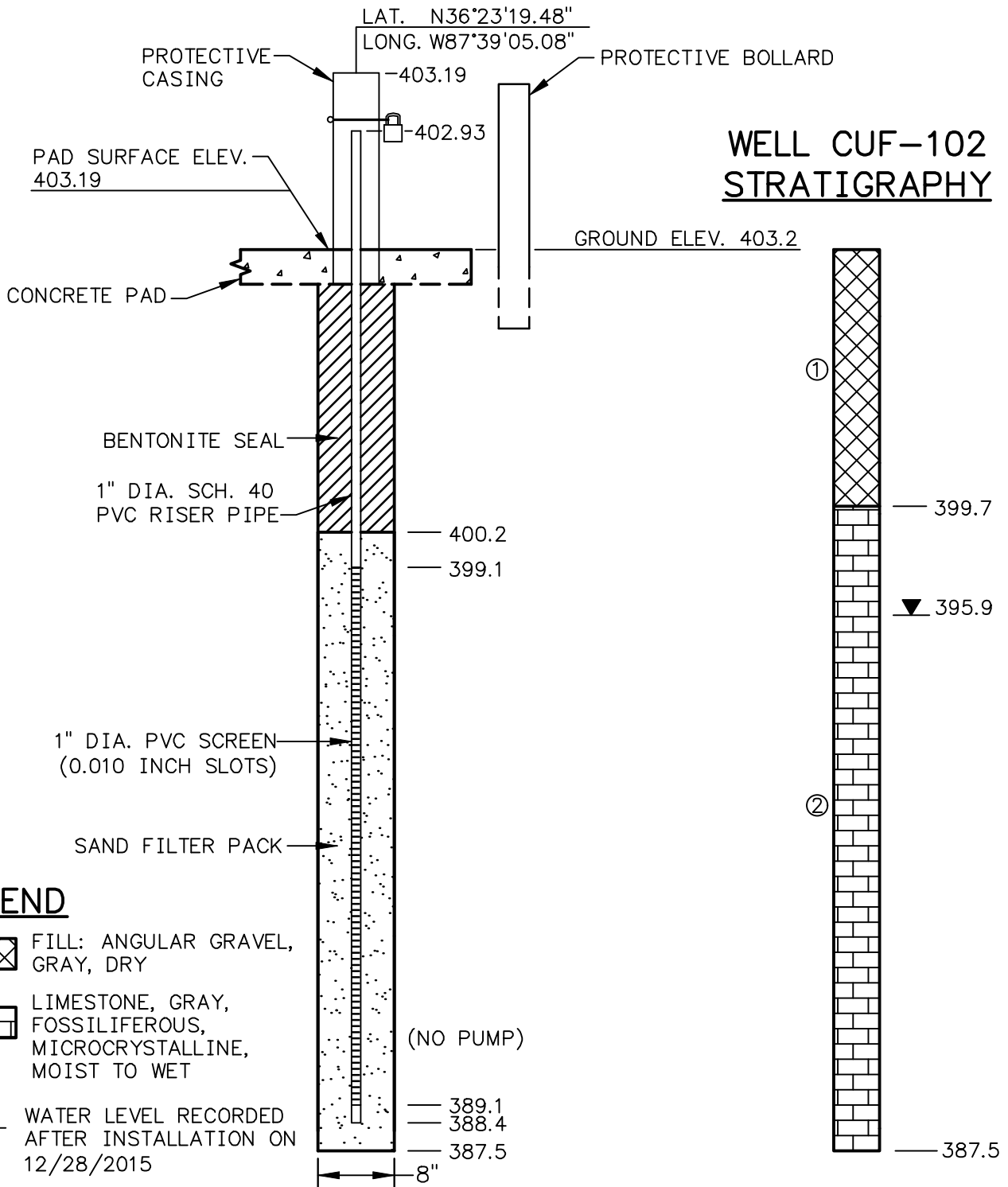


# Stantec

Stantec Consulting Services Inc.  
3052 Beaumont Centre Circle  
Lexington, Kentucky 40513  
859-422-3000  
[www.stantec.com](http://www.stantec.com)

DRAWN BY	MSJ	DATE	OCT. 2017	REVISED	SHEET
CHECKED BY	JGB	PROJ. NO.	175565299	1. NOV., 2017	3.
CHECKED BY	BLB	SCALE	NTS	2.	4.
<b>1 of 1</b>					

PLOT DATE: 10/11/2017 USER: JENNINGS, MATTHEW U:\1755\TVA GW MONITORING WELLS - CADD\CUF\175565299 - INSTALL\FROM\_LEX\CUF\_101.DWG



**LEGEND**

- ① FILL: ANGULAR GRAVEL, GRAY, DRY
- ② LIMESTONE, GRAY, FOSSILIFEROUS, MICROCRYSTALLINE, MOIST TO WET
- ▼ WATER LEVEL RECORDED AFTER INSTALLATION ON 12/28/2015

**NOTES:**

1. SUBSURFACE STRATIGRAPHY BASED ON BORING LOG CUF-101 BY AECOM ON 11/23/2015.
2. SURVEY INFORMATION PROVIDED BY STANTEC (NAD83/NGVD29 SHOWN).
3. WELL INSTALLED ON 11/23/2015 BY AECOM.
4. SCREEN INTERVAL AND WELL DEPTH BASED ON VIDEO LOGGING (STANTEC, 10/07/2016).

**CUF-102 OBSERVATION WELL INSTALLATION DETAIL  
TVA CUMBERLAND FOSSIL PLANT  
CUMBERLAND CITY, STEWART COUNTY, TN**



Stantec

Stantec Consulting Services Inc.  
3052 Beaumont Centre Circle  
Lexington, Kentucky 40513  
859-422-3000  
www.stantec.com

DRAWN BY	MSJ	DATE	OCT. 2017	REVISED	
CHECKED BY	JGB	PROJ. NO.	175565299	1. JAN., 2018	3.
CHECKED BY	BLB	SCALE	NTS	2.	4.

SHEET  
**1 of 1**



Project Number	175565299	Location	N36°23'16.63", W87°40'46.48" (NAD83)		
Project Name	TVA - CUF Well Installations	Boring No.	<b>CUF-201</b>	Total Depth	25.1 ft
County	Stewart, TN	Surface Elevation	396.7 ft (NGVD29)		
Project Type	Well Installations	Date Started	5/11/16	Completed	5/11/16
Supervisor	D. Pleiman	Driller	G. Thompson	Depth to Water	15.1 ft
Logged By	J. Andrew	Depth to Water	9.8 ft	Date/Time	5/11/16

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
396.7	0.0	Top of Hole							
395.7	1.0	Topsoil							4" diameter well installed
		Lean Clay, reddish brown and gray, moist, soft to medium stiff, with chert gravel		SPT-1	2.5 - 4.0	0.4	3-3-5	--	
				SPT-2	5.0 - 6.5	1.0	2-3-4	--	
				SPT-3	7.5 - 9.0	1.0	3-5-8	--	
				SPT-4	10.0 - 11.5	0.3	3-5-9	--	
385.2	11.5	Silt, gray and brown, moist to wet, loose, silty sand with chert gravel		SPT-5	12.5 - 14.0	1.5	1-2-2	--	
				SPT-6	15.0 - 16.5	1.5	2-2-3	--	
				SPT-7	17.5 - 19.0	1.5	2-5-5	--	
				SPT-8	20.0 - 21.5	1.0	13-10-16	--	
				SPT-9	22.5 - 24.0	0.6	3-5-8	--	
371.6	25.1								Water @ 15.1' during drilling

No Refusal /  
Bottom of Hole

STANTECFWISM\_LEGACY\_CUF\_PROJECT.GPJ FMSMAGRAPHIC.LOG.GDT 2/3/17

Project Number <u>175565299</u>	Location <u>N36°23'12.67", W87°40'34.02" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-202</b> Total Depth <u>18.5 ft</u>
County <u>Stewart, TN</u>	Surface Elevation <u>379.5 ft (NGVD29)</u>
Project Type <u>Well Installations</u>	Date Started <u>6/1/16</u> Completed <u>6/1/16</u>
Supervisor <u>D. Pleiman</u> Driller <u>D. Jessie</u>	Depth to Water <u>8.3 ft</u> Date/Time <u>6/1/16</u>
Logged By <u>J. Matthews</u>	Depth to Water <u>5.9 ft</u> Date/Time <u>7/22/16</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
379.5	0.0	Top of Hole							
379.0	0.5	Topsoil		SPT-1	0.0 - 1.5	1.4	3-1-1	--	4" diameter well installed
		Gravelly Silt with chert, light brown to brown, moist, stiff to very stiff		SPT-2	2.5 - 4.0	0.8	WOH-1-13	--	
				SPT-3	5.0 - 6.5	1.5	10-9-12	--	
				SPT-4	7.5 - 9.0	1.4	13-9-17	--	
369.0	10.5	Sandy Silt with Gravel, light brown, moist, stiff		SPT-5	10.0 - 11.5	1.5	9-10-10	--	Water @ 8.3' during drilling
				SPT-6	12.5 - 14.0	1.0	7-13-10	--	
		Less gravel below 16.0'		SPT-7	15.0 - 16.5	1.4	6-6-4	--	
361.0	18.5			SPT-8	17.5 - 18.5	0.7	50+/-5	--	

Auger Refusal /  
Bottom of Hole

STANTECFMNM\_LEGACY\_CUF\_PROJECT.GPJ\_FMSMAGRAPHIC.LOG.GDT\_2/3/17



Project Number	175565299	Location	N36°23'44.48", W87°39'47.21" (NAD83)		
Project Name	TVA - CUF Well Installations	Boring No.	<b>CUF-206</b>	Total Depth	91.5 ft
County	Stewart, TN	Surface Elevation	394.9 ft (NGVD29)		
Project Type	Well Installations	Date Started	6/2/16	Completed	6/2/16
Supervisor	D. Pleiman	Driller	T. Taylor	Depth to Water	Dry
Logged By	B. Rosen	Depth to Water	33.7 ft	Date/Time	7/22/16

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
394.9	0.0	Top of Hole							
394.7	0.2	Crushed stone							9" Sonic 4" diameter well installed
		Lean Clay, slightly silty, red-brown, brown-gray, or gray, damp to moist, some cherty zones, medium stiff							
		24.5-25.5: Limestone boulder							

STANTECFW5M\_LEGACY\_CUF\_PROJECT.GPJ F:\5MAGRAPHIC.LOG.GDT 2/3/17



Project Number <u>175565299</u>	Location <u>N36°23'44.48", W87°39'47.21" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-206</b> Total Depth <u>91.5 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
344.9	50.0	Lean Clay, slightly silty, red-brown, brown-gray, or gray, damp to moist, some cherty zones, medium stiff <i>(Continued)</i> 39.5-40.0: Limestone boulder							
329.9	65.0	Lean Clay, brown, moist, stiff, some chert fragments							
327.4	67.5	Gravelly Lean Clay, brown-gray, moist, stiff							
318.9	76.0	Lean Clay, dark gray, moist, stiff							

STANTECFM5M\_LEGACY\_CUF\_PROJECT.GPJ F:\5MAGRAPHIC.LOG.GDT 2/3/17

Project Number <u>175565299</u>	Location <u>N36°23'44.48", W87°39'47.21" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-206</b> Total Depth <u>91.5 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
315.4	79.5	Gravelly Lean Clay, brown to gray, moist, medium stiff to stiff, zones sandy <i>(Continued)</i>  Sand with Gravel, brown and gray, wet, medium dense to dense, zones clayey and silty							
304.9	90.0								
303.4	91.5	Limestone							

No Refusal /  
Bottom of Hole

Project Number <u>175565299</u>	Location <u>N36°23'40.91", W87°39'53.24" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-207</b> Total Depth <u>84.3 ft</u>
County <u>Stewart, TN</u>	Surface Elevation <u>394.4 ft (NGVD29)</u>
Project Type <u>Well Installations</u>	Date Started <u>5/12/16</u> Completed <u>5/12/16</u>
Supervisor <u>D. Pleiman</u> Driller <u>D. Jessie</u>	Depth to Water <u>Dry</u> Date/Time <u>5/12/16</u>
Logged By <u>Jordan Matthews</u>	Depth to Water <u>31.9 ft</u> Date/Time <u>7/22/16</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
394.4	0.0	Top of Hole							
		Gravelly Fat Clay, red-brown, moist, medium stiff		SPT-1	0.0 - 1.5	1.1	3-4-4	--	4" diameter well installed
				SPT-2	2.5 - 4.0	0.7	2-2-4	--	
				SPT-3	5.0 - 6.5	1.1	3-3-4	--	
				SPT-4	7.5 - 9.0	1.2	4-4-3	--	
				SPT-5	10.0 - 11.5	1.3	7-7-5	--	
				SPT-6	12.5 - 14.0	1.1	4-5-5	--	
378.4	16.0		Gravelly Lean Clay, light brown, moist, stiff		SPT-7	15.0 - 16.5	1.0	4-5-9	
				SPT-8	17.5 - 19.0	1.1	2-3-16	--	
				SPT-9	20.0 - 21.5	0.6	4-4-4	--	
371.9	22.5	Gravelly Lean Clay, brown to red-brown and gray-brown, moist to wet, soft to medium stiff		SPT-10	22.5 - 24.0	1.4	2-2-3	--	
				SPT-11	25.0 - 26.5	0.3	1-2-3	--	
				SPT-12	27.5 - 29.0	0.5	3-3-3	--	
				SPT-13	30.0 - 31.5	1.5	WOH-2-3	--	
				SPT-14	32.5 - 34.0	1.5	3-3-4	--	
				SPT-15	35.0 - 36.5	1.4	5-4-6	--	

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Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
351.9	42.5	Gravelly Lean Clay, brown to red-brown and gray-brown, moist to wet, soft to medium stiff <i>(Continued)</i>		SPT-16	37.5 - 39.0	0.9	3-6-11	--	
				SPT-17	40.0 - 41.5	0.8	8-11-8	--	
336.4	58.0	Lean Clay, gray-brown, moist to wet, medium stiff		SPT-18	42.5 - 44.0	1.0	3-2-3	--	
				SPT-19	45.0 - 46.5	1.5	3-5-8	--	
				SPT-20	47.5 - 49.0	1.3	7-4-7	--	
				SPT-21	50.0 - 51.5	0.8	6-4-6	--	
				SPT-22	52.5 - 54.0	1.5	3-3-3	--	
				SPT-23	55.0 - 56.5	1.5	2-2-2	--	
321.9	72.5	Sandy Silt, brown to gray, wet, soft to very soft		SPT-24	57.5 - 59.0	1.5	2-1-2	--	
				SPT-25	60.0 - 61.5	1.5	1-3-5	--	
				SPT-26	62.5 - 64.0	1.5	3-3-1	--	
		Gravelly below 66.0		SPT-27	65.0 - 66.5	1.5	WOH-1- WOH	--	
				SPT-28	67.5 - 69.0	1.2	2-WOH-1	--	
				SPT-29	70.0 - 71.5	1.3	8-3-WOH	--	
		Gravel w/ Sand, gray, wet, loose		SPT-30	72.5 - 74.0	0.8	12-16-12	--	
				SPT-31	75.0 - 76.5	0.7	7-9-13	--	

STANTECFW5M\_LEGACY\_CUF\_PROJECT.GPJ F:\5MAGRAPHIC.LOG.GDT 2/3/17

Project Number <u>175565299</u>	Location <u>N36°23'40.91", W87°39'53.24" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-207</b> Total Depth <u>84.3 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
311.9	82.5	Gravel w/ Sand, gray, wet, loose <i>(Continued)</i>		SPT-32	77.5 - 79.0	0.8	7-10-5	--	
				SPT-33	80.0 - 81.5	0.8	7-11-10	--	
310.1	84.3	Shale, gray, weathered		SPT-34	82.5 - 83.2	0.8	41-50+/.2	--	
				SPT-35	84.0 - 84.3	0.3	50+/.3	--	

Auger Refusal /  
Bottom of Hole

Top of Rock = 82.5  
Elevation (311.9)

Project Number <u>175565299</u>	Location <u>N36°23'31.88", W87°39'59.86" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-208</b> Total Depth <u>60.0 ft</u>
County <u>Stewart, TN</u>	Surface Elevation <u>394.6 ft (NGVD29)</u>
Project Type <u>Well Installations</u>	Date Started <u>5/17/16</u> Completed <u>5/17/16</u>
Supervisor <u>D. Pleiman</u> Driller <u>D. Jessie</u>	Depth to Water <u>30.0 ft</u> Date/Time <u>5/17/16</u>
Logged By <u>Jordan Matthews</u>	Depth to Water <u>35.9 ft</u> Date/Time <u>7/22/16</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
394.6	0.0	Top of Hole							
		Gravelly Fat Clay, red-brown, moist, soft to medium stiff		SPT-1	0.0 - 1.5	1.1	3-3-4	--	4" diameter well installed
				SPT-2	2.5 - 4.0	1.2	2-1-2	--	
				SPT-3	5.0 - 6.5	1.2	5-8-7	--	
				SPT-4	7.5 - 9.0	0.9	3-4-6	--	
383.6	11.0	Gravelly Lean Clay, brown to light brown, moist, medium stiff to stiff		SPT-5	10.0 - 11.5	1.3	7-6-7	--	
				SPT-6	12.5 - 14.0	1.1	4-5-6	--	
				SPT-7	15.0 - 16.5	0.4	3-4-5	--	
				SPT-8	17.5 - 19.0	1.0	8-8-9	--	
				SPT-9	20.0 - 21.5	0.3	4-4-2	--	
372.1	22.5	Gravelly Silt, light brown to brown with gray mottling, moist to wet, soft to medium stiff		SPT-10	22.5 - 24.0	0.1	1-1-1	--	
				SPT-11	25.0 - 26.5	0.2	2-5-6	--	
				SPT-12	27.5 - 29.0	0.6	2-2-2	--	
				SPT-13	30.0 - 31.5	1.4	2-2-3	--	
				SPT-14	32.5 - 34.0	0.8	2-2-3	--	
				SPT-15	35.0 - 36.5	1.5	2-2-4	--	
								Water @ 30.0' during drilling	

STANTECFW5M\_LEGACY\_CUF\_PROJECT.GPJ\_FWSMAGRAPHIC.LOG.GDT\_2/3/17

Project Number <u>175565299</u>	Location <u>N36°23'31.88", W87°39'59.86" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-208</b> Total Depth <u>60.0 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
		Gravelly Silt, light brown to brown with gray mottling, moist to wet, soft to medium stiff <i>(Continued)</i>		SPT-16	37.5 - 39.0	1.5	1-1-1	--	
			SPT-17	40.0 - 41.5	1.4	3-3-4	--		
			SPT-18	42.5 - 44.0	1.5	3-4-7	--		
			SPT-19	45.0 - 46.5	0.7	2-3-4	--		
			SPT-20	47.5 - 49.0	1.5	4-6-7	--		
			SPT-21	50.0 - 51.5	1.5	4-6-7	--		
			SPT-22	52.5 - 54.0	1.5	7-7-7	--		
			SPT-23	55.0 - 56.5	1.3	6-8-15	--		
			SPT-24	57.5 - 59.0	0.6	50+	--		
334.6	60.0								

Auger Refusal /  
Bottom of Hole

STANTEC\FM\SM\_LEGACY\_CUF\_PROJECT\GFI\_FM\SM\GRAPHIC\LOG.GDT 2/3/17





Project Number <u>175565299</u>	Location <u>N36°23'20.31", W87°40'01.40" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-209</b> Total Depth <u>61.4 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
340.5	54.0	Silt, dark brown and gray, moist to wet, soft to medium stiff, with black mottling <i>(Continued)</i>		SPT-15	37.5 - 39.0	1.5	5-2-2	--	
				SPT-16	40.0 - 41.5	1.1	7-6-5	--	
				SPT-17	42.5 - 44.0	1.5	4-4-6	--	
				SPT-18	45.0 - 46.5	1.5	5-5-6	--	
				SPT-19	47.5 - 49.0	1.5	6-5-6	--	
				SPT-20	50.0 - 51.5	1.5	3-2-3	--	
				SPT-21	52.5 - 54.0	1.5	1-4-10	--	
333.1	61.4	Silty Sand, brown, wet, with small gravel, very loose to loose		SPT-22	55.0 - 56.5	0.3	WOR	--	WOR = weight of rod
				SPT-23	57.5 - 59.0	1.1	WOR	--	
				SPT-24	60.0 - 61.0	1.0	WOR	--	

No Refusal /  
Bottom of Hole

Project Number <u>175565299</u>	Location <u>N36°23'14.45", W87°39'58.80" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-210</b> Total Depth <u>72.0 ft</u>
County <u>Stewart, TN</u>	Surface Elevation <u>394.5 ft (NGVD29)</u>
Project Type <u>Well Installations</u>	Date Started <u>5/17/16</u> Completed <u>5/17/16</u>
Supervisor <u>D. Pleiman</u> Driller <u>G. Thompson</u>	Depth to Water <u>Dry</u> Date/Time <u>5/17/16</u>
Logged By <u>J. Andrew</u>	Depth to Water <u>28.6 ft</u> Date/Time <u>7/22/16</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
394.5	0.0	Top of Hole							
394.3	0.2	Topsoil							4" diameter well installed
		Fat Clay, red-brown, moist, medium stiff to stiff, w/ chert gravel		SPT-1	2.5 - 4.0	1.2	2-3-4	--	
			SPT-2	5.0 - 6.5	1.0	4-7-9	--		
			SPT-3	7.5 - 9.0	1.5	4-5-7	--		
			SPT-4	10.0 - 11.5	1.5	4-6-9	--		
			SPT-5	12.5 - 14.0	0.9	5-7-10	--		
379.5	15.0	Silt, brown and gray, moist, medium stiff to stiff, w/ chert gravel		SPT-6	15.0 - 16.5	1.3	6-8-9	--	
			SPT-7	17.5 - 19.0	1.0	6-10-11	--		
			SPT-8	20.0 - 21.5	1.4	6-5-16	--		
			SPT-9	22.5 - 24.0	0.8	2-2-2	--		
			SPT-10	25.0 - 26.5	1.0	1-1-2	--		
			SPT-11	27.5 - 29.0	1.1	4-3-3	--		
			SPT-12	30.0 - 31.5	1.5	4-2-1	--		
			SPT-13	32.5 - 34.0	0.9	2-3-3	--		
359.5	35.0	30.0 - 35.0: Trace Organics, Coarse Sand and Gravel		SPT-14	35.0 - 36.5	1.2	3-3-7	--	
		Silt, brown to light brown, moist, soft to medium stiff							

STANTECFWISM\_LEGACY\_CUF\_PROJECT.GPJ\_FWSMAGRAPHIC.LOG.GDT\_2/3/17

Project Number		175565299			Location		N36°23'14.45", W87°39'58.80" (NAD83)			
Project Name		TVA - CUF Well Installations			Boring No.		<b>CUF-210</b>	Total Depth		72.0 ft
Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks	
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth		
348.0	46.5	Silt, brown to light brown, moist, soft to medium stiff <i>(Continued)</i>		SPT-15	37.5 - 39.0	1.5	4-3-5	--		
				SPT-16	40.0 - 41.5	1.5	3-3-5	--		
				SPT-17	42.5 - 44.0	1.5	3-3-6	--		
				SPT-18	45.0 - 46.5	1.5	5-7-8	--		
333.5	61.0	Lean Clay, red-brown to brown and light brown, moist, medium stiff to stiff, with occasional chert gravel		SPT-19	47.5 - 49.0	1.5	6-7-10	--		
				SPT-20	50.0 - 51.5	1.5	7-8-9	--		
				SPT-21	52.5 - 54.0	1.5	3-3-5	--		
				SPT-22	55.0 - 56.5	1.5	4-7-8	--		
				SPT-23	57.5 - 59.0	1.5	3-4-6	--		
				SPT-24	60.0 - 61.5	1.5	2-4-9	--		
329.5	65.0	Silty Sand, brown, wet, loose		SPT-25	62.5 - 64.0	1.5	3-5-8	--		
				SPT-26	65.0 - 66.5	1.5	3-4-4	--		
322.5	72.0	Silt, brown and gray, moist, soft		SPT-27	67.5 - 69.0	1.5	2-2-3	--		
				SPT-28	70.0 - 71.5	1.5	9-14-3	--		
		No Refusal / Bottom of Hole								

STANTECFMNM\_LEGACY\_CUF\_PROJECT.GPJ\_FMSMAGRAPHIC.LOG.GDT\_2/3/17

Project Number	175565299	Location	N36°23'08.15", W87°39'50.30" (NAD83)		
Project Name	TVA - CUF Well Installations	Boring No.	<b>CUF-211</b>	Total Depth	71.5 ft
County	Stewart, TN	Surface Elevation	395.0 ft (NGVD29)		
Project Type	Well Installations	Date Started	5/19/16	Completed	5/19/16
Supervisor	D. Pleiman    Driller D. Jessie	Depth to Water	Dry	Date/Time	5/19/16
Logged By	J. Matthews	Depth to Water	37.2 ft	Date/Time	7/22/16

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
395.0	0.0	Top of Hole							
		Gravelly Fat Clay, red-brown, moist, soft (fill)		SPT-1	0.0 - 1.5	1.0	4-6-4	--	4" diameter well installed
				SPT-2	2.5 - 4.0	0.6	3-3-4	--	
				SPT-3	5.0 - 6.5	1.3	3-3-4	--	
				SPT-4	7.5 - 9.0	0.8	3-4-2	--	
				SPT-5	10.0 - 11.5	0.0	3-3-5	--	
382.5	12.5	Lean Clay with Gravel, red-brown, moist, medium stiff to stiff		SPT-6	12.5 - 14.0	1.3	7-7-8	--	
			SPT-7	15.0 - 16.5	1.4	3-4-9	--		
377.0	18.0	Gravelly Silt, light brown, moist to wet, medium stiff to soft		SPT-8	17.5 - 19.0	1.2	4-5-9	--	
				SPT-9	20.0 - 21.5	0.7	4-7-5	--	
				SPT-10	22.5 - 24.0	1.3	WOH-1-2	--	
				SPT-11	25.0 - 26.5	1.1	5-4-4	--	
				SPT-12	27.5 - 29.0	0.0	1-3-1	--	
				SPT-13	30.0 - 31.5	1.3	2-2-3	--	
				SPT-14	32.5 - 34.0	0.7	1-4-5	--	
				SPT-15	35.0 - 36.5	1.5	3-3-5	--	

STANTECFW5M\_LEGACY\_CUF\_PROJECT.GPJ F:\5MAGRAPHIC\LOG.GDT 2/3/17

Project Number <u>175565299</u>	Location <u>N36°23'08.15", W87°39'50.30" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-211</b> Total Depth <u>71.5 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
352.5	42.5	Gravelly Silt, light brown, moist to wet, medium stiff to soft <i>(Continued)</i>  40.5 - 42.5: Dense gravelly (chert) zone		SPT-16	37.5 - 39.0	0.5	WOH-2-2	--	
				SPT-17	40.0 - 41.5	1.2	2-30-16	--	
334.5	60.5	Silt, gray, moist, soft to medium stiff, trace gravels		SPT-18	42.5 - 44.0	0.8	4-1-3	--	
				SPT-19	45.0 - 46.5	1.5	1-1-1	--	
				SPT-20	47.5 - 49.0	1.5	3-1-3	--	
				SPT-21	50.0 - 51.5	0.0	6-6-1	--	
				SPT-22	52.5 - 54.0	0.0	2-2-4	--	
			55.5 - 60.5: Becomes gravelly, sandy	SPT-23	55.0 - 56.5	1.3	3-2-3	--	
		SPT-24		57.5 - 59.0	0.4	4-2-6	--		
323.5	71.5	Sandy Gravel, gray to light brown, wet, loose		SPT-25	60.0 - 61.5	0.8	6-8-14	--	
				SPT-26	62.5 - 64.0	0.0	9-13-10	--	
				SPT-27	65.0 - 66.5	0.0	7-6-9	--	
				SPT-28	67.5 - 69.0	0.9	7-15-16	--	
				SPT-29	70.0 - 71.5	1.0	12-16-16	--	

No Refusal /  
Bottom of Hole

STANTECFW5M\_LEGACY\_CUF\_PROJECT.GPJ FWSMAGRAPHIC.LOG.GDT 2/3/17

Project Number <u>175565299</u>	Location <u>N36°22'50.52", W87°39'28.74" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-212</b> Total Depth <u>70.0 ft</u>
County <u>Stewart, TN</u>	Surface Elevation <u>395.0 ft (NGVD29)</u>
Project Type <u>Well Installations</u>	Date Started <u>5/24/16</u> Completed <u>5/24/16</u>
Supervisor <u>D. Pleiman</u> Driller <u>G. Thompson</u>	Depth to Water <u>18.5 ft</u> Date/Time <u>5/24/16</u>
Logged By <u>J. Andrew</u>	Depth to Water <u>40.1 ft</u> Date/Time <u>7/22/16</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks	
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth		
395.0	0.0	Top of Hole								
		Lean Clay, red-brown and brown, moist, soft to medium stiff with chert gravel		SPT-1	2.5 - 4.0	0.5	2-3-4	--	4" diameter well installed	
				SPT-2	5.0 - 6.5	1.1	4-3-3	--		
				SPT-3	7.5 - 9.0	1.0	3-4-8	--		
385.0	10.0	Silt, gray and brown, moist, soft to medium stiff with chert gravel		SPT-4	10.0 - 11.5	0.9	3-5-5	--		
				SPT-5	12.5 - 14.0	1.0	4-6-10	--		
				SPT-6	15.0 - 16.5	1.1	6-7-8	--		
376.5	18.5			SPT-7	17.5 - 19.0	1.0	5-7-16	--		
		Sand, dark gray, wet, with gravel, loose		SPT-8	20.0 - 21.5	1.5	3-10-3	--		Water @ 18.5' at time of drilling
374.0	21.0			SPT-9	22.5 - 24.0	1.2	6-12-10	--		
		Silt, dark gray to brown, moist to wet, with sand, medium stiff to stiff		SPT-10	25.0 - 26.5	0.9	1-1-1	--		
				SPT-11	27.5 - 29.0	0.8	4-2-3	--		
				SPT-12	30.0 - 31.5	1.5	4-6-8	--		
				SPT-13	32.5 - 34.0	1.3	4-6-7	--		

STANTECFW5M\_LEGACY\_CUF\_PROJECT.GPJ FWSMAGRAPHIC.LOG.GDT 2/3/17

Project Number		175565299			Location		N36°22'50.52", W87°39'28.74" (NAD83)					
Project Name		TVA - CUF Well Installations			Boring No.		<b>CUF-212</b>	Total Depth		70.0 ft		
Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks			
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth				
337.0	58.0	Silt, dark gray to brown, moist to wet, with sand, medium stiff to stiff <i>(Continued)</i> 35.5 - 36.5: Fat Clay, red-brown, gravelly  55.0 - 58.0: Dark red mottling, wet, very soft		SPT-14	35.0 - 36.5	1.5	5-7-7	--				
				SPT-15	37.5 - 39.0	1.5	3-7-10	--				
				SPT-16	40.0 - 41.5	1.5	3-2-3	--				
				SPT-17	42.5 - 44.0	1.5	3-3-4	--				
				SPT-18	45.0 - 46.5	1.5	1-1-3	--				
				SPT-19	47.5 - 49.0	1.5	3-2-2	--				
				SPT-20	50.0 - 51.5	1.5	4-2-2	--				
				SPT-21	52.5 - 54.0	1.5	3-2-3	--				
				SPT-22	55.0 - 56.5	1.5	WOH- WOH- WOH	--				
				SPT-23	57.5 - 59.0	0.4	1-3-7	--				
			325.0	70.0	Sandy Gravel, brown, wet, loose to medium dense, silty zones		SPT-24	60.0 - 61.5	0.9	8-10-11	--	
							SPT-25	62.5 - 64.0	0.8	8-11-12	--	
	SPT-26	65.0 - 66.5				1.3	2-17-23	--				
	SPT-27	67.5 - 69.0				0.9	WOH-3-2	--				
No Refusal / Bottom of Hole												

STANTECFMNM\_LEGACY\_CUF\_PROJECT.GPJ\_FMSMAGRAPHIC.LOG.GDT\_2/3/17

Project Number <u>175565299</u>	Location <u>N36°22'50.17", W87°39'06.70" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-213</b> Total Depth <u>45.9 ft</u>
County <u>Stewart, TN</u>	Surface Elevation <u>395.3 ft (NGVD29)</u>
Project Type <u>Well Installations</u>	Date Started <u>5/19/16</u> Completed <u>5/19/16</u>
Supervisor <u>D. Pleiman</u> Driller <u>G. Thompson</u>	Depth to Water <u>21.0 ft</u> Date/Time <u>5/19/16</u>
Logged By <u>J. Andrew</u>	Depth to Water <u>21.2 ft</u> Date/Time <u>7/22/16</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks	
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth		
395.3	0.0	Top of Hole								
		Lean Clay, red-brown, moist, with chert fragments, soft to medium stiff		SPT-1	2.5 - 4.0	0.7	4-4-3	--	4" diameter well installed	
				SPT-2	5.0 - 6.5	1.0	2-5-8	--		
387.8	7.5	Silt, dark brown and gray, moist, some chert fragments, soft to medium stiff		SPT-3	7.5 - 9.0	1.2	4-6-8	--		
				SPT-4	10.0 - 11.5	1.2	5-5-7	--		
				SPT-5	12.5 - 14.0	1.3	4-4-4	--		
				SPT-6	15.0 - 16.5	1.4	3-4-7	--		
				SPT-7	17.5 - 19.0	1.1	3-3-6	--		
			20.0 - 21.0: Lean Clay, red-brown		SPT-8	20.0 - 21.5	1.2	3-4-4		--
			Becomes wet below 21.0'		SPT-9	22.5 - 24.0	1.5	WOH-1-1		--
370.3	25.0	Silty Sand, dark gray and black, moist, medium dense		SPT-10	25.0 - 26.5	1.5	20-9-14	--		
				SPT-11	27.5 - 29.0	1.3	12-16-3	--		
365.3	30.0		Silt, dark gray, wet, soft to medium stiff, trace gravels		SPT-12	30.0 - 31.5	1.5	2-2-2		--
				SPT-13	32.5 - 34.0	1.5	1-1-1	--		
		35.0 - 36.0: Lean Clay, red-brown		SPT-14	35.0 - 36.5	0.8	1-3-12	--		

STANTECFM3M\_LEGACY\_CUF\_PROJECT.GPJ\_FINSMAGRAPHIC.LOG.GDT\_2/3/17



Project Number <u>175565299</u>	Location <u>N36°22'50.17", W87°39'06.70" (NAD83)</u>
Project Name <u>TVA - CUF Well Installations</u>	Boring No. <b>CUF-213</b> Total Depth <u>45.9 ft</u>

Lithology		Description	Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	Remarks
Elevation	Depth		Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	
		Silt, dark gray, wet, soft to medium stiff, trace gravels <i>(Continued)</i>		SPT-15	37.5 - 39.0	0.5	4-4-5	--	
		Limestone fragments increasing below 40.0'		SPT-16	40.0 - 41.5	1.5	5-6-7	--	
				SPT-17	42.5 - 44.0	1.3	20-11-17	--	
349.4	45.9			SPT-18	45.0 - 45.5	0.2	WOH-50+/-4	--	
		Auger Refusal / Bottom of Hole							

STANTEC\FM\SM\_LEGACY\_CUF\_PROJECT\GPJ\_FM\SM\GRAPHIC\LOG.GDT 2/3/17

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1000ALT</b>
Client	Tennessee Valley Authority	Boring Location	729,153.25 N; 1,507,363.51 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	392.3 ft
Project Name	CUF TDEC Order	Elevation Datum	NGVD29
Project Location	Stewart Co, Cumberland City, TN	Date Started	11/29/18
Inspector	G. Budd	Completed	11/29/18
Logger	G. Budd	Depth to Water	N/A
Drilling Contractor	Stantec Consulting Services Inc.	Date/Time	N/A
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 3" SS w/o liners		
Rock Drilling and Sampling Tools (Type and Size)	N/A		
Overdrill Tooling (Type and Size)	N/A	Overdrill Depth	N/A
Sampler Hammer Type	Automatic	Weight	140 lb
Drop	30"	Efficiency	N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A
Reviewed By	D. Norman	Approved By	P. Dunne

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	392.3	Top of Hole					
0.1	392.2		GRASS AND TOPSOIL			0.0 - 1.5	1.4	4-3-4
1	1.5	390.8	LEAN CLAY, CL, 5YR 4/4 (reddish brown), low plasticity, soft, moist, organics and trace fragments of chert		SS01G	0.0 - 1.5	1.4	4-3-4
2					SS02G	1.5 - 3.0	1.5	3-6-7
3	3.0	389.3	LEAN CLAY, CL, 5YR 4/6 (yellowish red), firm, moist, organic material		SS03G	3.0 - 4.5	1.5	6-7-7
4	4.5	387.8	FAT CLAY, CH, 7.5YR 4/6 (strong brown) and 10YR 5/6 (yellowish brown), firm, moist, abundant weathered chert		SS04G	4.5 - 6.0	1.5	5-7-10
5					SS05G	6.0 - 7.5	1.5	4-7-10
6	6.0	386.3	FAT CLAY, CH, 7.5YR 5/6 (strong brown), firm to stiff, dry, abundant weathered chert		SS06G	7.5 - 9.0	1.5	5-8-10
7	7.5	384.8	FAT CLAY, CH, 5YR 5/6 (yellowish red) and 7.5 3/2 (yellowish brown), firm to stiff, moist, trace fragments of weathered chert		SS07G	9.0 - 9.6	0.6	6-50/1"
8								
9	9.0	383.3	FAT CLAY, CH, 5YR 5/6 (yellowish red) and 7.5 3/2 (yellowish brown), stiff, dry, abundant weathered chert					
9.9	382.4		FAT CLAY, CH, 5YR 5/6 (yellowish red) and 7.5 3/2 (yellowish brown), stiff, dry, weathered chert, grading to limestone at 9.6'					

Refusal /  
Bottom of Hole at 9.9 Ft.

Boring abandoned and backfilled with 30% solids bentonite grout from 9.9' BGS to ground surface.

As-drilled boring location not surveyed. Historical coordinates shown based on proposed boring location. Vertical coordinates shown based on 2017 LIDAR surfaces.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface



TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT: 20190630.GDT: 11/13/19

Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-1000ALTA</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>729,161.60 N; 1,507,389.51 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>391.6 ft</u> Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>	Date Started <u>11/29/18</u> Completed <u>11/30/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>	Depth to Water <u>21.0 ft</u> Date/Time <u>11/29/18</u>
Inspector <u>G. Budd</u> Logger <u>G. Budd</u>	Depth to Water <u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor <u>Stantec Consulting Services Inc.</u>	Drill Rig Type and ID <u>CME 850XR, #953</u>
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 3" SS w/o liners</u>	
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>	
Overdrill Tooling (Type and Size) <u>8-1/4" HSA overdrill of boring</u> Overdrill Depth <u>22.2 ft</u>	
Sampler Hammer Type <u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u> Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>D. Norman</u> Approved By <u>P. Dunne</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	391.6						
	0.5	391.1						
1	1.3	390.3			SS01G	0.0 - 1.5	1.5	5-6-10
	1.5	390.1						
2					SS02G	1.5 - 3.0	1.2	2-6-8
3	3.0	388.6						
4	4.5	387.1			SS03G	3.0 - 4.5	1.5	10-8-11
5								
6	6.0	385.6			SS04G	4.5 - 6.0	1.5	7-8-11
7	7.5	384.1			SS05G	6.0 - 7.5	1.5	9-7-6
8								
9	9.0	382.6			SS06G	7.5 - 9.0	1.5	6-7-11
10	10.5	381.1			SS07G	9.0 - 10.5	1.5	7-9-11
11								
12	12.0	379.6			SS08G	10.5 - 12.0	1.5	7-13-15
13	13.5	378.1			SS09G	12.0 - 13.5	1.5	7-15-36
14								
15	15.0	376.6			SS10E	13.5 - 15.0	1.5	15-17-31
16	16.5	375.1			SS11G	15.0 - 16.5	1.5	7-13-14
17								
18	18.0	373.6			SS12G	16.5 - 18.0	1.5	3-3-4

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 11/12/19

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1000ALTA</b>
Client	Tennessee Valley Authority	Boring Location	729,161.60 N; 1,507,389.51 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	391.6 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			SANDY LEAN CLAY, CL, 10YR 5/6 (yellowish brown), firm to stiff, wet to moist, weathered fragments of sandstone					
19	19.5				SS13E	18.0 - 19.5	1.5	2-3-3
20					SS14G	19.5 - 21.0	1.5	2-1-2
21			FAT CLAY WITH SAND, CH, 7.5YR 4/6 (strong brown) and 7.5YR 2.5/2 (very dark brown), soft, moist to wet					
22	22.4				SS15G	21.0 - 22.2		1-2-50/2"

FAT CLAY WITH SAND, CH, 7.5YR 4/6 (strong brown), soft, saturated, fragments of limestone to 22.2', grading to limestone, light gray, hard

Refusal /  
Bottom of Hole at 22.4 Ft.

Temporary 1-inch PVC piezometer installed and yielded groundwater. Temporary piezometer removed and conventional 4-inch monitoring well subsequently installed in boring. Refer to monitoring well installation log dated 12/3/2018.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630.GDT 11/12/19

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-1001ALT</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>729,989.86 N; 1,514,631.88 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>413.4 ft</u> Elevation Datum <u>NGVD29</u>	
Project Name <u>CUF TDEC Order</u>		Date Started <u>12/12/18</u> Completed <u>12/18/18</u>	
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Inspector <u>G. Budd</u> Logger <u>G. Budd</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 850XR, #953</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 3" SS w/o liners</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>N/A</u> Overdrill Depth <u>N/A</u>			
Sampler Hammer Type <u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>			
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>A. Blair</u>		Approved By <u>P. Dunne</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	413.4	Top of Hole					
	0.3	413.1	GRASS AND TOPSOIL					
1	1.2	412.2	LEAN CLAY, CL, 7.5YR 3/2 (dark brown), soft to firm, dry, organics and abundant bottom ash, limestone gravel, and chert		SS01G	0.0 - 1.5	1.5	4-5-4
	1.5	411.9						
2	2.3	411.1	LEAN CLAY, CL, 7.5YR 4/6 (strong brown), firm, dry, abundant bottom ash and chert		SS02G	1.5 - 3.0	1.5	4-6-5
3	3.0	410.4						
	3.5	409.9	LEAN CLAY, CL, 7.5YR 4/6 (strong brown) and 7.5YR 2.5/1 (black), soft to firm, moist to dry		SS03G	3.0 - 4.5	1.2	14-15-12
4	4.5	408.9						
5			WELL GRADED SAND, SW, 7.5YR 2.5/1 (black), fine to coarse plasticity, loose, dry, [CCR]		SS04G	4.5 - 6.0	0.4	8-8-10
6	6.0	407.4	LEAN CLAY, CL, 7.5YR 4/6 (strong brown), stiff, moist, bottom ash and chert to 3.5'		SS05G	6.0 - 7.5	1.3	4-4-6
7	7.5	405.9	LEAN CLAY, CL, 7.5YR 4/6 (strong brown), stiff, dry, fill material with limestone gravel and siltstone fragments and shale fragments		SS06G	7.5 - 9.0	1.5	5-4-5
8			LIMESTONE GRAVEL FILL MATERIAL		SS07G	9.0 - 10.5	1.0	12-9-9
9	9.0	404.4	FAT CLAY, CH, 10YR 4/4 (dark yellowish brown), soft to firm, moist, with some bottom ash and limestone gravel		SS08G	10.5 - 12.0	1.5	7-7-8
10	10.5	402.9	FAT CLAY, CH, 10YR 4/2 (dark grayish brown), soft, moist, with abundant bottom ash, limestone gravel, organics, wood pieces		SS09G	12.0 - 13.5	1.2	8-20-15
11			LEAN CLAY, CL, 10YR 4/2 (dark grayish brown), stiff, moist, with fragments of limestone and chert, trace bottom ash		SS10E	13.5 - 15.0	1.3	6-9-12
12	12.0	401.4	FAT CLAY, CH, 10YR 4/2 (dark grayish brown), firm, moist, with fragments of limestone and organics		SS11G	15.0 - 16.5	1.5	6-7-7
13	13.5	399.9	FAT CLAY, CH, 10YR 4/3 (brown), stiff to very stiff, moist, with limestone gravel fill and organics					
14	15.0	398.4	LEAN CLAY, CL, 10YR 4/3 (brown) and 10YR 4/6 (dark yellowish brown), firm to stiff, moist, with organics					
15	16.5	396.9						

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 2/12/20

Client Borehole ID   N/A   Stantec Boring No. **CUF-1001ALT**  
 Client   Tennessee Valley Authority   Boring Location   729,989.86 N; 1,514,631.88 E NAD27 Plant Local    
 Project Number   175568209   Surface Elevation   413.4 ft   Elevation Datum   NGVD29  

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
17			FAT CLAY, CH, 5YR 5/6 (yellowish red) and 5YR 5/1 (gray), moist, with fragments of chert and trace organics		SS12G	16.5 - 18.0	1.5	5-7-18
18	18.0	395.4			SS13G	18.0 - 18.9	0.9	17-50/5"
19			FAT CLAY, CH, 10YR 5/6 (yellowish brown), firm to very stiff, dry, with manganese (Continued)					
19.5	393.9							
20			LEAN CLAY, CL, 7.5YR 4/6 (strong brown), stiff to hard, dry, with limestone gravel		SS14E	19.5 - 21.0	1.5	7-19-15
21			FAT CLAY, CH, 10YR 5/6 (yellowish brown), very stiff, dry, trace bottom ash to 20.7', limestone fill possible riprap					
21.8	391.6				SS15G	21.0 - 22.5	1.0	34-19-16
22			LIMESTONE FILL (RIPRAP)		SS16G	22.5 - 22.8	0.3	50/4"
22.3	391.1							
22.5	390.9							
22.8	390.6							

FAT CLAY, CH, 10YR 5/6 (yellowish brown), very stiff, dry

LIMESTONE FILL (RIPRAP)

FAT CLAY, CH, 10YR 5/6 (yellowish brown), hard, dry, with limestone fragments and chert

Refusal /  
Bottom of Hole at 22.8 Ft.

Monitoring well CUF-1001 was initially installed in the boring, but it yielded insufficient groundwater and the well/location was abandoned. CUF-1001 was subsequently installed in soil boring CUF1001ALT2.

As-drilled boring location not surveyed. Horizontal coordinates shown based on proposed boring location. Vertical coordinates shown based on 2017 LIDAR surfaces.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG: 175568209\_CUF\_TDEC SUBSURF DT: 20190630.GDT: 2/12/20



# SUBSURFACE LOG


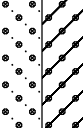
Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-1001ALT2</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>730,376.0 N; 1,513,548.7 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>390.3 ft</u> Elevation Datum <u>NGVD29</u>	
Project Name <u>CUF TDEC Order</u>		Date Started <u>4/9/19</u> Completed <u>4/9/19</u>	
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Inspector <u>M. Edmunds</u> Logger <u>M. Edmunds</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 85#1, #950</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 2" SS w/o liners</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>8-1/4" HSA overdrill of boring</u>		Overdrill Depth <u>18.1 ft</u>	
Sampler Hammer Type <u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u>		Efficiency <u>N/A</u>	
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>A. Blair</u>		Approved By <u>P. Dunne</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
0	0.0	390.3							
			Top of Hole						
1			LEAN CLAY TRACE SAND, CL, 5YR 5/4 (reddish brown) to 5YR 3/4 (dark reddish brown), non-plastic, medium stiff, dry to damp, [FILL]		SS01G	0.0 - 1.5	1.5	4-6-6	
2	2.2	388.1				SS02G	1.5 - 3.0	1.4	11-11-12
3				SANDY LEAN CLAY TRACE GRAVEL, CL, 5YR 5/4 (reddish brown) to 5YR 3/4 (dark reddish brown), non-plastic, medium stiff, dry to damp, [FILL]		SS03G	3.0 - 4.5	1.2	10-4-4
4							SS04G	4.5 - 6.0	0.5
5						SS05G	6.0 - 7.5	0.4	4-4-4
6	6.0	384.3	SILTY FAT CLAY TRACE GRAVEL, CH, 5YR 4/3 (reddish brown), medium plasticity, soft, moist		SS06G	7.5 - 9.0	1.5	4-4-6	
7						SS07G	9.0 - 10.5	1.5	4-6-8
8	8.5	381.8	SILTY FAT CLAY TRACE SAND, CH, 5YR 4/6 (yellowish red), medium plasticity, medium stiff, moist		SS08G	10.5 - 12.0	1.1	5-7-5	
9						SS09E	12.0 - 13.5	1.5	4-7-9
10						SS10E	13.5 - 15.0	1.5	6-6-9
11			FAT CLAY, CH, 5YR 4/6 (yellowish red), medium plasticity, medium stiff, moist						
12	12.0	378.3							
13									
14									
15									

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 11/22/19

12/01/19 5:20:19/04/19

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1001ALT2</b>
Client	Tennessee Valley Authority	Boring Location	730,376.0 N; 1,513,548.7 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	390.3 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
15			FAT CLAY, CH, 5YR 4/6 (yellowish red), medium plasticity, medium stiff, moist <i>(Continued)</i>		SS11E	15.0 - 16.5	1.4	5-8-20
16	16.2	374.1						
17			CLAYEY WELL GRADED GRAVEL WITH CLAY SOME SAND, GW-GC, 5YR 4/6 (yellowish red), medium to coarse, medium plasticity, loose, saturated, well graded, Fresh-very little to no weathering		SS12G	16.5 - 18.0	1.1	16-16-16
18	18.1	372.2						

Refusal /  
Bottom of Hole at 18.1 Ft.

Boring converted to Well ID CUF-1001. See monitoring well installation log dated 4/10/2019.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 11/22/19







# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1002ALT2</b>	
Client	Tennessee Valley Authority	Boring Location	731,662.39 N; 1,511,771.92 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	385.8 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	1/24/19	Completed 1/25/19
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	9.2 ft	Date/Time 1/24/19
Inspector	G. Budd	Logger	G. Budd	Depth to Water N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 850XR, #953	
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 2" SS w/o liners			
Rock Drilling and Sampling Tools (Type and Size)	N/A			
Overdrill Tooling (Type and Size)	8-1/4" HSA overdrill of boring	Overdrill Depth	17.8 ft	
Sampler Hammer Type	Automatic	Weight	140 lb	Drop 30" Efficiency N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	D. Norman	Approved By	P. Dunne	

Depth Ft <sup>3</sup>	Lithology		Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	385.8						
			Top of Hole					
1	1.5	384.3	GRAVEL/CLAY, GW, 7.5YR 4/6 (strong brown), stiff to very stiff, dry, limestone, #57 stone, road base		SS01G	0.0 - 1.5	0.9	9-11-20
2			GRAVEL/CLAY, GW, 7.5YR 4/6 (strong brown), hard to very stiff, dry		SS02G	1.5 - 3.0	1.2	32-19-13
3	3.0	382.8	GRAVEL/CLAY, GW, 7.5YR 4/6 (strong brown), firm to stiff, dry		SS03G	3.0 - 4.5	0.7	9-6-4
4	4.5	381.3	GRAVEL/CLAY, GW, 7.5YR 4/6 (strong brown), soft, dry		SS04G	4.5 - 6.0	0.5	4-2-3
5	6.0	379.8	GRAVEL/CLAY, GW, 10YR 4/2 (dark grayish brown), soft to firm, moist		SS05G	6.0 - 7.5	0.6	4-6-3
6	7.5	378.3	GRAVEL/CLAY, GW, 10YR 4/2 (dark grayish brown), soft to firm, moist		SS06G	7.5 - 9.0	0.4	10-4-4
7	9.0	376.8	GRAVEL/CLAY, GW, 10YR 4/2 (dark grayish brown), soft to firm, moist		SS07G	9.0 - 10.5	0.4	3-3-3
8	10.5	375.3	GRAVEL/CLAY, GW, 10YR 4/2 (dark grayish brown), firm to stiff, moist, limestone fill		SS08G	10.5 - 12.0	0.9	6-7-23
9	12.0	373.8	LEAN CLAY, CL, 10YR 4/2 (dark grayish brown), soft, moist, limestone fill		SS09G	12.0 - 13.5	1.5	3-3-3
10	12.6	373.2	FAT CLAY, CH, 7.5YR 5/6 (strong brown), soft, moist, fragments of chert		SS10G	13.5 - 15.0	1.2	17-10-11
11	13.5	372.3	FAT CLAY, CH, 7.5YR 5/6 (strong brown) and 10YR 4/2 (dark grayish brown), very stiff to stiff, wet, abundant fragments of limestone		SS11G	15.0 - 16.5	1.0	9-5-13
12	15.0	370.8	FAT CLAY, CH, 7.5YR 4/6 (strong brown), stiff, wet, fragments of limestone		SS12G	16.5 - 18.0	0.8	5-25-25
13	16.5	369.3	FAT CLAY, CH, 7.5YR 4/4 (brown), very stiff, wet,					
14	18.0	367.8						

TVA/EIP BORING LOG: 175568209 CUF TDEC ORDER/GPJ TDEC SUBSURF DT: 20190330.GDT: 8/8/19

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-1002ALT2</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  731,662.39 N; 1,511,771.92 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  385.8 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			abundant fragments of limestone					
18.9	366.9				SS13aG	18.0 - 18.9		
19			CLAYEY GRAVEL, GC, 7.5YR 4/4 (brown) and 10YR 5/2 (grayish brown), loose to medium dense, wet					
					SS13bG	18.9 - 19.5	1.3	7-15-12
20	20.3	365.5	limestone, grayish brown, fine grained, hard to 19.5'					

Refusal /  
Bottom of Hole at 20.3 Ft.

Boring converted to 4-inch permanent monitoring well. See well installation log for backfill details.


- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
  G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-1003</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>729,886.83 N; 1,513,730.55 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>391.7 ft</u> Elevation Datum <u>NGVD29</u>
Project Name	<u>CUF TDEC Order</u>	Date Started	<u>12/10/18</u> Completed <u>12/11/18</u>
Project Location	<u>Stewart Co, Cumberland City, TN</u>	Depth to Water	<u>10.5 ft</u> Date/Time <u>12/10/18 14:07</u>
Inspector	<u>G. Budd</u> Logger <u>G. Budd</u>	Depth to Water	<u>N/A</u> Date/Time <u>N/A</u>
Drilling Contractor	<u>Stantec Consulting Services Inc.</u>	Drill Rig Type and ID	<u>CME 850XR, #953</u>
Overburden Drilling and Sampling Tools (Type and Size)	<u>4-1/4" HSA, 2" SS w/o liners</u>		
Rock Drilling and Sampling Tools (Type and Size)	<u>N/A</u>		
Overdrill Tooling (Type and Size)	<u>N/A</u>	Overdrill Depth	<u>N/A</u>
Sampler Hammer Type	<u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>		
Borehole Azimuth	<u>N/A</u>	Borehole Inclination (from Vertical)	<u>N/A</u>
Reviewed By	<u>A. Blair</u>	Approved By	<u>P. Dunne</u>

Depth Ft <sup>3</sup>	Lithology		Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	391.7						
	0.3	391.4						
1			GRASS AND CLAY, [FILL]					
	1.5	390.2	LEAN CLAY, CL, 5YR 4/4 (reddish brown), firm, dry, fragments of limestone gravel		SS01G	0.0 - 1.5	1.0	6-7-8
2			LEAN CLAY, CL, 5YR 4/4 (reddish brown) and 5YR 6/1 (gray), firm, dry, fragments of limestone gravel and chert		SS02G	1.5 - 3.0	1.2	5-5-5
3	3.0	388.7	FAT CLAY, CH, 7.5YR 3/3 (dark brown), firm, dry, fragments of chert and shale		SS03G	3.0 - 4.5	1.5	5-5-7
4	4.5	387.2	FAT CLAY, CH, 7.5YR 4/6 (strong brown) and 7.5YR 4/2 (brown), soft, moist, fragments of chert and shale		SS04G	4.5 - 6.0	1.5	2-3-4
6	6.0	385.7	no sample collected from 6.0'-7.5'		SS05G	6.0 - 7.5	0.0	NR-NR-NR
7	7.5	384.2	FAT CLAY, CH, 7.5YR 4/6 (strong brown) and 7.5YR 4/2 (brown), soft to firm, moist, fragments of chert, limestone, and bottom ash mixed in clay		SS06G	7.5 - 9.0	1.5	2-4-6
9	9.0	382.7	FAT CLAY, CH, 7.5YR 4/6 (strong brown), soft, moist, trace organics		SS07G	9.0 - 10.5	1.5	3-3-3
11	10.5	381.2	FAT CLAY, CH, 7.5YR 5/6 (strong brown), soft to firm, moist, some fly ash mixed in clay		SS08G	10.5 - 12.0	1.4	3-4-6
12	12.0	379.7	FAT CLAY, CH, 7.5YR 5/6 (strong brown), soft to firm, moist, fragments of weathered chert		SS09G	12.0 - 13.5	1.3	2-4-5
13	13.5	378.2	FAT CLAY, CH, 7.5YR 5/6 (strong brown), soft to firm, moist, fragments of weathered chert		SS10G	13.5 - 15.0	1.5	4-4-5
14	15.0	376.7						

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFIJ TDEC SUBSURF DT:20190630 GDT: 11/26/19

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1003</b>
Client	Tennessee Valley Authority	Boring Location	729,886.83 N; 1,513,730.55 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	391.7 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI	
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %	
15			FAT CLAY, CH, 7.5YR 5/6 (strong brown), soft to hard, dry, fragments of weathered chert						
16					SS11G	15.0 - 16.5	15.0 - 16.5	1.5	5-6-6
17	17.2			374.5		SS12G	16.5 - 17.2	16.5 - 17.2	0.7

Refusal /  
Bottom of Hole at 17.2 Ft.

Boring abandoned and backfilled with 30% solids bentonite grout due to presence of CCR observed in soil samples on 12/11/18.

As-drilled boring location not surveyed. Horizontal coordinates shown based on proposed boring location. Vertical coordinates shown based on 2017 LIDAR surfaces.


- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-1003A</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>729,906.83 N; 1,513,730.55 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>388.0 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>12/11/18</u>	Completed <u>12/11/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>10.1 ft</u>	Date/Time <u>12/11/18 11:21</u>
Inspector <u>G. Budd</u>	Logger <u>G. Budd</u>	Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 850XR, #953</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 2" SS w/o liners</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>N/A</u>		Overdrill Depth <u>N/A</u>	
Sampler Hammer Type <u>Automatic</u>	Weight <u>140 lb</u>	Drop <u>30"</u>	Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>D. Norman</u>		Approved By <u>P. Dunne</u>	

Depth Ft <sup>3</sup>	Lithology		Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	388.0	Top of Hole					
	0.3	387.7	GRASS AND FILL MATERIAL, [FILL]					
1	1.5	386.5	LEAN CLAY, CL, 7.5YR 3/2 (dark brown), soft to firm, dry, organics, fragments of chert and weathered siltstone, [FILL]		SS01G	0.0 - 1.5	1.4	3-6-6
2	3.0	385.0	LEAN CLAY, CL, 7.5YR 4/4 (brown), firm, dry, fragments of chert		SS02G	1.5 - 3.0	1.5	5-6-6
3	4.5	383.5	LEAN CLAY, CL, 7.5YR 4/4 (brown), soft to firm, dry to moist, fragments of chert		SS03G	3.0 - 4.5	1.5	3-5-5
4	6.0	382.0	LEAN CLAY, CL, 7.5YR 4/4 (brown) and 7.5YR 4/2 (brown), soft, moist, fragments of chert, bottom ash		SS04G	4.5 - 6.0	1.5	4-4-5
5	7.5	380.5	LEAN CLAY, CL, 10YR 4/2 (dark grayish brown), soft, moist, fragments of chert, bottom ash, trace organic material		SS05G	6.0 - 7.5	1.4	3-3-5
6	9.0	379.0	LEAN CLAY, CL, 10YR 4/2 (dark grayish brown), soft to firm, moist, fragments of chert from 8.5'-9.0'		SS06G	7.5 - 9.0	1.5	4-5-7
7	10.5	377.5	FAT CLAY, CH, 10YR 4/2 (dark grayish brown) and 7.5YR 4/6 (strong brown), firm, dry, weathered chert and some bottom ash		SS07G	9.0 - 10.5	1.3	8-7-7
8	12.0	376.0	FAT CLAY, CH, 7.5YR 4/6 (strong brown), firm, dry, some bottom ash and weathered chert		SS08G	10.5 - 12.0	1.5	4-5-8
9	13.5	374.5	FAT CLAY, CH, 7.5YR 5/6 (strong brown), stiff, dry, abundant weathered chert, trace fly ash 12.0'-12.5'		SS09G	12.0 - 13.5	1.5	7-9-16
10	15.0	373.0	FAT CLAY, CH, 7.5YR 5/6 (strong brown), firm, dry, fragments of chert to 14.0', grading to weathered chert and some fat clay, 10YR 6/6, dry, firm		SS10G	13.5 - 15.0	1.3	7-6-4

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 11/26/19

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1003A</b>
Client	Tennessee Valley Authority	Boring Location	729,906.83 N; 1,513,730.55 E NAD27 Plant Local
Project Number	175568209	Surface Elevation	388.0 ft Elevation Datum NGVD29

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
15			FAT CLAY, CH, 7.5YR 4/6 (strong brown), soft, moist, weathered chert to 16.0', grading to weathered chert refusal at 16.3', wet from 16.0-16.3'		SS11G	15.0 - 16.3	0.8	2-1-50/4"
16	16.3	371.7						

Refusal /  
Bottom of Hole at 16.3 Ft.

Boring abandoned and backfilled with 30% solids bentonite grout due to presence of CCR observed in soil samples.

As-drilled boring location not surveyed. Horizontal coordinates shown based on proposed boring location. Vertical coordinates shown based on 2017 LIDAR surfaces.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface




# SUBSURFACE LOG

Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-1003B</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>729,882.92 N; 1,513,710.90 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>393.0 ft</u>	Elevation Datum <u>NGVD29</u>
Project Name <u>CUF TDEC Order</u>		Date Started <u>12/18/18</u>	Completed <u>12/18/18</u>
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>11.9 ft</u>	Date/Time <u>12/18/18 13:24</u>
Inspector <u>G. Budd</u>	Logger <u>D. Mihalek</u>	Depth to Water <u>N/A</u>	Date/Time <u>N/A</u>
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 850XR, #953</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 2" SS w/o liners</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>8-1/4" HSA overdrill of boring</u>		Overdrill Depth <u>15.3 ft</u>	
Sampler Hammer Type <u>Automatic</u>	Weight <u>140 lb</u>	Drop <u>30"</u>	Efficiency <u>N/A</u>
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>D. Norman</u>		Approved By <u>P. Dunne</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	393.0						
			<b>Top of Hole</b>					
1	1.5	391.5	ORGANIC MATTER WITH CLAY, grading to clay, 7.5YR 4/6, dry, soft to firm, weathered chert throughout		SS01G	0.0 - 1.5	1.1	2-4-5
2	3.0	390.0	LEAN CLAY, CL, 7.5YR 4/6 (strong brown), medium plasticity, firm, dry, weathered chert and coarse chert gravel throughout		SS02G	1.5 - 3.0	1.1	5-7-8
3	4.5	388.5	LEAN CLAY, CL, 7.5YR 4/6 (strong brown), medium plasticity, firm, dry, with chert fragments throughout		SS03G	3.0 - 4.5	1.1	4-6-7
4	6.0	387.0	FAT CLAY, CH, 7.5YR 4/4 (brown), medium plasticity, firm, moist, trace bottom ash and chert fragments throughout		SS04G	4.5 - 6.0	1.1	4-3-3
5	7.5	385.5	FAT CLAY, CH, 7.5YR 4/2 (brown), high plasticity, firm, moist, limestone fragments and bottom ash fragments throughout		SS05G	6.0 - 7.5	1.5	19-7-6
6	9.0	384.0	FAT CLAY, CH, 7.5YR 4/1 (dark gray), high plasticity, soft, moist, chert and bottom ash fragments throughout		SS06G	7.5 - 9.0	1.3	3-3-7
7	9.9	383.1	LEAN CLAY, CL, 7.5YR 3/4 (dark brown), medium plasticity, stiff, dry, bottom ash and chert fragments		SS07G	9.0 - 10.5	1.5	13-10-7
8	10.5	382.5	GRAVEL, 7.5YR 6/4 (light brown), coarse, loose, dry, chert gravel					
9	12.0	381.0	COBBLES, 7.5YR 6/3 (light brown), loose, dry, chert cobbles		SS08G	10.5 - 12.0	0.1	7-5-7
10	13.5	379.5	LEAN CLAY, CL, 7.5YR 4/6 (strong brown), firm, dry, chert and weathered chert coarse gravel fragments		SS09G	12.0 - 13.5	1.5	5-4-6
11	15.0	378.0	LEAN CLAY, CL, 7.5YR 4/6 (strong brown), medium plasticity, firm, dry, with chert fragments, chert cobbles at 15'		SS10G	13.5 - 15.0	1.5	4-5-8

TVA EIP BORING LOG - 175568209 CUF TDEC ORDER G.P.J. TDEC SUBSURF DT 20180530.GDT 12/17/19

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-1003B</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  729,882.92 N; 1,513,710.90 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  393.0 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
15	15.7	377.3			SS11G	15.0 - 15.7	0.7	4-50/2"

Refusal /  
Bottom of Hole at 15.7 Ft.

Boring converted to 4-inch permanent monitoring well. See well installation log for backfill details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
  G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190530.GDT 12/17/19





# SUBSURFACE LOG

Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1004ALT</b>	
Client	Tennessee Valley Authority	Boring Location	727,408.35 N; 1,510,613.17 E NAD27 Plant Local	
Project Number	175568209	Surface Elevation	390.8 ft	Elevation Datum NGVD29
Project Name	CUF TDEC Order	Date Started	12/5/18	Completed 12/5/18
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	N/A	Date/Time N/A
Inspector	G. Budd	Logger	G. Budd	Depth to Water N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 850XR, #953	
Overburden Drilling and Sampling Tools (Type and Size)	4-1/4" HSA, 3" SS w/o liners			
Rock Drilling and Sampling Tools (Type and Size)	N/A			
Overdrill Tooling (Type and Size)	N/A	Overdrill Depth	N/A	
Sampler Hammer Type	Automatic	Weight	140 lb	Drop 30" Efficiency N/A
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A	
Reviewed By	D. Norman	Approved By	P. Dunne	

Depth Ft <sup>3</sup>	Lithology		Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	390.8	Top of Hole					
	0.3	390.5	GRASS AND TOPSOIL					
1	1.5	389.3	LEAN CLAY, CL, 5YR 5/6 (yellowish red), soft, moist		SS01G	0.0 - 1.5	1.3	WH-3-4
2			LEAN CLAY, CL, 5YR 5/6 (yellowish red), soft to firm, moist, with trace weathered chert		SS02G	1.5 - 3.0	1.5	3-5-5
3	3.0	387.8	LEAN CLAY, CL, 5YR 5/6 (yellowish red), soft to firm, moist, with trace weathered chert		SS03G	3.0 - 4.5	1.5	4-6-7
4	4.5	386.3	LEAN CLAY, CL, 2.5YR 4/6 (red), stiff, dry, with fragments of chert		SS04G	4.5 - 6.0	1.5	6-9-13
5	6.0	384.8	LEAN CLAY, CL, 5YR 5/8 (yellowish red), stiff, dry, with some fragments of chert		SS05G	6.0 - 7.5	1.5	8-12-15
6			LEAN CLAY, CL, 5YR 5/6 (yellowish red), stiff, dry		SS06G	7.5 - 9.0	1.5	8-10-12
7	7.5	383.3	LEAN CLAY, CL, 5YR 5/6 (yellowish red) and 5YR 5/4 (reddish brown), stiff, dry		SS07G	9.0 - 10.5	1.5	6-10-13
8			LEAN CLAY, CL, 7.5YR 6/8 (reddish yellow), stiff, dry, with trace manganese		SS08G	10.5 - 12.0	1.5	9-10-14
9	12.0	378.8	LEAN CLAY, CL, 7.5YR 6/8 (reddish yellow), stiff, dry, with some highly weathered chert		SS09G	12.0 - 13.5	1.5	6-8-12
10	13.5	377.3	LEAN CLAY, CL, 7.5YR 6/8 (reddish yellow), stiff, dry, with highly weathered chert		SS10G	13.5 - 15.0	1.5	9-12-14
11	15.0	375.8	LEAN CLAY, CL, 7.5YR 6/8 (reddish yellow), stiff, dry, with abundant weathered chert		SS11G	15.0 - 16.5	1.5	10-11-11
12	16.5	374.3	LEAN CLAY, CL, 7.5YR 6/8 (reddish yellow), soft, moist, with fragments of weathered siltstone		SS12G	16.5 - 18.0	1.5	4-5-4
13	18.0	372.8						

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 11/13/19

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-1004ALT</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  727,408.35 N; 1,510,613.17 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  390.8 ft  </u> Elevation Datum <u>  NGVD29  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18	18.5	372.3	 LEAN CLAY, CL, 7.5YR 6/8 (reddish yellow), soft, moist					
19	19.5	371.3		 SANDY LEAN CLAY, CL, 7.5YR 5/6 (strong brown), very fine, soft to firm, moist to wet		SS13G	18.0 - 19.5	1.0
	19.9	370.9	 SANDY LEAN CLAY, CL, 7.5YR 5/6 (strong brown), very fine, very soft, moist to wet, grading to shale, dark gray, hard at 19.9'			SS14G	19.5 - 19.9	0.4

Refusal /  
Bottom of Hole at 19.9 Ft.

Due to the boring being dry, it was abandoned and backfilled with 30% solids bentonite grout to the ground surface.

As-drilled boring location not surveyed. Horizontal coordinates shown based on proposed boring location. Vertical coordinates shown based on 2017 LIDAR surfaces.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
  G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 11/13/19

Client Borehole ID <u>  N/A  </u>	Stantec Boring No. <b>CUF-1004ALT2</b>
Client <u>  Tennessee Valley Authority  </u>	Boring Location <u>  727,737.61 N; 1,510,547.15 E NAD27 Plant Local  </u>
Project Number <u>  175568209  </u>	Surface Elevation <u>  381.1 ft  </u> Elevation Datum <u>  NGVD29  </u>
Project Name <u>  CUF TDEC Order  </u>	Date Started <u>  12/4/18  </u> Completed <u>  12/4/18  </u>
Project Location <u>  Stewart Co, Cumberland City, TN  </u>	Depth to Water <u>  N/A  </u> Date/Time <u>  N/A  </u>
Inspector <u>  G. Budd  </u> Logger <u>  G. Budd  </u>	Depth to Water <u>  N/A  </u> Date/Time <u>  N/A  </u>
Drilling Contractor <u>  Stantec Consulting Services Inc.  </u>	Drill Rig Type and ID <u>  CME 850XR, #953  </u>
Overburden Drilling and Sampling Tools (Type and Size) <u>  4-1/4" HSA, 3" SS w/o liners  </u>	
Rock Drilling and Sampling Tools (Type and Size) <u>  N/A  </u>	
Overdrill Tooling (Type and Size) <u>  N/A  </u> Overdrill Depth <u>  N/A  </u>	
Sampler Hammer Type <u>  Automatic  </u> Weight <u>  140 lb  </u> Drop <u>  30"  </u> Efficiency <u>  N/A  </u>	
Borehole Azimuth <u>  N/A  </u> Borehole Inclination (from Vertical) <u>  N/A  </u>	
Reviewed By <u>  A. Blair  </u>	Approved By <u>  P. Dunne  </u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	381.1						
	0.3	380.8						
1			LEAN CLAY, CL, 5YR 4/6 (yellowish red), soft to stiff, moist, abundant fragments of chert at 2.0'		SS01G	0.0 - 1.5	1.5	2-4-5
2					SS02G	1.5 - 3.0	1.5	4-10-13
3	3.0	378.1			SS03G	3.0 - 4.5	1.5	6-10-16
4			LEAN CLAY, CL, 2.5YR 4/6 (red), stiff to very stiff, dry, abundant fragments of chert		SS04G	4.5 - 6.0	1.5	12-16-18
5					SS05G	6.0 - 6.6	0.6	18-50/1"
6	6.0	375.1			SS06G	7.5 - 8.0	0.5	91
7			LEAN CLAY, CL, 2.5YR 4/6 (red), very stiff to hard, dry, with fragments of chert, possible chert boulder Augered to 7.0'					
8	7.5	373.6						
9	9.0	372.1						

Refusal /  
Bottom of Hole at 9.0 Ft.

Due to the boring being dry, it was abandoned and backfilled with 30% solids bentonite grout to the ground surface.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA EIP BORING LOG - 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 11/13/19


Client Borehole ID <u>N/A</u>		Stantec Boring No. <b>CUF-1004ALT2A</b>	
Client <u>Tennessee Valley Authority</u>		Boring Location <u>727,751.77 N; 1,510,561.28 E NAD27 Plant Local</u>	
Project Number <u>175568209</u>		Surface Elevation <u>381.7 ft</u> Elevation Datum <u>NGVD29</u>	
Project Name <u>CUF TDEC Order</u>		Date Started <u>12/6/18</u> Completed <u>12/6/18</u>	
Project Location <u>Stewart Co, Cumberland City, TN</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Inspector <u>G. Budd</u> Logger <u>G. Budd</u>		Depth to Water <u>N/A</u> Date/Time <u>N/A</u>	
Drilling Contractor <u>Stantec Consulting Services Inc.</u>		Drill Rig Type and ID <u>CME 850XR, #953</u>	
Overburden Drilling and Sampling Tools (Type and Size) <u>4-1/4" HSA, 3" SS w/o liners</u>			
Rock Drilling and Sampling Tools (Type and Size) <u>N/A</u>			
Overdrill Tooling (Type and Size) <u>N/A</u> Overdrill Depth <u>N/A</u>			
Sampler Hammer Type <u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>			
Borehole Azimuth <u>N/A</u>		Borehole Inclination (from Vertical) <u>N/A</u>	
Reviewed By <u>D. Norman</u>		Approved By <u>P. Dunne</u>	

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	381.7	Top of Hole					
	0.3	381.4	GRASS AND TOPSOIL					
1			LEAN CLAY, CL, 5YR 5/6 (yellowish red), low plasticity, soft to firm, moist, with organics and weathered chert		SS01G	0.0 - 1.5	1.5	2-5-6
2			Color change to 2.5YR 4/6 (red) at 1.5'		SS02G	1.5 - 3.0	1.5	3-4-6
3			No organics beginning at 1.5'					
4			Color change to 2.5YR 4/8 (red) at 3.0'		SS03G	3.0 - 4.5	1.5	5-6-10
5			Firm to stiff at 3.0'					
6			Stiff, dry beginning at 4.5'		SS04G	4.5 - 6.0	1.5	8-12-14
7					SS05G	6.0 - 7.5	1.5	9-9-15
8			Trace manganese at 7.5'		SS06G	7.5 - 9.0	1.5	15-13-15
9								
10			Color change to 5YR 5/6 (yellowish red) at 10.2'		SS07G	9.0 - 10.5	1.5	8-11-16
11			Color change to 7.5YR 6/8 (reddish yellow) at 10.5'		SS08G	10.5 - 12.0	1.5	8-10-14
12			Firm at 12.0'					
13	13.5	368.2			SS09E	12.0 - 13.5	1.5	6-6-9
14			FAT CLAY, CH, 7.5YR 6/8 (reddish yellow), soft, moist, with weathered chert		SS10G	13.5 - 15.0	1.5	3-2-3
15	15.0	366.7						
16			LEAN CLAY, CL, 5YR 5/6 (yellowish red), soft, moist, with weathered chert		SS11G	15.0 - 16.5	1.2	3-3-2
17					SS12E	16.5 - 18.0	1.5	2-2-3

TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 6/17/20

 12/013.5-201812/06  
16.5/13.0-201812/06

Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-1004ALT2A</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>727,751.77 N; 1,510,561.28 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>381.7 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			LEAN CLAY, CL, 5YR 5/6 (yellowish red), soft, moist, with weathered chert (Continued) Moist to wet at 18.0'					
19				SS13G	18.0 - 19.5	1.0	1-3-2	
20				SS14G	19.5 - 20.9	1.0	3-1-50/5"	
20.9	360.8							

Refusal /  
Bottom of Hole at 20.9 Ft.

Temporary 1-inch PVC piezometer installed. Boring overdrilled, abandoned, and backfilled with 30% solids bentonite grout.

As-drilled boring location not surveyed. Horizontal coordinates based on field measurements. Vertical coordinates based on 2017 LIDAR surfaces.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG - 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 6/17/20

Client Borehole ID	<u>N/A</u>	Stantec Boring No.	<b>CUF-1005</b>
Client	<u>Tennessee Valley Authority</u>	Boring Location	<u>728,368.88 N; 1,513,879.56 E NAD27 Plant Local</u>
Project Number	<u>175568209</u>	Surface Elevation	<u>396.1 ft</u> Elevation Datum <u>NGVD29</u>
Project Name	<u>CUF TDEC Order</u>	Date Started	<u>1/16/19</u> Completed <u>1/22/19</u>
Project Location	<u>Stewart Co, Cumberland City, TN</u>	Depth to Water	<u>18.0 ft</u> Date/Time <u>1/16/19 10:45</u>
Inspector	<u>G. Budd</u> Logger <u>G. Budd</u>	Depth to Water	<u>5.8 ft</u> Date/Time <u>1/16/19 11:50</u>
Drilling Contractor	<u>Stantec Consulting Services Inc.</u>	Drill Rig Type and ID	<u>CME 850XR, #953</u>
Overburden Drilling and Sampling Tools (Type and Size)	<u>4-1/4" HSA, 2" SS w/o liners</u>		
Rock Drilling and Sampling Tools (Type and Size)	<u>N/A</u>		
Overdrill Tooling (Type and Size)	<u>8-1/4" HSA overdrill of boring</u>	Overdrill Depth	<u>25.7 ft</u>
Sampler Hammer Type	<u>Automatic</u> Weight <u>140 lb</u> Drop <u>30"</u> Efficiency <u>N/A</u>		
Borehole Azimuth	<u>N/A</u>	Borehole Inclination (from Vertical)	<u>N/A</u>
Reviewed By	<u>A. Blair</u>	Approved By	<u>P. Dunne</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	396.1						
1			Crush and run and #57 stone road base material gravel placed along edge of road on the slope, [FILL]					
2			Auger to 3.0' to begin sampling- no split spoon samples collected from 0.0' to 3.0'					
3	3.0	393.1						
4	4.5	391.6	LEAN CLAY, CL, 2.5YR 5/6 (red), soft, moist, with fragments of chert		SS03G	3.0 - 4.5	0.3	2-2-2
5	5.5		LEAN CLAY, CL, 7.5YR 4/3 (brown), stiff, dry, with fragments of chert, trace bottom ash		SS04G	4.5 - 6.0	1.2	4-9-12
6	6.0	390.1						
7	7.5	388.6	LEAN CLAY, CL, 7.5YR 5/6 (strong brown), firm, dry, with fragments of chert, trace organics (wood)		SS05G	6.0 - 7.5	1.5	5-8-8
8	8.5		LEAN CLAY, CL, 7.5YR 5/6 (strong brown), medium plasticity, soft to firm, dry, with fragments of chert		SS06G	7.5 - 9.0	1.5	4-3-6
9	9.5		LEAN CLAY, CL, 7.5YR 5/6 (strong brown), firm, dry to moist, with fragments of chert, trace manganese		SS07G	9.0 - 10.5	1.4	5-7-8
10	10.5	385.6						
11	11.5		LEAN CLAY, CL, 7.5YR 5/6 (strong brown) and 7.5YR 5/1 (gray), firm, dry, with some fragments of chert		SS08G	10.5 - 12.0	1.5	5-7-9
12	12.0	384.1						
13	13.5	382.6	LEAN CLAY, CL, 10YR 5/4 (yellowish brown) and 10YR 5/1 (gray), firm to stiff, dry, with some fragments of limestone and chert, trace fine sand		SS09G	12.0 - 13.5	1.5	7-8-11
14	14.5		LEAN CLAY, CL, 10YR 5/4 (yellowish brown) and 10YR 5/1 (gray), firm to stiff, dry, with some fragments of limestone and chert, trace fine sand		SS10G	13.5 - 15.0	1.5	8-8-10
15	15.0	381.1						
16	16.5	379.6	LEAN CLAY, CL, 10YR 5/6 (yellowish brown) and 10YR 5/1 (gray), soft to firm, dry to moist, with trace fragments of limestone and manganese		SS11G	15.0 - 16.5	1.5	4-4-7
17	17.5		LEAN CLAY, CL, 10YR 5/6 (yellowish brown), stiff, dry, with abundant fragments and limestone, trace		SS12G	16.5 - 18.0	1.5	10-12-15
18	18.0	378.1						

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFI TDEC SUBSURF DT 20190630 GDT 2/9/22

Client Borehole ID   N/A   Stantec Boring No. **CUF-1005**  
 Client   Tennessee Valley Authority   Boring Location   728,368.88 N; 1,513,879.56 E NAD27 Plant Local    
 Project Number   175568209   Surface Elevation   396.1 ft   Elevation Datum   NGVD29  

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			manganese					
19	19.5	376.6			SS13G	18.0 - 19.5	1.1	18-8-50+
20			Auger through boulder from 19.5' to 20.7'. Can't advance auger to 21.0'		SS14G	19.5 - 21.0	0.0	N/A
21	21.0	375.1			SS15aG	21.0 - 21.5	1.1	8-22-42
22	21.5	374.6			SS15bG	21.5 - 22.5		
23					SS16G	22.5 - 24.0	1.5	20-9-6
24	24.0	372.1			SS17aG	24.0 - 24.3	1.2	3-17-50+1/2"
25	24.3	371.8			SS17bG	24.3 - 25.2		
26	26.2	369.9						

Refusal /  
Bottom of Hole at 26.2 Ft.

Monitoring well CUF-1005 was installed in the boring. Refer to the CUF-1005 Well Installation Detail, dated 01/21/2019, for well construction information.

CCR: Sample analyzed for presence of ash (percent fly ash) by polarized light microscopy (PLM). Result ranged from 78% to 85% ash.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)
- G = Geotechnical Sample Custody
- 2: a,b,c denote Split Spoon divided between Environmental and Geotechnical Samples
- 3: Depths are reported in feet below ground surface

TVA/EIP BORING LOG 175568209 CUF TDEC ORDER GFJ TDEC SUBSURF DT 20190630 GDT 2/9/22



Client Borehole ID	N/A	Stantec Boring No.	<b>CUF-1006</b>		
Client	Tennessee Valley Authority	Boring Location	728,366.86 N; 1,513,925.62 E NAD27 Plant Local		
Project Number	175568209	Surface Elevation	378.8 ft	Elevation Datum	NGVD29
Project Name	CUF TDEC Order	Date Started	3/11/21	Completed	3/17/21
Project Location	Stewart Co, Cumberland City, TN	Depth to Water	N/A	Date/Time	N/A
Inspector	B. Evans	Logger	B. Evans	Depth to Water	N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 55LCX #714		
Overburden Drilling and Sampling Tools (Type and Size)	4.25" HSA, 2" SS w/o liners				
Rock Drilling and Sampling Tools (Type and Size)	N/A				
Overdrill Tooling (Type and Size)	8-1/4" HSA overdrill of boring	Overdrill Depth	27.8 ft		
Sampler Hammer Type	Automatic	Weight	140 lb	Drop	30"
Borehole Azimuth	N/A	Borehole Inclination (from Vertical)	N/A		
Reviewed By	C. Sexton	Approved By	C. Millhollin		
Efficiency	N/A				

Depth Ft <sup>3</sup>	Lithology		Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
0	0.0	378.8						
	0.5	378.3						
1			Topsoil					
	1.7	377.1						
2			LEAN CLAY, CL, 10YR 5/6 (yellowish brown), low to medium plasticity, firm, moist, [FILL]		SS01E	0.0 - 1.5	0.9	2-4-5
3			FAT CLAY, CH, 7.5YR 5/8 (strong brown) to 7.5YR 4/4 (brown), medium plasticity, firm, moist, angular chert gravel, [FILL]		SS02E	1.5 - 3.0	1.1	5-6-7
4					SS03E	3.0 - 4.5	1.0	5-4-6
5					SS04E	4.5 - 6.0	1.4	4-4-5
6					SS05E	6.0 - 7.5	0.0	3-5-6
7	7.5	371.3						
8			SANDY LEAN CLAY, CL, 5Y 4/2 (olive gray) to 7.5YR 4/4 (brown), low to medium plasticity, firm to hard, moist, trace chert gravel		SS06E	7.5 - 9.0	0.8	1-2-2
9			LEAN CLAY, CH, 10YR 4/6 (dark yellowish brown) to 2.5Y 5/4 (light olive brown), medium plasticity, firm to very hard, moist, some		SS07E	9.0 - 10.5	1.5	3-4-8
10					SS08aE	10.5 - 11.4	1.4	5-6-8
11	11.5	367.3						
12			SANDY LEAN CLAY, CL, 2.5Y 4/2 (dark grayish brown), low to medium plasticity, firm to very hard, moist		SS08bE	11.4 - 12.0	1.3	3-3-4
13					SS09E	12.0 - 13.5	1.5	5-3-5
14	14.2	364.6						
15					SS10aE	13.5 - 14.2	0.8	1-2-3
16					SS10bE	14.2 - 15.0	1.1	1-3-4
17					SS11E	15.0 - 16.5		
18	18.0	360.8						
19								

TVA EIP BORING LOG: 175568209 CUF TDEC ORDER.GPJ TDEC SUBSURF DT: 20190630.GDT: 12/7/21



Client Borehole ID <u>N/A</u>	Stantec Boring No. <b>CUF-1006</b>
Client <u>Tennessee Valley Authority</u>	Boring Location <u>728,366.86 N; 1,513,925.62 E NAD27 Plant Local</u>
Project Number <u>175568209</u>	Surface Elevation <u>378.8 ft</u> Elevation Datum <u>NGVD29</u>

Lithology			Description	Overburden:	Sample <sup>1,2</sup>	Depth Ft <sup>3</sup>	Rec. Ft	Blows/PSI
Depth Ft <sup>3</sup>	Elevation	Graphic		Rock Core:	RQD %	Run Ft	Rec. Ft	Rec. %
18			FAT CLAY SOME SAND, CH, 5Y 2.5/1 (black) to 2.5Y 3/2 (very dark grayish brown), medium plasticity, firm to very hard					
19				SS13E	18.0 - 19.5	1.3	2-2-4	
20				SS14E	19.5 - 21.0	1.3	1-2-3	
21				SS15E	21.0 - 22.5	1.5	2-4-3	
22				SS16E	22.5 - 24.0	1.2	4-3-4	
23								
24	24.2	354.6						
25			LEAN CLAY SOME SAND, CL, 10YR 5/4 (yellowish brown), low to medium plasticity, soft to firm, moist to wet					
26				SS17E	24.0 - 25.5	1.3	3-3-4	
27				SS18E	25.5 - 27.0	1.4	1-2-3	
27	27.5			351.3				
	27.8	351.0						

Limestone, highly weathered to slightly weathered

Refusal /  
Bottom of Hole at 27.8 Ft.

Top of Rock = 27.5 Ft.  
Top of Rock Elevation = 351.3 Ft.

Monitoring Well CUF-1006 was installed in boring on 03/18/2021. Refer to Monitoring Well Installation Detail CUF-1006, dated 03/18/2021 for well construction details.

- 1: E = Environmental Sample Custody (two Split Spoons may be required to obtain sufficient sample)  
G = Geotechnical Sample Custody
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TVA EIP BORING LOG 175568209 CUF TDEC ORDER GPJ TDEC SUBSURF DT 20190630 GDT 12/7/21