Stantec

Boring Logs

Perimeter Containment North Dredge Cell (Dike C) Segment 1 Sta. A161+50 to Sta. A179+50 Kingston Fossil Plant Harriman, Roane County, Tennessee

ISSUED FOR REVIEW
REVISED 90%

Stantec Consulting Services Inc.
One Team. Infinite Solutions.
1409 North Forbes Road
Lexington KY 40511-2050
Tel: (859) 422-3000 • Fax: (859) 422-3100
www.stantec.com

Prepared for

Tennessee Valley Authority
Kingston, Tennessee

March 18, 2011

Root Cause Analysis Borings - AECOM, January to March 2009			
Boring ID		Type(s) of Boring and Sampling Data	Notes
Original Designation on Log	Current Designation or Instrument(s)		
09-100		SPT and CPT Soil Boring	
09-100A		Vane Shear Boring	
09-100B		Osterberg Sample Boring	
09-101	PZ-101 and SI-101	SPT and CPT Soil Boring	
09-101A		Vane Shear Boring	
09-101B		Osterberg Sample Boring	
09-102	PZ-102 and SI-102	SPT and CPT Soil Boring	
09-102A		Vane Shear and ST Boring	
09-102B		Osterberg Sample Boring	
09-103	PZ-103 and SI-103	SPT and CPT Soil Boring	
09-103A		Vane Shear and ST Boring	
09-103B		Osterberg Sample Boring	
09-104		SPT and CPT Soil Boring	
09-104A		Vane Shear Boring	
09-104B		Osterberg Sample Boring	
09-105		SPT and CPT Soil Boring	
09-105A		Vane Shear, ST, and CPT Boring	
09-105B		Osterberg Sample Boring	
09-106	PZ-106 and SI-106	SPT and CPT Soil Boring	
09-106A		Vane Shear Boring	
09-106B		Osterberg Sample Boring	
09-107		SPT and CPT Soil Boring	
09-107A		Vane Shear Boring	
09-107B		Osterberg Sample Boring	
09-108		SPT and CPT Soil Boring	
09-108A		Vane Shear and ST Boring	
09-108B		Osterberg Sample Boring	
09-109	PZ-109 and SI-109	SPT and CPT Soil Boring	
09-109A		Vane Shear and CPT Boring	
09-109B		Osterberg Sample Boring	
09-110		SPT and CPT Soil Boring	
09-110A		Vane Shear, ST, and CPT Boring	
09-200		SPT and CPT Soil Boring	
09-200A		Vane Shear, ST, and CPT Boring	
09-200B		Osterberg Sample Boring	
09-201		SPT and CPT Soil Boring	
09-201A		Vane Shear, ST, and CPT Boring	
09-201B		Osterberg Sample Boring	
09-202		SPT and CPT Soil Boring	
09-202A		Vane Shear, ST, and CPT Boring	
09-202B		Osterberg Sample Boring	
09-203		SPT and CPT Soil Boring	
09-203A		Vane Shear Boring	
09-203B		Osterberg Sample Boring	
09-204		SPT and CPT Soil Boring	
09-204A		Vane Shear and ST Boring	
09-204B		Osterberg Sample Boring	
09-205		SPT and CPT Soil Boring	
09-205A		Vane Shear, SPT, and ST Boring	
09-205B		Osterberg Sample Boring	
09-206		SPT and CPT Soil Boring	

Root Cause Analysis Borings - AECOM, January to March 2009			
Boring ID		Type(s) of Boring and Sampling Data	Notes
Original Designation on Log	Current Designation or Instrument(s)		
09-206A		Vane Shear and ST Boring	
09-206B		Osterberg Sample Boring	
09-207		SPT Soil Boring	
09-207A		Vane Shear, SPT, and ST Boring	
09-207B		Osterberg Sample Boring	
09-208		SPT and CPT Soil Boring with Rock Core	
09-208A		Vane Shear, ST, and CPT Boring	
09-209		SPT and CPT Soil Boring	
09-209A		Vane Shear, ST, and CPT Boring	
09-209B		Osterberg Sample Boring	
09-210		SPT and CPT Soil Boring	
09-210A		Vane Shear Boring	
09-210B		Osterberg Sample Boring	
09-211	PZ-211A and PZ-211B, SI-211 and SI-211E	SPT and CPT Soil Boring with Rock Core	
09-211A		Vane Shear, ST, and CPT Boring	
09-211B		Osterberg Sample Boring	
09-409		SPT and CPT Soil Boring	
09-410		SPT and CPT Soil Boring	
09-410A		Vane Shear Boring	
09-411		CPT Sounding	
09-412		SPT and CPT Soil Boring	
09-413		SPT and CPT Soil Boring with Rock Core	
09-501		SPT and CPT Soil Boring	
09-601		SPT and CPT Soil Boring	
09-601A		Vane Shear, ST, and CPT Boring	
09-601B		Osterberg Sample Boring	
09-701		CPT Sounding	
09-900-SH1	SI-900	Slope Inclinometer	
09-900-SH2		Rock Core	

Dike D Buttress Borings - Stantec, December 2008 to January 2009			
Boring ID		Type(s) of Boring and Sampling Data	Notes
Original Designation on Log	Current Designation or Instrument(s)		
B-2	SI-B2	SPT Soil Boring	
B-3	SI-B3	Blank Augering	
B-4	SI-B4	SPT Soil Boring	
PZ-3	PZ-D3	SPT Soil Boring	Samples at 5' intervals
PZ-4	PZ-D4	SPT Soil Boring	Samples at 5' intervals
PZ-5	PZ-D5	SPT Soil Boring	Samples at 5' intervals
PZ-6	PZ-D6	SPT Soil Boring	Samples at 5' intervals
PZ-7	PZ-D7	SPT Soil Boring	Samples at 5' intervals
PZ-8	PZ-D8	SPT Soil Boring	Samples at 5' intervals

Test Embankment Instrumentation Borings - Stantec, April 2009			
Boring ID		Type(s) of Boring and Sampling Data	Notes
Original Designation on Log	Current Designation or Instrument(s)		
SI-11		Blank Augering	

Dike C Stability Report Borings - Stantec, April 2009			
Boring ID		Type(s) of Boring and Sampling Data	Notes
Original Designation on Log	Current Designation or Instrument(s)		
STN-2	PZ-2	SPT and ST Soil Boring	Piezometer installed in offset hole
STN-3	PZ-3A1,2 and PZ-3B	SPT and ST Soil Boring	Piezometers installed in offset holes
STN-3C		ST Soil Boring	
STN-3D		ST Soil Boring	
STN-4		SPT and ST Soil Boring with Rock Core	

North/South Haul Road Exploration Borings - Stantec/Mactec, April 2010			
Boring ID		Type(s) of Boring and Sampling Data	Notes
Original Designation on Log	Current Designation or Instrument(s)		
B-1	B-1 (MT 2010)	SPT Soil Boring	Samples at 5' intervals
B-2	B-2 (MT 2010)	SPT Soil Boring	Samples at 5' intervals
B-3	B-3 (MT 2010)	SPT and ST Soil Boring	Samples at 5' intervals
B-4	B-4 (MT 2010)	SPT Soil Boring	Samples at 5' intervals
B-5	B-5 (MT 2010)	SPT and ST Soil Boring	Samples at 5' intervals
B-6	B-6 (MT 2010)	SPT Soil Boring	Samples at 5' intervals
B-7	B-7 (MT 2010)	SPT Soil Boring	Samples at 5' intervals
B-8	B-8 (MT 2010)	SPT and ST Soil Boring	Samples at 5' intervals
B-9	B-9 (MT 2010)	SPT Soil Boring	Samples at 5' intervals
B-10	B-10 (MT 2010)	SPT Soil Boring	Samples at 5' intervals
B-11	B-11 (MT 2010)	SPT Soil Boring	Samples at 5' intervals
B-12	B-12 (MT 2010)	SPT Soil Boring	Samples at 5' intervals

Deep Soil Mixing Pilot Platform Borings - Stantec/Mactec, August 2010			
Boring ID		Type(s) of Boring and Sampling Data	Notes
Original Designation on Log	Current Designation or Instrument(s)		
DSM North	DSM North (MT 2010)	SPT Soil Boring with Rock Core	
DSM South	DSM South (MT 2010)	SPT Soil Boring with Rock Core	

Interim Ash Stacking Instrumentation Borings - Stantec, September to October 2010			
Boring ID		Type(s) of Boring and Sampling Data	Notes
Original Designation on Log	Current Designation or Instrument(s)		
PZ-B1		SPT Soil Boring	
PZ-B2		SPT Soil Boring	
PZ-B3		SPT Soil Boring	
PZ-B4		SPT Soil Boring	
PZ-B9		SPT Soil Boring	
SI-C1		SPT Soil Boring with Rock Core	SPT at 5' intervals below approx EL 715'
SI-C2		SPT Soil Boring with Rock Core	SPT at 5' intervals below approx EL 715'
SI-C3		SPT Soil Boring with Rock Core	SPT at 5' intervals below approx EL 715'
SI-C6		SPT Soil Boring with Rock Core	SPT at 5' intervals below approx EL 715'
SI-C7		SPT Soil Boring with Rock Core	SPT at 5' intervals below approx EL 715'
SI-C8		SPT Soil Boring with Rock Core	SPT at 5' intervals below approx EL 715'

Perimeter Exploration Borings - S&ME, August 2010			
Boring ID		Type(s) of Boring and Sampling Data	Notes
Original Designation on Log	Current Designation or Instrument(s)		
B-1	BH-1	SPT Soil Boring with Rock Core	Samples at 2.5' intervals
B-2	BH-2	SPT Soil Boring with Rock Core	Samples at 2.5' intervals
B-12	BH-12	SPT Soil Boring with Rock Core	Samples at 2.5' intervals

Pre-Failure Borings Set 1 - Singleton, July to August 1994 (Logs provided by AECOM)			
Boring ID		Type(s) of Boring and Sampling Data	Notes
Original Designation on Log	Current Designation or Instrument(s)		
SB-1	SS-1 (SI 1994)	SPT Soil Boring	Samples at 5' intervals
SB-2	SS-2 (SI 1994)	SPT Soil Boring	Samples at 5' intervals
SB-3	SS-3 (SI 1994)	SPT Soil Boring	Samples at 5' intervals
SB-4	SS-4 (SI 1994)	SPT Soil Boring	Samples at 5' intervals
SB-5	SS-5 (SI 1994)	SPT Soil Boring	Samples at 5' intervals
SB-6	SS-6 (SI 1994)	SPT Soil Boring	Samples at 5' intervals

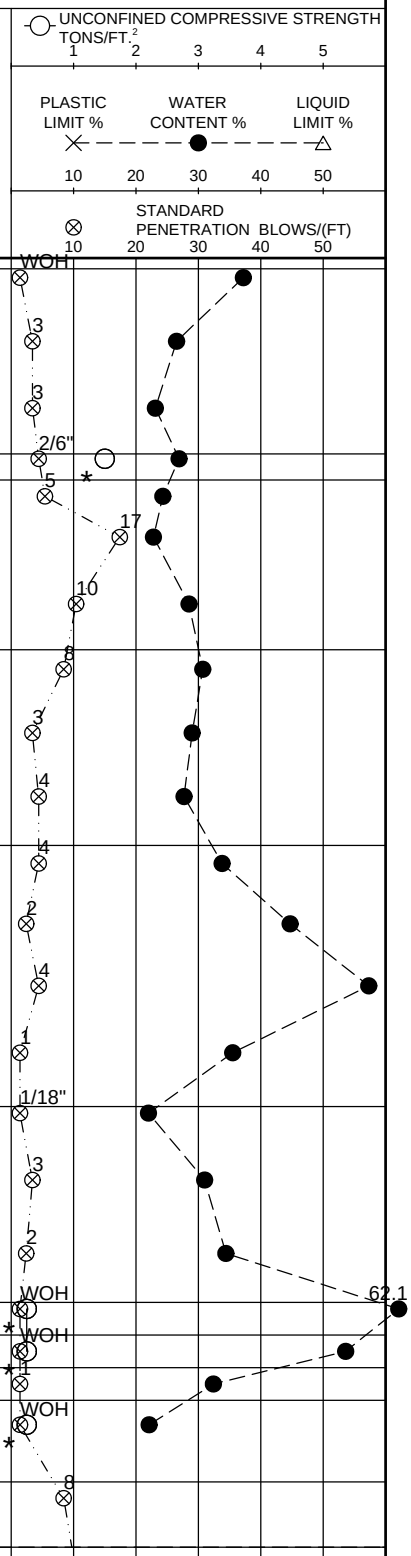
Pre-Failure Borings Set 2 - TVA, February to March 1975 (Logs provided by AECOM)			
Boring ID		Type(s) of Boring and Sampling Data	Notes
Original Designation on Log	Current Designation or Instrument(s)		
SS-2	SS-2 (TVA 1975)	SPT Soil Boring	
SS-3	SS-3 (TVA 1975)	SPT Soil Boring	
SS-17	SS-17 (TVA 1975)	SPT Soil Boring	
SS-18	SS-18 (TVA 1975)	SPT Soil Boring	
SS-19	SS-19 (TVA 1975)	SPT Soil Boring	

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-100**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +767.11

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			0.3 Fill: Driller's Observation: 4 inches gravel Fill: Sandy silt-sized ash, trace clay - gray - very loose - moist to wet (ML) (FA) Failed	
		2	SS				
5.0		3	SS			6.0	
		4	SS			6.8 Fill: Silty clay, trace fine gravel - brown - stiff (CL) Failed	
		4A	SS			Fill: Silty fine to coarse sand-sized ash, fine gravel - gray - loose to medium dense - moist to wet (SM) (FA) Failed	
10.0		5	SS				
		6	SS			12.0	
		7	SS			Fill: Silt-sized ash, little fine sand - gray - loose to very loose - saturated (ML) (FA) Failed	
15.0		8	SS				
		9	SS			18.0	
		10	SS			Fill: Silty fine to coarse sand-sized ash, trace clay - gray - loose to very loose - saturated (SM) (BA) Failed	
20.0		11	SS				
		12	SS				
25.0		13	SS			26.0	
		14	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose - saturated (ML) (FA) Failed	
30.0		15	SS				
		16	SS			32.0	
		17	SS			33.0 Silt with interbedded silt-sized ash slimes - gray and dark gray - wet- very loose (ML) & (FA)	
		17A	SS			34.0 Silt with interbedded silt-sized ash slimes - brown and gray - moist - very loose (ML) & (FA)	
35.0		18	SS			35.0 Fill: Silt-sized ash, little fine sand - gray - very loose - saturated (ML) (FA)	
		18A	SS			37.5 Silty clay, trace fine sand - brown and gray - soft (CL) Note: 1/8" seam of bottom ash (BA) noted at 35.0 ft.	
		19	SS			39.5 Clayey silt, little fine to medium sand - brown and gray - loose - moist (CL-ML)	



. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

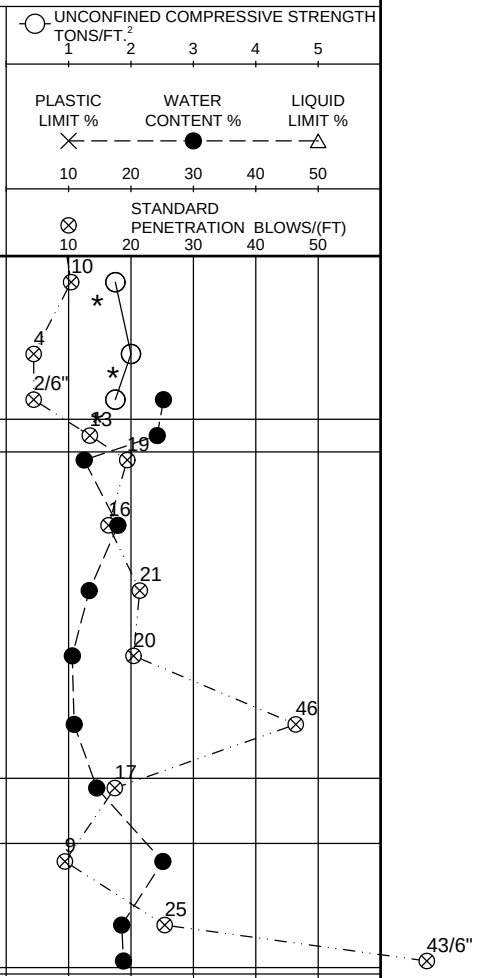
AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-100
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +767.11 (Continued)	
		20	SS			Silty clay, little sand, trace fine gravel and fine to coarse sand - brown and gray - very stiff to stiff (CL) Moisture content for Samples 19, 20 and 21 not available. Sample containers damaged during transit.	
		21	SS			Sample 22: Medium to coarse gravel noted	
		22	SS				
45.0	44.5	22A	SS			Clayey fine to coarse sand, little silt, trace fine gravel - brown and gray - medium dense - moist to wet (SC)	
	45.5	23	SS			Silty fine to coarse sand, little fine gravel, trace clay - gray - medium dense to dense - saturated (SM)	
		24	SS				
50.0		25	SS				
		26	SS				
55.0		27	SS				
	55.5	28	SS			Silty fine to medium sand, little fine gravel , trace clay, trace weathered shale - gray - medium dense - saturated (SM)	
	57.5	29	SS			Silty fine sand - gray - loose to medium dense - wet (SM)	
60.0		30	SS				
61.5	61.3	30A	SS				
	61.5					Weathered shale - gray/green	



* Calibrated Penetrometer

End of Boring
Borehole advanced to 6.0 ft. with power auger.
Borehole advanced from 6.0 to 59.5 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 10 ft. of 4 in.
Automatic-Mobile Hammer used for Standard Penetration Tests.
WOH = Weight of Hammer
(FA) = Fly Ash
(BA) = Bottom Ash

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
5.0 ft. WS; 12.0 ft. BCR & ACR	2/2/09	Chicago Area - 01	
NORTHING 557565.54	BORING COMPLETED 2/2/09	ENTERED BY KKB	SHEET NO. 2 OF 2
EASTING 2440202.63	RIG/FOREMAN Mobile B-57 (V.H.)/MB	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

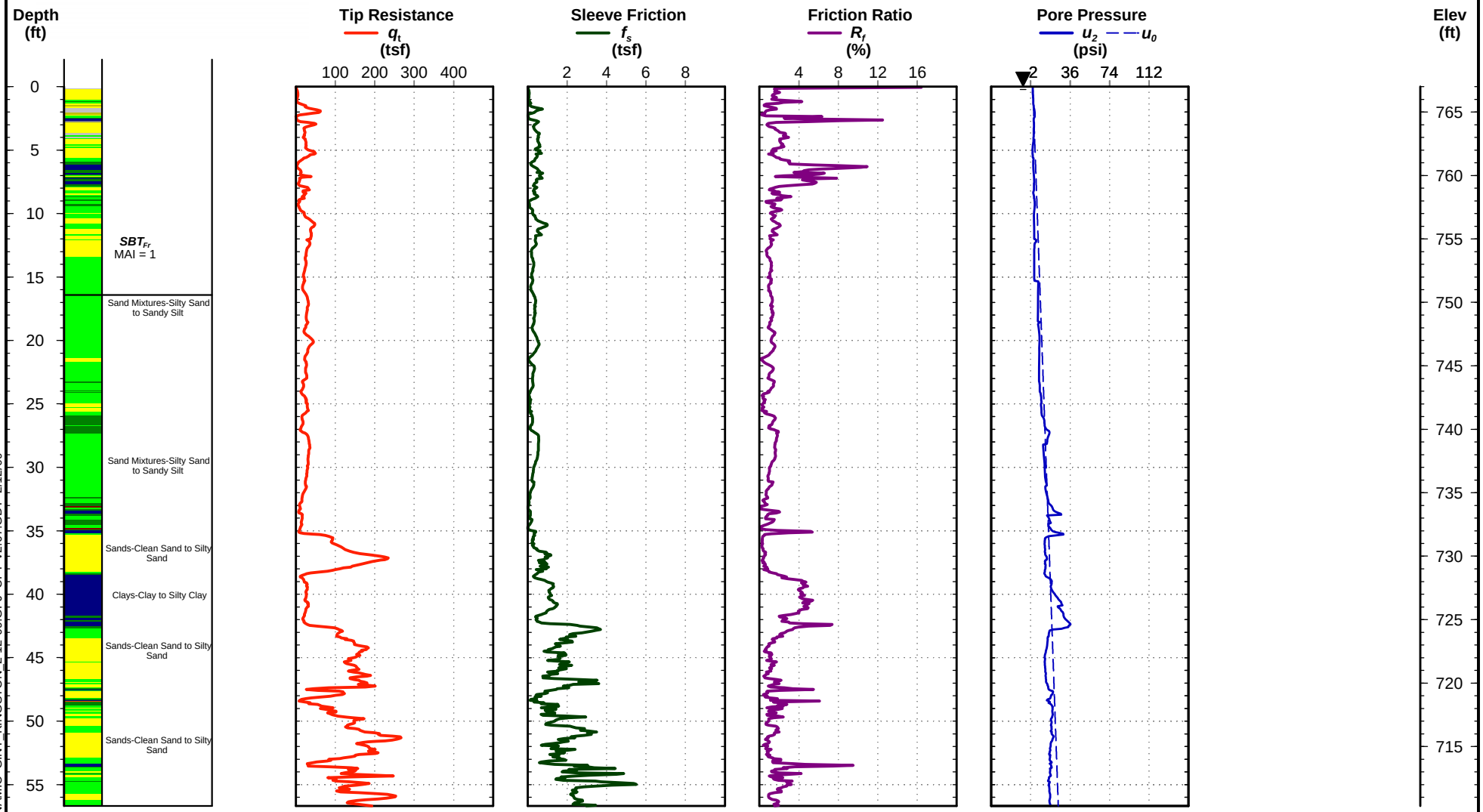
TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) *Cone Penetration Test* **09-100-C2**

Project No: 60095742

Date: Jan. 26, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557565.69
Easting: 2440199.51
Elevation: 767 NGVD

Total Depth: 56.7 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-100A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +767.27	UNIT DRY WT. LBS./FT.^{3}
			PA				
5.0							
10.0							
15.0							
20.0			RB				
25.0							
30.0						Disturbed samples retrieved following completion of vane shear testing.	
35.0			RB			Vane Shear Test #1 at 36.0 ft. Peak Su = 1325 psf, Remolded Su = 175 psf	
40.0			VS				

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-100A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +767.27 (Continued)	
			VS			Vane Shear Test #2 at 40.0 ft. Peak Su >4075 psf	
			VS			Vane Shear Test #3 at 41.5 ft. Peak Su = 2925 psf, Remolded Su = 375 psf	
43.0					43.0	Vane Shear Test #4 at 43.0 ft. Peak Su = 3150 psf, Remolded Su = 1050 psf End of Boring Borehole advanced to 5.0 ft. with power auger. Borehole advanced from 5.0 to 38.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8.5 ft. of 4 in.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **2/3/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557566.13**	BORING COMPLETED **2/3/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440206.63**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

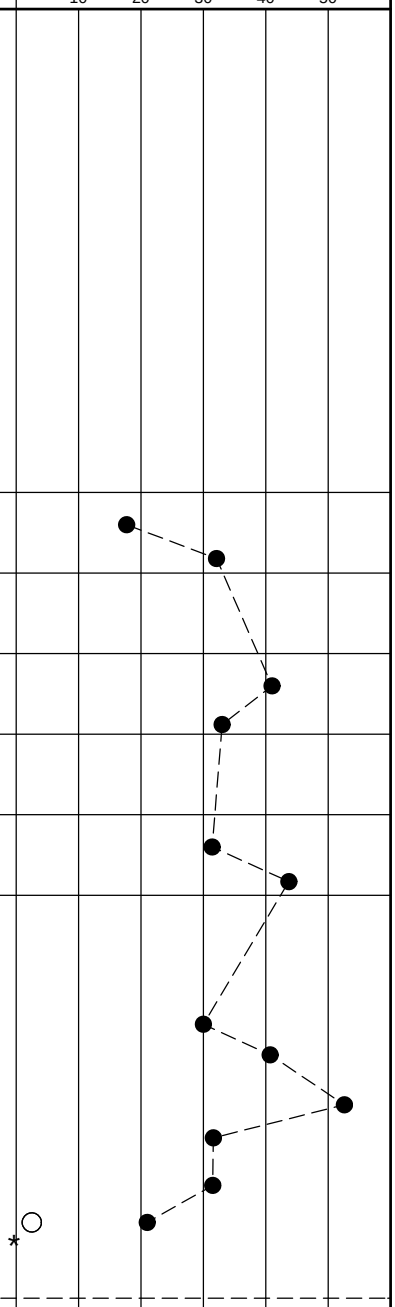
AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-100B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

SURFACE ELEVATION +767.02

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
			PA				
5.0							
			RB			Following retrieval of 3 in. tube sample, cuttings were taken from top and bottom for water content testing. Samples designated with an "A" were taken from bottom of sample; the others were taken from top.	
10.0							
15.0							
		1	OST			15.0 Fill: Silt-sized ash, little fine sand, trace clay - gray - saturated (ML) (FA) Failed	
		1A	OST			17.5	
			RB				
20.0							
		2	OST			20.0 Fill: Silty fine to medium sand-sized ash, trace clay - gray - saturated (SM) (BA) Failed	
		2A	OST			22.5	
			RB				
25.0							
		3	OST			25.0 Fill: Silt-sized ash, little fine sand, trace clay - gray - saturated (ML) (FA) Failed	
		3A	OST			27.5	
			RB				
30.0							
		4	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 4 description.	
		4A	OST				
		5	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 5 description.	
35.0							
		5A	OST				
		6	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 6 description.	
		6A	OST				
			RB				
40.0							



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-100B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +767.02 (Continued)	
45.0							
50.0						Driller's Note: Difficult drilling from 50 ft. to 69 ft. Mixed thick bentonite drilling fluid and borehole stabilized.	
55.0			RB				
60.0							
65.0						**Pneumatic Piezometer installed at 67.0 ft.**	
69.0	69.0					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 69 feet with rock bit and drilling fluid. Casing used: 9 ft. of 4 in. OST = Osterberg sampler Installed Pneumatic Piezometer at 67.0 ft.	*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **5.0 ft. WD**	BORING STARTED **3/6/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557557.85**	BORING COMPLETED **3/6/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440211.49**	RIG/FOREMAN **D-25/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

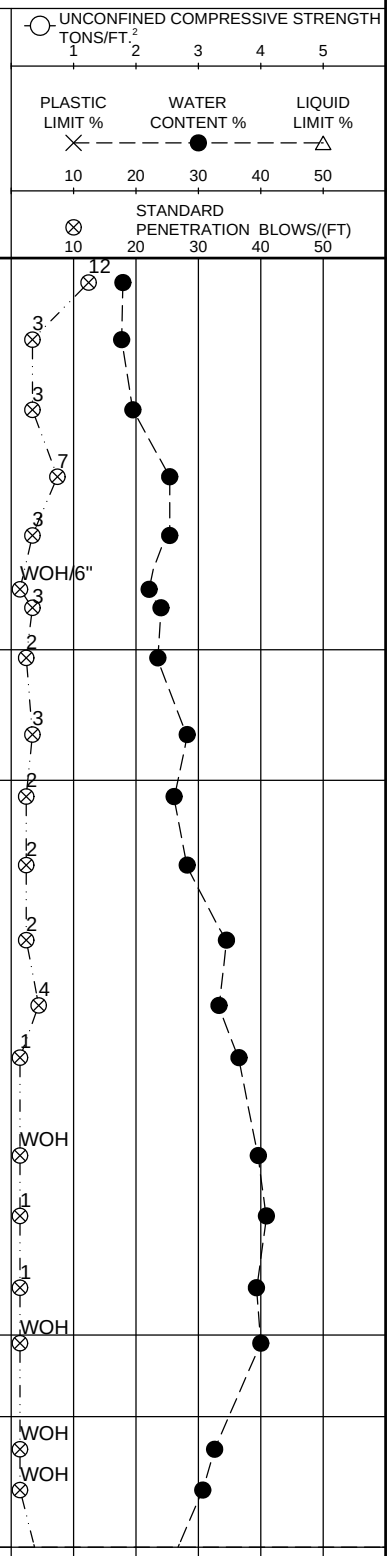
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-101
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +768.31

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silty fine to medium sand-sized ash - gray - medium dense to very loose - moist to wet (SM) (FA) Failed Sample 1: Brown silty clay noted intermixed with ash.	
		2	SS				
5.0		3	SS				
		4	SS				
		5	SS				
10.0		6	SS*			Sample 6: 3 in. clay seam intermixed with ash and organics at 10.3 ft.	
		6A	SS				
						12.0	
		7	SS			Fill: Silty fine to medium sand-sized ash, trace fine gravel - gray - very loose - saturated (SM) (FA) Failed Sample 8: 3 in. seam of sand-sized ash (BA) noted	
15.0		8	SS				
						16.0	
		9	SS			Fill: Silt-sized ash, trace clay and fine sand - gray - very loose to loose - saturated (ML) (FA) Failed	
		10	SS				
20.0							
		11	SS				
		12	SS				
25.0		13	SS			Sample 13: Final blow advanced split spoon sampler 12 in.	
		14	SS				
30.0		15	SS				
		16	SS				
						33.0	
		17	SS			Fill: Silty fine to coarse sand-sized ash, little silt - gray - very loose - saturated (SM) (BA) Failed Sample 17: First blow advanced split spoon sampler 30 in.	
35.0						35.5	
		18	SS			Fill: Silt-sized ash, some clay, trace fine to medium sand - gray - very loose - saturated (ML) (FA) Failed	
		19	SS				
						39.5	



. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-101
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

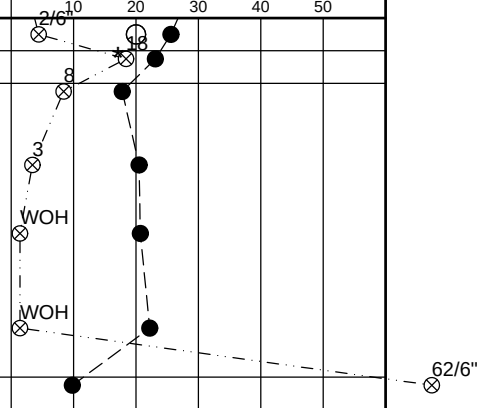
SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +768.31 (Continued)	
		20	SS			40.5 Fill: Silty clay, trace fine to medium sand - brown - very stiff (CL) Failed	
		20A	SS			41.5 Fill: Clayey fine to coarse sand, little silt, trace wood - brown and gray - medium dense - saturated (SC) Failed	
		21	SS			Silty fine to medium sand, little clay - brown and gray - loose to very loose - wet (SM)	
45.0		22	SS				
		23	SS				
50.0		24	SS			50.5	
		25	SS			51.5 Weathered shale - gray	
55.0			RB			Drilled without sampling. Driller's Note: Apparent shale bedrock	
56.5						56.5	



End of Boring
Borehole advanced to 10.0 ft. with power auger.
Borehole advanced from 10.0 to 56.5 ft. with rock bit and drilling fluid.
Borehole grouted and inclinometer casing installed to 56.5 ft.
Automatic-Mobile Hammer used for Standard Penetration Tests.
WOH = Weight of Hammer
(FA) = Fly Ash
(BA) = Bottom Ash

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
8.0 ft. WS; 15.0 ft. BCR & ACR	1/31/09	Chicago Area - 01	
NORTHING 557686.43	BORING COMPLETED 2/1/09	ENTERED BY KKB	SHEET NO. 2 OF 2
EASTING 2440334.29	RIG/FOREMAN Mobile B-57 (V.H.)/MB	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

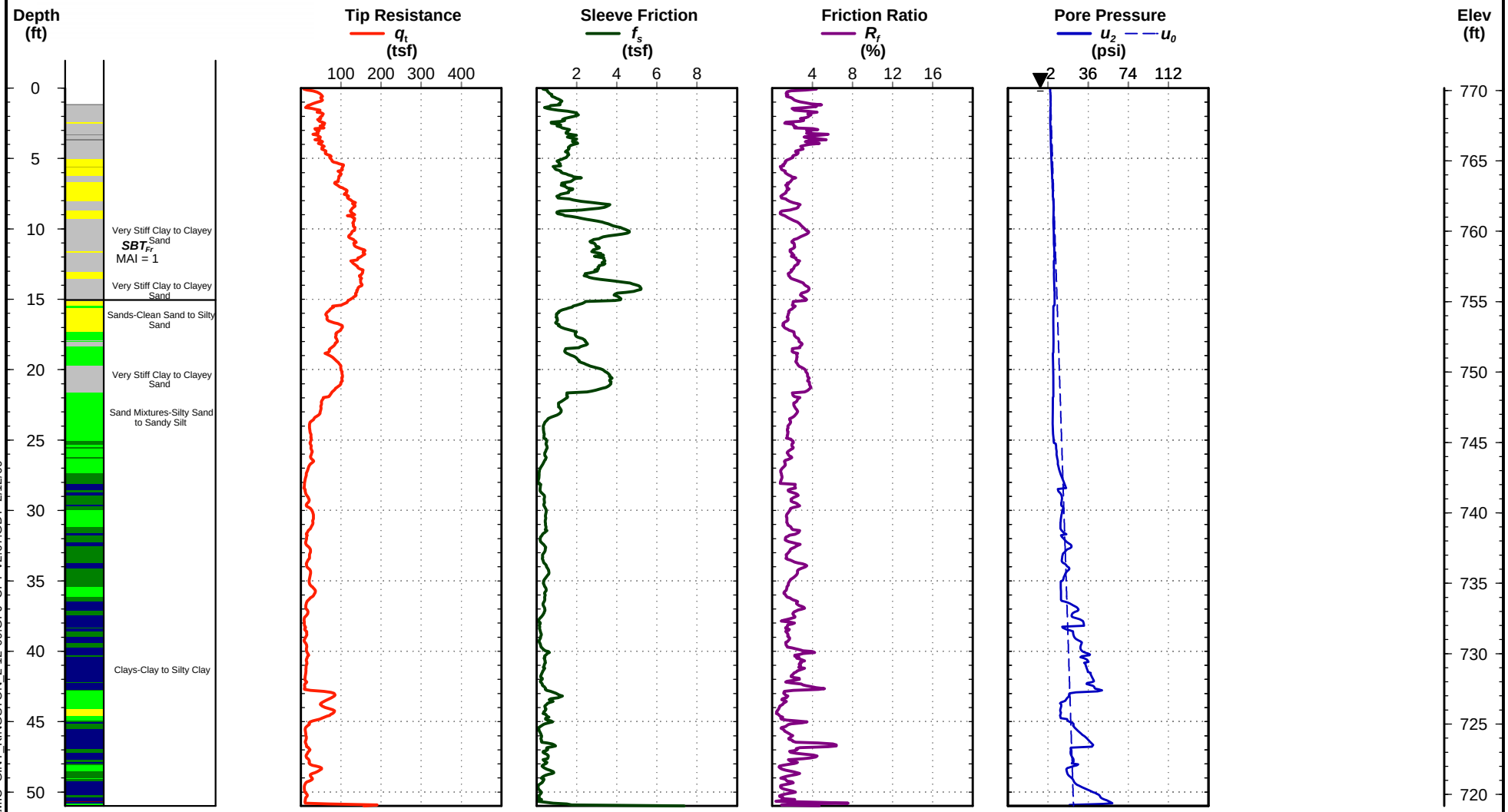
09-101-C1

Project No: 60095742

Date: Jan. 25, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557699.88
Easting: 2440339.56
Elevation: 770.17 NGVD

Total Depth: 51.0 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-101-C1

Electronic Filename: 09-101-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-101A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +768.10	UNIT DRY WT. LBS./FT.^{3}
			PA				
5.0							
10.0							
15.0							
20.0							
			RB				
25.0							
30.0							
						No sample recovery after two attempts with Shelby tube at any of the sampling depths. All samples recovered by pushing split spoon.	
35.0						Disturbed samples retrieved from vane shear depths following completion of the vane shear testing.	

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

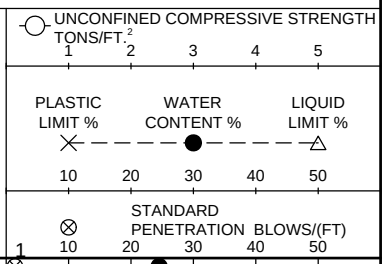
AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-101A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +768.10 (Continued)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			39.5 Fill: Fine to coarse sand, trace silt, fine gravel - gray - wet (SP)	
40.0		1A	SS			40.5 Fill: Silt-sized ash, trace gravel - saturated (ML) (FA) Failed Vane Shear Test #1 at 40 ft. Peak Su = 2675 psf, Remolded Su = 125 psf	
			RB				
45.0						45.0	
		2	SS			Silty fine to medium sand, trace clay - brown and gray - wet (SM) Vane Shear Test #2 at 46.5 ft. Peak Su = 2125 psf, Remolded Su = 300 psf	
			RB				
50.0		3	SS			Vane Shear Test #3 at 48.0 ft. Peak Su = 1825 psf, Remolded Su = 225 psf	
51.0						51.0	

End of Boring
Borehole advanced to 5.0 ft. with power auger.
Borehole advanced from 5.0 to 49.0 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 10 ft. of 4 in.
(FA) = Fly Ash



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **2/1/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557682.58**	BORING COMPLETED **2/1/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440331.62**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

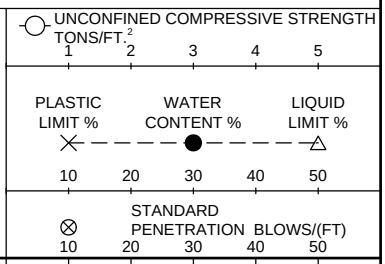
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-101B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +766.86

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0		1	OST			10.0 Fill: Silty fine to medium sand-sized ash, trace clay - gray- saturated (SM) (BA) Failed 12.5	
			RB				
15.0		2	OST			15.0 Fill: Silty fine to medium sand-sized ash, trace clay, trace roots - saturated (SM) (BA) Failed 17.5	
			RB				
20.0		3	OST			20.0 Fill: Silt-sized ash, little fine to medium sand, trace clay - gray - saturated (ML) (FA) Failed 22.5	
25.0			RB				
30.0							
35.0		4	OST			35.5 Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Failed 38.0	
40.0		5	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 5 description.	



. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-101B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +766.86 (Continued)	UNIT DRY WT. LBS./FT.^{3}
45.0			RB			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 5 description.	
	46.0						
48.5		6	OST			Silty fine to medium sand, trace clay - brownish gray - wet (SM)	
	48.5						
						End of Boring Borehole advanced to 10.0 ft. with power auger. Borehole advanced from 10.0 to 46.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Casing used: 10 ft. of 4 in.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **2/2/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557680.36**	BORING COMPLETED **2/2/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440327.82**	RIG/FOREMAN **D-50/RT**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

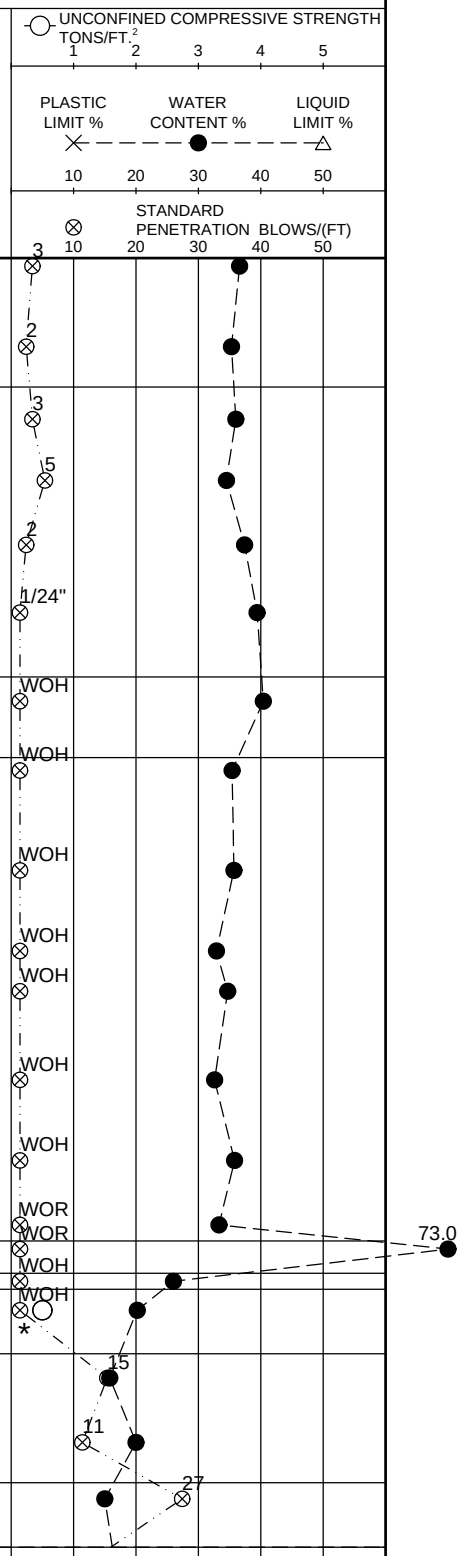
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-102
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +761.91

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silty fine to coarse sand-sized ash , trace clay and coal - gray - very loose - saturated (SM) (FA) Failed	
		2	SS			4.0	
5.0		3	SS			Fill: Silt-sized ash, trace clay and fine sand - gray - very loose to loose - saturated (ML) (FA) Failed	
		4	SS				
		5	SS				
10.0		6	SS			13.0	
		7	SS			Fill: Silty fine to medium sand-sized ash, trace clay - gray - very loose - saturated (SM) (FA) Failed	
15.0						15.5	
		8	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose - saturated (ML) (FA) Failed	
20.0		9	SS				
		10	SS				
		11	SS				
25.0		12	SS				
		13	SS				
30.0		14	SS			30.5	
		14A	SS			31.5 Silt, little clay, little to some fine sand interbedded with silt-sized ash slimes - brown and gray - very loose - saturated (ML) & (FA)	
		15	SS*			32.0	
		15A	SS			Sample 14A: Organic Content = 3.37%	
						34.0 Silt, little clay, little fine sand - brown and gray - very loose - saturated (ML)	
35.0		16	SS			Silt, little clay and fine to coarse sand, trace fine gravel - gray - very loose - saturated (ML)	
		17	SS			Clayey fine to coarse sand, little silt and fine to medium gravel - brown - medium dense - moist (SC)	
						38.0	
		18	SS			Silty fine to coarse sand, little fine to medium gravel, trace clay - brown - medium dense - moist to wet (SM)	
40.0						40.0	



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

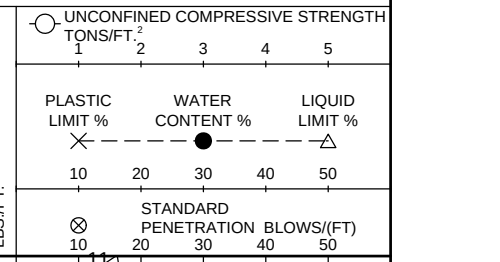
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-102**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +761.91 (Continued)	
		19	SS			Sandy fine to medium gravel, trace silt - brown and gray - medium dense - saturated (GP)	
	41.2	19A	SS			Clayey silt and fine to medium sand - brownish gray - soft (CL-ML)	
		20	SS			Sample 20: Poor recovery. Disturbed sample retrieved. Possible cave-in from upper gravel. Mixed thicker drilling fluid.	
45.0	44.0	21	SS			Silty fine sand, little clay - brownish gray - loose - wet (SM)	
	46.0	22	SS			Silty fine to coarse sand, little clay - gray - loose - saturated (SM)	
	47.7	22A	SS			Sample 22: No sample retrieved during extraction of 2 in. split spoon. Retrieved disturbed sample with 2.5 in. split spoon.	
		23	SS*			Weathered shale - brown and gray	
50.0	51.0		RB			Driller's note: Solid drilling	
53.0	53.0					End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 53.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion and inclinometer casing installed to 53.0 feet. Casing used: 10 ft. of 4 in. Automatic-Mobile hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. WOH = Weight of Hammer (FA) = Fly Ash	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
4.0 ft. WS	**1/21/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557771.87	**1/22/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440511.51	**Mobile B-57 (V.H.)/MB**	**RCR**	**60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

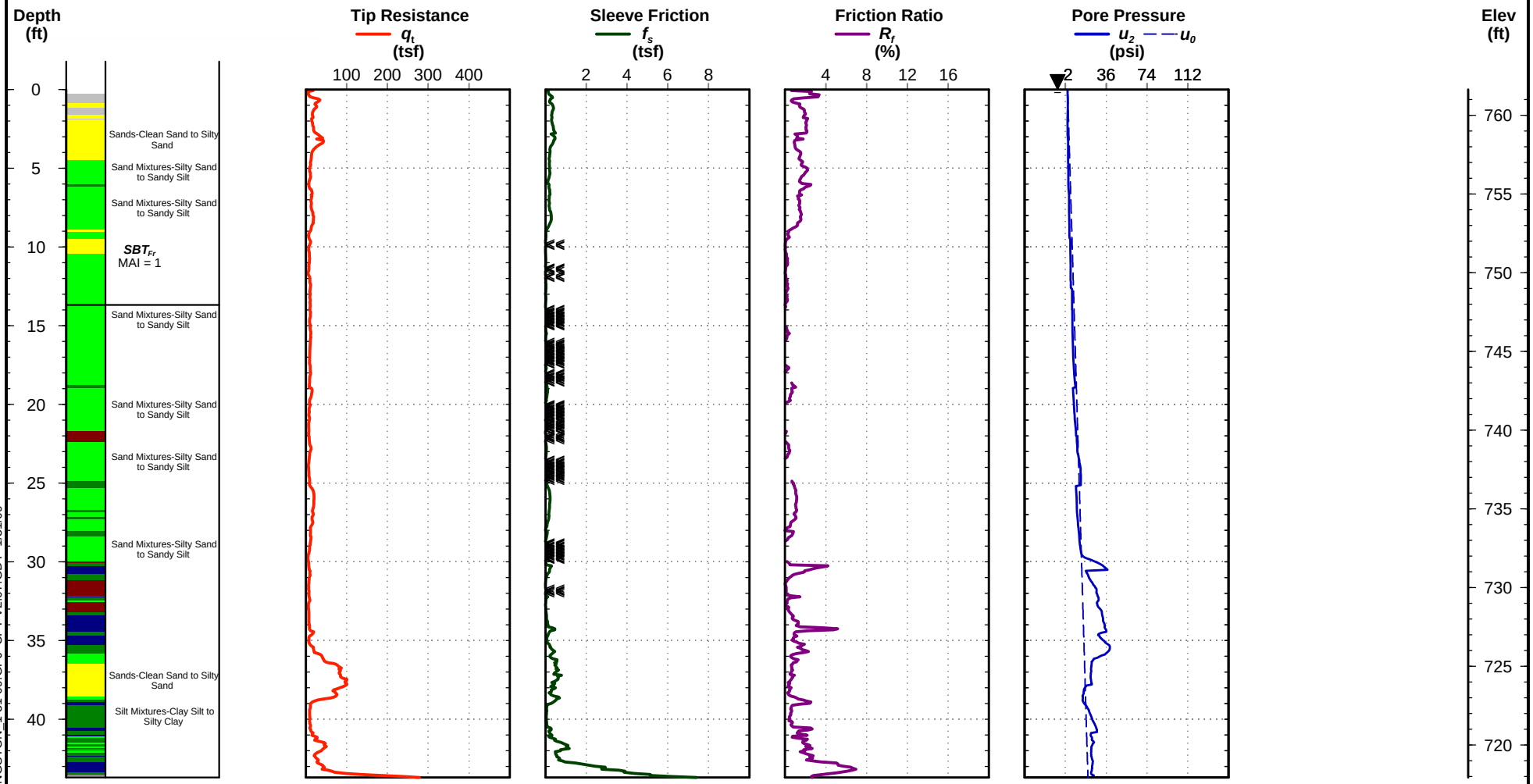
09-102-C1

Project No: 60095742

Date: Jan. 25, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557779.4
Easting: 2441513.32
Elevation: 761.64 NGVD

Total Depth: 43.7 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC KINGSTON_1-31-09.GPJ CPT V2.07.GDT 1/31/09

09-102-C1

Electronic Filename: 09-102-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-102A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +761.68	
5.0			PA				
10.0							
15.0							
20.0							
25.0			RB				
30.0							
35.0						Disturbed samples retrieved following completion of vane shear tests.	
40.0							

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742

SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-102A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +761.68 (Continued)	UNIT DRY WT. LBS./FT.^{3}
			RB			Vane Shear Test #1 at 42.0 ft. Peak Su = 1350 psf, Remolded Su = 525 psf	
	42.0	1	ST			Clayey silt and fine to coarse sand, trace fine gravel - brownish gray- wet (CL-ML)	
	43.5	2	ST			Vane Shear Test #2 at 43.5 ft. Peak Su >2025 psf	
45.0	45.0					Silty fine to coarse sand, trace fine gravel, little clay - gray - wet (SM) Vane Shear Test #3 at 45.0 ft. Peak Su >1975 psf	

End of Boring
Borehole advanced to 8.0 ft. with power auger.
Borehole advanced from 8.0 to 43.5 ft. with rock bit and drilling fluid.
Borehole backfilled upon completion.
Casing used: 10 ft. of 4 in.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **1/23/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557769.89**	BORING COMPLETED **1/23/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440503.55**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-102B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

SURFACE ELEVATION +761.42

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
			PA				
5.0							
10.0			RB				
15.0						**Pneumatic Piezometer installed at 14.0 ft.**	
20.0							
		1	OST			20.0 Fill: Silt-sized ash, little fine sand, trace clay - gray - saturated (ML) (FA) Failed 22.5	
25.0			RB			Following retrieval of 3 in. tube sample, cuttings were taken from top and bottom for water content testing. Samples designated with an "A" were taken from bottom of sample; the others were taken from top. **Pneumatic Piezometer installed at 26.0 ft.**	
30.0		2	OST			29.5 Silty clay, trace fine gravel, some fine to coarse sand - gray (CL) Sample OST-2 Top: Organic Content = 6.59% 32.0 Sample OST-2 Bottom: Organic Content = 3.39%	
		3	OST			**Pneumatic Piezometer installed at 31.0 ft.**	
		3A	OST			34.5 Silt, little fine to coarse sand, little clay - gray - wet to saturated (ML)	
35.0							
			RB				
40.0							

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-102B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +761.42 (Continued)	
	43.7					Driller's Note: Coarse gravel from 43.5 to 43.7 ft.	
45.0		4	OST			Silty clay, trace fine gravel, some fine to coarse sand - gray (CL)	
	46.2	4A	OST				
			RB				
50.0	50.0					**Pneumatic Piezometer installed at 49.0 ft.**	

End of Boring
Borehole advanced to 5.0 ft. with power auger.
Borehole advanced from 5.0 to 50 feet with rock bit and drilling fluid.
Casing used: 8 ft. of 4 in.
OST = Osterberg sampler
Pneumatic Piezometers installed at 14.0 feet, 26.0 ft., 31.0 ft. and 49.0 ft.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **1/27/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557776.23**	BORING COMPLETED **1/28/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440504.9**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

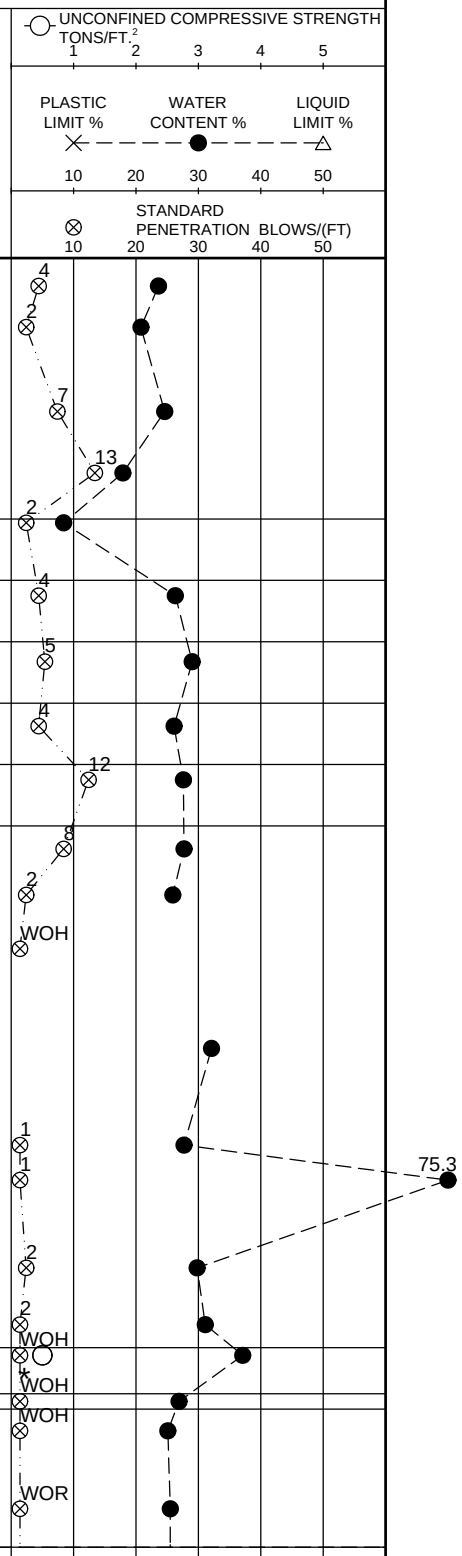
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-103
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +766.31

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Sandy silt-sized ash, trace clay and coal - gray - very loose to medium dense - moist (ML) (FA) Failed	
		2	SS			Sample 2: Final blow advanced sampler 12 inches.	
5.0		3	SS				
		4	SS				
	8.5						
10.0		5	SS			Fill: Medium to coarse gravel, trace silt - gray - very loose - saturated (GP) Failed	
	10.5					Black plastic fibers noted.	
		6	SS			Fill: Clayey silt-sized ash, trace fine to coarse sand - gray - loose - wet (CL-ML) (FA) Failed	
	12.5					Note: Sample intermixed with pockets of brown silty clay.	
		7	SS			Fill: Sandy silt-sized ash, trace clay and fine gravel - gray - loose - wet (ML) (FA) Failed	
	14.5						
15.0		8	SS			Fill: Silty fine to coarse sand-sized ash, trace clay and fine gravel - gray - loose - saturated (SM) (BA) Failed	
	16.5						
		9	SS			Fill: Sandy silt-sized ash, little clay, trace fine gravel - gray - medium dense - wet (ML) (FA) Failed	
	18.5						
20.0		10	SS			Fill: Silt-sized ash, little to some fine sand and clay - loose to very loose - saturated (ML) (FA) Failed	
		11	SS				
		12	SS			Sample 12: No recovery	
25.0		13	SS			Sample 13: Rods slipped and sampler fell out of control from 10 to 28 ft., penetrating 3 ft.	
		14	SS				
30.0		15	SS			Sample 15: Poor recovery. Fine to medium gravel noted in lower tip of sample.	
		16	SS				
35.0		17	SS			Final blow advanced sampler 24 inches.	
	35.5						
		17A	SS			Silt, some clay and fine sand interbedded with silt-sized ash slimes - gray and black - very loose - saturated (ML) & (FA)	
	37.0						
		18	SS				
	37.5						
		18A	SS			Clayey silt, some fine to medium sand, trace fine sand - brown and gray (CL-ML) Sample 18: Sample not sufficient for estimation of consistency	
40.0		19	SS			Silt and fine sand, little clay - brown and gray - very loose - moist (ML)	
	42.0						



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-103
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

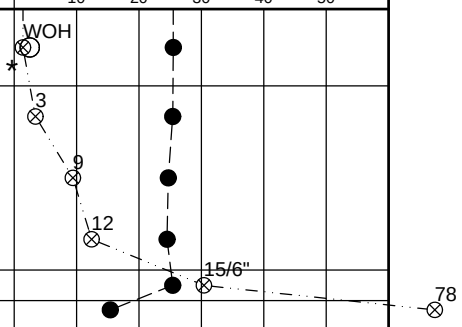
SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +766.31 (Continued)	
		20	SS			Clayey silt and fine sand - brown - soft (CL-ML)	
	44.5						
45.0		21	SS			Silty fine sand, little clay - brown and gray - very loose to medium dense - wet (SM)	
		22	SS				
50.0		23	SS			Sample 23: Black silty sand seam noted.	
	50.5						
		24	SS			Clayey silt, trace fine sand - gray and brown - dense - moist (CL-ML)	
	51.5						
		24A	SS			Driller notes: 30% drilling fluid loss while drilling from 53.5 to 58.5 ft.	
	52.5						
						Weathered shale - gray and green	
55.0			RB			Driller notes: Apparent shale bedrock	
58.5	58.5						
						End of Boring Borehole advanced to 8.5 ft. with power auger. Borehole advanced from 8.5 to 58.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion and set inclinometer casing to 58.5 ft. Casing used: 20 ft. of 4 in. Automatic-Mobile hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. WOH = Weight of Hammer WOR = Weight of Rod (FA) = Fly Ash (BA) = Bottom Ash	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
10.0 ft. WS	1/20/09	Chicago Area - 01	
NORTHING 557713.03	BORING COMPLETED 1/21/09	ENTERED BY KKB	SHEET NO. 2 OF 2
EASTING 2440704.68	RIG/FOREMAN Mobile B-57 (V.H.)/MB	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

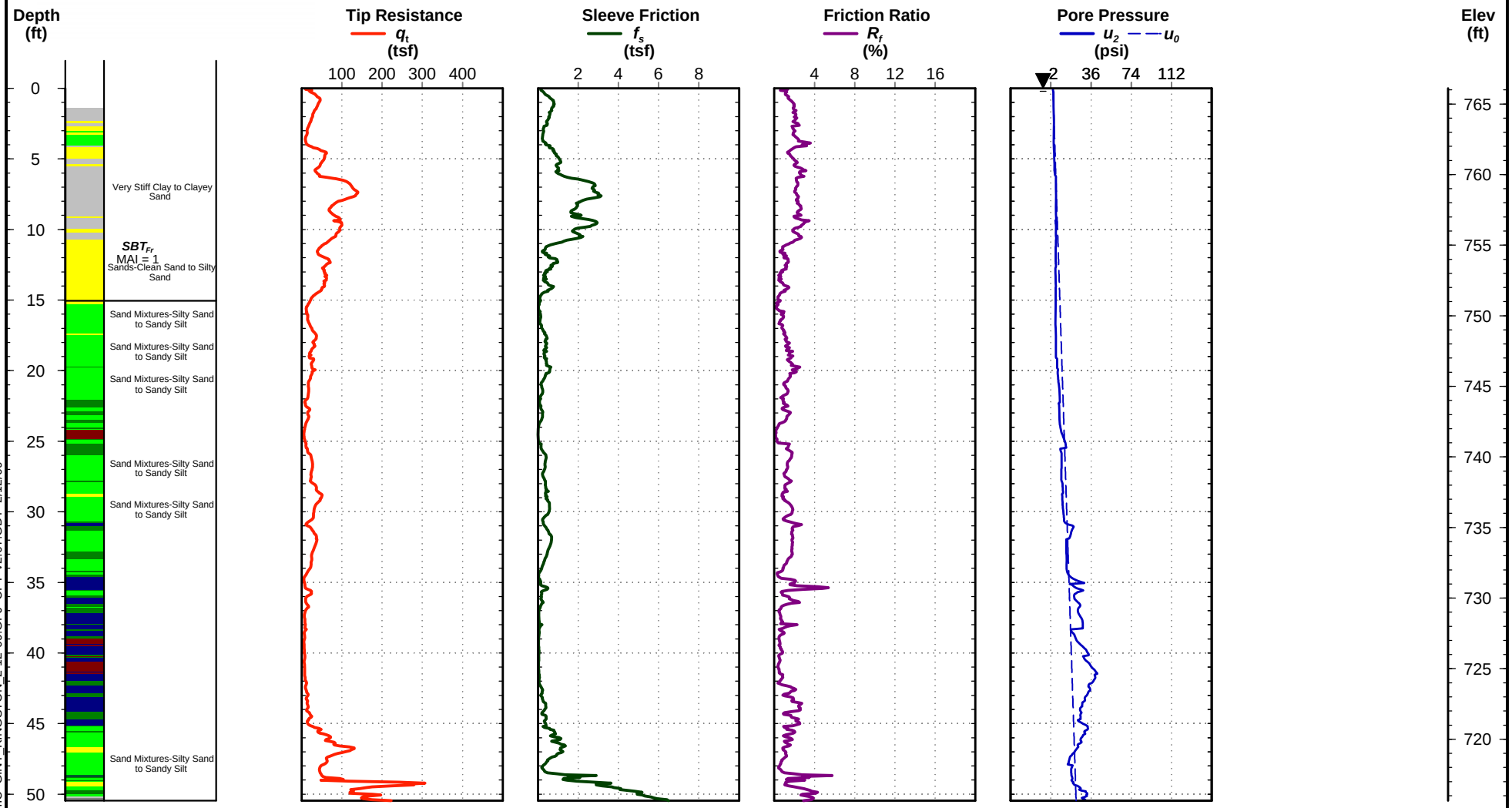
TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) *Cone Penetration Test* **09-103-C1**

Project No: 60095742

Date: Jan. 25, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557718.84
Easting: 2440708.23
Elevation: 766.11 NGVD

Total Depth: 50.5 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



09-103-C1

Electronic Filename: 09-103-C1.cpt

CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

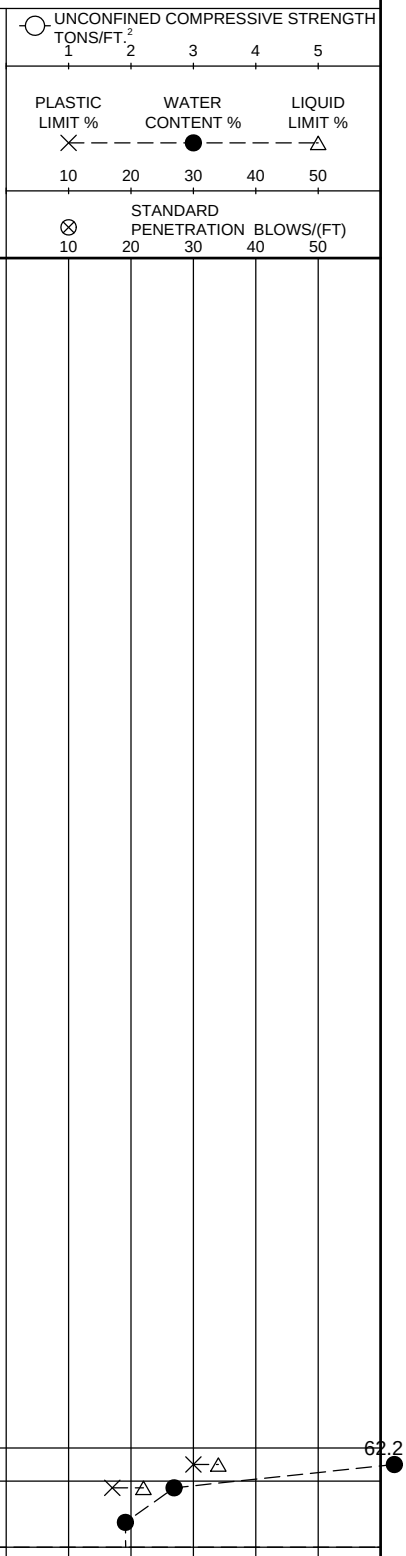
AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-103A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +766.11

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0							
15.0							
20.0			RB				
25.0						Disturbed samples retrieved following completion of vane shear testing.	
30.0							
35.0			RB			Vane Shear Test #1 at 36.0 ft. Peak Su = 875 psf, Remolded Su = 175 psf Vane Shear Test #2 at 37.5 ft. Peak Su = 1450 psf, Remolded Su = 275 psf	
	36.0	1	ST			Clayey silt, some fine to medium sand interbedded with silt-sized ash slimes - gray - saturated (CL-ML) & (FA)	
	37.0	1A	ST				
		2	ST			Silt and fine sand, little clay - gray - moist (ML)	
	39.0						

. . . continued



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-103A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +766.11 (Continued)	
40.0		3	ST			39.5 Vane Shear Test #3 at 39.0 ft. Peak Su = 825 psf, Remolded Su = 150 psf Silt and fine sand, little clay - gray - moist (ML)	
			ST			42.0 No recovery with Shelby tube from 40.5 to 42.0 ft. Vane Shear Test #4 at 40.5 ft. Peak Su = 775 psf, Remolded Su = 250 psf	
44.0		4	ST			44.0 Clayey silt and fine sand - brown - moist (CL-ML) Vane Shear Test #5 at 42.0 ft. Peak Su = 525 psf, Remolded Su = 125 psf Vane Shear Test #6 at 43.5 ft. Peak Su = 950 psf, Remolded Su = 325 psf End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 42.0 ft. with rock bit and drilling fluid. Casing used: 20 ft. of 4 in. Borehole backfilled upon completion.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **1/23/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557711.35**	BORING COMPLETED **1/23/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440700.19**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-103B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

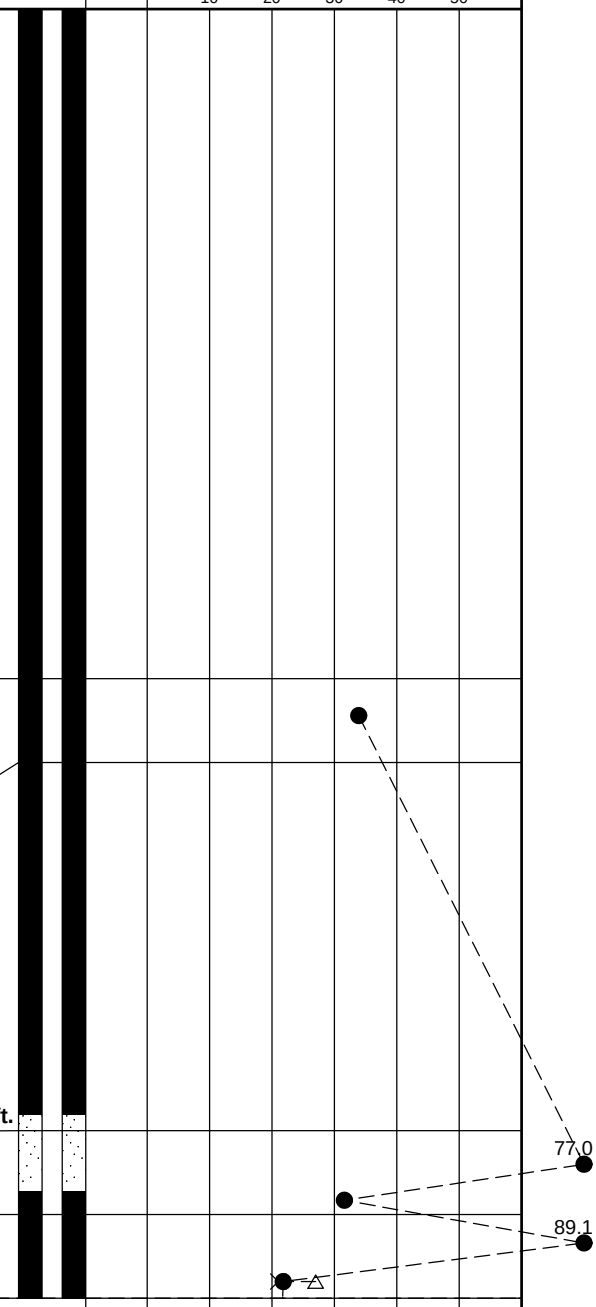
UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

SURFACE ELEVATION +766.37

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0			RB			Following retrieval of 3 in. tube sample, cuttings were taken from top and bottom for water content testing. Samples designated with an "A" were taken from bottom of sample; the others were taken from top.	
15.0							
20.0							
	20.0	1	OST			Sample OST-1: Organic Content = 2.28% Fill: Silt-sized ash, little fine to medium sand, trace clay - gray - saturated (ML) (FA) Failed	
	22.5						
25.0			RB				
30.0							
	33.5					**Pneumatic Piezometer installed at 34.0 ft.**	
35.0		2	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 2 description. Sample OST-2: Organic Content = 2.18%	
	36.0	2A	OST				
		3	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 3 description.	
	38.5	3A	OST				



. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-103B
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

SURFACE ELEVATION +766.37 (Continued)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
40.0		4	OST			Clayey silt, some fine to medium sand - light brown - moist (CL-ML) See UMass Direct Shear Test results (DeGroot, 2009) for Sample 4 description.	
	41.0					**Pneumatic Piezometer installed at 40.0 ft.**	
		5	OST			Clayey silt, some fine to medium sand - brown - moist (CL-ML) See UMass Direct Shear Test results (DeGroot, 2009) for Sample 5 description.	
	43.5						
45.0		6	OST				
	46.0	6A	OST			Sandy silt, little clay - brown and gray - wet (ML)	
50.0			RB			**Pneumatic Piezometer installed at 51.5 ft.** Material cave-in from 52.0 to 52.5 ft. prior to Pneumatic Piezometer installation.	
52.5	52.5					End of Boring	

Borehole advanced to 6.0 ft. with power auger.
Borehole advanced from 6.0 to 52.5 feet with rock bit and drilling fluid.
OST = Osterberg sampler
Pneumatic Piezometers installed at 34.0 ft., 40.0 ft. and 51.5 ft.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
Dry to 6.0 ft. WD	3/3/09	Chicago Area - 01	
NORTHING 557711.9	BORING COMPLETED 3/4/09	ENTERED BY KKB	SHEET NO. 2 OF 2
EASTING 2440714.68	RIG/FOREMAN D-25/BM	APP'D BY RCR	AECOM JOB NO. 60095742

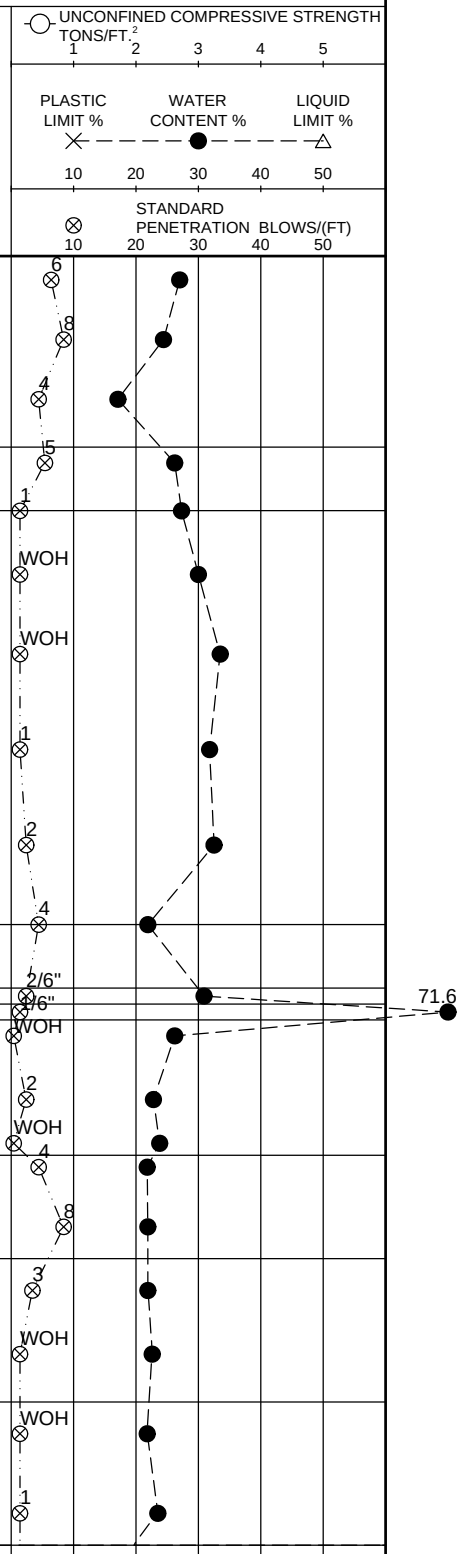
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-104**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +761.29

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silt-sized ash, little fine sand - gray - loose - moist (ML) (FA) Failed	
		2	SS				
5.0		3	SS				
		4	SS			6.0 Fill: Silty fine to medium sand-sized ash - gray - loose - moist (SM) (BA) Failed	
		5	SS			8.0 Fill: Silt-sized ash, trace fine sand - gray - very loose - saturated (ML) (FA) Failed 70% water loss while drilling from 10 to 15 ft.	
10.0		6	SS			Recovery information not available for Samples 5, 6, 7, 8, 9 and 10	
		7	SS				
15.0		8	SS			40% water loss while drilling from 15 to 23 ft.	
20.0		9	SS			21.0 Fill: Silty fine to medium sand-sized ash - gray - loose - saturated (SM) (FA) Failed	
		10	SS			23.0 Fill: Silt-sized ash, little fine sand - gray - very loose - saturated (ML) (FA) Failed	
		11	SS*			23.5	
		11A	SS			24.0	
25.0		11B	SS			Silt, little clay and fine sand interbedded with silt-sized ash slimes - brown and gray - very loose - wet to saturated (ML)	
		12	SS			Silt and fine to medium sand, little clay - brown and gray - very loose - moist (ML)	
		13	SS			28.3	
		13A	SS			Clayey fine sand, little silt - brown - loose - moist to wet (SC)	
30.0		14	SS			31.5	
		15	SS			Silt and fine to medium sand, little clay - brown - very loose - moist to wet (ML)	
35.0		16	SS			36.0	
		17	SS			Silty fine to coarse sand, trace clay - brown - very loose - saturated (SM)	
40.0		18	SS			40.5	



. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **2**

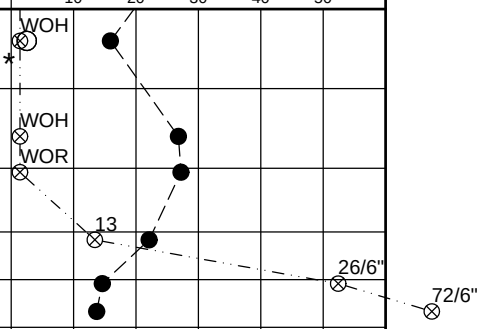
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/11/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-104**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +761.29 (Continued)	
		19	SS			Silty clay, some fine to medium sand - brown - soft (CL)	
	43.0					Silty fine to medium sand, little clay - brown - very loose - moist to wet (SM)	
45.0	45.5	20	SS			Clayey silt and fine sand - brown - very loose - wet (CL-ML)	
	47.5	21	SS			Silty fine to medium sand, trace clay - brown - medium dense - wet (SM)	
	49.0	22	SS			Weathered shale - gray, green and brown	
50.0	50.5	22A / 23	SS			End of Boring	
50.5						Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 50.5 feet with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 20 ft. of 4 in. Automatic-Mobile hammer used for Standard Penetration Tests. WOH = Weight of Hammer WOR = Weight of Rod (FA) = Fly Ash (BA) = Bottom Ash	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
10.0 ft. WS	**1/19/09**	**Chicago Area - 01**	
NORTHING **557587.27**	BORING COMPLETED **1/20/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440856.52**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/11/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

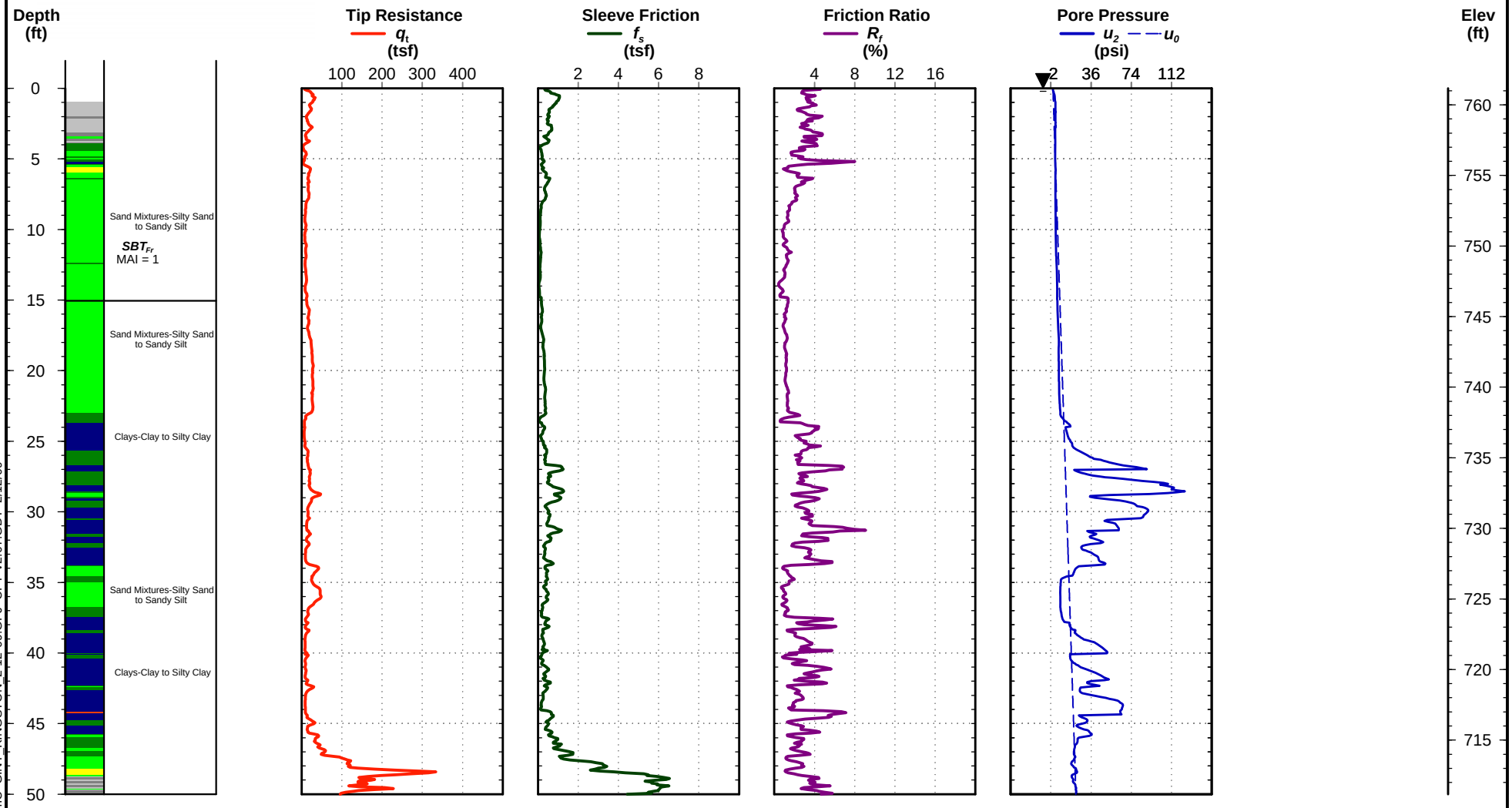
09-104-C1

Project No: 60095742

Date: Jan. 24, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557585.94
Easting: 2440855.42
Elevation: 761.17 NGVD

Total Depth: 50.0 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-104-C1

Electronic Filename: 09-104-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-104A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +761.28	
			PA				
5.0							
			RB				
10.0							
15.0			RB				
20.0							
			RB			Disturbed samples retrieved following completion of vane shear tests. Vane Shear Test #1 at 25.0 ft. Peak Su = 800 psf, Remolded Su = 375 psf Vane Shear Test #2 at 26.5 ft. Peak Su >1050 psf Vane Shear Test #3 at 28.0 ft. Peak Su = 2025 psf, Remolded Su = 600 psf	
25.0							
30.0						Vane Shear Test #4 at 32.0 ft. Peak Su = 1850 psf, Remolded Su = 675 psf Vane Shear Test #5 at 33.5 ft. Peak Su = 1850 psf, Remolded Su = 425 psf Vane Shear Test #6 at 35.0 ft. Peak Su = 1400 psf, Remolded Su = 425 psf	
35.0						35.0 End of Boring Borehole advanced to 5.0 ft. with power auger. Borehole advanced from 5.0 to 25.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Casing used: 20 ft. of 4 in.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **1/20/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557591.18**	BORING COMPLETED **1/20/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440853.5**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

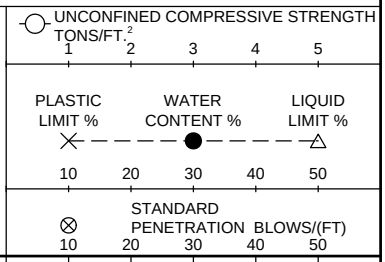
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-104B
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +761.29

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
5.0			PA			Following retrieval of 3 in. tube sample, cuttings were taken from top and bottom for water content testing. Samples designated with an "A" were taken from bottom of sample; the others were taken from top.	
10.0		1	OST			10.0 Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Failed 12.5	
15.0			RB			15.0	
		2	OST			Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Failed 17.5	
20.0			RB			20.0	
		3	OST			Fill: Silt-sized ash, some fine to medium sand, trace clay - gray - saturated (ML) (FA) Failed 22.5	
		4	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 4 description.	
25.0		4A	OST			25.0	
		5	OST			Silty clay, some fine to coarse sand - brown (CL) 26.3	
		5A	OST			27.5 Samples 5A, 6, 7, 8 and 9: Tubes partially filled with bentonite hole plug from adjacent boring.	
30.0		6	OST			Silty clay, little fine sand - brown (CL) 30.0	
		7	OST			32.5	
35.0		8	OST			Silt and fine sand, little clay - light brown - moist to wet (ML) 35.0	
37.0		9	ST			Fine to coarse sand and silt (SM) 37.0	
						End of Boring Borehole advanced to 10.0 ft. with power auger. Borehole advanced from 10.0 to 35.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Casing used: 15 ft. of 4 in. OST = Osterberg sampler	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
Not Observed	2/2/09	Chicago Area - 01	
NORTHING 557584.09	BORING COMPLETED 2/2/09	ENTERED BY KKB	SHEET NO. 1 OF 1
EASTING 2440860.47	RIG/FOREMAN CME-850/JD	APP'D BY RCR	AECOM JOB NO. 60095742

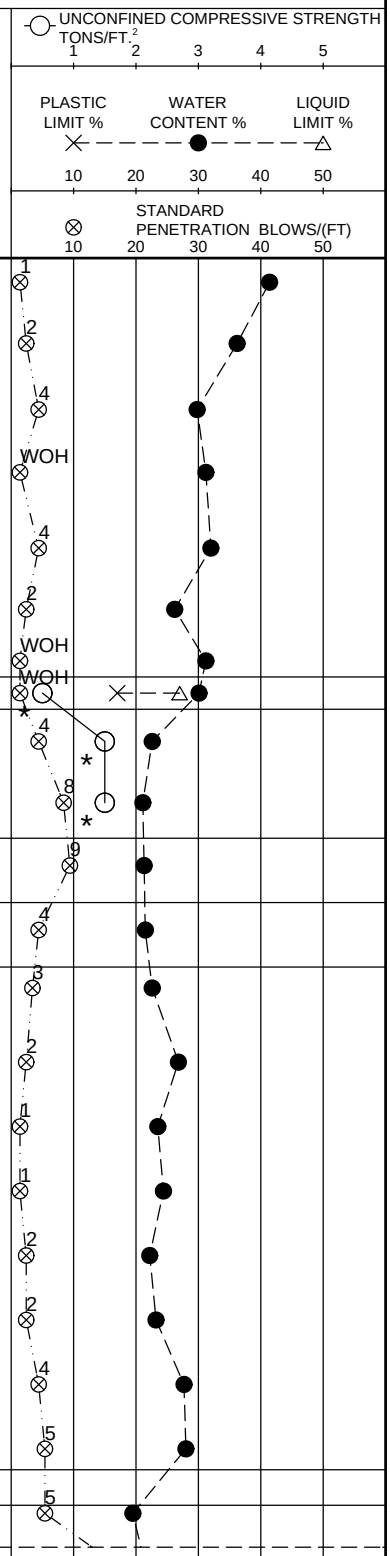
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-105**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +748.35

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose to loose - saturated (ML) (FA) Failed	
		2	SS				
5.0		3	SS			Sample 3: Occasional 1/8 in. seams of sand-sized ash (BA) noted. Sample 3: 3 in. layer of fibrous organic material noted.	
		4	SS				
		5	SS				
10.0		6	SS			Sample 6: Final blow advanced split spoon sample 12 in.	
		7	SS			13.0	
		7A	SS			14.0 Silty clay, little fine to medium sand - brown - medium (CL)	
15.0		8	SS			Silty clay and fine to medium sand - brown - stiff (CL) After sampling from 14 to 16 ft., casing sank under self-weight from 8 to 10 ft.	
		9	SS			18.0	
		10	SS			Silty fine sand, little clay - brown - loose - moist (SM)	
20.0						20.0	
		11	SS			Silty fine to medium sand, little clay - brown - loose - moist (SM)	
						22.0	
		12	SS			Silty fine to medium sand, little to trace clay - brown - very loose to loose - saturated (SM)	
25.0		13	SS				
		14	SS				
		15	SS				
30.0		16	SS				
		17	SS				
35.0		18	SS				
		19	SS			37.6	
						38.7 Sandy silt, little clay - gray - loose - saturated (ML)	
		20	SS				
40.0							



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-105**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

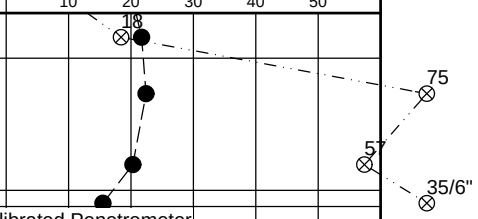
SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +748.35 (Continued)	
		21	SS			Sandy silt, little clay - brown - loose to medium dense - saturated (ML) 41.4	
		22	SS			Fine to medium sand, little silt - brown - very dense - moist to wet (SP-SM)	
45.0		23	SS			Sample 23: Weathered shale noted 45.5	
46.0		23A	SS			Weathered shale - red/brown 46.0	



*Calibrated Penetrometer

End of Boring
Borehole advanced to 6.0 ft. with power auger.
Borehole advanced from 6.0 ft. to 44.0 ft. with rock bit and drilling fluid.
Borehole backfilled upon completion.
Casing used: 15 ft. of 4 in.
Automatic-Diedrich Hammer used for Standard Penetration Tests.
WOH = Weight of Hammer
(FA) = Fly Ash

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **At Surface**	BORING STARTED **1/30/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557465.36**	BORING COMPLETED **1/31/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441010.27**	RIG/FOREMAN **D-50/RT**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)
Project No: 60095742

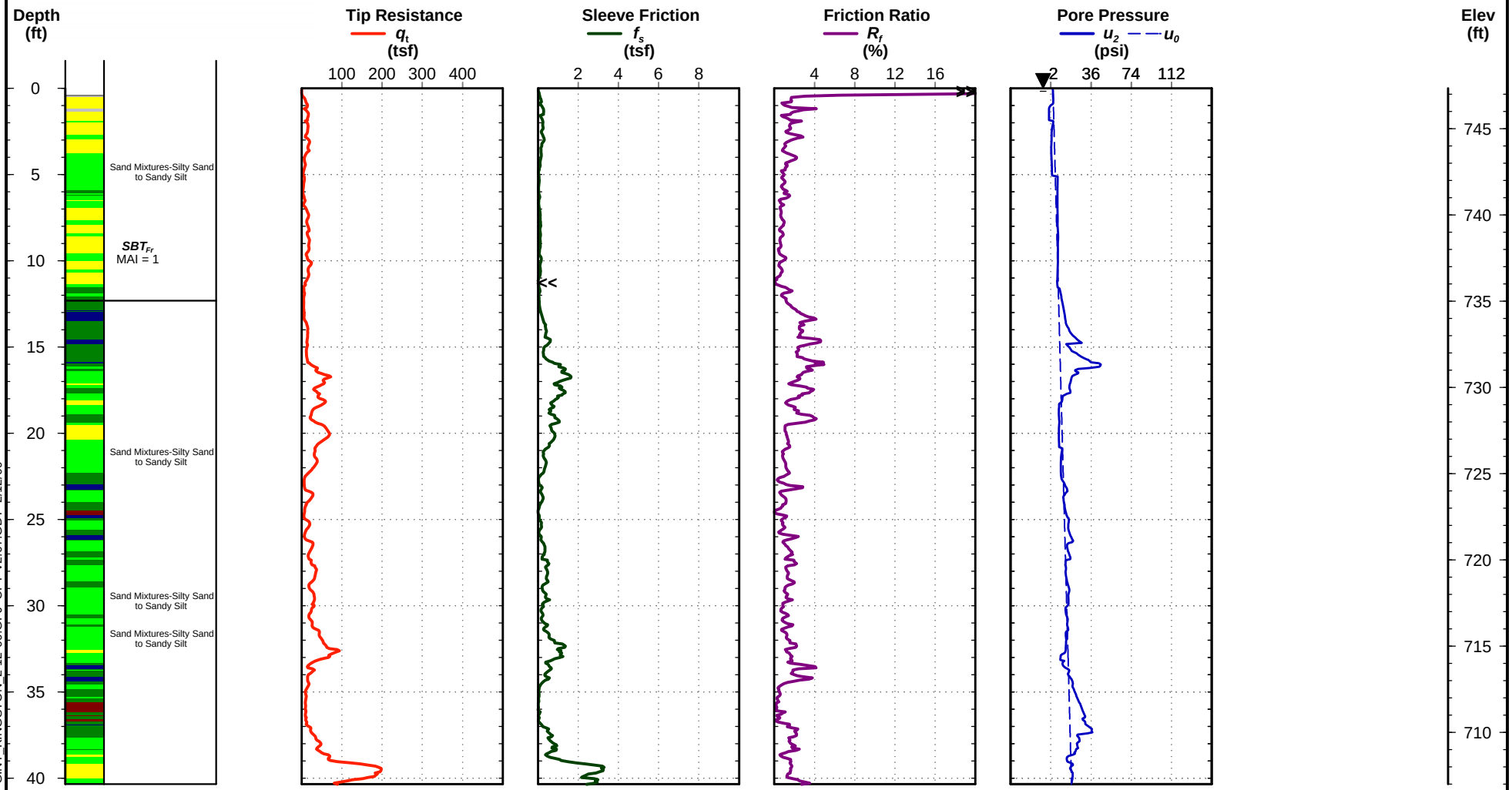
Cone Penetration Test

09-105-C1

Date: Jan. 29, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557460.81
Easting: 2441013.85
Elevation: 747.34 NGVD

Total Depth: 40.4 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-105-C1

Electronic Filename: 09-105-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-105A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

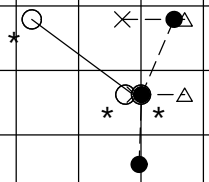
SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +748.73	
5.0			PA				
10.0			RB			Disturbed samples retrieved following completion of the Vane Shear testing.	
	13.0						
15.0		1	ST			Silty clay, little fine to medium sand - brown and gray - medium (CL) Vane Shear Test #1 at 14.0 feet Peak Su = 875 psf, Remolded Su = 225 psf	
	15.0	2	ST			Silty clay and fine sand - brown - very stiff (CL) Vane Shear Test #2 at 15.5 feet Peak Su = 2175 psf, Remolded Su = 850 psf	
	17.0	3	ST			Silty fine sand, little clay - brown - wet (SM) Vane Shear Test #3 at 17.0 feet Peak Su = 3700 psf, Remolded Su = 1150 psf	
19.0	19.0					End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 17.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Casing used: 8 ft. of 4 in.	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **2/1/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557466.78**	BORING COMPLETED **2/2/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441012.76**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-105B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +748.35	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0			RB				
						13.0	
15.0		1	OST			Silty clay, some fine sand - brown (CL) 15.5	
		2	OST			Silty clay, some fine sand - brown (CL) 18.0	
20.0		3	OST			Silty fine sand, little clay - brown - moist (SM) 20.5	
20.5						End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 18.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Casing used: 8 ft. of 4 in. OST = Osterberg sampler	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **2/1/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557467.77**	BORING COMPLETED **2/1/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441014.2**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

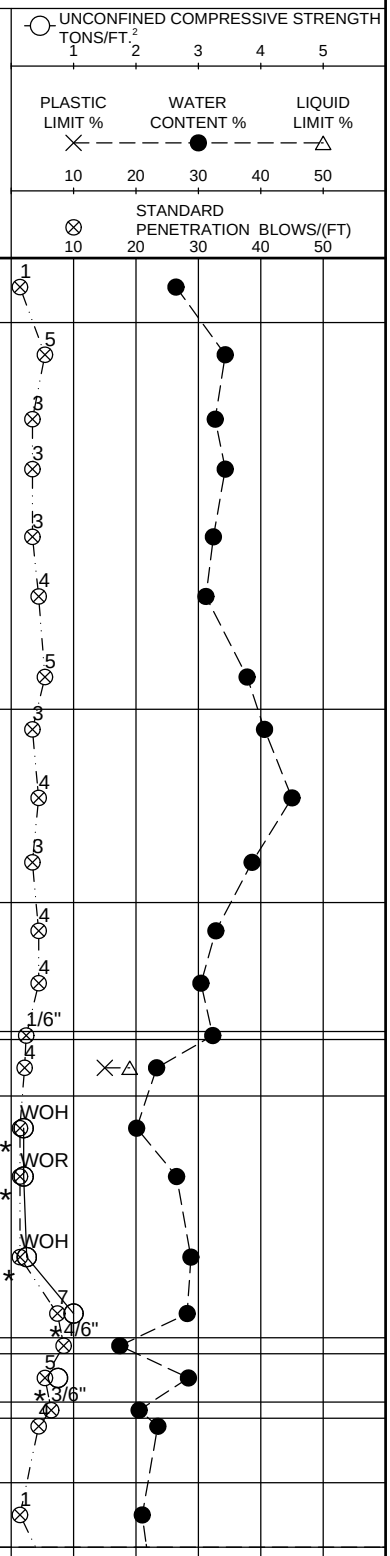
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-106**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +755.05

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silty fine to medium sand-sized ash, trace clay - gray - very loose - moist (SM) (FA) Failed	
	2.0	2	SS			Fill: Silt-sized ash, little fine sand, trace clay and coal - gray - loose to very loose - saturated (ML) (FA) Failed	
5.0		3	SS				
		4	SS				
		5	SS				
10.0		6	SS				
		7	SS				
	14.0						
15.0		8	SS			Fill: Silty fine sand-sized ash, trace clay and coal - gray - very loose to loose - saturated (SM) (BA) Failed	
		9	SS				
		10	SS			Silt-sized ash noted from 19 to 19.25 ft.	
20.0	20.0						
		11	SS			Fill: Silt-sized ash, trace clay, fine sand and coal - gray - loose - saturated (ML) (FA) Failed	
		12	SS				
	24.0						
		13	SS*			Silty clay, little fine sand - brown and black (CL)	
25.0	24.3	13A	SS			Clayey silt, some fine to medium sand - gray - loose - moist (CL-ML)	
	26.0					Sample 13A: Organic Content = 1.50%	
		14	SS			Silty clay, some fine to medium sand - brown and gray - medium to stiff (CL)	
		15	SS			Sample 14: Seams of black staining noted.	
30.0		16	SS				
		17	SS			Sample 17: 1/8 in. sand seam noted	
	33.5						
		17A	SS			Sandy silt, little clay - gray- loose - saturated (ML)	
35.0	34.0	18	SS			Clayey silt, little fine sand - brown and gray - medium (CL-ML)	
	35.5	18A	SS			Sandy silt, trace clay - gray - loose - saturated (ML)	
	36.0	19	SS			Silty fine to medium sand, little clay - brown - loose - saturated (SM)	
	38.0	20	SS			Silt, little clay and fine sand - gray - very loose - saturated (ML)	
40.0	40.0						



. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-106
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

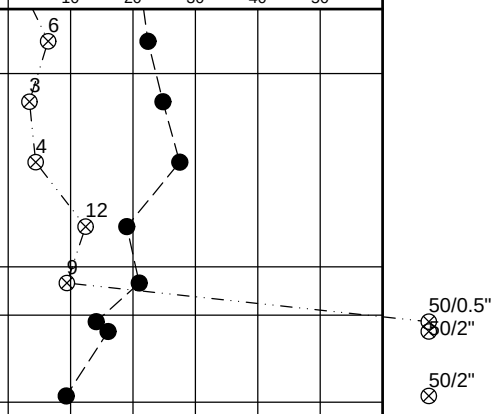
SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +755.05 (Continued)	
		21	SS			Silty fine to medium sand, little clay - gray - loose - saturated (SM)	
	42.0						
		22	SS			Sandy silt, little clay - gray - loose to medium dense - wet (ML)	
45.0		23	SS				
		24	SS				
	48.0						
		25	SS			Silty fine sand, trace clay - gray - loose - moist (SM)	
	49.5						
50.0		25A	SS			Weathered shale - dark gray	
		26	SS*				
			RB				
	52.2	27	SS*				
						Driller's note: Probable bedrock or boulder. No samples taken	
			RB				
55.0							
56.6	56.6						
						End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 56.6 ft. with rock bit and drilling fluid. Borehole grouted upon completion and installed inclinometer casing to 55.3 ft. Casing used: 8 ft. of 4 in. Automatic-Diedrich hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. or less. WOH = Weight of Hammer (FA) = Fly Ash (BA) = Bottom Ash	* Calibrated Penetrometer



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
4.7 ft. WS	1/20/09	Chicago Area - 01	
NORTHING 557303.7	BORING COMPLETED 1/21/09	ENTERED BY KKB	SHEET NO. 2 OF 2
EASTING 2441194.41	RIG/FOREMAN D-50/RT	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)
Project No: 60095742

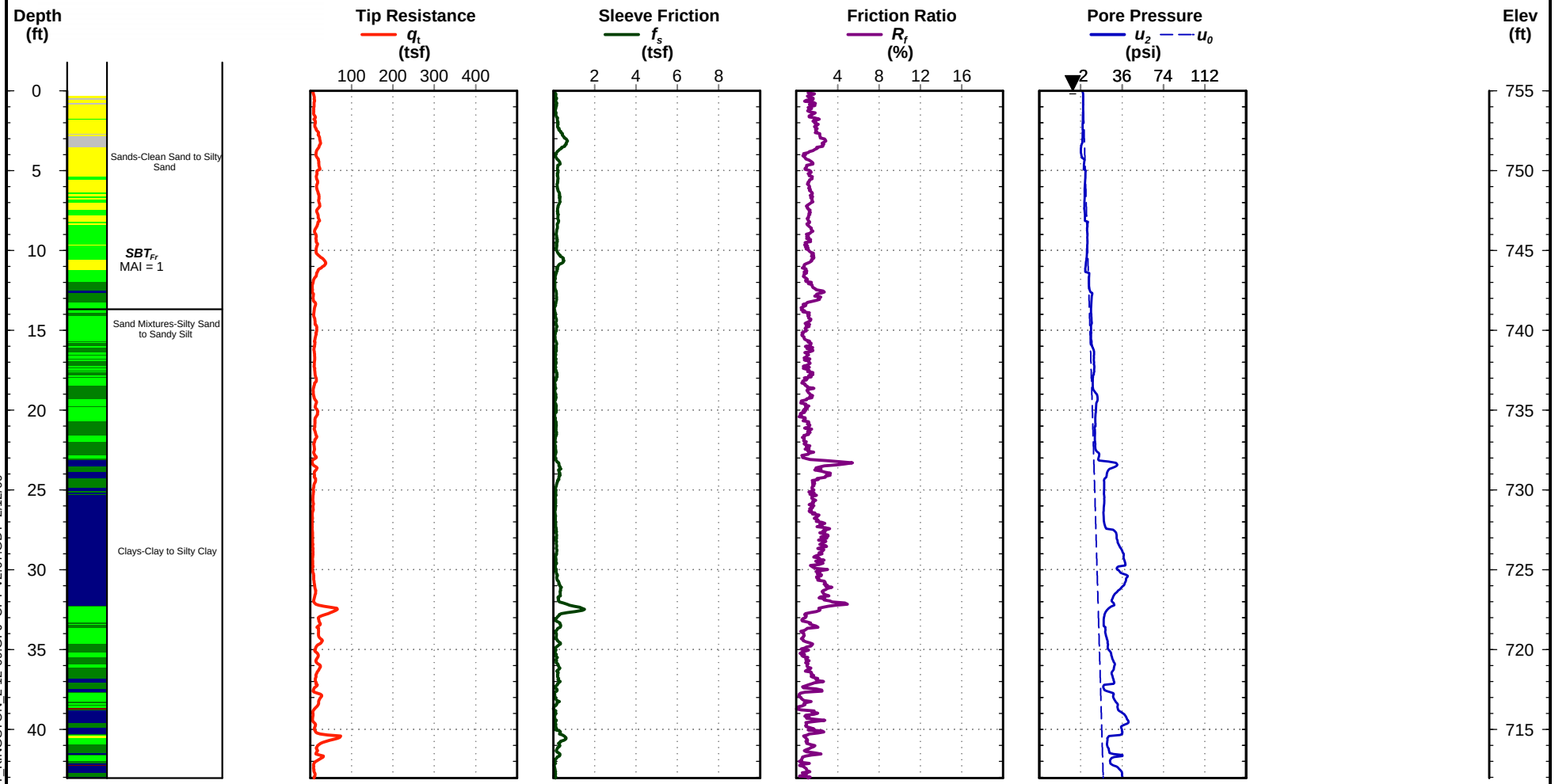
Cone Penetration Test

09-106-C2

Date: Jan. 19, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557306.52
Easting: 2441190.08
Elevation: 755 NGVD

Total Depth: 43.0 ft
Termination Criteria: Target Depth
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-106-C2

Electronic Filename: 09-106-C2.cpt

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

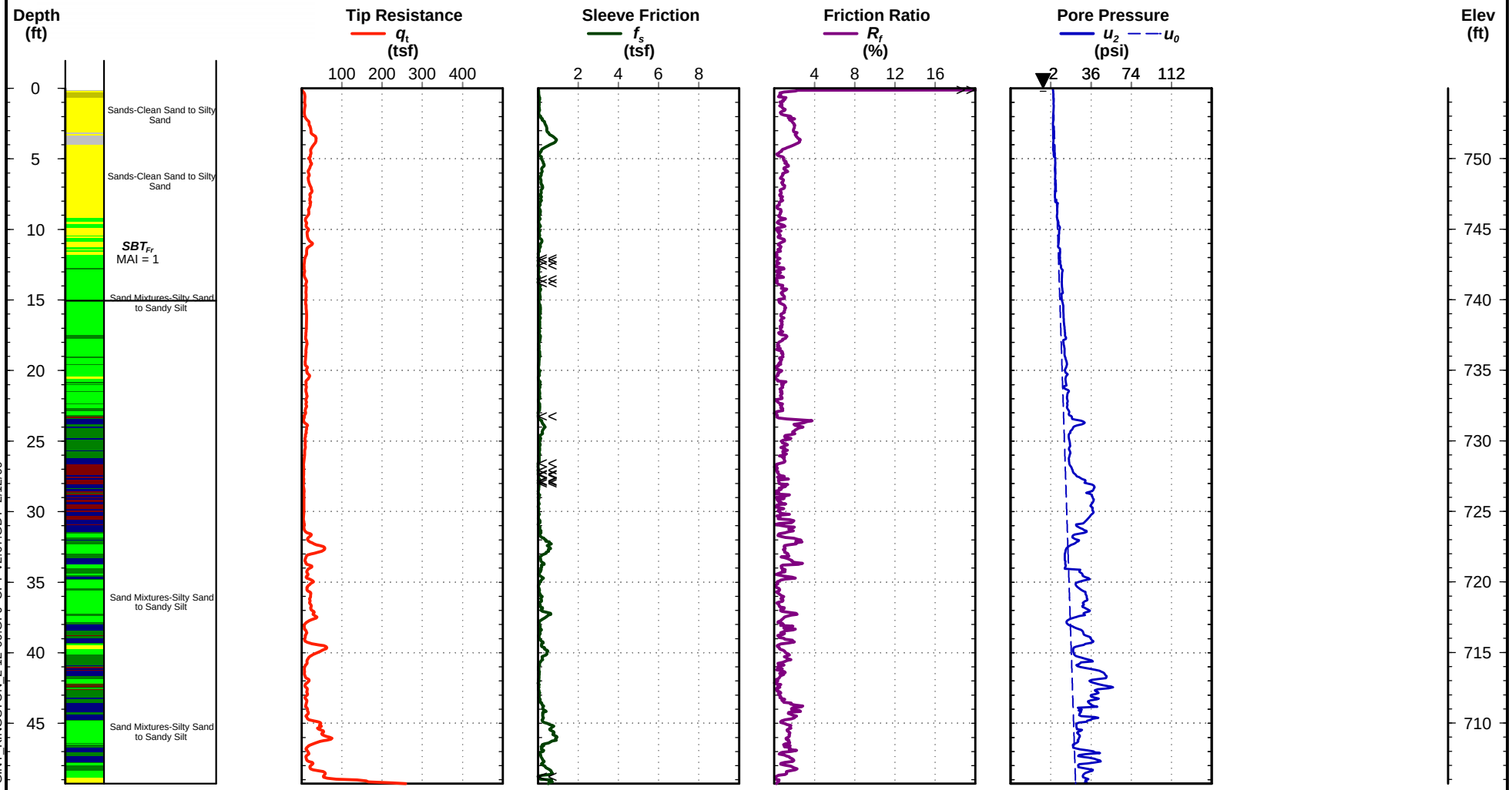
09-106-C1

Project No: 60095742

Date: Jan. 19, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557305.68
Easting: 2441189.38
Elevation: 754.98 NGVD

Total Depth: 49.3 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



09-106-C1

Electronic Filename: 09-106-C1.cpt

CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-106A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

SURFACE ELEVATION +754.69

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0							
15.0							
20.0			RB				
25.0						Disturbed samples retrieved following completion of vane shear tests.	
						Vane Shear Test #1 at 29.0 ft. Peak Su = 1250 psf, Remolded Su = 300 psf Vane Shear Test #2 at 30.0 ft. Peak Su = 1050 psf, Remolded Su = 250 psf	
30.0						**Pneumatic Piezometer Installed at 30.0 feet**	
	31.0	1	SS*			Silty fine to coarse gravel, little fine sand, trace clay - gray - wet - dense (GM)	
	31.5	1A	SS				
	32.0					Sandy silt, trace clay - gray - wet - very loose (ML)	
35.0			RB			3 in. sample attempted at 31.0 to 33.5 ft. with Osterberg sampler with no Recovery.	
						Pneumatic Piezometer Installed at 39.0 feet	
40.0							

15/6"

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-106A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +754.69 (Continued)	
						3 in. sample attempted at 31.0 to 33.5 ft. with Osterberg sampler with no Recovery.	
45.0			RB				
50.0	50.0					**Pneumatic Piezometer Installed at 49.0 feet**	
						End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 50.0 ft. with rock bit and drilling fluid. Casing used: 28 ft. of 4 in. Automatic Diedrich Hammer used for Penetration Tests. SS* = SPT value based on first 6 in. Pneumatic Piezometers installed at 30.0 ft., 39.0 ft., and 49.0 ft. Driller's Note: Unretrievable 4 in. diameter casing left in hole from 15 to 19 ft. below ground surface.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **At surface while drilling**	BORING STARTED **1/22/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557301.23**	BORING COMPLETED **1/23/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441197.31**	RIG/FOREMAN **D-50/RT**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

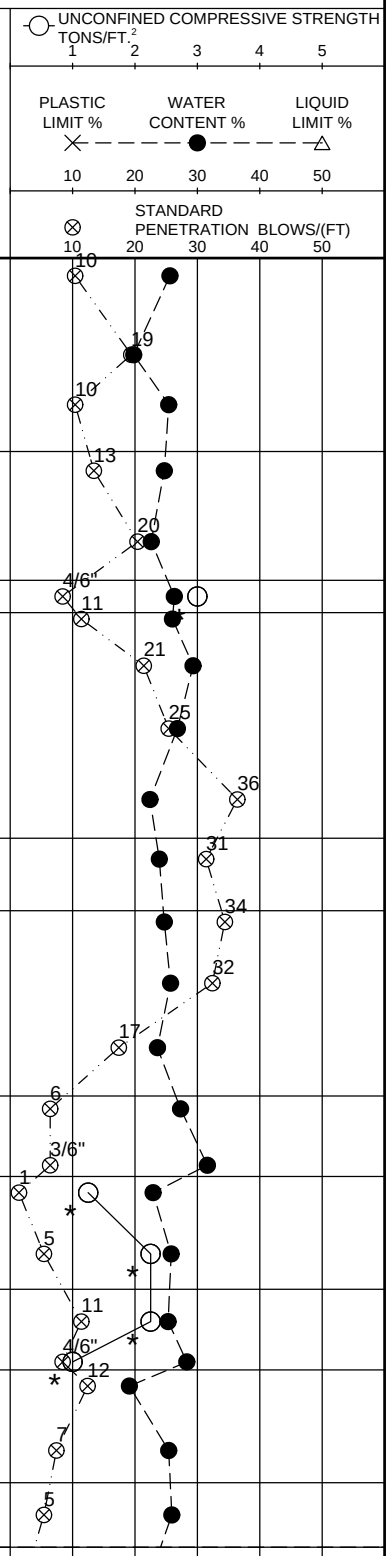
AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-107**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +762.44

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Sandy silt-sized ash, little to trace clay - gray - medium dense - moist to wet (ML) (FA) Failed	
		2	SS				
5.0		3	SS			Sample 3: 4-inch seam of sand-sized bottom ash (BA) noted	
		4	SS			Fill: Silty fine to coarse sand-sized ash, little fine to coarse gravel - gray - medium dense - wet (SM) (FA & BA) Failed	
		5	SS				
10.0		6	SS			Fill: Silty clay, trace fine to coarse sand - reddish brown - very stiff (CL) Failed	
		6A	SS				
		7	SS			Fill: Sandy silt-sized ash, little clay - gray - medium dense to dense - saturated (ML) (FA) Failed	
15.0		8	SS				
		9	SS				
		10	SS			Fill: Silty fine to coarse sand-sized ash, trace fine gravel - gray- dense - wet (SM) (BA) Failed	
20.0		11	SS			Fill: Sandy silt-sized ash - gray - dense to medium dense - saturated (FA) Failed Sample 12: Seams of sand-sized ash (BA)	
		12	SS				
25.0		13	SS				
		14	SS			Fill: Sandy silt-sized ash, trace fine gravel - gray - loose - saturated (ML) (FA) Failed	
		15	SS				
30.0		15A	SS			Silty clay, little sand - brown and gray - stiff to very stiff (CL) Sample 15A: Organic Content = 2.61%	
		16	SS				
		17	SS			Clayey silt, little fine to medium sand - brown and gray - very stiff to stiff (CL-ML)	
35.0		18	SS				
		18A	SS			Silty fine to medium sand, trace clay - gray - medium dense to loose - wet (SM)	
		19	SS				
40.0		20	SS			Silty fine sand, trace clay - brown - loose - saturated (SM)	

6.0 10.0 11.0 18.0 20.3 26.0 28.5 32.0 34.5 38.0 40.0



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

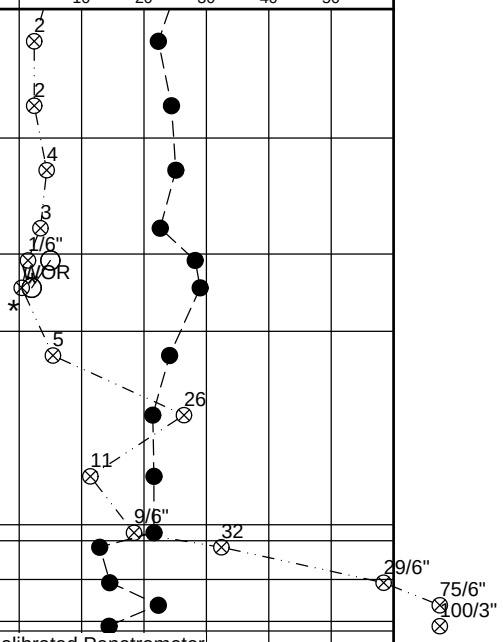
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-107**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +762.44 (Continued)	
		21	SS			Silt, little sand, trace clay - brown - very loose - saturated (ML)	
		22	SS				
						44.0	
45.0		23	SS			Sandy silt, little clay - brown - loose to very loose - saturated (ML)	
		24	SS				
						47.6	
		24A	SS			Silty clay, little fine to medium sand - brown to gray - medium to soft (CL) Note: Fine to medium sand seams noted	
		25	SS				
50.0						50.0	
		26	SS			Silty fine to medium sand, trace clay - gray - loose to medium dense - saturated (SM)	
		27	SS				
55.0		28	SS				
						56.0	
		29	SS			56.5 Silty fine to medium sand, little weathered shale gravel sized fragments - gray - medium dense - saturated (SM)	
		29A	SS				
		29B	SS			57.7 Silt, little clay, trace fine to medium sand - brown - dense - moist to wet (ML)	
		30	SS				
59.3		30A	SS			59.0 Weathered shale - gray	
						59.3 Shale - gray	



* Calibrated Penetrometer

End of Boring
Borehole advanced to 8.0 ft. with power auger.
Borehole advanced from 8.0 to 58.0 ft. with rock bit and drilling fluid.
Borehole backfilled upon completion.
Casing used: 8 ft. of 4 in.
Automatic-Diedrich Hammer used for Standard Penetration Tests.
SS* = SPT value based on first 6 in.
WOR = Weight of Rod
(FA) = Fly Ash
(BA) = Bottom Ash

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
4.0 ft. WS	**2/3/09**	**Chicago Area - 01**	
NORTHING **557206.53**	BORING COMPLETED **2/4/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441335.66**	RIG/FOREMAN **D-50/JHC & BZ**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

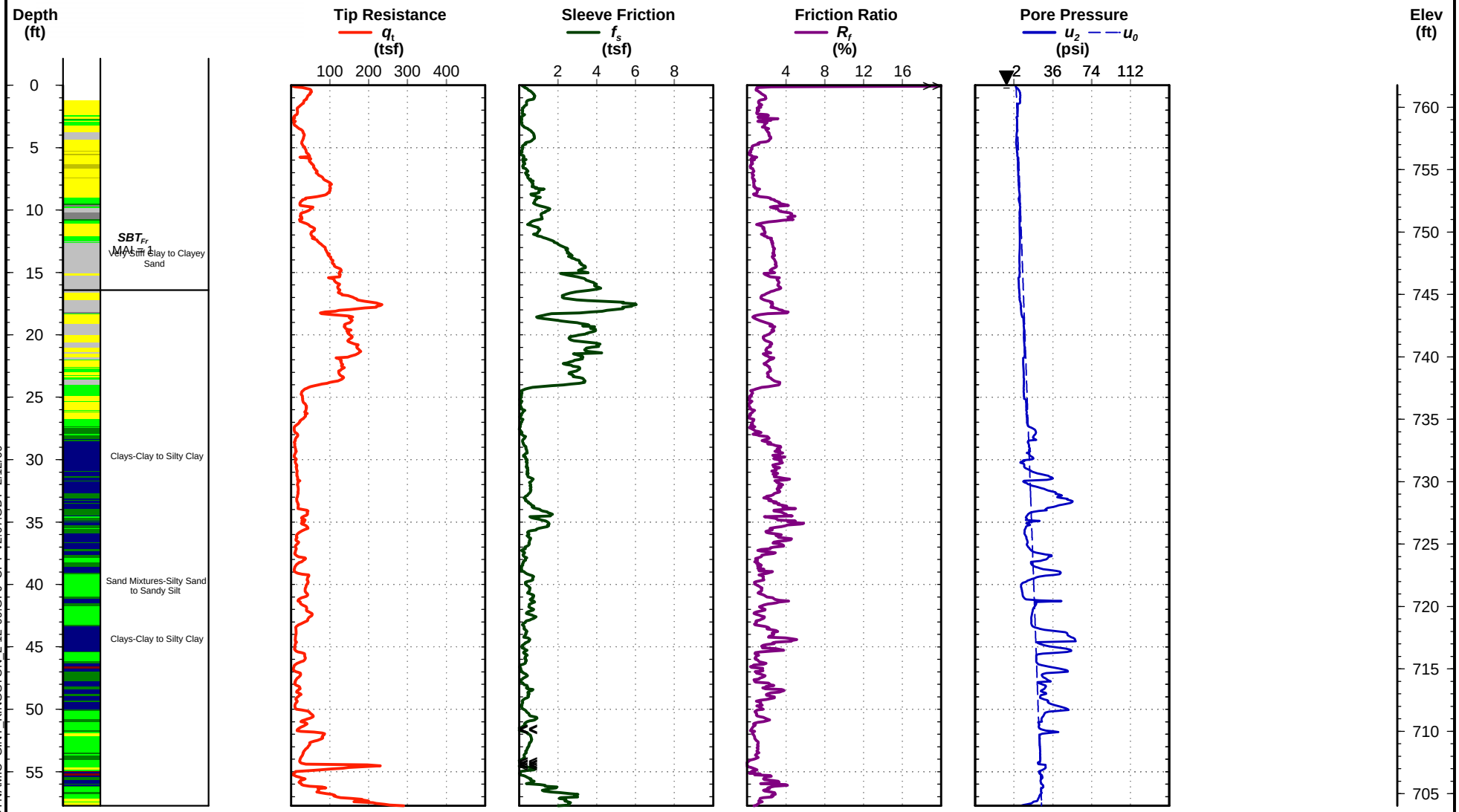
09-107-C1

Project No: 60095742

Date: Jan. 19, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557207.04
Easting: 2441333.93
Elevation: 761.77 NGVD

Total Depth: 57.7 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-107-C1

Electronic Filename: 09-107-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-107A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +762.42	
5.0			PA				
10.0							
15.0							
20.0			RB				
25.0						Disturbed samples retrieved following completion of vane shear testing. Vane Shear Test #1 at 29.0 ft. Peak >1875 psf	
						28.5	
30.0		1	SS			Silty fine to coarse sand-sized ash, trace fine gravel and clay - gray - saturated (SM) (BA) Failed	
						30.0	
		2	ST			Sample 1: No recovery with Shelby Tube. Pushed 3 in. split spoon to recover sample.	
						31.5	
						Silty clay, some fine sand - brown and gray - stiff (CL) Vane Shear Test #2 at 31.0 ft. Peak Su = 1800 psf, Remolded Su = 425 psf	
35.0			RB				
40.0							

. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-107A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +762.42 (Continued)	
						Vane Shear Test #2 at 31.0 ft. Peak Su = 1800 psf, Remolded Su = 425 psf	
45.0			RB				
	47.5						
49.0		3	SS3			Silty clay, some fine to medium sand - brown and gray (CL) Sample 3: No sample recovery with Shelby tube. Pushed 3-in. split-spoon to recover sample. Vane Shear Test #3 at 49.0 ft. Peak Su = 1475 psf, Remolded Su = 600 psf	*Calibrated Penetrometer
	49.0					End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 47.5 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. SS3 = 3 in. Split spoon Casing used: 8 ft. of 4 in.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **6.5 ft. WD**	BORING STARTED **2/17/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557201.83**	BORING COMPLETED **2/19/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441341.16**	RIG/FOREMAN **D-50/JHC & BZ**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-107B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

SURFACE ELEVATION +762.78

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
5.0							
10.0							
15.0							
20.0							
25.0							
	27.5	1	OST			Sample 1: Recovered sample placed into jar. Fill: Sandy silt-sized ash, trace clay - gray - saturated (ML) (FA) Failed	
30.0	30.0	2	OST			Sample 2 was not opened	
	32.5						
35.0			RB				
40.0							

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-107B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +762.78 (Continued)	
			RB			42.0	
		3	OST			Sample 3 was not opened 44.5	
45.0		4	OST			Sample 4 was not opened 47.0	
49.5		5	OST			Fine to medium sand and silt, trace clay - orangish gray - wet (SM) 49.5	
						End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 ft. to 47.0 ft. with rock bit and drilling fluid. Casing used: 30 ft. of 4 in. OST = Osterberg sampler Borehole grouted upon completion.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **5.0 ft. BCR; 6.0 ft. ACR**	BORING STARTED **2/16/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557204.24**	BORING COMPLETED **2/17/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441358.86**	RIG/FOREMAN **D-50/JC**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

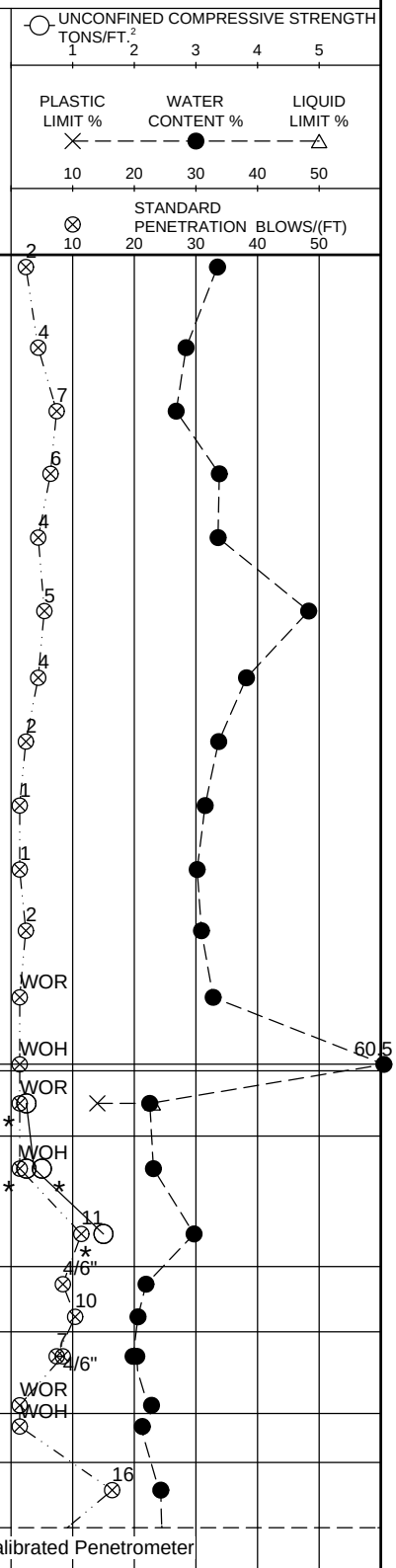
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-108
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +759.77

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silt-sized ash, trace to some clay, trace to little fine sand - gray - very loose to loose - saturated (ML) (FA) Failed	
		2	SS				
5.0		3	SS				
		4	SS				
		5	SS				
10.0		6	SS				
		7	SS				
15.0		8	SS				
		9	SS				
		10	SS				
20.0		11	SS				
		12	SS			Sample 12: Sampler fell under weight of rod for 30 in. and under weight of hammer an additional 30 in.	
25.0		12A	SS			24.8	
		13	SS			25.0 Clayey silt, trace fine sand interbedded with silt-sized ash slimes - dark brown and gray - very loose (CL-ML)	
						27.0 Silty clay, little to some fine to coarse sand and fine gravel - brown - soft (CL)	
		14	SS			Silty clay, little fine to coarse sand - brown and gray with reddish brown - medium to stiff (CL)	
30.0		15	SS			31.0	
		16	SS			Silt, little clay and fine to medium sand - brown and gray - loose to medium dense - moist (ML)	
		16A	SS			33.0	
		17	SS			Silty fine to medium sand, little clay - brown and gray - loose to very loose - wet to saturated (SM)	
		17A	SS				
35.0		18	SS*			35.5	
		18A	SS			Sandy silt, some clay - reddish brown - very loose - saturated (ML)	
						37.0	
		19	SS			Silty fine to medium sand, little clay - reddish brown - medium dense to loose - moist to saturated (SM)	



. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-108
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

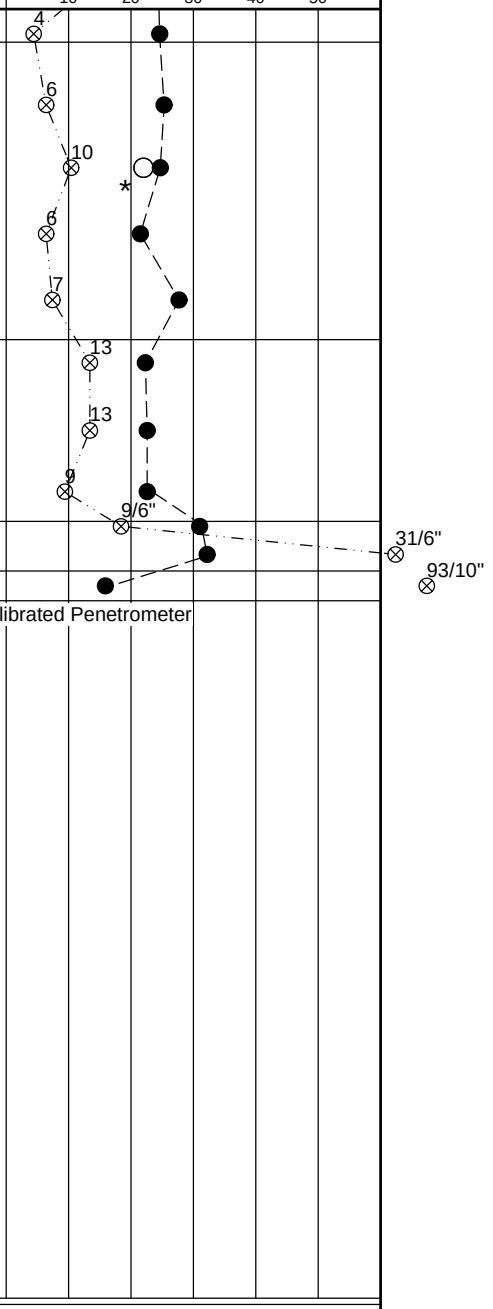
SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +759.77 (Continued)	
40.0		20	SS			40.0 Silty fine to medium sand, little clay - reddish brown and gray - medium dense to loose - moist to saturated (SM)	
		21	SS				
		22	SS			Sample 22: Very stiff clay seam noted.	
45.0		23	SS				
		24	SS			49.0 Sandy silt, little clay - gray - medium dense to loose - wet (ML)	
50.0		25	SS				
		26	SS				
		27	SS			54.5 Clayey silt, little fine to coarse sand and fine gravel (weathered shale) - reddish brown and dark brown - medium dense to very dense - moist to wet (CL-ML)	
55.0		27A	SS				
		28	SS			56.0	
56.9		28A	SS			56.9 Weathered shale - gray	



* Calibrated Penetrometer

End of Boring
Borehole advanced to 8.0 ft. with power auger.
Borehole advanced from 8.0 to 55.0 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 9.5 ft. of 4 in.
Automatic-Diedrich Hammer used for Standard Penetration Tests.
SS* = SPT value based on first 6 in.
WOH = Weight of Hammer
WOR = Weight of Rod
(FA) = Fly Ash

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
2.0 ft. WS; 6.1 ft. BCR; 5.8 ft. ACR	2/9/09	Chicago Area - 01	
NORTHING 557083.91	BORING COMPLETED 2/10/09	ENTERED BY KKB	SHEET NO. 2 OF 2
EASTING 2441485.11	RIG/FOREMAN D-50/JHC	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

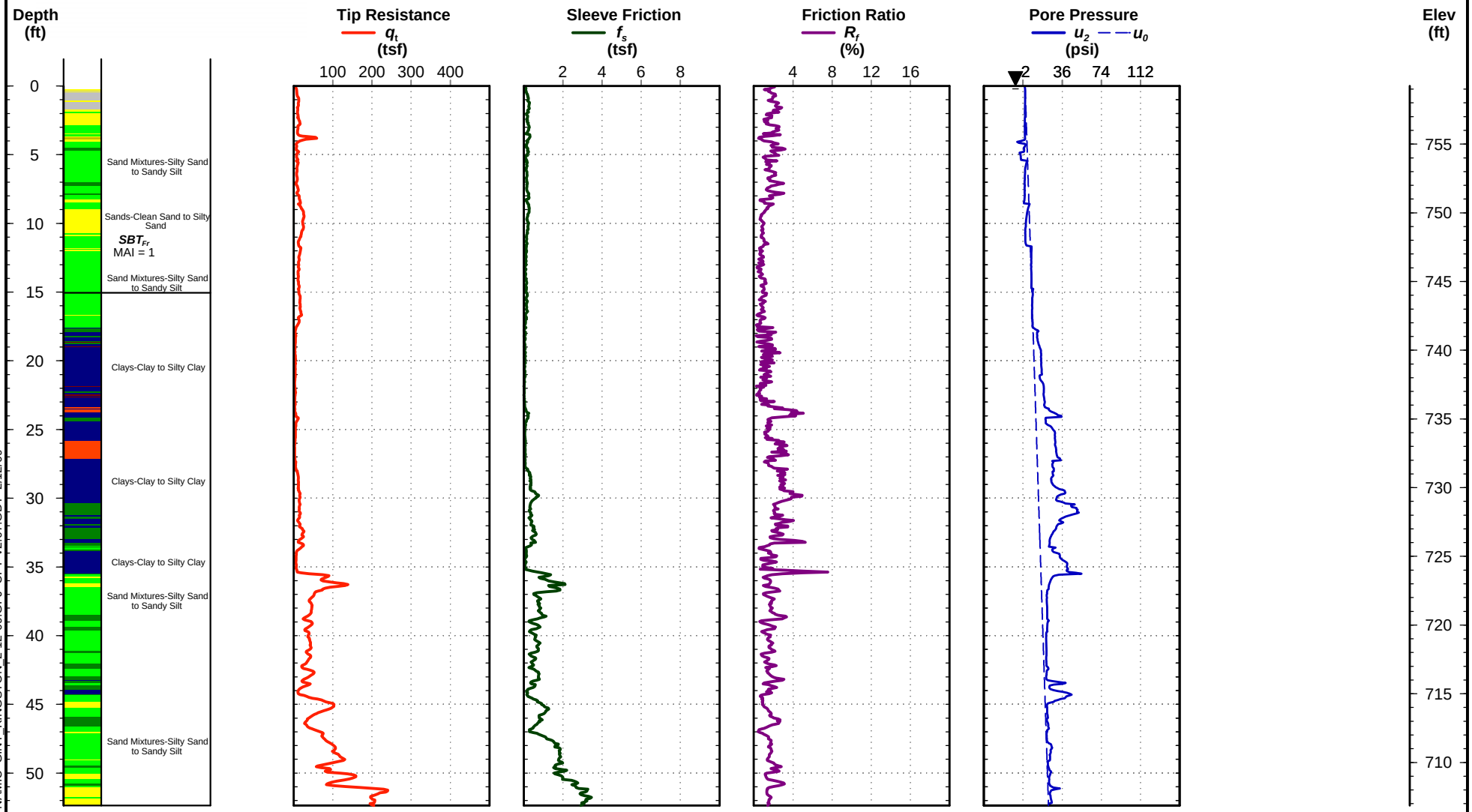
09-108-C1

Project No: 60095742

Date: Jan. 19, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557087.89
Easting: 2441481.7
Elevation: 759.23 NGVD

Total Depth: 52.4 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-108-C1

Electronic Filename: 09-108-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-108A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +759.27	
			PA				
5.0							
10.0							
15.0			RB				
						Disturbed samples retrieved following completion of vane shear testing	
20.0							
						Vane Shear Test #1 at 25.0 ft. Peak Su = 650 psf, Remolded Su = 50 psf	
	23.5		RB				
25.0	25.5	1	ST			Sample 1: No recovery with Shelby tube after two attempts.	
27.5	27.5	2	ST			Silty clay, some fine sand - brown - moist (CL) Vane Shear Test #2 at 26.5 ft. Peak Su = 600 psf, Remolded Su = 175 psf	
						End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 25.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 10 ft. of 4 in.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **5.0 ft. BCR; 4.8 ft. ACR**	BORING STARTED **2/10/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557081.35**	BORING COMPLETED **2/11/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441488.48**	RIG/FOREMAN **D-50/JHC**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-108B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +759.70	UNIT DRY WT. LBS./FT.^{3}
			PA				
5.0							
10.0			RB			Following retrieval of 3 in. tube sample, cuttings were taken from top and bottom for water content testing. Samples designated with an "A" were taken from bottom of sample; the others were taken from top.	
15.0							
20.0							
		1	OST			Sample 1: No sample recovery	
25.0		2	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 2 description.	
		2A	OST				
	26.0					Silty clay, little fine to coarse sand - brown (CL)	
		3	OST				
28.5	28.5					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 26.0 ft. with rock bit and drilling fluid. Casing used: 10 ft. of 4 in. Borehole grouted upon completion. OST = Osterberg sampler	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **1.8 ft. BCR; 2.4 ft. ACR**	BORING STARTED **2/11/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557083.64**	BORING COMPLETED **2/12/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441490.24**	RIG/FOREMAN **D-50/JHC**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

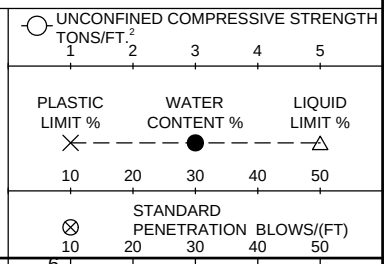
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-109**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +763.59

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silty fine to medium sand-sized ash, trace clay - gray - loose - moist (SM) (FA) Failed	
	2.0	2	SS			Fill: Silt-sized ash, little fine sand - gray - medium dense to loose - moist (ML) Sample 3: 2 in. seam of reddish brown silty clay noted. (FA) Failed	
5.0		3	SS				
	6.0	4	SS			Fill: Silty sand-sized ash - gray - very loose - wet (SM) (FA & BA) Failed	
		5	SS				
10.0	10.0	6	SS			Fill: Sandy silt-sized ash, little clay - gray - very loose - saturated (ML) (FA) Failed	
		7	SS				
15.0	16.0	8	SS				
		9	SS			Fill: Silt-sized ash, little clay, trace fine sand - gray - very loose - saturated (ML) (FA) Failed	
		10	SS				
20.0		11	SS				
		12	SS				
25.0	26.0	13	SS				
	26.5	14	SS*			Silt, little clay and trace fine sand interbedded with silt-sized ash slimes - dark gray and black - wet (ML) & (FA)	
		14A	SS				
		15	SS			Clayey silt, some fine to medium sand - brownish gray to grayish brown - very loose (CL-ML)	
30.0	30.0	16	SS			Clayey silt, little fine to medium sand - brown and gray - stiff (CL-ML)	
		17	SS				
35.0	34.0	18	SS			Silty fine to medium sand, little clay - light brown - loose - saturated (SM)	
		19	SS				
	38.0	20	SS			Silty fine to medium sand, little clay - reddish brown - very loose to loose - saturated (SM)	
40.0							



. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

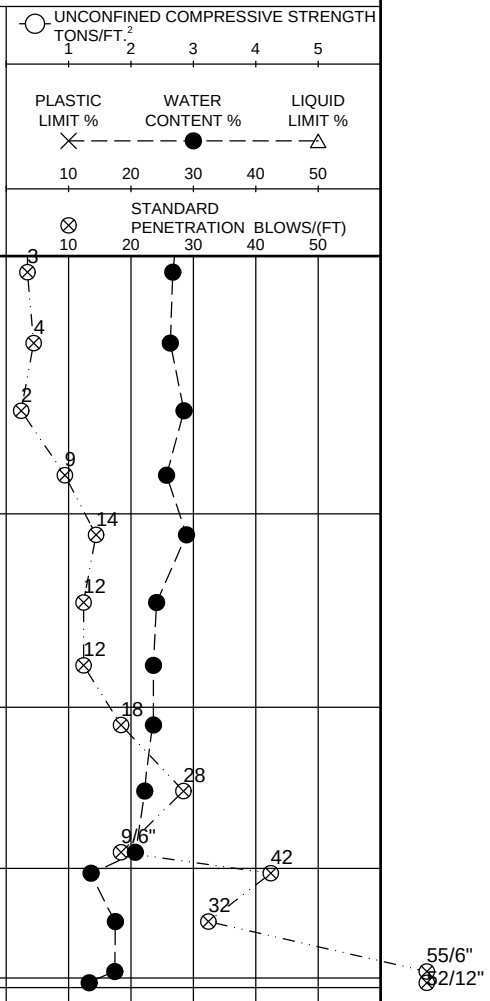
AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-109
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +763.59 (Continued)	
		21	SS			Silty fine to medium sand, little clay - reddish brown - very loose to loose - saturated (SM)	
		22	SS				
45.0		23	SS				
		24	SS			48.0	
		25	SS			Silty fine to medium sand, little clay - reddish brown to brown - medium dense - saturated (SM)	
50.0		26	SS				
		27	SS			54.0	
55.0		28	SS			Fine to medium sand, little silt, trace clay - brown - medium dense - saturated (SM)	
		29	SS				
		30	SS			59.0	
60.0		30A	SS			Gravelly fine to coarse sand, little silt, trace clay - brown and black - dense to extremely dense - saturated (SM) Weathered shale noted.	
		31	SS				
		32	SS*			62.4	
		32A	SS			62.7 Weathered shale - gray	
65.0			RB			Drilled without sampling Driller's Note: Apparent bedrock	
68.0						68.0	
						End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 68 feet with rock bit and drilling fluid. Borehole grouted upon completion and inclinometer installed to 68 ft. Casing used: 8 ft. of 4 in. Automatic-Diedrich Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. WOH = Weight of Hammer (FA) = Fly Ash (BA) = Bottom Ash	* Calibrated Penetrometer



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
7.3 ft. WD	2/12/09	Chicago Area - 01	
NORTHING 556971.56	BORING COMPLETED 2/12/09	ENTERED BY KKB	SHEET NO. 2 OF 2
EASTING 2441627.44	RIG/FOREMAN D-50/JD	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

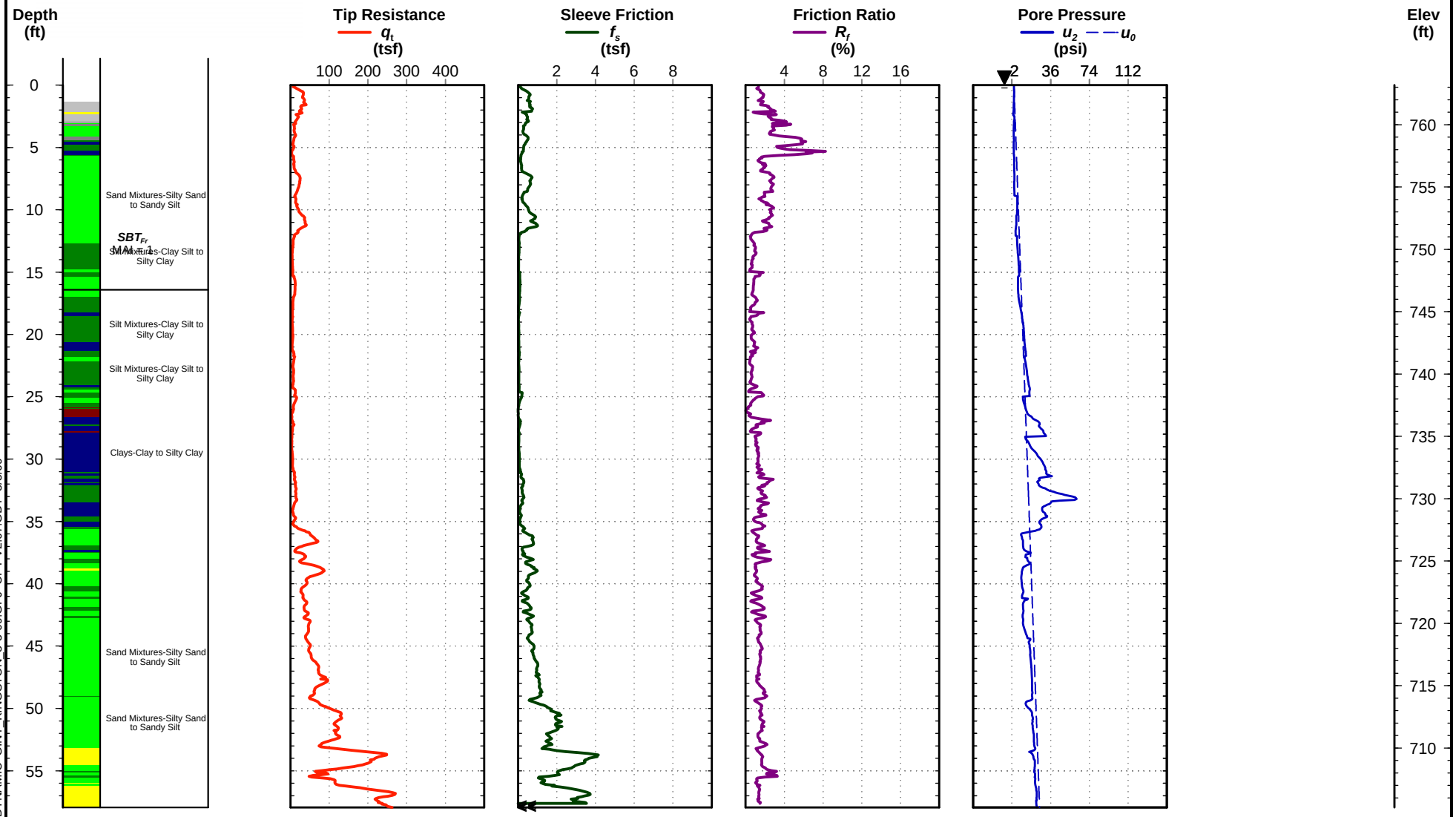
09-109-C1

Project No: 60095742

Date: Feb. 24, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing: 556981.34
Easting: 2441626.29
Elevation: 763.18 NGVD

Total Depth: 57.9 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_3-3-09.GPJ CPT V2.07.GDT 3/5/09

09-109-C1

Electronic Filename: 09-109-C1.cpt

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-109A
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

SURFACE ELEVATION +763.27

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0			RB				
15.0							
20.0							
25.0						Disturbed samples retrieved following completion of vane shear testing. Sample1: No recovery with Shelby tube after 2 attempts Sample 2: Sample slipped out of Shelby tube. Remaining sample placed into jar. Vane Shear Test #1 at 27.0 ft. Peak Su = 675 psf, Remolded Su = 50 psf	
		1	ST				
	28.0	2	ST			Clayey silt, little fine to medium sand - brown and gray - medium - saturated (CL-ML) Vane Shear Test #2 at 29.0 ft. Peak Su = 725 psf, Remolded Su = 225 psf	
30.0	30.0	3	ST				
	32.0	3A	ST			Clayey silt, little fine to medium sand - brown and gray - medium - saturated (CL-ML) Vane Shear Test #3 at 31.0 ft. Peak Su = 900 psf, Remolded Su = 50 psf	
		4	ST			Vane Shear Test #4 at 33.0 ft. Peak Su = 1500 psf, Remolded Su = 425 psf	
35.0		5	ST			S-4, S-5: No recovery with Shelby tube after 2 attempts Vane Shear Test #5 at 35.0 ft. Peak Su = 975 psf, Remolded Su = 275 psf	
36.0	36.0					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 34.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in.	

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
6.5 ft. BCR; 6.8 ft. ACR	2/13/09	Chicago Area - 01	
NORTHING: 556967.71	BORING COMPLETED: 2/14/09	ENTERED BY: KKB	SHEET NO. 1 OF 1
EASTING: 2441624.88	RIG/FOREMAN: D-50/JHC	APP'D BY: RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

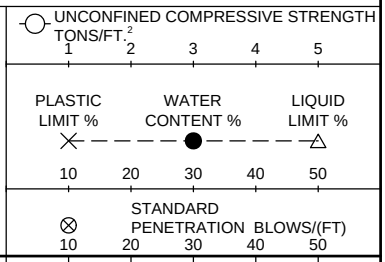
AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-109B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +763.41

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0							
15.0			RB			Following retrieval of 3 in. tube sample, cuttings were taken from top and bottom for water content testing. Samples designated with an "A" were taken from bottom of sample; the others were taken from top.	
20.0						**Pneumatic Piezometer Installed at 20.0 ft.**	
	20.5	1	OST			Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Failed	
25.0	25.5	2	OST			Sample 2: Poor recovery. Sample placed into jars.	
		3	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 3 description.	
	28.0	3A	OST				
30.0		4	OST			Clayey silt, some fine to coarse sand - brown and gray - saturated (CL-ML)	
		5	OST			**Pneumatic Piezometer Installed at 31.0 ft.**	
	33.0						
35.0	35.5	6	OST			Silty fine to medium sand, trace clay - light brown - saturated (SM)	
40.0			RB				

. . . continued



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-109B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +763.41 (Continued)	
						Pneumatic Piezometer Installed at 40.0 ft.	
45.0							
50.0			RB				
55.0							
60.0						**Pneumatic Piezometer Installed at 61.0 ft.**	
62.0						62.0	

End of Boring
Borehole advanced to 8.0 with power auger.
Borehole advanced from 8.0 ft. to 62.0 ft. with rock bit and drilling fluid.
Casing used: 23 ft. of 4 in.
OST = Osterberg sampler
Pneumatic Piezometers installed at 20.0, 31.0, 40.0, and 61.0 ft.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **2/14/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **556965.5**	BORING COMPLETED **2/16/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441623.3**	RIG/FOREMAN **D-50/JHC**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

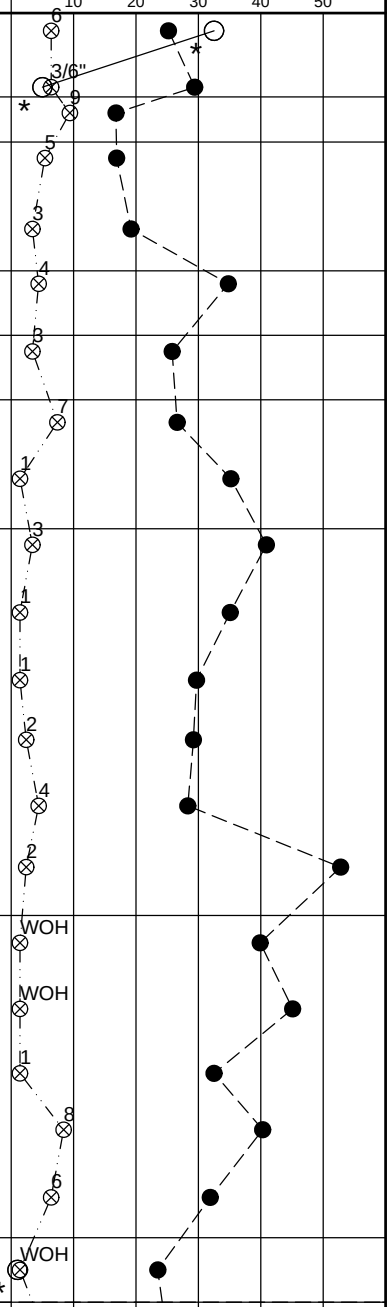
AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-110**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)
STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)

SURFACE ELEVATION +774.57

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silty clay, little fine to coarse sand, trace fine to coarse gravel - reddish brown - very stiff to medium (CL)	
		2	SS*				
	2.6	2A	SS			Fill: Sandy silt-sized ash, trace clay and fine gravel - gray - loose - moist (ML) (FA) Unfailed	
5.0	4.0	3	SS			Fill: Silty fine to coarse sand-sized ash, trace fine gravel - gray - loose to very loose - moist (SM) (FA & BA) Unfailed	
		4	SS				
	8.0	5	SS			Fill: Silty fine to coarse sand-sized ash, trace fine to coarse gravel - gray - loose - saturated (SM) (FA & BA) Unfailed	
10.0	10.0	6	SS			Fill: Sandy silt-sized ash, trace clay and fine to coarse gravel - gray - very loose - moist (ML) (FA & BA) Unfailed	
	12.0	7	SS			Fill: Fine to coarse sand-sized ash, little silt, trace clay and fine to coarse gravel - gray - loose to very loose - moist (SP-SM) (BA) Unfailed	
15.0		8	SS			Note: 100% drilling fluid loss while drilling to 14.0 ft. Extended casing to 14.0 ft.	
	16.0	9	SS			Fill: Silty fine to coarse sand-sized ash, little to trace clay, trace fine gravel - gray - very loose to loose - saturated (SP-SM) (BA) Unfailed	
20.0		10	SS				
		11	SS			Sample 9, 11, 12: Silt-sized ash (FA) seams noted. 100% drilling fluid loss while drilling to 16.0 ft. and 18.0 ft. Extended casing to 18.0 ft.	
		12	SS				
25.0		13	SS				
		14	SS				
	28.0	15	SS			Fill: Sandy silt-sized ash, little to trace clay - gray - very loose to loose - saturated (ML) (FA) Unfailed	
30.0		16	SS				
		17	SS				
35.0		18	SS				
		19	SS				
	38.0	20	SS			Silty clay, trace fine to medium sand - brown - soft (CL)	
40.0	40.0						



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

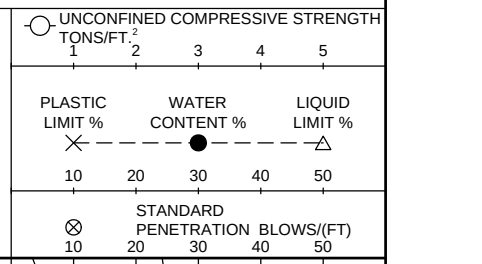
AECOM JOB NO. **60095742** SHEET NO. **1** OF **3**

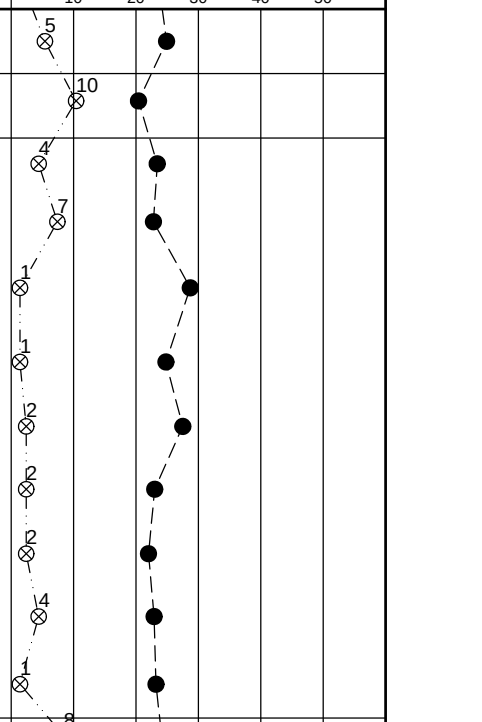
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-110
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +774.57 (Continued)	
		21	SS			Silty fine to medium sand, some clay - brown - loose - moist (SM)	
	42.0						
		22	SS			Sandy silt, little clay - brown and gray - medium dense - moist to wet (ML)	
	44.0						
45.0		23	SS			Silty fine to medium sand, little to trace clay - brown - loose to very loose - saturated (SM)	
		24	SS				
		25	SS				
50.0		26	SS				
		27	SS				
55.0		28	SS				
		29	SS				
		30	SS				
60.0		31	SS				
	62.0						
		32	SS			Fine to medium sand, little silt and clay - brown - loose - moist to wet (SP-SM)	
65.0		33	SS				
	66.0						
		34	SS			Silty fine to medium sand, little clay - brownish gray - very loose - saturated (SM)	
	68.0						
		35	SS			Silty fine to medium sand, little gravel - gray - medium dense - saturated (SM)	
70.0		36	SS				
	72.0						
		37	SS			Silty fine to coarse sand, little clay - reddish brown - loose - wet (SM)	
	73.5						
	74.0	37A	SS			Weathered shale - brown	
75.0		38	SS			Weathered shale - gray	
			RB			100% drilling fluid loss while drilling from 75.5 to 76.0 ft. Driller's Note: Difficulty encountered getting inclinometer casing between 66 and 74 ft. Possible cave-in of cobble.	
78.0	78.0						
						End of Boring Borehole advanced to 6.0 ft. with power auger.	* Calibrated Penetrometer
						. . . continued	* Calibrated Penetrometer





The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 2 OF 3

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-110**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)	PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % (10 20 30 40 50)	STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)
						SURFACE ELEVATION +774.57 (Continued)				
						Borehole advanced from 6.0 to 78.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion and inclinometer casing installed to 77.5 ft. Casing used: 23 ft. of 4 in. Automatic-Mobile Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. WOH = Weight of Hammer (FA) = Fly Ash (BA) = Bottom Ash					

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **8.0 ft. WS**	BORING STARTED **2/23/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **556899.87**	BORING COMPLETED **2/24/09**	ENTERED BY **KKB**	SHEET NO. **3** OF **3**
EASTING **2441755.38**	RIG/FOREMAN **Mobile B-57 (G.B.)/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

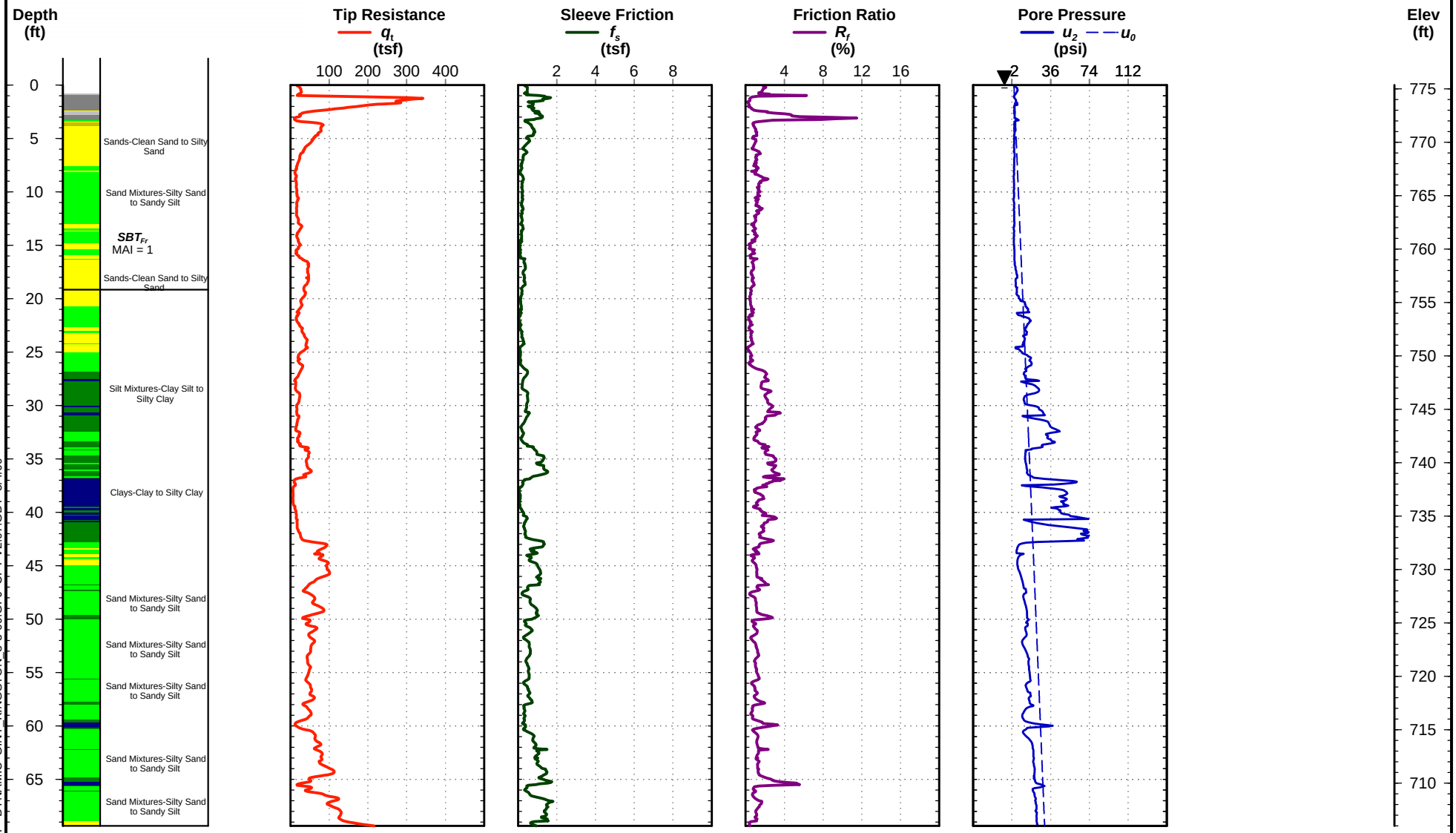
TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) *Cone Penetration Test* **09-110-C1**

Project No: 60095742

Date: Feb. 19, 2009
Estimated Water Depth: 0 ft
Rig/Operator: Mobile 57/CAP

Northing: 556902.07
Easting: 2441751.16
Elevation: 775.35 NGVD

Total Depth: 69.4 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



09-110-C1

Electronic Filename: 09-110-C1.cpt

CPT REPORT - DYNAMIC GINT_KINGSTON_3-3-09.GPJ CPT V2.07.GDT 3/4/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-110A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +774.77	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0							
15.0							
20.0							
			RB				
25.0							
30.0						Disturbed samples retrieved following completion of vane shear testing.	
35.0							
						Sample 1: No sample recovered with Shelby tube. Obtained sample with 3-in. split-spoon.	
	38.0						
40.0		1	SS3			Silty clay, some fine sand - brown - stiff (CL) Vane Shear Test #1 at 39.0 ft.	
	40.0						
						. . . continued	* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-110A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +774.77 (Continued)	
						Peak Su = 1075 psf, Remolded Su = 125 psf	
42.0		2	ST			Silty clay, little fine sand - reddish brown (CL) Vane Shear Test #2 at 40.5 ft. Peak Su >1950 psf Vane Shear Test #3 at 42.0 ft. Peak Su >1925 psf	
						End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 ft. to 40.0 ft. with rock bit and drilling fluid. Casing used: 33 ft. of 4 in. Borehole backfilled upon completion. SS3 = 3 in. Split spoon	

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **2/25/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **556908.16**	BORING COMPLETED **2/25/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441758.14**	RIG/FOREMAN **Mobile B-57 (G.B.)/RT**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

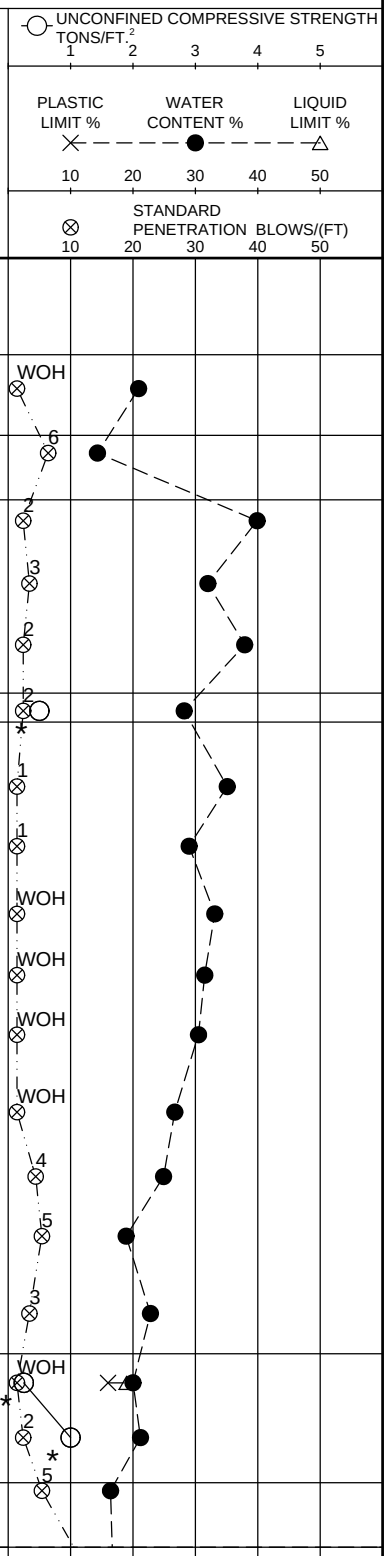
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-200**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +764.91

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
			PA			Driller's note: Crushed limestone gravel (GP)	
						3.0	
5.0		1	SS			Fill: Silty clay and silt-sized ash, trace fine sand and organics - brown and gray - very loose (CL) & (FA) Failed	
						5.5	
		2	SS			Fill: Sandy silt-sized ash, little clay - gray - loose - moist (ML) (FA) Failed	
						7.5	
		3	SS			Fill: Silt-sized ash, trace clay and fine sand - gray - very loose - saturated (ML) (FA) Failed	
10.0		4	SS				
		5	SS				
						13.5	
						14.4	
15.0		6	SS			Fill: Silty clay, trace fine to coarse sand - reddish brown -medium (CL) Failed Sample 6: 1 in. fly ash noted in lower tip.	
		7	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose to loose - saturated (ML) (FA) Failed	
		8	SS				
20.0		9	SS				
		10	SS				
		11	SS				
25.0							
		12	SS				
		13	SS				
30.0		14	SS				
		15	SS				
						34.0	
35.0		16	SS			Silt, some fine to coarse sand, little clay, trace fine gravel - gray - moist - very loose (ML)	
		17	SS				
						38.0	
		18	SS			Silty fine to coarse sand, little fine gravel and clay - brown and gray - loose - wet (SM)	
40.0						40.0	



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-200**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

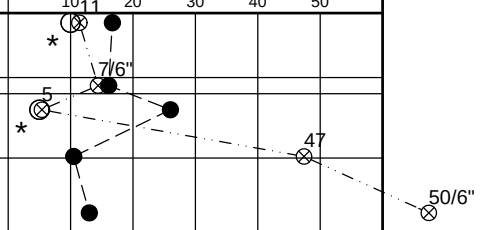
SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +764.91 (Continued)	
		19	SS			Silty clay, some fine to coarse sand, trace fine gravel - gray with brown - stiff (CL)	
	42.0						
		20	SS*			Silty gravelly fine to coarse sand, little clay - gray - medium dense - wet (SM)	
	42.5	20A	SS				
	44.5					Silty clay, little fine to medium sand, trace fine gravel - gray - medium (CL)	
45.0		21	SS				
						Silty fine to coarse gravel, little fine to coarse sand - gray - dense to extremely dense - saturated (GM)	
47.0	46.8	22	SS			Note: Weathered shale	
	47.0	22A	SS			Shale - gray	



*Calibrated Penetrometer

End of Boring
Borehole advanced to 7.5 ft. with power auger.
Borehole advanced from 7.5 to 46.0 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 8.5 ft. of 4 in.
Automatic-Mobile Hammer used for Standard Penetration Tests.
SS* = SPT value based on first 6 in.
WOH = Weight of Hammer
(FA) = Fly Ash

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **7.5 ft. WS; 18.0 ft. BCR; 15.0 ft. ACR**	BORING STARTED **1/31/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557894.56**	BORING COMPLETED **1/31/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440072.01**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

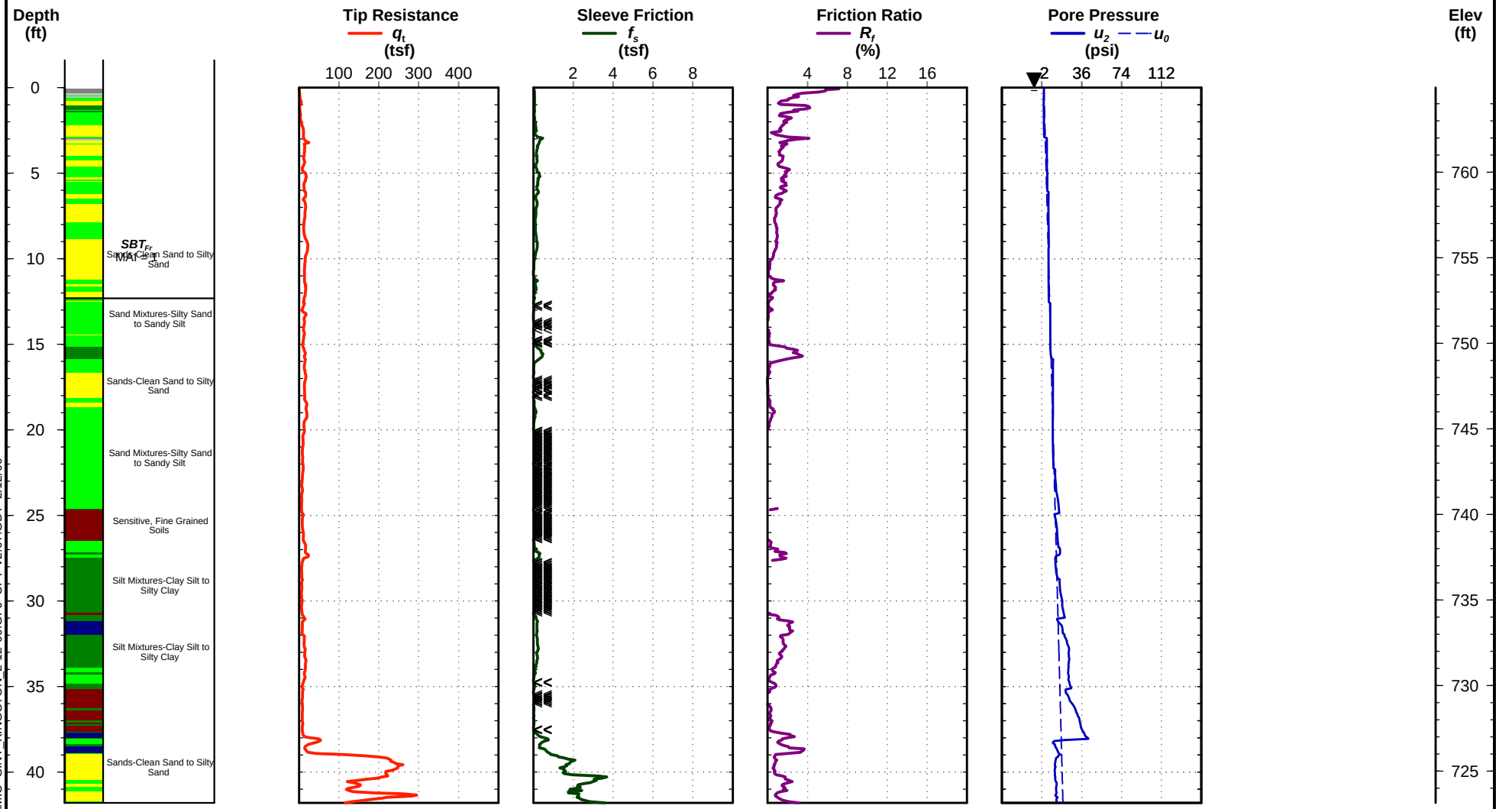
09-200-C1

Project No: 60095742

Date: Jan. 29, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557901.73
Easting: 2440085.91
Elevation: 764.94 NGVD

Total Depth: 41.8 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-200-C1

Electronic Filename: 09-200-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-200A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

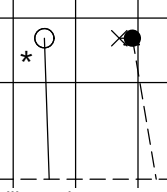
SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +765.15	
						Blank drill to 35.0 ft.	
5.0							
10.0							
15.0			RB				
20.0							
25.0							
30.0						Disturbed samples retrieved following completion of vane shear testing.	
35.0						35.0	
		1	ST			Silt, some fine to coarse sand, little clay, trace fine gravel - gray - moist (ML)	
						37.0 Vane Shear Test #1 at 36.0 ft.	
						Peak Su = 850 psf, Remolded Su = 225 psf	
			RB				
40.0							
						. . . continued	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-200A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +765.15 (Continued)	
			RB			42.0	
44.0		2	ST			44.0 Silty clay, some fine to coarse sand, trace fine gravel - brown - very stiff (CL) Sample 2: Coarse gravel noted in lower tip of Shelby tube. Vane Shear Test #2 at 43.5 ft. Peak Su = >2175 psf	

* Calibrated Penetrometer

End of Boring
Borehole advanced to 10.0 ft. with power auger.
Borehole advanced from 10.0 to 42.0 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used : 10 ft. of 4 in.

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **1/31/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **577891.88**	BORING COMPLETED **1/31/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440066.72**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

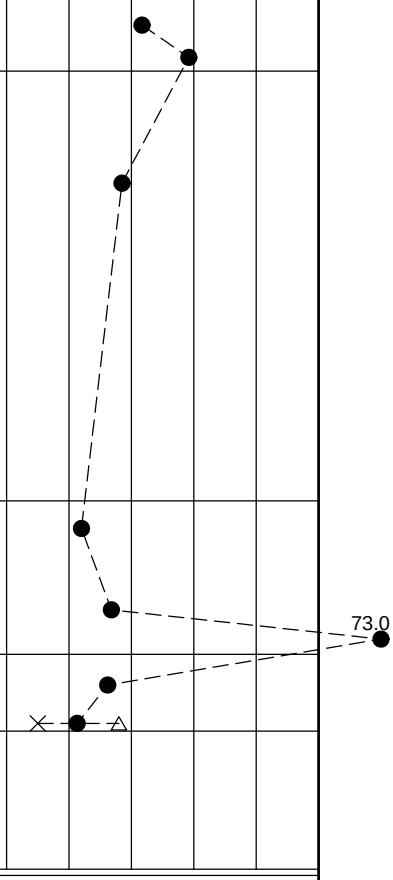
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-200B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +764.41	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0			RB			Following retrieval of 3 in. tube sample, cuttings were taken from top and bottom for water content testing. Samples designated with an "A" were taken from bottom of sample; the others were taken from top.	
	13.5						
15.0		1	OST			Fill: Silt-sized ash, trace clay and fine sand - gray - saturated (ML) (FA) Failed	
	16.0	1A	OST				
			RB				
20.0		2	OST			Sample 2: Osterberg piston sampler did not fully extend due to possible gravel.	
25.0			RB				
30.0	30.0						
		3	OST			Fill: Silt-sized ash, trace clay and fine sand - gray- very loose to loose - gray - saturated (ML) (FA) Failed	
		4	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 4 description.	
35.0	35.0	4A	OST			Sample 4: Wood fragments noted at lower tip of sample.	
		5	OST			Silty clay, little fine sand - brownish gray (CL)	
37.5	37.5	5A	OST				
						End of Boring Borehole advanced to 10.0 ft. with power auger. Borehole advanced from 10.0 to 35.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 10.0 ft. of 4 in.	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **3/7/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557896.13**	BORING COMPLETED **3/7/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440104.39**	RIG/FOREMAN **D-25/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

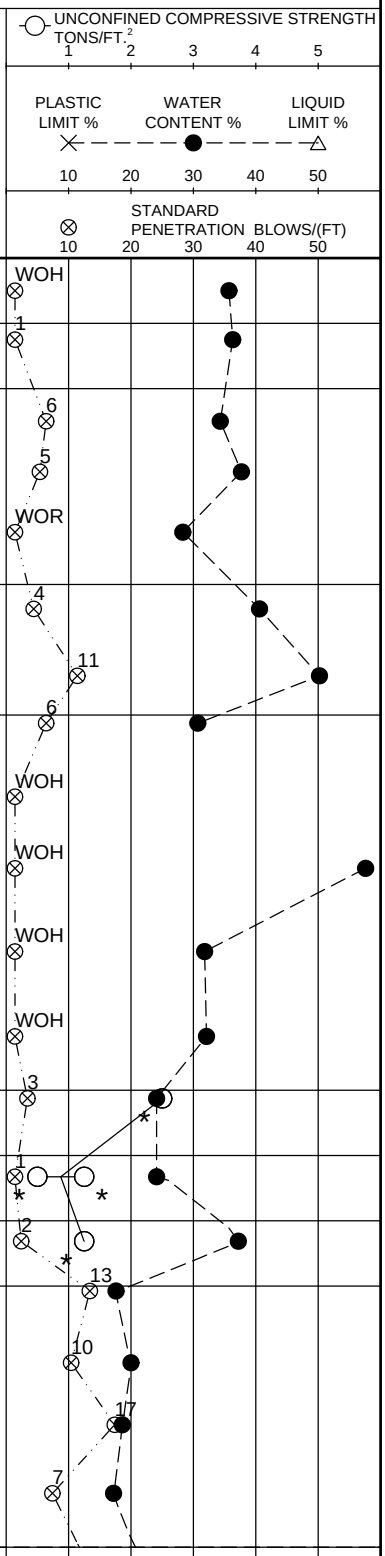
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-201**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +760.74

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Sandy silt-sized ash, trace clay - gray - very loose - saturated (ML) (FA) Failed	
	2.0	2	SS			Fill: Silty fine sand-sized ash, trace clay - gray - very loose - moist to wet (SM) (FA) Failed	
	4.0	3	SS			Fill: Silt-sized ash, trace to little fine sand and clay - gray - very loose to medium dense - saturated (ML) (FA) Failed	
5.0		4	SS			While drilling to 12.0 ft., casing sank from 7.5 to 9.5 ft.	
		5	SS				
10.0	10.0	6	SS			Fill: Silt-sized ash, little to some fine sand, trace to little clay - gray - loose to medium dense - saturated (ML) (FA) Failed	
		7	SS				
15.0	14.0	8	SS			Silt-sized ash, little clay, trace fine sand - gray - loose to very loose - saturated (ML) (FA) Failed	
		9	SS			While drilling to 14.0 ft., casing sank from 9.5 to 12.0 ft. and water lost around casing.	
20.0		10	SS			Casing removed, bentonite seal added and casing re-installed to 14.0 ft. Sample 9: No recovery	
		11	SS			After sampling to 18.5 ft., casing sank from 14.0 to 17.5 ft.	
25.0		12	SS			After sampling to 25.5 ft., casing sank from 17.5 to 22.5 ft.	
	25.5	13	SS			Clayey silt and fine sand - brown and gray - very loose - wet (CL-ML) After sampling to 27.5 ft. casing extended to 27.5 ft.	
	27.5	14	SS			Silty clay and fine to medium sand - grayish brown - medium to stiff (CL)	
30.0	29.5	15	SS			Silty clay, some fine to medium sand - grayish brown - stiff (CL)	
	31.5	16	SS			Silty fine to coarse sand, trace fine gravel, trace to little clay - brown - medium dense to loose - saturated (SM)	
35.0		17	SS			80% drilling fluid lost while drilling from 30 to 35 ft.	
		18	SS				
		19	SS				
	39.5						



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-201**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	STANDARD PENETRATION BLOWS/(FT)
						SURFACE ELEVATION +760.74 (Continued)		
		20	SS			Silty fine to medium sand, trace clay - gray - medium dense - wet (SM)		13
	41.5	21	SS			Clayey silt, little fine to medium sand and weathered shale - gray - medium dense - moist to wet (CL-ML)		26 *
45.0	43.5	22	SS			Silty fine to coarse sand, little clay, fine to coarse gravel (weathered shale) - brown and gray - dense to extremely dense - moist to wet (SM)		35
		23	SS					100
	48.2	24	SS					50/2"
50.0			RB			Drilled without sampling Driller's note: Hard drilling from 50.3 to 51.3 ft.		
51.3	51.3					Apparent shale bedrock		
						End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 51.3 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 27.5 ft. of 4 in. Automatic-CME Hammer used for Standard Penetration Tests. WOH = Weight of Hammer WOR = Weight of Rod (FA) = Fly Ash	* Calibrated Penetrometer	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
1.0 ft. WS	**2/7/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
558003.36	**2/8/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440259.58	**CME-850/JC**	**RCR**	**60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

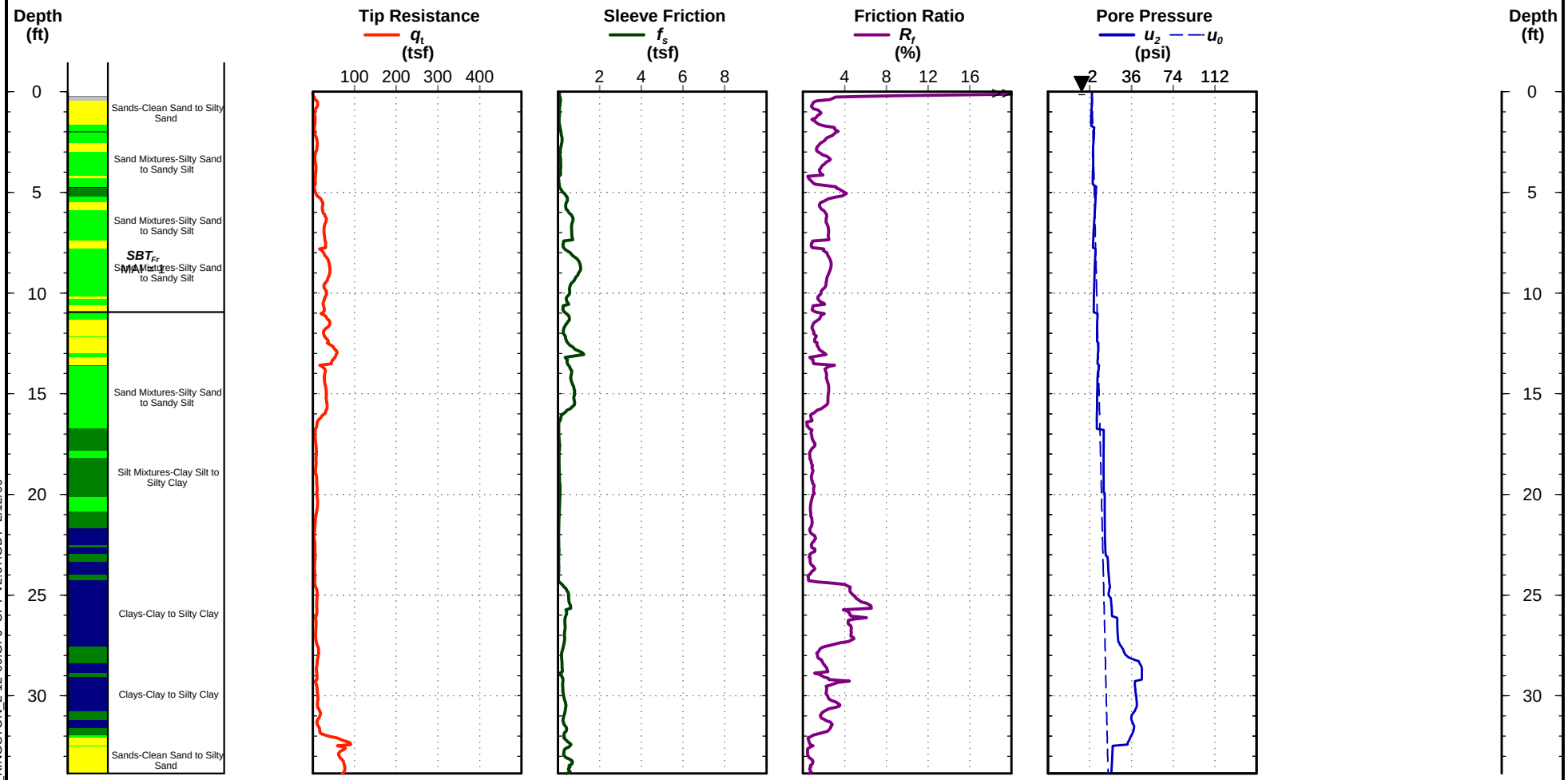
09-201-C2

Project No: 60095742

Date: Feb. 6, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing:
Easting:
Elevation:

Total Depth: 33.9 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



09-201-C2

Electronic Filename: 09-201-C2.cpt

CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

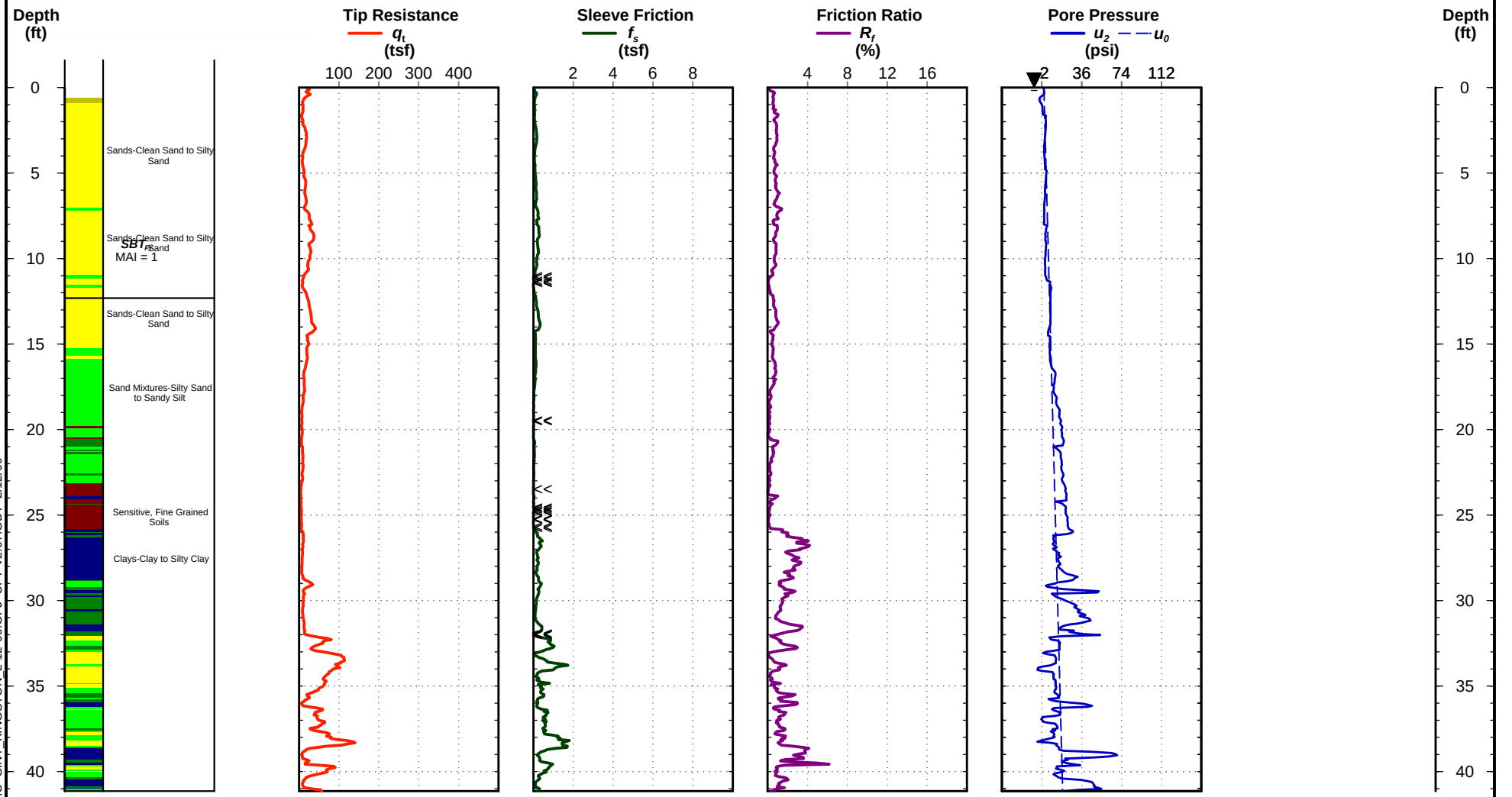
09-201-C1

Project No: 60095742

Date: Feb. 6, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing:
Easting:
Elevation:

Total Depth: 41.1 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-201-C1

Electronic Filename: 09-201-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-201A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +760.51	UNIT DRY WT. LBS./FT.^{3}
			PA				
5.0							
10.0			RB				
15.0							
20.0							
						Disturbed samples retrieved following completion of vane shear testing.	
25.0							
	26.0	1	ST			Clayey silt and fine sand - brown and gray - moist (CL-ML) Vane Shear Test #1 at 27.5 ft. Peak Su = 875 psf, Remolded Su = 875 psf	
	28.0	2	ST			Silty clay and fine to coarse sand, trace fine gravel - brown (CL) Vane Shear Test #2 at 29.0 ft. Peak Su = 1250 psf, Remolded Su = 525 psf	
30.0	29.5	3	ST			Silty clay, some fine to medium sand - gray (CL) Vane Shear Test #3 at 30.5 ft. Peak Su = 1275 psf, Remolded Su = 275 psf	
31.5	31.5					End of Boring Borehole advanced to 5.0 ft. with power auger. Borehole advanced from 5.0 to 29.5 ft. with rock bit and drilling fluid. Casing used: 14 ft. of 4 in. Borehole grouted upon completion.	

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **2.6 ft. BCR; 2.7 ft. ACR**	BORING STARTED **2/8/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **558003.67**	BORING COMPLETED **2/9/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440255.39**	RIG/FOREMAN **CME-850/JC**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-201B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

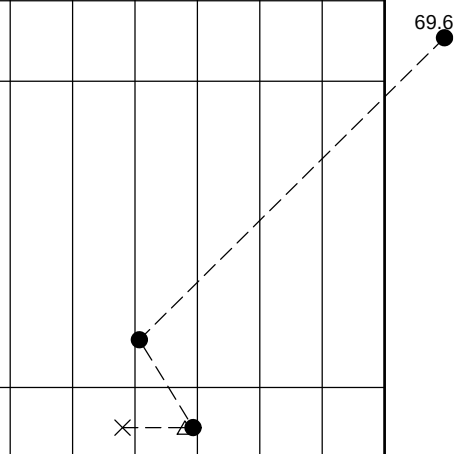
SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +760.65	UNIT DRY WT. LBS./FT.^{3}
5.0		PA				
10.0		RB				
15.0					16.0	
	1	OST			Fill: Silt-sized ash, little fine sand, trace clay - gray - saturated (ML) (FA) Failed 18.5	
20.0		RB				
25.0						
	2	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 2 description. 28.0	
30.0	3	OST			Silty clay, trace fine to medium sand - gray (CL) 30.5	
30.5					End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 30.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in. OST = Osterberg sampler	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **2/9/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **558004.18**	BORING COMPLETED **2/9/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440253.76**	RIG/FOREMAN **CME-850/(JHC/JD)**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

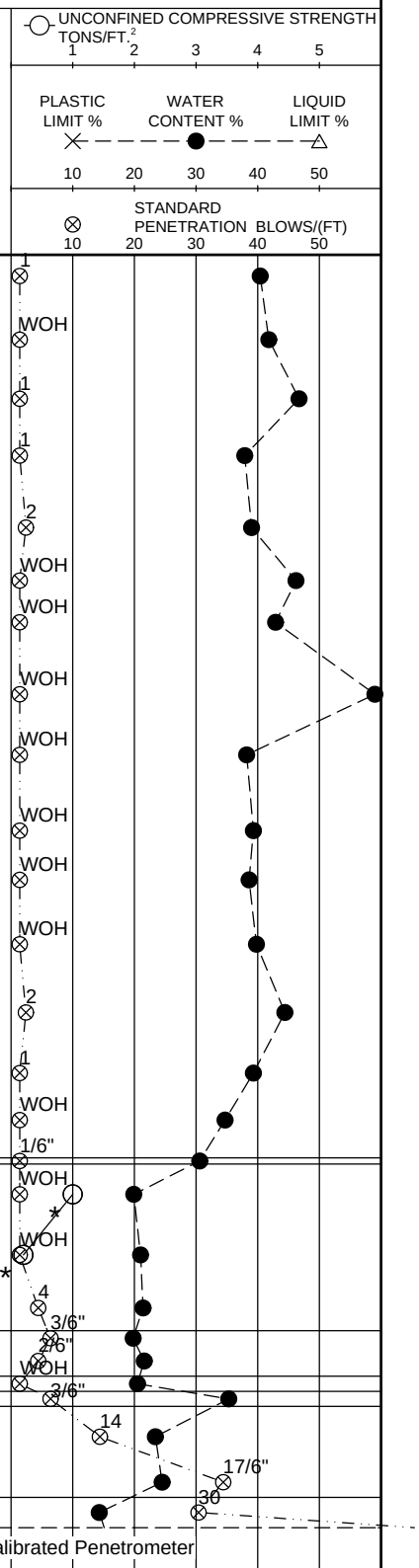
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-202**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +761.47

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silt-sized ash, trace clay and fine sand - gray - very loose - wet to saturated (ML) (FA) Failed	
		2	SS				
5.0		3	SS				
		4	SS				
		5	SS				
10.0		6	SS			Driller's Note: 10% drilling fluid loss from 10.0 to 47.5 ft.	
		7	SS				
15.0		8	SS				
		9	SS				
		10	SS				
20.0		11	SS				
		12	SS				
25.0		13	SS				
		14	SS				
		15	SS				
30.0		15A	SS			29.8	
		16	SS			30.0 Silt, little clay and fine sand - brown, gray and black - very loose (CL)	
		17	SS			Clayey silt, little fine to medium sand - brown and gray - very loose to loose - moist (CL-ML)	
35.0		18	SS			35.5	
		18A	SS			Clayey silt, some fine to medium sand - gray and brown - loose to very loose - moist (CL-ML)	
		19	SS			37.0	
		19A	SS			37.5 Silty fine to medium sand, trace clay - gray - very loose - saturated (SM)	
		19B	SS			38.0	
40.0		20	SS			Clayey silt, some fine to medium sand - gray - loose - saturated (CL-ML)	
		21	SS			41.0 Silty fine to medium sand, trace clay - gray and brown - medium dense to dense - saturated (SM)	
		21A	SS				



. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-202**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	
						SURFACE ELEVATION +761.47 (Continued)		
		22	SS			Silty fine to coarse sand, little clay, trace fine gravel (weathered shale) - reddish brown - dense to extremely dense - moist to wet (ML)		70/6"
		23	SS					100/5"
	44.0	24	SS			Silty gravel, some fine to medium sand, trace clay - brown and gray - extremely dense (GM) Weathered shale and limestone noted.		85/6"
45.0			RB					
		25	SS					157
47.5	47.5					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 46.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in. Automatic-CME Hammer used for Standard Penetration Tests. WOH = Weight of Hammer (FA) = Fly Ash	* Calibrated Penetrometer	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **2.0 ft. WD**	BORING STARTED **2/10/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **558101.06**	BORING COMPLETED **2/10/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440411.12**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

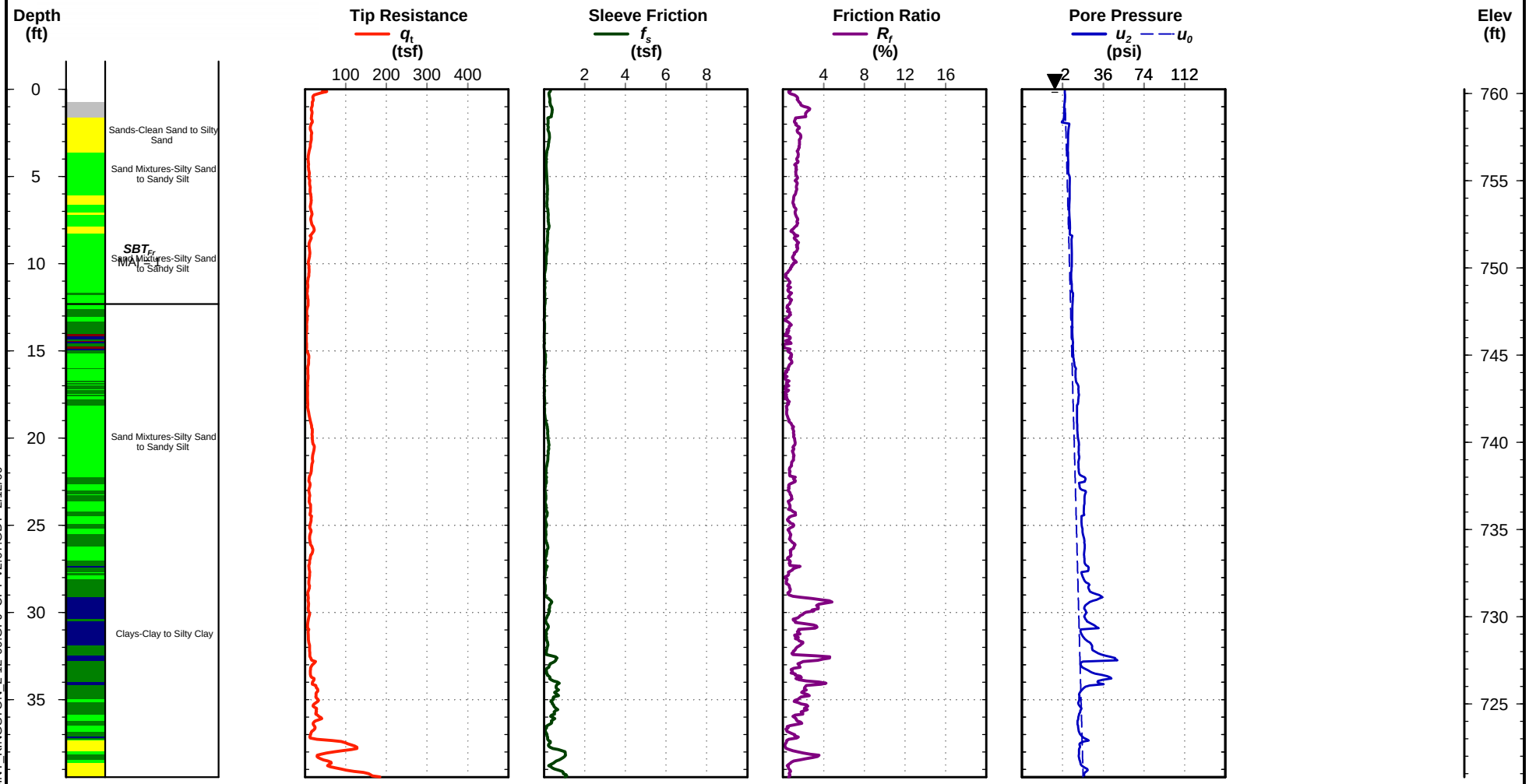
09-202-C1

Project No: 60095742

Date: Feb. 5, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing: 558100.37
Easting: 2440412.17
Elevation: 760.24 NGVD

Total Depth: 39.4 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-202-C1

Electronic Filename: 09-202-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-202A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +761.31	
						Drilled without sampling.	
5.0			PA				
10.0							
15.0							
20.0			RB				
25.0						Disturbed samples retrieved from vane shear depths following completion of vane shear testing. Moisture contents not available for disturbed samples obtained with split spoon. Sample 1: No recovery with Shelby tube. Obtained sample with split spoon.	
30.0						30.0	
		1	SS			Clayey silt, some fine to coarse sand - brown - stiff - moist to wet (CL-ML) Vane Shear Test #1 at 30.5 ft. Peak Su = 1375 psf, Remolded Su = 400 psf	
						32.0	
		2	ST			Sample 2: No recovery Vane Shear Test #2 at 32.5 ft. Peak Su = 1750 psf, Remolded Su =375 psf	
						33.5	
35.0		3	SS				
		3A	SS				
						35.5	
35.5						Clayey silt, some fine to coarse sand - brown - stiff - moist to wet (CL-ML) End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 33.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in. Automatic-CME hammer used for Standard Penetration Tests.	

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **2.0 ft. WD**	BORING STARTED **2/11/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **558102.45**	BORING COMPLETED **2/12/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440416.3**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-202B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +761.26	
5.0			PA			.	
10.0			RB			Following retrieval of 3 in. tube sample, cuttings were taken from top and bottom for water content testing. Samples designated with an "A" were taken from bottom of sample; the others were taken from top.	
15.0							
20.0							
25.0							
	26.0	1	OST			Clayey silt-sized ash, trace fine sand - gray - saturated (ML) (FA) Failed	
	28.5	1A	OST				
30.0		2	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 2 description.	
	31.0	2A	OST				
	33.5	3	OST			Clayey silt, some fine to medium sand - brownish gray - saturated (CL-ML)	

End of Boring
Boring advanced to 8.0 ft. with power auger.
Boring advanced from 8.0 to 31.0 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 8 ft. of 4 in.
OST = Osterberg sampler
(FA) = Fly Ash

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **2/11/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **558102.08**	BORING COMPLETED **2/11/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2004414.58**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

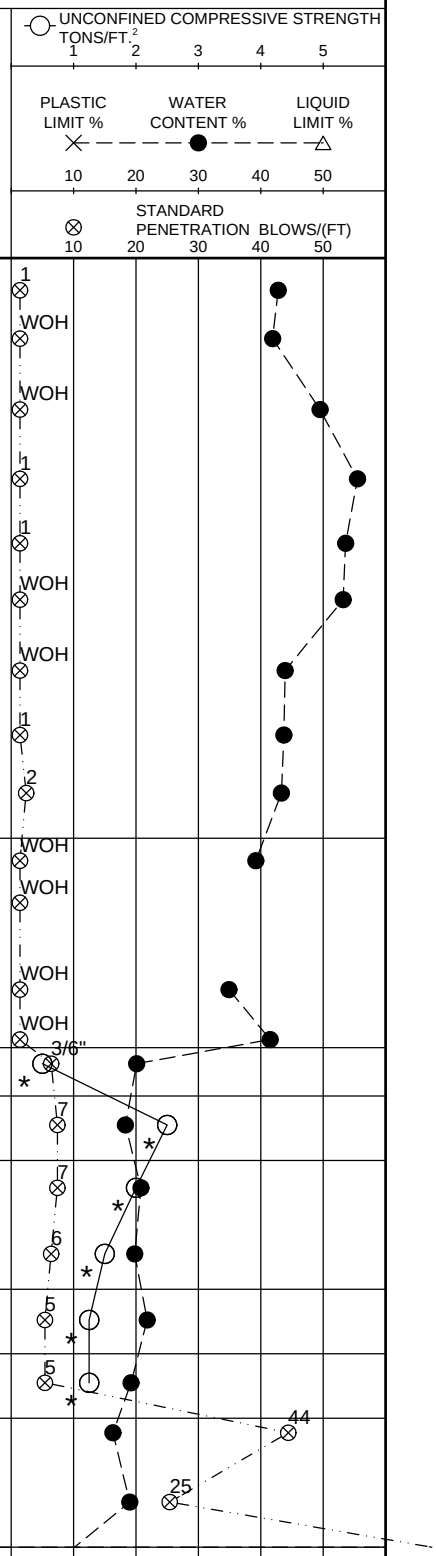
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-203**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +759.59

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silt-sized ash, trace to little clay, trace fine sand - gray - very loose - saturated (ML) (FA) Failed	
		2	SS				
5.0		3	SS				
		4	SS				
		5	SS				
10.0		6	SS				
		7	SS				
15.0		8	SS				
		9	SS			18.0	
		10	SS			Silt-sized ash, little to some fine sand, trace to little clay - gray - very loose - saturated (ML) (FA) Failed	
20.0		.	SS			No recovery from 20 to 22 ft.	
		11	SS				
		12	SS*			24.5	
25.0		12A	SS			Clayey silt, little fine to medium sand - brown and gray - medium (CL-ML) 26.0	
		13	SS			Sandy silt, little to some clay - brown and gray - loose - moist (ML) 28.0	
		14	SS			Clayey silt, little to some sand - brown and gray - very stiff to stiff (CL-ML)	
30.0		15	SS			32.0	
		16	SS			Silty clay, little fine to medium sand - brown and gray - stiff (CL) 34.0	
35.0		17	SS			Sandy silt, little clay - brown and gray - loose - wet (ML) 36.0	
		18	SS			Silty fine to medium sand, little to trace clay, trace fine gravel - brown and gray - dense to medium dense - wet (SM)	
		19	SS			40.0	



. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-203**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +759.59 (Continued)	
		20	SS*	1	1	100/5"	
40.4						40.4 Weathered shale - gray End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 40.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in. Automatic-CME Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. or less. WOH = Weight of Hammer (FA) = Fly Ash	

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **2.0 ft. WS**	BORING STARTED **2/12/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **558105.48**	BORING COMPLETED **2/12/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440604.25**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

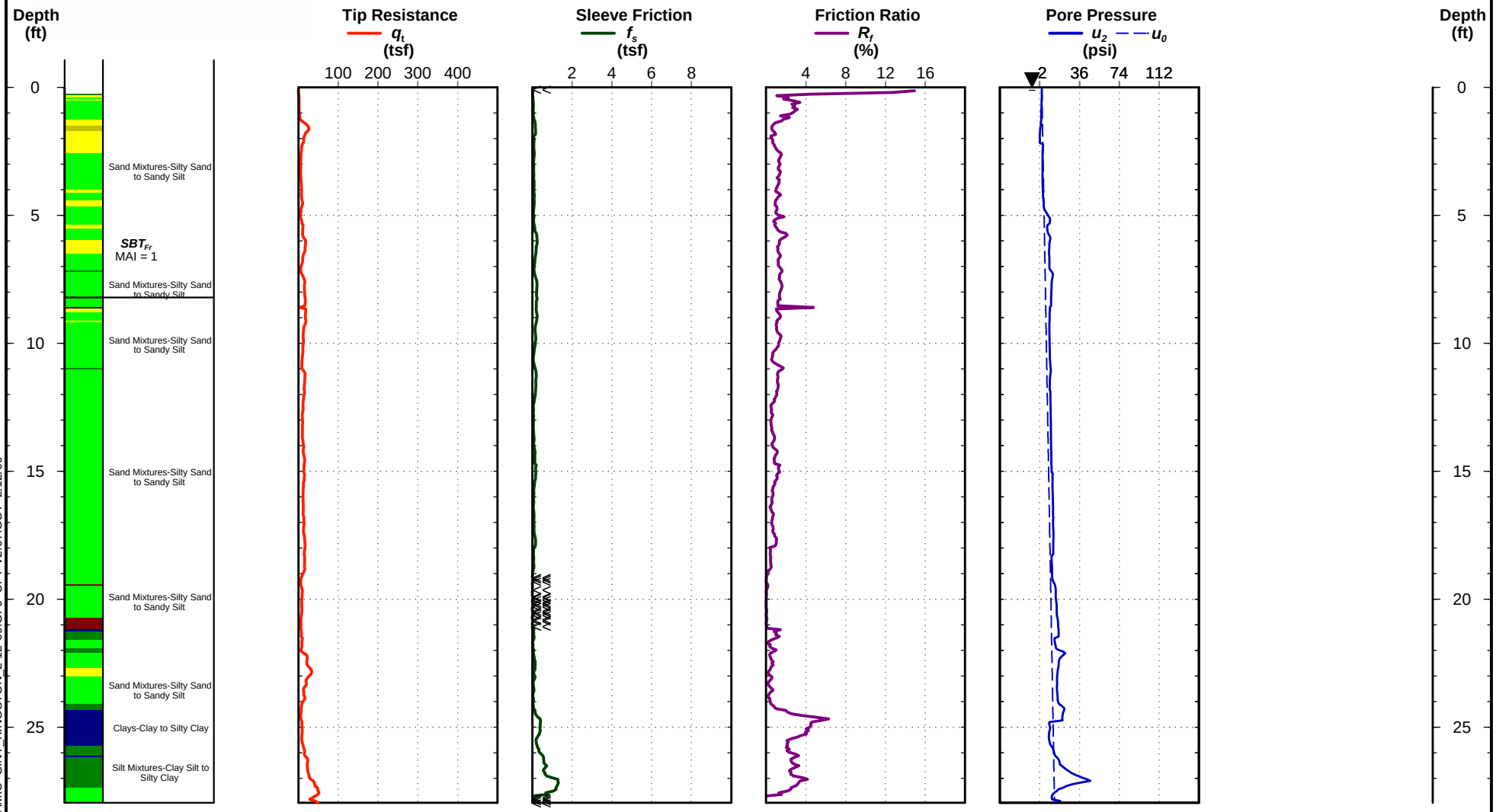
09-203-C1

Project No: 60095742

Date: Feb. 3, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing:
Easting:
Elevation:

Total Depth: 28.0 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-203A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +759.36	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0							
15.0			RB			Moisture contents not available for disturbed samples obtained with split spoon. Disturbed samples retrieved following completion of vane shear testing.	
20.0							
						Sample 1: No recovery with 2-in. split spoon. Pushed 2.5-in. split spoon for sample recovery.	
	23.5	1	SS			Silt-sized ash, little fine sand, trace clay - gray - very loose - saturated (ML) (FA) Failed	
	24.5	1A	SS				
25.0	25.0		RB			Sandy silt, little clay - brown and gray - moist (ML)	
	26.5	2	SS			Silty clay, some fine to medium sand - brown - very stiff (CL) Samples 2 and 3: No recovery with Shelby tube. Pushed split-spoon for sample recovery.	
30.0		3	SS			Vane Shear Test #1 at 27.5 ft. Peak Su = 3700 psf, Remolded Su = 925 psf	
30.5	30.5					Vane Shear Test #2 at 29.5 ft. Peak Su >3300 psf End of Boring Borehole advanced to 8.0 feet with power auger. Borehole advanced from 8.0 to 28.5 ft. with rock bit. Borehole grouted upon completion. Casing used: 8 ft. of 4 in. Automatic-CME hammer used for Standard Penetration Tests.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **2/14/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **558099.41**	BORING COMPLETED **2/14/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440605.72**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-203B
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

SURFACE ELEVATION +759.13

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0			RB				
15.0							
	18.5						
20.0		1	OST			Fill: Silt-sized and fine to medium sand-sized ash, trace clay - gray - saturated (ML) (FA) Failed	
	21.0						
		2	OST			Sample 2: No sample recovery	
	23.5						
25.0		3	OST			Silt, little fine to medium sand, little clay - brown and gray - wet (ML)	
	26.0						
		4	OST			Sample 4 was not opened.	
	28.5						
30.0		5	OST			Clayey silt, little fine to medium sand - reddish brown - wet (CL-ML)	
	31.0						
		6	OST			Silty clay, little fine to medium sand - brown (CL)	
33.5	33.5						

End of Boring
Borehole advanced to 8.0 ft. with power auger.
Borehole advanced from 8.0 to 31.0 feet with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 8 ft. of of 4 in.
OST = Osterberg sampler
(FA) = Fly Ash

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
2.0 ft. WD	2/13/09	Chicago Area - 01	
NORTHING 558102.79	BORING COMPLETED 2/13/09	ENTERED BY KKB	SHEET NO. 1 OF 1
EASTING 2440604.73	RIG/FOREMAN CME-850/JD	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

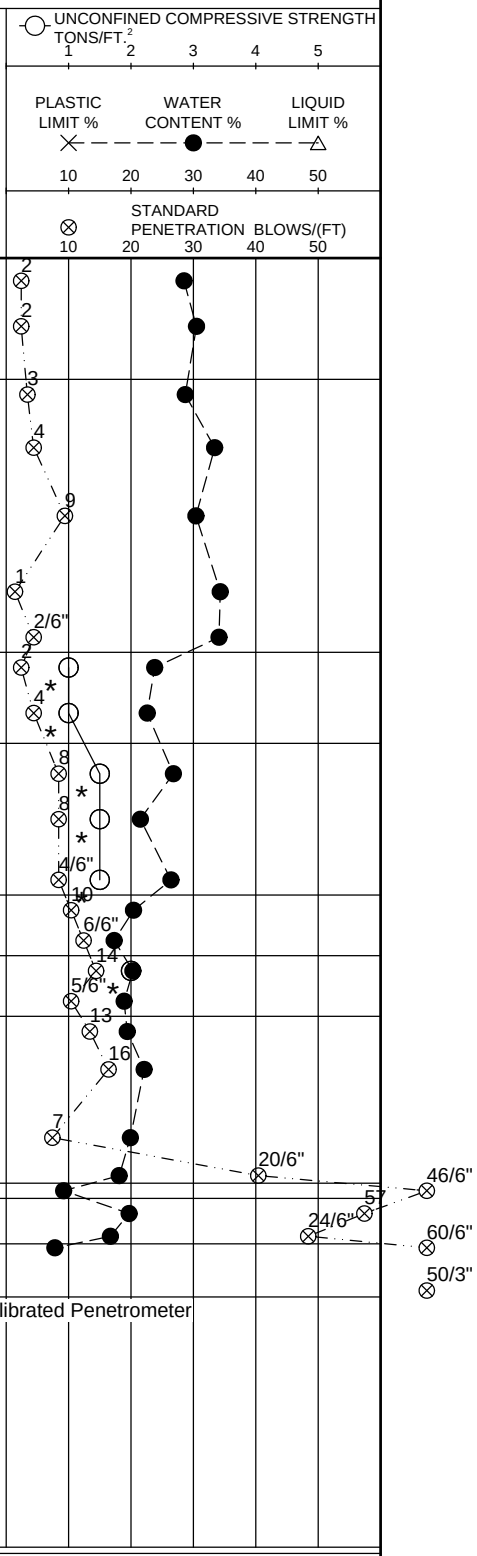
AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-204
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +750.14

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silt-sized ash, trace clay - gray - very loose - wet to saturated (ML) (FA) Failed	
		2	SS				
	4.0						
5.0		3	SS			Fill: Silt-sized ash, little to trace clay, trace fine sand - gray - very loose to loose - moist (ML) (FA) Failed	
		4	SS				
		5	SS				
10.0		6	SS				
		7	SS				
	13.0						
		7A	SS			Silty clay and fine sand - brown - stiff (CL)	
15.0		8	SS				
	16.0						
		9	SS			Clayey silt and fine to medium sand - brown - stiff (CL-ML)	
		10	SS				
20.0		11	SS				
	21.0						
		11A	SS			Sandy silt, some clay - brown and gray - medium dense - moist (ML)	
		12	SS				
	23.0						
		12A	SS			Silty clay, trace fine to medium sand - brownish gray - very stiff (CL)	
25.0		13	SS				
	25.0						
		13A	SS			Silty fine to medium sand, little clay - brown - loose to very dense - moist to wet (SM)	
		14	SS				
		15	SS				
30.0		16	SS*				
	30.5						
		16A	SS			Silty gravel, some sand - brown - extremely dense - moist (GM)	
	31.0						
		16B	SS				
		17	SS*			Silty fine to medium sand - gray - very dense to dense - moist to wet (SM)	
	32.5						
		17A	SS				
			RB				
34.3		18	SS*			Weathered shale	
	34.3						

End of Boring
Borehole advanced to 6.0 ft. with power auger.
Borehole advanced from 6.0 to 34.0 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 8 ft. of 4 in.
Automatic-Diedrich hammer used for Standard Penetration Tests.
SS* = SPT value based on first 6 in. or less.
(FA) = Fly Ash



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
4.0 ft. WS	1/24/09	Chicago Area - 01	
NORTHING 557991.42	BORING COMPLETED 1/24/09	ENTERED BY KKB	SHEET NO. 1 OF 1
EASTING 2440842.52	RIG/FOREMAN D-50/BM	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)
Project No: 60095742

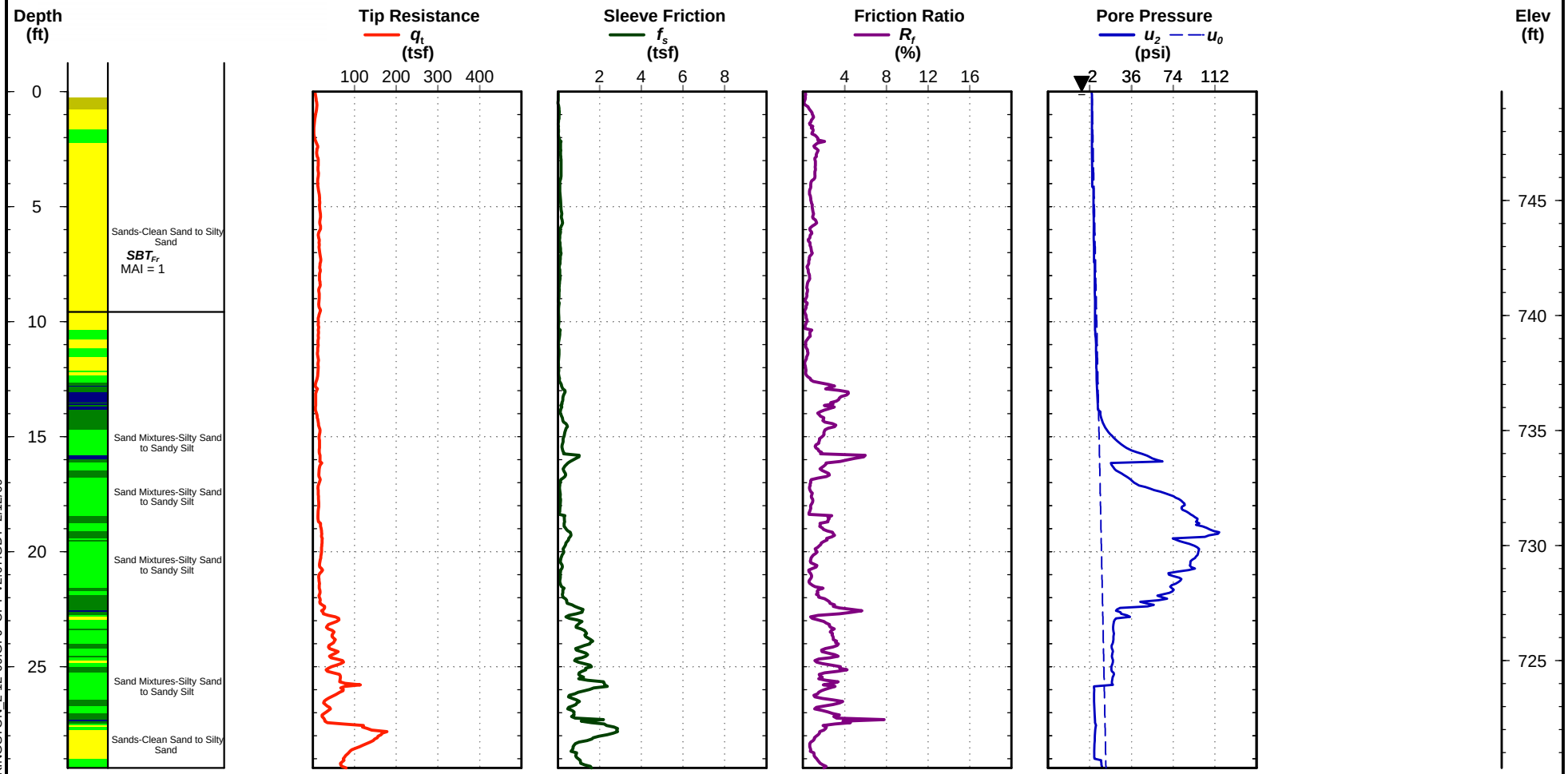
Cone Penetration Test

09-204-C1

Date: Jan. 24, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557992.83
Easting: 2440824.77
Elevation: 749.73 NGVD

Total Depth: 29.4 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



Electronic Filename: 09-204-C1.cpt

09-204-C1

CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-204A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +749.55	UNIT DRY WT. LBS./FT.^{3}
			PA				
5.0							
			RB				
10.0						Disturbed samples retrieved following completion of the vane shear testing. Vane Shear Test #1 at 14.0 ft. Peak Su = >2075 psf Vane Shear Test #2 at 15.5 ft. Peak Su = >2075 psf Vane Shear Test #3 at 17.0 ft. Peak Su = 2675 psf, Remolded Su = 475 psf	
			RB			14.0	
15.0		1	ST			Silty clay, some fine to medium sand - brown (CL)	
						15.5	
		2	ST			Clayey silt and fine to medium sand - brown - moist (CL-ML)	
						17.0	
		3	ST			Clayey silt, some fine to medium sand - light brown - moist (CL-ML)	
						18.5	
		4	ST			Vane Shear Test #4 at 18.5 ft. Peak Su = 2800 psf, Remolded Su = 850 psf	
20.0						20.0	
		5	ST			Clayey silt and fine to medium sand - brown - moist (CL-ML)	
						21.5	
		6	ST			Vane Shear Test #5 at 20.0 ft. Peak Su = 2500 psf, Remolded Su = 1025 psf	
						23.0	
		7	SS			Silty clay, trace fine gravel, some fine to coarse sand - light brown (CL)	
24.5						24.5	
						Clayey silt and fine to medium sand - brown - moist (CL-ML) Vane Shear Test #6 at 21.5 ft. Peak Su = 2475 psf, Remolded Su = 1025 psf	
						Silty fine to medium sand, trace clay - brown - wet (SM) Vane Shear Test #7 at 23.0 ft. Peak Su = 3200 psf, Remolded Su = 600 psf Sample 7: No recovery with Shelby tube. Pushed split-spoon to obtain sample. No recovery information available.	
						End of Boring Borehole advanced to 5.0 ft. with power auger. Borehole advanced from 5.0 to 23.0 ft. with rock bit and drilling fluid. Casing used: 17 ft. of 4 in. Borehole backfilled upon completion.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **4.0 ft. WD**	BORING STARTED **1/24/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557998.03**	BORING COMPLETED **1/25/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440841.98**	RIG/FOREMAN **D-50/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

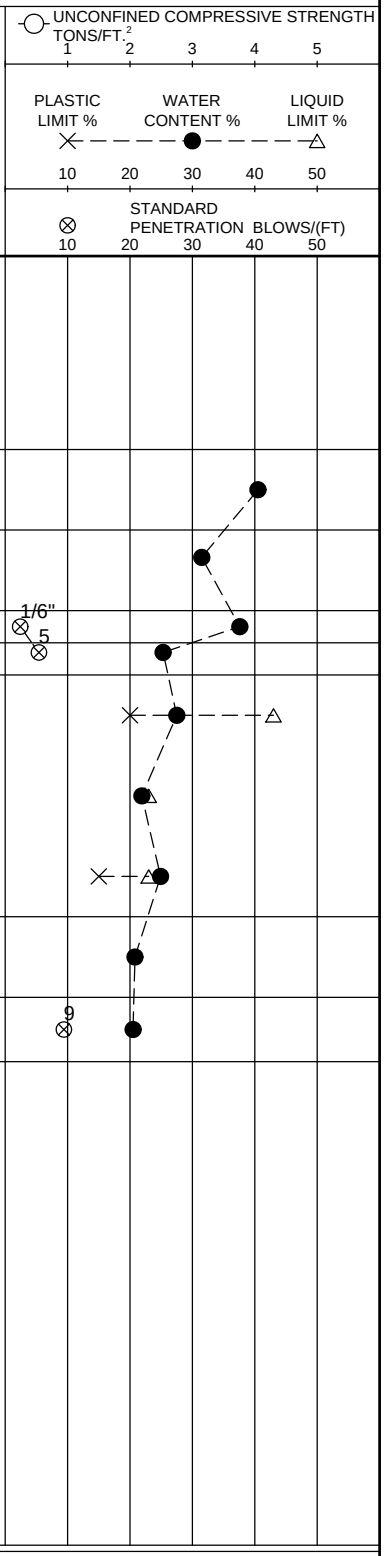
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-204B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +750.03	UNIT DRY WT. LBS./FT.^{3}
			PA			.	
5.0						6.0	
		1	OST			Fill: Silt-sized ash, trace fine sand, little clay - gray - saturated (ML) (FA) Failed 8.5	
10.0		2	OST			Sample 2 was not opened 11.0	
		3	SS			Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated - very loose (ML) (FA) Failed 12.0	
		3A	SS			13.0 Silty clay, little fine to medium sand - brown and gray (CL)	
15.0		4	OST			Silty clay, trace fine to coarse sand - reddish brown to light brown (CL)	
		5	OST				
20.0		6	OST			20.5	
		7	OST			Sample 7 was not opened 23.0	
25.0		8	SS			Silty fine sand, trace clay - brown - wet - loose (SM) 25.0	
						End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 23.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Automatic-Diedrich hammer used for Standard Penetration Tests. Casing used: 7 ft. of 4 in. OST = Osterberg sampler (FA) = Fly Ash	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **4.0 ft. WD**	BORING STARTED **1/25/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557984.69**	BORING COMPLETED **1/25/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440843.62**	RIG/FOREMAN **D-50/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

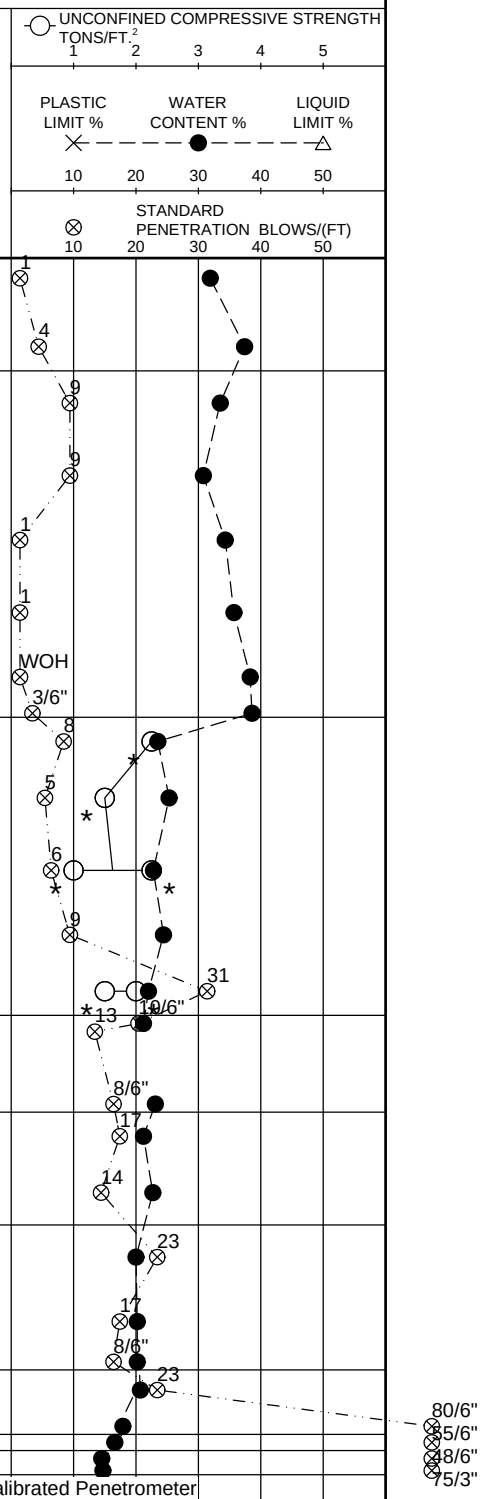
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-205
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +754.57

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Clayey silt-sized ash, trace fine sand - gray - very loose to loose - moist to wet (ML) (FA) Failed	
		2	SS				
	3.5					Fill: Silt-sized ash, little to some clay, trace fine sand - gray - loose to very loose - saturated (ML) (FA) Failed From 4.0 to 4.25 ft., sand-sized bottom ash seam noted.	
5.0		3	SS				
		4	SS				
		5	SS				
10.0		6	SS			3-in. sand-sized bottom ash seams noted at 11 and 13 ft.	
		7	SS				
		8	SS*				
	14.3					Silty clay, little to some fine to medium sand - brown - stiff to very stiff - moist (CL)	
15.0		8A	SS				
		9	SS				
		10	SS				
20.0		11	SS				
		12	SS				
	23.5					Clayey silt, some to little fine to medium sand, trace fine gravel - brown - medium dense - wet (CL-ML) Sample 13: No recovery	
		12A	SS				
25.0		13	SS				
		14	SS*				
	26.5					Sandy silt, little clay - reddish brown - medium dense - wet (ML)	
		14A	SS				
		15	SS				
30.0	30.0					Silty fine to medium sand, little clay - reddish brown - medium dense - wet (SM)	
		16	SS				
		17	SS				
		18	SS*				
	34.5					Silty fine to coarse sand, little gravel, trace clay - gray - medium dense to extremely dense (SM)	
35.0		18A	SS				
			RB				
		19	SS*				
	36.5					Silty sand, little gravel - brown - extremely dense - moist (SM)	
		20	SS*				
	37.0					Weathered shale noted.	
37.8		20A	SS				
		21	SS*				
	37.8					Weathered shale - gray - extremely dense	



*Calibrated Penetrometer

. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-205**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)	PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % (10 20 30 40 50)	STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)
						SURFACE ELEVATION +754.57 (Continued)				
						End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 37.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 10 ft. of 4 in. Automatic-Diedrich Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. or less. WOH = Weight of Hammer (FA) = Fly Ash					

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **3.5 ft. WS**	BORING STARTED **1/26/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557913.31**	BORING COMPLETED **1/26/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440978.41**	RIG/FOREMAN **D-50/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

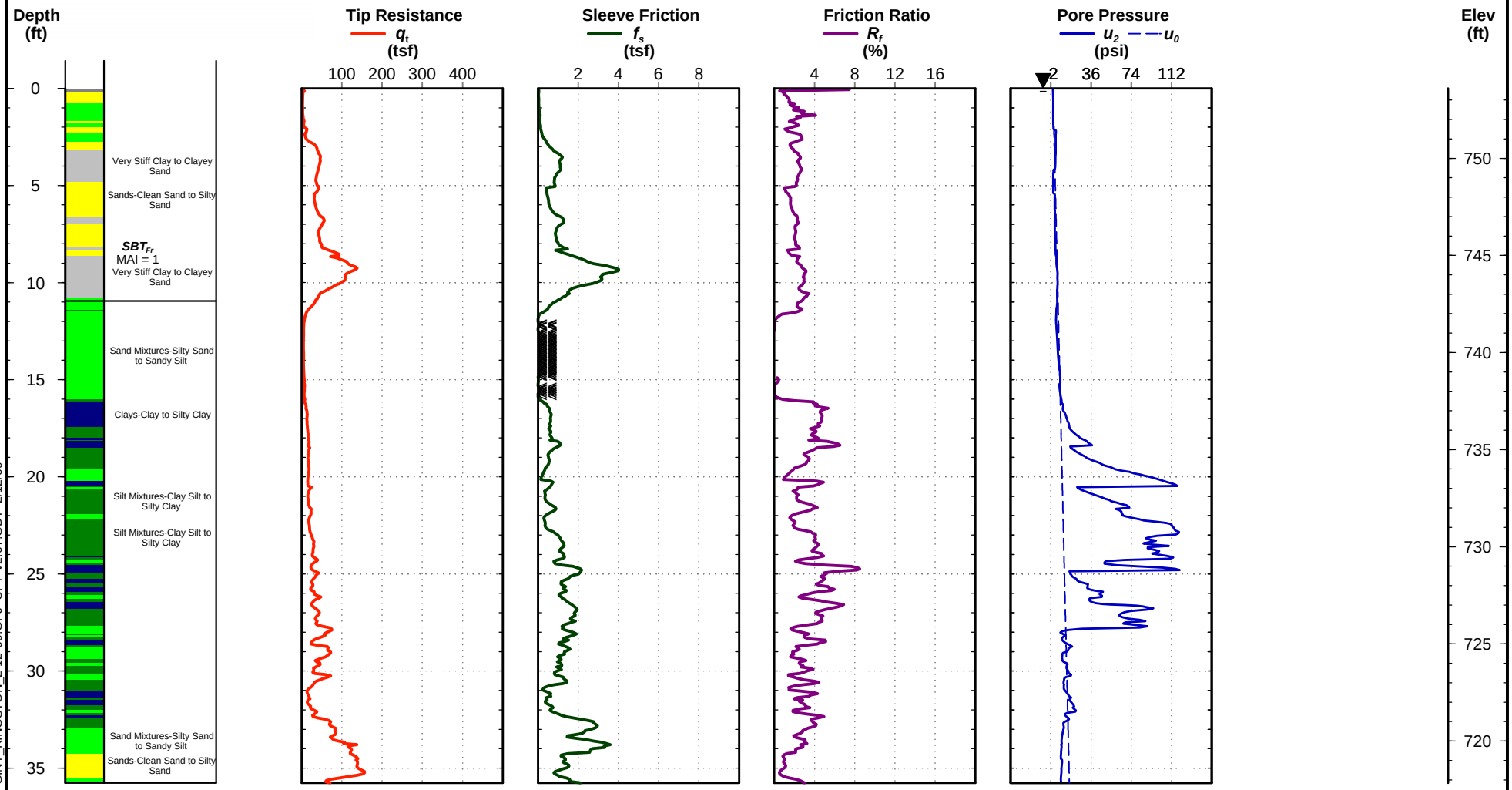
09-205-C1

Project No: 60095742

Date: Jan. 24, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557910.23
Easting: 2440983.58
Elevation: 753.6 NGVD

Total Depth: 35.8 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-205-C1

Electronic Filename: 09-205-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-205A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

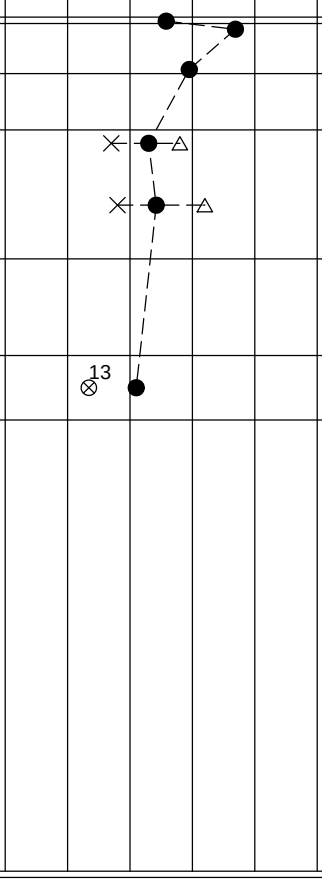
SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +754.33	UNIT DRY WT. LBS./FT.^{3}
			PA				
5.0							
			RB			Disturbed samples retrieved following completion of vane shear testing	
10.0							
		1	ST			13.5 13.7 Fill: Sandy silt-sized ash, trace fine gravel, little clay - dark gray - saturated (ML) (FA) Failed	
15.0		2	SS			15.3	
		3	SS			Fill: Silt-sized ash, trace fine gravel, fine sand and clay - gray - saturated (ML) (FA) Failed 17.0 Samples 2 and 3: No recovery with Shelby tube. Obtained sample with split spoon.	
		4	ST			Vane Shear Test #1 at 15.0 ft. Peak Su = 250 psf, Remolded Su = 100 psf	
20.0		5	ST			Silty clay, little fine to medium sand- brown to light brown - medium (CL) 21.0 Vane Shear Test #2 at 17.0 ft. Peak Su = 925 psf, Remolded Su = 400 psf	
			RB			Vane Shear Test #3 at 19.0 ft. Peak Su = 575 psf, Remolded Su = 100 psf 24.0 Vane Shear Test #4 at 21.0 ft. Peak Su = 1125 psf, Remolded Su = 75 psf	
25.0		6	SS			Coarse gravel noted while drilling from 23.5 to 24.0 ft.	
26.0						26.0 Silty fine to medium sand, some clay - reddish brown - moist to wet (SM) End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 24.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. (FA) = Fly Ash	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **4.0 ft. WD**	BORING STARTED **1/26/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557907.27**	BORING COMPLETED **1/26/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440983.23**	RIG/FOREMAN **D-50/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-205B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +755.26	
			PA			.	
5.0							
			RB			Following retrieval of 3 in. tube sample, cuttings were taken from top and bottom for water content testing. Samples designated with an "A" were taken from bottom of sample; the others were taken from top.	
10.0							
	11.0	1	OST			Fill: Silt-sized ash, trace fine sand, little clay - dark gray - saturated (ML) (FA) Failed	
	13.5						
15.0			RB				
	16.0	2	OST			Silty clay, trace fine sand - brown - (CL)	
		2A	OST				
	18.5	3	OST			Clayey silt, trace fine sand - light brown - wet (CL-ML)	
20.0		3A	OST				
21.0	21.0					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 21.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Casing used: 10 ft. of 4 in. Automatic-Diedrich Hammer used for Standard Penetration Tests. OST = Osterberg sampler (FA) = Fly Ash	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **4.0 ft. WD**	BORING STARTED **1/26/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557906.12**	BORING COMPLETED **1/27/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440973.84**	RIG/FOREMAN **D-50/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

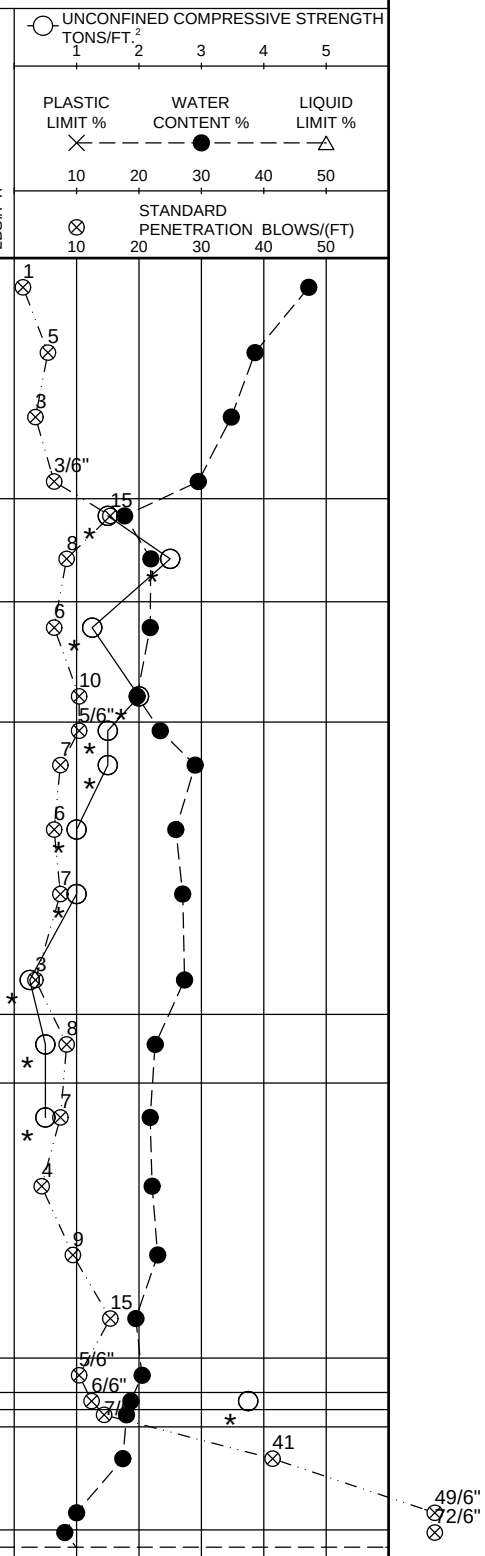
AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-206
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +754.56

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose to loose - saturated (ML) (FA) Failed	
		2	SS				
5.0		3	SS				
		4	SS			7.0	
		4A	SS			Fill: Silty clay, little fine to coarse sand, trace fine to medium gravel - brown - stiff to very stiff (CL)	
		5	SS				
10.0						10.0	
		6	SS			Fill: Silty clay, trace fine sand - brown and gray - stiff (CL)	
		7	SS			13.5	
		7A	SS			Fill: Silty clay, some to little fine to medium sand - reddish brown - stiff to medium (CL)	
15.0		8	SS				
		9	SS				
		10	SS				
20.0							
		11	SS			22.0	
		12	SS			Silty clay, some fine sand - brown and gray - medium (CL)	
						24.0	
25.0		13	SS			Silty fine sand, little to some clay - brown and gray - loose to medium dense - moist (SC-SM)	
		14	SS				
		15	SS				
30.0							
		16	SS			32.0	
		17	SS			33.0 Sandy silt, little clay - brown and gray - medium dense - saturated (ML)	
		17A	SS			33.5	
		17B	SS			34.0 Silty clay, little fine to coarse sand - brown - very stiff (CL)	
35.0		18	SS			Silty fine to medium sand - brown and gray - medium dense - saturated (SM)	
		19	SS			37.0 Fine to medium sand, little silt and fine to coarse gravel -	
		19A	SS				

. . . continued



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-206**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	
						SURFACE ELEVATION +754.56 (Continued)		
38.0		20	SS*			38.0 brown - very dense to extremely dense - moist to wet (SM)		68/6"
						Weathered shale - gray		
						End of Boring Borehole advanced to 4.0 ft. with power auger. Borehole advanced from 4.0 to 37.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 10 ft. of 4 in. Automatic-Diedrich Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. or less. (FA) = Fly Ash		

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **At surface**	BORING STARTED **1/27/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557766.73**	BORING COMPLETED **1/28/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441114.96**	RIG/FOREMAN **D-50/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)
Project No: 60095742

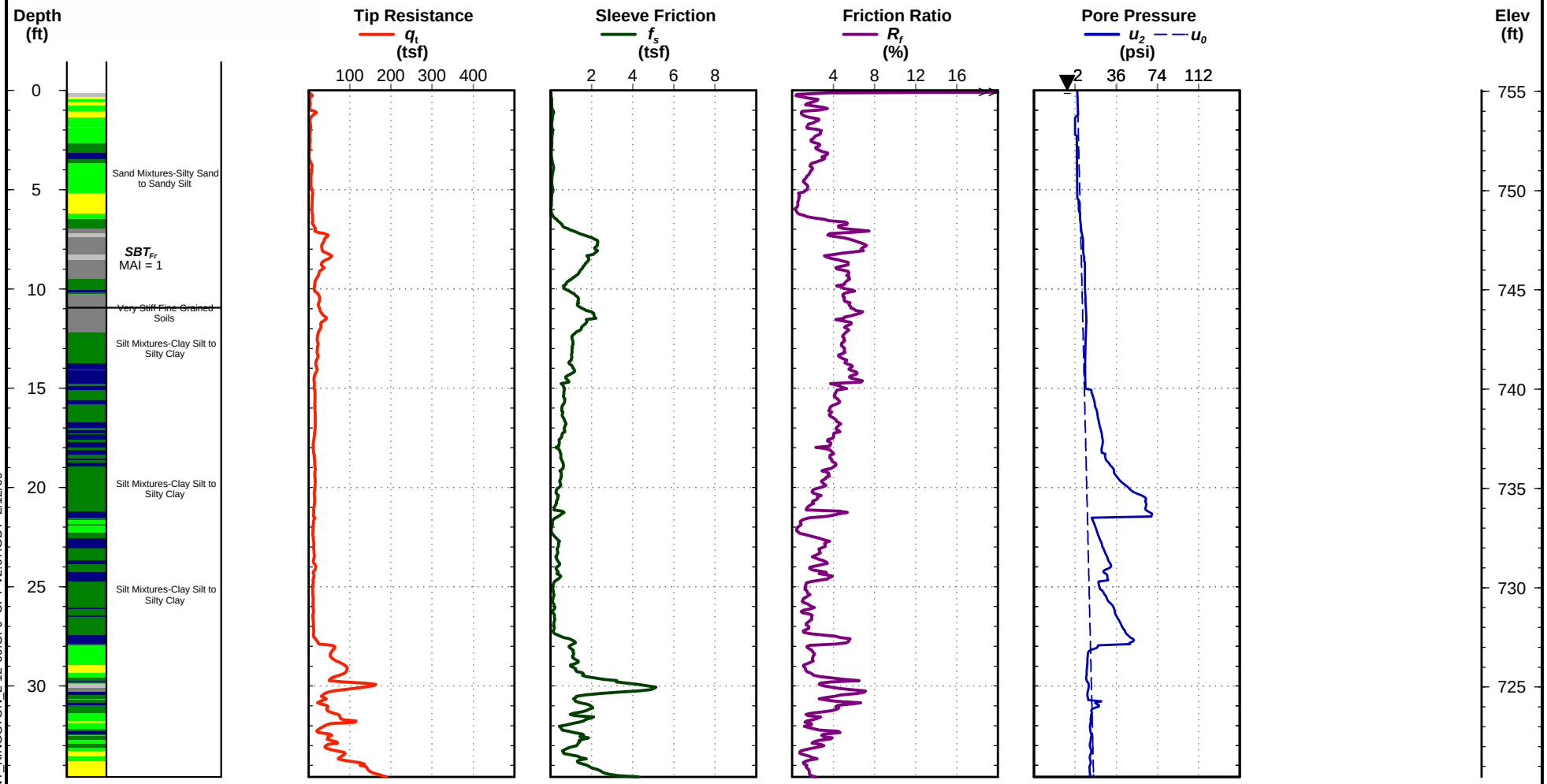
Cone Penetration Test

09-206-C1

Date: Jan. 24, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557766.2
Easting: 2441121.08
Elevation: 755.05 NGVD

Total Depth: 34.6 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-206-C1

Electronic Filename: 09-206-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-206A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +754.98	UNIT DRY WT. LBS./FT.^{3}
			PA			.	
5.0							
10.0			RB			Disturbed samples retrieved following completion of vane shear testing.	
						14.0	
15.0		1	ST			Fill: Silty clay, little to some fine to coarse sand - brown to reddish brown - stiff to very stiff (CL) Vane Shear Test #1 at 15.5 ft. Peak Su = 1350 psf, Remolded Su = 1175 psf	
		2	ST			Vane Shear Test #2 at 17.0 ft. Peak Su = 2075 psf, Remolded Su = 1450 psf	
		3	ST			Vane Shear Test #3 at 18.5 ft. Peak Su = 1900 psf, Remolded Su = 1625 psf	
20.0		4	ST			20.0	
		5	ST			Silt and fine sand, little clay - brown - moist (ML) Vane Shear Test #4 at 20.0 ft. Peak Su = 2175 psf, Remolded Su = 750 psf	
		6	SS			21.5 23.0 Clayey silt and fine sand - brown - very stiff - moist (CL-ML) Vane Shear Test #5 at 21.5 ft. Peak Su = 2000 psf, Remolded Su = 600 psf Sample 6 and 7: No sample recovery with Shelby tube. Obtained sample by pushing split-spoon.	
24.5		7	SS			24.5 Silty clay and fine sand - brown - stiff (CL) Vane Shear Test #6 at 23.0 ft. Peak Su = 1925 psf, Remolded Su = 450 psf Vane Shear Test #7 at 24.5 ft. Peak Su = 1225 psf, Remolded Su = 425 psf End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 23.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Casing used: 8 ft. of 4 in.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **3.0 ft. WD**	BORING STARTED **1/29/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557768.4**	BORING COMPLETED **1/29/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441109.93**	RIG/FOREMAN **D-50/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-206B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

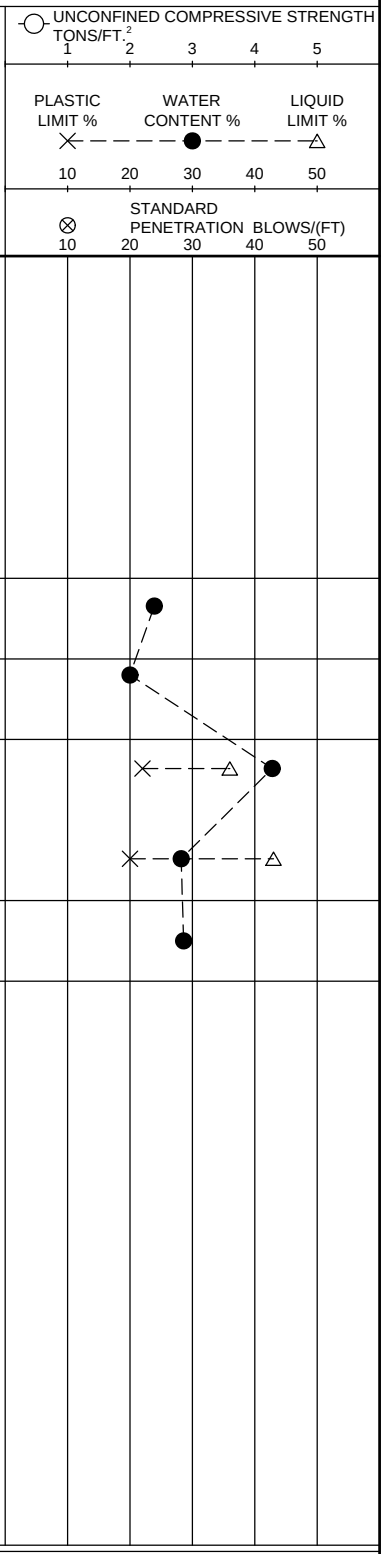
SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +754.56	UNIT DRY WT. LBS./FT.^{3}
			PA			.	
5.0							
			RB				
10.0						10.0 Sample 1 was not opened.	
		1	OST			12.5 Sample 2 was not opened.	
		2	OST				
15.0						15.0 Fill: Silty clay, trace fine to coarse sand - brown to reddish brown - moist - wet (CL)	
		3	OST				
		4	OST			20.0 See UMass Direct Shear Test results (DeGroot, 2009) for Sample 5 description.	
20.0							
		5	OST			22.5 End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 20.0 ft. with rock bit and drilling fluid. Casing used: 8 ft. of 4 in. Borehole grouted upon completion. OST = Osterberg Sampler	
22.5							



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **1/29/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557771.01**	BORING COMPLETED **1/30/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441116.26**	RIG/FOREMAN **D-50/RT**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

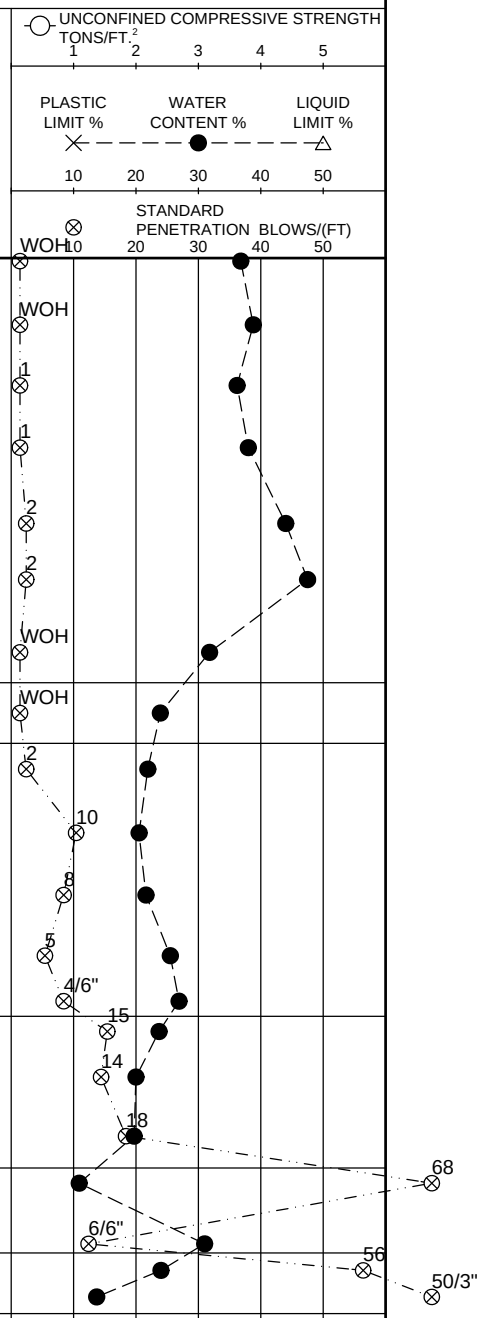
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-207
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +747.11

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silt-sized ash, little to some clay, and trace fine sand - gray - very loose - wet (ML) (FA) Failed	
		2	SS				
5.0		3	SS				
		4	SS				
		5	SS				
10.0		6	SS				
		7	SS				
						14.0	
15.0		8	SS			Silty clay, little fine to medium sand - brown and gray with black - medium (CL)	
						16.0	
		9	SS			Silty clay, little to some fine to medium sand - brown and gray - stiff to very stiff (CL)	
		10	SS				
20.0		11	SS				
		12	SS				
25.0		13	SS				
						25.0	
		13A	SS			Sandy silt, little clay - brown - medium dense - wet (ML)	
		14	SS				
		15	SS				
30.0						30.0	
		16	SS			Silty fine to medium sand, little fine to coarse gravel, trace clay and shale fragments - brown and black - very dense to medium dense - moist to wet (SM)	
		17	SS				
						32.8	
		17A	SS			Weathered shale - gray - very dense to extremely dense	
34.8		18	SS				
						34.8	
						End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 34.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in. Automatic-CME hammer used for Standard Penetration Tests. WOH = Weight of Hammer (FA) = Fly Ash	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
At Surface	1/30/09	Chicago Area - 01	
NORTHING 557643.84	BORING COMPLETED 1/30/09	ENTERED BY KKB	SHEET NO. 1 OF 1
EASTING 2441277.57	RIG/FOREMAN CME-850/JD	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

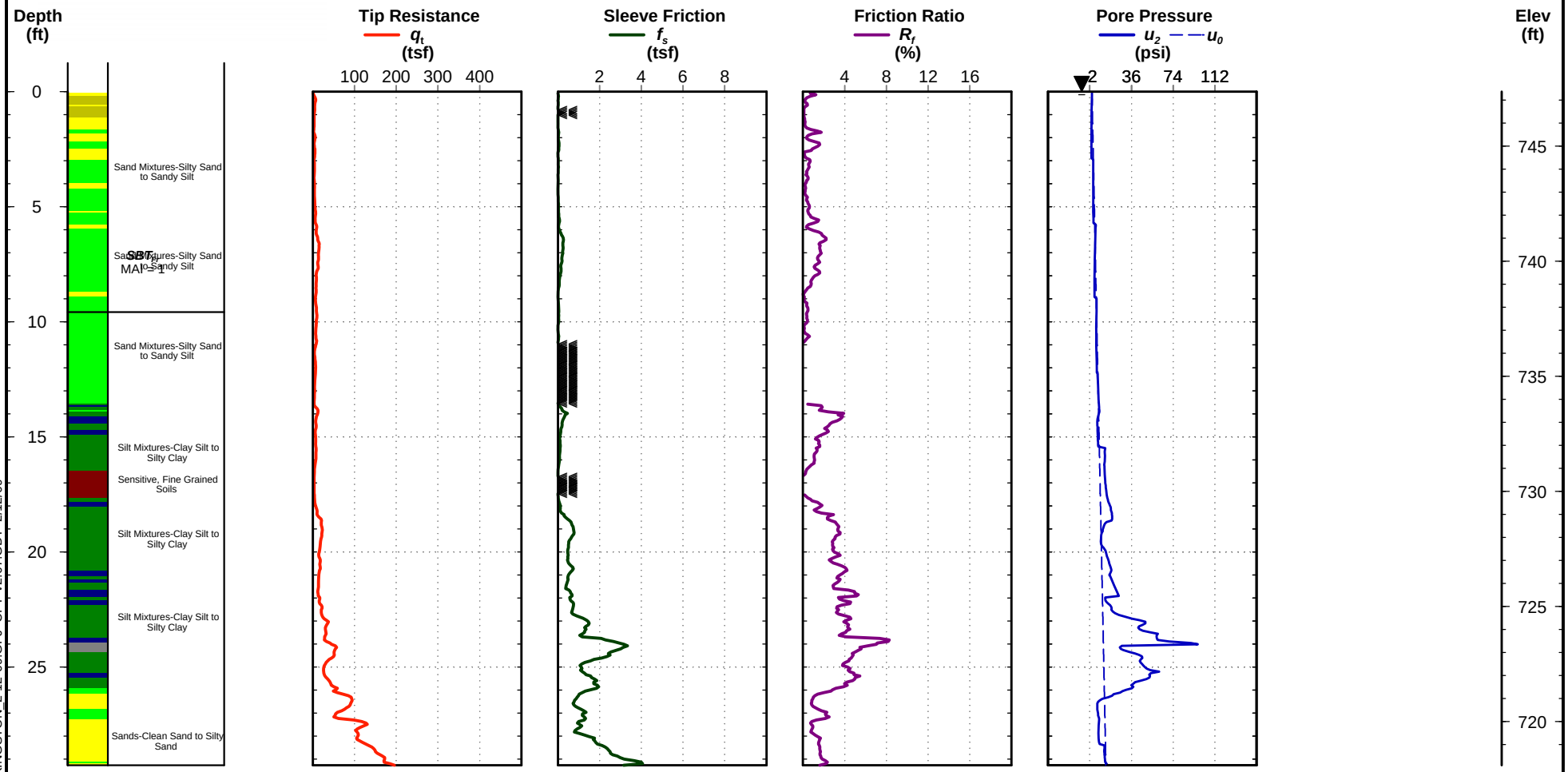
09-207-C1

Project No: 60095742

Date: Jan. 29, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557645.64
Easting: 2441280.54
Elevation: 747.37 NGVD

Total Depth: 29.3 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-207-C1

Electronic Filename: 09-207-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-207A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +747.31	UNIT DRY WT. LBS./FT.^{3}
5.0			PA				
10.0			RB				
15.0		1	ST			Samples 1 and 2: No recovery after two attempts with Shelby tube. Vane Shear Test #1 at 15.0 ft. Peak Su = 1300 psf, Remolded Su = 550 psf Vane Shear Test #2 at 16.5 ft. Peak Su = 1000 psf, Remolded Su = 275 psf Moisture contents are not available for disturbed samples obtained by pushing split spoon.	
		2	ST				
		3	SS			17.5 Silty clay, little fine sand - brown - very stiff (CL) Samples 3, 4 and 5: No recovery with Shelby tube. Obtained sample by pushing split-spoon. Vane Shear Test #3 at 18.0 ft. Peak Su = 2000 psf, Remolded Su = 325 psf Vane Shear Test #4 at 19.5 ft. Peak Su >2150 psf	
20.0		4	SS				
22.5		5	SS			22.5 Vane Shear Test #5 at 21.0 ft. Peak Su >2100 psf Vane Shear Test #6 at 22.5 ft. Peak Su = 2700 psf, Remolded Su = 1025 psf End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 21.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **1/30/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557645.76**	BORING COMPLETED **1/30/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441282.96**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-207B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +747.33	UNIT DRY WT. LBS./FT.^{3}
5.0			RB			.	
						8.0	
10.0		1	OST			Fill: Silt-sized ash, trace fine sand, little clay - gray - saturated (ML) (FA) Failed	
						10.5	
		2	OST			Fill: Silt-sized ash, trace fine to medium sand, some clay - gray - saturated (ML) (FA) Failed	
						13.0	
15.0		3	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 3 description.	
						15.5	
		4	OST			Silty clay, trace fine sand - brownish gray (CL)	
						18.0	
20.0		5	OST			Silty clay, little fine to medium sand - brown and gray (CL)	
						20.5	
		6	ST3			Silty clay, trace fine sand - light brown (CL)	
						23.0	
25.0		7	ST3			Silty clay, little fine sand - brown (CL)	
25.6						25.5	
						End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 23.0 ft. with rock bit and drilling fluid. Casing used: 8 ft. of 4 in. Borehole grouted upon completion. OST = Osterberg sampler ST3 = 3 in. Shelby tube	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **1/31/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557646.89**	BORING COMPLETED **1/31/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441285.95**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-208
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

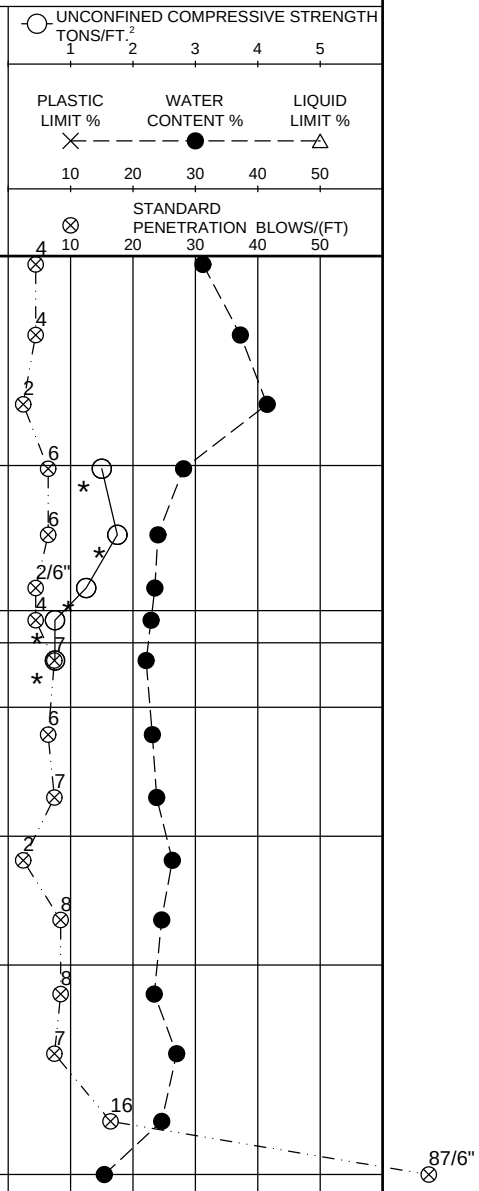
SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +744.78

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silt-sized ash, little to trace fine sand and clay, trace wood fragments - gray - loose to very loose - saturated (ML) (FA) Failed	
		2	SS				
5.0		3	SS				
		4	SS			Silty clay, little to some fine sand - reddish brown to brown - stiff (CL)	
		5	SS				
10.0		6	SS				
		6A	SS			Sandy silt, little clay - brown - loose - moist (ML)	
		7	SS			Clayey fine to medium sand, little to some silt - brown - loose - moist (SC)	
15.0		8	SS			Silty fine to medium sand, little to trace clay - brown - loose - moist to wet (SM)	
		9	SS				
		10	SS			Silty fine to medium sand, little clay - brown and dark brown - very loose to loose - saturated (SM)	
20.0		11	SS				
		12	SS			Silty fine to medium sand, little to trace clay - brown and gray - loose to medium dense - moist to wet (SM)	
25.0		13	SS				
		14	SS				
		15	SS				
			RB			Silty fine to coarse sand, trace clay and gravel - reddish brown - extremely dense - moist to wet (SM)	
30.0						Weathered shale - gray	
35.0		RUN 1	DB			Conasauga Shale. Greenish-gray to dark gray to black shale. Moderately weathered, soft to moderately hard, fissile, finely laminated to thinly bedded. Bedding approximately 15º from horizontal. Scattered hairline fractures healed with calcite.	
40.0							

Run #	Depth (ft.)	Recovery (%)	RQD (%)	Fracture Frequ.
1	29.75 - 39.95	38.2	0	> 20 / foot

6.5
11.0
12.0
14.0
18.0
22.0
28.5
29.1
29.8
40.0



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-208**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5) / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % (10 20 30 40 50) / STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)
						SURFACE ELEVATION +744.78 (Continued)		
						End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 29.75 ft. with rock bit and drilling fluid. Borehole advanced from 29.75 to 39.95 ft. with diamond coring bit and drilling fluids. Borehole grouted upon completion. Casing used: 8 ft. of 4 in. Automatic-Diedrich Hammer used for Standard Penetration Tests. (FA) = Fly Ash	* Calibrated Penetrometer	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **At Surface**	BORING STARTED **3/11/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557505.1**	BORING COMPLETED **3/11/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441472.19**	RIG/FOREMAN **D-50/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

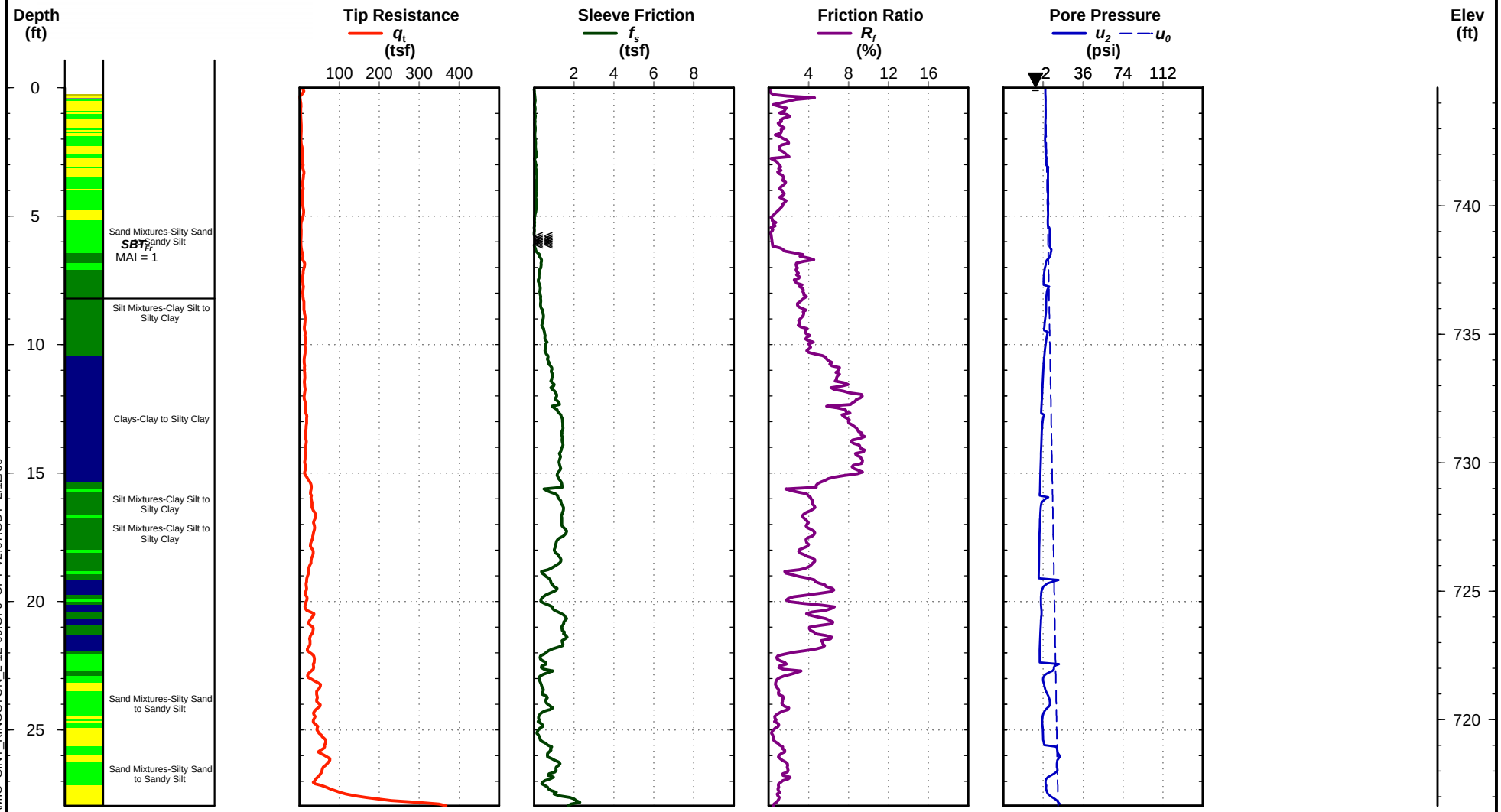
09-208-C2

Project No: 60095742

Date: Jan. 20, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557507.16
Easting: 2441468.46
Elevation: 744.6 NGVD

Total Depth: 28.0 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-208-C2

Electronic Filename: 09-208-C2.cpt

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

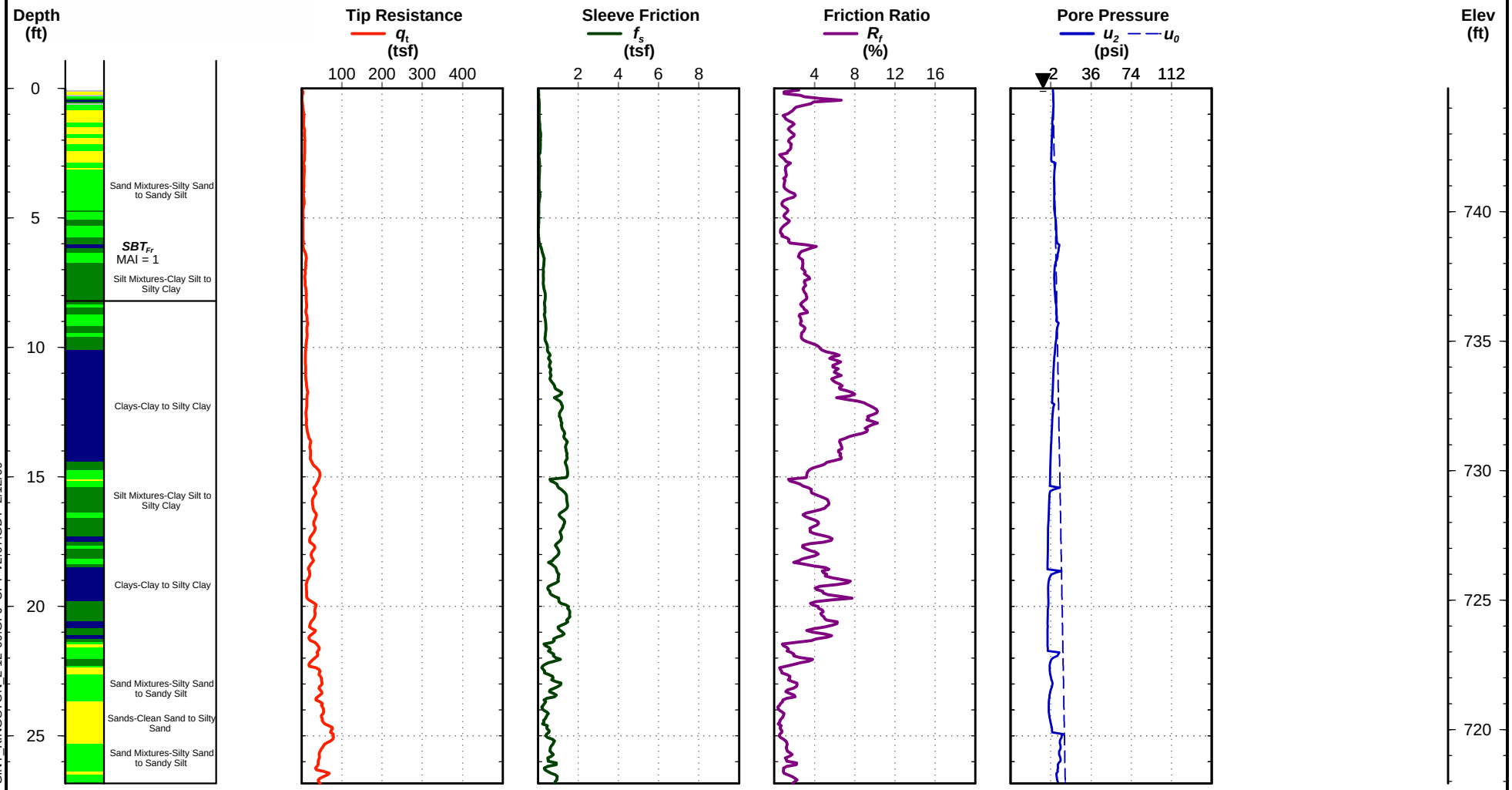
09-208-C1

Project No: 60095742

Date: Jan. 20, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557507.75
Easting: 2441467.55
Elevation: 744.76 NGVD

Total Depth: 26.8 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-208-C1

Electronic Filename: 09-208-C1.cpt

AECOM

ROCK CORE PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tennessee Valley Authority	Kingston Fossil Plant – Harriman, Tennessee	60095742

Photo No. **09-208**

Date: 3-22-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-208 Run 1 (29.75 – 39.95')

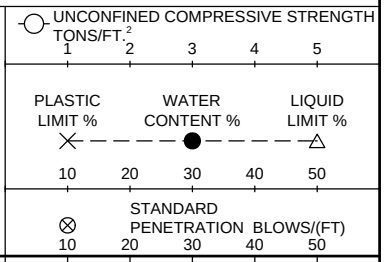
Conasauga Shale

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-208A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +744.85	UNIT DRY WT. LBS./FT.^{3}
			PA			Disturbed samples retrieved following completion of vane shear testing.	
5.0			RB				
		1	ST			Sample 1: No recovery after several attempts Vane Shear Test #1 at 7.0 ft. Peak Su = 2250 psf, Remolded Su = 950 psf	
	8.0	2	ST			Silty clay, trace fine sand - brown - very stiff (CL) Vane Shear Test #2 at 8.5 ft. Peak Su = 2025 psf, Remolded Su = 1300 psf	
10.0	10.0	3	ST			Silty clay, little fine to medium sand - brown - very stiff to stiff (CL) Vane Shear Test #3 at 10.0 ft. Peak Su = 2100 psf, Remolded Su = 1100 psf	
		4	**2.5"**			Vane Shear Test #4 at 11.5 ft. Peak Su = 1800 psf, Remolded Su = 900 psf	
14.0	14.0					Sample 4: No recovery with Shelby tube. Obtained sample by pushing 2.5-in. split spoon. Moisture content not available. Vane Shear Test #5 at 13.0 ft. Peak Su = 2650 psf, Remolded Su = 1200 psf End of Boring Borehole advanced to 4.0 ft. with power auger. Borehole advanced from 4.0 to 12.0 ft. with rock bit and drilling fluid. Casing used: 5.5 ft. of 4 in. Boring backfilled upon completion. **2.5"** = 2.5 inch split spoon	



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **2.5 ft. BCR; 2.2 ft. ACR**	BORING STARTED **3/12/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557506.55**	BORING COMPLETED **3/15/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441470.03**	RIG/FOREMAN **D-50/JC**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

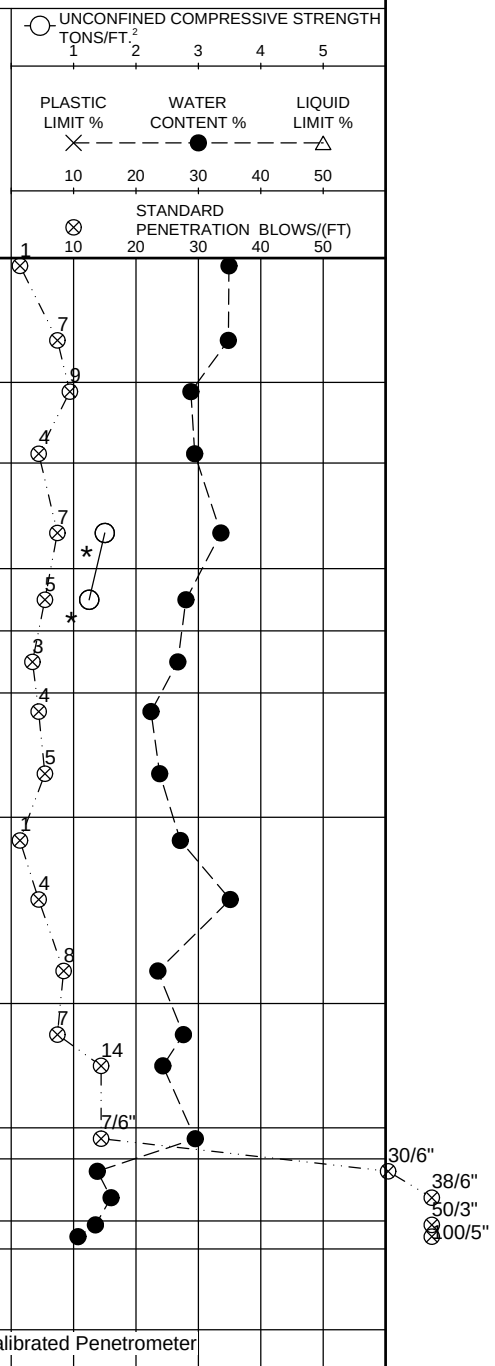
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-209**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +746.19

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Sandy silt-sized ash, trace clay - gray - very loose to loose - moist to wet (ML) (FA) Failed	
		2	SS			4.0	
5.0		3	SS			Fill: Silt-sized ash, trace clay and fine sand - gray - loose - saturated (ML) (FA) Failed	
		4	SS			6.6 Silty clay, little fine to medium sand - reddish brown - stiff (CL)	
10.0		5	SS			10.0	
		6	SS			Silty clay, some fine sand - reddish brown - stiff (CL)	
		7	SS			12.0 Sandy silt, little clay - reddish brown - loose - moist to wet (ML)	
15.0		8	SS			14.0 Silty fine to medium sand, little to trace clay - reddish brown - loose - moist to wet (SM)	
		9	SS			18.0	
20.0		10	SS			Silty fine to medium sand, little to some clay - reddish brown - very loose to loose - wet to saturated (SM)	
		11	SS				
		12	SS			24.0	
25.0		13	SS			Silty fine to medium sand, trace to little clay - brown - loose to medium dense - saturated (SM)	
		14	SS			28.0	
		15	SS			29.0 Silty fine to medium sand, trace clay - brown and dark brown - medium dense - saturated (SM)	
30.0		15A	SS				
		16	SS			31.0 Gravelly sand, little silt - gray - very dense to extremely dense - wet (SM)	
		16A	SS				
		17	RB			31.9 Driller's note: Difficult drilling from 28 to 30 ft.	
			SS			Weathered shale - gray	
			RB			Driller's note: Apparent weathered shale bedrock	
34.5						34.5	
						End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 34.5 feet with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 13 ft. of 4 in. Automatic-Diedrich Hammer used for Standard Penetration Tests. (FA) = Fly Ash	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
2.0 ft. WS	**3/10/09**	**Chicago Area - 01**	
NORTHING **557409.86**	BORING COMPLETED **3/10/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441605.58**	RIG/FOREMAN **D-50/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

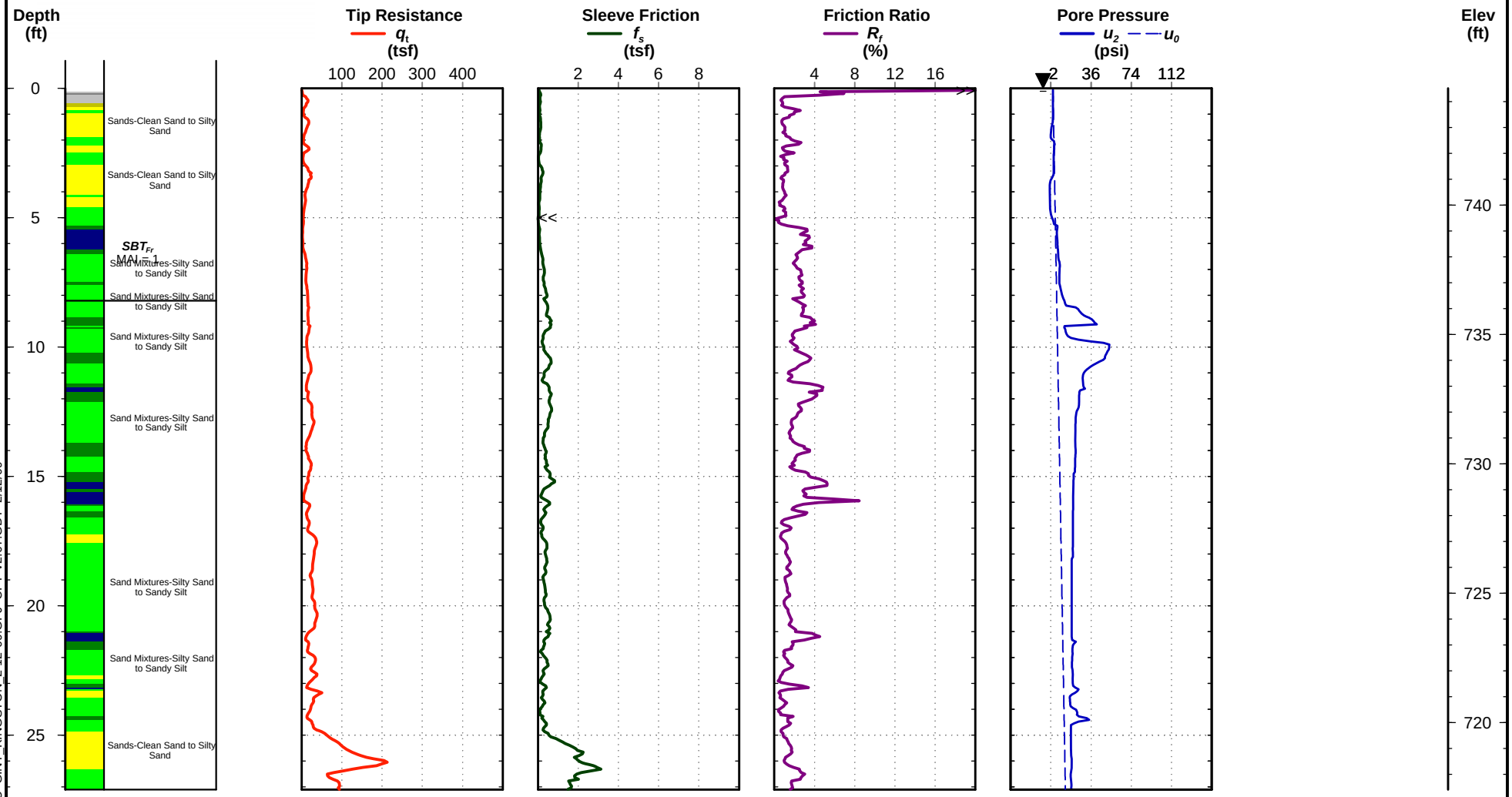
09-209-C1

Project No: 60095742

Date: Jan. 20, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557399.87
Easting: 2441601.21
Elevation: 744.51 NGVD

Total Depth: 27.1 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-209-C1

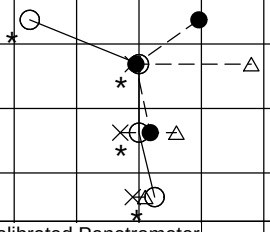
Electronic Filename: 09-209-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-209A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50
STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +746.42	UNIT DRY WT. LBS./FT.^{3}
			PA			Disturbed samples retrieved following completion of vane shear testing.	
5.0						6.0	
			RB			Fill: Silty clay, little fine to medium sand - brown - very stiff (CL)	
		1	SS			Sample 1: No recovery with Shelby tube. Obtained sample with split spoon. 8.5	
10.0		2	ST			Silty clay, trace fine sand - brown - very stiff (CL) Vane Shear Test #1 at 8.5 ft. Peak Su = 2150 psf, Remolded Su = 325 psf 10.5	
		3	ST			Silty clay and fine sand - brown - very stiff (CL) Vane Shear Test #2 at 10.5 ft. Peak Su = 2200 psf, Remolded Su = 1550 psf 12.5	
14.0		4	ST			Sandy silt, little clay - brown - very stiff - moist (ML) 14.0 Vane Shear Test #3 at 12.5 ft. Peak Su = 2025 psf, Remolded Su = 650 psf Vane Shear Test #4 at 14.0 ft. Peak Su = 1875 psf, Remolded Su = 400 psf	
						End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 12.5 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Casing used: 10.0 ft. of 4 in.	



* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **3/10/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557414.39**	BORING COMPLETED **3/10/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441606.54**	RIG/FOREMAN **D-50/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-209B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +746.58	UNIT DRY WT. LBS./FT.^{3}
			PA			.	
5.0			RB			6.0	
		1	OST			Sample 1 was not opened. 8.5	
10.0		2	OST			Silty clay, little fine to coarse sand - brown (CL) 11.0	
13.5		3	OST			Clayey silt, little fine to coarse sand - brown - moist to wet (CL-ML) 13.5	

End of Boring
Borehole advanced to 4.0 ft. with power auger.
Borehole advanced from 4.0 to 11.5 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 7.0 ft. of 4 in.
OST = Osterberg sampler

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **3/11/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557419.11**	BORING COMPLETED **3/11/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441606.86**	RIG/FOREMAN **D-50/BZ**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

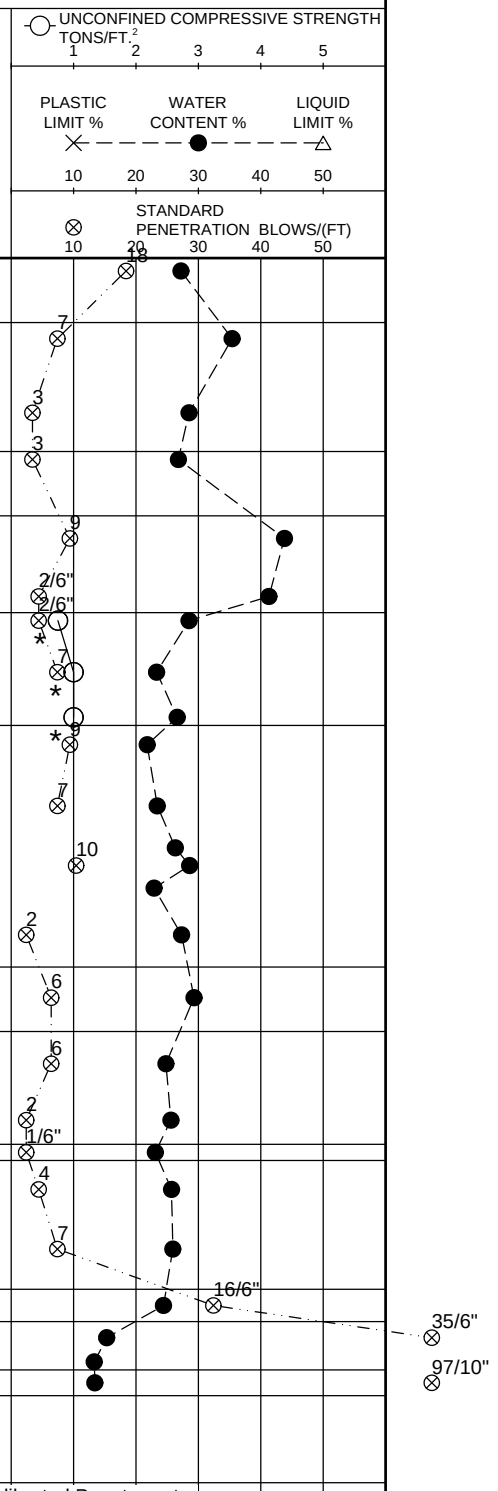
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-210
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +749.55

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Sandy silt-sized ash - gray - medium dense - moist (ML) (FA) Failed	
	2.0	2	SS			Fill: Silt-sized ash, little to some fine sand - gray- loose to very loose - saturated (ML) (FA) Failed	
5.0		3	SS			Sample 3: Seams of reddish brown silty clay noted	
	6.0	4	SS			Fill: Silty fine to coarse sand-sized ash, trace fine gravel - gray - very loose - saturated (SM) Failed	
	8.0	5	SS			Fill: Silt-sized ash, little to trace fine sand - gray - loose - saturated (ML) (FA) Failed	
10.0	11.0	6	SS				
		6A	SS			Silty clay, little fine to coarse sand - brown to reddish brown - medium to stiff (CL)	
		7	SS				
	14.5	8	SS				
15.0		8A	SS			Silty fine to medium sand, little to trace clay - brown and gray - very loose to medium dense - moist to wet (SM)	
		9	SS				
		10	SS			Sample 10A: Seam of dark brown to black silty sand noted	
		10A	SS				
20.0		10B	SS				
		11	SS				
	22.0	12	SS			Silty fine to medium sand, little clay - brown and gray - loose - wet (SM)	
	24.0	13	SS			Silty fine sand, little clay - brown to grayish brown - loose to very loose - wet to saturated (SM)	
25.0		14	SS				
	27.5	14A	SS			Silty fine to medium sand, trace clay - gray - very loose - saturated (SM)	
	28.0	15	SS			Silty fine to medium sand, little clay - gray - loose - saturated (SM)	
30.0		16	SS				
	32.0	17	SS			Silty fine to medium sand, trace clay - reddish brown - dense - saturated (SP-SM)	
	33.0	17A	SS			Gravelly fine to coarse sand, little silt - gray - very dense - saturated (SM)	
	34.5	18	SS				
35.0	35.3	18A	SS			Weathered shale - gray	
			RB			Apparent shale bedrock	
38.0	38.0					End of Boring Borehole advanced to 6.0 ft. with power auger.	



* Calibrated Penetrometer

. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-210**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +749.55 (Continued)	
						Borehole advanced from 6.0 to 38.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in. Automatic-Diedrich Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. or less. (FA) = Fly Ash	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **4.0 ft. WS; 5.8 ft. BCI**	BORING STARTED **3/2/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557293.27**	BORING COMPLETED **3/3/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441762.3**	RIG/FOREMAN **D-50/JC**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)
Project No: 60095742

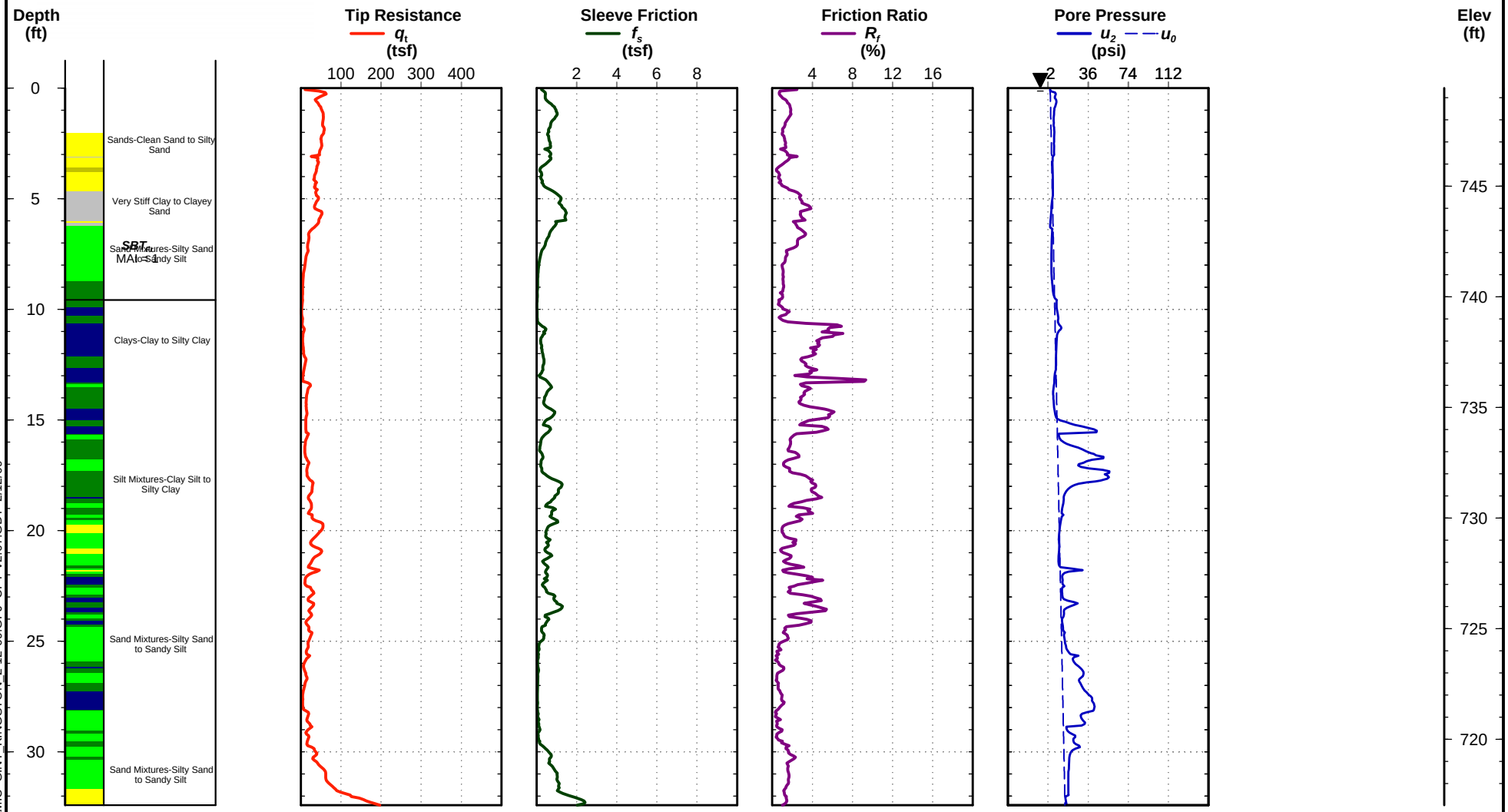
Cone Penetration Test

09-210-C1

Date: Jan. 20, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850 CAP

Northing: 557280.23
Easting: 2441760.51
Elevation: 749.43 NGVD

Total Depth: 32.4 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-210-C1

Electronic Filename: 09-210-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-210A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +749.94	
			PA			.	
5.0						Disturbed samples retrieved following completion of vane shear testing.	
			RB			Moisture content tests not available for samples obtained by pushing split spoon.	
			RB			Samples 1 and 2: No sample recovery with Shelby tube. Obtained samples by pushing split-spoon.	
10.0						10.0	
		1	SS			Fill: Silt-sized ash, some fine to coarse sand, little clay, trace fine gravel - gray - saturated (ML) (FA) Failed Vane Shear Test #1 at 11.5 ft.	
						12.0	
		2	SS			Peak Su = 1550 psf, Remolded Su = 950 psf	
14.0						14.0	
						Silty clay, little fine to coarse sand - brown (CL) Vane Shear Test #2 at 13.5 ft. Peak Su >2150 psf Vane Shear Test #3 at 14.0 ft. Peak Su = 2550 psf, Remolded Su = 1000 psf	
						End of Boring	
						Borehole advanced to 6.0 ft. with power auger.	
						Borehole advanced from 6.0 to 12.0 ft. with rock bit and drilling fluid.	
						Borehole backfilled upon completion.	
						Casing used: 10 ft. of 4 in.	
						(FA) = Fly Ash	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **3/4/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557286.92**	BORING COMPLETED **3/4/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441767.5**	RIG/FOREMAN **D-50/BZ**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

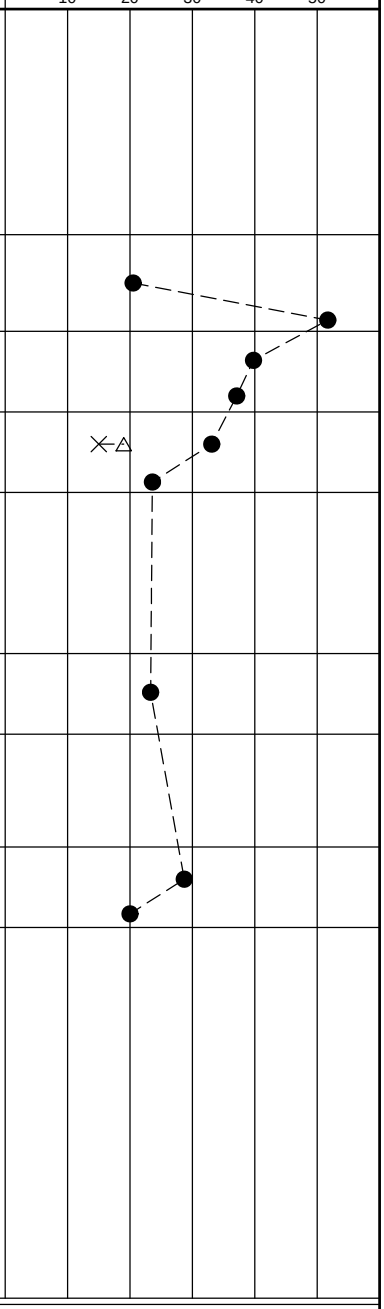
AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-210B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50
STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

SURFACE ELEVATION +749.63

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
			PA			.	
5.0						Following retrieval of 3 in. tube sample, cuttings were taken from top and bottom for water content testing. Samples designated with an "A" were taken from bottom of sample; the others were taken from top.	
	7.0		RB				
		1	OST			Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Failed	
10.0	10.0	1A	OST				
		2	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 2 description.	
	12.5	2A	OST				
		3	OST			Clayey silt, little fine sand - brown - moist to wet (CL-ML)	
15.0	15.0	3A	OST				
			RB				
20.0	20.0						
		4	OST			Silty fine to medium sand, trace fine gravel, little clay - brown - wet (SM)	
	22.5						
25.0			RB				
	26.0						
		5	OST			Silty fine sand, trace clay - brown to gray - wet (SM)	
28.5	28.5	5A	OST				
						End of Boring Borehole advanced to 7.0 ft. with power auger. Borehole advanced from 7.0 to 26.0 feet with rock bit and drilling fluid. Casing used: 7 ft. of 4 in. OST = Osterberg sampler	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
4.3 ft. BCR; 9.3 ft. ACR	**3/3/09**	**Chicago Area - 01**	
NORTHING **557290.26**	BORING COMPLETED **3/3/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441764.39**	RIG/FOREMAN **D-50/JC**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

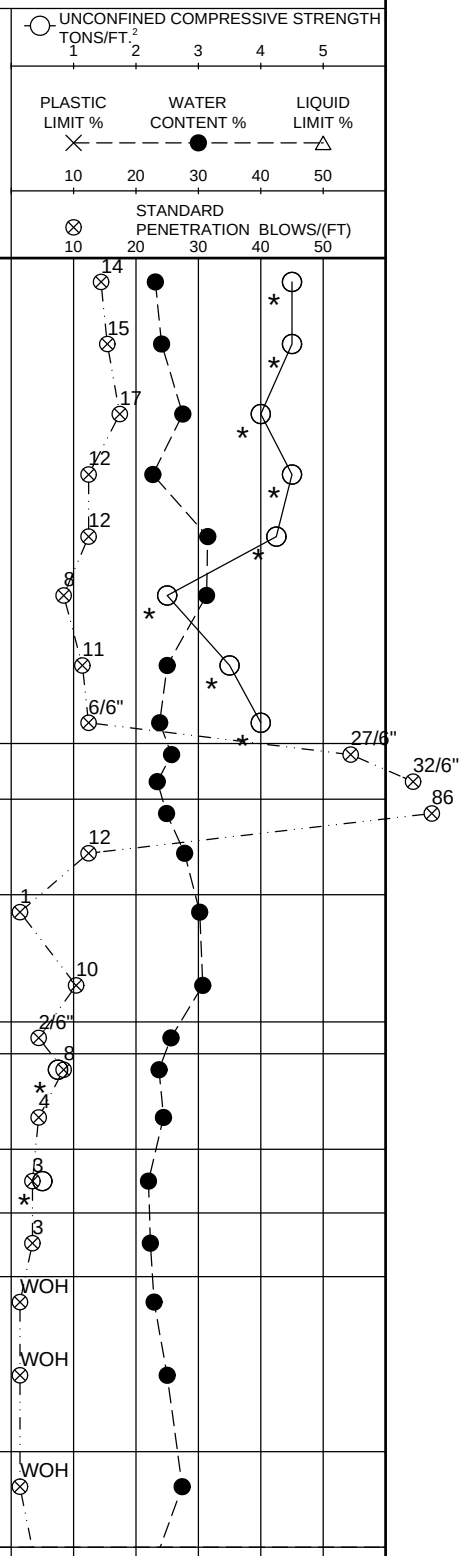
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-211
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +765.55

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silty clay, little fine to coarse sand, trace fine to coarse gravel - dark reddish brown - hard to very stiff (CL)	
		2	SS				
5.0		3	SS				
		4	SS				
		5	SS				
10.0		6	SS				
		7	SS				
15.0		8	SS*			15.3	
		8A	SS			Fill: Silty fine to coarse sand-sized ash, little clay and fine gravel - gray - very dense - saturated (SM) (BA) Unfailed	
		9	SS			17.0	
		9A	SS			Fill: Silty fine to coarse sand-sized ash, trace fine gravel - gray - extremely dense to medium dense - moist (SM) (BA) Unfailed	
20.0		10	SS			20.0	
		11	SS			Fill: Silty medium to coarse sand-sized ash, little clay and fine to medium gravel - gray - very loose to medium dense - saturated (SM) (BA) Unfailed Sample 12: 0.3 ft. seam of silt-sized ash noted (FA)	
		12	SS			24.0	
25.0		13	SS			25.0 Silty fine to medium sand, trace clay - brown - loose - moist to wet (SM)	
		13A	SS			Silty clay, little to some sand - brown - medium (CL)	
		14	SS			28.0	
		15	SS			Clayey silt, some fine sand - brown - very loose - moist to wet (CL-ML)	
30.0						30.0	
		16	SS			Clayey silt, little fine to medium sand - brown - very loose - moist (CL-ML)	
						32.0	
		17	SS			Silty fine to medium sand, little to trace gravel and clay - brown - very loose - moist to wet (SM)	
35.0		18	SS			Sample 18: One blow advanced sampler from 35.5 to 37.5 ft.	
						37.5	
		19	SS			Silty medium to coarse sand, little clay - brown - very loose - saturated (SM) Sample 19: One blow advanced sampler from 38.0 to 40.5 ft.	
40.0						40.5	



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

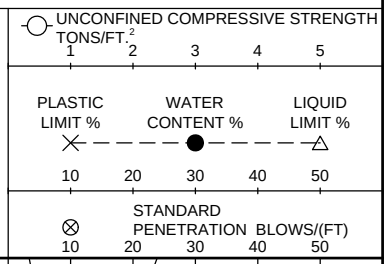
AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-211
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +765.55 (Continued)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		20	SS			Silty fine to medium sand, little clay - brown - loose - moist to wet (SM)	
	42.5	21	SS			Silty fine to coarse sand, little clay - brown - very loose - saturated (SP-SM)	
45.0	44.5	22	SS			Silty fine to medium sand, some clay - gray - very loose - saturated (SM)	
		23	SS				
	48.5	24	SS			Silty medium to coarse sand, little clay - gray - loose - saturated (SM)	
50.0	50.5	25	SS			Silty fine to coarse sand, little gravel, trace clay - gray - medium dense - moist (SP) Sample 25: Sandstone noted.	
	53.5		RB				
55.0		RUN 1	DB			Conasauga Shale. Gray to dark gray shale with widely scattered, thin limestone/dolomite layers. Moderately weathered, soft (shale) to moderately hard (limestone/dolomite), fissile, finely laminated. Bedding is horizontal.	
60.0		RUN 2	DB				
65.0							
69.5	69.5					**Pneumatic Piezometer installed at 68.5 ft.**	

Run #	Depth (ft.)	Recovery (%)	RQD (%)	Fracture Frequ.
1	53.5 - 61.5	87.5	25.5	> 10 /ft. to 54.8 ft. 5 - 10/ft. below 54.8 ft.
2	61.5 - 69.5	100	49.5	5 - 10/ft.



* Calibrated Penetrometer

End of Boring
Borehole advanced to 10.0 ft. with power auger.
Borehole advanced from 10.0 to 53.5 ft. with rock bit and drilling fluid.
Borehole advanced from 53.5 to 69.5 ft. with diamond coring bit and drilling fluid.
Pneumatic Piezometer installed at 68.5 ft.
Casing used: 10 ft. of 4 in. and 55 ft. of 3 in.
Automatic-Mobile hammer used for Standard Penetration Tests.
SS* = SPT value based on first 6 in.
WOH = Weight of Hammer
(FA) = Fly Ash
(BA) = Bottom Ash

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
15.25 ft. WS	3/3/09	Chicago Area - 01	
NORTHING 557054.25	BORING COMPLETED 3/4/09	ENTERED BY KKB	SHEET NO. 2 OF 2
EASTING 2441966.5	RIG/FOREMAN Mobile B-57 (V.H.)/MB	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)
Project No: 60095742

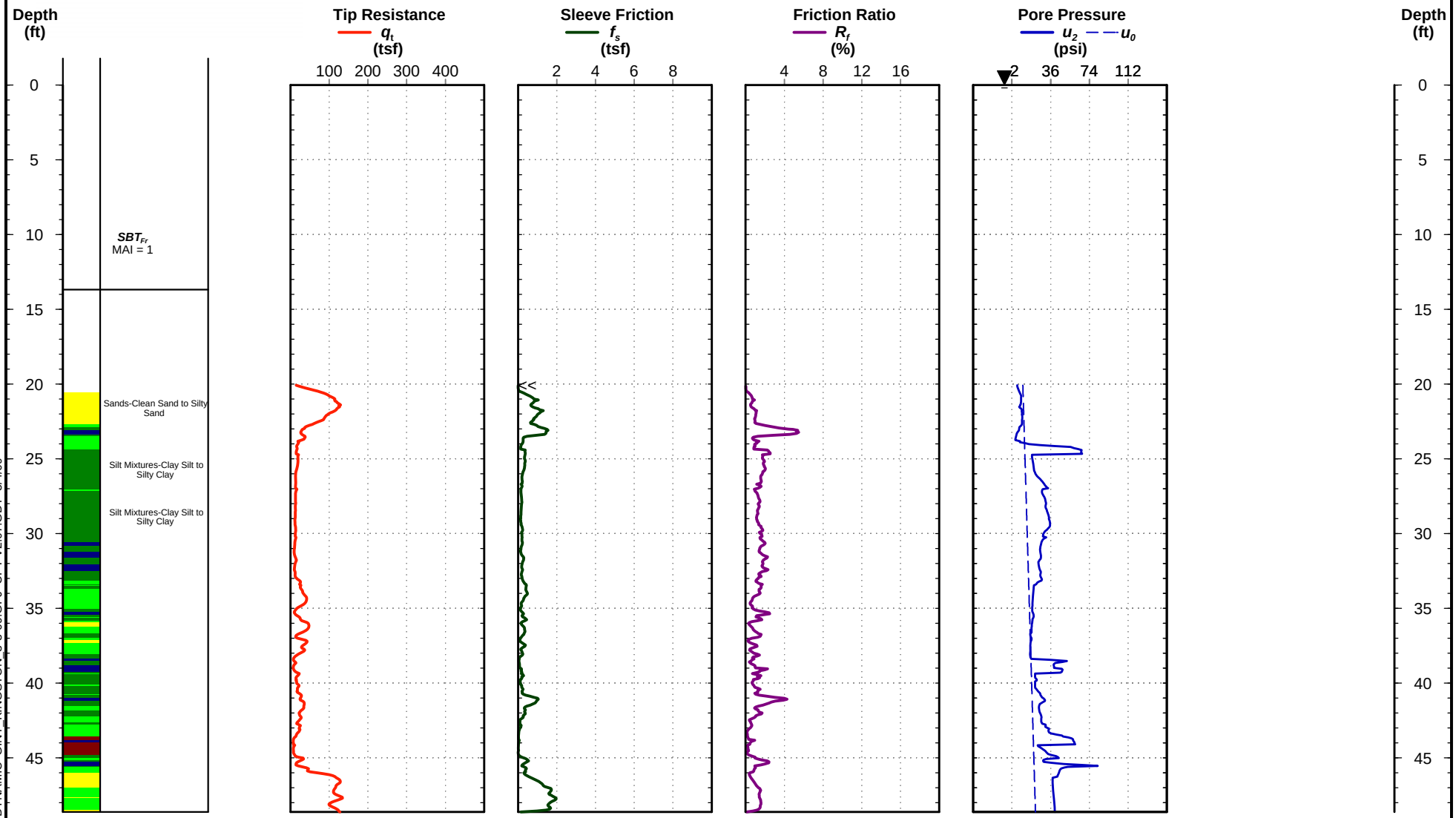
Cone Penetration Test

09-211-C2

Date: Feb. 19, 2009
Estimated Water Depth: 0 ft
Rig/Operator: Mobile 57/CAP

Northing:
Easting:
Elevation:

Total Depth: 48.6 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



09-211-C2

Electronic Filename: 09-211-C2.cpt

CPT REPORT - DYNAMIC GINT_KINGSTON_3-3-09.GPJ CPT V2.07.GDT 3/4/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

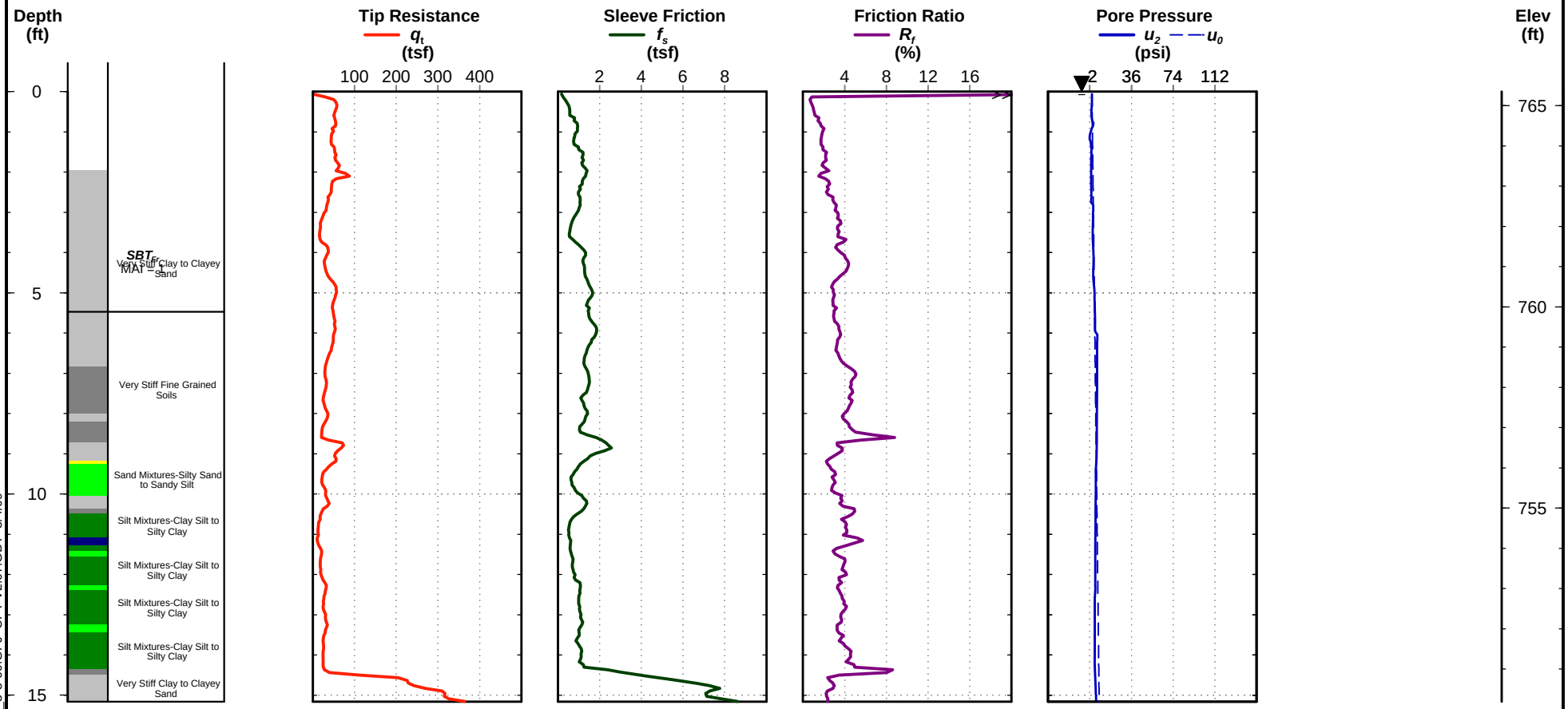
09-211-C1

Project No: 60095742

Date: Feb. 19, 2009
Estimated Water Depth: 0 ft
Rig/Operator: Mobile 57/CAP

Northing: 557060.12
Easting: 2441959.73
Elevation: 765.35 NGVD

Total Depth: 15.2 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_3-3-09.GPJ CPT V2.07.GDT 3/4/09

09-211-C1

Electronic Filename: 09-211-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-211A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +765.43	
			PA				
5.0							
10.0			RB				
15.0							
						Disturbed samples retrieved following completion of vane shear testing.	
20.0						**Pneumatic Piezometer installed at 21.0 ft.**	
						24.0	
25.0		1	ST			25.0 Silty fine to coarse sand, trace fine gravel, little clay - brown - moist to wet (SM)	
		1A	ST			26.0 Silty clay, some fine sand - brown - very stiff (CL)	
		2	SS			Vane Shear Test #1 at 25.5 ft. Peak Su = 2475 psf, Remolded Su = 1250 psf 28.0	
						Silty clay, little fine sand - brown - very stiff (CL) Sample 2: No recovery with Shelby tube. Pushed split spoon for sample recovery.	
30.0			RB			Vane Shear Test #2 at 27.5 ft. Peak Su = 2775 psf, Remolded Su = 1300 psf	
33.0						33.0 **Pneumatic Piezometer installed at 33.0 ft.**	
						End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 33.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Casing used: 8 ft. of 4 in. Installed Pneumatic Piezometers at 21.0 and 33.0 ft.	

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **3/5/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557047.46**	BORING COMPLETED **3/5/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441975.52**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-211B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +765.38	
5.0			PA				
10.0							
15.0			RB				
20.0							
		1	OST			Samples 1 and 2: No recovery	
		2	OST				
25.0						25.0	
		3	OST			Sample 3 was not opened.	
						27.5	
		4	OST			Clayey silt, little fine to medium sand - brown - moist (CL-ML)	
30.0						30.5	
		5	OST			Silty clay, little fine to medium sand - brown (CL)	
						33.0	
35.0			RB				
40.0							

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-211B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +765.38 (Continued)	
45.0							
50.0			RB				
55.0							
58.5						58.5	
						End of Boring Borehole advanced to 10.0 ft. with power auger. Borehole advanced from 10.0 to 58.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion and Inclinometer casing installed to 58.5 ft. Casing used: 10 ft. of 4 in. OST = Osterberg sampler	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **3/5/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557050.87**	BORING COMPLETED **3/5/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441970.43**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-211-SH1**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +765.55	UNIT DRY WT. LBS./FT.^{3}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)	PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % (10, 20, 30, 40, 50)	STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)
			HS							
5.0										
10.0										
15.0										
20.0										
25.0										
			RB*							
30.0										
35.0										
40.0										

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **3**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-211-SH1**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +765.55 (Continued)	
						.	
45.0							
50.0							
						Driller notes apparent shale bedrock at 51.0 ft.	
55.0							
60.0							
65.0							
70.0							
75.0			RB*				
80.0						. . . continued	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **2** OF **3**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

ROCK CORE PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tennessee Valley Authority	Kingston Fossil Plant – Harriman, Tennessee	60095742

Photo No.	Date:
09-211	3-5-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-211 Run 1 (53.5 – 61.5')

Conasauga Shale

AECOM

ROCK CORE PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tennessee Valley Authority	Kingston Fossil Plant – Harriman, Tennessee	60095742

Photo No. **09-211**

Date: 3-5-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-211 Run 2 (61.5 – 69.5')

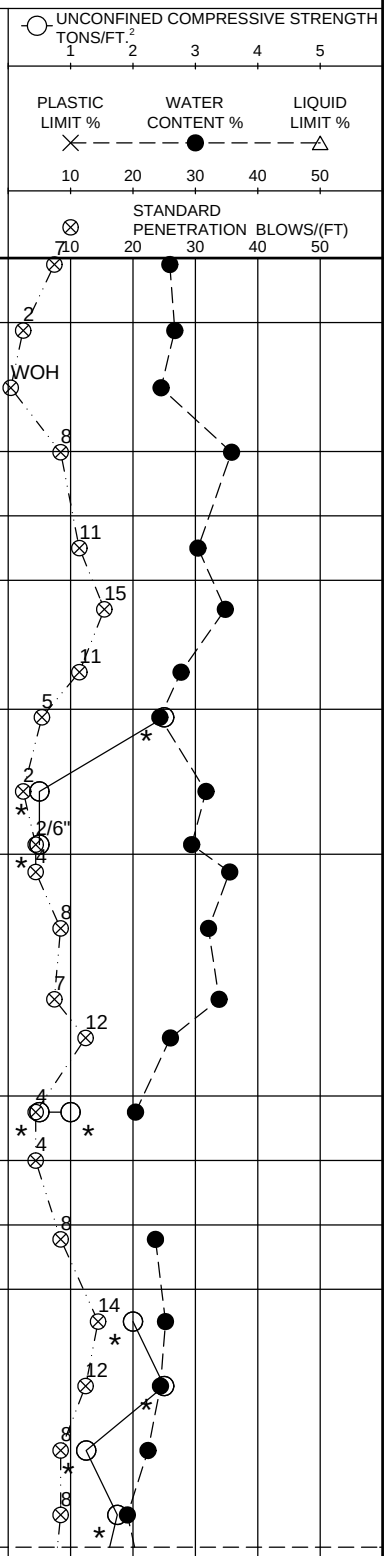
Conasauga Shale

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-409**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +762.61

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silt-sized ash, little fine to medium sand, trace clay - gray - loose - moist (ML-SM) (FA & BA) Failed	
	2.0	2	SS			Fill: Fine to medium sand, little silt - gray - very loose to loose - moist (SP-SM) (BA) Failed	
5.0		3	SS				
	6.0	4	SS			Fill: Fine to medium sand-sized ash, little silt - gray - very loose to loose - moist (SP-SM) (BA) Unfailed	
	8.0	5	SS			Fill: Silt-sized ash, trace fine sand - gray - medium dense - moist (ML) (FA) Unfailed	
10.0	10.0	6	SS			Fill: Silt-sized ash, little fine to medium sand - gray - medium dense - saturated (ML) (FA) Unfailed	
	14.0	7	SS				
15.0		8	SS			Fill: Silty clay, little fine to coarse sand, trace to little fine to medium gravel - reddish brown - very stiff to medium (CL) Unfailed Sample 8: Poor recovery - Gravel noted in tip.	
		9	SS				
	18.5	10	SS*				
20.0		10A	SS			Fill: Silt-sized ash, trace to little clay - gray - loose to medium dense - saturated (ML) (FA) Unfailed	
		11	SS				
		12	SS				
25.0		13	SS			Sample 13: Poor recovery - sand and gravel-sized bottom ash noted.	
	26.0	14	SS			Silty clay, little fine to coarse sand - gray - medium to stiff (CL)	
	28.0	15	SS			Sample 15: No sample recovery	
30.0	30.0	16	SS			Clayey silt, little fine to medium sand - brown and gray - loose - wet (CL-ML)	
	32.0	17	SS			Silty clay, little fine to medium sand - brown and gray - very stiff to stiff (CL)	
35.0		18	SS				
		19	SS				
40.0		20	SS				



. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

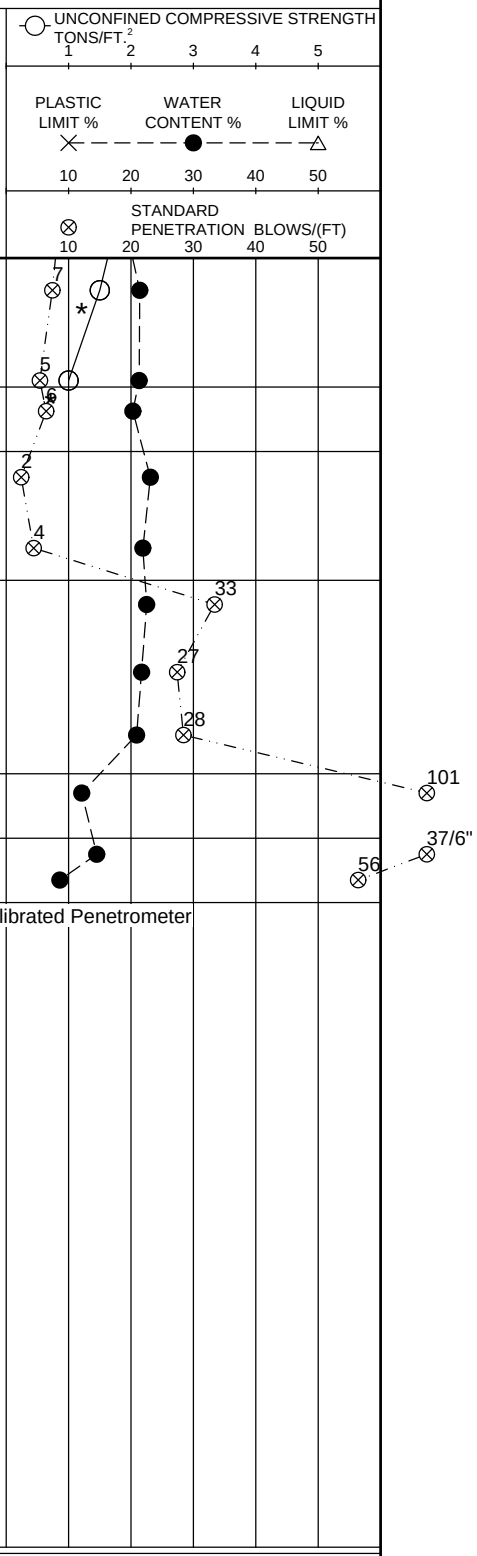
AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-409
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +762.61 (Continued)	
		21	SS			Silty clay, little fine to medium sand - brown and gray - very stiff to stiff (CL)	
		22	SS			44.0	
45.0		23	SS			Silty fine to medium sand, trace clay - gray - loose - saturated (SM)	
						46.0	
		24	SS			Clayey silt, little fine sand - gray - very loose to loose - moist to wet (CL-ML)	
50.0		25	SS			50.0	
		26	SS			Silty fine to medium sand, trace clay and fine gravel - gray - dense to medium dense - wet (SM)	
		27	SS				
55.0		28	SS			Sample 28: Trace wood fragments	
						56.0	
		29	SS			Silty medium to coarse sand, little fine to coarse gravel and weathered shale fragments, trace clay - gray - extremely dense - wet (SM)	
						58.0	
		30	SS			Sandy fine to coarse gravel (weathered shale), little silt and clay - gray - very dense - saturated (GM)	
60.0		30A	SS			60.0	



*Calibrated Penetrometer

End of Boring
Borehole advanced to 8.0 ft. with power auger.
Borehole advanced from 8.0 to 58.0 ft. with rock bit and drilling fluid.
Casing used: 10 ft. of 4 in.
Automatic-Diedrich Hammer used for Standard Penetration Tests.
SS* = SPT value based on first 6 in.
WOH = Weight of Hammer
(FA) = Fly Ash
(BA) = Bottom Ash

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
8.0 ft. WS	2/5/09	Chicago Area - 01	
NORTHING 557107.02	BORING COMPLETED 2/6/09	ENTERED BY KKB	SHEET NO. 2 OF 2
EASTING 2439769.63	RIG/FOREMAN D-120/GD	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

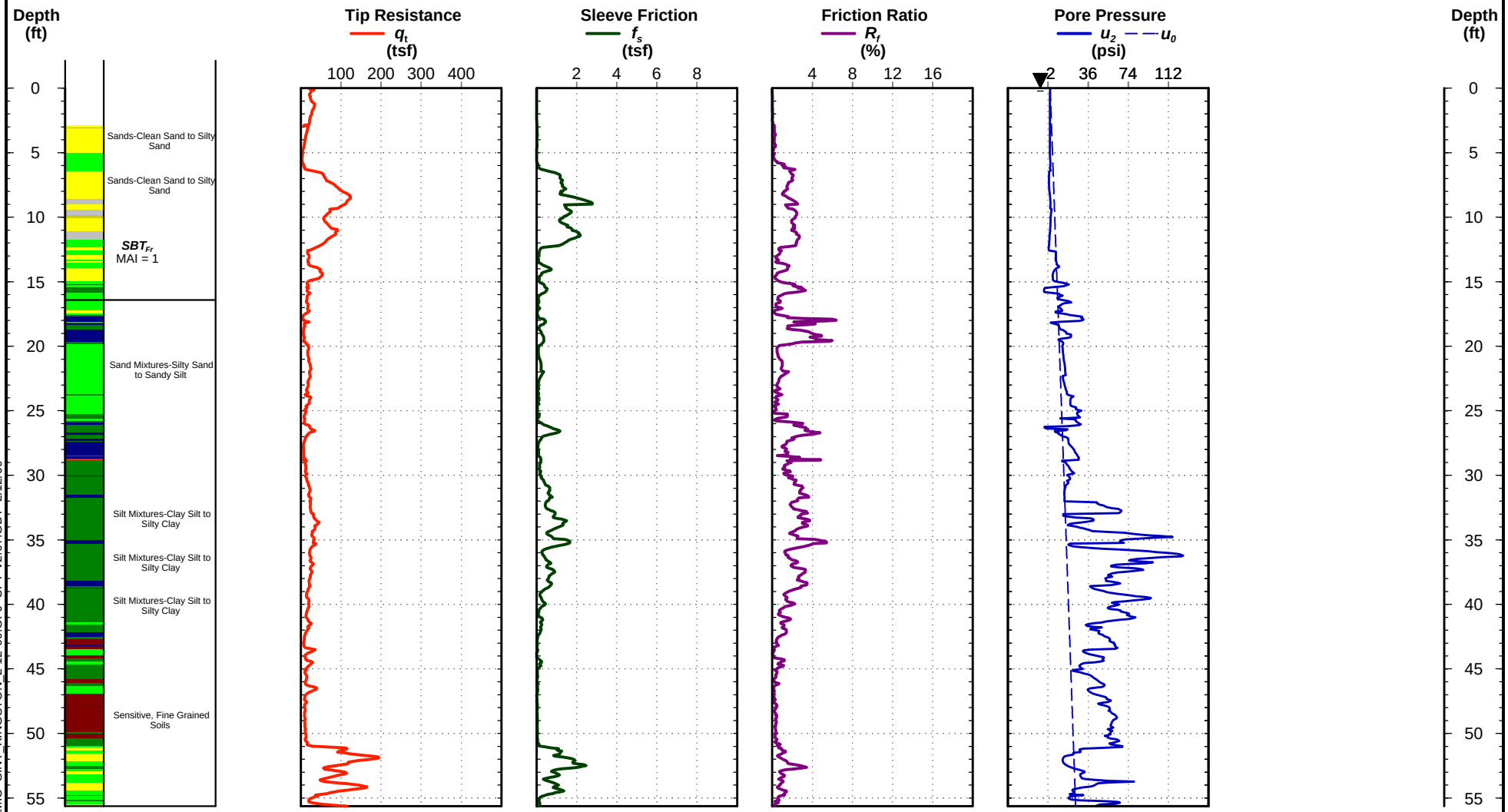
09-409-C2

Project No: 60095742

Date: Feb. 7, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing:
Easting:
Elevation:

Total Depth: 55.6 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-409-C2

Electronic Filename: 09-409-C2.cpt

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)
Project No: 60095742

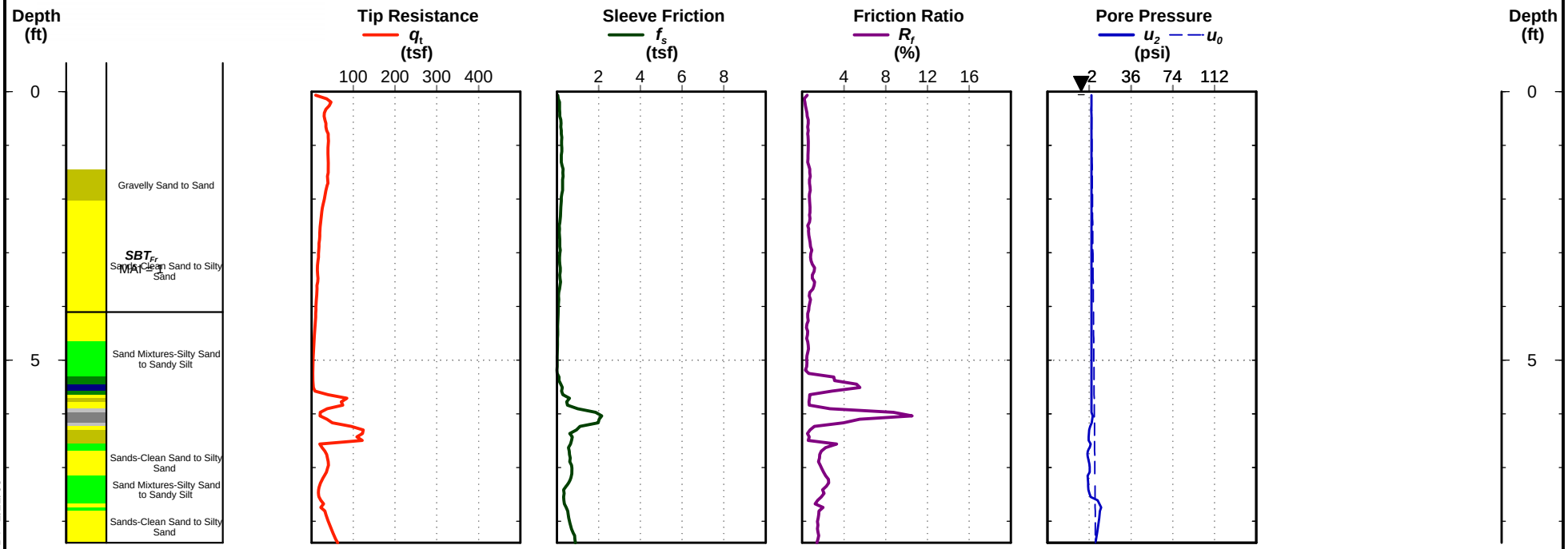
Cone Penetration Test

09-409-C1

Date: Feb. 7, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing:
Easting:
Elevation:

Total Depth: 8.4 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

Electronic Filename: 09-409-C1.cpt

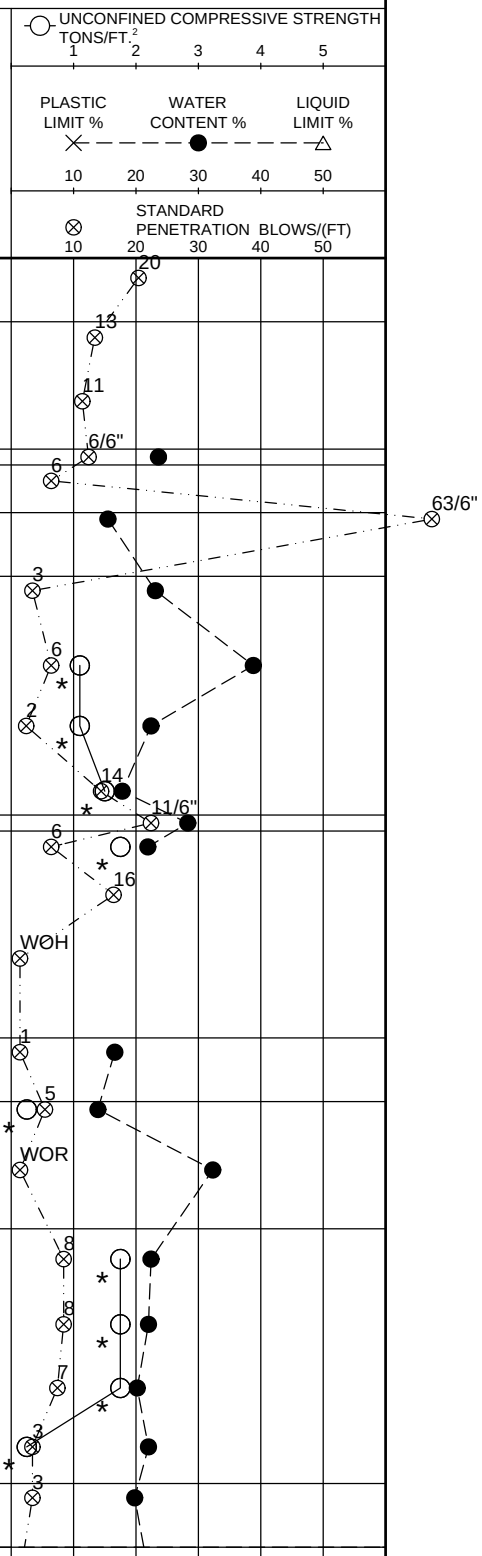
09-409-C1

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-410
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +762.50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silt-sized ash, little fine to medium gravel, trace clay and fine sand - gray - medium dense - moist (ML) (FA)	
	2.0	2	SS			Fill: Silty fine to coarse gravel, little fine to medium sand - gray - medium dense - moist (GM) Moisture content samples not available for Samples 1, 2 and 3.	
5.0		3	SS				
	6.0	4	SS*				
	6.5	4A	SS			Fill: Sandy silt, little fine to coarse gravel, trace clay - gray - medium dense - moist (ML)	
	8.0	5	SS*			Fill: Sandy silt-sized ash, little fine to coarse gravel - gray- loose - wet (ML-SM) (FA) Unfailed	
10.0	10.0	6	SS			Fill: Silty fine to medium sand-sized ash, little fine to medium gravel, trace clay - gray - extremely dense - wet (SM) (FA & BA) Unfailed	
		7	SS			Fill: Silty clay, little fine to medium sand - reddish brown - stiff (CL) Unfailed	
15.0		8	SS				
	17.5	9	SS				
	18.0	9A	SS			Fill: Silty fine to medium sand-sized ash, little clay - gray - medium dense - moist (SM) (BA) Unfailed	
20.0		10	SS			Fill: Silty clay, and fine to coarse sand, trace fine gravel - reddish brown - stiff (CL) Unfailed	
		.	SS			No sample recovery from 20.0 to 24.5 ft.	
		.	SS				
25.0	24.5	11	SS			Fill: Silty clay and silty sand-sized ash, little fine to medium sand, trace fine gravel - gray - very loose (CL & SM) (FA) Unfailed	
	26.5	12	SS			Silty clay, little fine to medium sand, trace fine to medium gravel - brown and black - soft (CL)	
30.0		13	SS				
	30.5	14	SS			Silty clay, little fine to medium sand, trace fine gravel - gray and brown - stiff to soft (CL)	
35.0		15	SS				
		16	SS				
		17	SS				
	38.5	18	SS			Sandy silt, little clay, trace fine to medium gravel - brown and gray - very loose - wet (ML)	
40.0	40.5						



. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-410**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

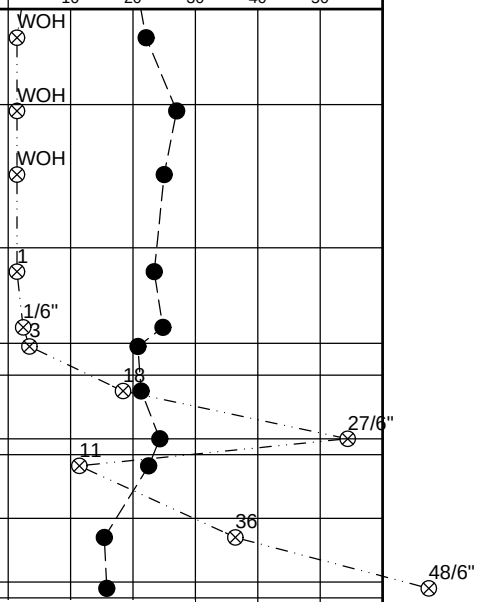
SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +762.50 (Continued)	
		19	SS			Silty fine to medium sand, little clay - brown and gray - very loose - wet (SM) Sample 19: One blow advanced sampler 3.0 ft.	
	43.5						
45.0		20	SS			Silt and fine sand, some to little clay, trace gravel - brown and gray - very loose - saturated (ML)	
		21	SS			Sample 21: WOH advanced sampler 2.5 ft.	
	48.0						
		22	SS			Silty fine to medium sand, little clay - brown - very loose - saturated (SM)	
50.0		23	SS				
	51.0						
		23A	SS			Silty fine to medium sand, little clay - gray - very loose - saturated (SM)	
	52.0						
		24	SS			Sandy silt, little clay, trace fine to medium gravel - brown and gray - medium dense - saturated (ML)	
	54.0						
		24A	SS			Silty fine to medium sand, trace clay and fine gravel - reddish brown - very dense - saturated (SM)	
55.0	54.5						
		25	SS			Silty fine to medium sand, little clay - gray - medium dense - saturated (SM)	
	56.5						
		26	SS			Silty fine to medium sand, trace clay - brown - dense - saturated (SM)	
	58.5						
59.0		27	SS*			Sandy fine to medium gravel (weathered shale), little silt and clay - brown and gray - extremely dense - saturated (GM)	
	59.0						



*Calibrated Penetrometer

End of Boring
Borehole advanced to 12.0 feet with power auger.
Borehole advanced from 12.0 to 58.5 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 10 ft. of 4 in.
Automatic-Mobile Hammer used for Standard Penetration Tests.
SS* = SPT value based on first 6 in.
WOH = Weight of Hammer
WOR = Weight of Rod
(FA) = Fly Ash
(BA) = Bottom Ash

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **4.0 ft. WS; 12.0 ft. BCR; 4.0 ft. ACR**	BORING STARTED **2/8/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557238.48**	BORING COMPLETED **2/8/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2439904.44**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)

Project No: 60095742

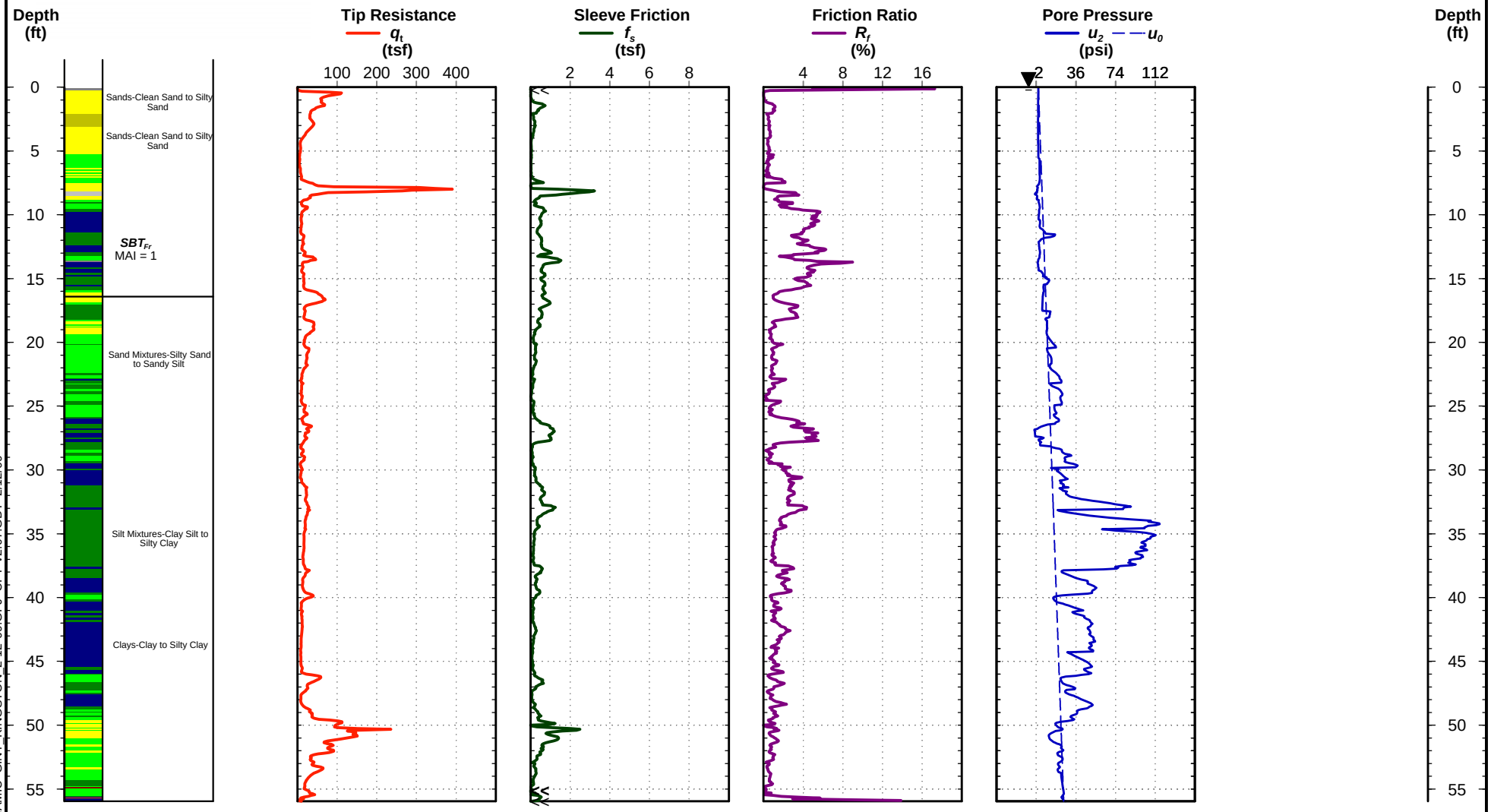
Cone Penetration Test

09-410-C2

Date: Feb. 7, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing:
Easting:
Elevation:

Total Depth: 56.0 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



09-410-C2

Electronic Filename: 09-410-C2.cpt

AECOM

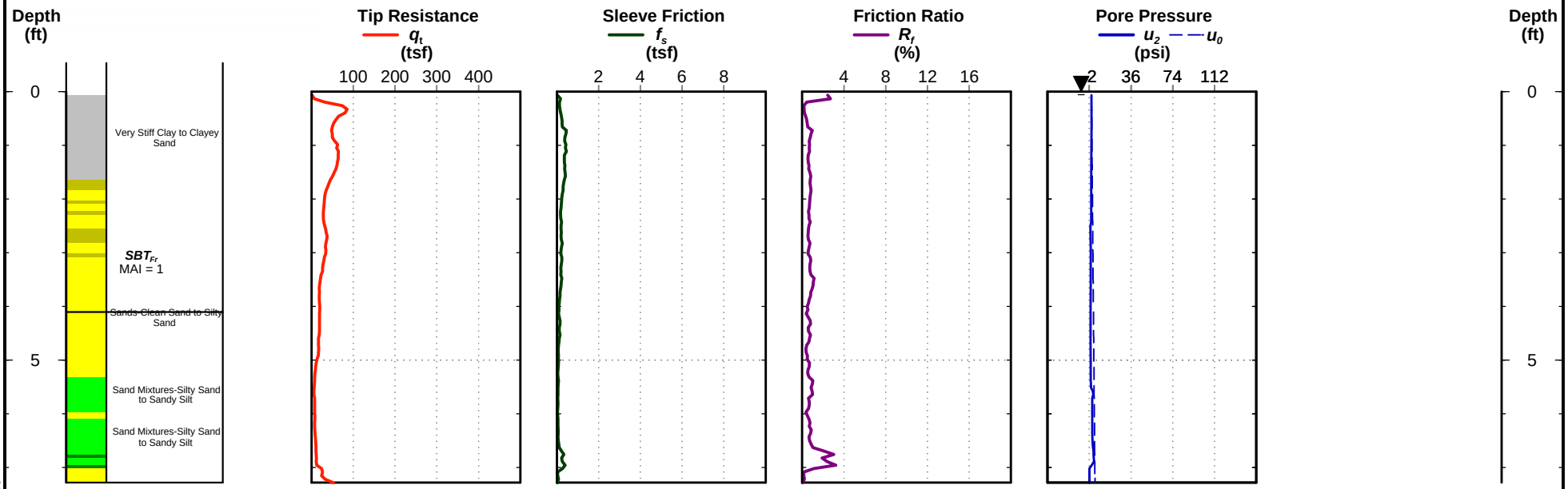
TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) *Cone Penetration Test* **09-410-C1**

Project No: 60095742

Date: Feb. 7, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing:
Easting:
Elevation:

Total Depth: 7.3 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-410-C1

Electronic Filename: 09-410-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-410A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

SURFACE ELEVATION +762.08

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						Drilled without sampling	
5.0			PA			Disturbed samples retrieved following completion of vane shear testing.	
10.0			RB			Vane Shear Test #1 at 12.0 ft. Peak Su >2100 psf, Remolded Su = 1375 psf Unable to obtain sample at 12 to 14 ft. due to coarse gravel	
	14.0						
15.0		1	SS			Fill: Silty clay, trace fine sand - reddish brown (CH) Vane Shear Test #2 at 15.0 ft. Peak Su = 2150 psf, Remolded Su = 1225 psf	
	16.0		RB				
	17.5					Vane Shear Test #3 at 17.5 ft. Peak Su = 2425 psf, Remolded Su = 300 psf	
		2	SS				
	18.5	2A	SS			Fill: Silty fine to medium sand-sized ash, trace fine gravel - gray - saturated (SM) (FA) Unfailed	
20.0			RB				
	20.0	3	SS			Fill: Silty clay, little fine sand - reddish brown (CL)	
	22.0		RB			Fill: Silty fine to medium sand-sized ash - gray - saturated (SM) (FA) & (BA)	
	22.5	4	SS			Vane Shear Test #4 at 20.0 ft. Peak Su = 1425 psf, Remolded Su = 225 psf	
25.0	24.5		RB			Fill: Clayey silt-sized ash and fine to coarse sand, trace fine gravel - gray - saturated (CL-ML) (FA) Unfailed	
		5	SS			Vane Shear Test #5 at 22.5 ft. Peak Su = 1100 psf, Remolded Su = 75 psf	
30.0			RB			Sample 5: Poor recovery. Vane Shear Test #6 at 25.0 ft. Peak Su = 925 psf, Remolded Su = 100 psf Drilled without sampling	
	32.0	6	SS			Vane Shear Test #7 at 27.5 ft. Peak Su = 1825 psf, Remolded Su = 125 psf Silty clay and fine to medium sand - brown (CL)	
	34.0						
35.0			RB			Vane Shear Test #8 at 35.0 ft. Peak Su = 3850 psf, Remolded Su = 1200 psf	
	37.0	7	SS			Vane Shear Test #9 at 37.5 ft. Peak Su = 2825 psf, Remolded Su = 975 psf	
39.0	39.0					Silty clay, little fine to coarse sand - brown - very stiff (CL)	
						End of Boring Borehole advanced to 10.0 ft. with power auger. Borehole advanced from 10.0 to 37.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 30 ft. of 4 in.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **15.0 ft. BCR**	BORING STARTED **2/9/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557248.67**	BORING COMPLETED **2/10/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2439913.94**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)

Project No: 60095742

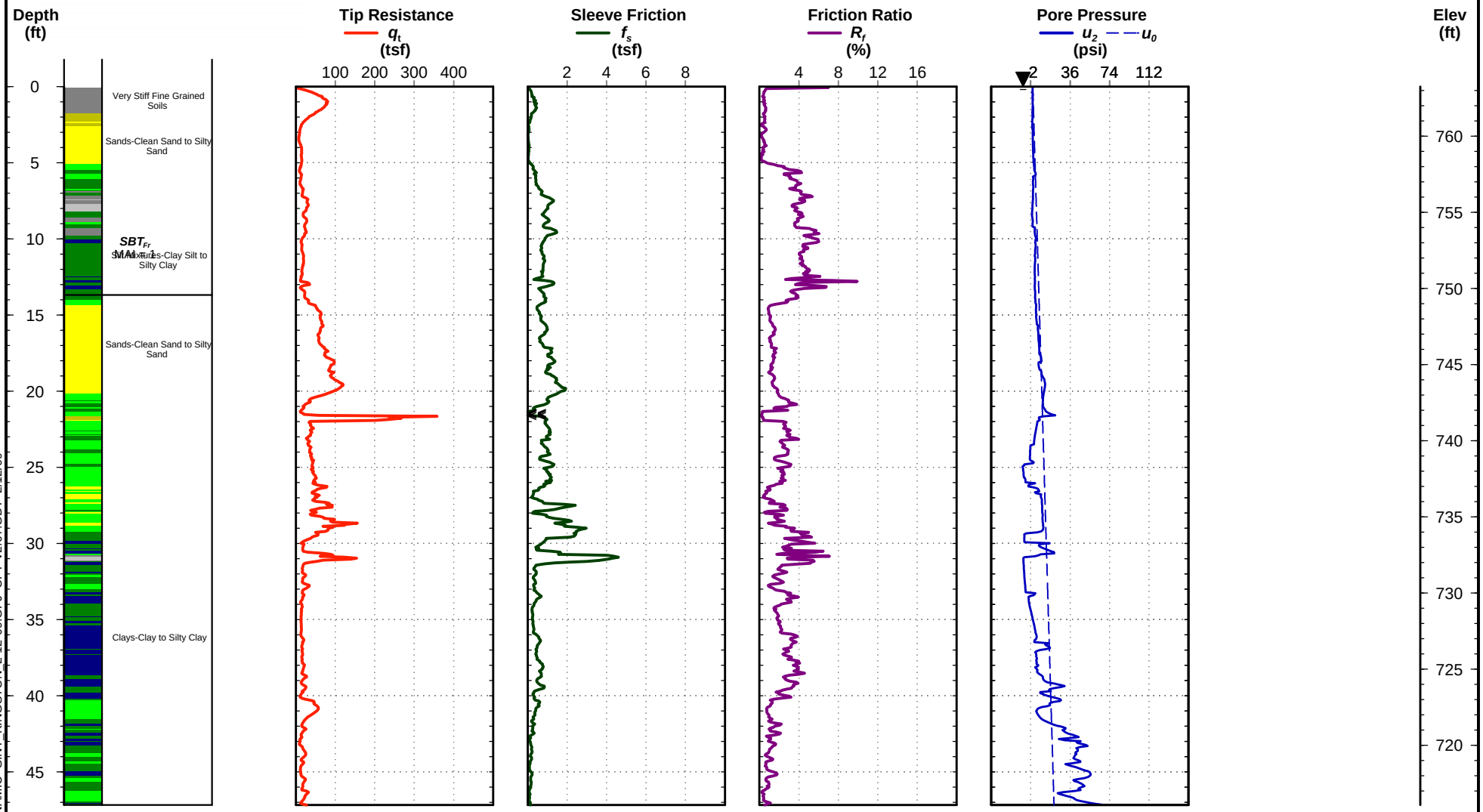
Cone Penetration Test

09-411-C1

Date: Feb. 7, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing: 557420.48
Easting: 2440020.69
Elevation: 763.25 NGVD

Total Depth: 47.2 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



Electronic Filename: 09-411-C1.cpt

09-411-C1

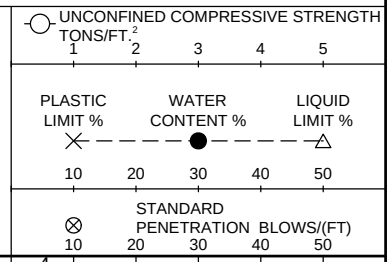
CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

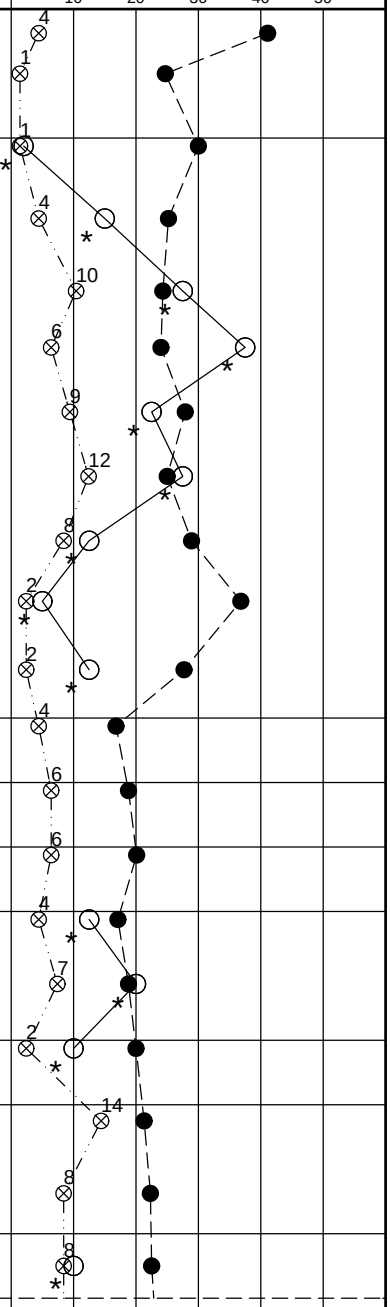
AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-412**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +764.83

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Medium to coarse sand-sized ash, little silt and fine to medium gravel - gray - loose to very loose - moist (SP-SM) (BA) Failed	
		2	AS			Sample 2: No sample recovery with split spoon. Obtained sample from auger.	
						4.0	
5.0		3	SS			Fill: Silty clay, little fine to medium gravel and fine to coarse sand - reddish brown - soft to very stiff (CL) Unfailed	
		4	SS				
		5	SS				
10.0		6	SS				
		7	SS				
15.0		8	SS				
		9	SS				
		10	SS				
20.0		11	SS				
						22.0	
		12	SS			Fill: Fine to medium gravel-sized ash, little coarse sand, trace silt - dark gray - loose - wet (GP) (BA) Unfailed Note: 70% Drilling fluid lost while drilling from 22 to 24 ft.	
						24.0	
25.0		13	SS			Clayey fine to coarse sand, little fine to coarse gravel - brown - loose - wet (SC) Weathered shale noted	
						26.0	
		14	SS			Sandy silt, little fine to medium gravel, trace clay - dark brown - loose - moist to wet (ML) Weathered shale noted	
						28.0	
		15	SS			Clayey fine to coarse sand, little fine to medium gravel - brown - loose - wet (SC)	
30.0		16	SS				
						32.0	
		17	SS			Silty clay, little fine to medium sand - gray - stiff (CL)	
						34.0	
35.0		18	SS			Clayey silt, little fine to medium sand - brown - medium dense to loose - moist to wet (CL-ML)	
		19	SS				
						38.0	
		20	SS			Silty clay, trace fine sand - brown and gray - stiff (CL)	
40.0							





. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742

SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-412**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

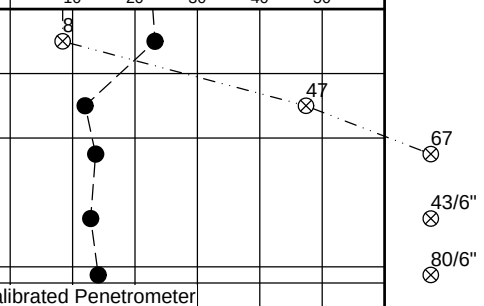
SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +764.83 (Continued)	
		21	SS			Silty clay, trace fine sand - brown and gray - stiff (CL) Sample 21: Sand seam noted.	
	42.0						
		22	SS			Silty medium to coarse sand, little clay - dark gray - dense - moist to wet (SM) Weathered bedrock noted.	
	44.0						
45.0		23	SS			Sandy silt, little clay and fine to coarse gravel - dark brown and gray - very dense to extremely dense - moist to wet (ML) Weathered shale noted.	
		24	SS				
	48.0						
48.5		25	SS*			Weathered shale - dark brown and gray	
	48.5					End of Boring Borehole advanced to 12.0 ft. with power auger. Borehole advanced from 12.0 to 48.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 14 ft. of 4 in. Automatic-Mobile Hammer used for Standard Penetration Tests. (BA) = Bottom Ash	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Dry to 14.0 ft. WD**	BORING STARTED **2/10/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557613.53**	BORING COMPLETED **2/10/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440043.37**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)
Project No: 60095742

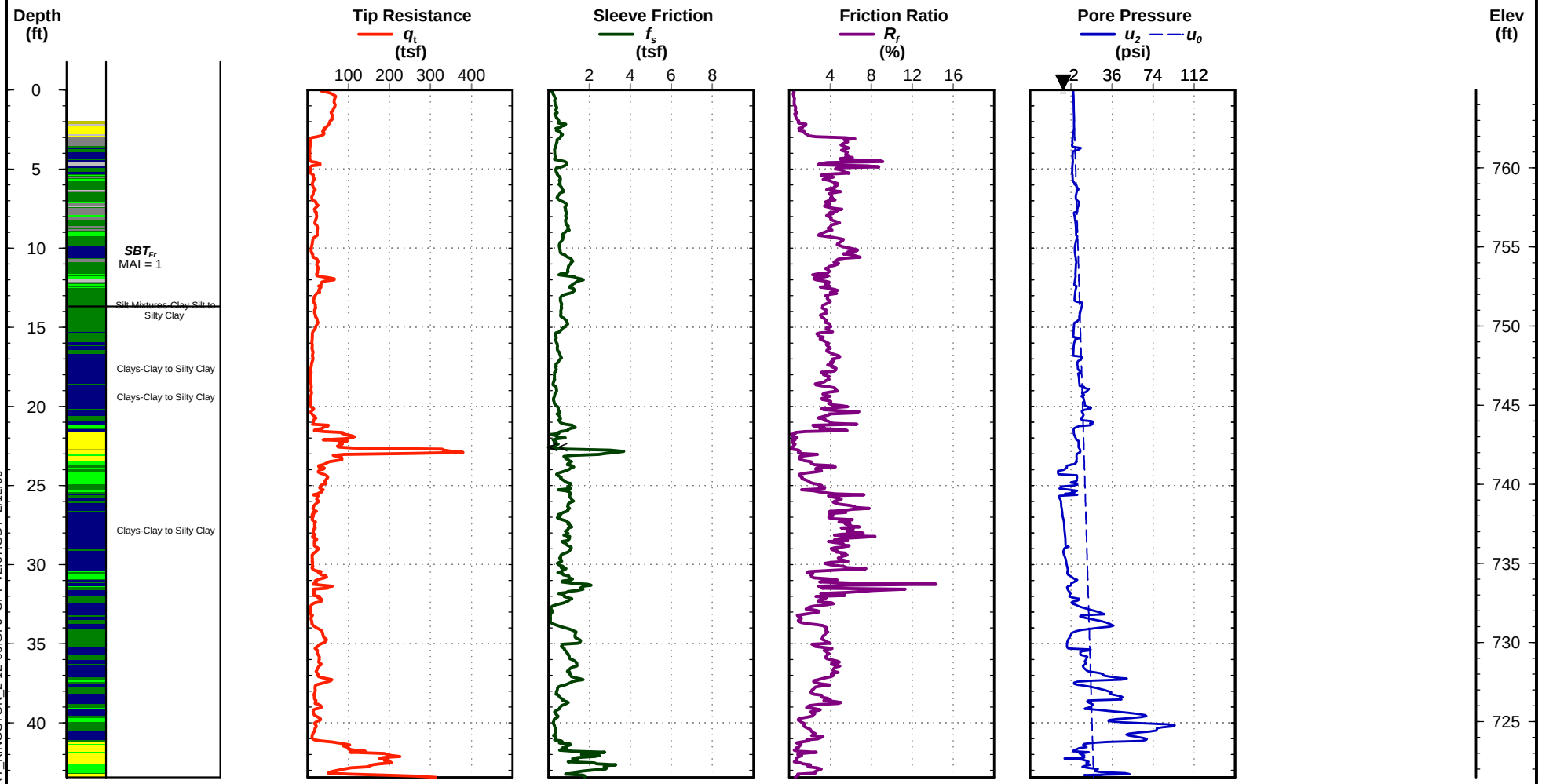
Cone Penetration Test

09-412-C1

Date: Feb. 8, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing: 557617.79
Easting: 2440043.59
Elevation: 764.92 NGVD

Total Depth: 43.4 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

Electronic Filename: 09-412-C1.cpt

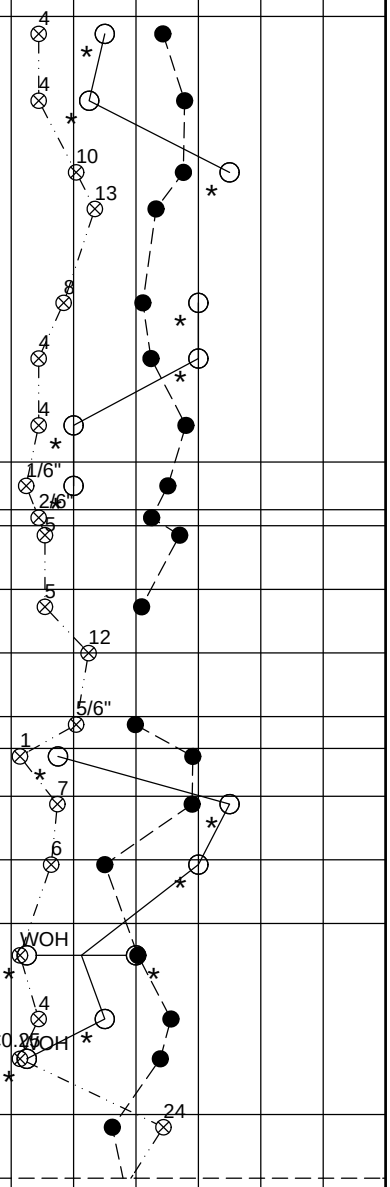
09-412-C1

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-413**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)
STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +764.42	
						Fill: Coarse gravel (limestone), trace silt - gray - wet (GP)	
						4.0	
5.0		1	SS			Fill: Silty clay, little to some fine to coarse sand, trace to little fine gravel - reddish brown - stiff to very stiff (CL) Unfailed	
		2	SS				
		3	SS				
10.0		4	SS			Sample 4: Poor sample recovery. Sample disturbed.	
		5	SS			Sample 5: Wood noted	
15.0		6	SS				
		7	SS				
						18.0	
		8	SS			Fill: Silty fine to coarse sand, little clay, trace coarse gravel - gray - very loose - moist (SM) Unfailed	
						19.5	
20.0		8A	SS			20.0 Fill: Silty clay, trace fine to medium sand - reddish brown - medium (CL) Unfailed	
		9	SS			22.0 Fill: Clayey fine to coarse sand, little silt - brown, black and gray - loose - saturated (SC) Unfailed	
		10	SS			24.0 Fill: Silty fine to medium sand-sized ash, trace clay - gray - loose - saturated (SM) (FA) Unfailed	
25.0		11	SS			Sample 11: No sample recovery after two attempts.	
						26.0	
		12	SS			27.0 Fill: Silty fine to coarse sand-sized ash - gray - medium dense - saturated (SM) (FA & BA) Unfailed	
		12A	SS			28.5 Silty clay, trace to little fine sand - brown and black - medium (CL) Sample 12A: One blow advanced sampler 18 in.	
30.0		13	SS			30.5 Sandy silt, little clay - brown - loose - moist (ML)	
		14	SS			Silty fine to medium sand, little clay - gray - loose - moist to wet (ML)	
						32.5	
		15	SS			Silty clay, little fine to medium sand, trace fine gravel - gray and brown - soft to very stiff (CL)	
35.0		16	SS				
		17	SS				
						38.5	
40.0		18	SS				



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-413
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

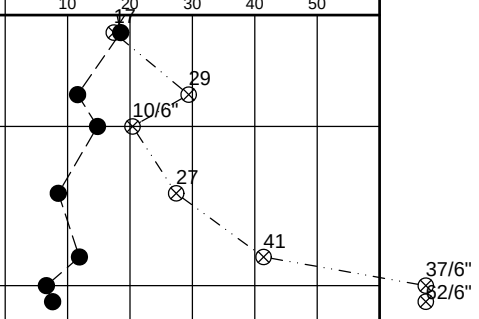
SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)

STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +764.42 (Continued)	
		19	SS			Silty medium to coarse sand, little gravel, trace clay - brown and gray - medium dense - wet (SM)	
		20	SS			Below 39 ft. water from granular layers dilute drilling fluid.	
		20A	SS			44.0 Silty fine to coarse sand, little fine to medium gravel, trace clay - gray - medium dense to dense - moist to wet (SM)	
45.0			RB				
		21	SS			Sample 20A: Weathered shale noted	
		22	SS			49.0	
		22A	SS			Weathered shale - gray	
50.0		23	SS*			50.5	
			DB				
		R 1	DB			51.0 Conasauga Shale. Greenish to greenish gray shaley limestone. Moderately weathered, soft to moderately hard, thinly bedded. Most of core is shattered.	
		RUN 2	DB			53.4	
55.0		RUN 3	DB			Run # 1, Depth (ft.) 50.5 - 51.0, Recovery (%) 100*, RQD (%) 0, Fracture Frequ. Undetermined *May not be representative because much of the core is broken Conasauga Shale. Dark green to brown shale. Moderately weathered to fresh, soft, fissile, laminated to thinly bedded. Bedding approx. 20º from horizontal.	
60.0						Run # 2, Depth (ft.) 51.0 - 53.4, Recovery (%) 100*, RQD (%) 0, Fracture Frequ. Undetermined *May not be representative because much of the core is broken 60.5 Conasauga Shale. Dark green to grayish green to gray shaley limestone. Moderately weathered, with more weathering along fracture, soft (shale) to moderately hard (limestone fragments in shaley matrix). Bedding approx. 30º from horizontal.	
60.5						Run # 3, Depth (ft.) 53.4 - 60.5, Recovery (%) 40.8*, RQD (%) 0, Fracture Frequ. Undetermined *May not be representative because much of the core is broken End of Boring Borehole advanced to 12.0 ft. with power auger. Borehole advanced from 12.0 to 50.5 ft. with rock bit and drilling fluid. Borehole advanced from 50.5 to 60.5 ft. with diamond coring bit and drilling fluid. Borehole grouted upon completion. Casing used: 10 ft. of 4 in. and 50 ft. of 3 in. Automatic-Mobile Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. WOH = Weight of Hammer (FA) = Fly Ash (BA) = Bottom Ash	* Calibrated Penetrometer



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
Dry to 14.0 ft.; 18.0 ft. BCR & ACR	1/28/09	Chicago Area - 01	
NORTHING 557798.09	BORING COMPLETED 1/29/09	ENTERED BY KKB	SHEET NO. 2 OF 2
EASTING 2440033.31	RIG/FOREMAN Mobile B-57 (V.H.)/MB	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

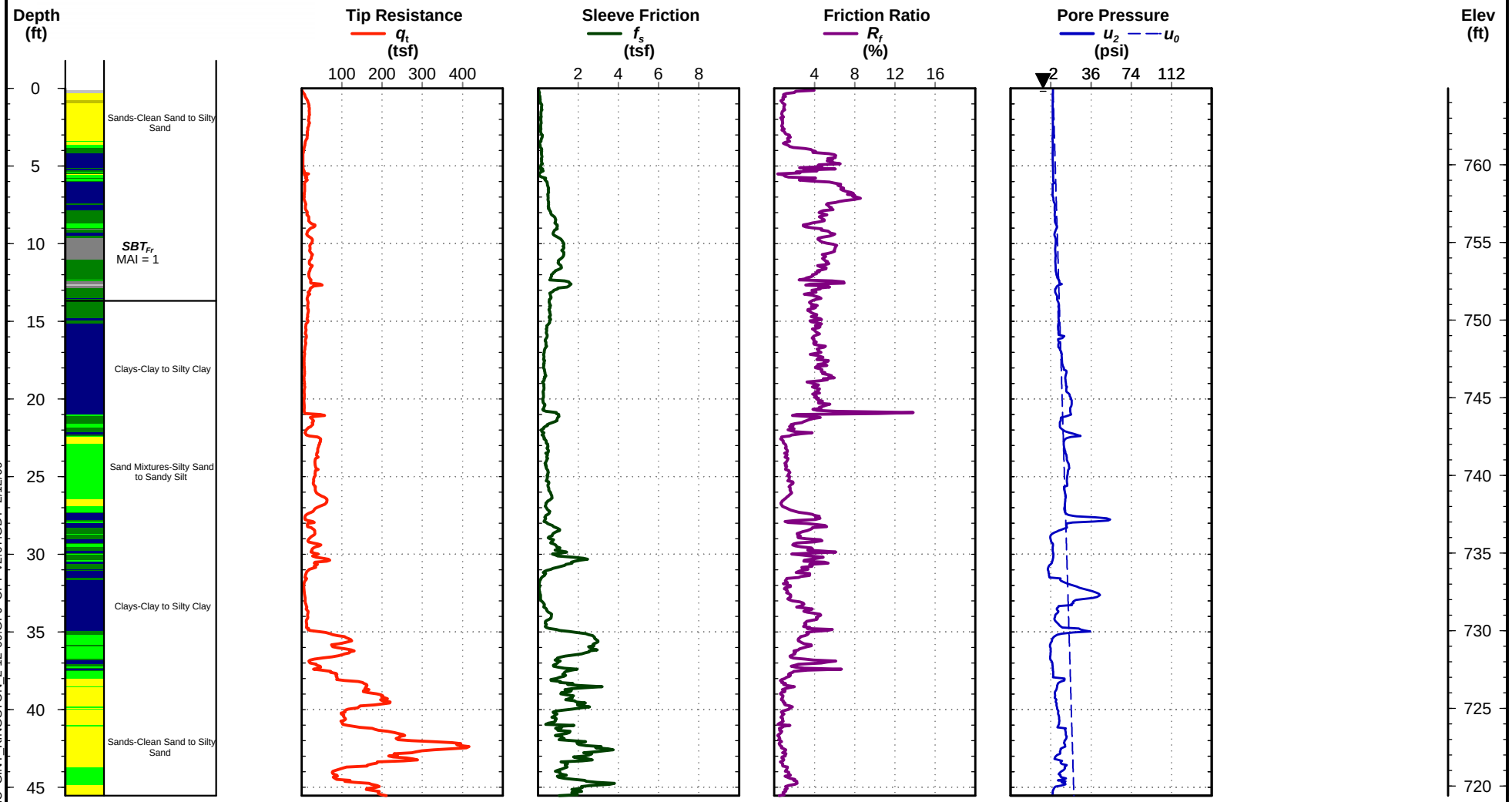
09-413-C1

Project No: 60095742

Date: Feb. 8, 2009
Estimated Water Depth: 0 ft
Rig/Operator: CME-850/CAP

Northing: 557801.02
Easting: 2440036.65
Elevation: 764.92 NGVD

Total Depth: 45.5 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_2-12-09.GPJ CPT V2.07.GDT 2/12/09

09-413-C1

Electronic Filename: 09-413-C1.cpt

AECOM

ROCK CORE PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tennessee Valley Authority	Kingston Fossil Plant – Harriman, Tennessee	60095742

Photo No. **09-413**

Date: 3-17-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-413 Run 1 (50.5 – 60.5')

Conasauga Shale

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-413A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

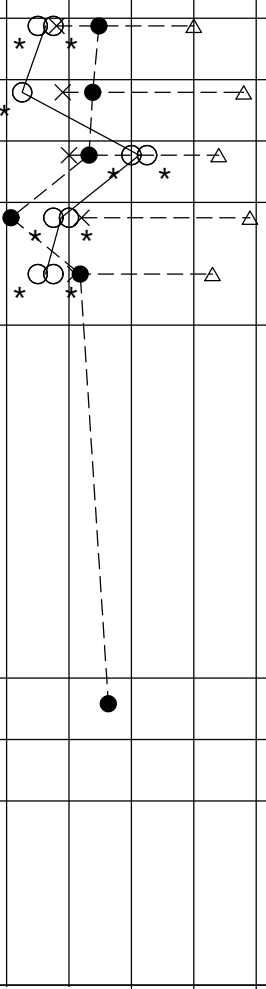
UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

SURFACE ELEVATION +764.49

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
5.0			PA			Vane Shear Test #1 at 6.0 ft. Peak Su = 1300 psf, Remolded Su = 1000 psf Vane Shear Test #2 at 8.5 ft. Peak Su >2025 psf	
	6.0	1	ST			Fill: Silty clay, some fine gravel, some fine to coarse sand - reddish brown - stiff (CL)	
	8.0	2	ST			Fill: Silty clay, trace fine gravel, some fine to coarse sand - reddish brown - very stiff (CL)	
10.0	10.0	3	ST			Fill: Silty clay, little fine gravel, some fine to coarse sand - reddish brown - very stiff (CL) Vane Shear Test #3 at 11.0 ft. Peak Su >1975 psf	
	12.0	4	ST			Fill: Silty clay, trace fine gravel, some fine to coarse sand - reddish brown - very stiff to stiff (CL) Vane Shear Test #4 at 13.5 ft. Peak Su = 3500 psf, Remolded Su = 1700 psf	
15.0	16.0	5	ST			Vane Shear Test #5 at 15.5 ft. Peak Su = 1925 psf, Remolded Su = 1500 psf	
20.0			SS			At 16 to 18 ft. Several attempts to retrieve sample with Shelby tube and split spoon were not successful. Vane Shear Test #6 at 17.5 ft. Peak Su = 1050 psf, Remolded Su = 1000 psf	
25.0	27.5		RB			Vane Shear Test #7 at 28.0 ft. Peak Su = 1625 psf, Remolded Su = 125 psf Vane Shear Test #8 at 30.5 ft. Peak Su = >1900 psf	
30.0	29.5	6	ST			Silt and fine to coarse sand, trace fine gravel, little clay - brown - saturated (ML)	
	31.5		SS			No sample recovery from 29.5 to 31.5 ft. with Shelby tube or split spoon. Vane met refusal at 31.5 ft.	
35.0		7	SS			Silt and fine to coarse sand, trace fine gravel, little clay - brown (ML) Coarse gravel noted from 31.5 to 32.5 ft.	
37.5		8	SS			Sample 7 and 8: No recovery with Shelby tube. Obtained sample by pushing split spoon.	
		9	SS			Moisture contents not available for samples obtained by pushing split spoon.	
	37.5					Vane Shear Test #9 at 34.5 ft. Peak Su = 1375 psf, Remolded Su = 275 psf Vane Shear Test #10 at 36.5 ft. Peak Su = >2050 psf Vane met refusal at 37.5 ft. End of Boring	



*Calibrated Penetrometer

. . . continued

*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-413A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +764.49 (Continued)	
						Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 35.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 10 ft. of 4 in.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Available**	BORING STARTED **1/30/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557801.37**	BORING COMPLETED **1/30/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440036.3**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

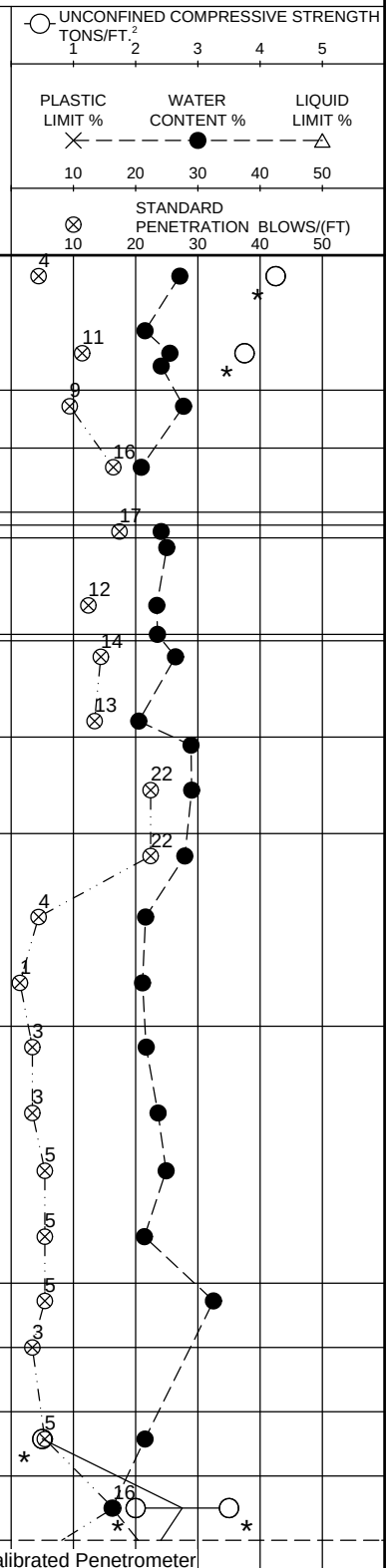
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-501**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +765.02

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Fill: Silty clay, little fine to medium sand, trace fine gravel - reddish brown - stiff (CL)	
		2	SS			Sample 2A: Bottom ash seam noted.	
		2A	SS				
		2B	SS				
						4.2	
5.0		3	SS			Fill: Silty fine to coarse sand-sized ash - brownish gray - loose - wet (SM) (BA) Failed	
						6.0	
		4	SS			Fill: Silty fine to coarse sand-sized ash, trace fine gravel - gray - medium dense - wet (SM) (FA & BA) Failed	
						8.0	
		5	SS			8.4	
		5A	SS			Fill: Silty fine to coarse sand-sized ash, trace fine gravel - gray - medium dense - saturated (SM) (BA) Failed	
		5B	SS			8.8	
10.0						Fill: Sandy silt sized ash, trace clay - gray - medium dense - saturated (ML) (FA) Failed	
		6A	SS				
		6B	SS			11.8	
						Fill: Silty fine to coarse sand sized ash, trace fine gravel - gray - medium dense - saturated (SM) (BA) Failed	
						12.0	
		7	SS			Fill: Silty clay, little fine to medium sand, trace fine gravel and roots - reddish brown (CL) Note: Sample disturbed	
15.0		8A	SS				
						15.0	
		8B	SS			Fill: Silty fine to medium sand-sized ash, trace clay and fine gravel - gray - medium dense - saturated (SM) (FA & BA) Failed	
		9	SS				
						18.0	
						Fill: Sandy silt-sized ash, trace clay - gray - medium dense - saturated (ML) (FA) Failed Note: Bottom ash present.	
		10	SS				
20.0						Fill: Silty fine to coarse sand-sized ash, trace fine gravel - gray - medium dense to very loose - saturated (SM) (BA) Failed	
		11	SS				
		12	SS				
						24.0	
25.0		13	SS			Fill: Silty fine to coarse sand-sized ash, trace fine gravel - gray - very loose to loose - saturated (SM) (BA) Failed	
		14	SS				
		15	SS				
30.0							
		16	SS				
						32.0	
		17	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray - loose - saturated (ML) (FA) Failed	
						34.0	
35.0			SS			No sample recovery	
						36.0	
		18	SS			Sandy silt, some clay - brown and gray to reddish brown - loose - moist (ML)	
						38.0	
40.0		19	SS			Clayey silt, little to some fine sand - brown and gray - medium dense to loose - moist (CL-ML)	



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 1 OF 2

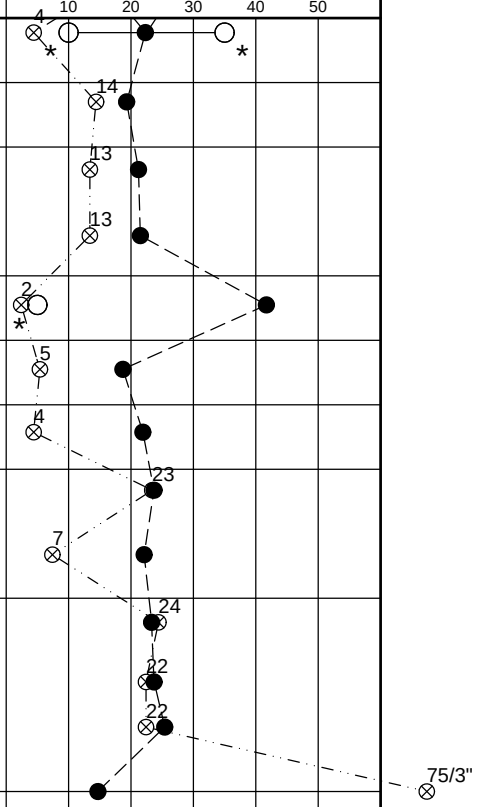
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-501**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +765.02 (Continued)	
		20	SS			Clayey silt, little to some fine sand - brown and gray - medium dense to loose - moist (CL-ML) Sample 20: Gray fine sand pockets and plant fibers noted.	
	42.0	21	SS			Silty fine to coarse sand, some clay, trace fine gravel - gray - medium dense - saturated (SM)	
45.0	44.0	22	SS			Silty fine to medium sand, little clay, trace fine gravel and shells - gray - medium dense - saturated (SM)	
		23	SS				
	48.0	24	SS			Clayey silt, little to some fine sand - dark gray and black - very loose - moist (CL-ML)	
50.0	50.0	25	SS			Silty fine to medium sand, little to some clay - gray - loose - moist to wet (SM)	
	52.0	26	SS			Sandy silt, some clay - reddish brown - loose - wet (ML)	
55.0	54.0	27	SS			Sandy silt, little to trace clay - gray and reddish brown - medium dense to loose - saturated (ML)	
		28	SS				
60.0	58.0	29	SS			Silty fine to medium sand, trace clay - gray to reddish brown - medium dense - saturated (SM)	
		30	SS				
		31	SS				
64.8	64.0	32	SS			Silty fine to coarse sand, trace clay and fine gravel - brown - extremely dense - moist to wet (SM) Sandstone noted at lower tip of sample.	
	64.8					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 64.0 ft. with roller bit and drilling fluid. Borehole grouted upon completion. Casing used: 7 ft. of 4 in. Automatic-CME Hammer used for Standard Penetration Tests. WOH = Weight of Hammer (FA) = Fly Ash (BA) = Bottom Ash	



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **4.2 ft. WS**	BORING STARTED **4/2/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557396.4**	BORING COMPLETED **4/3/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440546.47**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

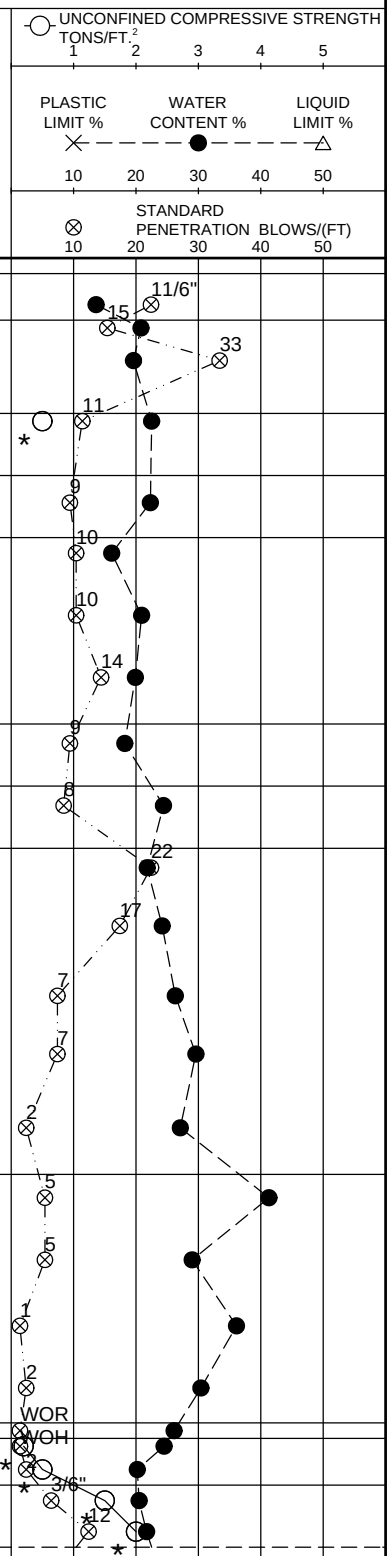
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-601**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +773.44

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
			PA				
			PA				
						0.5 Driller's note: 2 to 3 in. gravel	
		1	SS			2.0 Fill: Silty fine to medium sand-sized ash - gray - medium dense - moist (SM) (FA) Unfailed	
		1A	SS			Fill: Sandy silt-sized ash - gray - medium dense to dense - moist (ML) (FA) Unfailed	
		2	SS				
5.0						5.0 Fill: Silty fine to medium sand-sized ash, trace clay - brown and gray - medium dense - moist (SM) (FA) Unfailed	
		3	SS			7.0 Sample 3: Sample intermixed with brown silty clay.	
		4	SS			9.0 Fill: Silt-sized ash, little fine sand - gray - loose - moist (ML) (FA) Unfailed	
10.0		5	SS			Fill: Fine to medium sand-sized ash, little silt - gray - medium dense - moist (SP-SM) (FA) Unfailed	
		6	SS				
		7	SS				
15.0						15.0 Fill: Silty fine to coarse sand-sized ash, little clay - gray - loose - moist (SM) (BA) Unfailed	
		8	SS			17.0 Fill: Sandy silt-sized ash, little clay - gray - loose - moist (ML) (FA) Unfailed	
		9	SS			19.0 Fill: Silty fine to coarse sand-sized ash - gray - medium dense to very loose - moist (SM) (FA & BA) Unfailed	
20.0		10	SS				
		11	SS				
		12	SS				
25.0		13	SS				
		14	SS			29.5 Fill: Silt-sized ash, little fine sand - gray - loose to very loose - wet (ML) (FA) Unfailed	
30.0		15	SS				
		16	SS				
35.0		17	SS				
		18	SS			37.5	
		19	SS*			38.0 Clayey silt - brown and gray - very loose - moist (CL-ML)	
		19A	SS			Silty clay, little fine to medium sand - brown and gray - soft to medium (CL)	
		19B	SS			39.5 Clayey silt, little fine sand - brown - medium dense to very loose - moist (CL-ML)	
40.0		20	SS				
		20A	SS				



. . . continued

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

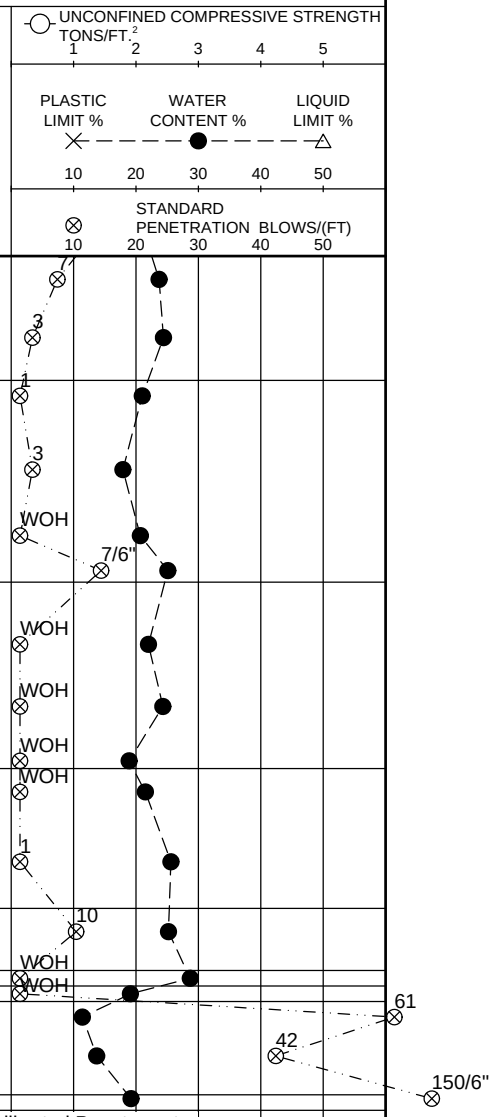
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-601
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +773.44 (Continued)	
		21	SS			Clayey silt, little fine sand - brown - medium dense to very loose - moist (CL-ML)	
45.0		22	SS				
	45.5	23	SS			Silty sand, little clay - brown - very loose to medium dense - saturated (SM)	
		24	SS				
50.0		25	SS				
	52.0	25A	SS			Sample 25A: Sample noted as wet - not saturated Sandy silt, little clay - brown - very loose - saturated (ML)	
		26	SS				
55.0		27	SS				
	58.0	28	SS*				
		28A	SS			Sandy silt, little clay - gray - very loose - saturated (ML)	
60.0		29	SS				
	62.5	30	SS			Silty fine to medium sand, trace clay - gray - medium dense - moist to wet (SM)	
65.0	64.5	31	SS*			Sandy silt, trace clay - brown, black and gray - very loose - saturated (ML)	
	65.0	31A	SS				
	65.5	31B	SS			Silty fine to medium sand, trace clay and fine gravel - brown and gray - very loose - wet (SM)	
		32	SS				
69.0	68.5	33	SS*			Silty fine to medium sand, trace fine gravel - brown and gray - dense to very dense - wet (SM)	
	69.0					Clayey silt, little sand and fine to coarse gravel and weathered shale - brown and black - extremely dense - moist (CL-ML)	

End of Boring
Boring advanced to 11.0 ft. with power auger.
Boring advanced from 11.0 to 68.5 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 10 ft. of 4 in.
Automatic-Mobile hammer used for Standard Penetration Tests.
SS* = SPT value based on first 6 in.
WOH = Weight of Hammer
WOR = Weight of Rod
(FA) = Fly Ash
(BA) = Bottom Ash



*Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
11.0 ft. WS	1/18/09	Chicago Area - 01	
NORTHING 556709.83	BORING COMPLETED 1/19/09	ENTERED BY KKB	SHEET NO. 2 OF 2
EASTING 2441602.14	RIG/FOREMAN Mobile B-57 (V.H.)/MB	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)

Project No: 60095742

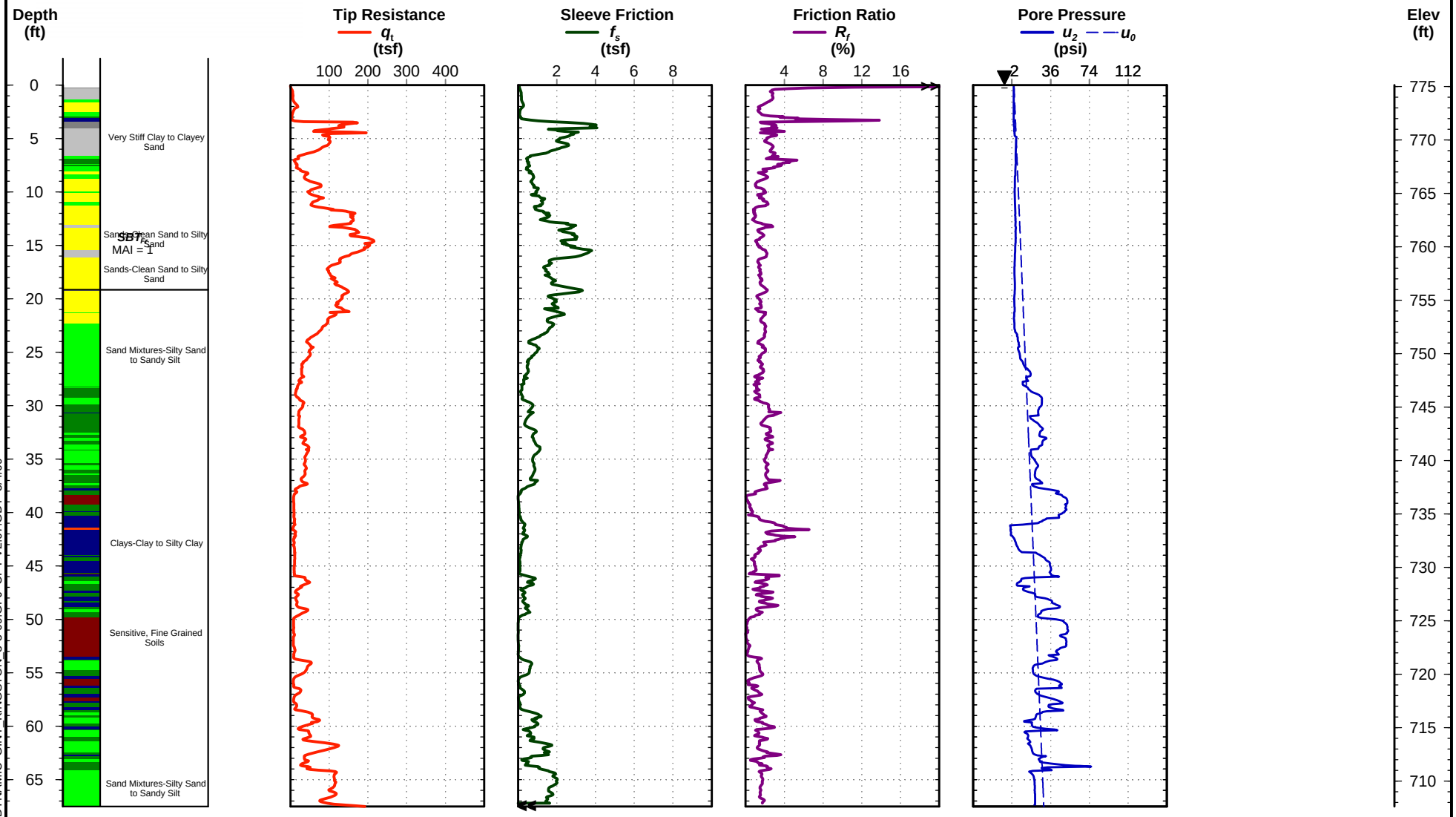
Cone Penetration Test

09-601-C3

Date: Feb. 20, 2009
Estimated Water Depth: 0 ft
Rig/Operator: Mobile 57/CAP

Northing: 556710.78
Easting: 2441601.88
Elevation: 775.14 NGVD

Total Depth: 67.5 ft
Termination Criteria: Refusal
Cone Size: 10T Tension Cone



09-601-C3

Electronic Filename: 09-601-C3.cpt

CPT REPORT - DYNAMIC GINT_KINGSTON_3-3-09.GPJ CPT V2.07.GDT 3/4/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)
Project No: 60095742

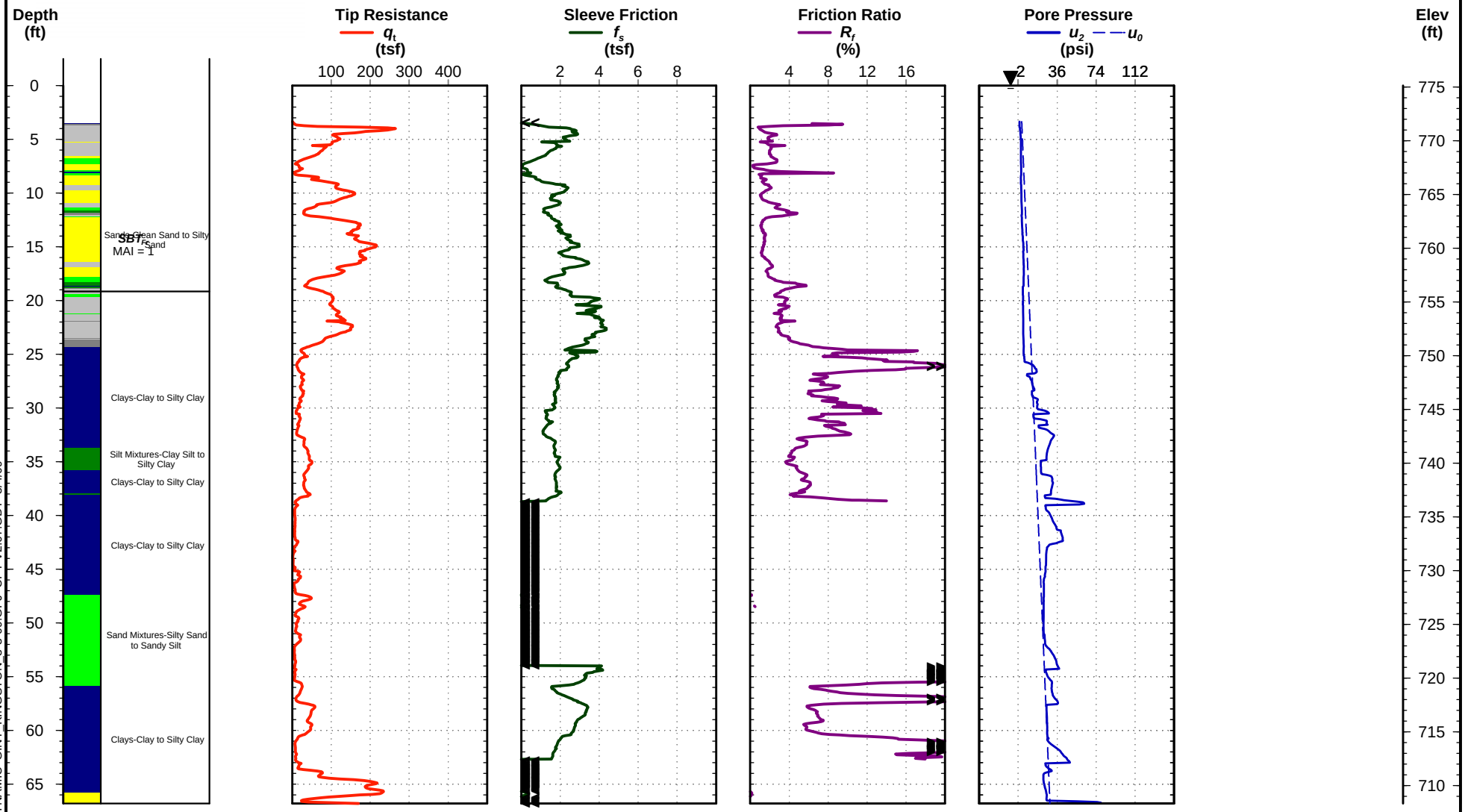
Cone Penetration Test

09-601-C2

Date: Feb. 20, 2009
Estimated Water Depth: 0 ft
Rig/Operator: Mobile 57/CAP

Northing: 556710.78
Easting: 2441601.88
Elevation: 775.14 NGVD

Total Depth: 66.8 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_3-3-09.GPJ CPT V2.07.GDT 3/4/09

09-601-C2

Electronic Filename: 09-601-C2.cpt

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee)
Project No: 60095742

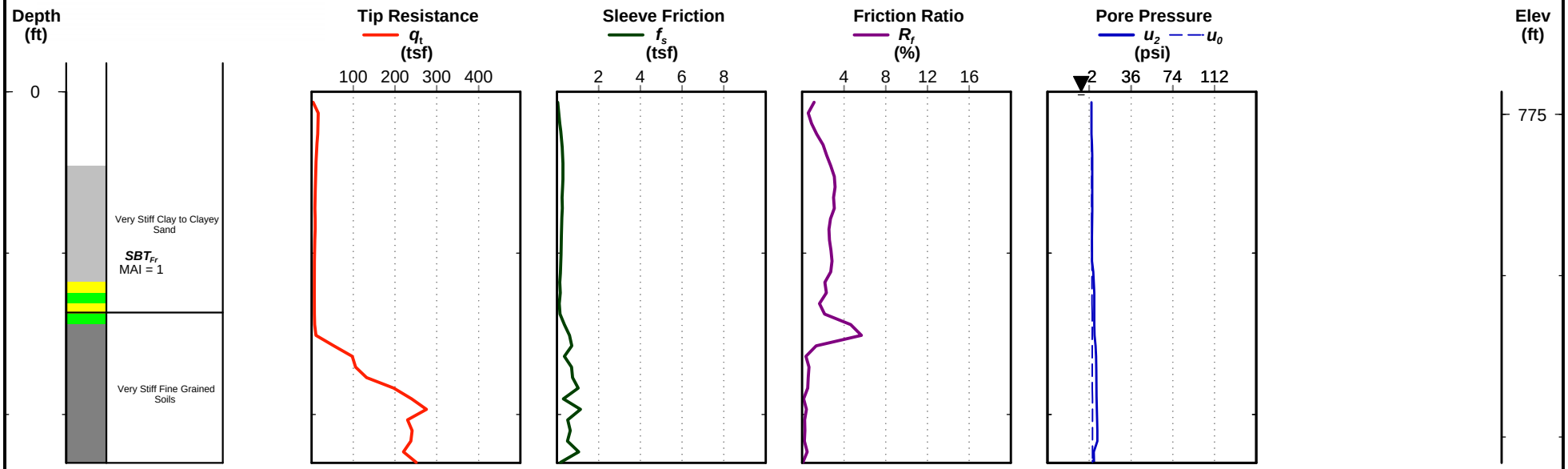
Cone Penetration Test

09-601-C1

Date: Feb. 20, 2009
Estimated Water Depth: 0 ft
Rig/Operator: Mobile 57/CAP

Northing: 556710.78
Easting: 2441601.88
Elevation: 775.14 NGVD

Total Depth: 2.3 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_3-3-09.GPJ CPT V2.07.GDT 3/4/09

09-601-C1

Electronic Filename: 09-601-C1.cpt

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-601A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +775.08	
5.0			PA				
10.0							
15.0							
20.0							
25.0			RB				
30.0							
35.0							
40.0						Disturbed samples retrieved following completion of vane shear testing. Vane Shear Test #1 at 40.5 ft. Peak Su = 1250 psf, Remolded Su = 750 psf 40.0	
						. . . continued	* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-601A**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +775.08 (Continued)	
		1	ST			Silty clay, little fine to medium sand - grayish brown - stiff to very stiff (CL)	
	42.0						
		2	ST			Silty clay and fine to medium sand - brown - very stiff (CL) Vane Shear Test #2 at 42.0 ft. Peak Su >2100 psf	
	44.0						
45.0		3	ST			Vane Shear Test #3 at 42.5 ft. Peak Su = 3775 psf, Remolded Su = 975 psf	
	46.0						
		4	ST			Clayey silt and fine to medium sand - brown - saturated (CL-ML) Vane Shear Test #4 at 44.0 ft. Peak Su = 3075 psf, Remolded Su = 725 psf	
48.0	48.0					Sandy silt, little clay - brown - moist to wet (ML) Vane Shear Test #5 at 46.0 ft. Peak Su = 2800 psf, Remolded Su = 425 psf Vane Shear Test #6 at 48.0 ft. Peak Su = 2375 psf, Remolded Su = 500 psf	
						End of Boring Boring advanced to 7.5 ft. with power auger. Borehole advanced from 7.5 ft to 46.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in.	

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **3/5/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **556707.26**	BORING COMPLETED **3/5/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441601.62**	RIG/FOREMAN **Mobile B-57 (G.B.)/RT**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-601B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

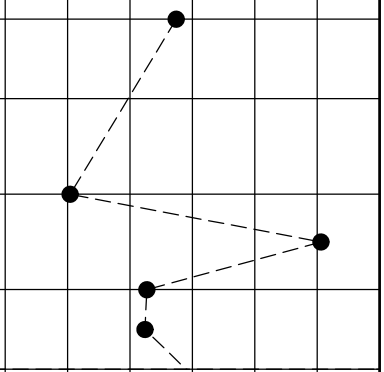
SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +775.05	
5.0			PA				
10.0							
15.0							
20.0			RB			Following retrieval of 3 in. tube sample, cuttings were taken from top and bottom for water content testing. Samples designated with an "A" were taken from bottom of sample; the others were taken from top.	
25.0							
						Recovery information not available	
						29.5	
30.0		1	OST			Sample 1 was not opened.	
						32.0	
			RB				
35.0						35.0	
		2	OST			Sample 2 was not opened.	
		2A	OST			38.0	
		3	OST			Sample 3 was not opened.	
40.0		3A	OST			40.5	
						. . . continued	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **2**

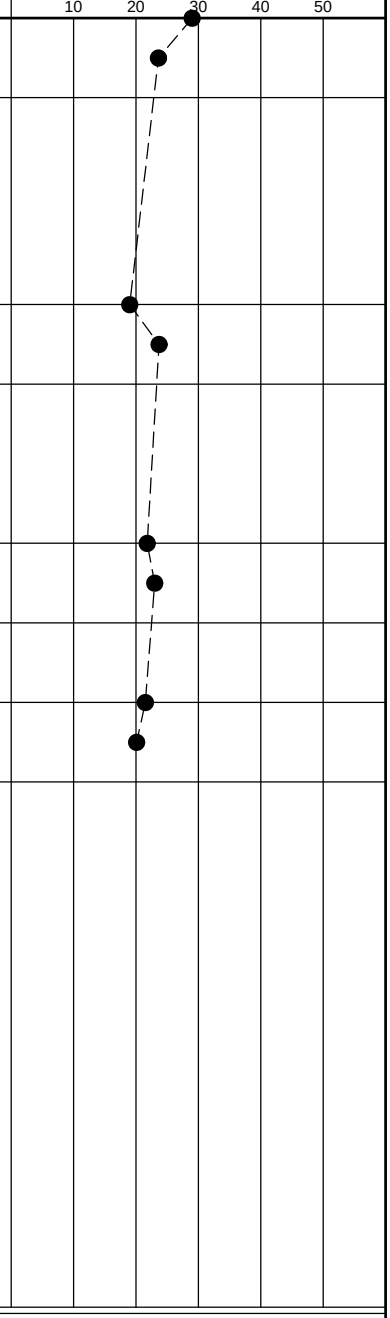
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-601B**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +775.05 (Continued)	UNIT DRY WT. LBS./FT.^{3}
		4	OST			Sample 4 was not opened.	
		4A	OST			43.0	
45.0			RB				
						49.5	
50.0		5	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 5 description.	
		5A	OST			52.0	
55.0			RB				
						57.0	
		6	OST			Sample 6 was not opened.	
		6A	OST			59.5	
60.0			RB				
						62.0	
		7	OST			Sample 7 was not opened.	
64.5		7A	OST			64.5	
						End of Boring Boring advanced to 10 ft. with power auger. Borehole advanced from 10 ft to 62 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 18 ft. of 4 in.	



The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **3/17/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **556706.84**	BORING COMPLETED **3/17/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441608.65**	RIG/FOREMAN **D-50/RT**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

AECOM

TVA Kingston Coal Ash Pond RCA (Kingston,Tennessee) Cone Penetration Test

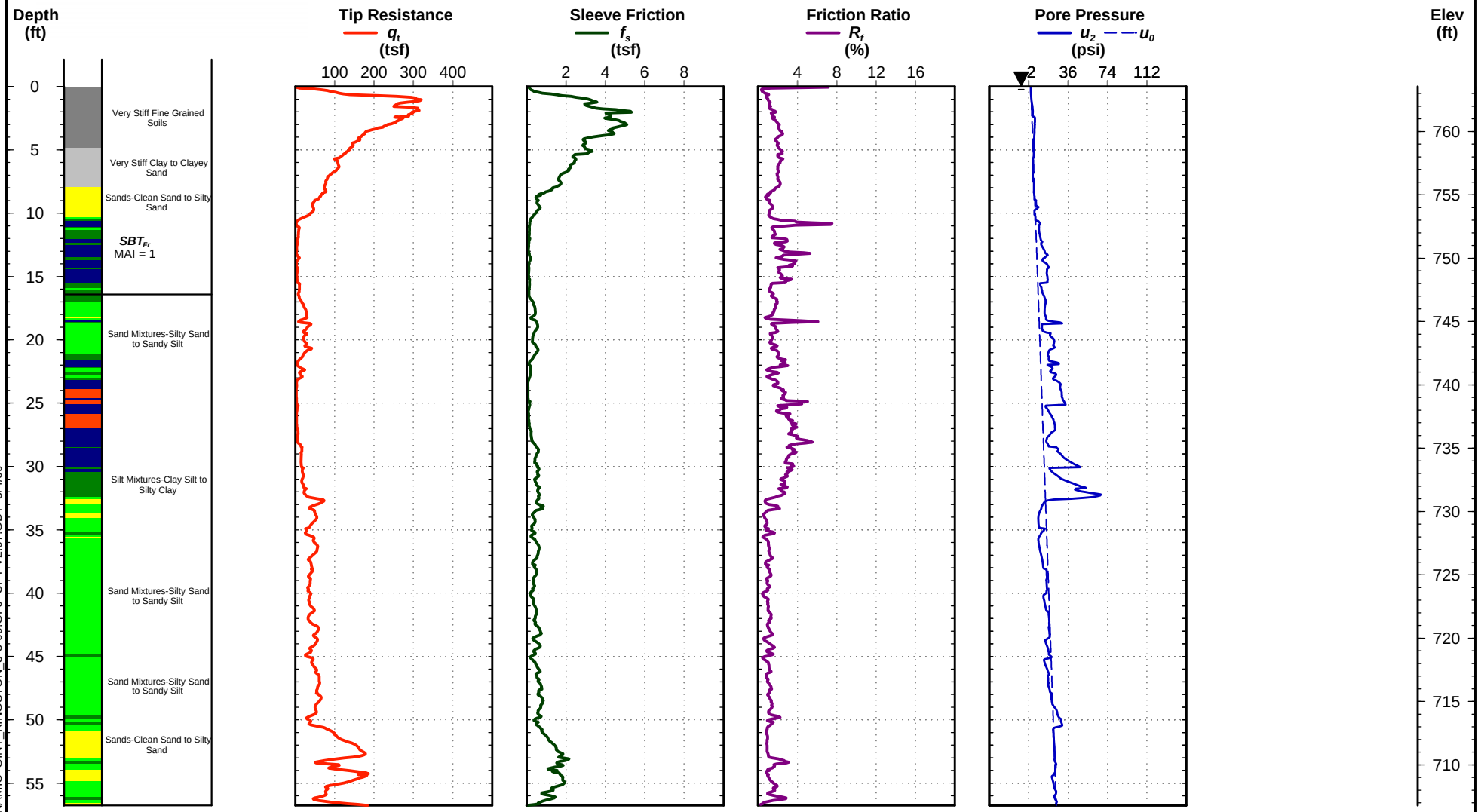
09-701-C1

Project No: 60095742

Date: Feb. 12, 2009
Estimated Water Depth: 0 ft
Rig/Operator: D-120/CAP

Northing: 556672.79
Easting: 2441943.99
Elevation: 763.56 NGVD

Total Depth: 56.8 ft
Termination Criteria: Refusal
Cone Size: 5T Tension Cone



CPT REPORT - DYNAMIC GINT_KINGSTON_3-3-09.GPJ CPT V2.07.GDT 3/4/09

09-701-C1

Electronic Filename: 09-701-C1.cpt

SI-900

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-900-SH1**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +766.08	
5.0			PA				
10.0							
15.0							
20.0							
25.0			RB				
30.0							
35.0							
40.0						. . . continued	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **1** OF **3**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-900-SH1**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +766.08 (Continued)	UNIT DRY WT. LBS./FT.^{3}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5) / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % (10 20 30 40 50) / STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)
45.0								
50.0								
55.0			RB					
60.0								
65.0								
70.0						70.0 Driller's note: Difficult drilling from 70 to 105 ft. Hole advanced from 70 to 105 ft. with 2-15/16 in. RB. After advancement to 105 ft., hole reamed out with 3-7/8 in. RB prior to inclinometer installation.		
75.0			RB					
80.0						. . . continued		

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742** SHEET NO. **2** OF **3**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

SI-900

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-900-SH1
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}: 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %: 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT): 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +766.08 (Continued)	
						Driller's note: Difficult drilling from 70 to 105 ft. Hole advanced from 70 to 105 ft. with 2-15/16 in. RB. After advancement to 105 ft., hole reamed out with 3-7/8 in. RB prior to inclinometer installation.	
85.0							
90.0							
			RB				
95.0							
100.0							
105.0						105.0	
						End of Boring Casing used: 50 ft. of 4 in. Borehole advanced to 8 ft. with power auger Borehole advanced from 8 to 105 ft. with rock bit and drilling fluid. Borehole grouted upon completion and 105 ft. of inclinometer casing installed.	

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED	AECOM OFFICE	
Not Observed	2/16/09	Chicago Area - 01	
NORTHING 557741.09	BORING COMPLETED 2/16/09	ENTERED BY KKB	SHEET NO. 3 OF 3
EASTING 2440758.43	RIG/FOREMAN Mobile B-57 (V.H.)/MB	APP'D BY RCR	AECOM JOB NO. 60095742

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-900-SH2**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +766.13	
5.0			PA				
10.0							
15.0							
20.0							
25.0			RB				
30.0							
35.0							

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **4**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/11/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-900-SH2
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +766.13 (Continued)	
45.0			RB				
50.0						50.0	
55.0		RUN 1	DB			Conasauga Shale. 0.2 ft. gray limestone layer at top over dark greenish gray to brown shale. Moderately to extremely weathered in isolated layers, very soft to soft, finely laminated to thinly bedded with some beds up to 0.2 ft. thick. Below 54.3 ft. core is fragile. Bottom 0.2 ft. appears to be very soft clay. Bedding is approx. 15º from horizontal. Run # / Depth (ft.) / Recovery (%) / RQD (%) / Fracture Frequ. 1 / 50.0 - 57.5 / 69.3 / 4.4 / > 10 / ft.	
						57.5	
60.0		RUN 2	DB			Driller's note: Significant drill rod vibration during coring. Following Run 1, drilled out hole with rock bit to 57.5 ft. and set 57.5 ft of 3 in. casing. Conasauga Shale. Same description as Run 1. Core heavily broken along bedding planes. Driller estimated 70% water loss. Run # / Depth (ft.) / Recovery (%) / RQD (%) / Fracture Frequ. 2 / 57.5 - 66.0 / 50.0 / 0 / > 10 / ft.*	
65.0						66.0	
70.0		RUN 3	DB			Conasauga Shale. Same rock as Runs 1 and 2. Very soft, core stuck to barrel - not removable without disturbing layers. Moderately hard layers of shaley limestone at 66.5 to 67.0, 68.0 to 68.2, and 68.7 to 69.2 ft. 1/8 to 1/16" calcite veins crosscut core from 68.7 to 69.2 ft. Driller estimated 100% water loss. Run # / Depth (ft.) / Recovery (%) / RQD (%) / Fracture Frequ. 3 / 66.0 - 71.0 / 50.0 / 0 / > 20 / ft.*	
						71.0	
75.0		RUN 4	DB			Conasauga Shale. Same general description as Runs 1 through 3 with slightly larger pieces. Zones of fissile shale at 71.3 to 71.4, 72.2 to 72.4, 73.2 - 73.6, and 74.7 to 76.0 ft. and some shaley limestone clasts (rip-up clasts?) in a green to dark green matrix throughout (best examples from 73.6 to 74.7 ft. Run # / Depth (ft.) / Recovery (%) / RQD (%) / Fracture Frequ. 4 / 71.0 - 79.0 / 56.3 / 14.6 / > 20 / ft.*	
						79.0	

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 2 OF 4

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/11/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-900-SH2
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +766.13 (Continued)	
80.0		RUN 5	DB			Conasauga Shale. Dark gray top dark grayish-black shale with shaley limestone inclusions (rip-up clasts). Very sticky - disintegrates coming out of core barrel. Fresh to moderately weathered, fewer fissile zones, finely laminated to thinly bedded. Bedding approx. 15º from horizontal.	
	83.5					Run # 5; Depth (ft.) 79.0 - 83.5; Recovery (%) 93.0; RQD (%) 49.1; Fracture Frequ. > 20 / ft.*	
85.0		RUN 6	DB			Conasauga Shale. Same description as Run 5. Bedding remains approx. 15º from horizontal.	
	87.5					Run # 6; Depth (ft.) 83.5 - 87.5; Recovery (%) 75.0; RQD (%) 0; Fracture Frequ. > 20 / ft.*	
		RUN 7	DB			Driller's note: Difficulty advancing split barrel due to blocking of the barrel. Reduced runs to length of 1 - 3 ft.	
90.0	90.0	R 8	DB			Conasauga Shale. Core recovered is fissile and shattered.	
	91.0	R 9	DB				
	92.5					Run # 7; Depth (ft.) 87.5 - 90.0; Recovery (%) 28.0; RQD (%) 0; Fracture Frequ. > 20 / ft.*	
95.0		RUN 10	DB			Conasauga Shale. Core badly shattered. Appears similar to Run 7. Bedding still appears to be approx. 15º from horizontal.	
	98.0					Run # 8; Depth (ft.) 90.0 - 91.0; Recovery (%) 50.0; RQD (%) 0; Fracture Frequ. > 20 / ft.*	
100.0		RUN 11	DB			Conasauga Shale. Same general description of Run 8. Clay seams observed from 91.9 to 92.1 and from 92.3 to 92.4 ft. Bedding remains approx. 15º from horizontal.	
						Run # 9; Depth (ft.) 91.0 - 92.5; Recovery (%) 100; RQD (%) 0; Fracture Frequ. > 20 / ft.*	
103.5	103.5					Driller's note: Eliminated use of revert derivative and used bentonite slurry as drilling fluid. Blocking of split barrel eliminated or lessened.	
						Conasauga Shale. Darker gray to gray black shale/siltstone with disturbed beds (rip-up clasts) throughout. Fresh, more intact core, less fissile than previous Runs. Clay seams observed from 94.8 to 94.9 ft. Bedding remains approx. 15º from horizontal.	
						Run # 10; Depth (ft.) 92.5 - 98.0; Recovery (%) 100; RQD (%) 33.3; Fracture Frequ. 3 - 4 / ft.	
						Conasauga Shale. Same general description as Run10. Fossiliferous, fresh, with scattered thin (< 1/4") layers of black shale, usually as the matrix around rip-up clasts.	
						Run # 11; Depth (ft.) 98.0 - 103.5; Recovery (%) 87.3; RQD (%) 18.9; Fracture Frequ. 3 - 5 / ft.	
						*Fracture Frequency estimated. Core shattered by drilling.	
						End of Boring	

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. 60095742 | SHEET NO. 3 OF 4

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/11/09

AECOM	CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **09-900-SH2**
	PROJECT NAME **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)	PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % (10 20 30 40 50)	STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)
						SURFACE ELEVATION +766.13 (Continued)				
						Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8 to 50 ft. with rock bit. Borehole advanced from 50.0 to 103.5 ft. with NX diamond core barrel. Borehole grouted and inclinometer casing installed to 105.0 ft upon completion. Casing used: 10 ft. of 4 in. and 56 ft. of 3 in.				

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **Not Observed**	BORING STARTED **2/17/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557731.26**	BORING COMPLETED **2/19/09**	ENTERED BY **KKB**	SHEET NO. **4** OF **4**
EASTING **2440756.84**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/11/09

AECOM

ROCK CORE PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tennessee Valley Authority	Kingston Fossil Plant – Harriman, Tennessee	60095742

Photo No.	Date:
09-900 SH2	3-22-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-900 SH2
Runs 1 & 2
(50.0 – 61.1')

Conasauga Shale

Note: 09-900 SH2 was labeled as 09-901 SH2 at the time of drilling.

AECOM

ROCK CORE PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tennessee Valley Authority	Kingston Fossil Plant – Harriman, Tennessee	60095742

Photo No.	Date:
09-900 SH2	3-22-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-900 SH2
Runs 2, 3, & 4
(61.1 – 79.0')

Conasauga Shale

Note: 09-900 SH2 was labeled as 09-901 SH2 at the time of drilling.

AECOM

ROCK CORE PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tennessee Valley Authority	Kingston Fossil Plant – Harriman, Tennessee	60095742

Photo No.	Date:
09-900 SH2	3-22-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-900 SH2
Runs 5, 6, 7, & 8
(79.0 – 91.0')

Conasauga Shale

Note: 09-900 SH2 was labeled as 09-901 SH2 at the time of drilling.

AECOM

ROCK CORE PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tennessee Valley Authority	Kingston Fossil Plant – Harriman, Tennessee	60095742

Photo No.	Date:
09-900 SH2	3-22-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-900 SH2
Runs 9, 10, & 11
(91.0 – 99.6')

Conasauga Shale

Note: 09-900 SH2 was labeled as 09-901 SH2 at the time of drilling.

AECOM

ROCK CORE PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tennessee Valley Authority	Kingston Fossil Plant – Harriman, Tennessee	60095742

Photo No.	Date:
09-900 SH2	3-22-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-900 SH2
Run 11
(99.6 – 103.5')

Conasauga Shale

Note: 09-900 SH2 was labeled as 09-901 SH2 at the time of drilling.

SUBSURFACE LOG

SI-B2

Project No.	171468117		Location	N 556877.44, E 2441744.70 (NAD27)	
Project Name	Kingston Fossil Plant Dike D Buttress		Boring No.	**B-2**	Total Depth 78.0 ft
Location	Kingston, Tennessee		Surface Elevation	774.1 ft. (NGVD29)	
Project Type	Geotechnical Exploration		Date Started	12/26/08	Completed 12/27/08
Supervisor	Jim Andrew	Driller G. Thompson	Depth to Water	N/A	Date/Time N/A
Logged By	Jim Andrew		Depth to Water	N/A	Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
774.1'	0.0'	Top of Hole							
		Bottom Ash, gray to dark gray, dry to wet, very loose to dense, fine to coarse grained, sand-sized particles, non-plastic							Boring location surveyed by TVA SPTs driven with 140-lb auto hammer
				SPT-1	5.0 - 6.5		5-6-15	--	
				SPT-2	10.0 - 11.5		8-14-11	15	material is dry from 5.0 feet to 12.5 feet
				SPT-3	12.5 - 14.0		19-24-24	--	
				SPT-4	15.0 - 16.5		8-13-14	--	
				SPT-5	17.5 - 19.0		5-5-6	--	material becomes wet at 17.5 feet
				SPT-6	20.0 - 21.5		3-2-2	--	
				SPT-7	22.5 - 24.0		wh-wh-wh	24	
				SPT-8	25.0 - 26.5		wh-wh-wh	--	wh = weight of hammer
				SPT-9	27.5 - 29.0		wh-wh-wh	--	
				SPT-10	30.0 - 31.5		wh-wh-wh	--	
				SPT-11	32.5 - 34.0		wh-wh-wh	--	
				SPT-12	35.0 - 36.5		1-1-3	--	
				SPT-13	37.5 - 39.0		2-2-1	26	
				SPT-14	40.0 - 41.5		wh-wh-wh	46	
730.6'	43.5'			SPT-15	42.5 - 44.0		wh-wh-3	--	

FMSM_LEGACY 171468117 SLOPE INCLINOMETERS.GPJ FMSM.GDT 4/20/09

SUBSURFACE LOG

SI-B2

Project No.	171468117	Location	N 556877.44, E 2441744.70 (NAD27)
Project Name	Kingston Fossil Plant Dike D Buttress	Boring No.	**B-2**
		Total Depth	78.0 ft

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
		Silty Sand (alluvium), orange to brown, wet, very loose to medium dense, fine grained, poorly graded *(Continued)*		SPT-16	45.0 - 46.5		2-3-2	--	
				SPT-17	47.5 - 49.0		1-wh-wh	21	
				SPT-18	50.0 - 51.5		wh-wh-wh	--	
				SPT-19	52.5 - 54.0		2-1-3	--	
				SPT-20	55.0 - 56.5		2-4-5	--	decreasing fines content with depth
				SPT-21	57.5 - 59.0		2-2-2	24	
				SPT-22	60.0 - 61.5		5-5-6	--	
				SPT-23	62.5 - 64.0		6-9-8	--	
				SPT-24	65.0 - 66.5		3-2-1	--	
				SPT-25	67.5 - 69.0		9-10-10	--	
				SPT-26	70.0 - 71.5		9-7-10	23	
700.5'	73.6'								
		Shale, (augered)							
696.1'	78.0'								Slope Inclinometer B-2 installed
		No Refusal / Bottom of Hole Top of Rock = 73.6' Elevation (700.5')							

FMSM_LEGACY 171468117 SLOPE INCLINOMETERS.GPJ FMSM.GDT 4/20/09

SUBSURFACE LOG

SI-B3

Project No.	171468117	Location	N 557061.67, E 2441887.56 (NAD27)
Project Name	Kingston Fossil Plant Dike D Buttress	Boring No.	**B-3** Total Depth 60.2 ft
Location	Kingston, Tennessee	Surface Elevation	770.9 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	12/29/08 Completed 12/29/08
Supervisor	Patrick Kiser Driller G. Thompson	Depth to Water	N/A Date/Time N/A
Logged By	Patrick Kiser	Depth to Water	N/A Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
770.9'	0.0'	Top of Hole							
		Bottom Ash, dark gray to gray, damp to wet, fine to coarse grained sand-sized particles, non-plastic							Boring location surveyed by TVA Boring logged by auger cuttings; no sampling performed material becomes wet at 18.0 feet Zone of coarse gravel 25.0 feet - 30.0 feet
728.9'	42.0'								

FMSM_LEGACY 171468117 SLOPE INCLINOMETERS.GPJ FMSM.GDT 4/20/09

SUBSURFACE LOG

SI-B3

Project No.	171468117	Location	N 557061.67, E 2441887.56 (NAD27)
Project Name	Kingston Fossil Plant Dike D Buttress	Boring No.	**B-3**
Total Depth	60.2 ft		

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
		Silty Sand (alluvium), orange to brown, wet, fine grained, poorly graded *(Continued)*							
714.4'	56.5'								
710.7'	60.2'	Shale, (augered)							Slope Inclinometer B-3 installed
		No Refusal / Bottom of Hole Top of Rock = 56.5' Elevation (714.4')							

FMSM_LEGACY 171468117 SLOPE INCLINOMETERS.GPJ FMSM.GDT 4/20/09

SUBSURFACE LOG

SI-B4

Project No.	171468117	Location	N 556934.61, E 2442066.28 (NAD27)
Project Name	Kingston Fossil Plant Dike D Buttress	Boring No.	**B-4** Total Depth 59.5 ft
Location	Kingston, Tennessee	Surface Elevation	764.2 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	12/28/08 Completed 12/29/08
Supervisor	Patrick Kiser Driller G. Thompson	Depth to Water	N/A Date/Time N/A
Logged By	Patrick Kiser	Depth to Water	N/A Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
764.2'	0.0'	Top of Hole							
759.7'	4.5'	Bottom Ash, gray to dark gray, dry to damp, very dense, fine to coarse grained sand-sized particles, non-plastic		SPT-1	2.0 - 3.5	1.5	8-24-35	--	Boring location surveyed by TVA SPTs driven with 140-lb auto hammer
756.4'	7.8'	Sandy Lean Clay, red - brown, moist, medium stiff to stiff, with sand sized chert particles		SPT-2	5.0 - 6.5	1.4	5-5-7	24	
748.3'	15.9'	Bottom Ash, gray to dark gray, dry to wet, loose to medium dense, fine to coarse grained sand-sized particles, non-plastic		SPT-3	7.5 - 9.0	1.2	5-14-16	17	
				SPT-4	10.0 - 11.5	0.6	3-7-5	17	material becomes wet at 12.0 feet
				SPT-5	15.0 - 16.5	0.6	2-3-1	--	
741.6'	22.6'	Sandy Lean Clay, red - brown, moist, medium stiff to stiff, with sand layers and lenses		SPT-6	20.0 - 21.5	0.9	1-1-3	29	
728.8'	35.4'	Bottom Ash, gray to dark gray, dry to wet, loose to medium dense, fine to coarse grained sand-sized particles, non-plastic		SPT-7	22.5 - 24.0	1.5	4-10-9	--	
				SPT-8	25.0 - 26.5	1.0	3-4-5	--	
				SPT-9	27.5 - 29.0	1.5	4-5-3	20	
				SPT-10	30.0 - 31.5	1.5	2-2-4	--	
				SPT-11	32.5 - 34.0	1.5	3-3-1	--	
		Silty Sand (alluvium), orange to brown, wet, very loose to loose, fine grained, poorly graded		SPT-12	35.0 - 36.5	1.5	2-1-3	--	SPT-12 sample split, 35.0 - 35.6 & 35.6 - 36.5
				SPT-13	37.5 - 39.0	0.6	1-2-3	--	
				SPT-14	40.0 - 41.5	1.2	1-1-1	19	

FMSM_LEGACY 171468117 SLOPE INCLINOMETERS.GPJ FMSM.GDT 4/20/09

SUBSURFACE LOG

SI-B4

Project No.	171468117	Location	N 556934.61, E 2442066.28 (NAD27)
Project Name	Kingston Fossil Plant Dike D Buttress	Boring No.	**B-4**
		Total Depth	59.5 ft

Lithology			Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	
Elevation	Depth	Description	Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	Remarks
712.1'	52.1'	Silty Sand (alluvium), orange to brown, wet, very loose to loose, fine grained, poorly graded *(Continued)*							
704.7'	59.5'	Shale, (augered)							Slope Inclinometer B-4 installed
		No Refusal / Bottom of Hole Top of Rock = 52.1' Elevation (712.1')							

FMSM_LEGACY 171468117 SLOPE INCLINOMETERS.GPJ FMSM.GDT 4/20/09

SUBSURFACE LOG

PZ-D3

Project No.	171468117		Location	N 556822.89, E 2441588.49 (NAD27)	
Project Name	Kingston Fossil Plant Dike D Buttress		Boring No.	**PZ-3**	Total Depth 26.5 ft
Location	Kingston, Tennessee		Surface Elevation	766.3 ft. (NGVD29)	
Project Type	Geotechnical Exploration		Date Started	1/14/09	Completed 1/15/09
Supervisor	Jim Andrew	Driller G. Thompson	Depth to Water	4.0 ft	Date/Time 1/15/09
Logged By	Jim Andrew		Depth to Water	5.9 ft	Date/Time 1/16/09

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
766.3'	0.0'	Top of Hole							
763.3'	3.0'	Buttress Aggregate (Not Sampled)							SPTs driven with 140-lb auto hammer
756.3'	10.0'	Bottom Ash, dark gray, moist, loose, fine to coarse grained sand-sized particles, non-plastic, some fly ash		SPT-1	5.0 - 6.5	1.5	3-4-4	31	Boring performed prior to completion of buttress
751.3'	15.0'	Bottom Ash (50%), dark gray, moist, very loose, fine to coarse grained sand-sized particles, non-plastic, mixed with fly ash (50%)		SPT-2	10.0 - 11.5	1.5	2-2-2	--	
		Fly Ash, dark gray, moist to wet, very soft, non-plastic		SPT-3	15.0 - 16.5	1.5	2-2-3	--	
				SPT-4	20.0 - 21.5	1.5	1-1-1	--	
739.8'	26.5'			SPT-5	25.0 - 26.5	1.0	1-1-1	--	Piezometer installed
		No Refusal / Bottom of Hole							

FMSM_LEGACY 171468117 PZ BORINGS.GPJ FMSM.GDT 4/20/09

SUBSURFACE LOG

PZ-D4

Project No.	171468117		Location	N 556814.11, E 2441602.33 (NAD27)	
Project Name	Kingston Fossil Plant Dike D Buttress		Boring No.	**PZ-4**	Total Depth 16.5 ft
Location	Kingston, Tennessee		Surface Elevation	766.0 ft. (NGVD29)	
Project Type	Geotechnical Exploration		Date Started	1/14/09	Completed 1/14/09
Supervisor	Jim Andrew	Driller G. Thompson	Depth to Water	3.5 ft	Date/Time 1/14/09
Logged By	Jim Andrew		Depth to Water	5.0 ft	Date/Time 1/16/09

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
766.0'	0.0'	Top of Hole							
762.0'	4.0'	Buttress Aggregate (Not Sampled)							SPTs driven with 140-lb auto hammer
754.5'	11.5'	Bottom Ash, dark gray, dry to moist, loose to medium dense, fine to coarse grained sand-sized particles, non-plastic, some fly ash		SPT-1	5.0 - 6.5	1.0	9-5-5	--	Boring performed prior to completion of buttress
				SPT-2	10.0 - 11.5	1.5	2-5-5	--	10.0 - 11.5, bulk sample taken
749.5'	16.5'	Fly Ash, dark gray, wet, very soft, non-plastic		SPT-3	15.0 - 16.5	1.0	wh-wh-wh	35	wh = weight of hammer Piezometer installed
		No Refusal / Bottom of Hole							

FMSM_LEGACY 171468117 PZ BORINGS.GPJ FMSM.GDT 4/20/09

SUBSURFACE LOG

PZ-D5

Project No.	171468117	Location	N 556958.41, E 2441690.90 (NAD27)
Project Name	Kingston Fossil Plant Dike D Buttress	Boring No.	**PZ-5** Total Depth 31.5 ft
Location	Kingston, Tennessee	Surface Elevation	763.7 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	1/15/09 Completed 1/15/09
Supervisor	Jim Andrew Driller G. Thompson	Depth to Water	5.7 ft Date/Time 1/16/09
Logged By	Jim Andrew	Depth to Water	N/A Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
763.7'	0.0'	Top of Hole							
		Buttress Aggregate (Not Sampled)							SPTs driven with 140-lb auto hammer Boring performed prior to completion of buttress
750.7'	13.0'								
		Bottom Ash, dark gray, moist, loose to medium dense, fine to coarse grained sand-sized particles, non-plastic		SPT-1	15.0 - 16.5	0.5	4-5-5	16	
742.7'	21.0'			SPT-2	20.0 - 21.5	1.5	2-2-3	--	
		Fly Ash, dark gray, moist to wet, medium stiff, non-plastic		SPT-3	25.0 - 26.5	1.0	2-2-2	17	
733.2'	30.5'								Piezometer installed
732.2'	31.5'	Sandy Clay, red - brown, moist, soft		SPT-4	30.0 - 31.5	1.5	2-2-3	--	
		No Refusal / Bottom of Hole							

FMSM_LEGACY 171468117 PZ BORINGS.GPJ FMSM.GDT 4/20/09

SUBSURFACE LOG

PZ-D6

Project No.	171468117	Location	N 556944.60, E 2441707.83 (NAD27)
Project Name	Kingston Fossil Plant Dike D Buttress	Boring No.	**PZ-6** Total Depth 16.5 ft
Location	Kingston, Tennessee	Surface Elevation	763.7 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	1/15/09 Completed 1/15/09
Supervisor	Jim Andrew Driller G. Thompson	Depth to Water	4.3 ft Date/Time 1/16/09
Logged By	Jim Andrew	Depth to Water	N/A Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
763.7'	0.0'	Top of Hole							
759.2'	4.5'	Buttress Aggregate (Not Sampled)							SPTs driven with 140-lb auto hammer
753.2'	10.5'	Bottom Ash, dark gray, dry, medium dense, fine to coarse grained sand-sized particles, non-plastic		SPT-1	5.0 - 6.5	0.5	8-6-9	--	Boring performed prior to completion of buttress
752.2'	11.5'	Clay, red - brown, moist, very stiff		SPT-2	10.0 - 11.5	0.5	8-11-13	--	
747.2'	16.5'	Fly Ash, dark gray, wet, soft, non-plastic		SPT-3	15.0 - 16.5	1.0	1-2-2	--	Piezometer installed
		No Refusal / Bottom of Hole							

SUBSURFACE LOG

PZ-D7

Project No.	171468117	Location	N 557105.47, E 2441791.06 (NAD27)
Project Name	Kingston Fossil Plant Dike D Buttress	Boring No.	**PZ-7** Total Depth 26.5 ft
Location	Kingston, Tennessee	Surface Elevation	760.0 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	1/15/09 Completed 1/15/09
Supervisor	Jim Andrew Driller G. Thompson	Depth to Water	5.4 ft Date/Time 1/16/09
Logged By	Jim Andrew	Depth to Water	N/A Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
760.0'	0.0'	Top of Hole							
755.0'	5.0'	Buttress Aggregate (Not Sampled)							SPTs driven with 140-lb auto hammer
750.0'	10.0'	Bottom Ash, dark gray, moist, medium dense, fine to coarse grained sand-sized particles, non-plastic		SPT-1	5.0 - 6.5	0.0	4-8-7	--	Boring performed prior to completion of buttress
736.8'	23.2'	Fly Ash, dark gray, moist to wet, very soft, non-plastic		SPT-2	10.0 - 11.5	0.5	2-1-1	20	
				SPT-3	15.0 - 16.5	0.5	wh-wh-wh	9	wh = weight of hammer
				SPT-4	20.0 - 21.5	0.5	1-1-1	--	
733.5'	26.5'	Sandy Clay, red - brown, moist, soft		SPT-5	25.0 - 26.5	1.0	1-2-2	--	Piezometer installed
		No Refusal / Bottom of Hole							

FMSM_LEGACY 171468117 PZ BORINGS.GPJ FMSM.GDT 4/20/09

SUBSURFACE LOG

PZ-D8

Project No.	171468117	Location	N 557088.57, E 2441818.68 (NAD27)
Project Name	Kingston Fossil Plant Dike D Buttress	Boring No.	**PZ-8** Total Depth 16.5 ft
Location	Kingston, Tennessee	Surface Elevation	760.1 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	1/15/09 Completed 1/15/09
Supervisor	Jim Andrew Driller G. Thompson	Depth to Water	5.0 ft Date/Time 1/15/09
Logged By	Jim Andrew	Depth to Water	N/A Date/Time N/A

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
760.1'	0.0'	Top of Hole							
752.8'	7.3'	Buttress Aggregate (Not Sampled)							SPTs driven with 140-lb auto hammer Boring performed prior to completion of buttress
743.6'	16.5'	Ash, dark gray, wet, very soft, non-plastic		SPT-1	10.0 - 11.5	0.0	1-2-2	--	
				SPT-2	15.0 - 16.5	0.0	2-1-1	--	Piezometer installed
		No Refusal / Bottom of Hole							

FMSM_LEGACY 171468117 PZ BORINGS.GPJ FMSM.GDT 4/20/09

SUBSURFACE LOG

Project No.	171468117	Location	N 557066.19, E 2441439.93 (NAD27)
Project Name	Kingston Ash Pond	Boring No.	**SI-11** Total Depth 59.0 ft
Location	Kingston, Tennessee	Surface Elevation	758.0 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	4/20/09 Completed 4/20/09
Supervisor	Ben Halada Driller Kent Clements	Depth to Water	N/A Date/Time N/A
Logged By	Ben Halada	Automatic Hammer ☐	Safety Hammer ☐ Other ☐

Lithology			Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	
Elevation	Depth	Description	Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	Remarks
758.0'	0.0'	Top of Hole							
		OVERBURDEN, (Augered, no sampling)							Boring advanced using 3 1/4 " Hollow Stem Augers

FMSM_LEGACY 175960015 KINGSTON INSTRUMENTATION.GPJ FMSM.GDT 9/17/09

SUBSURFACE LOG

Project No.	171468117	Location	N 557066.19, E 2441439.93 (NAD27)
Project Name	Kingston Ash Pond	Boring No.	**SI-11** Total Depth 59.0 ft

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
703.0'	55.0'	OVERBURDEN, (Augered, no sampling) *(Continued)*							Boring backfilled with bentonite cement grout from 0.0 ft to 74.0 ft
699.0'	59.0'	No Core, Rock like resistance (Augered)							
		Auger Refusal / Bottom of Hole							

Slope Indicator (59.0 ft of pipe) installed with a concrete pad and flushmount cover

FMSM_LEGACY 175669015 KINGSTON INSTRUMENTATION.GPJ FMSM.GDT 9/17/09

Stantec

SUBSURFACE LOG

Project No.	175569042	Location	N 556804.57, E 2442329.32 (NAD27)
Project Name	Kingston Ash Pond	Boring No.	**STN-2** Total Depth 41.0 ft
Location	Kingston, Tennessee	Surface Elevation	751.2 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	4/14/09 Completed 4/14/09
Supervisor	Ben Halada Driller Kent Clements	Depth to Water	18.0 ft Date/Time 4/14/09
Logged By	Ben Halada	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
751.2'	0.0'	Top of Hole							
		LEAN CLAY (Fill), red brown, moist, medium stiff		SPT-1	0.0 - 1.5	1.0	2-3-4	28	Boring advanced using 3 1/4 " Hollow Stem Augers
				SPT-2	1.5 - 3.0	1.1	4-5-5	19	
747.7'	3.5'								
747.2'	4.0'	BOTTOM ASH (Fill), black, moist, medium dense		SPT-3	3.0 - 4.5	1.1	11-13-17	14	Piston sampler and sucker rods were utilized to obtain recovery during Shelby Tube sampling
745.7'	5.5'			SPT-4	4.5 - 6.0	1.3	8-11-15	19	
744.7'	6.5'	FAT CLAY (Fill), red brown, moist, medium stiff		SPT-5	6.0 - 7.5	1.1	10-9-9	15	
		BOTTOM ASH (Fill), black, moist, medium dense		SPT-6	7.5 - 9.0	1.3	9-9-11	20	
		LEAN CLAY (Fill), light brown, moist, soft to medium stiff, some fine grained sand		ST-1	9.0 - 11.0	1.6		--	
739.2'	12.0'			SPT-7	11.0 - 12.5	1.1	1-2-3	23	
		LEAN CLAY, red brown, moist, soft, trace silt, some fine grained sand		SPT-8	12.5 - 14.0	1.0	1-3-4	21	
				ST-2	14.0 - 16.0	1.8		--	
				SPT-9	16.0 - 17.5	1.2	1-2-2	17	
732.2'	19.0'			SPT-10	17.5 - 19.0	1.2	2-2-3	23	
		LEAN CLAY, light brown, saturated, very soft to soft, some silt		SPT-11	19.0 - 20.5	1.0	3-2-4	22	
				ST-3	20.5 - 22.5	2.0		--	
				SPT-12	22.5 - 24.0	1.3	1-2-2	28	
				SPT-13	24.0 - 25.5	1.1	WOH-1-2	27	
				SPT-14	25.5 - 27.0	1.4	WOH-2-2	24	
				SPT-15	27.0 - 28.5	1.2	2-3-2	28	
				SPT-16	28.5 - 30.0	1.3	WOH-WOH-WOH	28	
719.2'	32.0'			ST-4	30.0 - 32.0	2.0		--	ST-4: sand in bottom of tube
		SAND, light gray to gray, saturated, very loose to medium dense, fine to medium grained, trace silt		SPT-17	32.0 - 33.5	1.0	WOR-WOR-WOH	19	
				SPT-18	33.5 - 35.0	1.1	3-2-1	21	
				SPT-19	35.0 - 36.5	0.2	7-11-13	16	

FMSN_LEGACY 171489117 KINGSTON ASH POND.GPJ FMSN.GDT 7/16/09

SUBSURFACE LOG

Project No.	175569042	Location	N 556804.57, E 2442329.32 (NAD27)
Project Name	Kingston Ash Pond	Boring No.	**STN-2** Total Depth 41.0 ft

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
713.7'	37.5'			SPT-20	36.5 - 38.0	1.1	21-25-27	20	SPT-20: shale in tip of spoon
713.2'	38.0'			SPT-21	38.0 - 39.5	1.0	13-23-38	--	Boring backfilled with bentonite cement grout from 0.0 ft to 41.0 ft
		Sandstone, (Augered)		SPT-22	39.5 - 40.4	0.8	31-50/0.4	--	
710.2'	41.0'								
		Shale, (Augered)							
		Auger Refusal / Bottom of Hole							

WOH = Weight of Hammer
WOR = Weight of Rods

Split Samples: SPT-3 and 4

FMSM_LEGACY 171/68117 KINGSTON ASH POND.GPJ FMSM.GDT 7/16/09

SUBSURFACE LOG

Project No.	175569042	Location	N 556756.78, E 2442263.59 (NAD27)
Project Name	Kingston Ash Pond	Boring No.	**STN-3** Total Depth 50.3 ft
Location	Kingston, Tennessee	Surface Elevation	763.7 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	4/14/09 Completed 4/15/09
Supervisor	Ben Halada Driller Sam Wilks	Depth to Water	19.5 ft Date/Time 4/15/09
Logged By	Briggs Evans	Automatic Hammer ☐	Safety Hammer ☒ Other ☐

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
763.7'	0.0'	Top of Hole						
763.2'	0.5'	CLAYEY GRAVEL (Fill), brown red yellow, dry to moist, stiff to very stiff, some gravel	SPT-1	0.0 - 1.5	1.0	17-19-22	12	Boring advanced using 3 1/4 " Hollow Stem Augers
			SPT-2	1.5 - 3.0	1.0	8-18-18	13	
		BOTTOM ASH (Fill), dark gray, moist to wet, dense to medium dense, some fly ash	SPT-3	3.0 - 4.5	0.8	13-8-9	18	Wet at 4ft bgs
			SPT-4	4.5 - 6.0	1.0	9-7-7	21	
757.4'	6.3'							
		FAT CLAY (Fill), red brown, moist, medium stiff, some chert, some gravel, medium plasticity	SPT-5	6.0 - 7.5	1.0	6-6-6	23	
			SPT-6	7.5 - 9.0	0.8	2-3-4	31	
			SPT-7	9.0 - 10.5	1.0	2-3-5	22	
			ST-1	10.5 - 12.5	2.0		--	
749.7'	14.0'		ST-2	12.5 - 14.5	2.0		--	
		BOTTOM ASH (Fill), dark gray, moist, medium dense, some coal refuse	SPT-8	14.5 - 16.0	1.5	13-39-25	15	
746.7'	17.0'		SPT-9	16.0 - 17.5	1.5	3-4-17	21	
		BOTTOM ASH (Fill), dark gray to olive green, wet to saturated, loose to very loose, some fly ash	SPT-10	17.5 - 19.0	1.5	6-7-6	22	
			SPT-11	19.0 - 20.5	1.0	5-5-5	20	Saturated at 19.5 ft bgs
			SPT-12	20.5 - 22.0	1.5	2-2-2	18	
			SPT-13	22.0 - 23.5	1.2	4-3-2	27	Began adding water to limit blow-back
			SPT-14	23.5 - 25.0	1.4	6-5-3	30	
			SPT-15	25.0 - 26.5	0.8	3-4-2	18	
			SPT-16	26.5 - 28.0	1.2	3-2-3	20	
735.0'	28.8'		SPT-17	28.0 - 29.5	1.5	2-4-4	24	
		SANDY CLAY, brown, wet, soft to medium stiff, homogeneous	SPT-18	29.5 - 31.0	1.5	WOH-2-2	21	
732.5'	31.3'							
		LEAN CLAY, brown, saturated, soft, mottled	SPT-19	31.0 - 32.5	1.5	2-2-3	22	
			SPT-20	32.5 - 34.0	1.5	WOH-WOH-3	26	
729.7'	34.0'							
			SPT-21	34.0 - 35.5	1.5	WOH-1-2	19	
			SPT-22	35.5 - 37.0	1.5	WOH-1-2	21	

FMSM_LEGACY 171468117 KINGSTON ASH POND.GPJ FMSM.GDT 7/16/09

SUBSURFACE LOG

Project No.	175569042	Location	N 556756.78, E 2442263.59 (NAD27)
Project Name	Kingston Ash Pond	Boring No.	**STN-3** Total Depth 50.3 ft

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
726.7'	37.0'	SILTY SAND, tan, saturated, loose to very loose, fine to medium grained, well graded, trace clay *(Continued)*		SPT-23	37.0 - 38.5	1.5	WOH-1-1	20	
				SPT-24	38.5 - 40.0	1.5	WOH-1-2	18	
		SAND, light brown, saturated, loose to very loose, fine grained, trace silt, homogeneous		SPT-25	40.0 - 41.5	1.5	WOR-WOR-WOR	20	
				SPT-26	41.5 - 43.0	1.5	2-2-2	21	
				SPT-27	43.0 - 44.5	1.5	WOR-2-2	18	
				SPT-28	44.5 - 46.0	1.5	3-3-4	21	
				SPT-29	46.0 - 47.5	1.5	WOR-WOR-WOR	20	
714.7'	49.0'			SPT-30	47.5 - 48.5		4-50+/0.4	69	Wood fragments - 48.0 to 48.3 ft
713.4'	50.3'	Shale, (Augered)		SPT-31	49.0 - 50.3	0.8	40-44-16/0.3	--	
		Auger Refusal / Bottom of Hole							Boring backfilled with bentonite grout from 50.3ft to surface
		Top of Rock = 49.0' Elevation (714.7')							

FMSM_LEGACY 171469117 KINGSTON ASH POND.GPJ FMSM.GDT 7/16/09

SUBSURFACE LOG

Project No.	175569042	Location	N 556763.50, E 2442257.42 (NAD27)
Project Name	Kingston Ash Pond	Boring No.	**STN-3C** Total Depth 35.0 ft
Location	Kingston, Tennessee	Surface Elevation	763.8 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	5/1/09 Completed 5/1/09
Supervisor	Ben Halada Driller Steve Bradford	Depth to Water	N/A Date/Time N/A
Logged By	Adam Smith	Automatic Hammer ☐	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
763.8'	0.0'	Top of Hole							
		Overburden, (Augered without sampling)							Boring advanced using 4 1/4 " Hollow Stem Augers Revert used to keep augers clear Piston sampler and sucker rods were utilized to obtain recovery during Shelby Tube sampling
738.8'	25.0'								
736.8'	27.0'	Bottom Ash, black, saturated		ST-1	25.0 - 27.0	0.5		--	ST-1: bottom ash fell out upon retrieval, should have had 1.5' recovery
		SILTY CLAY, light brown and red brown, moist, soft		ST-2	27.0 - 29.0	1.5		--	
				ST-3	29.0 - 31.0	2.0		24	Boring backfilled with bentonite cement grout from 0.0 ft to 35.0 ft
				ST-4	31.0 - 33.0	2.0		22	
728.8'	35.0'			ST-5	33.0 - 35.0	2.0		24	
		No Refusal / Bottom of Hole							

FMSM_LEGACY 17149117 KINGSTON ASH POND.GPJ FMSM.GDT 7/16/09

SUBSURFACE LOG

Project No.	175569042	Location	N 556762.50, E 2442258.42 (NAD27)
Project Name	Kingston Ash Pond	Boring No.	**STN-3D** Total Depth 35.0 ft
Location	Kingston, Tennessee	Surface Elevation	763.8 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	5/4/09 Completed 5/4/09
Supervisor	Ben Halada Driller Steve Bradford	Depth to Water	N/A Date/Time N/A
Logged By	Brad Smiley	Automatic Hammer ☐	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
763.8'	0.0'	Top of Hole							
		Overburden, (Augered without sampling)							Boring advanced using 4 1/4 " Hollow Stem Augers
									Revert used to keep augers clear
									Piston sampler and sucker rods were utilized to obtain recovery during Shelby Tube sampling
738.8'	25.0'								
736.8'	27.0'	Bottom Ash, black, saturated		ST-1	25.0 - 27.0			--	
		SILTY CLAY, light brown and red brown, moist, soft		ST-2	27.0 - 29.0			--	
				ST-3	29.0 - 31.0			--	
				ST-4	31.0 - 33.0			--	Boring backfilled with bentonite cement grout from 0.0 ft to 35.0 ft
728.8'	35.0'			ST-5	33.0 - 35.0			--	
		No Refusal / Bottom of Hole							

FMSM_LEGACY 171468117 KINGSTON ASH POND.GPJ FMSM.GDT 7/16/09

SUBSURFACE LOG

Project No.	175569042	Location	N 556625.56, E 2442047.01 (NAD27)
Project Name	Kingston Ash Pond	Boring No.	**STN-4** Total Depth 83.0 ft
Location	Kingston, Tennessee	Surface Elevation	763.3 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	4/16/09 Completed 4/17/09
Supervisor	Ben Halada Driller Kent Clements	Depth to Water	16.0 ft Date/Time 4/16/09
Logged By	Ben Halada	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
763.3'	0.0'	Top of Hole							
		BOTTOM ASH (Fill), black, moist, loose to medium dense		SPT-1	0.0 - 1.5	1.3	8-18-18	25	Boring advanced using 3 1/4 " Hollow Stem Augers
				SPT-2	1.5 - 3.0	1.3	14-18-19	22	
				SPT-3	3.0 - 4.5	1.4	6-15-13	22	Piston sampler and sucker rods were utilized to obtain recovery during Shelby Tube sampling
				SPT-4	4.5 - 6.0	1.3	4-7-11	24	
				SPT-5	6.0 - 7.5	1.5	14-15-12	23	
				SPT-6	7.5 - 9.0	1.2	5-11-10	24	
				SPT-7	9.0 - 10.5	1.3	4-9-9	26	
				SPT-8	10.5 - 12.0	1.5	9-6-7	28	
				SPT-9	12.0 - 13.5	1.5	4-7-7	29	
749.3'	14.0'								
		FLY ASH (Fill), light gray to black, moist to saturated, very loose		SPT-10	13.5 - 15.0	1.5	2-2-5	28	
				SPT-11	15.0 - 16.5	1.5	1-1-WOH	41	
				SPT-12	16.5 - 18.0	1.3	WOR-WOR-WOH	29	
				SPT-13	18.0 - 19.5	1.5	WOR-1-1	31	
				SPT-14	19.5 - 21.0	1.4	WOR-WOH-2	35	
				SPT-15	21.0 - 22.5	1.5	2-2-WOH	32	
				SPT-16	22.5 - 24.0	1.4	WOR-WOH-WOH	32	
738.3'	25.0'			SPT-17	24.0 - 25.5	1.3	WOR-WOH-WOH	24	Water added at 24.0 ft to keep augers clear
		FAT CLAY, brown, saturated, very soft, some sandy silt		ST-1	25.5 - 27.5	2.0		--	
				SPT-18	27.5 - 29.0	1.3	WOR-WOR-1	23	
				SPT-19	29.0 - 30.5	1.5	2-3-2	22	
731.8'	31.5'			SPT-20	30.5 - 32.0	1.5	1-2-3	22	
		SILTY SAND, brown, moist to saturated, very loose, fine to medium grained, trace clay		SPT-21	32.0 - 33.5	1.2	1-1-2	21	
				SPT-22	33.5 - 35.0	0.9	WOR-WOH-1	22	
				SPT-23	35.0 - 36.5	1.1	1-2-1	24	

FMSM_LEGACY 171469117 KINGSTON ASH POND.GPJ FMSM.GDT 7/16/09

SUBSURFACE LOG

Project No.	175569042	Location	N 556625.56, E 2442047.01 (NAD27)
Project Name	Kingston Ash Pond	Boring No.	**STN-4** Total Depth 83.0 ft

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
		SILTY SAND, brown, moist to saturated, very loose, fine to medium grained, trace clay *(Continued)*		SPT-24	36.5 - 38.0	1.1	3-3-2	21	
				SPT-25	38.0 - 39.5	0.0	WOR-WOR-WOR	--	
				SPT-26	39.5 - 41.0	1.0	WOR-1-1	21	
				SPT-27	41.0 - 42.5	1.2	3-1-2	27	
				SPT-28	42.5 - 44.0	1.3	3-1-1	21	
				SPT-29	44.0 - 45.5	1.1	1-1-2	21	
				SPT-30	45.5 - 47.0	1.1	WOR-WOH-1	25	
				SPT-31	47.0 - 48.5	1.1	WOH-1-1	20	
				SPT-32	48.5 - 50.0	1.0	WOR-WOH-1	21	
				SPT-33	50.0 - 51.5	1.2	WOH-1-1	22	
				SPT-34	51.5 - 53.0	1.5	4-6-4	23	
709.3'	54.0'			SPT-35	53.0 - 54.5	1.4	5-7-11	23	
		SAND, light gray, moist, medium dense, fine to medium grained		SPT-36	54.5 - 56.0	1.3	5-6-6	23	
				SPT-37	56.0 - 57.5	1.5	4-4-4	24	
				SPT-38	57.5 - 59.0	1.4	3-5-4	22	
				SPT-39	59.0 - 60.5	1.2	5-7-5	22	
702.3'	61.0'			SPT-40	60.5 - 61.4	0.8	50-50/0.4	--	SPT-40: shale in tip of spoon
700.3'	63.0'	Shale, (Augered)							Began Core
		Shale, gray, soft, thin bedded, close fracture spacing, 30°, interbedded with very thin to thin limestone layers		0%	3.5	1.2	34	66.5	
				0%	6.5	3.2	49	73.0	
				0%	3.5	3.0	86	76.5	

FMSM_LEGACY 17146817 KINGSTON ASH POND.GPJ FMSM.GDT 7/16/09

SUBSURFACE LOG

Project No.	175569042	Location	N 556625.56, E 2442047.01 (NAD27)
Project Name	Kingston Ash Pond	Boring No.	**STN-4** Total Depth 83.0 ft

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
				55%	2.0	1.2	60	78.5	
680.3'	83.0'	Shale, gray, soft, thin bedded, close fracture spacing, 30°, interbedded with very thin to thin limestone layers *(Continued)*		0%	4.5	2.9	64	83.0	Boring backfilled with bentonite cement grout from 0.0 ft to 83.0 ft

Bottom of Hole

Top of Rock = 61.0'
Elevation (702.3')

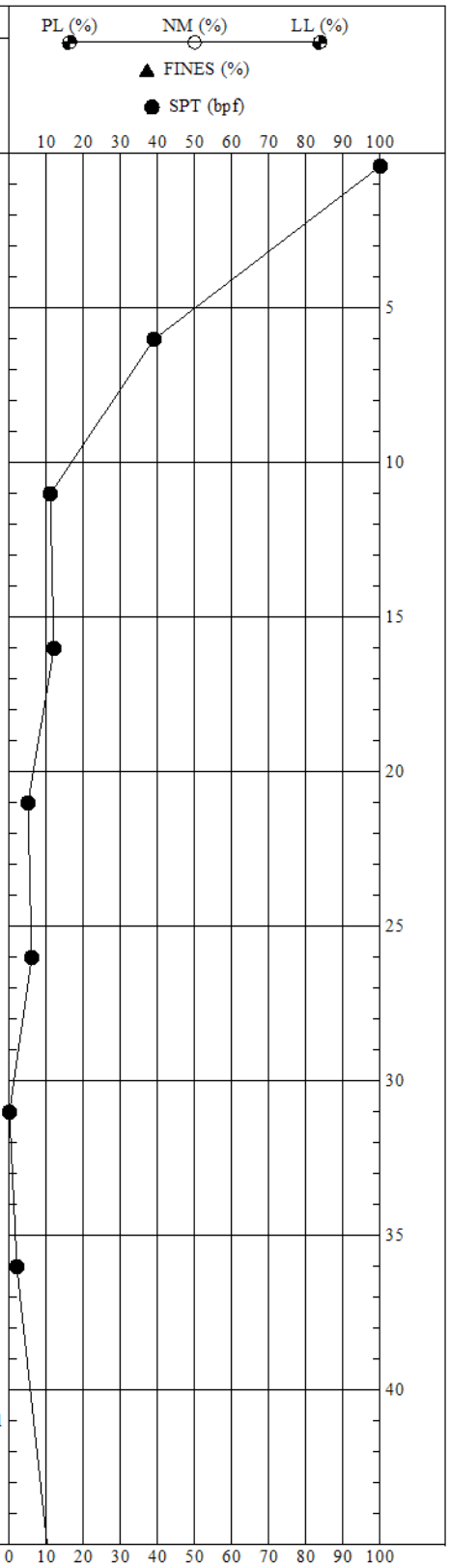
WOH = Weight of Hammer
WOR = Weight of Rods

Split Samples: SPT-10, 17, 20, 35

FMSM_LEGACY 171459117 KINGSTON ASH POND.GPJ FMSM.GDT 7/16/09

B-1 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
0	VERY DENSE, WELL GRADED GRAVEL - FILL	767.9	SPT-1		50/0.4'	
	DENSE, GRAY TO DARK GRAY, MOIST, FLY ASH WITH GRAVEL - FILL					
5		762.9	SPT-2		11-25-14	
	FIRM, BROWN TO GRAYISH BROWN, MOIST, SANDY FLY ASH - FILL					
10		757.9	SPT-3		3-6-5	
	STIFF, DARK GRAY, MOIST, FLY ASH - FILL					
15		752.9	SPT-4		4-5-7	
	LOOSE, WET, FINE SAND / FLY ASH WITH TRACE GRAVEL - FILL					
20		747.9	SPT-5		1-2-3	
	LOOSE, WET, SAND / FLY ASH - FILL					
25		742.9	SPT-6		2-2-4	
	VERY SOFT, DARK GRAY, WET, FLY ASH - FILL					
30		737.9	SPT-7		WOH	
	VERY SOFT, DARK GRAY, WET, FLY ASH - FILL					
35		732.9	SPT-8		WOH-1-1	
	VERY SOFT, DARK GRAY, WET, FLY ASH - FILL					
40		727.9	SPT-9		WOH-WOH-1	
	STIFF, OLIVE BROWN TO GRAY, MOIST, CLAY WITH SHALE FRAGMENTS - ALLUVIUM					
45		722.9				



SOIL_3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

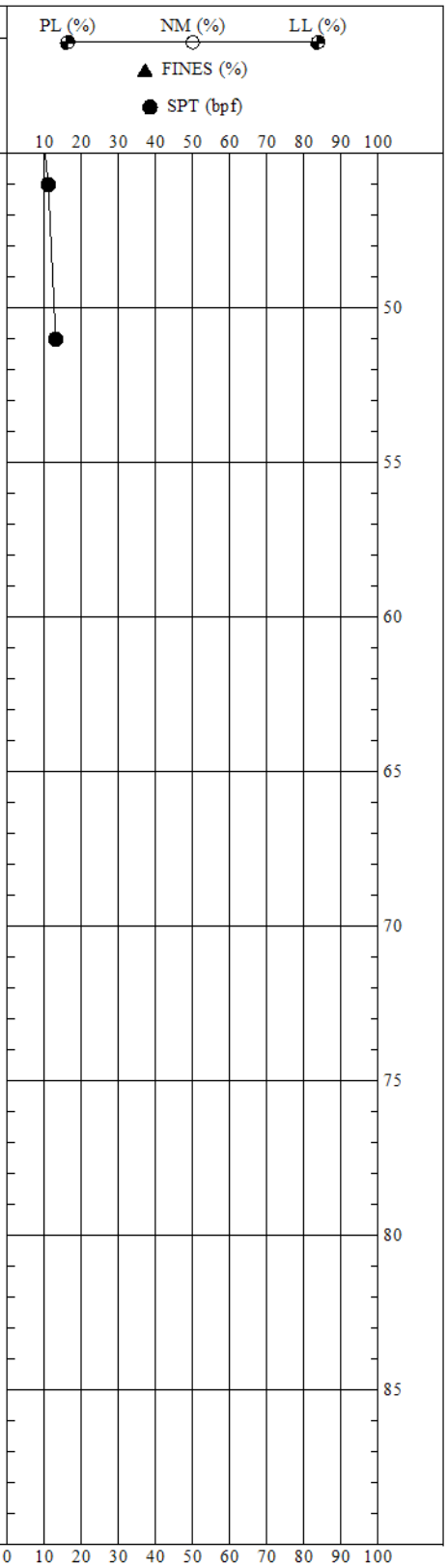
DRILLED: April 17, 2010 **BORING NO.:** B-1

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-1 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	STIFF, OLIVE BROWN TO GRAY, MOIST, CLAY WITH SHALE FRAGMENTS - ALLUVIUM		722.9	SPT-10		3-4-7	
	FIRM, WET, CLAYEY SAND WITH TRACE GRAVEL - ALLUVIUM						
50			717.9	SPT-11		4-5-8	
	BORING TERMINATED AT 51.5'						
55			712.9				
60			707.9				
65			702.9				
70			697.9				
75			692.9				
80			687.9				
85			682.9				
90			677.9				



SOIL_3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

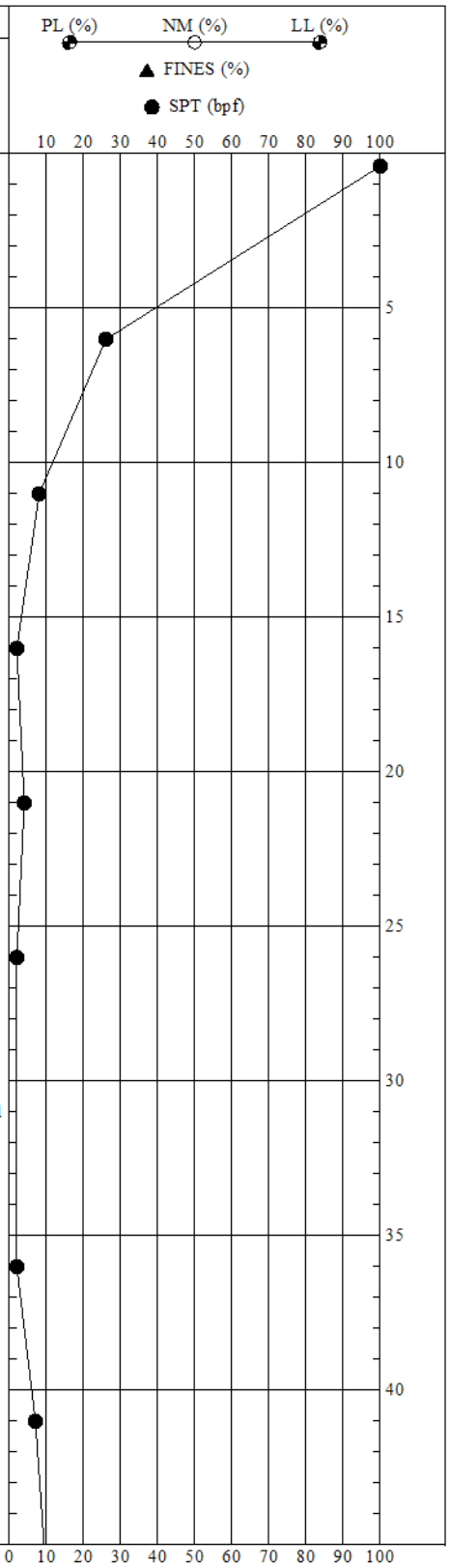
DRILLED: April 17, 2010 **BORING NO.:** B-1

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

B-2 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	VERY DENSE, GRAY, MOIST, WELL GRADED GRAVEL WITH SOME FLY ASH - FILL		764.1	SPT-1		50/0.4'
	VERY STIFF, DARK GRAYISH BROWN, MOIST, FLY ASH WITH SOME GRAVEL - FILL					
5			759.1	SPT-2		6-11-15
	FIRM, DARK GRAY, MOIST TO WET, FLY ASH WITH TRACE DEBRIS / PIPE INSULATION - FILL					
10			754.1	SPT-3		6-4-4
	VERY SOFT, DARK GRAY, WET, FLY ASH - FILL					
15			749.1	SPT-4		WOH-1-1
	LOOSE, DARK GRAY, WET, SANDY FLY ASH - FILL					
20			744.1	SPT-5		2-2-2
	VERY LOOSE, DARK GRAY, WET, SANDY FLY ASH - FILL					
25			739.1	SPT-6		2-1-1
	VERY SOFT, DARK GRAY, WET, FLY ASH - FILL					
30			734.1	SPT-7		WOH-WOH-1
	VERY SOFT, DARK GRAY, WET, FLY ASH WITH LITTLE FINE SAND - FILL					
35			729.1	SPT-8		1-1-1
	FIRM, OLIVE BROWN AND GRAY, MOIST, CLAY - ALLUVIUM					
40			724.1	SPT-9		2-3-4
	LOOSE, LIGHT BROWN, WET, SILTY SAND - ALLUVIUM					
45			719.1			



SOIL 3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

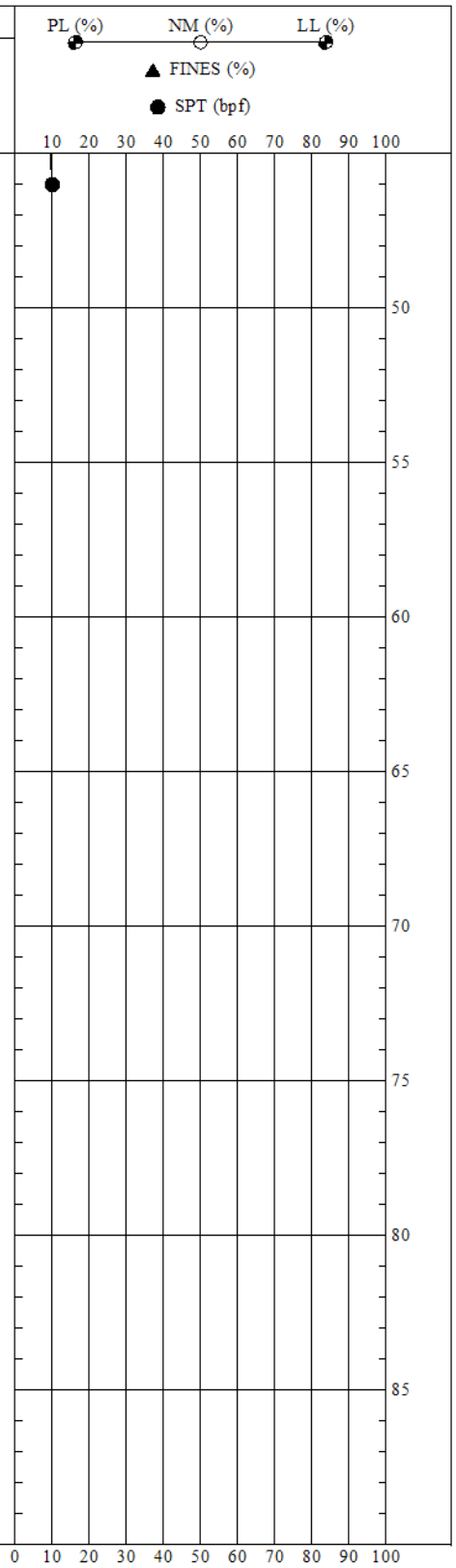
DRILLED: April 12, 2010 **BORING NO.:** B-2

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-2 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	LOOSE, LIGHT BROWN, WET, SILTY SAND - ALLUVIUM		719.1	SPT-10		3-4-6	
	BORING TERMINATED AT 46.5'						
50			714.1				
55			709.1				
60			704.1				
65			699.1				
70			694.1				
75			689.1				
80			684.1				
85			679.1				
90			674.1				



SOIL_3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State	
Logged By: R.C.	
Checked By: T.S.L.	

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

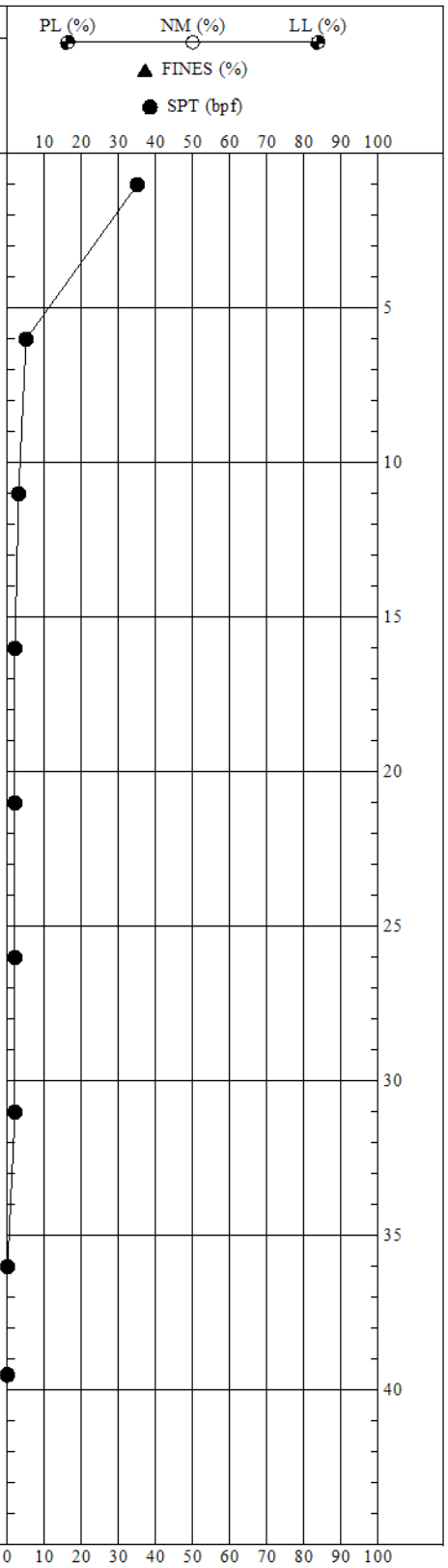
DRILLED: April 12, 2010 **BORING NO.:** B-2

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

B-3 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	HARD TO FIRM, VERY DARK GREENISH GRAY, DRY TO MOIST, FLY ASH WITH GRAVEL - FILL	764.3	SPT-1		11-20-15
5	FIRM, STRONG BROWN, MOIST, SILTY SANDY CLAY WITH CHERT FRAGMENTS - FILL	759.3	SPT-2		1-2-3
	SOFT TO VERY SOFT, VERY DARK GREENISH GRAY, MOIST TO WET, FLY ASH - FILL				
10		754.3	SPT-3		WOH-1-2
15		749.3	SPT-4		1-1-1
20		744.3	SPT-5		WOH-1-1
25		739.3	SPT-6		WOH-1-1
30		734.3	SPT-7		WOH-1-1
	VERY SOFT, DARK GRAYISH BROWN MOTTLED WITH BLACK, MOIST, SLIGHTLY SANDY SILTY CLAY - ALLUVIUM				
35		729.3	SPT-8		WOH
			UD-1		1.0-1.0
	VERY WET, COARSE SAND - ALLUVIUM				
40		724.3	SPT-9		WOH
	VERY SOFT, STRONG BROWN, MOIST, CLAYEY SAND - ALLUVIUM				
45		719.3			



SOIL 3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: L.S.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

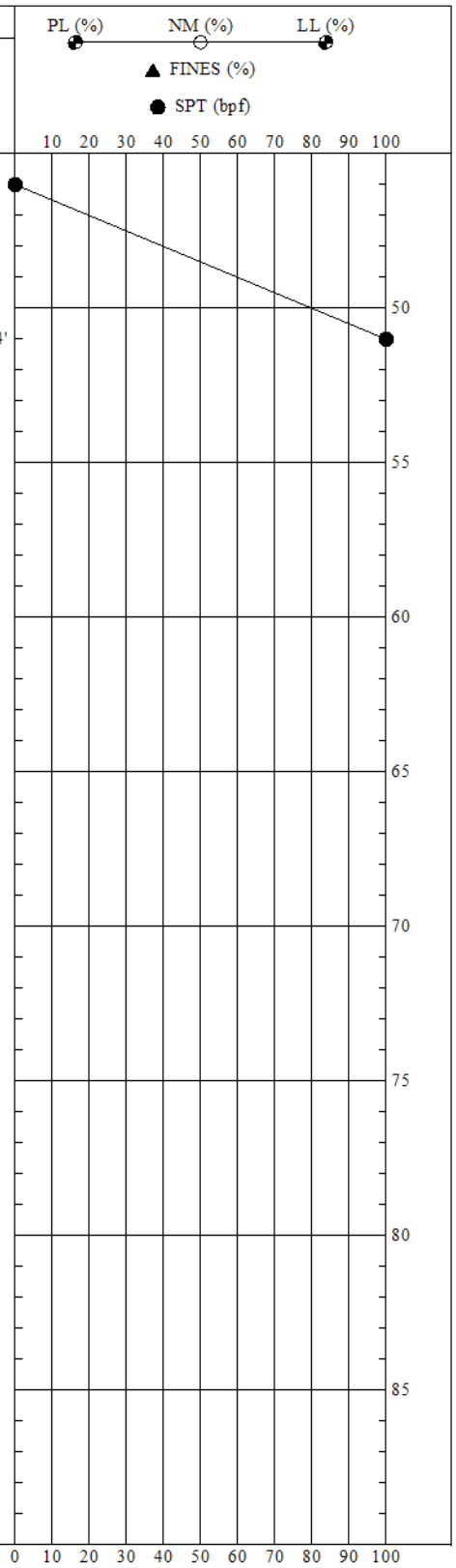
DRILLED: April 9, 2010 **BORING NO.:** B-3

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-3 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	VERY SOFT, STRONG BROWN, MOIST, CLAYEY SAND - ALLUVIUM		719.3	SPT-10		WOH	
50	VERY HARD, DARK BLUISH GRAY, DRY, WEATHERED SHALE WITH IRON STAINING - RESIDUUM		714.3	SPT-11		23-41-50/0.4'	
	AUGER REFUSAL AT 51.4'						
55			709.3				
60			704.3				
65			699.3				
70			694.3				
75			689.3				
80			684.3				
85			679.3				
90			674.3				



SOIL_3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: L.S.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

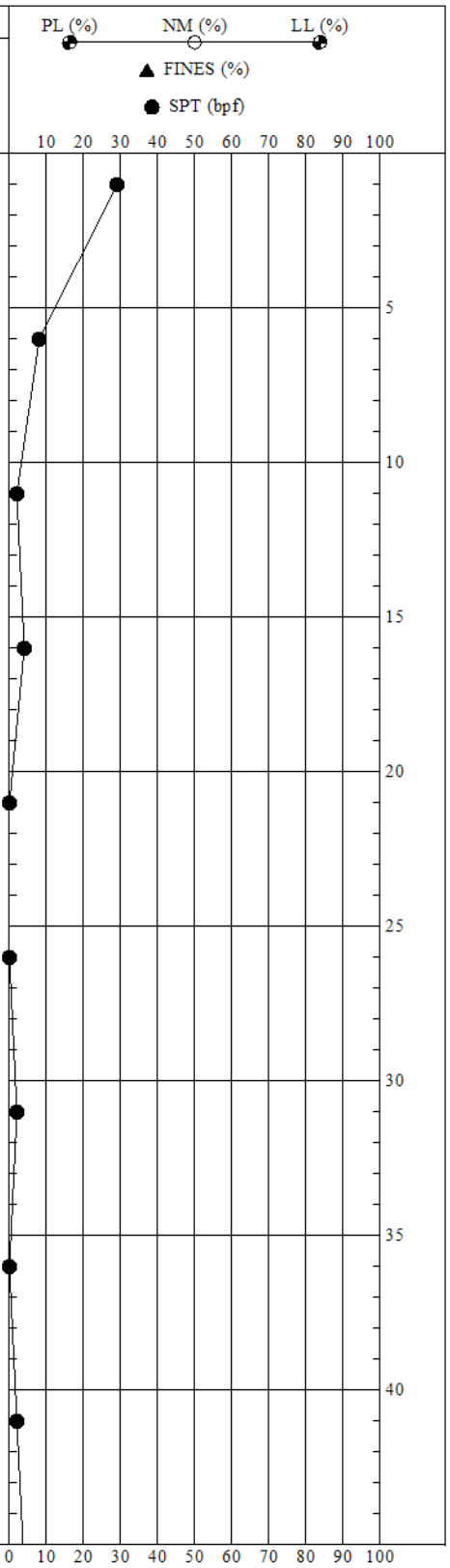
DRILLED: April 9, 2010 **BORING NO.:** B-3

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

B-4 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	VERY STIFF, DARK GRAY TO GRAY, MOIST, FLY ASH - FILL	765.4	SPT-1		3-12-17
	FIRM, DARK GRAY TO GRAY, MOIST, FLY ASH - FILL				
5		760.4	SPT-2		3-4-4
	VERY SOFT, GRAY WITH A LITTLE RED, WET, FLY ASH WITH CLAYEY SAND - FILL				
10		755.4	SPT-3		1-1-1
	SOFT, DARK GRAY, WET, FLY ASH WITH LITTLE SAND - FILL				
15		750.4	SPT-4		2-2-2
	VERY SOFT, DARK GRAY, WET, FLY ASH - FILL				
20		745.4	SPT-5		WOH
	VERY SOFT, DARK GRAY, FLY ASH WITH SAND - FILL				
25		740.4	SPT-6		WOH
	VERY SOFT, VERY DARK GRAY, WET, FLY ASH WITH SAND - FILL				
30		735.4	SPT-7		1-1-1
	VERY SOFT, DARK GRAYISH BROWN, FLY ASH WITH SAND - FILL				
35		730.4	SPT-8		WOH
	VERY SOFT, YELLOWISH BROWN, WET, CLAY WITH SAND - ALLUVIUM				
40		725.4	SPT-9		1-1-1
45		720.4			



SOIL 3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State	
Logged By: R.C.	
Checked By: T.S.L.	

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

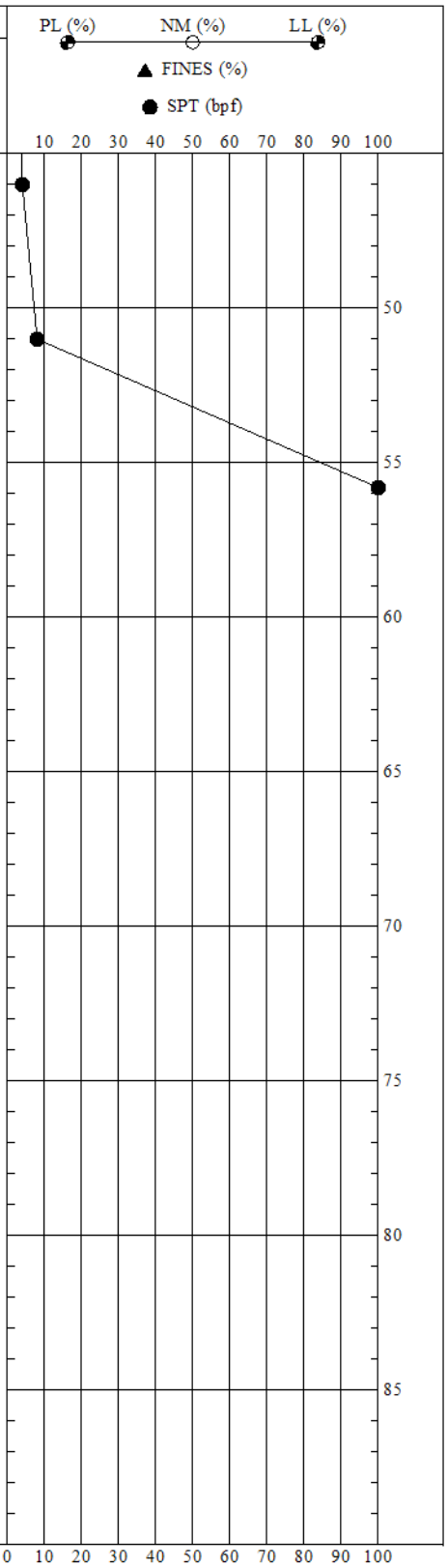
DRILLED: April 5, 2010 **BORING NO.:** B-4

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-4 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
45	VERY LOOSE, YELLOWISH BROWN, WET, CLAYEY SAND - ALLUVIUM	720.4	SPT-10		WOH-2-2
50	LOOSE, YELLOWISH BROWN TO LIGHT YELLOWISH BROWN, WET, CLAYEY SAND WITH TRACE OF GRAVEL - ALLUVIUM	715.4	SPT-11		2-2-6
55	VERY HARD, REDDISH GREENISH BROWN, WEATHERED SHALE - RESIDUUM BORING TERMINATED AT 55.8'	710.4	SPT-12		38-50/0.3'
60		705.4			
65		700.4			
70		695.4			
75		690.4			
80		685.4			
85		680.4			
90		675.4			



SOIL 3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

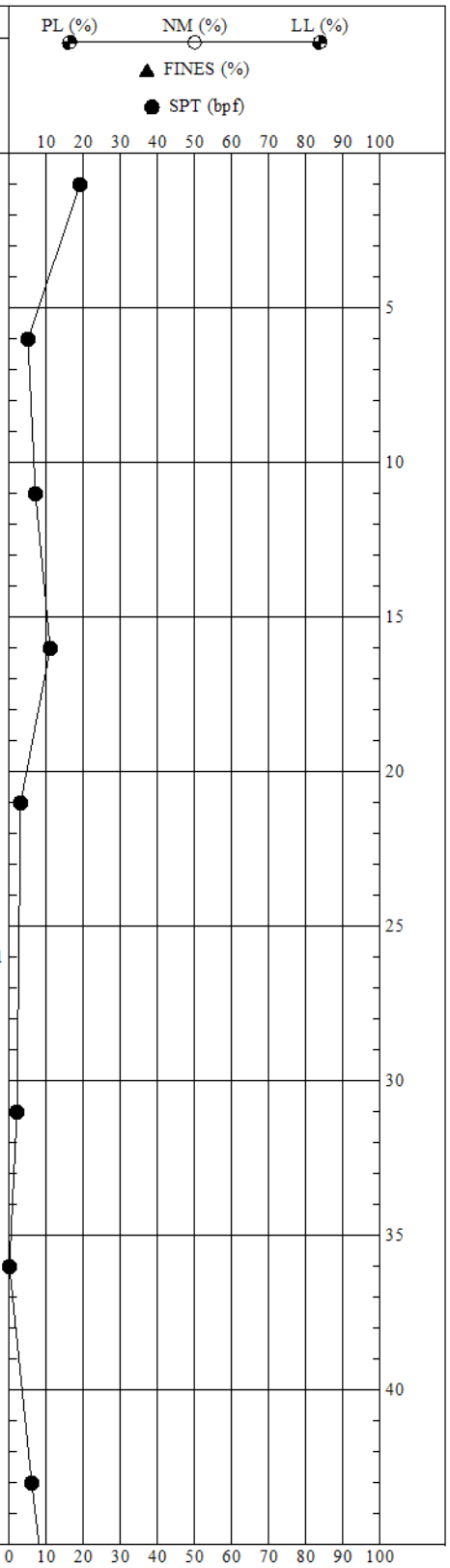
DRILLED: April 5, 2010 **BORING NO.:** B-4

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

B-5 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	VERY STIFF, DARK GREENISH GRAY, MOIST, FLY ASH WITH ROCK FRAGMENTS - FILL	771.1	SPT-1		3-10-9
5	FIRM, DARK GRAYISH BROWN WITH SOME YELLOWISH BROWN MOTTLING, MOIST, SANDY SILTY CLAY WITH ROOT AND ROCK FRAGMENTS - FILL	766.1	SPT-2		1-2-3
10	FIRM, DARK GREENISH GRAY, MOIST, FLY ASH WITH GRAVEL FRAGMENTS - FILL	761.1	SPT-3		2-3-4
15	STIFF, MOIST, FLY ASH WITH ROOT AND ROCK FRAGMENTS AND A LAYER OF SILTY CLAY WITH CHERT FRAGMENTS - FILL	756.1	SPT-4		2-4-7
20	SOFT, MOIST, FLY ASH - FILL	751.1	SPT-5		WOH-1-2
25	VERY SOFT, DARK GREENISH GRAY, WET TO MOIST, SANDY FLY ASH - FILL	746.1	SPT-6		WOH-WOH-1
30		741.1	SPT-7		1-1-1
35	VERY SOFT, GRAYISH BROWN, WET TO MOIST, SILTY CLAY - ALLUVIUM	736.1	SPT-8		WOH
40	YELLOW-BROWN, SLIGHTLY CLAYEY SAND - ALLUVIUM	731.1	UD-1		2.0-2.0
45	LOOSE, LIGHT BROWNISH GRAY, MOIST, SILTY SAND - ALLUVIUM	726.1	SPT-9		1-3-3



SOIL_304310014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: L.S.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

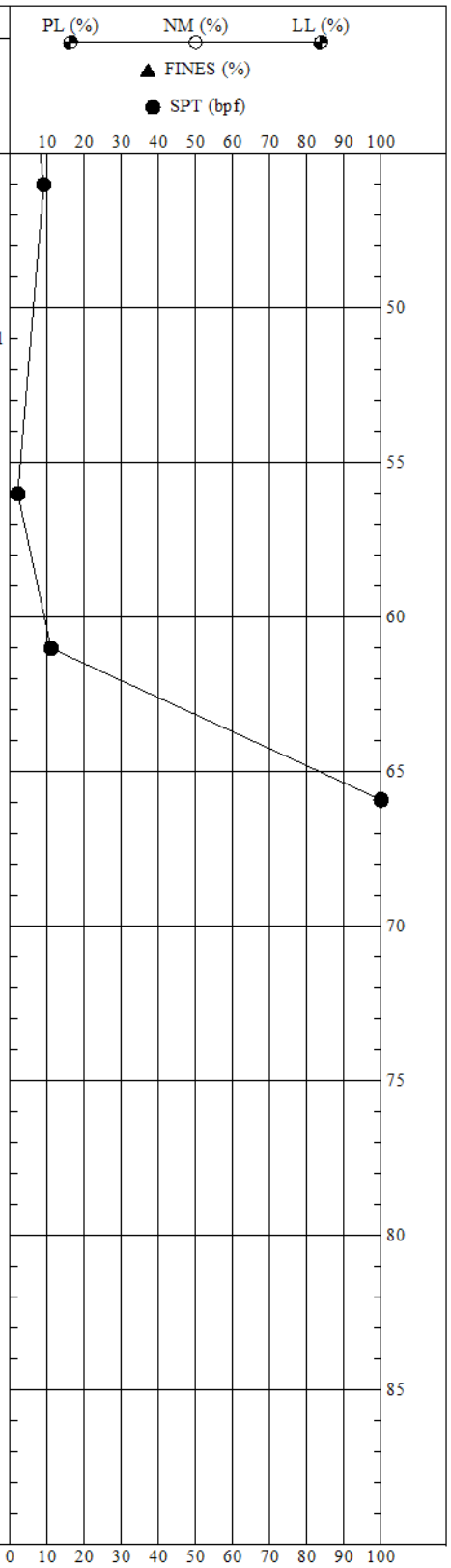
DRILLED: April 8, 2010 **BORING NO.:** B-5

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-5 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
45	FIRM, BROWNISH YELLOW WITH LIGHT BROWNISH GRAY MOTTLING, MOIST, SLIGHTLY SANDY SILT - ALLUVIUM	726.1	SPT-10		1-4-5
	LOOSE, BROWNISH YELLOW, MOIST, SILTY SAND - ALLUVIUM				
50	VERY LOOSE, BROWNISH YELLOW, WET, SILTY SAND - ALLUVIUM	721.1	SPT-11		WOH-WOH-1
55		716.1	SPT-12		0-1-1
	STIFF, LIGHT GRAY MOTTLED WITH BROWNISH YELLOW, MOIST, SANDY SILT - ALLUVIUM				
60		711.1	SPT-13		1-5-6
65	HARD, DRY TO MOIST, WEATHERED SHALE - RESIDUUM	706.1	SPT-14		20-50/0.4'
	BORING TERMINATED AT 65.9'				
70		701.1			
75		696.1			
80		691.1			
85		686.1			
90		681.1			



SOIL 3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: L.S.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

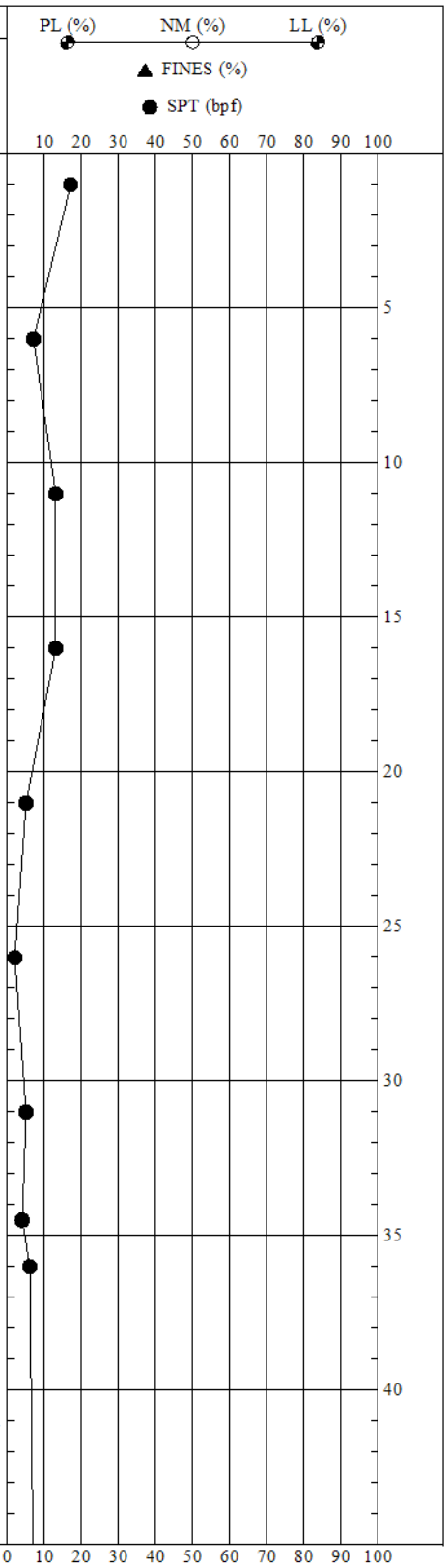
DRILLED: April 8, 2010 **BORING NO.:** B-5

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

B-6 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	VERY STIFF, VERY DARK GRAYISH BROWN, DRY TO MOIST, CLAYEY FLY ASH MIX WITH GRAVEL AND COAL FRAGMENTS - FILL	764.5	SPT-1		5-7-10
5	STIFF, VERY DARK GREENISH GRAY, DRY TO MOIST, FLY ASH - FILL	759.5	SPT-2		2-4-3
10	STIFF, WET TO MOIST, FLY ASH WITH SAND - FILL	754.5	SPT-3		5-7-6
15	FIRM TO VERY SOFT, WET, FLY ASH - FILL	749.5	SPT-4		5-7-6
20		744.5	SPT-5		2-2-3
25	FIRM, STRONG BROWN, MOIST, CLAYEY SILT - ALLUVIUM	739.5	SPT-6		1-1-1
30	SOFT TO FIRM, STRONG BROWN WITH GRAY MOTTLING, MOIST, SLIGHTLY SANDY SILT - ALLUVIUM	734.5	SPT-7		WOH-2-3
35	VERY SOFT, STRONG BROWN MOTTLED WITH GRAY, MOIST TO WET, SLIGHTLY SANDY SILT - ALLUVIUM	729.5	SPT-8		1-1-3
			SPT-9		1-3-3
40	FIRM, DARK BROWN WITH STRONG BROWN MIX, SANDY SILT TO GRAY, CLAYEY SAND - ALLUVIUM	724.5	SPT-10		WOH-WOH-1
45		719.5			



SOIL 3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: L.S.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

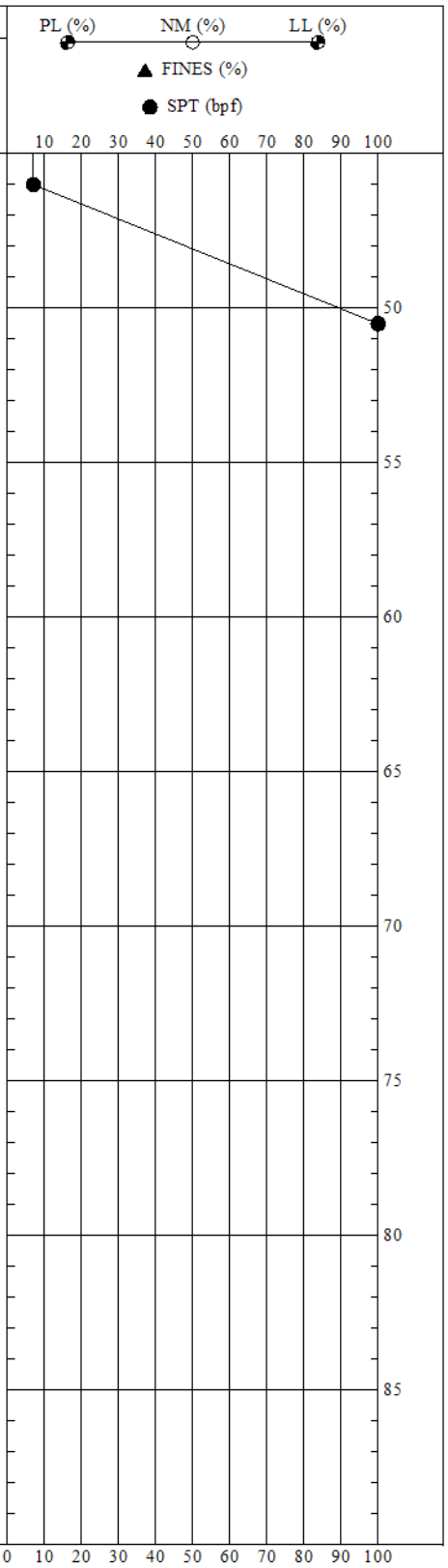
DRILLED: April 9, 2010 **BORING NO.:** B-6

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-6 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	FIRM, DARK BROWN WITH STRONG BROWN MIX, SANDY SILT TO GRAY, CLAYEY SAND - ALLUVIUM		719.5	SPT-11		1-3-4	
50	VERY HARD, DARK BLUISH GRAY, DRY TO MOIST, WEATHERED SHALE - RESIDUUM BORING TERMINATED AT 50.5'		714.5	SPT-12		50/0.5'	
55			709.5				
60			704.5				
65			699.5				
70			694.5				
75			689.5				
80			684.5				
85			679.5				
90			674.5				



SOIL_3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: L.S.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

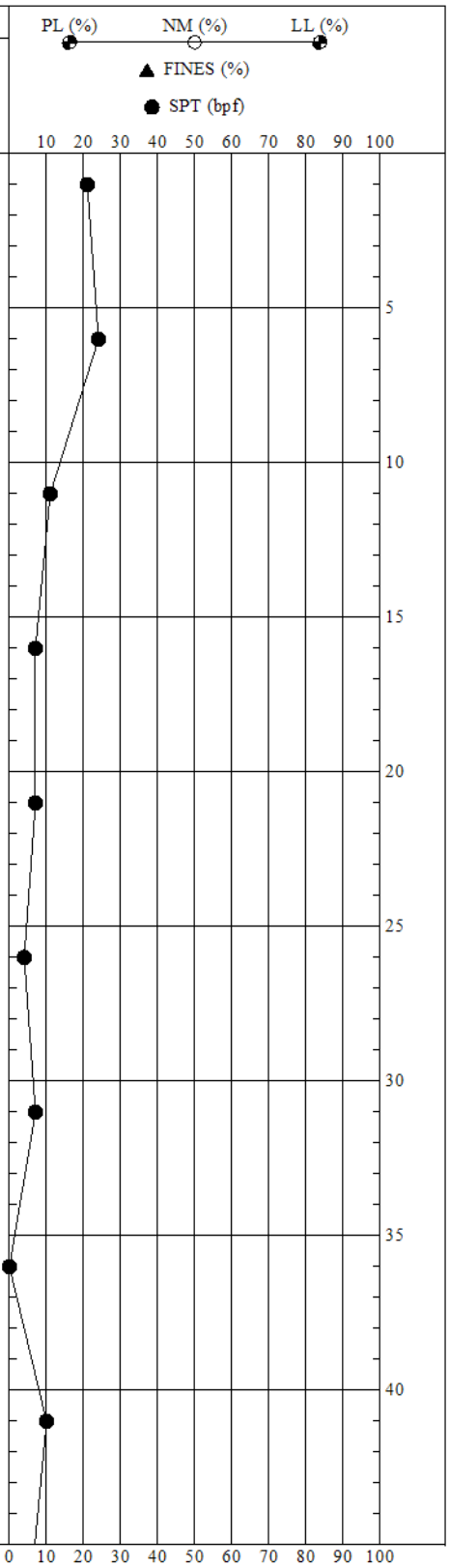
DRILLED: April 9, 2010 **BORING NO.:** B-6

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

B-7 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	VERY STIFF, DARK GRAY, DRY, FLY ASH WITH TRACE GRAVEL - FILL		766.9	SPT-1		4-8-13
	STIFF TO VERY STIFF, DARK GRAY, MOIST, FLY ASH - FILL					
5			761.9	SPT-2		5-10-14
10			756.9	SPT-3		4-6-5
	FIRM TO SOFT, DARK GRAY, WET, FLY ASH WITH A LITTLE SAND - FILL					
15			751.9	SPT-4		3-4-3
20			746.9	SPT-5		2-3-4
25			741.9	SPT-6		2-2-2
	LOOSE, DARK GRAY, WET, SILTY SAND / FLY ASH - FILL					
30			736.9	SPT-7		3-3-4
	VERY SOFT, DARK GRAY, WET, FLY ASH - FILL					
35			731.9	SPT-8		3-1-WOH
	STIFF, REDDISH BROWN MOTTLED WITH LIGHT YELLOWISH BROWN, MOIST, SANDY CLAY - ALLUVIUM					
40			726.9	SPT-9		3-4-6
	LOOSE, YELLOWISH BROWN, WET, SILTY SAND - ALLUVIUM					
45			721.9			



SOIL_3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

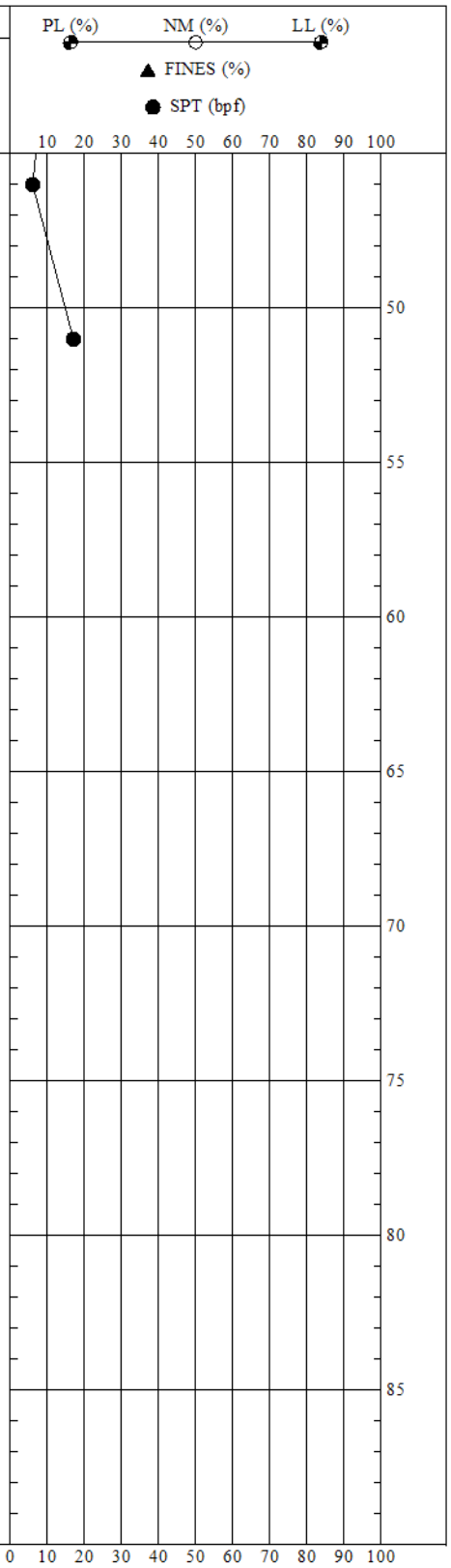
DRILLED: April 6, 2010 **BORING NO.:** B-7

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-7 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	LOOSE, YELLOWISH BROWN, WET, SILTY SAND - ALLUVIUM		721.9	SPT-10		2-3-3	
	FIRM, PINKISH GRAYISH BROWN, MOIST, CLAYEY SAND - ALLUVIUM						
50			716.9	SPT-11		4-5-12	
	BORING TERMINATED AT 51.5'						
55			711.9				
60			706.9				
65			701.9				
70			696.9				
75			691.9				
80			686.9				
85			681.9				
90			676.9				



SOIL_3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

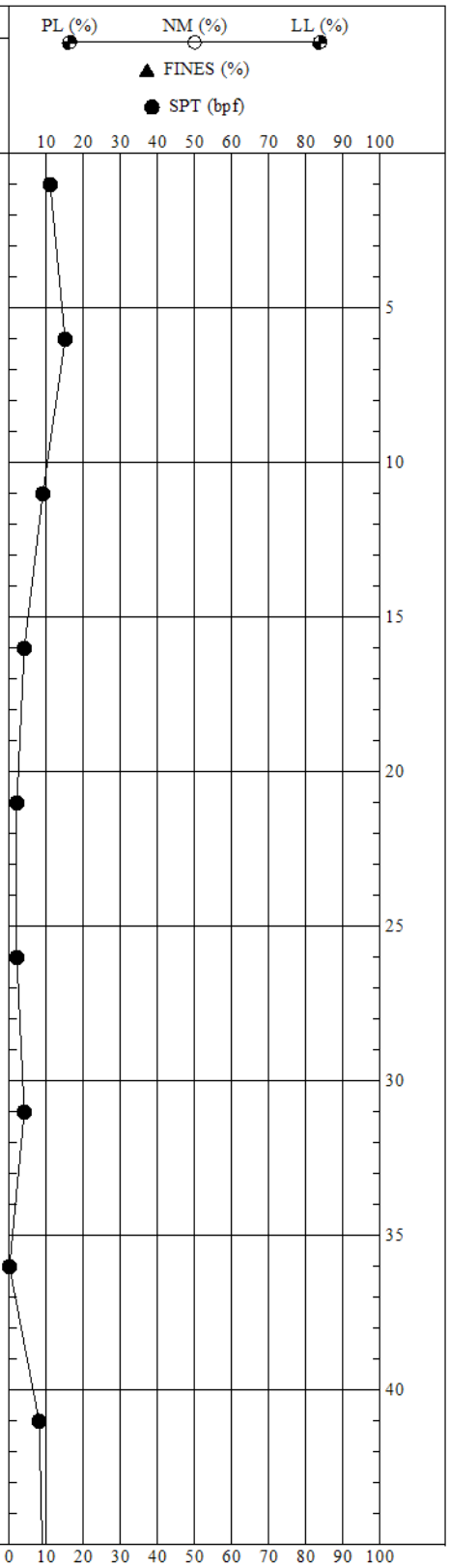
DRILLED: April 6, 2010 **BORING NO.:** B-7

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

B-8 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	STIFF TO FIRM, DARK GRAY, MOIST, FLY ASH WITH TRACE GRAVEL - FILL	767.3	SPT-1		3-4-7
5		762.3	SPT-2		4-9-6
10		757.3	SPT-3		4-4-5
13	VERY LOOSE, DARK GRAY, MOIST, SANDY FLY ASH WITH TRACE GRAVEL AND WOOD DEBRIS - FILL				
15		752.3	SPT-4		2-2-2
18	VERY SOFT TO SOFT, DARK GRAY, WET, FLY ASH WITH SOME FINE SAND - FILL				
20		747.3	SPT-5		1-1-1
25		742.3	SPT-6		WOH-1-1
30		737.3	SPT-7		2-2-2
32	VERY SOFT, LIGHT GRAYISH YELLOWISH BROWN, MOIST TO WET, SANDY CLAY - ALLUVIUM				
35		732.3	SPT-8		WOH
			UD-1		2.0-2.0
40	FIRM, LIGHT YELLOWISH TO YELLOWISH BROWN, WET, SILTY CLAY WITH SOME FINE SAND - ALLUVIUM	727.3	SPT-9		4-4-4
43	LOOSE, YELLOWISH ORANGISH BROWN, WET, CLAYEY SAND - ALLUVIUM				
45		722.3			



SOIL 3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

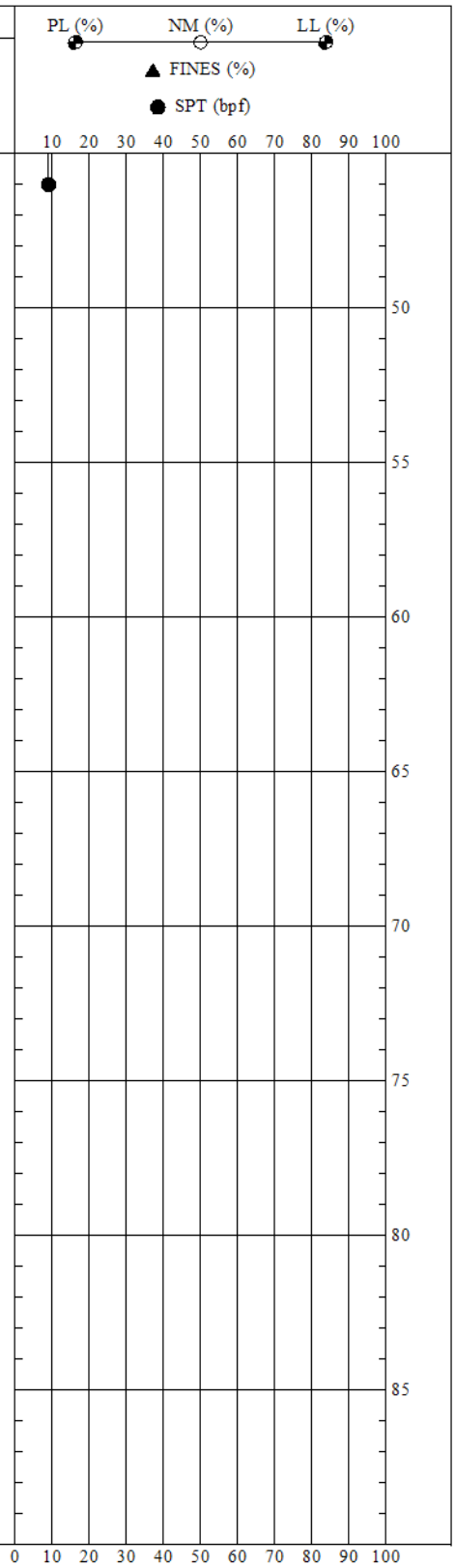
DRILLED: April 9, 2010 **BORING NO.:** B-8

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-8 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	LOOSE, YELLOWISH ORANGISH BROWN, WET, CLAYEY SAND - ALLUVIUM		722.3	SPT-10		3-4-5	
	BORING TERMINATED AT 46.5'						
50			717.3				
55			712.3				
60			707.3				
65			702.3				
70			697.3				
75			692.3				
80			687.3				
85			682.3				
90			677.3				



SOIL_3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

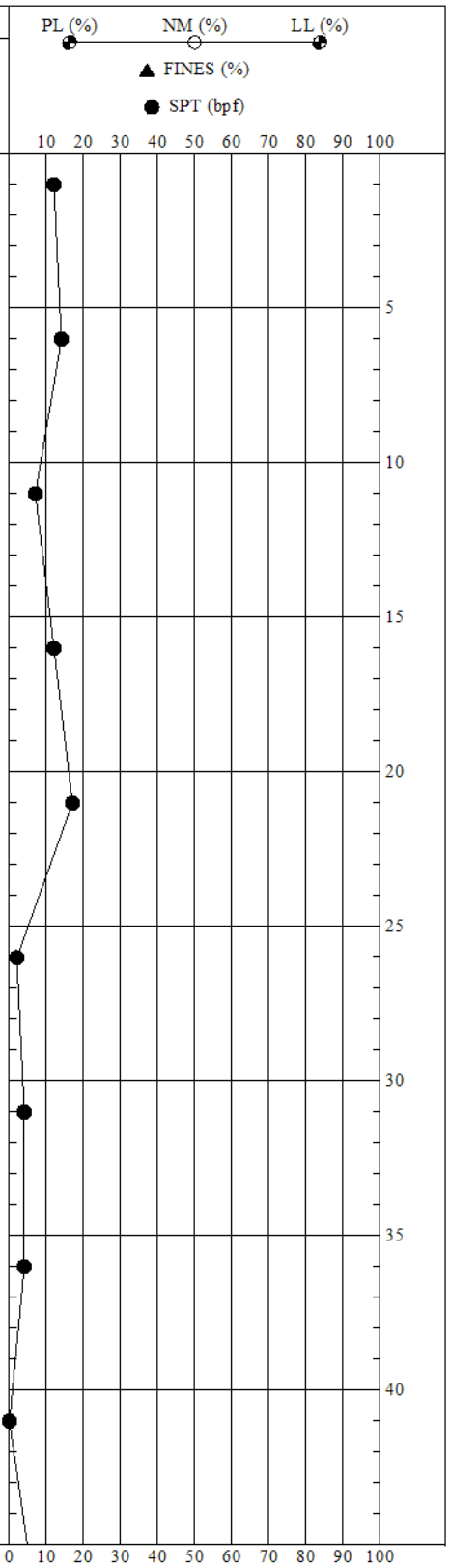
DRILLED: April 9, 2010 **BORING NO.:** B-8

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

B-9 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	STIFF, DARK GRAY, MOIST, FLY ASH WITH GRAVEL - FILL	770.5	SPT-1		4-5-7
5		765.5	SPT-2		6-7-7
	FIRM TO VERY STIFF, DARK GRAY, MOIST, FLY ASH - FILL				
10		760.5	SPT-3		2-3-4
15		755.5	SPT-4		4-5-7
20		750.5	SPT-5		7-8-9
	VERY SOFT, DARK GRAY, WET, FLY ASH WITH SAND - FILL				
25		745.5	SPT-6		1-1-1
	SOFT, DARK GRAY, WET, FLY ASH - FILL				
30		740.5	SPT-7		1-2-2
35		735.5	SPT-8		1-2-2
	VERY SOFT, LIGHT YELLOWISH BROWN, MOIST, CLAY WITH A LITTLE SAND - ALLUVIUM				
40		730.5	SPT-9		WOH
	FIRM, LIGHT YELLOWISH BROWN MOTTLED WITH ORANGISH BROWN, WET TO MOIST, SANDY SILT - ALLUVIUM				
45		725.5			



SOIL_3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. COLLECTED BULK SAMPLE OF AUGER CUTTINGS FROM DEPTH OF 0 TO 15 FEET.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

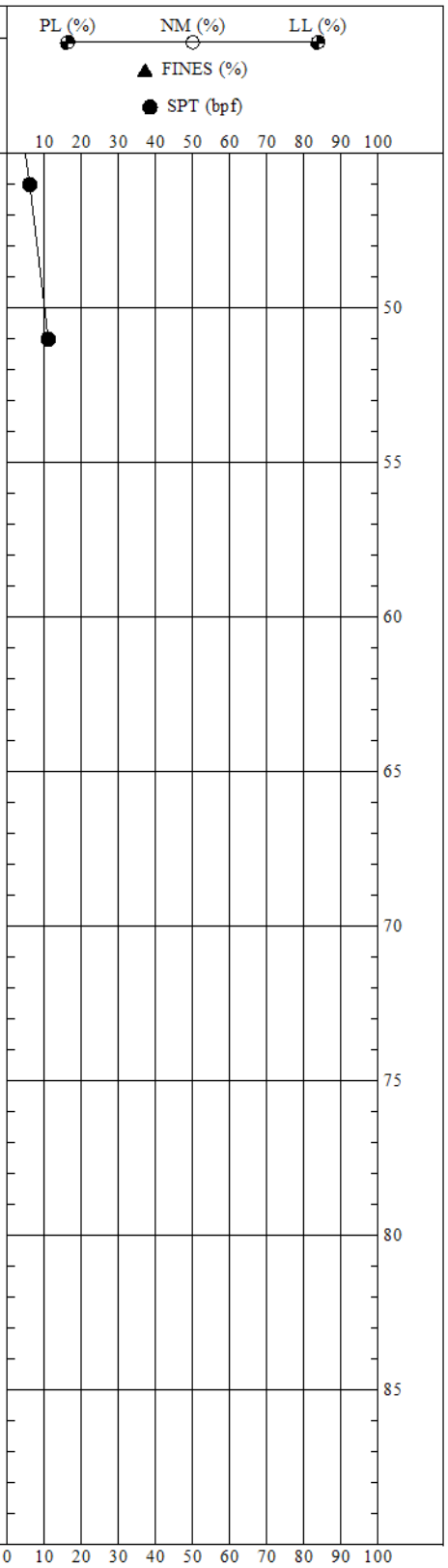
DRILLED: April 7, 2010 **BORING NO.:** B-9

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-9 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	FIRM, LIGHT YELLOWISH BROWN MOTTLED WITH ORANGISH BROWN, WET TO MOIST, SANDY SILT - ALLUVIUM		725.5	SPT-10		2-3-3	
	FIRM, ALTERNATING LAYERS OF YELLOWISH BROWN AND ORANGISH BROWN, WET, CLAYEY SAND - ALLUVIUM						
50			720.5	SPT-11		4-5-6	
	BORING TERMINATED AT 51.5'						
55			715.5				
60			710.5				
65			705.5				
70			700.5				
75			695.5				
80			690.5				
85			685.5				
90			680.5				



SOIL_3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. COLLECTED BULK SAMPLE OF AUGER CUTTINGS FROM DEPTH OF 0 TO 15 FEET.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

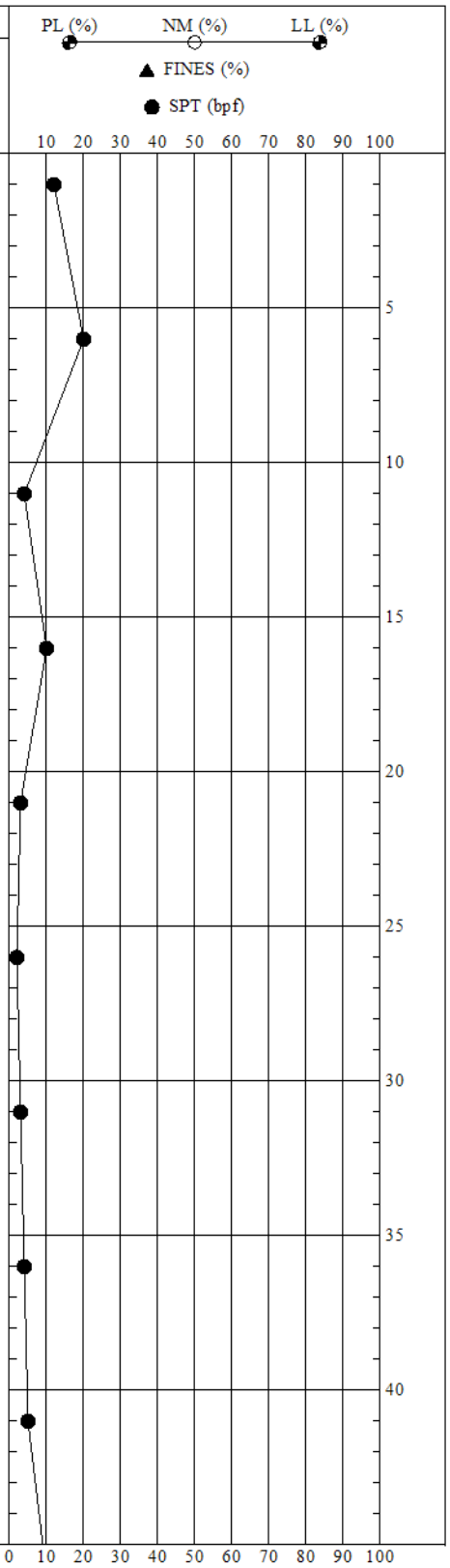
DRILLED: April 7, 2010 **BORING NO.:** B-9

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

B-10 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	STIFF TO VERY STIFF, DARK GRAY, MOIST, FLY ASH WITH TRACE GRAVEL - FILL	766.6	SPT-1		3-5-7
5		761.6	SPT-2		8-11-9
	SOFT, DARK GRAY, MOIST, FLY ASH - FILL				
10		756.6	SPT-3		1-2-2
	STIFF, DARK GRAY, MOIST, FLY ASH - FILL				
15		751.6	SPT-4		3-4-6
	VERY LOOSE, DARK GRAY, WET, SILTY SAND / FLY ASH - FILL				
20		746.6	SPT-5		2-1-2
	VERY SOFT TO SOFT, DARK GRAY, WET, FLY ASH - FILL				
25		741.6	SPT-6		2-1-1
30		736.6	SPT-7		2-1-2
35	FIRM TO SOFT, YELLOWISH BROWN MOTTLED WITH REDDISH BROWN, WET, SILT - ALLUVIUM	731.6	SPT-8		2-2-2
40		726.6	SPT-9		2-3-2
	LOOSE, YELLOWISH BROWN TO LIGHT GRAYISH BROWN, WET, CLAYEY SAND - ALLUVIUM				
45		721.6			



SOIL_304310014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. COLLECTED BULK SAMPLE OF AUGER CUTTINGS FROM DEPTH OF 0 TO 15 FEET.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

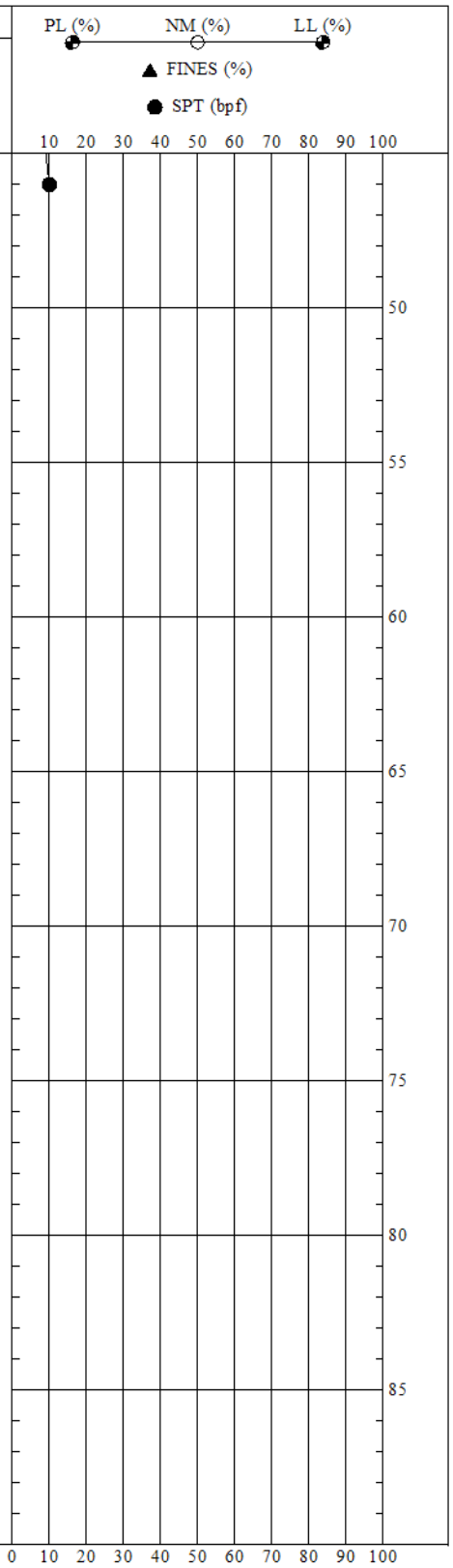
DRILLED: April 7, 2010 **BORING NO.:** B-10

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-10 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	LOOSE, YELLOWISH BROWN TO LIGHT GRAYISH BROWN, WET, CLAYEY SAND - ALLUVIUM		721.6	SPT-10		2-4-6	
	BORING TERMINATED AT 46.5'						
50			716.6				
55			711.6				
60			706.6				
65			701.6				
70			696.6				
75			691.6				
80			686.6				
85			681.6				
90			676.6				



SOIL 3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. COLLECTED BULK SAMPLE OF AUGER CUTTINGS FROM DEPTH OF 0 TO 15 FEET.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: R.C.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

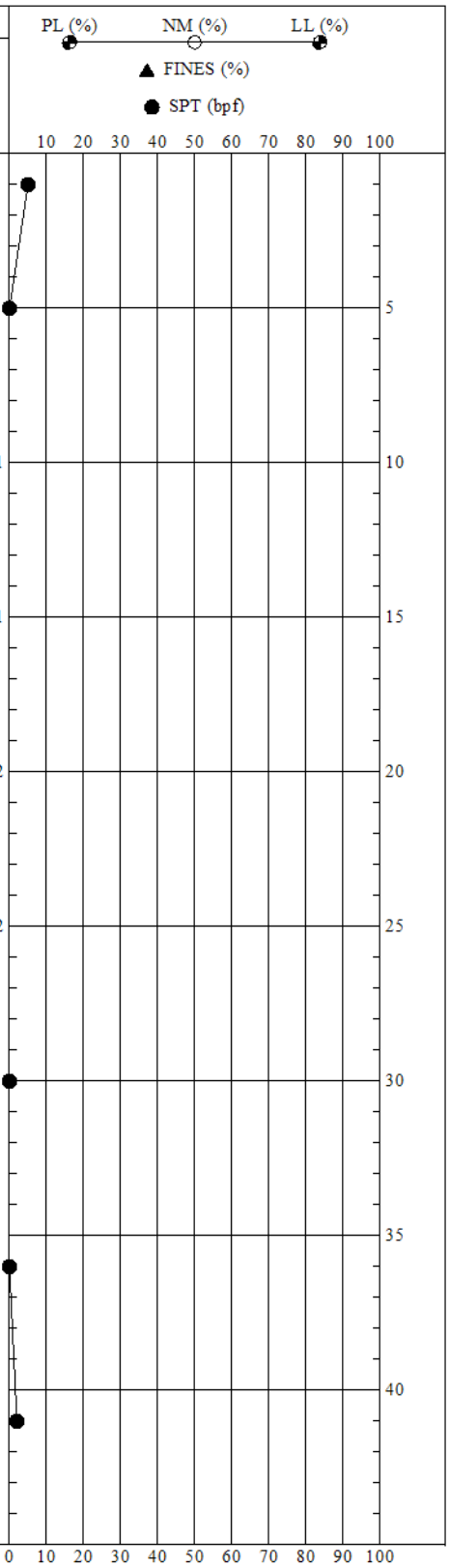
DRILLED: April 7, 2010 **BORING NO.:** B-10

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

B-11 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	SAMPLE IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	FIRM, DARK GREENISH GRAY, SLIGHTLY MOIST, FLY ASH - FILL	763.3	SPT-1		3-3-2
	VERY SOFT, DARK GREENISH GRAY, WET, FLY ASH - FILL				
5		758.3	SPT-2		WOH
10		753.3	SPT-3		WOH-WOH-1
15		748.3	SPT-4		WOH-WOH-1
20		743.3	SPT-5		WOH-WOH-2
25		738.3	SPT-6		WOH-WOH-2
30	VERY SOFT, YELLOWISH BROWN, MOIST, SANDY SILTY CLAY - POSSIBLE ALLUVIUM	733.3	SPT-7		WOH
	VERY SOFT, GRAYISH BROWN, MOIST, SLIGHTLY SANDY SILT - POSSIBLE ALLUVIUM				
35		728.3	UD-1		0.0-2.0
			SPT-8		WOH
	VERY SOFT, GRAYISH BROWN WITH REDDISH YELLOW MOTTLING, MOIST, SANDY CLAY - ALLUVIUM				
40		723.3	UD-1		0.0-2.0
			SPT-9		1-1-1
45		718.3			



SOIL 3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: L.S.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

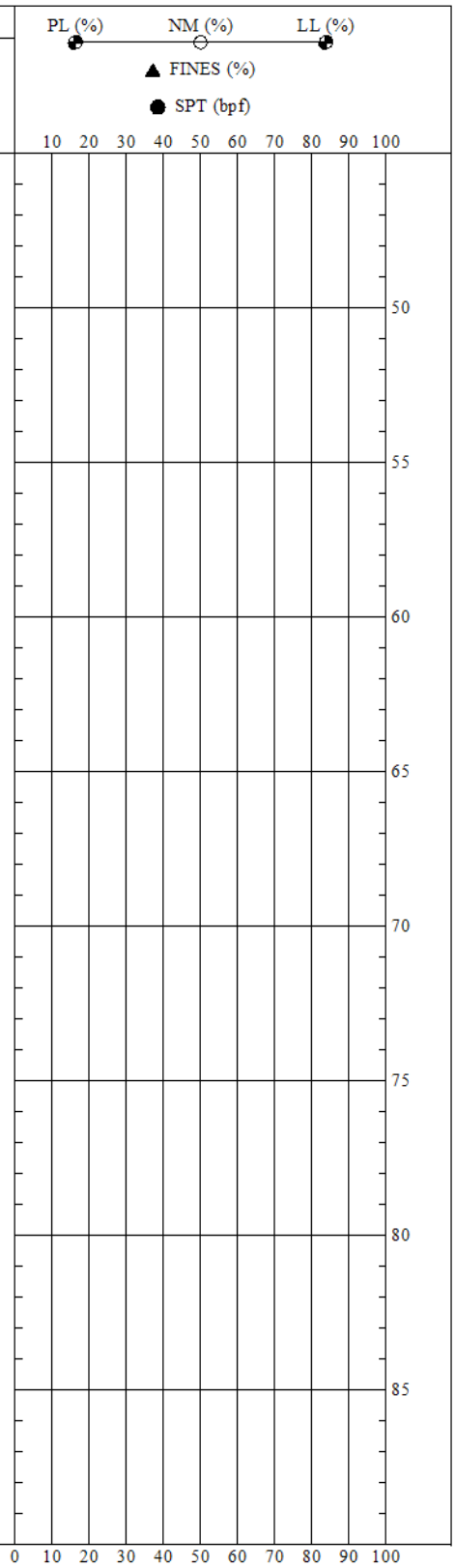
DRILLED: April 6, 2010 **BORING NO.:** B-11

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-11 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	VERY HARD, STRONG BROWN, DRY TO MOIST, WEATHERED SHALE - RESIDUUM		718.3	SPT-10		37-50	
	AUGER REFUSAL AT 46.2'						
50			713.3				
55			708.3				
60			703.3				
65			698.3				
70			693.3				
75			688.3				
80			683.3				
85			678.3				
90			673.3				



SOIL 3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: L.S.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

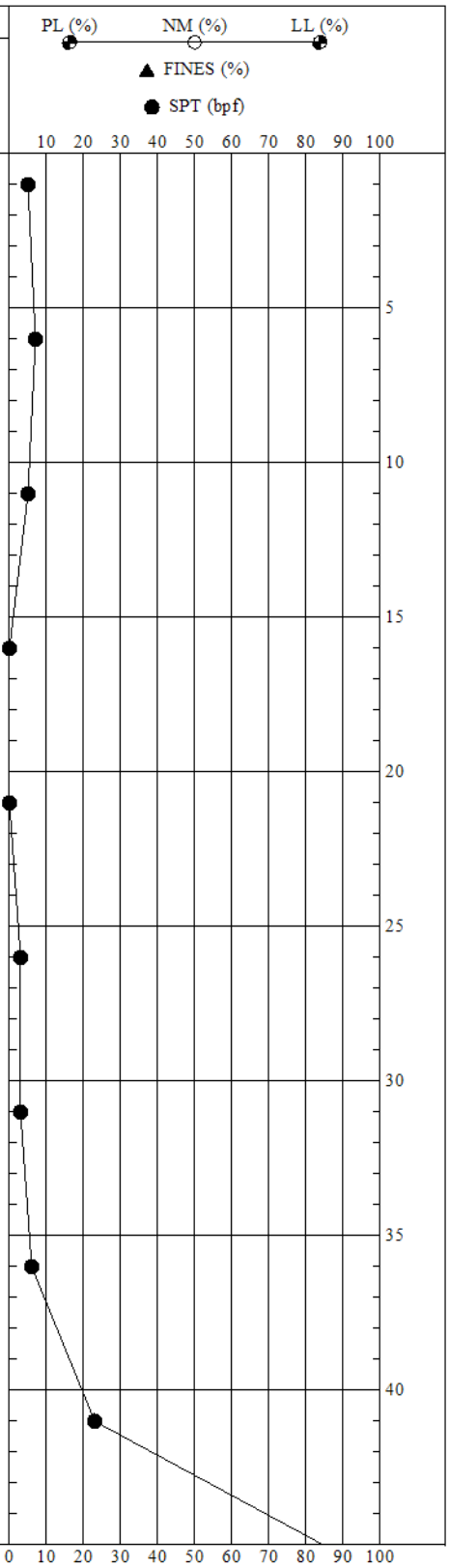
DRILLED: April 6, 2010 **BORING NO.:** B-11

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

B-12 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	FIRM, DARK GREENISH GRAY, MOIST, FLY ASH WITH YELLOW-BROWN, SILTY CLAY- FILL	764.7	SPT-1		4-3-2
	FIRM TO VERY SOFT, DARK GREENISH GRAY, MOIST TO WET, FLY ASH - FILL				
5		759.7	SPT-2		1-1-6
10		754.7	SPT-3		1-2-3
15		749.7	SPT-4		WOH
20		744.7	SPT-5		WOH
25		739.7	SPT-6		WOH-1-2
30		734.7	SPT-7		1-1-2
35	FIRM, GRAYISH BROWN, SLIGHTLY SANDY CLAY - POSSIBLE ALLUVIUM	729.7	SPT-8		WOH-1-5
	VERY FIRM, LIGHT YELLOWISH BROWN WITH GRAYISH BROWN MOTTLING, MOIST, SILTY SAND WITH GRAVEL - ALLUVIUM				
40		724.7	SPT-9		23-13-10
	VERY FIRM, BROWNISH YELLOW SAND WITH GRAVEL - ALLUVIUM				
45		719.7			



SOIL 3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. COLLECTED BULK SAMPLE OF AUGER CUTTINGS.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State	
Logged By: L.S.	
Checked By: T.S.L.	

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

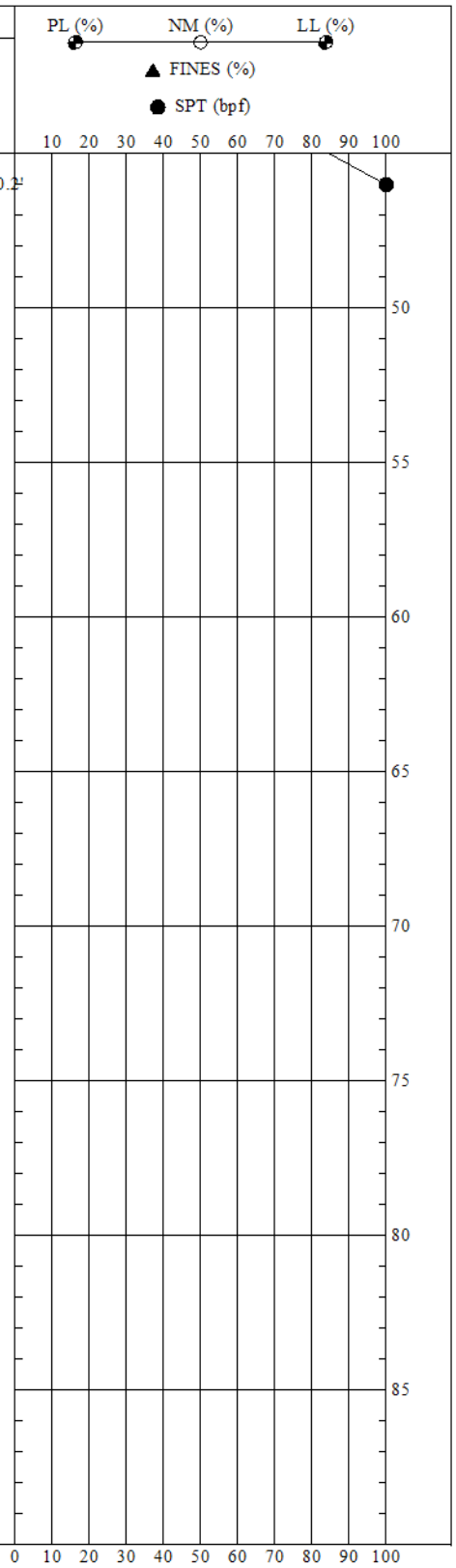
DRILLED: April 7, 2010 **BORING NO.:** B-12

PROJ. NO.: 3043-10-1014 **PAGE 1 OF 2**

MACTEC

B-12 (MT 2010)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)
45	VERY HARD, DARK YELLOWISH BROWN WEATHERED SHALE - RESIDUUM		719.7	SPT-10		6-50/0.5'-50/0.2'	
	BORING TERMINATED AT 46.2'						
50			714.7				
55			709.7				
60			704.7				
65			699.7				
70			694.7				
75			689.7				
80			684.7				
85			679.7				
90			674.7				



SOIL_3043101014.GPJ LAW_GIBB.GDT 5/24/10

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. COLLECTED BULK SAMPLE OF AUGER CUTTINGS.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Driller : Tri-State
Logged By: L.S.
Checked By: T.S.L.

SOIL TEST BORING RECORD

PROJECT: TVA - Kingston Haul Road

DRILLED: April 7, 2010 **BORING NO.:** B-12

PROJ. NO.: 3043-10-1014 **PAGE 2 OF 2**

MACTEC

SUBSURFACE LOG

DSM-North (MT 2010)

Project No.	175669015	Location	N 557527.80, E 2440947.00 (NAD27)
Project Name	KIF-TVA; DSM Pilot Platform	Boring No.	**DSM-North** Total Depth 70.0 ft
Location	Roane County, Tennessee	Surface Elevation	767.0 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	8/5/10 Completed 8/6/10
Supervisor	M. Jones Driller S. Snow	Depth to Water	N/A Date/Time N/A
Logged By	M. Jones	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
767.0'	0.0'	Top of Hole							
		FLY ASH, gray, moist to wet, very soft to medium stiff							Boring advanced with 3.25" HSA and center plug.
				SPT-1	4.0 - 5.5	1.1	1-1-1	--	
				SPT-2	9.0 - 10.5	1.4	1-1-1	--	
		-trace organics		SPT-3	14.0 - 15.5	1.4	2-3-3	--	
				SPT-4	19.0 - 20.5	1.3	3-3-4	--	
				SPT-5	24.0 - 25.5	1.4	1-2-3	--	
737.4'	29.6'								
		LEAN CLAY, brown to grayish brown, wet, very soft, silty		SPT-6	29.0 - 30.5	1.5	1-1-1	--	
735.0'	32.0'			SPT-7	30.5 - 32.0	0.9	WOH-WOH-WOH	--	
733.3'	33.7'	SANDY LEAN CLAY, orange brown, moist to wet, very soft, with fine sand, silty		SPT-8	32.0 - 33.5	1.4	WOH-WOH-WOH	--	
				SPT-9	33.5 - 35.0	1.5	WOH-1-2	--	
		SANDY SILTY CLAY, orange brown, moist, soft to medium stiff, with fine sand		SPT-10	35.0 - 36.5	1.2	WOH-1-5	--	
729.8'	37.2'			SPT-11	36.5 - 38.0	1.5	2-3-4	--	
		SILTY SAND, orange brown, moist, very loose to loose, fine to medium grained		SPT-12	38.0 - 39.5	1.4	1-2-2	--	
				SPT-13	39.5 - 41.0	1.5	WOH-2-1	--	
725.0'	42.0'			SPT-14	41.0 - 42.5	1.5	2-WOH-WOH	--	
		SANDY SILT, orange brown, wet, very soft, with fine sand		SPT-15	42.5 - 44.0	1.5	WOH-	--	

FMSM_LEGACY DSM PILOT PLATFORM BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

DSM-North (MT 2010)

Project No.	175669015	Location	N 557527.80, E 2440947.00 (NAD27)
Project Name	KIF-TVA; DSM Pilot Platform	Boring No.	**DSM-North** Total Depth 70.0 ft

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
722.6'	44.4'	SILTY SAND, orange brown, wet, very loose, fine to medium grained		SPT-16	44.0 - 45.5	1.3	WOH-1 1-WOH-WOH	--	
				SPT-17	45.5 - 47.0	1.3	1-1-1	--	
				SPT-18	47.0 - 48.5	1.4	1-1-2	--	
				SPT-19	48.5 - 50.0	1.5	1-WOH-WOH	--	
715.5'	51.5'			SPT-20	50.0 - 51.5	1.5	WOH-WOH-WOH	--	
		LEAN CLAY with Sand, orange brown mottled gray, moist to wet, very soft, silty		SPT-21	51.5 - 53.0	1.5	WOH-WOH-WOH	--	
				SPT-22	53.0 - 54.5	1.0	WOH-WOH-WOH	--	
711.6'	55.4'			SPT-23	54.5 - 56.0	1.5	1-2-2	--	
710.9'	56.1'	SANDY SILT, gray mottled orange brown, wet, soft, with fine sand		SPT-24	56.0 - 57.5	1.5	3-4-4	--	
708.9'	58.1'			SPT-25	57.5 - 58.4	0.7	4-50/0.4'	--	
708.1'	58.9'	SILTY SAND, gray, wet, loose, fine to medium grained							
		Apparent Sandstone (augered)							Began Core
		Shale, gray, fine, hard, very thin bedded to thin bedded, moderately to highly weathered, bedding planes at apprximately 20 degrees from horizontal		0%	4.6	1.1	24	64.6	
				0%	4.1	3.1	76	68.7	
697.0'	70.0'			31%	1.3	1.3	100	70.0	

Bottom of Hole

Base of Weathered Rock = 60.0'

Top of Rock = 58.1'
Elevation (708.9')

FMSM_LEGACY DSM PILOT PLATFORM BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

DSM-South (MT 2010)

Project No.	175669015	Location	N 557409.79, E 2440872.96 (NAD27)
Project Name	KIF-TVA; DSM Pilot Platform	Boring No.	**DSM-South** Total Depth 80.0 ft
Location	Roane County, Tennessee	Surface Elevation	767.7 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	8/3/10 Completed 8/4/10
Supervisor	M. Jones Driller S. Snow	Depth to Water	25.9 ft Date/Time 8/4/10
Logged By	M. Jones	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
767.7'	0.0'	Top of Hole							
		FLY ASH, gray, moist to wet, very soft to medium stiff							Boring advanced with 3.25" HSA and center plug.
				SPT-1	4.0 - 5.5	0.8	6-7-8	--	
		-trace sand		SPT-2	9.0 - 10.5	0.5	WOH-WOH-WOH	--	
		-trace organics		SPT-3	14.0 - 15.5	0.8	2-3-4	--	
		-occasional sand and/or bottom ash		SPT-4	19.0 - 20.5	1.3	1-1-3	--	
				SPT-5	24.0 - 25.5	1.1	WOH-1-2	--	
				SPT-6	25.5 - 27.0	1.1	WOH-1-1	--	
				SPT-7	27.0 - 28.5	1.2	WOH-1-1	--	
				SPT-8	28.5 - 30.0	1.4	WOH-WOH-1	--	
				SPT-9	30.0 - 31.5	1.5	1-WOH-1	--	
				SPT-10	31.5 - 33.0	1.1	WOH-WOH-2	--	
733.0'	34.7'			SPT-11	33.0 - 34.5	1.1	1-1-1	--	
		LEAN CLAY, grayish brown mottled gray to black, wet, very soft, silty, trace fine sand		SPT-12	34.5 - 36.0	1.5	1-2-1	--	
				SPT-13	36.0 - 37.5	1.5	WOH-WOH-WOH	--	
729.1'	38.6'			SPT-14	37.5 - 39.0	1.2	WOH-1-2	--	
		SANDY LEAN CLAY, orange brown mottled orange and yellowish brown, moist, very soft, silty		SPT-15	39.0 - 40.0	1.5	WOH-2	--	
726.7'	41.0'			SPT-16	40.0 - 41.5	1.5	WOH-1-2	--	
725.0'	42.7'	SANDY SILT, orange brown mottled grayish brown, moist, loose, trace		SPT-17	41.5 - 43.0	1.4	WOH-2-3	--	
				SPT-18	43.0 - 44.5	1.5	1-4-5	--	

FMSM_LEGACY DSM PILOT PLATFORM BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

DSM-South (MT 2010)

Project No.	175669015	Location	N 557409.79, E 2440872.96 (NAD27)
Project Name	KIF-TVA; DSM Pilot Platform	Boring No.	**DSM-South** Total Depth 80.0 ft

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
		clay SILTY SAND, orange brown mottled grayish brown, wet, very loose to loose, fine to medium grained *(Continued)*		SPT-19	44.5 - 46.0	1.2	WOH-WOH-1	--	
				SPT-20	46.0 - 47.5	1.3	1-1-WOH	--	
				SPT-21	47.5 - 49.0	1.3	WOH-1-3	--	
717.5'	50.2'			SPT-22	49.0 - 50.5	1.5	1-1-1	--	
		SANDY SILT, orange brown, wet, very soft, fine sand, trace clay		SPT-23	50.5 - 52.0	1.5	WOH-WOH-WOH	--	
714.2'	53.5'			SPT-24	52.0 - 53.5	1.5	WOH-WOH-WOH	--	
		SILTY SAND, orange brown, wet, very loose to loose, fine to medium grained		SPT-25	53.5 - 55.0	1.5	1-WOH-WOH	--	
				SPT-26	55.0 - 56.5	1.3	2-3-4	--	
				SPT-27	56.5 - 58.0	1.5	2-2-4	--	
708.2'	59.5'			SPT-28	58.0 - 59.5	1.4	2-1-7	--	
		SAND, orange brown to yellowish brown, wet, loose to medium dense, slightly silty, fine to medium grained		SPT-29	59.5 - 61.0	1.1	3-6-9	--	
				SPT-30	61.0 - 62.5	1.1	5-5-9	--	
				SPT-31	62.5 - 64.0	1.3	4-4-5	--	
702.6'	65.1'			SPT-32	64.0 - 65.5	1.5	6-9-12	--	
		Highly Weathered Shale, grayish brown to orange brown, moist, very soft, silty		SPT-33	65.5 - 66.4	0.9	17-50/0.4'	--	
699.4'	68.3'								Began Core
				0%	1.7	0.1	6	70.0	
		Shale, gray, fine, hard, very thin bedded, moderately to slightly weathered, bedding planes at approximately 20 degrees from horizontal		0%	5.0	3.3	66	75.0	
687.7'	80.0'			0%	5.0	2.8	56	80.0	

Bottom of Hole

Base of Weathered Rock = 68.3'

Top of Rock = 65.1'
Elevation (702.6')

FMSM_LEGACY DSM PILOT PLATFORM BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

Project No.	175660041	Location	N 557650.05, E 2440843.85 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**PZ-B1** Total Depth 48.0 ft
Location	Roane County, Tennessee	Surface Elevation	765.5 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	10/4/10 Completed 10/5/10
Supervisor	M. Jones Driller M. Martin	Depth to Water	N/A Date/Time N/A
Logged By	M. Jones	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
765.5'	0.0'	Top of Hole							
		Blank drill to 30 feet.							Boring advanced with 4.25" hollow stem augers.
		OVERBURDEN (Ash)							
735.5'	30.0'								
735.0'	30.5'	FLY ASH, gray, moist		SPT-1	30.0 - 31.5	1.5	1-2-2	--	
734.6'	30.9'	SILT, dark gray, moist, soft		SPT-2	31.5 - 33.0	1.5	2-3-3	--	
731.0'	34.5'	SANDY LEAN CLAY, orange brown, moist, soft to medium stiff		SPT-3	33.0 - 34.5	0.3	2-2-4	--	
		LEAN CLAY, orange brown and grayish brown, moist to wet, medium stiff		SPT-4	34.5 - 36.0	1.5	2-3-3	--	
				SPT-5	36.0 - 37.5	1.5	4-4-4	--	
		-wet, very soft layer from approximately 37.5 to 38.5 feet		SPT-6	37.5 - 39.0	1.5	1-1-2	--	
				SPT-7	39.0 - 40.5	1.5	WOH-1-2	--	
		-wet, very soft, silty layer from approximately 40.5 to 41.2 feet		SPT-8	40.5 - 42.0	1.5	1-2-3	--	
722.0'	43.5'			SPT-9	42.0 - 43.5	0.0	3-4-4	--	

FMSM_LEGACY 175660041 INSTRUMENTATION BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

Project No.	175660041	Location	N 557650.05, E 2440843.85 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**PZ-B1**
Total Depth	48.0 ft		

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
		SILTY SAND, pale orange and gray, wet, loose to medium dense, fine to medium grained *(Continued)*		SPT-10	43.5 - 45.0	1.5	2-4-5	--	
				SPT-11	45.0 - 46.5	1.5	2-2-4	--	
717.5'	48.0'	-reddish brown below 47 feet		SPT-12	46.5 - 48.0	1.5	4-6-13	--	

No Refusal /
Bottom of Hole

WOH = Weight of Hammer

Three vibrating wire piezometers installed; tip elevations are at 740.8', 729.8', and 718.8'. See installation log for backfill details.

SUBSURFACE LOG

Project No.	175660041	Location	N 557474.69, E 2441074.15 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**PZ-B2** Total Depth 46.0 ft
Location	Roane County, Tennessee	Surface Elevation	759.8 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	10/5/10 Completed 10/5/10
Supervisor	M. Jones Driller M. Martin	Depth to Water	N/A Date/Time N/A
Logged By	M. Jones	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
759.8'	0.0'	Top of Hole							
		Blank drill to 25 feet.							Boring advanced with 4.25" hollow stem augers.
		OVERBURDEN (Ash)							
734.8'	25.0'								
734.3'	25.5'	FLY ASH, gray, moist		SPT-1	25.0 - 26.5	1.4	1-1-1	--	Possible failed Dike C material from 25.8 to 28 feet.
734.0'	25.8'								
731.8'	28.0'	SILT, dark gray and black, moist, very soft		SPT-2	26.5 - 28.0	1.5	2-2-2	--	
				SPT-3	28.0 - 29.5	1.5	3-3-4	--	
729.8'	30.0'	LEAN CLAY, reddish brown, moist, soft to medium stiff		SPT-4	29.5 - 31.0	1.5	3-4-4	--	
		LEAN CLAY with Sand, orange brown and yellowish brown, moist to wet, medium stiff		SPT-5	31.0 - 32.5	1.5	1-1-2	--	
				SPT-6	32.5 - 34.0	0.0	2-3-3	--	
724.3'	35.5'	SILTY SAND, orange brown and grayish brown, moist, loose to very loose, fine grained		SPT-7	34.0 - 35.5	1.5	1-1-1	--	
				SPT-8	35.5 - 37.0	1.5	WOH-WOH-WOH	--	
		SANDY SILT, orange brown and yellowish brown, wet, very soft		SPT-9	37.0 - 38.5	1.5	WOH-WOH-WOH	--	
				SPT-10	38.5 - 40.0	1.5	WOH-WOH-1	--	
718.3'	41.5'			SPT-11	40.0 - 41.5	1.5	WOH-WOH-3	--	
		SILTY SAND, orange brown, wet, very loose, fine grained		SPT-12	41.5 - 43.0	1.5	WOH-2-2	--	
				SPT-13	43.0 - 44.5	1.5	WOH-	--	

FMSM_LEGACY 175660041 INSTRUMENTATION BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

Project No.	175660041	Location	N 557474.69, E 2441074.15 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**PZ-B2**
Total Depth	46.0 ft		

Lithology			Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	
Elevation	Depth	Description	Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	Remarks
713.8'	46.0'			SPT-14	44.5 - 46.0	1.5	WOH-1 WOH- WOH-2	--	

No Refusal /
Bottom of Hole

WOH = Weight of Hammer

Three vibrating wire piezometers installed; tip elevations are at 742.8', 731.8', and 715.8'. See installation log for backfill details.

SUBSURFACE LOG

Project No.	175660041	Location	N 557156.48, E 2441468.58 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**PZ-B3** Total Depth 36.5 ft
Location	Roane County, Tennessee	Surface Elevation	756.0 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	9/29/10 Completed 9/29/10
Supervisor	M. Jones Driller M. Martin	Depth to Water	N/A Date/Time N/A
Logged By	M. Jones	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
756.0'	0.0'	Top of Hole							
		Blank drill to 20 feet.							Boring advanced with 4.25" hollow stem augers.
		OVERBURDEN (Ash)							
736.0'	20.0'								
735.2'	20.8'	FLY ASH, gray, wet		SPT-1	20.0 - 21.5	1.5	1-WOH-WOH	--	Apparent "tortured" material observed from 20 to 21.5 feet.
735.0'	21.0'								
734.5'	21.5'	LAMINATED ASH/SILT		SPT-2	21.5 - 23.0	1.5	WOH-WOH-WOH	--	
		SILT, gray, wet, with organics		SPT-3	23.0 - 24.5	1.5	WOH-WOH-WOH	--	
731.3'	24.7'	FLY ASH, gray, wet							
731.1'	24.9'			SPT-4	24.5 - 26.0	1.5	WOH-3-3	--	
730.8'	25.2'	LAMINATED ASH/SILT							
		SILT, gray and black, wet		SPT-5	26.0 - 27.5	1.5	WOH-2-2	--	
				SPT-6	27.5 - 29.0	1.5	WOH-2-5	--	
726.5'	29.5'	LEAN CLAY with Sand, orange brown and gray, moist, soft		SPT-7	29.0 - 30.5	1.2	3-2-3	--	
724.6'	31.4'	SILTY SAND, orange and gray, moist, loose, fine grained		SPT-8	30.5 - 32.0	1.5	3-3-3	--	
		SAND, gray and orange, wet, very loose to loose, fine to medium grained		SPT-9	32.0 - 33.5	0.0	WOH-WOH-WOH	--	
				SPT-10	33.5 - 35.0	1.5	1-1-1	--	
719.5'	36.5'			SPT-11	35.0 - 36.5	1.5	2-2-2	--	
		No Refusal / Bottom of Hole							

FMSM_LEGACY 175660041 INSTRUMENTATION BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

Project No.	175660041	Location	N 557156.48, E 2441468.58 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**PZ-B3**
		Total Depth	36.5 ft

Lithology			Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	
Elevation	Depth	Description	Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	Remarks

WOH = Weight of Hammer

Three vibrating wire piezometers installed; tip elevations are at 741.4', 730.4', and 722.4'. See installation log for backfill details.

SUBSURFACE LOG

Project No.	175660041	Location	N 557417.79, E 2440622.29 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**PZ-B4** Total Depth 48.0 ft
Location	Roane County, Tennessee	Surface Elevation	765.2 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	9/30/10 Completed 10/1/10
Supervisor	M. Jones Driller M. Martin	Depth to Water	N/A Date/Time N/A
Logged By	M. Jones	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
765.2'	0.0'	Top of Hole							
		Blank drill to 30 feet.							Boring advanced with 4.25" hollow stem augers.
		OVERBURDEN (Ash)							
735.2'	30.0'								
		FLY ASH, gray, wet, very soft to medium stiff		SPT-1	30.0 - 31.5	1.3	1-2-3	--	
				SPT-2	31.5 - 33.0	1.5	1-1-1	--	
		-black laminations, trace bottom ash		SPT-3	33.0 - 34.5	1.5	2-3-3	--	
729.6'	35.6'			SPT-4	34.5 - 36.0	1.5	1-1-1	--	
729.3'	35.9'	LAMINATED SILT/ASH							
729.0'	36.2'			SPT-5	36.0 - 37.5	1.5	2-3-2	--	
		SILT, gray and black, moist, with organics		SPT-6	37.5 - 39.0	1.5	WOH-WOH-1	--	
724.7'	40.5'	LEAN CLAY, gray and brown, moist, very soft to stiff		SPT-7	39.0 - 40.5	1.5	4-5-5	--	
				SPT-8	40.5 - 42.0	0.2	5-10-9	--	
		SILTY SAND, gray, wet, medium dense, fine to medium grained		SPT-9	42.0 - 43.5	1.5	7-5-5	--	

SUBSURFACE LOG

Project No.	175660041	Location	N 557417.79, E 2440622.29 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**PZ-B4**
		Total Depth	48.0 ft

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
720.7'	44.5'	SAND, orange brown and gray, wet, medium dense, medium grained, slightly silty		SPT-10	43.5 - 45.0	1.5	3-6-10	--	
				SPT-11	45.0 - 46.5	1.5	4-6-13	--	
717.2'	48.0'			SPT-12	46.5 - 48.0	1.5	5-10-12	--	

No Refusal /
Bottom of Hole

WOH = Weight of Hammer

Three vibrating wire piezometers installed; tip elevations are at 738.6', 727.6', and 720.6'. See installation log for backfill details.

SUBSURFACE LOG

Project No.	175660041	Location	N 557184.29, E 2440434.10 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**PZ-B9** Total Depth 57.0 ft
Location	Roane County, Tennessee	Surface Elevation	765.7 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	9/21/10 Completed 9/21/10
Supervisor	M. Jones Driller M. Martin	Depth to Water	N/A Date/Time N/A
Logged By	M. Jones	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
765.7'	0.0'	Top of Hole							
		Blank drill to 30 feet.							Boring advanced with 4.25" hollow stem augers.
		OVERBURDEN (Ash)							
735.7'	30.0'								
		FLY ASH, gray, moist to wet, soft to stiff		SPT-1	30.0 - 31.5	1.5	2-3-3	--	
				SPT-2	31.5 - 33.0	1.5	2-2-2	--	
				SPT-3	33.0 - 34.5	0.1	4-5-5	--	
				SPT-4	34.5 - 36.0	1.5	3-2-3	--	
728.4'	37.3'			SPT-5	36.0 - 37.5	1.5	2-2-2	--	
		LEAN CLAY, gray, moist, medium stiff to stiff, trace sand, silty		SPT-6	37.5 - 39.0	1.3	WOH-4-5	--	
725.3'	40.4'			SPT-7	39.0 - 40.5	1.5	1-2-2	--	
		LEAN CLAY with Sand, gray and brown, moist, stiff		SPT-8	40.5 - 42.0	1.5	4-5-7	--	
723.2'	42.5'			SPT-9	42.0 - 43.5	1.4	3-3-5	--	

FMSM_LEGACY 175660041 INSTRUMENTATION BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

Project No.	175660041	Location	N 557184.29, E 2440434.10 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**PZ-B9**
		Total Depth	57.0 ft

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
720.7'	45.0'	SILTY SAND, gray, moist to wet, loose to medium dense, mostly medium grained, occasional coarse sand to fine gravel *(Continued)*		SPT-10	43.5 - 45.0	1.5	4-8-8	--	
719.0'	46.7'			SPT-11	45.0 - 46.5	1.3	4-7-3	--	
				SPT-12	46.5 - 48.0	1.5	2-3-3	--	
716.4'	49.3'	SAND, gray and brown, wet, loose, medium to coarse grained, occasional fine gravel		SPT-13	48.0 - 49.5	1.5	2-4-17	--	
				SPT-14	49.5 - 51.0	1.0	7-7-7	--	
		SANDY LEAN CLAY, gray, moist, stiff, silty		SPT-15	51.0 - 52.5	1.5	2-3-4	--	
				SPT-16	52.5 - 54.0	1.5	3-6-6	--	
		SAND, gray, wet, loose to dense, occasional silty layers, fine to medium grained		SPT-17	54.0 - 55.5	1.5	4-6-8	--	
708.7'	57.0'			SPT-18	55.5 - 57.0	1.5	8-14-20	--	

No Refusal /
Bottom of Hole

WOH = Weight of Hammer

Three vibrating wire piezometers installed; tip elevations are at 737.7', 726.7', and 712.7'. See installation log for backfill details.

SUBSURFACE LOG

Project No.	175660041	Location	N 557631.46, E 2441145.39 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C1** Total Depth 60.5 ft
Location	Roane County, Tennessee	Surface Elevation	762.5 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	10/6/10 Completed 10/6/10
Supervisor	M. Jones Driller M. Martin	Depth to Water	N/A Date/Time N/A
Logged By	M. Jones	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology			Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	
Elevation	Depth	Description	Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	Remarks
762.5'	0.0'	Top of Hole							
		Blank drill to 49 feet. OVERBURDEN							Boring advanced with 4.25" hollow stem augers.

SUBSURFACE LOG

Project No.	175660041	Location	N 557631.46, E 2441145.39 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C1**
Total Depth	60.5 ft		

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
		Blank drill to 49 feet.							
		OVERBURDEN *(Continued)*							
713.5'	49.0'								
712.0'	50.5'	Weathered SHALE, gray, moist, soft, highly weathered		SPT-1	49.0 - 50.5	1.5	16-30-30	--	
		Cored from 50.5 to 60.5 feet. Core not logged or saved. Weathered Shale observed in recovered specimens, generally poor recovery, highly fractured.							
702.0'	60.5'								
		Auger Refusal / Bottom of Hole							
		Top of Rock = 49.0' Elevation (713.5')							

WOH = Weight of Hammer

Slope inclinometer pipe installed and grouted into place. See installation log for backfill details.

SUBSURFACE LOG

Project No.	175660041	Location	N 557273.60, E 2441512.84 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C2** Total Depth 54.0 ft
Location	Roane County, Tennessee	Surface Elevation	756.6 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	10/6/10 Completed 10/7/10
Supervisor	M. Jones Driller M. Martin	Depth to Water	N/A Date/Time N/A
Logged By	M. Jones	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
756.6'	0.0'	Top of Hole							
		Blank Drill to 40 feet. OVERBURDEN							Boring advanced with 4.25" hollow stem augers.
716.6'	40.0'								
		SAND, gray, wet, dense, medium grained, occasional shale fragments		SPT-1	40.0 - 41.5	1.5	14-17-21	--	
712.7'	43.9'								

SUBSURFACE LOG

Project No.	175660041	Location	N 557273.60, E 2441512.84 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C2**
		Total Depth	54.0 ft

Lithology			Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	
Elevation	Depth	Description	Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	Remarks
		Cored from 43.9 to 54.0 feet. Core not logged or saved. Weathered Shale observed in recovered specimens, very poor recovery, highly fractured. *(Continued)*							
702.6'	54.0'								

Auger Refusal /
Bottom of Hole

Top of Rock = 43.9'
Elevation (712.7')

WOH = Weight of Hammer

Slope inclinometer pipe installed and grouted into place. See installation log for backfill details.

SUBSURFACE LOG

Project No.	175660041	Location	N 557563.75, E 2440558.94 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C3** Total Depth 76.1 ft
Location	Roane County, Tennessee	Surface Elevation	766.4 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	9/2/10 Completed 9/3/10
Supervisor	M. Jones Driller M. Martin	Depth to Water	N/A Date/Time N/A
Logged By	M. Jones	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
766.4'	0.0'	Top of Hole							
		Blank drill to 50 feet. OVERBURDEN							Boring advanced with 4.25" hollow stem augers.

FMSM_LEGACY 175660041 INSTRUMENTATION BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

Project No.	175660041	Location	N 557563.75, E 2440558.94 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C3**
Total Depth	76.1 ft		

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
		Blank drill to 50 feet.							
		OVERBURDEN *(Continued)*							
716.4'	50.0'								
		SILTY SAND, gray, wet, loose, fine to medium grained		SPT-1	50.0 - 51.5	1.5	2-6-3	--	
		-with gravel (shale fragments), dense		SPT-2	55.0 - 56.5	1.5	15-23-13	--	
705.4'	61.0'			SPT-3	60.0 - 61.5	1.5	1-2-3	--	
		SAND, gray, wet, loose, fine to medium grained							
700.9'	65.5'			SPT-4	65.0 - 65.8	0.5	32-50/0.3'	--	
700.6'	65.8'	SHALE, greenish gray, highly weathered							
		Cored from 65.8 to 76.1 feet. Core not logged or saved. Weathered Shale observed in recovered specimens, generally poor recovery, highly fractured.							
690.3'	76.1'								
		Auger Refusal / Bottom of Hole							
		Top of Rock = 65.5' Elevation (700.9')							

WOH = Weight of Hammer

Slope inclinometer pipe installed and grouted into place. See installation log for backfill details.

FMSM_LEGACY 175660041 INSTRUMENTATION BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

Project No.	175660041	Location	N 557393.87, E 2440383.27 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C6** Total Depth 79.0 ft
Location	Roane County, Tennessee	Surface Elevation	762.8 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	9/2/10 Completed 9/3/10
Supervisor	J. Rytel Driller J. Felts	Depth to Water	N/A Date/Time N/A
Logged By	J. Rytel	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology			Overburden	Sample #	Depth	Rec. Ft.	Blows	Mois.Cont. %	
Elevation	Depth	Description	Rock Core	RQD	Run	Rec. Ft.	Rec. %	Run Depth	Remarks
762.8'	0.0'	Top of Hole							
		Blank drill to 45 feet. OVERBURDEN							Boring advanced with 4.25" hollow stem augers.

SUBSURFACE LOG

Project No.	175660041	Location	N 557393.87, E 2440383.27 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C6**
		Total Depth	79.0 ft

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
717.8'	45.0'								
		SAND, gray, wet, dense, fine to medium grained		SPT-1	45.0 - 46.5	1.5	8-28-10	--	
		-medium dense		SPT-2	50.0 - 51.5	1.3	8-8-9	--	
				SPT-3	55.0 - 56.5	1.5	7-11-11	--	
		-reddish brown to orange brown		SPT-4	60.0 - 61.5	1.5	5-12-16	--	
		-grayish brown		SPT-5	65.0 - 66.5	1.3	8-10-11	--	
694.3'	68.5'								
		Cored from 68.5 to 79.0 feet. Core not logged or saved. Weathered Shale observed in recovered specimens, generally poor recovery, highly fractured.							
683.8'	79.0'								

Auger Refusal /
Bottom of Hole

Top of Rock = 68.5'
Elevation (694.3')

WOH = Weight of Hammer

Slope inclinometer pipe installed and grouted into place. See installation log for backfill details.

SUBSURFACE LOG

Project No.	175660041	Location	N 557112.27, E 2440114.45 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C7** Total Depth 71.0 ft
Location	Roane County, Tennessee	Surface Elevation	765.2 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	9/1/10 Completed 9/2/10
Supervisor	M. Jones Driller M. Martin	Depth to Water	N/A Date/Time N/A
Logged By	M. Jones	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
765.2'	0.0'	Top of Hole							
		Blank drill to 50 feet. OVERBURDEN							Boring advanced with 4.25" hollow stem augers.

FMSM_LEGACY 175660041 INSTRUMENTATION BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

Project No.	175660041	Location	N 557112.27, E 2440114.45 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C7**
Total Depth	71.0 ft		

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
		Blank drill to 50 feet.							
		OVERBURDEN *(Continued)*							
715.2'	50.0'								
		SILTY SAND, grayish brown, wet, medium dense, fine to medium grained, trace clay		SPT-1	50.0 - 51.5	1.0	3-6-6	--	
		-with gravel-sized shale fragments below 55.5 feet		SPT-2	55.0 - 56.5	1.5	4-11-22	--	
704.7'	60.5'			SPT-3	60.0 - 60.8	0.8	16-50/0.3'	--	
704.4'	60.8'	SHALE, grayish brown to orange brown, highly weathered							
		Cored from 60.8 to 71.0 feet. Core not logged or saved. Weathered Shale observed in recovered specimens, generally poor recovery, highly fractured.							
694.2'	71.0'								

Auger Refusal /
Bottom of Hole

Top of Rock = 60.5'
Elevation (704.7')

WOH = Weight of Hammer

Slope inclinometer pipe installed and grouted into place. See installation log for backfill details.

SUBSURFACE LOG

Project No.	175660041	Location	N 556987.05, E 2440256.37 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C8** Total Depth 71.7 ft
Location	Roane County, Tennessee	Surface Elevation	765.8 ft. (NGVD29)
Project Type	Geotechnical Exploration	Date Started	9/1/10 Completed 9/2/10
Supervisor	J. Rytel Driller M. Martin	Depth to Water	N/A Date/Time N/A
Logged By	J. Rytel	Automatic Hammer ☒	Safety Hammer ☐ Other ☐

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
765.8'	0.0'	Top of Hole							
		Blank drill to 50 feet. OVERBURDEN							Boring advanced with 4.25" hollow stem augers.

FMSM_LEGACY 175660041 INSTRUMENTATION BORINGS.GPJ FMSM.GDT 11/10/10

SUBSURFACE LOG

Project No.	175660041	Location	N 556987.05, E 2440256.37 (NAD27)
Project Name	Interim Ash Stacking Instrumentation	Boring No.	**SI-C8**
Total Depth	71.7 ft		

Lithology Elevation	Lithology Depth	Description	Overburden / Rock Core	Sample # / RQD	Depth / Run	Rec. Ft. / Rec. Ft.	Blows / Rec. %	Mois.Cont. % / Run Depth	Remarks
		Blank drill to 50 feet.							
		OVERBURDEN *(Continued)*							
715.8'	50.0'								
		SAND, gray, wet, medium dense, with occasional gravel		SPT-1	50.0 - 51.5	1.0	4-7-8	--	
		-more silty		SPT-2	55.0 - 56.5	1.3	7-7-11	--	
706.3'	59.5'								
		Cored from 59.5 to 71.7 feet. Core not logged or saved. Weathered Shale observed in recovered specimens, generally poor recovery, highly fractured.							
694.1'	71.7'								

Auger Refusal /
Bottom of Hole

Top of Rock = 59.5'
Elevation (706.3')

WOH = Weight of Hammer

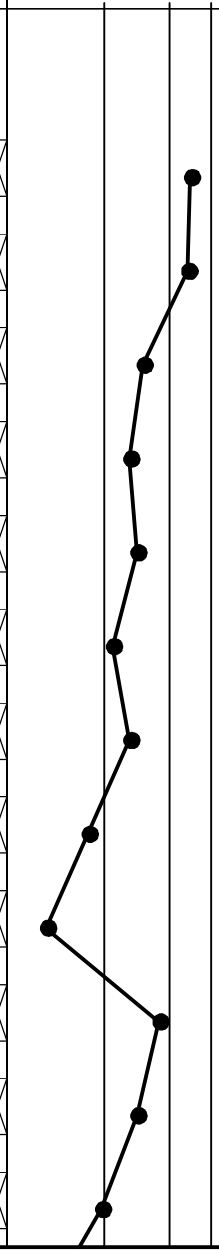
Slope inclinometer pipe installed and grouted into place. See installation log for backfill details.

FMSM_LEGACY 175660041 INSTRUMENTATION BORINGS.GPJ FMSM.GDT 11/10/10

PROJECT: **TVA KIF Geotechnical Exploration - Dredge Cell Closure** **Kingston, Tennessee** **S&ME Project No. 1431-10-318**	BORING LOG: **B-1**
DATE DRILLED: **10/18/10**	ELEVATION: **768.6** FEET
DRILLING METHOD: **CME 550, 3¼" H.S.A.**	BORING DEPTH: **94.3** FEET
LOGGED BY: **M. Devoe**	WATER LEVEL @ TOB: **23.0 feet**
DRILLER: **D. Hedges**	WATER LEVEL @ 24 hrs: **Not Measured**

NOTES: **Soil descriptions based on visual observation of obtained samples and classification in general accordance with USCS. Ground surface elevations and coordinates of borings were obtained from a site survey performed by TVA.**

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet)	SAMPLE NO. / SAMPLE TYPE	1st	2nd	3rd	4th	N VALUE
	2-inch Crushed Stone (Drilling Pad)							
5	**ASH**- With lean clay and gravel; dark brown; dry to slightly moist; very stiff - FILL	764	1 REC 100%	5	10	12		22
			2 REC 100%	10	12	9		21
10		759	3 REC 100%	6	5	5		10
			4 REC 100%	3	4	4		8
15		754	5 REC 100%	3	4	5		9
	ASH- Dark gray; dry to wet; fine-to-medium grained; medium dense to very loose - FILL		6 REC 100%	4	3	3		6
20		749	7 REC 100%	2	4	4		8
			8 REC 100%	2	2	2		4
25		744	9 REC 100%	2	1	1		2
			10 REC 100%	5	6	7		13
30	**LEAN CLAY (CL)**- With chert fragments and ash; tan, brown, gray, to reddish brown; moist; stiff - FILL	739	11 REC 100%	5	4	5		9
	ASH - Dark gray; wet; fine-to-medium grained; loose - FILL		12 REC 100%	4	4	1		5



SPT INTERVALS (blows/6 inches)

WATER LEVEL

BORING LOG - TVA 10-318.GPJ 1/14/11

NOTES:

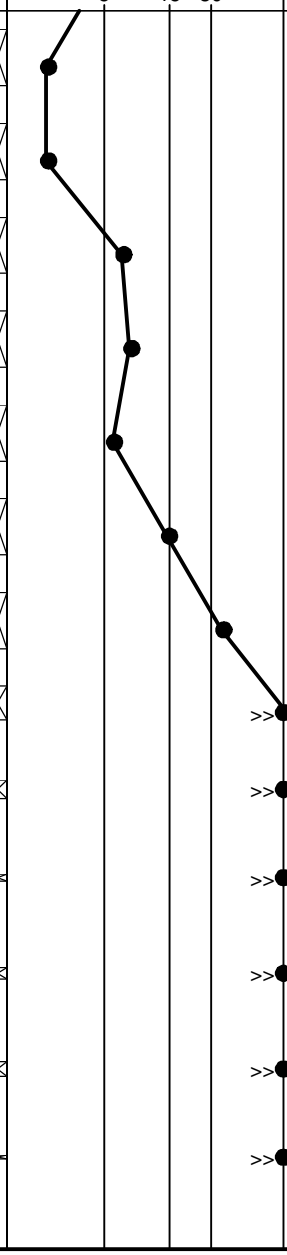
1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT: **TVA KIF Geotechnical Exploration - Dredge Cell Closure** **Kingston, Tennessee** **S&ME Project No. 1431-10-318**	BORING LOG: **B-1**
DATE DRILLED: **10/18/10**	ELEVATION: **768.6** FEET
DRILLING METHOD: **CME 550, 3¼" H.S.A.**	BORING DEPTH: **94.3** FEET
LOGGED BY: **M. Devoe**	WATER LEVEL @ TOB: **23.0 feet**
DRILLER: **D. Hedges**	WATER LEVEL @ 24 hrs: **Not Measured**

NOTES: **Soil descriptions based on visual observation of obtained samples and classification in general accordance with USCS. Ground surface elevations and coordinates of borings were obtained from a site survey performed by TVA.**

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet)	SAMPLE NO. / SAMPLE TYPE	STANDARD PENETRATION TEST (SPT) DATA (blows/ft)	SPT INTERVALS (blows/6 inches) 1st	2nd	3rd	4th	N VALUE
35	**LEAN CLAY (CL)** - Tan, brown, to reddish brown; moist to very moist; very soft - ALLUVIUM	734	13 REC 100%		1	1	1		2
			14 REC 100%		2	1	1		2
40	**LEAN CLAY WITH SAND** - Tan, brown, and reddish brown; moist; firm - ALLUVIUM	729	15 REC 100%		2	3	4		7
			16 REC 100%		2	4	4		8
45	**SANDY LEAN CLAY (CL)** - Tan, brown, and reddish brown; moist to wet; firm to stiff - ALLUVIUM	724	17 REC 100%		2	3	3		6
			18 REC 100%		5	9	6		15
50	**SILTY SAND (SM)** - Tan and light brown; wet; fine-to-medium grained; dense - ALLUVIUM	719	19 REC 100%		17	17	20		37
			20 REC 100%	>>	18	50/.4			50/.4
55	**WEATHERED SHALE** - Brown, greenish gray, and gray; slightly moist to moist; very hard	714	21 REC 100%	>>	50/.5				50/.5
			22 REC 100%	>>	50/.2				50/.2
60		709	23 REC 100%	>>	50/.3				50/.3
			24 REC 100%	>>	50/.4				50/.4
65		704	25 REC 0%	>>	50/.1				50/.1



WATER LEVEL

BORING LOG - TVA 10-318.GPJ 1/14/11

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT: **TVA KIF Geotechnical Exploration - Dredge Cell Closure** **Kingston, Tennessee** **S&ME Project No. 1431-10-318**	BORING LOG: **B-1**

DATE DRILLED: **10/18/10**	ELEVATION: **768.6** FEET	NOTES: **Soil descriptions based on visual observation of obtained samples and classification in general accordance with USCS. Ground surface elevations and coordinates of borings were obtained from a site survey performed by TVA.**
DRILLING METHOD: **CME 550, 3¼" H.S.A.**	BORING DEPTH: **94.3** FEET	
LOGGED BY: **M. Devoe**	WATER LEVEL @ TOB: **23.0 feet**	
DRILLER: **D. Hedges**	WATER LEVEL @ 24 hrs: **Not Measured**	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST (SPT) DATA (blows/ft) 5 15 30	SPT INTERVALS (blows/6 inches) 1st	2nd	3rd	4th	N VALUE
		WEATHERED SHALE - Brown, greenish gray, and gray; slightly moist to moist; very hard *(continued)*									
70				699							
		Auger Refusal at 73.0 feet. Advanced PW casing to 73.7 feet. Began PQ coring at 73.7 feet.			R1 REC 88% RQD 48%						
75		Run No. 1 (73.7' to 75.8') Siltstone with interbedded shale - Fine-to-medium grained; poorly sorted; gray, light gray, and greenish gray; siltstone is moderately hard, shale is soft; very slightly to slightly weathered. Occasional lense of calcareous siltstone. Bedding is at an apparent dip of 30 degrees.		694	R2 REC 92% RQD 62%						
80		Run No. 2 (75.8' to 80.8') Siltstone with interbedded shale - Same lithology as previous run.		689							
		Run No. 3 (80.8' to 85.8') Siltstone with interbedded shale - Same lithology as previous run. Joint (45 to 60 degrees) observed from 84.1' to 85.5'.			R3 REC 100% RQD 28%						
85				684							
		Run No. 4 (85.8' to 90.8') Siltstone with interbedded shale - Same as previous run. Bedding is at an apparent dip of 20 to 25 degrees.			R4 REC 67% RQD 61%						
90				679							
		Run No. 5 (90.8' to 94.3') Siltstone with interbedded shale - Same lithology as previous run.			R5 REC 100% RQD 91%						
		PQ Coring Terminated at a depth of 94.3 feet.									

BORING LOG - TVA 10-318.GPJ 1/14/11

NOTES:

1. ***THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.***
2. ***BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.***
3. ***STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.***
4. ***WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.***

S&ME

TVA KIF Dredge Cell Closure
Kingston, Tennessee
Project # 1431-10-318

S&ME
1413 Topside Road
Louisville, TN 37777

Photo 1

Date: 10/18/2010

Photographer: M. DeVoe

Location / Orientation	B-1, Run 1: 73.7' – 75.8'
Remarks	Siltstone with interbedded shale, occasional lenses of calcareous siltstone

Photo 2

Date: 10/18/2010

Photographer: M. DeVoe

Location / Orientation	B-1, Run 2: 75.8' – 80.8'
Remarks	Siltstone with interbedded shale, occasional lenses of calcareous siltstone

S&ME
1413 Topside Road
Louisville, TN 37777

Photo 3

Date: 10/18/2010

Photographer: M. DeVoe

Location / Orientation	B-1, Run 3: 80.0' – 85.8'
Remarks	Siltstone with interbedded shale, occasional lenses of calcareous siltstone

Photo 4

Date: 10/18/2010

Photographer: M. DeVoe

Location / Orientation	B-1, Run 4: 85.8' – 90.8'
Remarks	Siltstone with interbedded shale, occasional lenses of calcareous siltstone

S&ME
1413 Topside Road
Louisville, TN 37777

Photo 5

Date: 10/18/2010

Photographer : M. DeVoe

Location / Orientation	B-1, Run 5: 90.8' – 94.3'
Remarks	Siltstone with interbedded shale, occasional lenses of calcareous siltstone

Photo 6

Date: 10/14/2010

Photographer: M. DeVoe

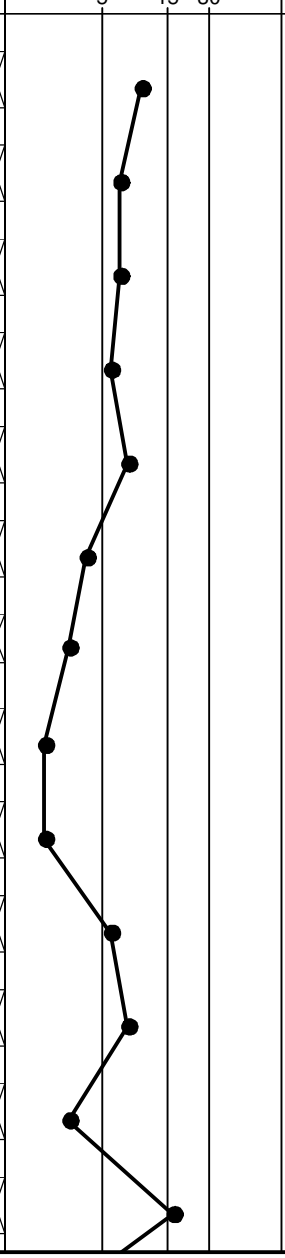
Location / Orientation	B-2, Run 1: 69.5' – 70.8'
Remarks	Shale

BH-2

PROJECT: **TVA KIF Geotechnical Exploration - Dredge Cell Closure** **Kingston, Tennessee** **S&ME Project No. 1431-10-318**	BORING LOG: **B-2**
DATE DRILLED: **10/14/10**	ELEVATION: **767.1** FEET
DRILLING METHOD: **CME 550, 3¼" H.S.A.**	BORING DEPTH: **80.8** FEET
LOGGED BY: **M. Devoe**	WATER LEVEL @ TOB: **15.0 feet**
DRILLER: **D. Hedges**	WATER LEVEL @ 24 hrs: **Not Measured**

NOTES: **Soil descriptions based on visual observation of obtained samples and classification in general accordance with USCS. Ground surface elevations and coordinates of borings were obtained from a site survey performed by TVA.**

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST (SPT) DATA (blows/ft)	SPT INTERVALS (blows/6 inches) 1st	2nd	3rd	4th	N VALUE
		ASH- With intermittent intervals of clay fill containing chert fragments; dark gray; slightly moist; fine-to-medium grained; loose - FILL			1 REC 100%		7	5	5		10
5				762	2 REC 100%		6	4	3		7
					3 REC 100%		4	3	4		7
10				757	4 REC 100%		4	3	3		6
					5 REC 100%		6	4	4		8
15		**ASH**- Dark gray; moist to wet; fine-grained; loose to very loose - FILL	▽	752	6 REC 100%		3	2	2		4
					7 REC 115%		1	2	1		3
20				747	8 REC 100%		1	1	1		2
					9 REC 100%		2	1	1		2
25				742	10 REC 100%		1	2	4		6
					11 REC 100%		3	4	4		8
30		**ASH**- Dark gray; wet; medium-to-coarse grained; very loose to medium dense - FILL		737	12 REC 100%		1	1	2		3
					13 REC 100%		2	6	11		17



BORING LOG - TVA 10-318.GPJ 1/14/11

NOTES:

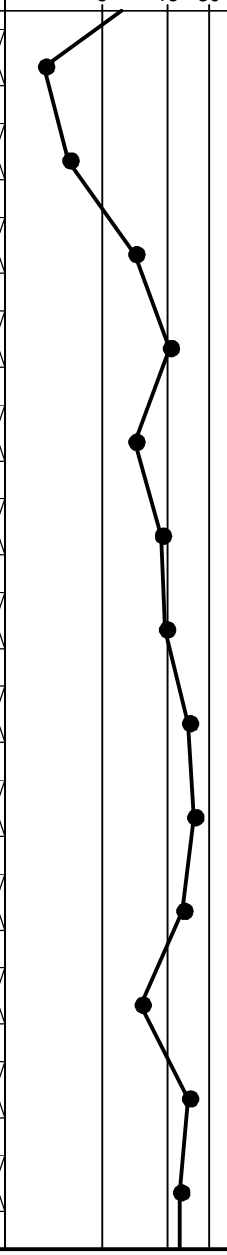
1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT: **TVA KIF Geotechnical Exploration - Dredge Cell Closure** **Kingston, Tennessee** **S&ME Project No. 1431-10-318**	BORING LOG: **B-2**

DATE DRILLED: **10/14/10**	ELEVATION: **767.1** FEET	NOTES: **Soil descriptions based on visual observation of obtained samples and classification in general accordance with USCS. Ground surface elevations and coordinates of borings were obtained from a site survey performed by TVA.**
DRILLING METHOD: **CME 550, 3¼" H.S.A.**	BORING DEPTH: **80.8** FEET	
LOGGED BY: **M. Devoe**	WATER LEVEL @ TOB: **15.0 feet**	
DRILLER: **D. Hedges**	WATER LEVEL @ 24 hrs: **Not Measured**	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST (SPT) DATA (blows/ft)	SPT INTERVALS (blows/6 inches) 1st	2nd	3rd	4th	N VALUE
35		**LEAN CLAY (CL)**- With organics; dark brown, black, to brown; moist to wet; very soft to soft - ALLUVIUM		732	14 REC 100%		1	1	1		2
					15 REC 100%		1	2	1		3
40		**LEAN CLAY (CL)**- Tan, brown, to gray; moist to very moist; stiff to very stiff - ALLUVIUM		727	16 REC 100%		2	4	5		9
					17 REC 100%		5	7	9		16
45		**SANDY LEAN CLAY (CL)** - Gray and tan; moist to wet; stiff - ALLUVIUM		722	18 REC 100%		4	4	5		9
					19 REC 100%		2	7	7		14
50		**SILTY GRAVEL (GM)**- Tan to brown; wet; medium dense - ALLUVIUM		717	20 REC 100%		5	7	8		15
		LEAN CLAY WITH GRAVEL (CL)- Tan to brown; wet; very stiff - ALLUVIUM			21 REC 100%		7	10	12		22
55		**SILTY SAND (SM)**- With some gravel; tan to brown; wet; medium-grained; medium dense - ALLUVIUM		712	22 REC 100%		7	10	14		24
					23 REC 100%		4	8	12		20
60		**SILTY SAND (SM)**- Tan, brown, to white; wet; fine-grained; loose to medium dense - ALLUVIUM		707	24 REC 100%		3	4	6		10
					25 REC 100%		7	8	14		22
65				702	26 REC 100%		8	7	12		19



BORING LOG - TVA 10-318.GPJ 1/14/11

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT: **TVA KIF Geotechnical Exploration - Dredge Cell Closure** **Kingston, Tennessee** **S&ME Project No. 1431-10-318**	BORING LOG: **B-2**

DATE DRILLED: **10/14/10**	ELEVATION: **767.1** FEET	NOTES: **Soil descriptions based on visual observation of obtained samples and classification in general accordance with USCS. Ground surface elevations and coordinates of borings were obtained from a site survey performed by TVA.**
DRILLING METHOD: **CME 550, 3¼" H.S.A.**	BORING DEPTH: **80.8** FEET	
LOGGED BY: **M. Devoe**	WATER LEVEL @ TOB: **15.0 feet**	
DRILLER: **D. Hedges**	WATER LEVEL @ 24 hrs: **Not Measured**	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST (SPT) DATA (blows/ft) 5 15 30	SPT INTERVALS (blows/6 inches) 1st	2nd	3rd	4th	N VALUE
		SILTY SAND (SM)- Tan, brown, to white; wet; fine-grained; loose to medium dense - ALLUVIUM *(continued)*			27 REC 100%		8	7	12		19
70		Auger Refusal at 69.0 feet. Advanced PW casing to 69.5 feet. Began PQ coring at 69.5 feet.		697	R1 REC 100% RQD 0%						
		Run No. 1 (69.5' to 70.8') Shale - Fine grained; gray; very soft to soft; slightly weathered. Bedding is at an apparent dip of 30 degrees.			R2 REC 100% RQD 50%						
75		Run No. 2 (70.8' to 75.8') Siltstone with interbedded shale - Fine-to-medium grained; very poorly sorted; gray and light gray; siltstone is moderately hard, shale is soft; very slightly to slightly weathered. Occasional lenses of calcite are present. Bedding is at an apparent dip of 10 to 30 degrees.		692							
		Run No. 3 (75.8' to 80.8') Siltstone with interbedded shale - Same lithology as previous run. Joint (60 degrees) observed at 79.6'.			R3 REC 100% RQD 46%						
80				687							
		PQ Coring Terminated at a depth of 80.8 feet.									

BORING LOG - TVA 10-318.GPJ 1/14/11

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

S&ME
1413 Topside Road
Louisville, TN 37777

Photo 5

Date: 10/18/2010

Photographer : M. DeVoe

Location / Orientation	B-1, Run 5: 90.8' – 94.3'
Remarks	Siltstone with interbedded shale, occasional lenses of calcareous siltstone

Photo 6

Date: 10/14/2010

Photographer: M. DeVoe

Location / Orientation	B-2, Run 1: 69.5' – 70.8'
Remarks	Shale

S&ME
1413 Topside Road
Louisville, TN 37777

Photo 7

Date: 10/14/2010

Photographer: M. DeVoe

Location / Orientation	B-2, Run 2: 70.8' – 75.8'
Remarks	Siltstone with interbedded shale, occasional lenses of calcite

Photo 8

Date: 10/14/2010

Photographer: M. DeVoe

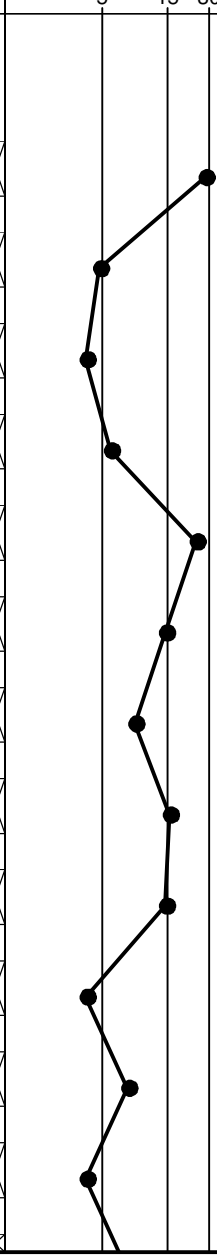
Location / Orientation	B-2, Run 3: 75.8' – 80.8'
Remarks	Siltstone with interbedded shale, occasional lenses of calcite

BH-12

PROJECT: **TVA KIF Geotechnical Exploration - Dredge Cell Closure** **Kingston, Tennessee** **S&ME Project No. 1431-10-318**	BORING LOG: **B-12**

DATE DRILLED: **10/12/10**	ELEVATION: **772.1** FEET	NOTES: **Soil descriptions based on visual observation of obtained samples and classification in general accordance with USCS. Ground surface elevations and coordinates of borings were obtained from a site survey performed by TVA.**
DRILLING METHOD: **CME 550, 3¼" H.S.A.**	BORING DEPTH: **70.7** FEET	
LOGGED BY: **M. Devoe**	WATER LEVEL @ TOB: **31.0 feet**	
DRILLER: **D. Hedges**	WATER LEVEL @ 24 hrs: **Not Measured**	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST (SPT) DATA (blows/ft)	SPT INTERVALS (blows/6 inches) 1st	2nd	3rd	4th	N VALUE
		2-inch Crushed Stone (Drilling Pad)									
		Crushed Stone Aggregate with tan sand			1 REC 100%		7	14	15		29
5				767	2 REC 100%		2	3	2		5
					3 REC 100%		1	2	2		4
10				762	4 REC 100%		2	3	3		6
		ASH- With intermittent intervals of clay fill starting at 13 feet; dark gray; slightly moist; fine-to-medium grained; very loose to medium dense - FILL			5 REC 100%		4	12	13		25
15				757	6 REC 100%		4	7	8		15
					7 REC 100%		3	4	5		9
20				752	8 REC 100%		4	7	9		16
		LEAN CLAY (CL)- With chert fragments; tan, brown, to reddish brown; slightly moist; stiff to very stiff - FILL			9 REC 100%		4	7	8		15
25				747	10 REC 0%		2	2	2		4
					11 REC 100%		4	4	4		8
30		**ASH**- Dark gray; moist to wet; loose to very loose - FILL	▽	742	12 REC 100%		2	2	2		4



BORING LOG - TVA 10-318.GPJ 1/14/11

NOTES:

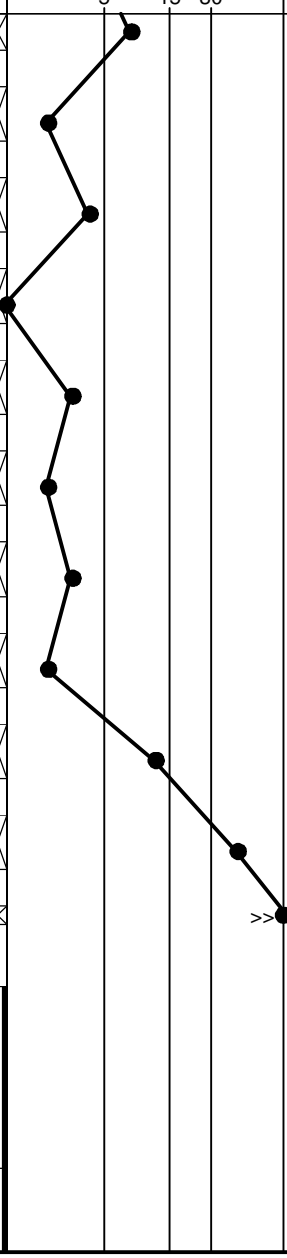
1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT: **TVA KIF Geotechnical Exploration - Dredge Cell Closure** **Kingston, Tennessee** **S&ME Project No. 1431-10-318**	BORING LOG: **B-12**
DATE DRILLED: **10/12/10**	ELEVATION: **772.1** FEET
DRILLING METHOD: **CME 550, 3¼" H.S.A.**	BORING DEPTH: **70.7** FEET
LOGGED BY: **M. Devoe**	WATER LEVEL @ TOB: **31.0 feet**
DRILLER: **D. Hedges**	WATER LEVEL @ 24 hrs: **Not Measured**

NOTES: **Soil descriptions based on visual observation of obtained samples and classification in general accordance with USCS. Ground surface elevations and coordinates of borings were obtained from a site survey performed by TVA.**

DEPTH (feet)	MATERIAL DESCRIPTION	ELEVATION (feet)	SAMPLE NO. / SAMPLE TYPE	STANDARD PENETRATION TEST (SPT) DATA (blows/ft)	SPT INTERVALS (blows/6 inches) 1st	2nd	3rd	4th	N VALUE
35	**ASH**- Dark gray; moist to wet; loose to very loose - FILL *(continued)*	737	13 REC 100%		3	4	4		8
			14 REC 100%		0	1	1		2
40	**LEAN CLAY WITH SAND (CL)** - Gray, tan to brown; moist; soft to very soft - ALLUVIUM	732	15 REC 100%		4	2	2		4
			16 REC 100%		0	0	1		1
45	**SILTY CLAYEY SAND (SC-SM)** - Tan to brown; wet; fine-to-medium grained; very loose to medium dense - ALLUVIUM	727	17 REC 100%		1	2	1		3
			18 REC 100%		0	1	1		2
50		722	19 REC 100%		1	1	2		3
			20 REC 100%		0	0	2		2
55		717	21 REC 100%		2	5	7		12
	SILTY SAND WITH GRAVEL (SM) - Tan; wet; medium grained; dense - ALLUVIUM		22 REC 100%		10	23	24		47
	WEATHERED SHALE - Gray; moist; very hard		23 REC 300%	>>	50.5				50.5
60	Auger Refusal at 60.0 feet. Advanced PW casing to 60.7 feet. Began PQ coring at 60.7 feet.	712							
65	Run No. 1 (60.7' to 65.7') Shale with interbedded limestone and siltstone - Shale is fine grained; gray; soft; slightly weathered. Limestone and siltstone is fine to medium grained; poorly sorted; gray and light gray; moderately hard to hard; slightly weathered. Bedding is at an apparent dip of 10 degrees.	707	R1 REC 98% RQD 38%						
			R2 REC						



WATER LEVEL

BORING LOG - TVA 10-318.GPJ 1/14/11

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT: **TVA KIF Geotechnical Exploration - Dredge Cell Closure** **Kingston, Tennessee** **S&ME Project No. 1431-10-318**	BORING LOG: **B-12**

DATE DRILLED: **10/12/10**	ELEVATION: **772.1** FEET	NOTES: **Soil descriptions based on visual observation of obtained samples and classification in general accordance with USCS. Ground surface elevations and coordinates of borings were obtained from a site survey performed by TVA.**
DRILLING METHOD: **CME 550, 3¼" H.S.A.**	BORING DEPTH: **70.7** FEET	
LOGGED BY: **M. Devoe**	WATER LEVEL @ TOB: **31.0 feet**	
DRILLER: **D. Hedges**	WATER LEVEL @ 24 hrs: **Not Measured**	

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO. SAMPLE TYPE	STANDARD PENETRATION TEST (SPT) DATA (blows/ft) 5 15 30	SPT INTERVALS (blows/6 inches) 1st	2nd	3rd	4th	N VALUE
70		Run No. 2 (65.7' to 70.7') Shale with interbedded limestone and siltstone - Same lithology as previous run. Near vertical joint observed at 68.0'. Surface of joint exhibiting iron-staining (oxidation).		702	60% RQD 0%						
		PQ Coring Terminated at a depth of 70.7 feet.									

BORING LOG - TVA 10-318.GPJ 1/14/11

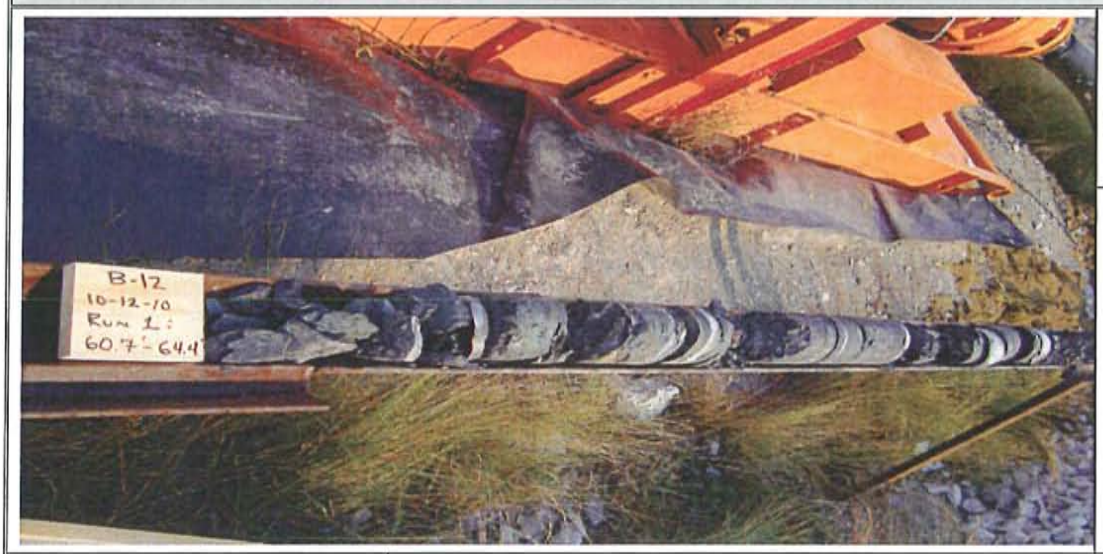
NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

S&ME
1413 Topside Road
Louisville, TN 37777

Photo 37



Date: 10/12/2010

Photographer: M. DeVoe

Location / Orientation	B-12, Run 1: 60.7' – 65.7'
Remarks	Shale with interbedded limestone and siltstone

Photo 38

Date: 10/12/2010

Photographer: M. DeVoe

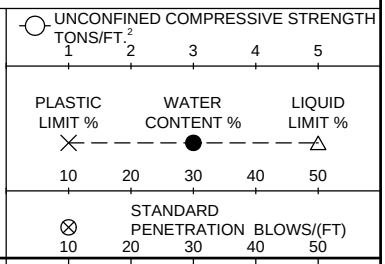
Location / Orientation	B-12, Run 2: 65.7' – 70.7'
Remarks	Shale with interbedded limestone and siltstone

WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SB-1** **Singleton (1994) SS-1**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +752.00	
						Fill: Silty clay - tan and gray - dry (CL)	
5.0		1					
10.0		2				Fill: Silty clay, trace gray topsoil - light brown - moist (CL)	
15.0		3				Fill: Silty clay - brown and gray - very moist (CL)	
20.0		4					
25.0		5					
30.0		6				Ash: Silty sand, trace gravel - gray - very moist to wet	
35.0		7					
39.0						End of Boring at 39 feet	



Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **8.8 feet**	BORING STARTED **7/28/94**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557991.7**	BORING COMPLETED **7/28/94**	ENTERED BY **PCC**	SHEET NO. **1** OF **1**
EASTING **2440901**	RIG/FOREMAN **/**	APP'D BY	AECOM JOB NO. **60095742**

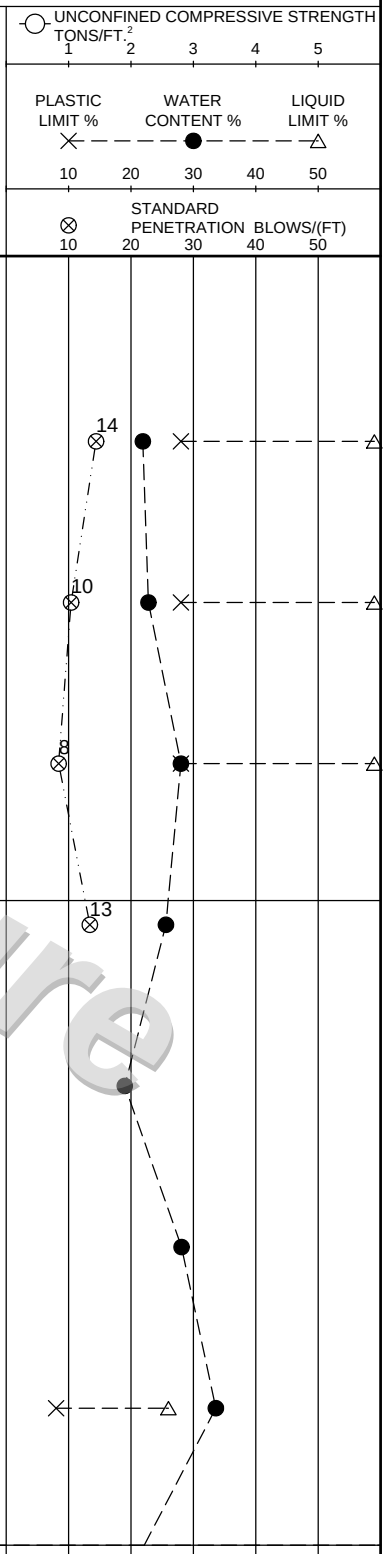
WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SB-2** **Singleton (1994) SS-2**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

SURFACE ELEVATION +764.00

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						Fill: Silty clay, trace topsoil and gravel - medium to stiff - brown to red brown - dry to moist (CH)	
5.0		1	SS				
10.0		2	SS				
15.0		3	SS				
20.0		4	SS			20.0 Ash: Silty sand, trace gravel - very loose to loose - gray - very moist to wet	
25.0		5					
30.0		6				- little brown silty clay below 30 feet	
35.0		7					
40.0						40.0	



. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **2**

Pre-Failure

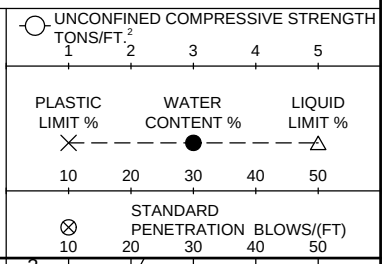
TVA OLD LOGS 60095742.GPJ FS_DATATEMPLATE.GDT 1/27/09

WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SB-2** **Singleton (1994) SS-2**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +764.00 (Continued)	
		8	SS			Alluvium : Silty clay - stiff - gray - very moist (CL)	
	45.0					45.0	
		9	SS			Alluvium: Sandy silt, little gray clay - medium dense to very dense - moist	
			SS				
	50.0						
		10					
	52.0					52.0	
						End of Boring At a Depth of 52 feet	



Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **5.7 feet**	BORING STARTED **7/27/94**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557957.3**	BORING COMPLETED **7/27/94**	ENTERED BY **PCC**	SHEET NO. **2** OF **2**
EASTING **2440883**	RIG/FOREMAN **/**	APP'D BY	AECOM JOB NO. **60095742**

WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SB-3** **Singleton (1994) SS-3**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

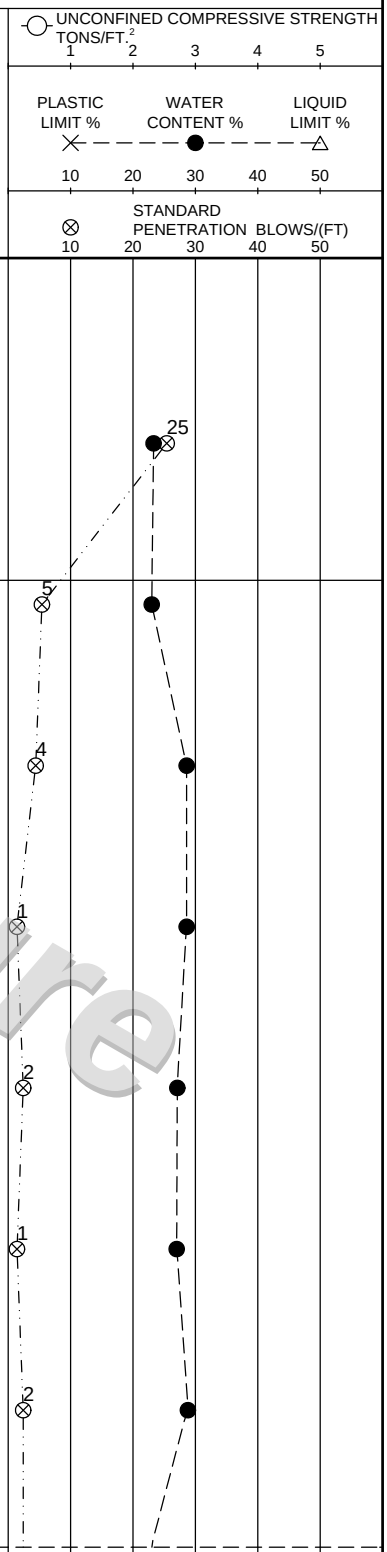
SITE LOCATION
714 Swan Pond Road; Harriman, TN

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +773.00	
						Ash: Clayey silt - medium dense to loose - gray - moist	
5.0		1	SS				
10.0						10.0	
		2	SS			Ash: Silty sand, trace silty clay and gravel - loose to very loose - gray - very moist to wet	
15.0		3	SS				
20.0		4	SS				
25.0		5	SS				
30.0		6	SS				
35.0		7	SS				
40.0							



Pre-Failure

. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

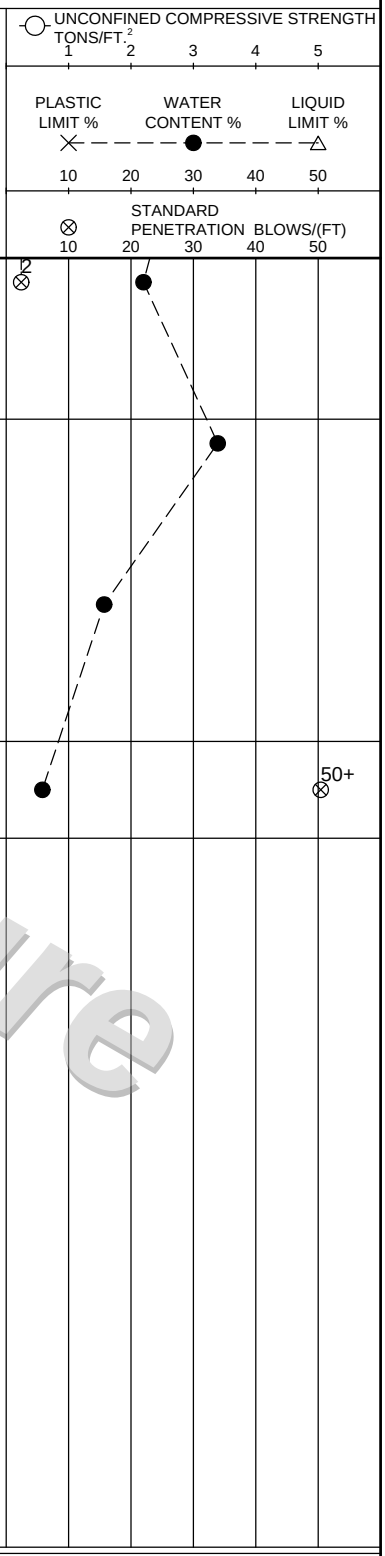
SHEET NO. **1** OF **2**

WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SB-3** **Singleton (1994) SS-3**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +773.00 (Continued)	
		8	SS			Ash: Silty sand, trace silty clay and gravel - loose to very loose - gray - very moist to wet	
45.0						45.0	
		9				Ash: Clayey silt, trace gravel - gray - wet to very moist	
50.0							
		10					
55.0						55.0	
		11	SS			Clayey silt, trace gravel - gray - moist	
58.0						58.0	
						End of Boring At a Depth of 58 feet	



Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **9.7 feet**	BORING STARTED **7/28/94**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557916.7**	BORING COMPLETED **7/28/94**	ENTERED BY **PCC**	SHEET NO. **2** OF **2**
EASTING **2440862**	RIG/FOREMAN **/**	APP'D BY	AECOM JOB NO. **60095742**

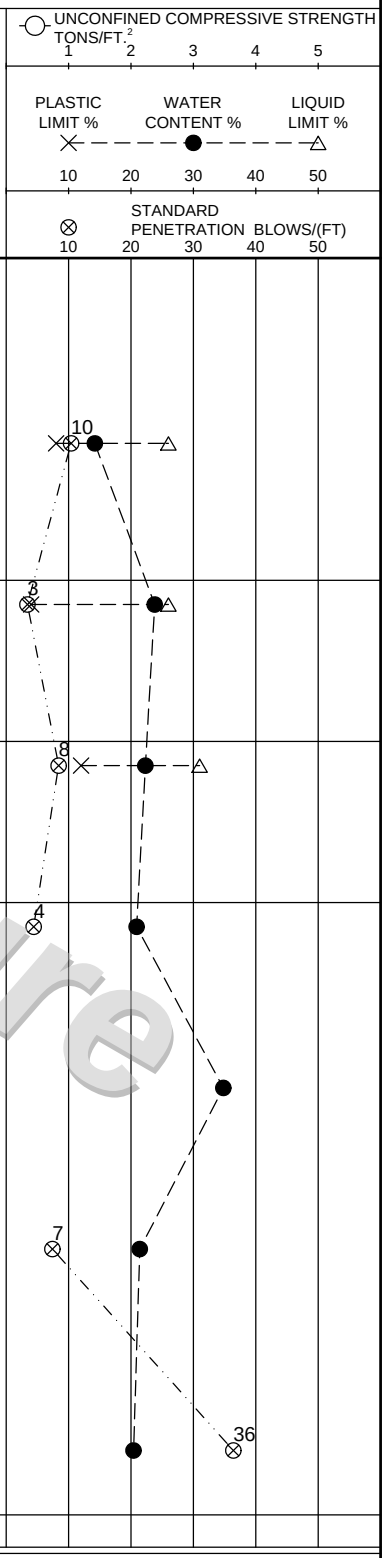
WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SB-4** **Singleton (1994) SS-4**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +752.00	
						Fill: Silty clay, little topsoil - stiff to soft - light brown - dry (CL)	
5.0		1	SS				
10.0						10.0	
		2	SS			Fill: Silty clay, little topsoil - soft to medium - brown and gray - moist (CL)	
15.0						15.0	
		3	SS			Fill: Silty clay - medium to soft - tan and gray - very moist (CL)	
20.0						20.0	
		4	SS			Silty sand - tan - loose to dense - wet	
25.0		5					
30.0		6	SS				
35.0		7	SS				
39.0						39.0	
						End of Boring at 39 feet	



Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **9.0 feet**	BORING STARTED **7/26/94**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557617.7**	BORING COMPLETED **7/26/94**	ENTERED BY **PCC**	SHEET NO. **1** OF **1**
EASTING **2441319**	RIG/FOREMAN **/**	APP'D BY	AECOM JOB NO. **60095742**

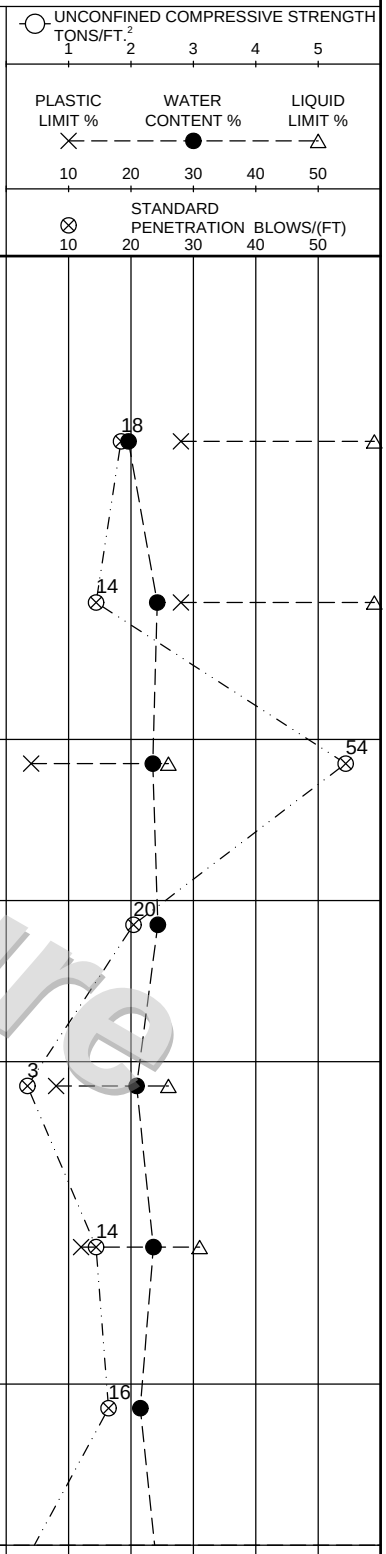
WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SB-5** **Singleton (1994) SS-5**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +764.00	
						Fill: Silty clay, little gravel - stiff - red to brown - dry (CH)	
5.0		1	SS				
10.0		2	SS				
15.0						15.0	
		3	SS			Fill: Silty clay, little pink topsoil and gray clayey silt - hard to very stiff - brown - moist (CL-ML)	
20.0						20.0	
		4	SS			Ash: Silty sand - medium dense to very dense - trace gravel - gray - moist	
25.0						25.0	
		5	SS			Alluvium: Silty clay, trace gravel - soft to stiff - light brown, tan and gray - very moist (CL)	
30.0		6	SS				
35.0						35.0	
		7	SS			Alluvium: Clayey silt - medium dense to very loose - brown and gray - very moist	
40.0						40.0	
						. . . continued	



Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **2**

WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SB-5** **Singleton (1994) SS-5**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

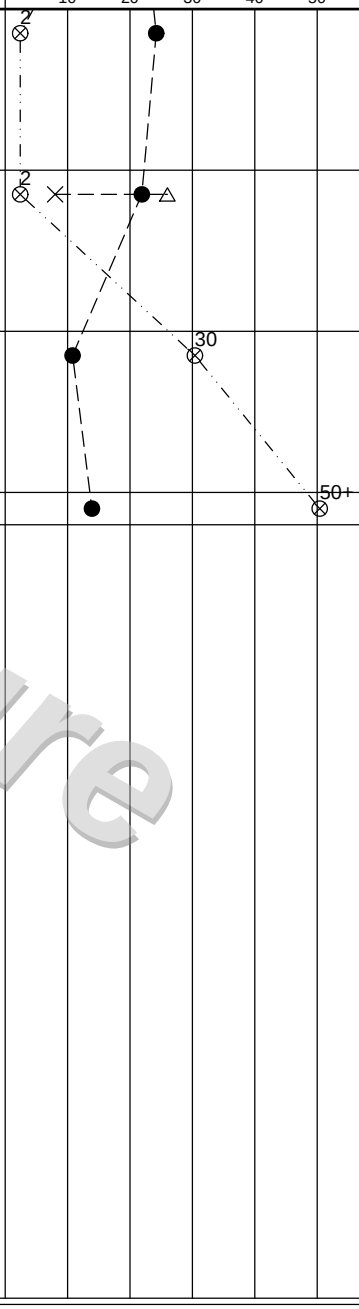
SITE LOCATION
714 Swan Pond Road; Harriman, TN

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +764.00 (Continued)	
		8	SS			Alluvium: Clayey sand - very loose - very moist	
45.0						45.0	
		9	SS			Alluvium: Clayey silt, trace pink topsoil - very loose to medium dense - tan - very moist	
50.0						50.0	
		10	SS			Alluvium: Silty sand, little gravel - dense to very dense - light brown - very moist	
55.0						55.0	
56.0		11	SS			56.0 Alluvium: Clayey silt - very dense - brown and gray - moist	
						End of Boring At a Depth of 56 feet	



Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **20.0 feet**	BORING STARTED **7/27/94**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557587.4**	BORING COMPLETED **7/27/94**	ENTERED BY **PCC**	SHEET NO. **2** OF **2**
EASTING **2441297**	RIG/FOREMAN **/**	APP'D BY	AECOM JOB NO. **60095742**

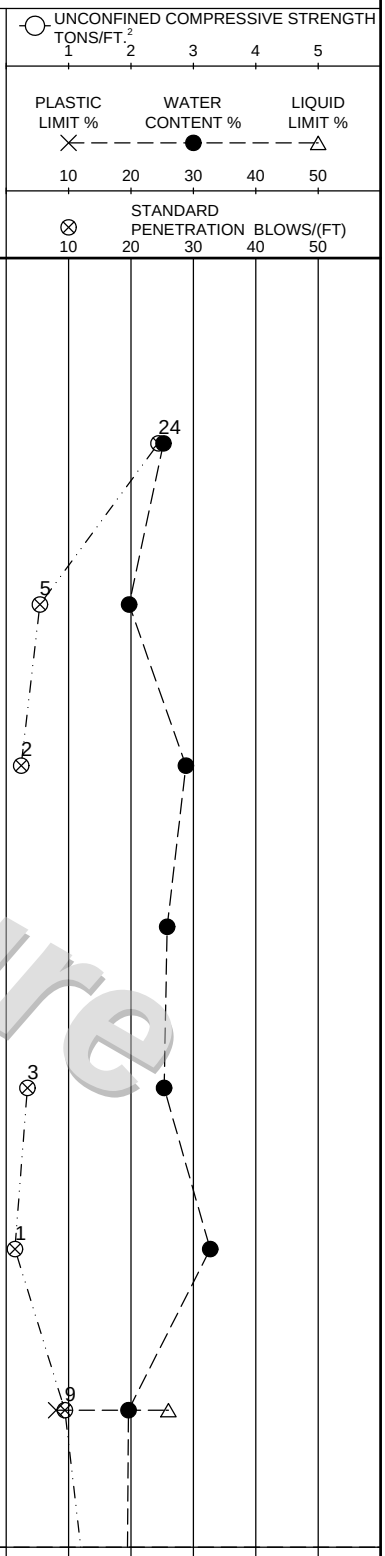
WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SB-6** **Singleton (1994) SS-6**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

SURFACE ELEVATION +773.00

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						Ash: Silt, little sand and brown silty clay - medium dense to very loose - gray - moist to wet	
5.0		1	SS				
10.0		2	SS				
15.0		3	SS				
20.0		4	SS				
25.0		5	SS				
30.0		6	SS				
35.0		7	SS			- mixed with brown silty clay and clayey silt below 35 feet	
40.0						40.0	



. . . continued

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

AECOM JOB NO. **60095742**

SHEET NO. **1** OF **2**

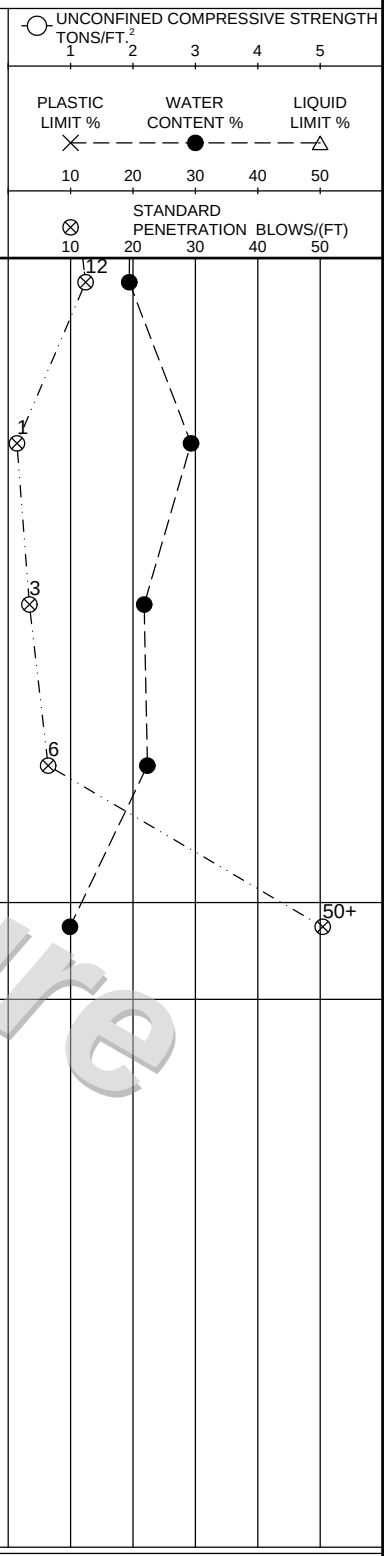
Pre-Failure

WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SB-6** **Singleton (1994) SS-6**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +773.00 (Continued)	
		8	SS			Silty sand - very loose to loose - brown - wet	
45.0		9	SS				
50.0		10	SS				
55.0		11	SS				
60.0		12	SS			60.0 (Alluvium?): Silt - very dense - gray - moist	
63.0						63.0 End of Boring At a Depth of 63 feet	



Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **16.6 feet**	BORING STARTED **8/1/94**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557543.5**	BORING COMPLETED **8/1/94**	ENTERED BY **PCC**	SHEET NO. **2** OF **2**
EASTING **2441258**	RIG/FOREMAN **/**	APP'D BY	AECOM JOB NO. **60095742**

WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SS-2** **1975**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

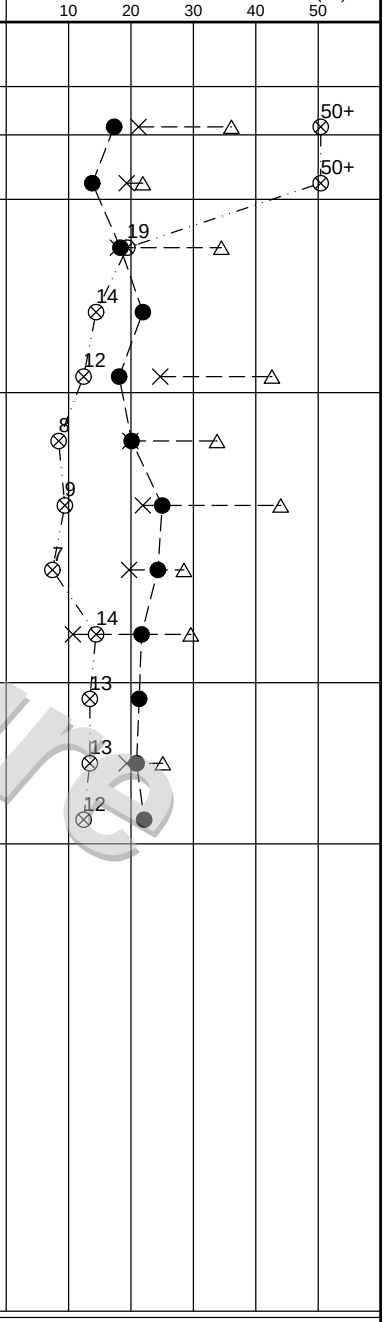
UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % 10 20 30 40 50

STANDARD PENETRATION BLOWS/(FT) 10 20 30 40 50

SURFACE ELEVATION +752.60

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						Fill (2.0)	
		1	SS			Ash: G-SC (3.5)	
5.0		2	SS			Ash: GM (5.5)	
		3	SS			Fill: CL	
		4	SS				
10.0		5	SS			(11.5)	
		6	SS			Alluvium: Cl	
15.0		7	SS				
		8	SS				
		9	SS				
20.0		10	SS			(20.5) Alluvium: ML-Cl	
		11	SS				
25.0		12	SS			(25.5)	
25.5						End of Boring At a Depth of 25.5 feet	



Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL **10**	BORING STARTED **2/18/75**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557891.1**	BORING COMPLETED **3/12/75**	ENTERED BY **PCC**	SHEET NO. **1** OF **1**
EASTING **2440959**	RIG/FOREMAN **/**	APP'D BY	AECOM JOB NO. **60095742**

WORK IN PROGRESS

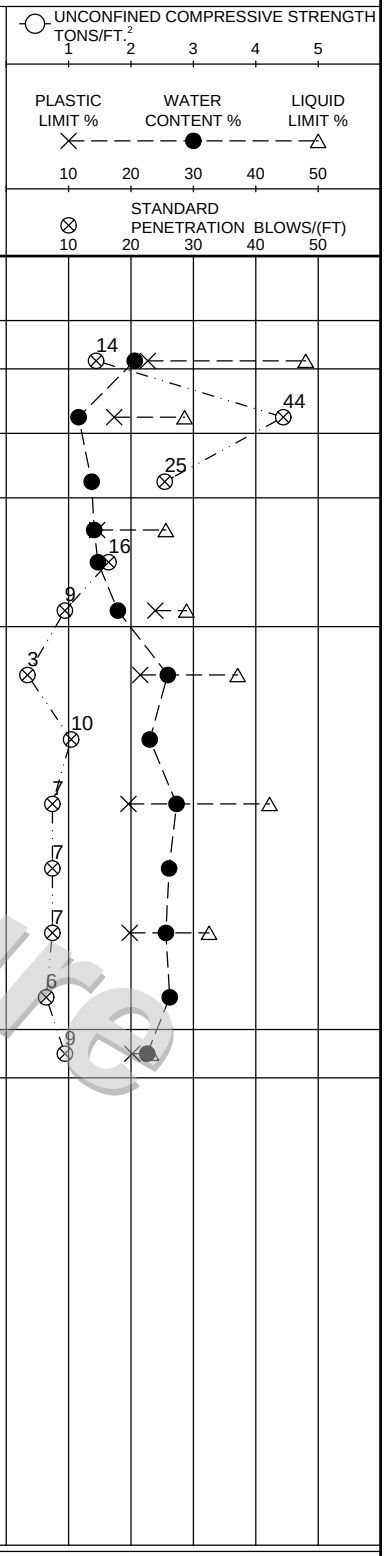
CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SS-3** **1975**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10, 20, 30, 40, 50)
STANDARD PENETRATION BLOWS/(FT) (10, 20, 30, 40, 50)

SURFACE ELEVATION +752.50

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						Fill	
	2.0					Ash: CL	
		1	SS				
	3.5					Ash: GC	
5.0		2	SS				
	5.5					Ash: G-SM	
		3	SS				
	7.5					Alluvium: ML	
		3A					
10.0		4	SS				
		5	SS				
	11.5					Alluvium: CL	
		6	SS				
15.0		7	SS				
		8	SS				
		9	SS				
20.0		10	SS				
		11	SS				
	24.0					Alluvium: ML	
25.0		12	SS				
	25.5					End of Boring At a Depth of 25.5 feet	



Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

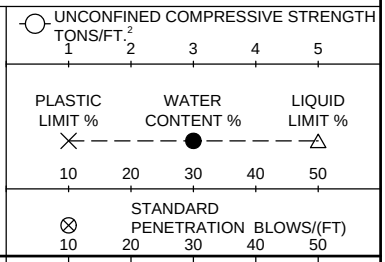
WL **11**	BORING STARTED **2/18/75**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557269.9**	BORING COMPLETED **3/12/75**	ENTERED BY **PCC**	SHEET NO. **1** OF **1**
EASTING **2441752**	RIG/FOREMAN **/**	APP'D BY	AECOM JOB NO. **60095742**

WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SS-17** **1975**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL SURFACE ELEVATION +750.20	UNIT DRY WT. LBS./FT.^{3}
		1	SS			Ash: Silt - medium dense (ML)	
						3.0	
		2	SS			Ash: Silty sand - medium dense (SM)	
5.0						5.0	
		3	SS			Ash: Silt - loose to medium dense (ML)	
		4	SS				
10.0		5	SS				
		6	SS			12.5	
		7	SS			Ash: Silty sand - very loose to medium dense (SM)	
15.0		8	SS				
		9	SS				
20.0		10	SS			21.0	
		11	SS			Silt - medium dense (ML)	
23.0						23.0	
						End of Boring At a Depth of 23 feet	



Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

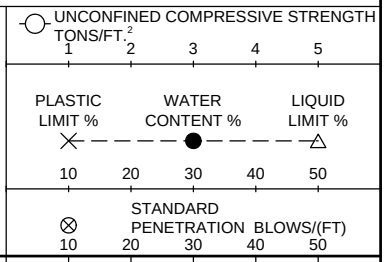
WL	BORING STARTED **2/18/75**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **558095.2**	BORING COMPLETED **3/12/75**	ENTERED BY **PCC**	SHEET NO. **1** OF **1**
EASTING **2440485**	RIG/FOREMAN **/**	APP'D BY	AECOM JOB NO. **60095742**

WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SS-18** **1975**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
						SURFACE ELEVATION +750.40	
						Fill 2.0	
		1	SS			Ash: Silt - very loose to loose - wet (ML)	
5.0		2	SS				
		3	SS				
		4	SS				
10.0		5	SS				
		6	SS				
15.0		7	SS				
		8	SS			17.0 Alluvium	
		9	SS				
20.0						20.5	
20.5						End of Boring At a Depth of 20.5 feet	



Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED **2/18/75**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557512.2**	BORING COMPLETED **3/12/75**	ENTERED BY **PCC**	SHEET NO. **1** OF **1**
EASTING **2441298**	RIG/FOREMAN **/**	APP'D BY	AECOM JOB NO. **60095742**

TVA OLD LOGS 60095742.GPJ FS_DATATEMPLATE.GDT 1/27/09

WORK IN PROGRESS

CLIENT **Tennessee Valley Authority**	LOG OF BORING NUMBER **SS-19** **1975**
PROJECT NAME **Kingston RCA**	ARCHITECT-ENGINEER **OGC**

SITE LOCATION
714 Swan Pond Road; Harriman, TN

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5) / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % (10 20 30 40 50) / STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)
						SURFACE ELEVATION +749.50		
		1	SS			Ash: Silty sand - very loose to medium dense - wet (SM)		11
		2	SS					7
5.0		3	SS					3
		4	SS					1
		5	SS					1
10.0		6	SS					1
		7	SS					WOH
15.0		8	SS					1
		9	SS			18.0		6
		10	SS			Alluvium		4
20.0						20.5		
20.5						End of Boring At a Depth of 20.5 feet		

Pre-Failure

The stratification lines represent the approximate boundary lines between soil types: in situ, the transition may be gradual.

WL	BORING STARTED **2/18/75**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **556867**	BORING COMPLETED **3/12/75**	ENTERED BY **PCC**	SHEET NO. **1** OF **1**
EASTING **2442149**	RIG/FOREMAN **/**	APP'D BY	AECOM JOB NO. **60095742**