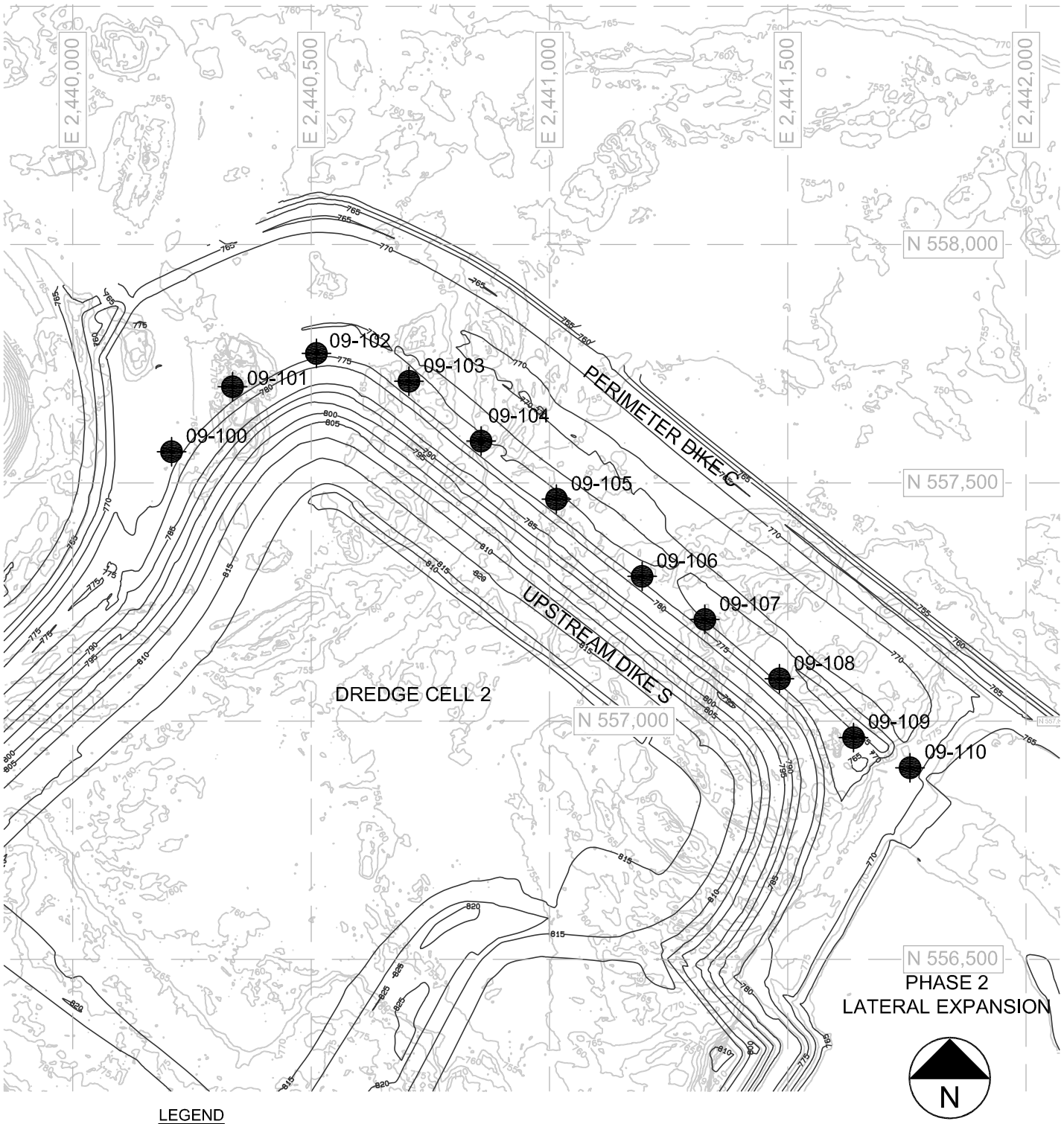

LEGEND

09-100 100 SERIES SOIL BORINGS AND CPTu SOUNDINGS LOCATIONS (AECOM 2009)

PRE-FAILURE CONTOURS

POST FAILURE CONTOURS

NOTES:
1. BASE MAP BASED ON LIDAR DATA COLLECTED ON DECEMBER 24, 2008
2. HORIZONTAL DATUM: NAD 27 (TENNESSEE LAMBERT)
3. VERTICAL DATUM: NGVD 29

0 300

1" = 300'

AECOM

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100 SERIES EXPLORATION LOCATION

ROOT CAUSE ANALYSIS
TVA KINGSTON DREDGE CELL FAILURE
ON DECEMBER 22, 2008
KINGSTON FOSSIL PLANT
HARRIMAN, TENNESSEE

Drawn :	DTB	6/12/2009
Checked:	LWB	6/12/2009
Approved:	WHW	6/12/2009
PROJECT NUMBER	60095742	
FIGURE NUMBER	2E-1	

X:\PROJECTS\60095742\KEY\g60095742-KEY 100 SERIES.dwg; 6/11/2009 11:22:02 AM; DEARMAN, DANIEL; STS.stb

09-100 Series

AECOM

Boring/Sounding ID	Ground Surface Elevation (GSE)	Easting	Northing
09-100	767.11	2,440,202.63	557,565.54
09-100A	767.27	2,440,206.63	557,566.13
09-100B	767.02	2,440,211.49	557,557.85
09-101	768.31	2,440,344.29	557,686.43
09-101A	768.10	2,440,331.62	557,682.58
09-101B	766.86	2,440,327.82	557,680.36
09-101B2	768.22	2,440,333.82	557,678.56
09-102	761.91	2,440,511.51	557,771.87
09-102A	761.68	2,440,503.55	557,769.89
09-102B	761.42	2,440,504.90	557,776.23
09-103	766.31	2,440,704.68	557,713.03
09-103A	766.11	2,440,700.19	557,711.35
09-103B	766.37	2,440,714.68	557,711.90
09-104	761.29	2,440,856.52	557,587.27
09-104A	761.28	2,440,853.50	557,591.18
09-104B	761.29	2,440,860.47	557,584.09
09-105	748.35	2,441,010.27	557,465.36
09-105A	748.73	2,441,012.76	557,466.78
09-105B	748.35	2,441,014.20	557,467.77
09-106	755.05	2,441,194.41	557,303.70
09-106A	754.69	2,441,197.31	557,301.23
09-107	762.44	2,441,335.66	557,206.53
09-107A	762.42	2,441,341.16	557,201.83
09-107B	762.78	2,441,358.86	557,204.24
09-108	759.77	2,441,485.11	557,083.91
09-108A	759.27	2,441,488.48	557,081.35
09-108B	759.70	2,441,490.24	557,083.64
09-109	763.59	2,441,627.44	556,971.56
09-109A	763.27	2,441,624.88	556,957.71
09-109B	763.41	2,441,623.30	556,965.50
09-110	774.57	2,441,755.38	556,899.87
09-110A	774.77	2,441,758.14	556,908.16

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

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)
	1	SS			0.3 Fill: Driller's Observation: 4 inches gravel		WOH
	2	SS			Fill: Sandy silt-sized ash, trace clay - gray - very loose - moist to wet (ML) (FA) Failed		3
5.0	3	SS					3
					6.0		
	4	SS			6.8 Fill: Silty clay, trace fine gravel - brown - stiff (CL) Failed		2/6"
	4A	SS			Fill: Silty fine to coarse sand-sized ash, fine gravel - gray - loose to medium dense - moist to wet (SM) (FA) Failed		5 *
	5	SS					17
10.0	6	SS					10
					12.0		
	7	SS			Fill: Silt-sized ash, little fine sand - gray - loose to very loose - saturated (ML) (FA) Failed		8
15.0	8	SS					3
	9	SS					4
					18.0		
	10	SS			Fill: Silty fine to coarse sand-sized ash, trace clay - gray - loose to very loose - saturated (SM) (BA) Failed		4
20.0	11	SS					2
	12	SS					4
25.0	13	SS					1
					26.0		1/18"
	14	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose - saturated (ML) (FA) Failed		3
	15	SS					
30.0	16	SS					2
					32.0		WOH
	17	SS			33.0 Silt with interbedded silt-sized ash slimes - gray and dark gray - wet- very loose (ML) & (FA)		* WOH
	17A	SS			34.0 Silt with interbedded silt-sized ash slimes - brown and gray - moist - very loose (ML) & (FA)		* 1
35.0	18	SS			35.0 Fill: Silt-sized ash, little fine sand - gray - very loose - saturated (ML) (FA)		WOH
	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.		8
	19	SS			39.5 Clayey silt, little fine to medium sand - brown and gray - loose - moist (CL-ML)		

62.1

. . . 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**

SURFACE ELEVATION +767.11 (Continued)

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)
	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.		10 * 4 2/6"
	21	SS			Sample 22: Medium to coarse gravel noted		*
	22	SS					
45.0	22A	SS			44.5 Clayey fine to coarse sand, little silt, trace fine gravel - brown and gray - medium dense - moist to wet (SC) 45.5		13 19
	23	SS			Silty fine to coarse sand, little fine gravel, trace clay - gray - medium dense to dense - saturated (SM)		16
	24	SS					21
50.0	25	SS					20
	26	SS					46
55.0	27	SS			55.5		17
	28	SS			Silty fine to medium sand, little fine gravel , trace clay, trace weathered shale - gray - medium dense - saturated (SM) 57.5		9
	29	SS			Silty fine sand - gray - loose to medium dense - wet (SM)		25
60.0	30	SS					
61.5	30A	SS			61.3 61.5 Weathered shale - gray/green		43/6"

* 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

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**

SURFACE ELEVATION +767.27

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						
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	
		VS				
40.0					. . . continued	

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

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

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**

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**

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 +767.27 (Continued)		
		VS			Vane Shear Test #2 at 40.0 ft. Peak Su >4075 psf		
43.0		VS			Vane Shear Test #3 at 41.5 ft. Peak Su = 2925 psf, Remolded Su = 375 psf		
					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**

SURFACE ELEVATION +767.02

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}
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		RB			
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**

SURFACE ELEVATION +767.02 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
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.	

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)

*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**

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 +768.31		
	1	SS			Fill: Silty fine to medium sand-sized ash - gray - medium dense to very loose - moist to wet (SM) (FA) Failed		12
	2	SS			Sample 1: Brown silty clay noted intermixed with ash.		3
5.0	3	SS					3
	4	SS					7
	5	SS					3
10.0	6	SS*					WOH/6"
	6A	SS			Sample 6: 3 in. clay seam intermixed with ash and organics at 10.3 ft.		3
					12.0		
	7	SS			Fill: Silty fine to medium sand-sized ash, trace fine gravel - gray - very loose - saturated (SM) (FA) Failed		2
15.0	8	SS			Sample 8: 3 in. seam of sand-sized ash (BA) noted		3
					16.0		
	9	SS			Fill: Silt-sized ash, trace clay and fine sand - gray - very loose to loose - saturated (ML) (FA) Failed		2
20.0	10	SS					2
	11	SS					2
	12	SS					4
25.0	13	SS			Sample 13: Final blow advanced split spoon sampler 12 in.		1
	14	SS					WOH
30.0	15	SS					1
	16	SS					1
					33.0		WOH
35.0	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.		
					35.5		WOH
	18	SS			Fill: Silt-sized ash, some clay, trace fine to medium sand - gray - very loose - saturated (ML) (FA) Failed		WOH
	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**

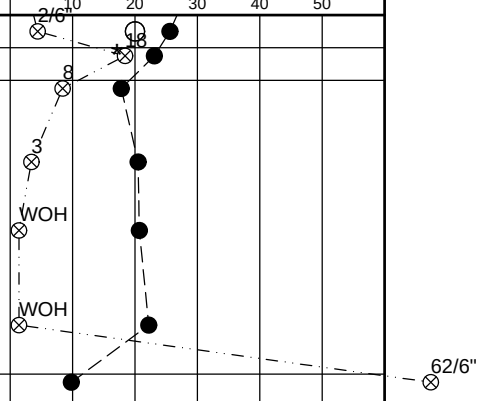
SURFACE ELEVATION +768.31 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
	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	
		RB			Drilled without sampling. Driller's Note: Apparent shale bedrock	
55.0						
56.5					56.5	

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)



*Calibrated Penetrometer

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

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

WL: **8.0 ft. WS; 15.0 ft. BCR & ACR**	BORING STARTED: **1/31/09**	AECOM OFFICE: **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**

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**

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 +768.10		
		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}
40.0	1	SS			39.5 Fill: Fine to coarse sand, trace silt, fine gravel - gray - wet (SP)	
	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	

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

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	**2/1/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557682.58	**2/1/09**	**KKB**	**2** **2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440331.62	**Mobile B-57 (V.H.)/MB**	**RCR**	**60095742**

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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +766.86	
5.0		PA				
10.0					10.0	
	1	OST			Fill: Silty fine to medium sand-sized ash, trace clay - gray- saturated (SM) (BA) Failed	
					12.5	
		RB				
15.0					15.0	
	2	OST			Fill: Silty fine to medium sand-sized ash, trace clay, trace roots - saturated (SM) (BA) Failed	
					17.5	
		RB				
20.0					20.0	
	3	OST			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					35.5	
	4	OST			Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Failed	
					38.0	
	5	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 5 description.	
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: **09-101B**
	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 +766.86 (Continued)		
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	BORING STARTED	AECOM OFFICE	
Not Observed	**2/2/09**	**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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-101-B2**

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 +768.22		
5.0		PA					
10.0							
15.0							
20.0							
25.0							
		RB					
30.0							
35.0							
					Pneumatic Piezometer installed at 37.0 ft.		
40.0					**Pneumatic Piezometer installed at 40.0 ft.**		
					. . . 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 **09-101-B2**

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 +768.22 (Continued)	
45.0						
49.0					49.0 **Pneumatic Piezometer installed at 48.0 ft.**	
					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 49.0 feet with rock bit and drilling fluid. Casing used: 9 ft. of 4 in. Installed Pneumatic Piezometers at 37.0, 40.0 and 48.0 ft.	

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 **3/5/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **557678.56**	BORING COMPLETED **3/5/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440333.82**	RIG/FOREMAN **D-25/BM**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

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

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)
	1	SS			Fill: Silty fine to coarse sand-sized ash , trace clay and coal - gray - very loose - saturated (SM) (FA) Failed		3
	2	SS					2
					4.0		
5.0	3	SS			Fill: Silt-sized ash, trace clay and fine sand - gray - very loose to loose - saturated (ML) (FA) Failed		3
	4	SS					5
	5	SS					2
10.0	6	SS					1/24"
					13.0		
	7	SS			Fill: Silty fine to medium sand-sized ash, trace clay - gray - very loose - saturated (SM) (FA) Failed		WOH
15.0					15.5		
	8	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose - saturated (ML) (FA) Failed		WOH
	9	SS					WOH
20.0	10	SS					WOH
	11	SS					WOH
25.0	12	SS					WOH
	13	SS					WOH
30.0	14	SS			30.5		WOR
	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)		WOR
	15	SS*			32.0		WOH
	15A	SS			Sample 14A: Organic Content = 3.37%		WOH
					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)		15
	17	SS			Clayey fine to coarse sand, little silt and fine to medium gravel - brown - medium dense - moist (SC)		11
					38.0		
	18	SS			Silty fine to coarse sand, little fine to medium gravel, trace clay - brown - medium dense - moist to wet (SM)		27
40.0					40.0		

73.0

. . . 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			41.2 Sandy fine to medium gravel, trace silt - brown and gray - medium dense - saturated (GP)	
		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		21	SS			44.0	
		22	SS			46.0 Silty fine sand, little clay - brownish gray - loose - wet (SM)	
		22A	SS			47.7 Silty fine to coarse sand, little clay - gray - loose - saturated (SM)	
		23	SS*			Sample 22: No sample retrieved during extraction of 2 in. split spoon. Retrieved disturbed sample with 2.5 in. split spoon.	
50.0			RB			51.0 Weathered shale - brown and gray	
						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

100/5"

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

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

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**

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 +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**

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 +761.68 (Continued)		
			RB			Vane Shear Test #1 at 42.0 ft. Peak Su = 1350 psf, Remolded Su = 525 psf		
		1	ST			42.0 Clayey silt and fine to coarse sand, trace fine gravel - brownish gray- wet (CL-ML)		
		2	ST			43.5 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**

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	
		PA			.	
5.0						
10.0		RB				
15.0					**Pneumatic Piezometer installed at 14.0 ft.**	
20.0					20.0	
	1	OST			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.**	
					29.5	
30.0	2	OST			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% **Pneumatic Piezometer installed at 31.0 ft.**	
	3	OST				
	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)	
	4A	OST			46.2	
		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**

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	
		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	
15.0						14.5	
		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**

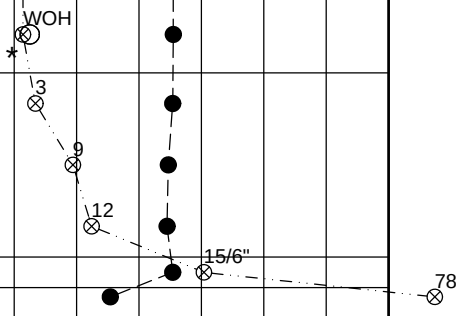
SURFACE ELEVATION +766.31 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
	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				
	23	SS			Sample 23: Black silty sand seam noted.	
50.0					50.5	
	24	SS			51.5 Clayey silt, trace fine sand - gray and brown - dense - moist (CL-ML)	
	24A	SS			52.5 Driller notes: 30% drilling fluid loss while drilling from 53.5 to 58.5 ft.	
					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	

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)



*Calibrated Penetrometer

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

WL: **10.0 ft. WS**	BORING STARTED: **1/20/09**	AECOM OFFICE: **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

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	
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	

62.2

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	
		ST			Silt and fine sand, little clay - gray - moist (ML) 42.0 No recovery with Shelby tube from 40.5 to 42.0 ft.	
	4	ST			Vane Shear Test #4 at 40.5 ft. Peak Su = 775 psf, Remolded Su = 250 psf	
44.0					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	BORING STARTED	AECOM OFFICE	
Not Observed	**1/23/09**	**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**

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)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +766.37	
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%	
	2A	OST			36.0	
	3	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 3 description.	
	3A	OST			38.5	
					. . . continued	

77.0

89.1

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)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +766.37 (Continued)	
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.	
45.0	6	OST			43.5 Sandy silt, little clay - brown and gray - wet (ML)	
	6A	OST			46.0	
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	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557711.9	**3/4/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440714.68	**D-25/BM**	**RCR**	**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**

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	
		1	SS			Fill: Silt-sized ash, little fine sand - gray - loose - moist (ML) (FA) Failed	6
		2	SS				8
5.0		3	SS				4
						6.0	
		4	SS			Fill: Silty fine to medium sand-sized ash - gray - loose - moist (SM) (BA) Failed	5
						8.0	1
		5	SS			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	WOH
		7	SS				WOH
15.0						40% water loss while drilling from 15 to 23 ft.	1
		8	SS				2
20.0		9	SS				4
						21.0	
		10	SS			Fill: Silty fine to medium sand-sized ash - gray - loose - saturated (SM) (FA) Failed	
						23.0	2/6"
		11	SS*			23.5	2/6"
		11A	SS			Fill: Silt-sized ash, little fine sand - gray - very loose - saturated (ML) (FA) Failed	WOH
25.0		11B	SS			24.0	WOH
		12	SS			Silt, little clay and fine sand interbedded with silt-sized ash slimes - brown and gray - very loose - wet to saturated (ML)	2
		13	SS			Silt and fine to medium sand, little clay - brown and gray - very loose - moist (ML)	WOH
						28.3	4
		13A	SS			Clayey fine sand, little silt - brown - loose - moist to wet (SC)	
30.0		14	SS				8
						31.5	
		15	SS			Silt and fine to medium sand, little clay - brown - very loose - moist to wet (ML)	3
35.0		16	SS				WOH
						36.0	
		17	SS			Silty fine to coarse sand, trace clay - brown - very loose - saturated (SM)	WOH
40.0		18	SS				1
						40.5	

71.6

. . . 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	
45.0		20	SS			Silty fine to medium sand, little clay - brown - very loose - moist to wet (SM)	
						45.5	
		21	SS			Clayey silt and fine sand - brown - very loose - wet (CL-ML)	
						47.5	
		22	SS			Silty fine to medium sand, trace clay - brown - medium dense - wet (SM)	
						49.0	
		22A	SS			Weathered shale - gray, green and brown	
50.0		23	SS			50.5	
50.5						End of Boring	

WOH, WOH, WOR, 13, 26/6", 72/6"

*Calibrated Penetrometer

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

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

WL: **10.0 ft. WS**	BORING STARTED: **1/19/09**	AECOM OFFICE: **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**

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**

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 +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	BORING STARTED	AECOM OFFICE	
Not Observed	**1/20/09**	**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**

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**

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	
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					10.0	
	1	OST			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			Samples 5A, 6, 7, 8 and 9: Tubes partially filled with bentonite hole plug from adjacent boring.	
					27.5	
	6	OST			Silty clay, little fine sand - brown (CL)	
30.0					30.0	
	7	OST				
					32.5	
	8	OST			Silt and fine sand, little clay - light brown - moist to wet (ML)	
35.0					35.0	
	9	ST			Fine to coarse sand and silt (SM)	
37.0					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**

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	
	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	
	20	SS			38.7 Sandy silt, little clay - gray - loose - saturated (ML)	
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)

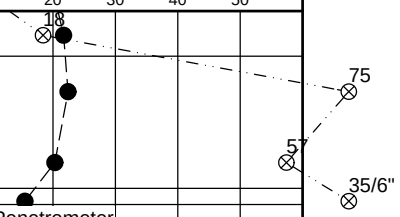
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT % (10 20 30 40 50)

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					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

*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	
At Surface	**1/30/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557465.36	**1/31/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441010.27	**D-50/RT**	**RCR**	**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: **09-105A**
	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 +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		
19.0	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		
					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	BORING STARTED	AECOM OFFICE	
Not Observed	**2/1/09**	**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**

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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +748.35	
					.	
5.0		PA				
10.0		RB				
					13.0 Silty clay, some fine sand - brown (CL)	
15.0	1	OST			15.5 Silty clay, some fine sand - brown (CL)	
	2	OST			18.0 Silty fine sand, little clay - brown - moist (SM)	
20.0	3	OST			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

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}
	1	SS			Fill: Silty fine to medium sand-sized ash, trace clay - gray - very loose - moist (SM) (FA) Failed	1
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
5.0	3	SS				3
	4	SS				3
	5	SS				3
10.0	6	SS				4
	7	SS				5
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	3
	9	SS				4
	10	SS				3
20.0					Silt-sized ash noted from 19 to 19.25 ft.	
20.0						
	11	SS			Fill: Silt-sized ash, trace clay, fine sand and coal - gray - loose - saturated (ML) (FA) Failed	4
	12	SS				4
24.0						
	13	SS*				1/6"
25.0	13A	SS			Silty clay, little fine sand - brown and black (CL)	4
26.0					Clayey silt, some fine to medium sand - gray - loose - moist (CL-ML)	
	14	SS			Sample 13A: Organic Content = 1.50%	WOH
	15	SS			Silty clay, some fine to medium sand - brown and gray - medium to stiff (CL)	WOR
30.0					Sample 14: Seams of black staining noted.	
	16	SS				WOH
	17	SS			Sample 17: 1/8 in. sand seam noted	7
33.5						
	17A	SS			Sandy silt, little clay - gray- loose - saturated (ML)	4/6"
34.0						
35.0	18	SS			Clayey silt, little fine sand - brown and gray - medium (CL-ML)	5
35.5						
	18A	SS			Sandy silt, trace clay - gray - loose - saturated (ML)	3/6"
36.0						4
	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)	1
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				
		27	SS*			52.2	
						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

Standard penetration blows: 6; 3; 4; 12; 9; 50/0.5"; 50/2"; 50/2"

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	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557303.7	**1/21/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441194.41	**D-50/RT**	**RCR**	**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: 09-106A
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +754.69

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}
5.0		PA			.	
10.0						
15.0						
20.0		RB				
25.0					Disturbed samples retrieved following completion of vane shear tests.	
30.0					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 **Pneumatic Piezometer Installed at 30.0 feet**	
	1	SS*			31.0 31.5 Silty fine to coarse gravel, little fine sand, trace clay - gray - wet - dense (GM)	
	1A	SS			32.0 Sandy silt, trace clay - gray - wet - very loose (ML) 3 in. sample attempted at 31.0 to 33.5 ft. with Osterberg sampler with no Recovery.	
35.0		RB				
40.0					**Pneumatic Piezometer Installed at 39.0 feet**	
					. . . continued	

15/6"

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

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

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**

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 +754.69 (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**

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

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}
	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	
					6.0	
	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					10.0	
	6	SS			11.0 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			18.0	
	10	SS			Fill: Silty fine to coarse sand-sized ash, trace fine gravel - gray- dense - wet (SM) (BA) Failed	
20.0					20.3	
	11	SS			Fill: Sandy silt-sized ash - gray - dense to medium dense - saturated (FA) Failed	
	12	SS			Sample 12: Seams of sand-sized ash (BA)	
25.0	13	SS				
					26.0	
	14	SS			Fill: Sandy silt-sized ash, trace fine gravel - gray - loose - saturated (ML) (FA) Failed	
	15	SS			28.5	
	15A	SS			Silty clay, little sand - brown and gray - stiff to very stiff (CL)	
30.0	16	SS			Sample 15A: Organic Content = 2.61%	
					32.0	
	17	SS			Clayey silt, little fine to medium sand - brown and gray - very stiff to stiff (CL-ML)	
	18	SS			34.5	
35.0	18A	SS			Silty fine to medium sand, trace clay - gray - medium dense to loose - wet (SM)	
	19	SS				
					38.0	
	20	SS			Silty fine sand, trace clay - brown - loose - saturated (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: **09-107**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

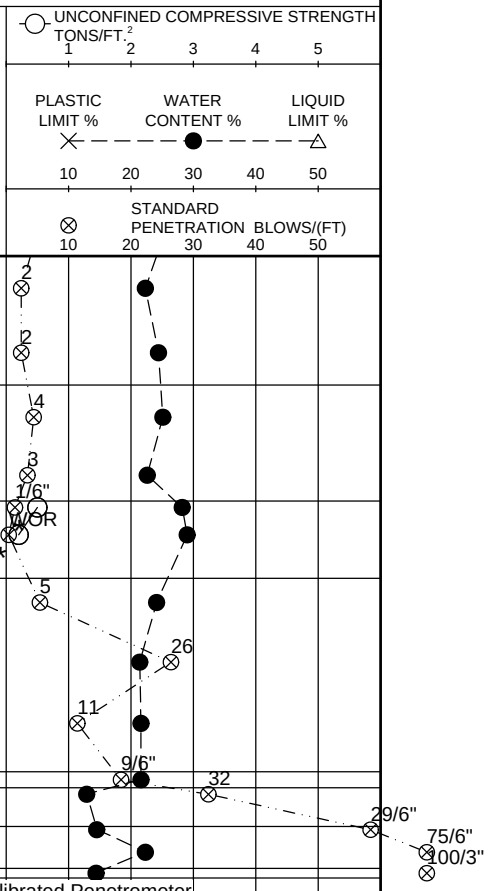
ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +762.44 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
	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)	
	25	SS			Note: Fine to medium sand seams noted	
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			57.7 Silt, little clay, trace fine to medium sand - brown - dense - moist to wet (ML)	
	29B	SS				
	30	SS			59.0 Weathered shale - gray	
59.3	30A	SS			59.3 Shale - gray	

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: **4.0 ft. WS**	BORING STARTED: **2/3/09**	AECOM OFFICE: **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

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**

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 +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		
					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.		

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

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +762.78	
5.0						
10.0						
15.0						
20.0						
25.0						
27.5						
30.0	1	OST			Sample 1: Recovered sample placed into jar. Fill: Sandy silt-sized ash, trace clay - gray - saturated (ML) (FA) Failed	
	2	OST			Sample 2 was not opened	
32.5						
35.0		RB				
40.0						
					. . . continued	

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

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	
	5	OST			Fine to medium sand and silt, trace clay - orangish gray - wet (SM) 49.5	
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**

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}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2}	PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	STANDARD PENETRATION BLOWS/(FT)
		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
		2	SS									4
5.0		3	SS									7
		4	SS									6
		5	SS									4
10.0		6	SS									5
		7	SS									4
15.0		8	SS									2
		9	SS									1
		10	SS									1
20.0		11	SS									2
		12	SS			Sample 12: Sampler fell under weight of rod for 30 in. and under weight of hammer an additional 30 in.						WOR
25.0		12A	SS			24.8						WOH
		13	SS			25.0 Clayey silt, trace fine sand interbedded with silt-sized ash slimes - dark brown and gray - very loose (CL-ML)						WOR
		14	SS			27.0 Silty clay, little to some fine to coarse sand and fine gravel - brown - soft (CL)						WOH
30.0		15	SS			Silty clay, little fine to coarse sand - brown and gray with reddish brown - medium to stiff (CL)						11
		16	SS			31.0						4/6"
		16A	SS			Silt, little clay and fine to medium sand - brown and gray - loose to medium dense - moist (ML)						10
		17	SS			33.0						7
		17A	SS			Silty fine to medium sand, little clay - brown and gray - loose to very loose - wet to saturated (SM)						4/6"
35.0		18	SS*			35.5						WOR
		18A	SS			Sandy silt, some clay - reddish brown - very loose - saturated (ML)						WOH
		19	SS			37.0 Silty fine to medium sand, little clay - reddish brown - medium dense to loose - moist to saturated (SM)						16

60.5

. . . 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

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

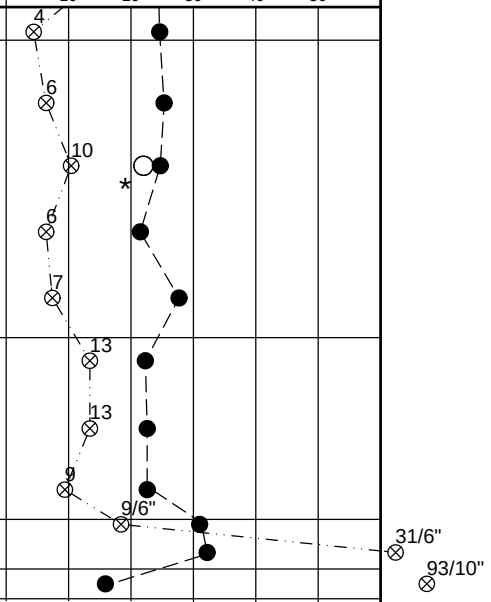
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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	
						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	



*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; 6.1 ft. BCR; 5.8 ft. ACR	**2/9/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557083.91	**2/10/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441485.11	**D-50/JHC**	**RCR**	**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: **09-108A**
	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	
5.0		PA				
10.0						
15.0		RB				
20.0					Disturbed samples retrieved following completion of vane shear testing	
					Vane Shear Test #1 at 25.0 ft. Peak Su = 650 psf, Remolded Su = 50 psf	
		RB			23.5	
25.0	1	ST			Sample 1: No recovery with Shelby tube after two attempts.	
					25.5	
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	
					27.5	
					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	BORING STARTED	AECOM OFFICE	
5.0 ft. BCR; 4.8 ft. ACR	**2/10/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557081.35	**2/11/09**	**KKB**	**1 1**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441488.48	**D-50/JHC**	**RCR**	**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**

SURFACE ELEVATION +759.70

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						
	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	
	3	OST			Silty clay, little fine to coarse sand - brown (CL)	
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	

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)

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

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 +763.59	
	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	8	SS			
				16.0	
	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	13	SS			
				26.0	
	14	SS*		26.5 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			
				34.0	
35.0	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

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

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**

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**

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 +763.59 (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				
		25	SS			48.0 Silty fine to medium sand, little clay - reddish brown to brown - medium dense - saturated (SM)	
50.0		26	SS				
		27	SS				
		28	SS			54.0 Fine to medium sand, little silt, trace clay - brown - medium dense - saturated (SM)	
55.0		29	SS				
		30	SS			59.0	
		30A	SS			Gravelly fine to coarse sand, little silt, trace clay - brown and black - dense to extremely dense - saturated (SM) Weathered shale noted.	
60.0		31	SS				
		32	SS*			62.4	
		32A	SS			62.7 Weathered shale - gray	
						Drilled without sampling Driller's Note: Apparent bedrock	
65.0			RB				
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

Standard penetration values: 3, 4, 2, 9, 14, 12, 12, 18, 28, 9/6", 42, 32, 55/6", 12/12"

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

WL: **7.3 ft. WD**	BORING STARTED: **2/12/09**	AECOM OFFICE: **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	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)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +763.27	
5.0		PA			.	
10.0						
15.0		RB				
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					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	2	ST				
	3	ST				
30.0	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 Vane Shear Test #4 at 33.0 ft. Peak Su = 1500 psf, Remolded Su = 425 psf	
32.0	4	ST				
35.0	5	ST				
36.0					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					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**

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	
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	2	OST		Sample 2: Poor recovery. Sample placed into jars.	
				25.5	
	3	OST		See UMass Direct Shear Test results (DeGroot, 2009) for Sample 3 description.	
	3A	OST		28.0	
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	6	OST		Silty fine to medium sand, trace clay - light brown - saturated (SM)	
				35.5	
		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**

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**

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 +763.41 (Continued)		
					Pneumatic Piezometer Installed at 40.0 ft.		
45.0							
50.0		RB					
55.0							
60.0							
62.0					**Pneumatic Piezometer Installed at 61.0 ft.** 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**

SURFACE ELEVATION +774.57

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} / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % / STANDARD PENETRATION BLOWS/(FT)
	1	SS			Fill: Silty clay, little fine to coarse sand, trace fine to coarse gravel - reddish brown - very stiff to medium (CL)		6
	2	SS*					3/6"
2.6							
	2A	SS			Fill: Sandy silt-sized ash, trace clay and fine gravel - gray - loose - moist (ML)		9
4.0					(FA) Unfailed		
5.0	3	SS			Fill: Silty fine to coarse sand-sized ash, trace fine gravel - gray - loose to very loose - moist (SM)		5
	4	SS			(FA & BA) Unfailed		3
8.0							
	5	SS			Fill: Silty fine to coarse sand-sized ash, trace fine to coarse gravel - gray - loose - saturated (SM)		4
10.0					(FA & BA) Unfailed		
10.0	6	SS			Fill: Sandy silt-sized ash, trace clay and fine to coarse gravel - gray - very loose - moist (ML) (FA & BA)		3
12.0					Unfailed		
	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)		7
15.0	8	SS			(BA) Unfailed		1
16.0					Note: 100% drilling fluid loss while drilling to 14.0 ft. Extended casing to 14.0 ft.		
	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)		3
	10	SS			(BA) Unfailed		1
20.0	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.		1
	12	SS					2
25.0	13	SS					4
	14	SS					2
28.0							
	15	SS			Fill: Sandy silt-sized ash, little to trace clay - gray - very loose to loose - saturated (ML)		WOH
30.0	16	SS			(FA) Unfailed		WOH
	17	SS					1
35.0	18	SS					8
	19	SS					6
38.0							
40.0	20	SS			Silty clay, trace fine to medium sand - brown - soft (CL)		WOH
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**

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 +774.57 (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	
	37A	SS			74.0 Weathered shale - brown	
	38	SS			Weathered shale - gray	
75.0		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.	
					. . . continued	

Penetrometer values plotted: 5, 10, 4, 7, 1, 1, 1, 2, 2, 2, 4, 1, 8, 6, 1, 12, 20, 6, 22/6", 50/3"

*Calibrated Penetrometer

*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**

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**

SURFACE ELEVATION +774.77

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)
5.0		PA					
10.0							
15.0							
20.0							
25.0		RB					
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.		⊗ (STANDARD PENETRATION)
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**

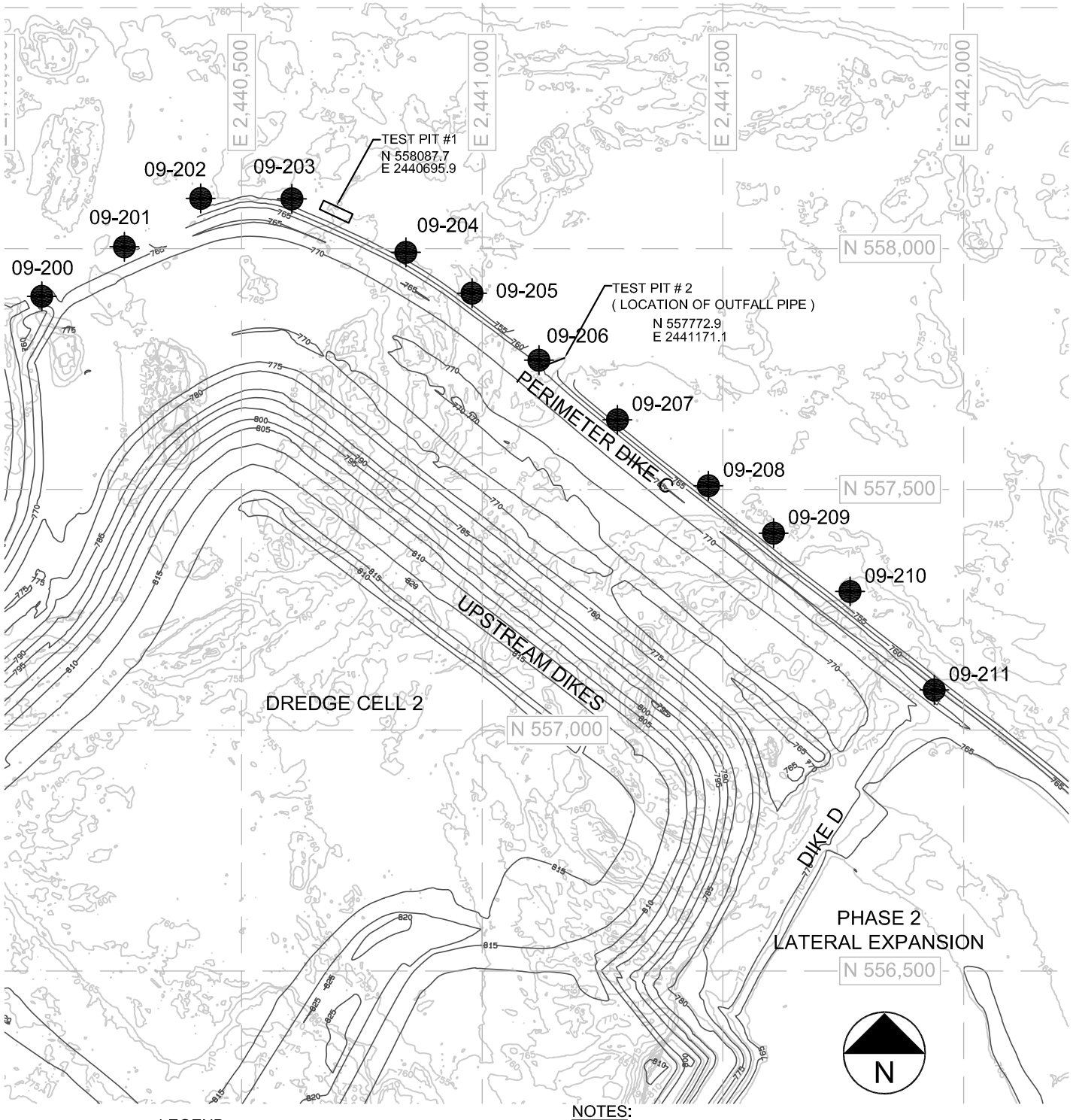
DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5) / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % (10 20 30 40 50) / STANDARD PENETRATION BLOWS/(FT) (10 20 30 40 50)
						SURFACE ELEVATION +774.77 (Continued)		
		2	ST			Peak Su = 1075 psf, Remolded Su = 125 psf 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		
42.0						42.0		
						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



LEGEND

09-200 200 SERIES SOIL BORINGS AND CPTu SOUNDINGS LOCATIONS (AECOM 2009)

PRE-FAILURE CONTOURS

POST FAILURE CONTOURS

NOTES:

1. BASE MAP BASED ON LIDAR DATA COLLECTED ON DECEMBER 24, 2008
2. HORIZONTAL DATUM: NAD 27 (TENNESSEE LAMBERT)
3. VERTICAL DATUM: NGVD 29
4. LOCATION OF CPTu SOUNDING 09-212 SEE FIGURE 2E-7

0 300

1" = 300'

200 SERIES EXPLORATION LOCATION

ROOT CAUSE ANALYSIS
TVA KINGSTON DREDGE CELL FAILURE
ON DECEMBER 22, 2008
KINGSTON FOSSIL PLANT
HARRIMAN, TENNESSEE

Drawn :	DTB	6/12/2009
Checked:	LWB	6/12/2009
Approved:	WHW	6/12/2009
PROJECT NUMBER	60095742	
FIGURE NUMBER	2E-2	

AECOM
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09-200 Series

AECOM

Boring/Sounding ID	Ground Surface Elevation (GSE)	Easting	Northing
09-200	764.91	2,440,072.01	557,894.56
09-200A	765.15	2,440,066.72	557,891.88
09-200B	764.41	2,440,104.39	557,896.13
09-201	760.74	2,440,259.58	558,003.36
09-201A	760.51	2,440,255.39	558,003.67
09-201B	760.65	2,440,253.76	558,004.18
09-202	761.47	2,440,411.12	558,101.06
09-202A	761.31	2,440,416.30	558,102.45
09-202B	761.26	2,440,414.58	558,102.08
09-203	759.59	2,440,604.25	558,105.48
09-203A	759.36	2,440,605.72	558,099.41
09-203B	759.13	2,440,604.73	558,102.79
09-203B2	759.14	2,440,605.81	558,100.99
09-204	750.14	2,440,842.52	557,991.42
09-204A	749.55	2,440,841.98	557,998.03
09-204B	750.03	2,440,843.62	557,984.69
09-205	754.57	2,440,978.41	557,913.31
09-205A	754.33	2,440,983.23	557,907.27
09-205B	755.26	2,440,973.84	557,906.12
09-206	754.56	2,441,114.96	557,766.73
09-206A	754.98	2,441,109.93	557,768.40
09-206B	754.56	2,441,116.26	557,771.01
09-207	747.11	2,441,277.57	557,643.84
09-207A	747.31	2,441,282.96	557,645.76
09-207B	747.33	2,441,285.95	557,646.89
09-208	744.78	2,441,472.19	557,505.10
09-208A	744.85	2,441,470.03	557,506.55
09-209	746.19	2,441,605.58	557,409.86
09-209A	746.42	2,441,606.54	557,414.39
09-209B	746.58	2,441,606.86	557,419.11
09-210	749.55	2,441,762.30	557,293.27
09-210A	749.94	2,441,767.50	557,286.92
09-210B	749.63	2,441,764.39	557,290.26
09-211	765.55	2,441,966.50	557,054.25
09-211A	765.43	2,441,975.52	557,047.46
09-211B	765.38	2,441,970.43	557,050.87
09-211D	765.55	2,441,929.93	557,086.35
09-211E	765.52	2,441,937.68	557,079.29
09-211F	765.40	2,441,945.54	557,073.02

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}	STANDARD PENETRATION BLOWS/(FT)
				SURFACE ELEVATION +764.91		
		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		WOH
				5.5		
	2	SS		Fill: Sandy silt-sized ash, little clay - gray - loose - moist (ML) (FA) Failed		6
				7.5		
	3	SS		Fill: Silt-sized ash, trace clay and fine sand - gray - very loose - saturated (ML) (FA) Failed		2
10.0	4	SS				3
	5	SS				2
				13.5		
	6	SS		14.4 Fill: Silty clay, trace fine to coarse sand - reddish brown -medium (CL) Failed Sample 6: 1 in. fly ash noted in lower tip.		2 *
15.0	7	SS		Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose to loose - saturated (ML) (FA) Failed		1
	8	SS				1
20.0	9	SS				WOH
	10	SS				WOH
	11	SS				WOH
25.0	12	SS				WOH
	13	SS				4
30.0	14	SS				5
	15	SS				3
				34.0		
35.0	16	SS		Silt, some fine to coarse sand, little clay, trace fine gravel - gray - moist - very loose (ML)		WOH *
	17	SS				2 *
				38.0		5
40.0	18	SS		Silty fine to coarse sand, little fine gravel and clay - brown and gray - loose - wet (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: **09-200**
	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)

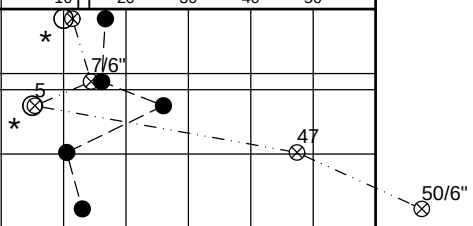
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

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				
						Silty clay, little fine to medium sand, trace fine gravel - gray - medium (CL)	
45.0	44.5	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	
						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

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

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**

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 +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

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 +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 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.		* *

*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 **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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +764.41	
					.	
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	
	1A	OST			16.0	
		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	4A	OST			Sample 4: Wood fragments noted at lower tip of sample. 35.0	
	5	OST			Silty clay, little fine sand - brownish gray (CL)	
37.5	5A	OST			37.5	
					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.	

73.0

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	**3/7/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557896.13	**3/7/09**	**KKB**	**1 1**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440104.39	**D-25/BM**	**RCR**	**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**

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 +760.74	
	1	SS			Fill: Sandy silt-sized ash, trace clay - gray - very loose - saturated (ML) (FA) Failed	WOH
2.0						
	2	SS			Fill: Silty fine sand-sized ash, trace clay - gray - very loose - moist to wet (SM) (FA) Failed	1
4.0						
5.0	3	SS			Fill: Silt-sized ash, trace to little fine sand and clay - gray - very loose to medium dense - saturated (ML) (FA) Failed	6
	4	SS				5
					While drilling to 12.0 ft., casing sank from 7.5 to 9.5 ft.	
	5	SS				WOR
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	4
	7	SS				11
14.0						
15.0	8	SS			Silt-sized ash, little clay, trace fine sand - gray - loose to very loose - saturated (ML) (FA) Failed	6
					While drilling to 14.0 ft., casing sank from 9.5 to 12.0 ft. and water lost around casing.	WOH
	9	SS				WOH
					Casing removed, bentonite seal added and casing re-installed to 14.0 ft. Sample 9: No recovery	
20.0	10	SS				WOH
	11	SS			After sampling to 18.5 ft., casing sank from 14.0 to 17.5 ft.	
					After sampling to 25.5 ft., casing sank from 17.5 to 22.5 ft.	WOH
25.0	12	SS				
25.5						
	13	SS			Clayey silt and fine sand - brown and gray - very loose - wet (CL-ML)	3
27.5					After sampling to 27.5 ft. casing extended to 27.5 ft.	
	14	SS			Silty clay and fine to medium sand - grayish brown - medium to stiff (CL)	1 * *
29.5						
30.0	15	SS			Silty clay, some fine to medium sand - grayish brown - stiff (CL)	2 *
31.5						
	16	SS			Silty fine to coarse sand, trace fine gravel, trace to little clay - brown - medium dense to loose - saturated (SM)	13
					80% drilling fluid lost while drilling from 30 to 35 ft.	10
35.0	17	SS				
	18	SS				17
	19	SS				7
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**

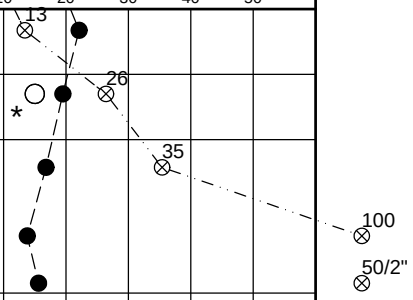
SURFACE ELEVATION +760.74 (Continued)

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, trace clay - gray - medium dense - wet (SM)	
41.5						
	21	SS			Clayey silt, little fine to medium sand and weathered shale - gray - medium dense - moist to wet (CL-ML)	
43.5						
45.0	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)	
	23	SS				
	24	SS				
48.2						
50.0		RB			Drilled without sampling Driller's note: Hard drilling from 50.3 to 51.3 ft.	
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	

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)



*Calibrated Penetrometer

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

WL: **1.0 ft. WS**	BORING STARTED: **2/7/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **558003.36**	BORING COMPLETED: **2/8/09**	ENTERED BY: **KKB**	SHEET NO. **2** OF **2**
EASTING: **2440259.58**	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: **09-201A**
PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +760.51

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							
15.0			RB				
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				
	29.5					Silty clay and fine to coarse sand, trace fine gravel - brown (CL)	
30.0		3	ST			Vane Shear Test #2 at 29.0 ft. Peak Su = 1250 psf, Remolded Su = 525 psf	
31.5	31.5					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	
						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.	

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)

* 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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +760.65	
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	3	OST			Silty clay, trace fine to medium sand - gray (CL)	
30.0						
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	

69.6

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	**2/9/09**	**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**

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 +761.47		
	1	SS			Fill: Silt-sized ash, trace clay and fine sand - gray - very loose - wet to saturated (ML) (FA) Failed		1
	2	SS					WOH
5.0	3	SS					1
	4	SS					1
	5	SS					2
10.0	6	SS			Driller's Note: 10% drilling fluid loss from 10.0 to 47.5 ft.		WOH
	7	SS					WOH
15.0	8	SS					WOH
	9	SS					WOH
	10	SS					WOH
20.0	11	SS					WOH
	12	SS					WOH
25.0	13	SS					2
	14	SS					1
	15	SS					WOH
30.0	15A	SS			29.8		1/6"
	16	SS			30.0 Silt, little clay and fine sand - brown, gray and black - very loose (CL)		WOH
	17	SS			Clayey silt, little fine to medium sand - brown and gray - very loose to loose - moist (CL-ML)		WOH
35.0	18	SS					4
	18A	SS			35.5		3/6"
	19	SS			Clayey silt, some fine to medium sand - gray and brown - loose to very loose - moist (CL-ML)		2/6"
	19A	SS			37.0		WOH
	19B	SS			37.5 Silty fine to medium sand, trace clay - gray - very loose - saturated (SM)		3/6"
	20	SS			38.0 Clayey silt, some fine to medium sand - gray - loose - saturated (CL-ML)		14
40.0	21	SS			41.0 Silty fine to medium sand, trace clay - gray and brown - medium dense to dense - saturated (SM)		17/6"
	21A	SS					30

. . . 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**

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 +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							
45.0		24	SS			Silty gravel, some fine to medium sand, trace clay - brown and gray - extremely dense (GM) Weathered shale and limestone noted.		85/6"
			RB					
47.5		25	SS					157
	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**

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)	
					32.0	
	2	ST			Vane Shear Test #1 at 30.5 ft. Peak Su = 1375 psf, Remolded Su = 400 psf	
					33.5	
	3	SS			Sample 2: No recovery Vane Shear Test #2 at 32.5 ft. Peak Su = 1750 psf, Remolded Su =375 psf	
35.0	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	BORING STARTED	AECOM OFFICE	
2.0 ft. WD	**2/11/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
558102.45	**2/12/09**	**KKB**	**1 1**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440416.3	**CME-850/JD**	**RCR**	**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						
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						
25.0						
					26.0	
	1	OST			Clayey silt-sized ash, trace fine sand - gray - saturated (ML) (FA) Failed	
	1A	OST			28.5	
30.0	2	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 2 description.	
	2A	OST			31.0	
	3	OST			Clayey silt, some fine to medium sand - brownish gray - saturated (CL-ML)	
33.5					33.5	
					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	BORING STARTED	AECOM OFFICE	
Not Observed	**2/11/09**	**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

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)
	1	SS			Fill: Silt-sized ash, trace to little clay, trace fine sand - gray - very loose - saturated (ML) (FA) Failed		1
	2	SS					WOH
5.0	3	SS					WOH
	4	SS					1
	5	SS					1
10.0	6	SS					WOH
	7	SS					WOH
15.0	8	SS					1
	9	SS					2
					18.0		
	10	SS			Silt-sized ash, little to some fine sand, trace to little clay - gray - very loose - saturated (ML) (FA) Failed		WOH
20.0							WOH
	.	SS			No recovery from 20 to 22 ft.		
	11	SS					WOH
	12	SS*					WOH
					24.5		
25.0	12A	SS			Clayey silt, little fine to medium sand - brown and gray - medium (CL-ML)		3/6" *
					26.0		
	13	SS			Sandy silt, little to some clay - brown and gray - loose - moist (ML)		7 *
					28.0		
	14	SS			Clayey silt, little to some sand - brown and gray - very stiff to stiff (CL-ML)		7 *
30.0	15	SS					6 *
					32.0		
	16	SS			Silty clay, little fine to medium sand - brown and gray - stiff (CL)		5 *
					34.0		
35.0	17	SS			Sandy silt, little clay - brown and gray - loose - wet (ML)		5 *
					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)		44
	19	SS					25
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**

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

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 +759.59 (Continued)		
		20	SS*	1	1	40.4 Weathered shale - gray		100/5"
40.4						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	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	UNIT DRY WT. LBS./FT.^{3}	STANDARD PENETRATION BLOWS/(FT)
					SURFACE ELEVATION +759.36		
					.		
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		⊗ 3
24.5							
25.0	1A	SS					
		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					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	BORING STARTED	AECOM OFFICE	
Not Observed	**2/14/09**	**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**

SURFACE ELEVATION +759.13

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)
					.		
5.0		PA					
10.0							
15.0		RB					
					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: **2.0 ft. WD**	BORING STARTED: **2/13/09**	AECOM OFFICE: **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**

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-203-B2**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +759.14

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)
5.0		PA			.		
10.0							
15.0		RB*					
20.0							
21.0	1	OST			Fill: Silt-sized ash, little fine sand, little clay - gray - saturated (ML) (FA) Failed		
25.0	2	OST					
26.0	3	OST			Clayey silt, little fine to medium sand - brown and gray - moist (CL-ML)		
28.5					End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 26.0 ft. with rock bit and drilling fluid. Casing used: 8 ft. of 6 in. Borehole grouted upon completion. OST = Osterberg sampler RB* = 5-7/8 in. rock bit		

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	**2/13/09**	**Chicago Area - 01**	
NORTHING **558100.99**	BORING COMPLETED **2/13/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440605.81**	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

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}
		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: **4.0 ft. WS**	BORING STARTED: **1/24/09**	AECOM OFFICE: **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	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**

SURFACE ELEVATION +749.55

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		PA			.	
5.0						
		RB			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	
10.0						
		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) Vane Shear Test #4 at 18.5 ft. Peak Su = 2800 psf, Remolded Su = 850 psf	
18.5						
20.0	4	ST				
20.0						
	5	ST			Clayey silt and fine to medium sand - brown - moist (CL-ML) Vane Shear Test #5 at 20.0 ft. Peak Su = 2500 psf, Remolded Su = 1025 psf	
21.5						
	6	ST				
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.	

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

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

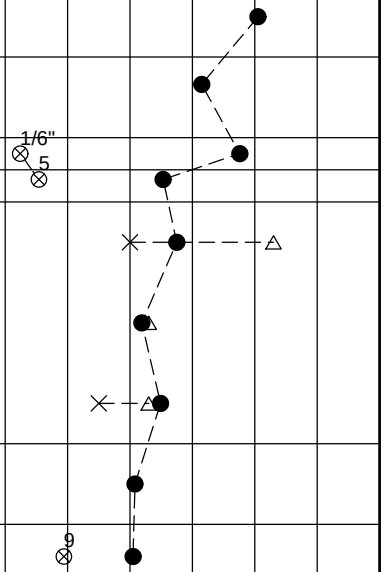
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +750.03	
5.0		PA			.	
					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**

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 +754.57	
	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						
5.0	3	SS			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.	
	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						
15.0	8A	SS			Silty clay, little to some fine to medium sand - brown - stiff to very stiff - moist (CL)	
	9	SS				
	10	SS				
20.0	11	SS				
	12	SS				
23.5						
	12A	SS			Clayey silt, some to little fine to medium sand, trace fine gravel - brown - medium dense - wet (CL-ML) Sample 13: No recovery	
25.0	13	SS				
	14	SS*				
26.5						
	14A	SS			Sandy silt, little clay - reddish brown - medium dense - wet (ML)	
	15	SS				
30.0						
	16	SS			Silty fine to medium sand, little clay - reddish brown - medium dense - wet (SM)	
	17	SS				
	18	SS*				
34.5						
35.0	18A	SS			Silty fine to coarse sand, little gravel, trace clay - gray - medium dense to extremely dense (SM)	
	19	RB				
	19	SS*				
36.5						
	20	SS*			Silty sand, little gravel - brown - extremely dense - moist (SM)	
37.0						
37.8	20A	SS			Weathered shale noted.	
	21	SS*			Weathered shale - gray - extremely dense	
					. . . continued	

* Calibrated Penetrometer

* 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	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**

SURFACE ELEVATION +754.33

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}
5.0		PA		.	
10.0		RB		Disturbed samples retrieved following completion of vane shear testing	
				13.5	
	1	ST		13.7 Fill: Sandy silt-sized ash, trace fine gravel, little clay - dark gray - saturated (ML) (FA) Failed	
15.0	2	SS			
				15.3 Fill: Silt-sized ash, trace fine gravel, fine sand and clay - gray - saturated (ML) (FA) Failed	
	3	SS		17.0 Samples 2 and 3: No recovery with Shelby tube. Obtained sample with split spoon. Vane Shear Test #1 at 15.0 ft. Peak Su = 250 psf, Remolded Su = 100 psf	
	4	ST			
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 Vane Shear Test #3 at 19.0 ft. Peak Su = 575 psf, Remolded Su = 100 psf	
		RB		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	

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

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 +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		
20.0	3	OST			Clayey silt, trace fine sand - light brown - wet (CL-ML)		
21.0	3A	OST			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	BORING STARTED	AECOM OFFICE	
4.0 ft. WD	**1/26/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557906.12	**1/27/09**	**KKB**	**1 1**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440973.84	**D-50/BM**	**RCR**	**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

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	
	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			Sandy silt, little clay - brown and gray - medium dense - saturated (ML)	
	17A	SS			33.0	
	17B	SS			33.5 Silty clay, little fine to coarse sand - brown - very stiff (CL)	
35.0	18	SS			34.0 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**

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*	1	1	38.0 brown - very dense to extremely dense - moist to wet (SM)	
						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	

68/6"

*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**

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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +754.98	
		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)	
24.5	7	SS			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	
					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	BORING STARTED	AECOM OFFICE	
3.0 ft. WD	**1/29/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557768.4	**1/29/09**	**KKB**	**1 1**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441109.93	**D-50/BM**	**RCR**	**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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +754.56	
					.	
5.0		PA				
		RB				
10.0					10.0	
	1	OST			Sample 1 was not opened.	
					12.5	
	2	OST			Sample 2 was not opened.	
15.0					15.0	
	3	OST			Fill: Silty clay, trace fine to coarse sand - brown to reddish brown - moist - wet (CL)	
	4	OST				
20.0					20.0	
	5	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 5 description.	
22.5					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	

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	**1/29/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557771.01	**1/30/09**	**KKB**	**1 1**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441116.26	**D-50/RT**	**RCR**	**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}	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % / STANDARD PENETRATION BLOWS/(FT)
	1	SS			Fill: Silt-sized ash, little to some clay, and trace fine sand - gray - very loose - wet (ML) (FA) Failed		WOH
	2	SS					WOH
5.0	3	SS					1
	4	SS					1
	5	SS					2
10.0	6	SS					2
	7	SS			14.0		WOH
15.0	8	SS			Silty clay, little fine to medium sand - brown and gray with black - medium (CL) 16.0		WOH
	9	SS			Silty clay, little to some fine to medium sand - brown and gray - stiff to very stiff (CL)		2
	10	SS					10
20.0	11	SS					8
	12	SS					5
	13	SS			25.0		4/6"
25.0	13A	SS			Sandy silt, little clay - brown - medium dense - wet (ML)		15
	14	SS					14
	15	SS					18
30.0	16	SS			30.0 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)		68
	17	SS			32.8		6/6"
	17A	SS			Weathered shale - gray - very dense to extremely dense		56
34.8	18	SS			34.8		50/3"
					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: **At Surface**	BORING STARTED: **1/30/09**	AECOM OFFICE: **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

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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +747.31	
5.0		PA				
10.0		RB			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.	
15.0	1	ST				
	2	ST				
					17.5 Silty clay, little fine sand - brown - very stiff (CL)	
	3	SS			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 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	
20.0	4	SS				
22.5	5	SS			22.5 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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +747.33	
					.	
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**

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 +744.78	
		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			6.5 Silty clay, little to some fine sand - reddish brown to brown - stiff (CL)	
		5	SS				
10.0		6	SS			11.0	
		6A	SS			12.0 Sandy silt, little clay - brown - loose - moist (ML)	
		7	SS			Clayey fine to medium sand, little to some silt - brown - loose - moist (SC) 14.0	
15.0		8	SS			Silty fine to medium sand, little to trace clay - brown - loose - moist to wet (SM)	
		9	SS			18.0	
		10	SS			Silty fine to medium sand, little clay - brown and dark brown - very loose to loose - saturated (SM)	
20.0		11	SS			22.0	
		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			28.5	
			RB			29.1 Silty fine to coarse sand, trace clay and gravel - reddish brown - extremely dense - moist to wet (SM) 29.8	
30.0						Weathered shale - gray	
		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.	
35.0						Run # 1 — Depth (ft.) 29.75 - 39.95 — Recovery (%) 38.2 — RQD (%) 0 — Fracture Frequ. > 20 / foot	
40.0						40.0	

87/6"

. . . 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**

AECOM

ROCK CORE PHOTOGRAPHIC LOG

Client Name: Tennessee Valley Authority	**Site Location:** Kingston Fossil Plant – Harriman, Tennessee	**Project No.** 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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +744.85	
		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	
	2	ST			8.0 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	3	ST			10.0 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	
14.0	4	**2.5"**			Vane Shear Test #4 at 11.5 ft. Peak Su = 1800 psf, Remolded Su = 900 psf 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
		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
	6.6					
		4	SS			Silty clay, little fine to medium sand - reddish brown - stiff (CL)
		5	SS			
10.0	10.0					
		6	SS			Silty clay, some fine sand - reddish brown - stiff (CL)
	12.0					
		7	SS			Sandy silt, little clay - reddish brown - loose - moist to wet (ML)
	14.0					
15.0		8	SS			Silty fine to medium sand, little to trace clay - reddish brown - loose - moist to wet (SM)
		9	SS			
	18.0					
		10	SS			Silty fine to medium sand, little to some clay - reddish brown - very loose to loose - wet to saturated (SM)
20.0		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					
	29.0	15	SS			Silty fine to medium sand, trace clay - brown and dark brown - medium dense - saturated (SM)
30.0		15A	SS			Gravelly sand, little silt - gray - very dense to extremely dense - wet (SM)
		16	SS			
	31.0	16A	SS			
	31.9	17	RB			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

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

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)

1 7 9 4 7 * 5 * 3 4 5 1 4 8 7 14 7/6" 30/6" 38/6" 50/3" 100/5"

* 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: **3/10/09**	AECOM OFFICE: **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

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-209A**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

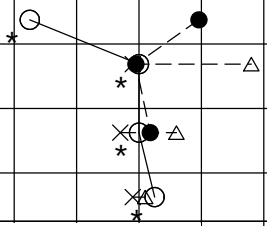
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +746.42	
5.0		PA			Disturbed samples retrieved following completion of vane shear testing.	
					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) 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	
					14.0	
					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	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +746.58	
		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**

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	
		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		6	SS				
	11.0						
		6A	SS			Silty clay, little fine to coarse sand - brown to reddish brown - medium to stiff (CL)	
		7	SS				
		8	SS				
	14.5						
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				
		10A	SS			Sample 10A: Seam of dark brown to black silty sand noted	
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						
25.0		13	SS			Silty fine sand, little clay - brown to grayish brown - loose to very loose - wet to saturated (SM)	
		14	SS				
	27.5						
	28.0	14A	SS			Silty fine to medium sand, trace clay - gray - very loose - saturated (SM)	
		15	SS			Silty fine to medium sand, little clay - gray - loose - saturated (SM)	
30.0							
		16	SS				
	32.0						
	33.0	17	SS			Silty fine to medium sand, trace clay - reddish brown - dense - saturated (SP-SM)	
		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

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

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**

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

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 +749.55 (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**

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**

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 +749.94		
		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. Peak Su = 1550 psf, Remolded Su = 950 psf		
					12.0		
	2	SS			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		
14.0					14.0		
					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	BORING STARTED	AECOM OFFICE	
Not Observed	**3/4/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557286.92	**3/4/09**	**KKB**	**1 1**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441767.5	**D-50/BZ**	**RCR**	**60095742**

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)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +749.63	
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.	
		RB			7.0	
	1	OST			Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Failed	
10.0	1A	OST			10.0	
	2	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 2 description.	
	2A	OST			12.5	
	3	OST			Clayey silt, little fine sand - brown - moist to wet (CL-ML)	
15.0	3A	OST			15.0	
		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	5A	OST			28.5	
					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	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557290.26	**3/3/09**	**KKB**	**1 1**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441764.39	**D-50/JC**	**RCR**	**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

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}
	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**

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**

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)	
	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)	
					44.5	
45.0	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.	
		RB			53.5	
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 # 1: Depth (ft.) 53.5 - 61.5; Recovery (%) 87.5; RQD (%) 25.5; Fracture Frequ. > 10 /ft. to 54.8 ft.	
					5 - 10/ft. below 54.8 ft.	
65.0	RUN 2	DB			Run # 2: Depth (ft.) 61.5 - 69.5; Recovery (%) 100; RQD (%) 49.5; Fracture Frequ. 5 - 10/ft.	
69.5					**Pneumatic Piezometer installed at 68.5 ft.** 69.5	
					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	

SS* values: 4, 1, WOH, 3, 8, 27

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

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**

SURFACE ELEVATION +765.43

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}
		PA			.	
5.0						
10.0		RB				
15.0						
20.0					Disturbed samples retrieved following completion of vane shear testing.	
					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)	
30.0		RB			Sample 2: No recovery with Shelby tube. Pushed split spoon for sample recovery. Vane Shear Test #2 at 27.5 ft. Peak Su = 2775 psf, Remolded Su = 1300 psf	
33.0					**Pneumatic Piezometer installed at 33.0 ft.**	
					33.0 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	BORING STARTED	AECOM OFFICE	
Not Observed	**3/5/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557047.46	**3/5/09**	**KKB**	**1 1**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441975.52	**Mobile B-57 (V.H.)/MB**	**RCR**	**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**

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 +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**

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	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 +765.55		
					.		
		HS					
5.0							
10.0							
15.0							
20.0							
25.0							
		RB*					
30.0							
35.0							
40.0							
					. . . continued		

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

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**

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	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 +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: Tennessee Valley Authority	**Site Location:** Kingston Fossil Plant – Harriman, Tennessee	**Project No.** 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.	Date:
09-211	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: **09-211-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	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 +765.55 (Continued)		
					.		
85.0							
90.0							
95.0							
100.0							
104.0					104.0 End of Boring Borehole advanced to 6.0 ft. with hollow-stem auger. Borehole advanced from 6.0 to 104.0 ft. with rock bit and drilling fluid. Inclinometer installed at 104.0 ft. and borehole grouted by tremie methods Casing used: 8 ft. of 6 in. RB* = 5-7/8 in. RB		

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

WL: **Not Observed**	BORING STARTED: **3/8/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **557086.35**	BORING COMPLETED: **3/9/09**	ENTERED BY: **KKB**	SHEET NO.: **3** OF **3**
EASTING: **2441929.93**	RIG/FOREMAN: **Mobile B-57 (G.B.)/BZ**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-211-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 +765.52		
					.		
5.0		HS					
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-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 +765.52 (Continued)	
45.0					.	
50.0						
55.0						
60.0						
65.0						
70.0		RB*				
75.0						
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	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-211-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 +765.52 (Continued)		
85.0					.		
90.0							
95.0							
100.0							
104.0					104.0 End of Boring Borehole advanced to 8.0 ft. with hollow-stem auger. Borehole advanced from 8.0 to 104.0 ft. with rock bit and drilling fluid. Inclinometer installed to 104.0 ft. and borehole grouted by tremie methods Casing used: 8 ft. of 6 in. WOH = Weight of Hammer RB* = 5-7/8 in. RB		

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	3/10/09	Chicago Area - 01	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557079.29	3/11/09	KKB	3 3
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441937.68	Mobile B-57 (G.B.)/BZ	RCR	60095742

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-211-SH3**

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 +765.40		
		HS			.		
5.0							
10.0							
15.0							
20.0							
25.0							
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-SH3**

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 +765.40 (Continued)		
45.0					.		
50.0							
55.0		RB*					
60.0							
65.0							
70.0							
75.0							
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

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-211-SH3**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

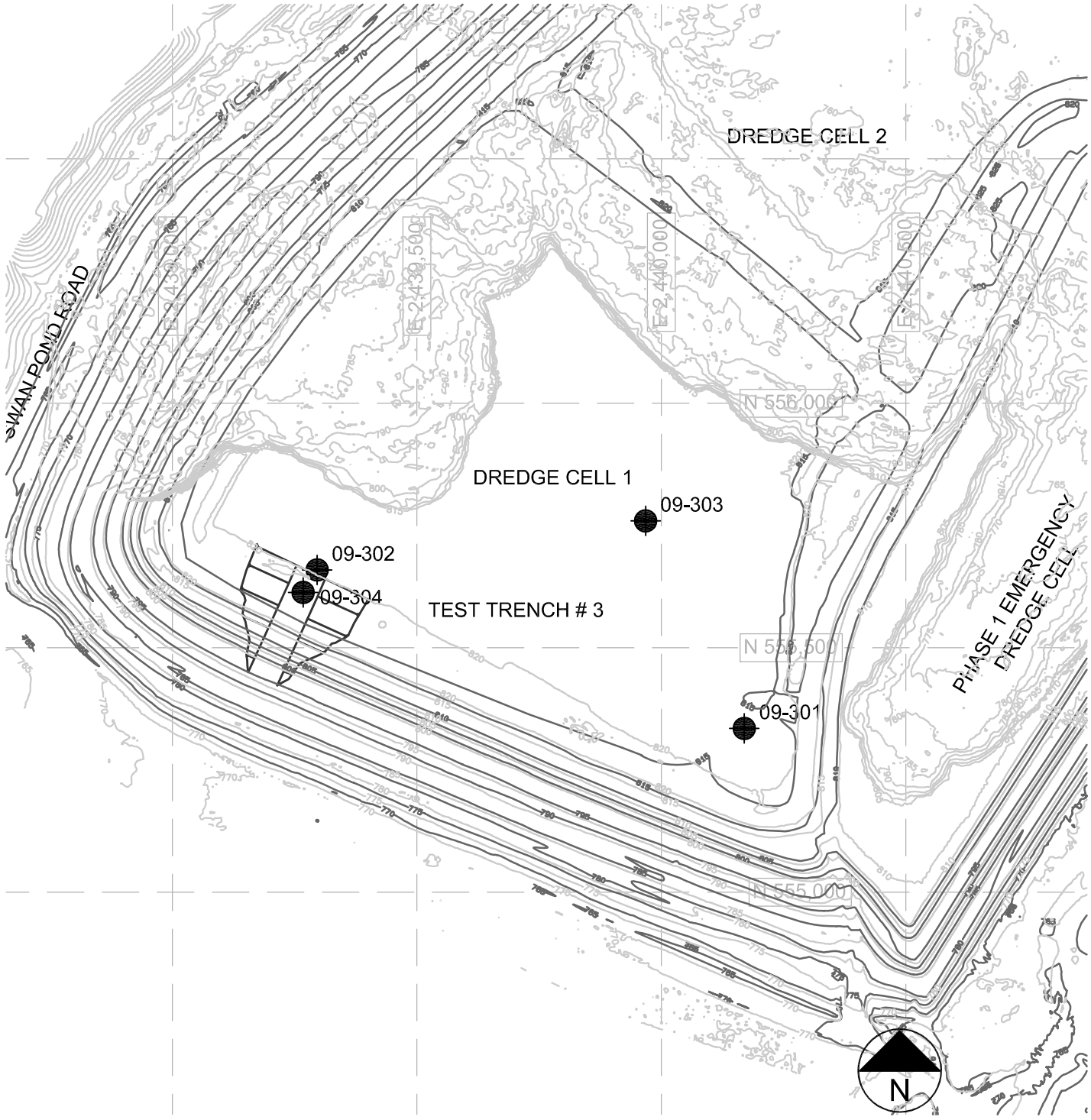
ARCHITECT-ENGINEER: **OGC**

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 +765.40 (Continued)		
					.		
85.0							
90.0							
95.0							
100.0							
104.5					104.5 End of Boring Borehole advanced to 8.0 ft. with hollow-stem auger. Borehole advanced from 8.0 to 104.5 ft. with rock bit and drilling fluid. Inclinometer installed to 104.5 ft. and borehole grouted by tremie methods Casing used: 8 ft. of 6 in. RB* = 5-7/8 in. RB		

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

WL: **Not Observed**	BORING STARTED: **3/12/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **557073.02**	BORING COMPLETED: **3/15/09**	ENTERED BY: **KKB**	SHEET NO.: **3** OF **3**
EASTING: **2441945.54**	RIG/FOREMAN: **Mobile B-57 (G.B.)/BZ**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**



LEGEND

09-300 300 SERIES SOIL BORINGS AND CPTu SOUNDINGS LOCATIONS (AECOM 2009)

PRE-FAILURE CONTOURS

POST FAILURE CONTOURS

NOTES:
1. BASE MAP BASED ON LIDAR DATA COLLECTED ON DECEMBER 24, 2008
2. HORIZONTAL DATUM: NAD 27 (TENNESSEE LAMBERT)
3. VERTICAL DATUM: NGVD 29

0 300

1" = 300'

300 SERIES EXPLORATION LOCATION

ROOT CAUSE ANALYSIS
TVA KINGSTON DREDGE CELL FAILURE
ON DECEMBER 22, 2008
KINGSTON FOSSIL PLANT
HARRIMAN, TENNESSEE

Drawn :	CJH	1/27/2009
Checked:	LWB	6/12/2009
Approved:	WHW	6/12/2009
PROJECT NUMBER	60095742	
FIGURE NUMBER	2E-3	

AECOM
847.279.2500
www.aecom.com

09-300 Series

AECOM

Boring/Sounding ID	Ground Surface Elevation (GSE)	Easting	Northing
09-301	815.95	2,440,166.15	555,335.00
09-301B	816.30	2,440,173.50	555,334.39
09-301C1	816.31	2,440,169.36	555,335.22
09-301D	816.30	2,440,155.21	555,347.00
09-301E	816.13	2,440,161.05	555,355.40
09-301F	816.12	2,440,166.28	555,363.55
09-302	817.38	2,439,297.28	555,664.92
09-302C1	817.33	2,439,296.19	555,659.04
09-303	817.43	2,439,974.35	555,755.80
09-303A	817.49	2,439,973.37	555,760.09
09-303B	817.42	2,439,974.63	555,756.05
09-303C1	817.05	2,439,967.74	555,759.43
09-304	819.50	2,439,240.10	555,555.20

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-301**

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 +815.95		
		1	SS			Fill: Silt-sized ash, little clay, trace fine sand - gray - very loose - moist (ML) (FA) Unfailed		1
		2	2.5"			Sample 1: No recovery		1
						4.0		
5.0		3	SS			Fill: Silt-sized ash, trace fine sand - gray - very loose - saturated (ML) (FA) Unfailed		2
						6.0		
		4	2.5"			Fill: Silt-sized ash, little clay, trace fine sand - gray - loose to medium dense - moist to wet (ML) (FA) Unfailed		5
		5	SS					17
10.0						10.0		
		6	2.5"			Fill: Silt-sized ash, little clay, trace fine sand - gray - very loose to loose - moist to wet (ML) (FA) Unfailed		5
		7	SS					3
15.0		8	2.5"					3
		9	SS					1
		10	2.5"					2
20.0		11	SS					2
		12	2.5"					2
25.0		13	SS					WOH
		14	2.5"					2
		15	SS					2
30.0		16	2.5"					1
		17	SS					WOH
35.0		18	2.5"					1
		19	SS					3
		20	2.5"					1
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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-301**

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 +815.95 (Continued)	
		21	SS			Fill: Silt-sized ash, little clay, trace fine sand - gray - very loose to loose - moist to wet (ML) (FA) Unfailed	
		22	2.5"				
	44.0						
45.0		23	SS			Fill: Silt-sized ash, little clay, trace fine sand - gray - medium dense to very loose - saturated (ML) (FA) Unfailed	
		24	2.5"				
		25	SS				
50.0		26	2.5"				
	52.0						
		27	SS			Fill: Silt-sized ash, trace to little fine sand, trace clay - gray - extremely dense to dense - saturated (ML) (FA) Unfailed	
55.0		28	2.5"				
		29	SS				
		30	2.5"				
		31	SS				
60.0	60.0						
		32	2.5"			Fill: Fine to coarse sand-sized ash, little silt - gray - medium dense to loose - saturated (SP-SM) (BA) Unfailed	
		33	SS				
65.0		34	2.5"				
	66.0						
		35	SS			Fill: Silt-sized ash, trace fine sand - gray - medium dense to loose - saturated (ML) (FA) Unfailed	
		36	2.5"				
70.0		37	SS				
		38	2.5"				
75.0		39	SS				
	76.0						
		40	2.5"			Fill: Sandy silt-sized ash, trace clay - gray - medium dense - moist to wet (ML) (FA) Unfailed	
	78.0						
		41	SS			Fill: Silt-sized ash, trace fine sand - gray - loose - saturated (ML) (FA) Unfailed	
80.0	80.0						

. . . 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. **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: **09-301**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

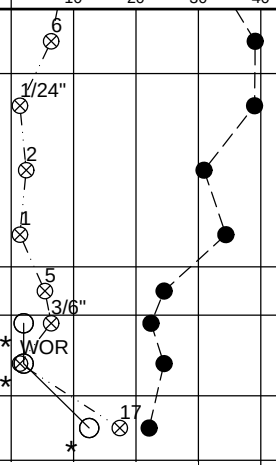
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +815.95 (Continued)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		42	**2.5"**			Fill: Silt-sized ash, little clay and fine to medium sand - gray - loose - saturated (ML) Unfailed	
	82.0						
		43	SS			Fill: Silt-sized ash, trace clay and fine sand - gray - very loose - saturated (ML) (FA) Unfailed	
85.0		44	**2.5"**				
		45	SS				
	88.0						
		46	**2.5"**			Clayey silt, some fine sand - brownish gray and black - loose - moist to wet (CL-ML)	
	89.5						
90.0		46A	**2.5"**			Silty clay, some fine sand - grayish brown - soft (CL)	
		47	SS				
	92.0						
		48	**2.5"**			Sandy silt, some clay - brown and gray - medium dense - moist to wet (ML)	
94.0	94.0						

End of Boring
Borehole advanced to 6.0 ft. with power auger.
Borehole advanced from 6.0 to 92 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 8 ft. of 4 in.
Safety hammer used for Standard Penetration Tests.
WOH = Weight of hammer
(FA) = Fly Ash
(BA) = Bottom Ash
2.5" = 2.5 in. Split spoon used for Penetration Tests

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)



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	**2/13/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
555335	**2/14/09**	**KKB**	**3 3**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440166.15	**D-25/BM**	**RCR**	**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: **09-301B**

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 +816.30	
5.0		PA			.	
10.0						
15.0		RB				
20.0					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.	
25.0					25.0	
	1	OST			Sample OST-1: Organic Content = 4.08% Fill: Silt-sized ash, trace fine gravel, trace fine to coarse sand, trace clay - gray - saturated (ML) (FA) Unfailed	
	1A	OST			27.5	
30.0		RB				
35.0					35.0	
	2	OST			Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Unfailed	
	2A	OST			37.5	
40.0		RB			40.0	
					. . . continued	

60.6

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: **09-301B**

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 +816.30 (Continued)	
	3	OST			Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Unfailed	
	3A	OST			42.5	
45.0						
50.0						
55.0		RB				
60.0						
65.0						
70.0					70.0	
	4	OST			Fill: Silt-sized ash, trace fine gravel, trace fine sand, trace clay - gray - saturated (ML) (FA) Unfailed	
	4A	OST			72.5	
75.0		RB				
80.0						

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)

. . . 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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-301B**

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 +816.30 (Continued)	
		RB				
85.0					85.0	
	5	OST			Fill: Silt-sized ash, trace fine gravel, trace fine sand, trace clay - gray - saturated (ML) (FA) Unfailed	
	5A	OST			87.5	
	6	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 6 description.	
90.0	6A	OST			90.0	
	7	OST			Silty clay, little fine to medium sand - grayish brown (CL)	
	7A	OST			92.5	
	8	OST			Clayey silt, some fine to medium sand - brown - moist to wet (CL-ML)	
95.0	8A	OST			95.0	
					End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 92.5 ft. with rock bit and drilling fluid. Casing used: 11 ft. of 6 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: **2.0 ft. WD**	BORING STARTED: **2/15/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555334.39**	BORING COMPLETED: **2/16/09**	ENTERED BY: **KKB**	SHEET NO.: **3** OF **3**
EASTING: **2440173.5**	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: **09-301-C1**

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 +816.31		
		PA			.		
5.0							
		RB					
10.0					**See 09-301-C1 CPT Test Results**		
15.0							
20.0							
		RB					
25.0							
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: **09-301-C1**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

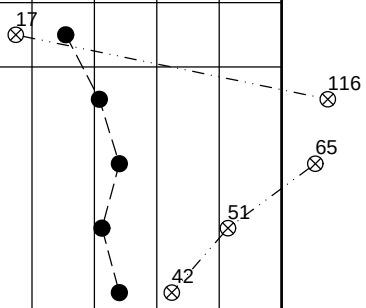
SURFACE ELEVATION +816.31 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
45.0		RB			.	
50.0					51.0	
	1	SS			Silt-sized ash, little fine sand - gray - medium dense - moist (ML) (FA) Unfailed	
					53.0	
	2	SS			Silt-sized ash, trace fine sand - gray - extremely dense to dense - saturated (ML) (FA) Unfailed	
55.0	3	SS				
	4	SS				
60.0	5	SS				
					61.0	
65.0		CPT			**See 09-301-C1 CPT Test Results**	
70.0						
75.0						
80.0					. . . continued	

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



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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-301-C1**

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 +816.31 (Continued)		
					See 09-301-C1 CPT Test Results		
85.0							
		CPT					
90.0							
95.0							
96.6					96.6		
					End of Boring Borehole advanced to 5.0 ft. with power auger. Borehole advanced from 5.0 to 59.0 ft. with rock bit and drilling fluid. Pushed CPT to 96.6 ft. Borehole backfilled upon completion. Casing used: 10 ft. of 4 in. Automatic-CME hammer used for Standard Penetration Tests. (FA) = Fly Ash		

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

WL: **Not Available**	BORING STARTED: **1/17/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555335.22**	BORING COMPLETED: **1/17/09**	ENTERED BY: **KKB**	SHEET NO.: **3** OF **3**
EASTING: **2440169.36**	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 **09-301D**

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 +816.30		
		PA					
5.0							
10.0							
15.0							
20.0							
		RB					
25.0							
30.0							
35.0							
40.0							
					. . . continued		

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

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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-301D**

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 +816.30 (Continued)		
45.0							
50.0							
55.0							
60.0		RB					
65.0							
70.0							
75.0							
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 6/11/09

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-301D**

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 +816.30 (Continued)		
85.0							
90.0							
95.0		RB					
100.0							
105.0							
110.0					110.0		
					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 110.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion and installed inclinometer to 110.0 ft. Casing used: 9 ft. of 4 in.		

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: **3/1/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555347.00**	BORING COMPLETED: **3/1/09**	ENTERED BY: **KKB**	SHEET NO.: **3** OF **3**
EASTING: **2440155.21**	RIG/FOREMAN: **D-25/BM**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-301E**

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 +816.13		
5.0		PA					
10.0							
15.0							
20.0							
25.0		RB					
30.0							
35.0							
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 **09-301E**

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 +816.13 (Continued)		
45.0							
50.0							
55.0							
60.0		RB					
65.0							
70.0							
75.0							
80.0							

. . . 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. **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: **09-301E**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

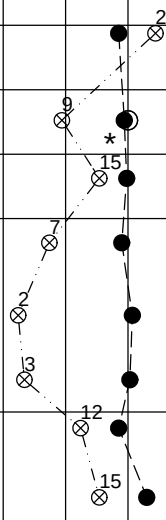
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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 +816.13 (Continued)	
85.0		RB				
90.0						
					94.0	
95.0	1	SS			Silty fine to medium sand, little clay - brown and gray - medium dense - moist to wet (SM)	
					96.0	
	2	SS			Clayey silt, some fine sand - brown and gray - loose - moist (CL-ML)	
					98.0	
	3	SS			Silty fine to medium sand, little clay - brown and gray - medium dense - moist to wet (SM)	
100.0					100.0	
	4	SS			Clayey fine to medium sand, little silt - gray - loose to very loose - wet (SC)	
	5	SS				
105.0	6	SS				
					106.0	
	7	SS			Silty fine to coarse sand, little clay - gray - medium dense - wet (SM)	
	8	SS				
110.0					110.0	
					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 110.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion and inclinometer installed to 110.0 ft. Casing used: 9.0 ft. of 4 in. Safety 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	BORING STARTED	AECOM OFFICE	
3.0 ft. WD	**3/1/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
555355.4	**3/2/09**	**KKB**	**3** **3**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440161.05	**D-25/BM**	**RCR**	**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 **09-301F**

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 +816.12		
		PA					
5.0							
10.0							
15.0							
20.0							
		RB					
25.0							
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: **09-301F**

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 +816.12 (Continued)		
45.0							
50.0							
55.0							
60.0		RB					
65.0							
70.0							
75.0							
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

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-301F**

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 +816.12 (Continued)		
85.0							
90.0							
95.0		RB					
100.0							
105.0							
110.0					110.0 End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 110.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion and installed inclinometer to 110.0 ft. Casing used: 9 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: **3/2/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555363.55**	BORING COMPLETED: **3/3/09**	ENTERED BY: **KKB**	SHEET NO.: **3** OF **3**
EASTING: **2440166.28**	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: **09-302**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +817.38

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)
	1	SS		Fill: Sandy silt-sized ash, trace clay - gray - very loose - moist (ML) (FA) Unfailed		2
		PA				
5.0				5.0		
	2	2.5"		Fill: Silt-sized ash, trace clay and fine sand - gray - medium dense to very loose - saturated (ML) (FA) Unfailed		11
		RB				
10.0						
	3	SS				11
		RB				
15.0						
	4	2.5"				2
		RB				
20.0						
	5	SS				3
		RB				
25.0						
	6	2.5"				WOH
		RB				
30.0						
	7	SS				5
		RB				
35.0						
	8	2.5"				4
		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 **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: **09-302**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +817.38 (Continued)

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)
	9	SS		Fill: Silt-sized ash, trace clay and fine sand - gray - medium dense to very loose - saturated (ML) (FA) Unfailed		4
		RB				
45.0				45.0		
	10	2.5"		Fill: Sandy silt-sized ash - gray - loose - saturated (ML) (FA) Unfailed		4
		RB				
50.0				50.0		
	11	SS		Fill: Silt-sized ash, little clay and fine sand - gray - dense to extremely dense - wet (ML) (FA) Unfailed		38
	12	2.5"		54.0		109
55.0	13	SS		Fill: Silt-sized ash, little clay - gray - dense - saturated (ML) (FA) Unfailed		32
	14	2.5"		58.0		40
	15	SS		Fill: Sandy silt-sized ash - gray - medium dense - saturated (ML) (FA) Unfailed		14
60.0	16	2.5"		62.0		10
	17	SS		Fill: Silt-sized ash, little fine sand - gray - very loose to loose - saturated (ML) (FA) Unfailed Sample 17: 1/8 in. sand-sized ash seams noted.		1
65.0	18	2.5"				WOH
	19	SS				4
	20	2.5"		Sample 20: 1/8 in. brown silty clay seam noted at 69 ft.		WOH
70.0	21	SS				3
	22	2.5"		73.0		1/6"
	22A	2.5"		74.0 Fill: Silty fine to medium sand - gray - loose - saturated (SM) (FA & BA) Unfailed		5
75.0	23	SS		Fill: Silt-sized ash, little fine sand and clay - gray - very loose to medium dense - saturated (ML) (FA) Unfailed		WOH
	24	2.5"		76.4 Sample 23: 1 in. Brown silty seam noted.		17
	25	SS		Fill: Fine to coarse sand-sized ash, little silt - gray - medium dense to loose - saturated (SP-SM) (BA) Unfailed		7
80.0				80.0		

68.8 60.8 71.9

. . . 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: **09-302**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

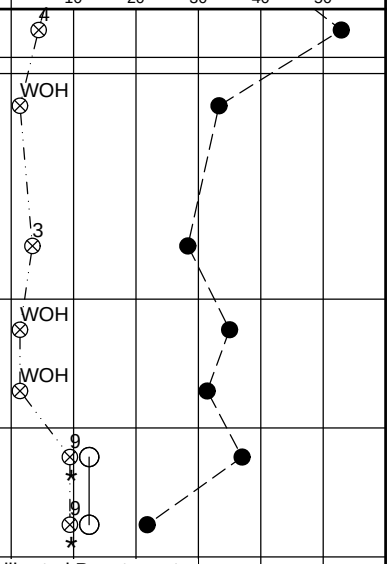
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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 +817.38 (Continued)	
	26	**2.5"**			Fill: Silt-sized ash, trace fine sand - gray - loose - saturated (ML) (FA) Unfailed	
81.5						
82.0					Fill: Fine to coarse sand-sized ash - gray - medium dense - saturated (SP-SM) (BA) Unfailed	
					Fill: Silt-sized ash - gray - very loose - saturated (ML) (FA) Unfailed	
85.0	27	SS			Sample 27: Split spoon dropped 5 ft. after 2nd hammer blow.	
	28	**2.5"**				
89.0						
90.0	29	SS			Fill: Silt-sized ash, some fine sand, little clay - gray - very loose - saturated (ML) (FA) Unfailed	
	30	**2.5"**				
93.0						
	31	SS			Silty clay, some fine to medium sand - gray to brown and gray - stiff (CL)	
95.0						
	32	**2.5"**				
97.0						
					End of Boring Borehole advanced to 5.0 ft. with power auger. Borehole advanced from 5.0 to 95.0 ft. with rock bit and drilling fluid. Casing used: 9 ft. of 4 in. Borehole grouted upon completion. Safety hammer used for Standard Penetration Tests. WOH = Weight of Hammer (FA) = Fly Ash (BA) = Bottom Ash **2.5"** = 2.5 in. Split spoon used for Penetration Tests	



*Calibrated Penetrometer

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

WL **1.0 ft. WS**	BORING STARTED **2/12/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **555664.92**	BORING COMPLETED **2/13/09**	ENTERED BY **KKB**	SHEET NO. **3** OF **3**
EASTING **2439297.28**	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: **09-302-C1**

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 +817.33		
		PA			**See 09-302-C1 Cone Penetrometer Test (CPT) results**		
5.0							
10.0							
15.0							
20.0							
		RB					
25.0							
30.0							
35.0							
40.0					. . . continued		

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

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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-302-C1**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

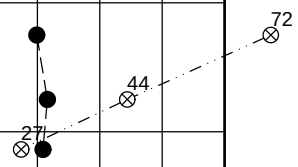
SURFACE ELEVATION +817.33 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
45.0		RB			**See 09-302-C1 Cone Penetrometer Test (CPT) results**	
50.0						
					52.0	
	1	SS			Fill: Sandy silt-sized ash - gray - very dense to dense - saturated (ML) (FA) Unfailed	
55.0	2	SS				
					56.0	
	3	SS			Fill: Silty fine sand - gray - medium dense - saturated (SM) (FA) Unfailed	
					58.0	
60.0					**See 09-302-C1 Cone Penetrometer Test (CPT) results**	
65.0						
		CPT				
70.0						
75.0						
80.0						
					. . . continued	

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



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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-302-C1**

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 +817.33 (Continued)		
					See 09-302-C1 Cone Penetrometer Test (CPT) results		
85.0							
90.0		CPT					
95.0							
100.0					100.0		
					End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 56.0 ft. with rock bit and drilling fluid. Pushed CPT to 100.0 ft. Borehole backfilled upon completion. Casing used: 8 ft. of 4 in. Automatic-CME hammer used for Standard Penetration Tests. (FA) = Fly Ash		

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

WL: **Not Available**	BORING STARTED: **1/21/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555659.04**	BORING COMPLETED: **1/21/09**	ENTERED BY: **KKB**	SHEET NO.: **3** OF **3**
EASTING: **2439296.19**	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: **09-303**

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 +817.43		
	1	SS			Fill: Sandy silt-sized ash - gray - very loose to loose - moist to wet (ML) (FA) Unfailed		2
	2	2.5"					2
5.0	3	SS					4
					6.0		
	4	2.5"			Fill: Silt-sized ash, little fine sand and clay - gray - loose to medium dense - saturated to wet (ML) (FA) Unfailed		6
	5	SS					19
10.0	6	2.5"					15
					12.0		
	7	SS			Fill: Silty fine sand-sized ash - gray - very loose to loose - saturated (SM) (FA) Unfailed		3
15.0	8	2.5"					6
					16.0		
	9	SS			Fill: Silt-sized ash, little fine sand and clay - gray - very loose to medium dense - wet to saturated (ML) (FA) Unfailed		3
	10	2.5"					15
20.0	11	SS					6
	12	2.5"					6
25.0	13	SS					1
	14	2.5"					4
	15	SS					5
30.0	16	2.5"					5
	17	SS					1
35.0	18	2.5"					6
	19	SS					4
	20	2.5"					2
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 **4**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-303**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +817.43 (Continued)

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}
	21	SS		Fill: Silt-sized ash, little fine sand and clay - gray - very loose to medium dense - wet to saturated (ML) (FA) Unfailed	
	22	2.5"			
45.0	23	SS		45.0	
	23A	SS		46.0 Fill: Fine to medium sand-sized ash, trace silt - gray- medium dense - moist to wet (SP) (BA) Unfailed	
	24	2.5"		Fill: Silty fine to medium sand-sized ash - gray - dense to extremely dense - saturated (SM) (FA) Unfailed	
	25	SS			
50.0	26	2.5"			
	27	SS		53.5	
	28	2.5"		Fill: Silty fine to medium sand-sized ash - gray - medium dense - saturated (SM) (FA) Unfailed	
55.0	28A	2.5"		55.0 55.5 Fill: Silty fine to medium sand-sized ash - gray - very dense - saturated (SM) (BA) Unfailed	
	29	SS			
	30	2.5"		57.5 Fill: Silty fine to medium sand-sized ash - gray - medium dense - saturated (SM) (FA) Unfailed	
60.0	31	SS		Fill: Silt-sized ash, trace fine sand - gray - very loose - saturated (ML) (FA) Unfailed	
	32	2.5"		62.0	
	32A	2.5"		Fill: Silty fine to medium sand-sized ash - gray - medium dense - saturated (SM) (BA) Unfailed	
65.0	33	SS			
	34	2.5"		67.5	
	35	SS		Fill: Silt-sized ash, little fine sand and clay - gray - very loose - saturated (ML) (FA) Unfailed	
70.0		RB			
	36	2.5"			
75.0	37	SS			
	38	2.5"		75.5 76.5 Fill: Silty fine to medium sand-sized ash - gray - medium dense - wet (SM) (FA & BA) Unfailed	
	38A	2.5"		77.5 Fill: Silty medium to coarse sand-sized ash - gray - medium dense - saturated (SM) (BA) Unfailed	
	39	SS			
80.0				Fill: Silt-sized ash, some clay, trace fine sand - gray - very loose - saturated (ML) (FA) Unfailed	

. . . 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 **4**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-303**

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) (1 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 +817.43 (Continued)	
	40	2.5"			Fill: Silt-sized ash, some clay, trace fine sand - gray - very loose - saturated (ML) (FA) Unfailed	WOH
	41	SS				WOH
85.0	42	2.5"				WOH
	43	SS				1/6"
	44	2.5"			88.5	7
	44A	SS			Silty clay, some fine sand - brown and gray - medium to very stiff (CL)	* 5/6"
90.0	45	SS				13
	45A	SS				18
	46	2.5"			93.5	13
	47	SS			Silt, little to some fine to medium sand, little clay - brown and gray - medium dense to dense (ML)	31
95.0	48	2.5"				12
	49	SS			98.5	8/6"
	49A	SS			Sandy silt, little clay - brown and gray - medium dense - moist to wet (ML)	14
100.0	50	2.5"			100.7	11
	50A	2.5"			101.5 Sandy silt, little clay - gray - medium dense - wet (ML)	
	51	SS			Sandy silt, little clay - gray- very loose to medium dense - saturated (ML)	1
105.0	52	2.5"				13
	53	SS			107.5	8
	54	2.5"			Silty fine to medium sand - gray - dense to extremely dense - wet (SM)	71
		RB				
110.0	55	SS				83
		RB			111.5	
	56	SS			112.2 Silt and weathered shale, little fine sand, trace clay - gray - extremely dense - moist to wet (ML)	50/2"
					Drilled without sampling	
115.0					Driller's Note: Apparent shale bedrock	
		RB				
120.0						

. . . 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. **3** OF **4**

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

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-303**

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 +817.43 (Continued)	
121.5					121.5	
					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 121.5 ft. with rock bit and drilling fluid. Borehole grouted and inclinometer casing installed to 121.5 ft. Casing used: 8 ft. of 4 in. Safety hammer used for Standard Penetration Tests. WOH = Weight of Hammer (FA) = Fly Ash (BA) = Bottom Ash **2.5"** = 2.5 inch split spoon used for Penetration Tests	* Calibrated Penetrometer

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

WL **6.0 ft. WS**	BORING STARTED **1/30/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **555755.8**	BORING COMPLETED **2/4/09**	ENTERED BY **KKB**	SHEET NO. **4** OF **4**
EASTING **2439974.35**	RIG/FOREMAN **D-25/(BM/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 **09-303A**

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 +817.49		
		PA			.		
5.0							
10.0							
15.0							
20.0							
		RB					
25.0							
30.0							
35.0							
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: **09-303A**

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 +817.49 (Continued)		
45.0					.		
50.0							
55.0							
60.0		RB			Following completion of vane shear test #5, the borehole squeezed at 60 ft. and was re-drilled.		
65.0							
70.0							
75.0							
80.0					. . . 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. **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: **09-303A**
	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 +817.49 (Continued)	
					. Disturbed samples retrieved following completion of vane shear testing.	
		RB			Water content testing not performed on disturbed samples obtained by pushing split spoon.	
85.0					Sample 1: No recovery with Shelby tube. Recovered sample by pushing split-spoon.	
87.0	1	SS			Fill: Silt-sized ash, trace fine sand, little clay - gray - saturated (ML) (FA) Unfailed	
	1A	SS				
	1B	SS				
89.0					Vane Shear Test #1 at 89.0 ft. Peak Su = 2325 psf, Remolded Su = 700 psf	
90.0	2	ST			Silty clay, little to some fine to medium sand - brown and gray - very stiff (CL)	
	3	ST				
92.0					Vane Shear Test #2 at 90.5 ft. Peak Su = 2175 psf, Remolded Su = 1475 psf	
93.5	4	ST			Silty clay and fine to medium sand - brown - very stiff (CL)	
95.0	5	SS			Vane Shear Test #3 at 92.0 ft. Peak Su = 2525 psf, Remolded Su = 1800 psf	
		RB			Silty clay, little fine sand - brown - very stiff to hard (CL)	
					Vane Shear Test #4 at 93.5 ft. Peak Su >3950 psf	
					Vane Shear Test #5 at 95.0 ft. Peak Su >4200 psf	
100.0					Samples 5, 6, and 7: No recovery with Shelby tube.	
100.0	6	SS			Recovered samples by pushing split-spoon.	
100.5	6A	SS			Clayey silt and fine to medium sand - brown - wet (CL-ML)	
102.0	7	SS			Sandy silt, little clay - gray - wet (ML)	
104.0	8	SS			Silty fine sand, little clay - gray - wet (SM)	
105.0					Vane Shear Test #6 at 102.0 ft. Peak Su = 1900 psf, Remolded Su = 325 psf	
106.0					Clayey silt and fine sand - gray - wet (CL-ML)	
					Vane Shear Test #7 at 104.0 ft. Peak Su = 2525 psf, Remolded Su = 675 psf	
					Vane Shear Test #8 at 106.0 ft. Peak Su = 2250 psf, Remolded Su = 525 psf	
					End of Boring	
					Borehole advanced to 6.0 ft. with power auger.	
					Borehole advanced from 6.0 to 104.0 ft. with rock bit and drilling fluid.	
					Borehole grouted upon completion.	
					Casing used: 10 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	
3.0 ft. WD	**2/4/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
555760.09	**2/6/09**	**KKB**	**3 3**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2439973.37	**D-25/BM**	**RCR**	**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: **09-303B**

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 +817.42	
					.	
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					20.0	
	1	OST			Fill: Silt-sized ash, trace clay - gray - saturated (ML) (FA) Unfailed	
					22.5	
25.0		RB*				
30.0					30.0	
	2	OST			Sample OST-2: Organic Content = 0.57% Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Unfailed	
					32.5	
35.0		RB*			Driller's Note: Used 30 ft. of 4 in. casing. Could not extend Osterberg sampler to depths. Re-drilled hole and installed 10 ft. of 6 in. casing and utilized 4 7/8 in. RB to completion of boring.	
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: **09-303B**

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 +817.42 (Continued)	
	.	OST			No sample recovery from 40 to 42.5 ft.	
					42.5	
45.0	3	OST			Fill: Silt-sized ash, trace fine sand, little clay - gray - saturated (ML) (FA) Unfailed	
					45.0	
50.0						
55.0		RB*				
60.0						
65.0						
70.0					70.0	
	4	OST			Fill: Silt-sized ash, trace fine sand, trace clay, trace organics - gray - saturated (ML) (FA) Unfailed	
					72.5	
		RB*			**Pneumatic Piezometer installed at 71.0 ft**	
75.0					75.0	
	5	OST			Fill: Silt-sized ash, trace fine sand, little clay - gray - saturated (ML) (FA) Unfailed	
					77.5	
	.	RB*				
80.0					80.0	
					. . . continued	

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

61.9

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: **09-303B**

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 +817.42 (Continued)	
	6	OST			Fill: Silt-sized ash, trace fine sand, some clay - gray - saturated (ML) (FA) Unfailed Sample OST-6: Organic Content = 0.45%	
	7	OST				
85.0					**Pneumatic Piezometer installed at 85.0 ft.**	
	8	OST			Sample OST-8: Organic Content = 0.89%	
					87.5	
	9	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 9 description.	
90.0	9A	OST			90.0	
	10	OST			Silty clay, some fine sand - brown (CL)	
					Pneumatic Piezometer installed at 91.5 ft.	
					92.5	
	11	OST			Silty clay, little fine to medium sand - brown and gray (CL)	
95.0					95.0	
	12	OST			Sandy silt, little clay - gray - wet (ML)	
					Pneumatic Piezometer installed at 96.0 ft.	
					97.5	
	13	OST			Silty fine sand, little clay - brown and gray - wet (SM)	
100.0					100.0	
		RB*				
105.0					**Pneumatic Piezometer installed at 105.0 ft.**	
106.0					106.0	
					End of Boring Borehole advanced to 10.0 ft. with power auger. Borehole advanced from 10.0 to 106.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion with Pneumatic Piezometer. Grouted from 65 ft. to surface. Casing used: 10 ft. of of 6 in. OST = Osterberg sampler Installed Pneumatic Piezometers at 71.0, 85.0, 91.5, 96.0 and 105.0 ft. *RB = 4 7/8 in. rock bit	

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

WL: **Not Observed**	BORING STARTED: **2/6/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555756.05**	BORING COMPLETED: **2/9/09**	ENTERED BY: **KKB**	SHEET NO.: **3** OF **3**
EASTING: **2439974.63**	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 **09-303-C1**

PROJECT NAME
Kingston Dredge Cell Failure RCA

ARCHITECT-ENGINEER
OGC

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +817.05

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)
		PA			**See 09-303-C1 Cone Penetrometer Test (CPT) results**		
5.0							
10.0		RB					
15.0							
20.0							
25.0							
30.0		RB					
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: **09-303-C1**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

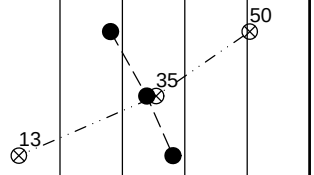
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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 +817.05 (Continued)	
					See 09-303-C1 Cone Penetrometer Test (CPT) results	
45.0		RB				
50.0					50.0	
	1	SS			Silt-sized ash, little sand - gray - very dense to medium dense - saturated (ML) (FA) Unfailed	
	2	SS				
55.0	3	SS			56.0	
					See 09-303-C1 Cone Penetrometer Test (CPT) results	
60.0		CPT				
65.0		CPT				
70.0		CPT				
75.0		CPT				
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

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-303-C1**

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 +817.05 (Continued)		
		CPT			**See 09-303-C1 Cone Penetrometer Test (CPT) results**		
85.0		CPT					
90.0		CPT					
95.0							
96.0					96.0		
					End of Boring Boring advanced to 5.0 ft. with power auger. Boring advanced from 5.0 to 54.0 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Casing used: 18 ft. of 4 in. Automatic-CME hammer used for Standard Penetration Tests. (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: **1/22/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555759.43**	BORING COMPLETED: **1/22/09**	ENTERED BY: **KKB**	SHEET NO.: **3** OF **3**
EASTING: **2439967.74**	RIG/FOREMAN: **CME-850/JD**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-304**

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 +819.50	
	1	SS			Fill: Silt-sized ash, little to trace fine sand, little to trace clay - gray - medium dense to very dense - moist (ML) (FA) Unfailed	
	2	2.5"				
5.0	3	SS			Sample 3: 1 in. Bottom ash seam at 4.3 ft.	
	4	2.5"			Sample 4: 1 in. Bottom ash seams at 6.5 and 7.5 ft.	
	5	SS				
10.0					10.0	
	6	2.5"			10.5 Fill: Sandy silt-sized ash - gray - medium dense - wet (ML) (FA) Unfailed	
	6A	2.5"				
	7	SS*			12.5 Fill: Silty fine to medium sand-sized ash - gray - dense to medium dense - saturated (SM) (FA & BA) Unfailed	
	7A	SS			Fill: Sandy silt-sized ash - gray - dense to loose - saturated (ML) (FA) Unfailed	
15.0	8	2.5"				
	9	SS			16.9	
	9A	SS			18.0 Fill: Silty fine to medium sand-sized ash - gray - medium dense - moist to wet (SM) (FA & BA) Unfailed	
	10	2.5"			Fill: Silt-sized ash, little fine sand - gray - medium dense to loose - saturated (ML) (FA) Unfailed	
20.0	11	SS			Sample 11: 1 in. Seam of bottom ash at 20 ft.	
	12	2.5"			22.0	
	12A	2.5"			22.3 Fill: Silty fine to medium sand-sized ash, trace clay - gray - loose - saturated (SM) (FA & BA) Unfailed	
25.0	13	SS			Fill: Silt-sized ash, little fine sand - gray - loose to very loose - saturated (ML) (FA) Unfailed	
	14	2.5"				
	15	SS				
30.0					30.0	
	16	2.5"			Fill: Silt-sized ash, little to trace fine sand - gray - dense to medium dense - saturated (ML) (FA) Unfailed	
	17	SS			1/2 to 1 in. seams of bottom ash noted between 32 and 33.5 ft.	
35.0	18	2.5"				
					36.0	
	19	SS			Fill: Silty fine to medium sand-sized ash - gray - medium dense to loose - moist to wet (SM) (FA) Unfailed	
	20	2.5"			Sample 20: 1/8 in. Seams of bottom ash noted	
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**

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

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-304**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

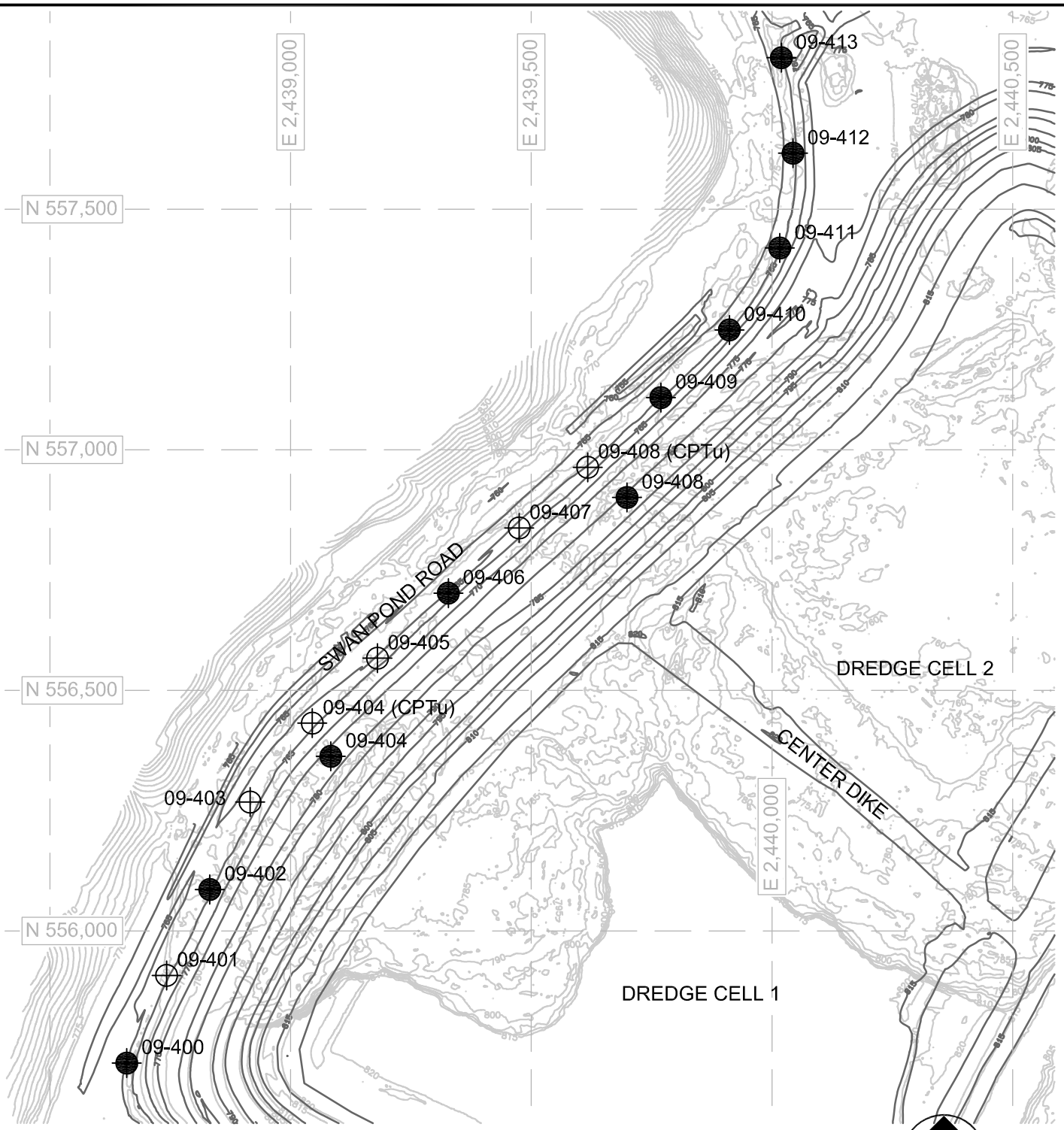
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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 +819.50 (Continued)		
	21	SS			Fill: Silt-sized ash, trace fine sand - gray - very loose - saturated to moist (ML) (FA) Unfailed		WOH
	22	**2.5"**			Sample 22: 1/8 in. Seams of bottom ash noted		1
					44.0		
45.0	23	SS			Fill: Silty fine to medium sand-sized ash - gray - very loose - saturated (SM) (FA) Unfailed		1
					46.0 Sample 23: 1/8" Seam of bottom ash noted.		
	24	**2.5"**			Fill: Sandy silt-sized ash, trace clay - gray - medium dense - moist to wet (ML) (FA & BA) Unfailed		17
					48.0		
	25	SS			Fill: Silt-sized ash, trace fine sand - gray - very loose - saturated (ML) (FA) Unfailed		WOH
50.0					50.0		

End of Boring
Borehole advanced to 6.0 ft. with power auger.
Borehole advanced from 6.0 to 48.0 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 8 ft. of 4 in.
Safety hammer used for Standard Penetration Tests.
WOH = Weight of Hammer
SS* = SPT value based on first 6 in.
(FA) = Fly Ash
(BA) = Bottom Ash
2.5" = 2.5 in. Split spoon used for Penetration Tests

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	**2/11/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
555555.2	**2/11/09**	**KKB**	**2** **2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2439240.1	**D-25/BM**	**RCR**	**60095742**



LEGEND

09-400 400 SERIES SOIL BORINGS (AECOM 2009)

09-400 CPTu SOUNDINGS LOCATIONS (AECOM 2009)

PRE-FAILURE CONTOURS

POST FAILURE CONTOURS

NOTES:
1. BASE MAP BASED ON LIDAR DATA COLLECTED ON DECEMBER 24, 2008
2. HORIZONTAL DATUM: NAD 27 (TENNESSEE LAMBERT)
3. VERTICAL DATUM: NGVD 29

400 SERIES EXPLORATION LOCATION

ROOT CAUSE ANALYSIS
TVA KINGSTON DREDGE CELL FAILURE
ON DECEMBER 22, 2008
KINGSTON FOSSIL PLANT
HARRIMAN, TENNESSEE

AECOM
847.279.2500
www.aecom.com

Drawn :	CJH	1/27/2009
Checked:	LWB	6/12/2009
Approved:	WHW	6/12/2009
PROJECT NUMBER	60095742	
FIGURE NUMBER	2E-4	

09-400 Series

AECOM

Boring/Sounding ID	Ground Surface Elevation (GSE)	Easting	Northing
09-400	766.75	2,438,673.31	555,671.52
09-402	764.93	2,438,838.54	556,092.73
09-402A	765.03	2,438,838.27	556,087.92
09-402B	764.91	2,438,839.30	556,095.94
09-404	763.41	2,439,083.64	556,363.00
09-404A	763.62	2,439,086.98	556,359.69
09-404B	763.56	2,439,089.60	556,357.90
09-406	764.33	2,439,331.95	556,709.89
09-406A	764.42	2,439,334.28	556,712.49
09-408	764.76	2,439,698.90	556,900.86
09-408A	764.35	2,439,701.33	556,898.39
09-408B	764.15	2,439,704.82	556,896.51
09-409	762.61	2,439,769.63	557,107.02
09-410	762.50	2,439,904.44	557,238.48
09-410A	762.08	2,439,913.94	557,248.67
09-412	764.83	2,440,043.37	557,613.53
09-413	764.42	2,440,033.31	557,798.09
09-413A	764.49	2,440,036.30	557,801.37

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-400**

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 +766.75

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, little to some clay, trace to little fine gravel - gray - medium dense to dense - moist to wet (ML)	14
	2	SS				14
5.0	3	SS			Following completion of sampling to 8 ft., soil boring was offset 20 ft. southwest to avoid interference with truck traffic.	24
	4	SS			Moisture content tests not available from 0 to 8 ft.	44
					8.0	
	5	SS			Fill: Sand and silt-sized ash - gray - loose - moist to wet (SM) (FA) & (BA) Unfailed	4
10.0					10.0	
	6	SS*			10.5 Fill: Silty sand-sized ash - gray - very loose - saturated (SM) (FA) Unfailed	1/6"
	6A	SS			11.0	WOH
	6B	SS			12.0 Fill: Clayey silt, little fine to coarse sand - brown and gray - very loose - saturated (CL-ML) Unfailed	6
	7	SS			14.0 Fill: Silty sand-sized ash, trace clay - gray - loose - saturated (SM) (FA) Unfailed	1
15.0	8	SS			Fill: Silt-sized ash, trace fine sand - gray - very loose - saturated (ML) (FA) Unfailed	62
	9	SS			Fill: Silty clay, little fine to medium gravel and fine to coarse sand - reddish brown and gray - soft (CL) Unfailed	6
	9A	SS			18.0	* 7/6"
20.0	10	SS			Fill: Silty fine to coarse sand-sized ash, little fine to coarse gravel - gray - medium dense to very loose - saturated (SM) (BA) Unfailed	7
	11	SS				4
	12	SS			Sample 11: Coarse gravel noted Sample 12: Black cinders - coarse gravel noted	2
25.0	13	SS			Samples 11, 12 and 13: Sufficient sample not available for moisture content tests.	2
	14	SS				3
					28.5	
30.0	15	SS			Fill: Sandy silt-sized ash - gray - very loose - saturated (ML) (FA) Unfailed	1
					31.0	
	16	SS			Fill: Silty fine to medium sand-sized ash - gray - very loose - saturated (SM) (FA) Unfailed	1
					33.0	
35.0	17	SS			Fill: Silt-sized ash, little clay and fine sand - gray - very loose - saturated (ML) (FA) Unfailed	1
	18	SS				WOH
					37.0	1
	18A	SS			Silty clay, little fine sand - brown - stiff (CL)	1
	19	SS			Sample 19: Poor recovery	
					39.5	

92.2

. . . 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: **09-400**

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 +766.75 (Continued)	
	20	SS			Silty clay, little fine to medium sand - brown and gray - soft (CL)	
	21	SS				
					43.5	
45.0	22	SS			Sandy silt, some clay - brown and gray - medium dense - moist (ML)	
					45.5	
	23	SS			Clayey silt and fine to medium sand - brown and gray - loose (CL-ML)	
					47.5	
	24	SS			Clayey silt and fine to medium sand - gray - very loose - saturated (CL-ML)	
50.0	25	SS				
	26	SS				
					54.0	
55.0	27	SS			Silty fine to coarse sand, little clay, trace fine gravel - dark brown to brown - loose to medium dense - wet (SM)	
	28	SS				
					58.0	
	29	SS			Sample 29: No sample recovery	
60.0					60.0	
		RB			61.0 Driller's note: Possible weathered bedrock or boulder	
65.0		DB			Conasauga Shale. Greenish gray to brown shale. Moderately weathered, soft to very soft, fissile, finely laminated to laminated. Bedding inclined approximately 15º from horizontal. Core shattered upon removal from core barrel.	

Run #	Depth (ft.)	Recovery (%)	RQD (%)	Fracture Frequ.
1	61.0 - 68.5	59.0	0	0.13* / ft.

*Difficult to identify due to shattering.

Pneumatic Piezometer installed at 65.5 ft.

30% drilling fluid lost while coring 66 to 74 ft.

68.5

70.0		DB			Conasauga Shale. Greenish-gray to brown shale. Less weathered than Run 1. Soft to moderately hard, fissile, finely laminated to laminated. Calcite veining in stress fractures (folded rock). Fractures noted approximately 80º to bedding at 68.1, 69.0, 69.5, and 69.9 ft.	

Run #	Depth (ft.)	Recovery (%)	RQD (%)	Fracture Frequ.
2	68.5 - 74.5	76.7	5.5	0.67 / ft.

74.0					74.0 End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 61.0 ft. with rock bit and drilling fluid.	

. . . continued

*Calibrated Penetrometer

*Calibrated Penetrometer

WOH WOH WOH 1 8 11 9 20 57

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: **09-400**

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 +766.75 (Continued)		
						Borehole advanced from 61.0 to 74.0 ft. with diamond coring bit and drilling fluid. Pneumatic Piezometer installed at 65.5 ft. Casing used: 20 ft. of 4 in. Automatic-Mobile Hammer used for Standard Penetration Tests. WOH = Weight of Hammer (FA) = Fly Ash (BA) = Bottom Ash **Coordinates reflect offset boring location**		

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

WL: **4.0 ft. WS**	BORING STARTED: **2/14/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555671.52**	BORING COMPLETED: **2/15/09**	ENTERED BY: **KKB**	SHEET NO.: **3** OF **3**
EASTING: **2438673.31**	RIG/FOREMAN: **Mobile B-57 (V.H.)/MB**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

ROCK CORE PHOTOGRAPHIC LOG

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

Photo No.	Date:
09-400	3-22-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-400 Run 1 (61.0 – 68.5')

Conasauga Shale

Note: Boring 09-400 was labeled as 09-400I 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:
09-400	3-22-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-400 Run 2 (68.5 – 74.5')

Conasauga Shale

Note: Boring 09-400 was labeled as 09-400I at the time of drilling.

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-402**

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 +764.93	
		1	SS			Fill: Silty fine to coarse sand-sized ash, little fine to medium gravel - gray - very loose to loose - moist (SM) (FA & BA) Failed Note: Area potholed and backfilled to approximately 6 ft. prior to drilling.	
		2	SS				
	4.0						
5.0		3	SS			Fill: Fine to coarse sand-sized ash, little silt, trace fine to medium gravel - gray - very loose - moist (SP-SM) (FA & BA) Failed	
	6.0						
		4	SS			Fill: Silty fine to medium sand-sized ash, trace to little clay - gray - loose to medium dense - moist to wet (SM) (FA & BA) Unfailed	
		5	SS				
10.0	10.0						
		6	SS			Fill: Silty clay, little fine to medium gravel and fine to coarse sand - reddish brown - very stiff (CL) Unfailed	
		7	SS				
		8	SS*				
15.0	14.5						
		8A	SS			Fill: Medium to coarse sand-sized ash, little fine to medium gravel, trace silt - gray - very dense - saturated (SP) (BA) Unfailed	
	16.0						
		9	SS			Fill: Silty fine to medium sand-sized ash - gray - medium dense - saturated (SM) (FA) Unfailed	
	18.0						
20.0		10	SS			Fill: Silty fine to medium sand-sized ash intermixed with dark gray silt - gray - very loose - saturated (SM) (FA) Unfailed	
	20.0						
		11	SS			Clayey fine to coarse sand, some fine to coarse gravel - brown - very loose to loose - wet (SC)	
		12	SS			Sample 12: No sample recovery	
25.0		13	SS			Sample 14: No sample recovery. Coarse gravel in lower tip of sampler.	
		14	SS				
		15	SS				
30.0		16	SS				
	32.0						
		17	SS			Silty clay, little fine to medium gravel (weathered shale) and fine to medium sand - brown - very stiff (CL)	
35.0		18	SS			Sample 15: Weathered shale noted.	
	36.0						
		19	SS			Silty clay, little to some fine to medium sand - gray - medium to stiff (CL)	
		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: **09-402**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

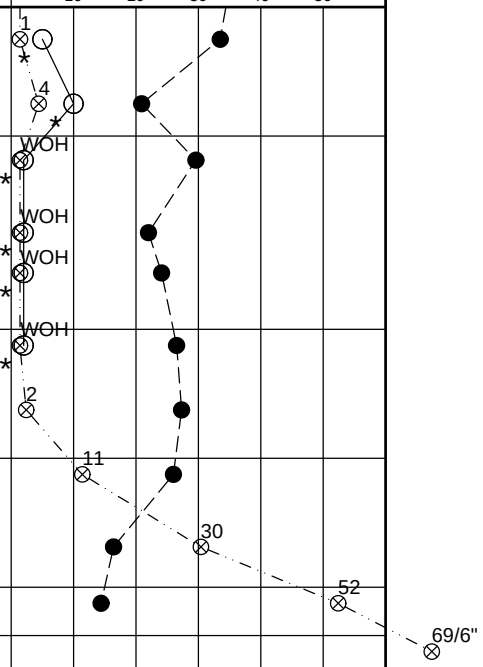
ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +764.93 (Continued)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		21	SS			Silty clay, little to some fine to medium sand - gray - medium to stiff (CL)	
		22	SS				
	44.0						
45.0		23	SS			Clayey silt, little fine sand - gray - very loose - moist (CL-ML)	
		24	SS				
		25	SS				
50.0	50.0						
		26	SS			Silt and fine sand, little clay - gray - very loose - saturated (ML)	
		27	SS				
	54.0						
55.0		28	SS			Silty fine to coarse sand, little clay - gray - medium dense to dense - saturated (SM)	
		29	SS				
	58.0						
		30	SS			Silty fine to medium sand and weathered shale - gray - very dense - moist (SM)	
60.0	59.5	31	SS			Weathered shale - gray	
60.5	60.5					End of Boring	

Borehole advanced to 10.0 ft. with power auger.
Borehole advanced from 10.0 to 59.5 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 15 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 **14.5 ft. WS**	BORING STARTED **2/13/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **556092.73**	BORING COMPLETED **2/13/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2438838.54**	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: **09-402A**
	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 +765.03		
5.0		PA					
10.0							
15.0		RB					
20.0							
25.0							
30.0					Disturbed samples retrieved following completion of vane shear testing.		
35.0					Refusal of vane shear at 35.0 ft. Drilled to 36.5 ft.		
36.5							
	1	ST			Silty clay, trace to some fine to medium sand - brown and gray - medium (CL) Vane Shear Test #1 at 38.5 ft. Peak Su = 500 psf, Remolded Su = 325 psf		* *
40.0	2	ST					
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**

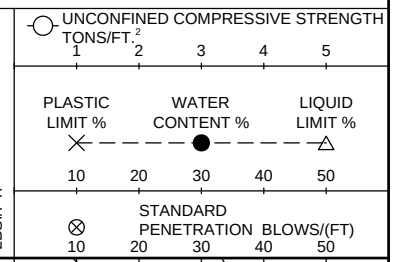
WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/9/09

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-402A**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +765.03 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE / RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
	3	ST		Silty clay, trace fine sand and organics - brown and black - medium to stiff (CL) Vane Shear Test #2 at 40.5 ft. Peak Su = 675 psf, Remolded Su = 175 psf Vane Shear Test #3 at 42.5 ft. Peak Su = 1825 psf, Remolded Su = 500 psf	
	4	ST			
44.5 / **45.0**	5	ST		Sandy silt, little to some clay - gray - saturated (ML) Vane Shear Test #4 at 44.5 ft. Peak Su = 925 psf, Remolded Su = 275 psf Vane Shear Test #5 at 46.5 ft. Peak Su = 625 psf, Remolded Su = 250 psf	
	6	ST		Vane Shear Test #6 at 48.5 ft. Peak Su = 950 psf, Remolded Su = 175 psf	
		VST			
50.5 / **50.0**				Vane Shear Test #7 at 50.5 ft. Peak Su = 1550 psf, Remolded Su = 175 psf End of Boring Borehole advanced to 13.0 ft. with power auger. Borehole advanced from 13.0 to 46.5 ft. with rock bit and drilling fluid. Casing used: 15 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	BORING STARTED	AECOM OFFICE	
Not Observed	**2/13/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
556087.92	**2/14/09**	**KKB**	**2** **2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2438838.27	**Mobile B-57 (V.H.)/MB**	**RCR**	**60095742**

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-402B**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

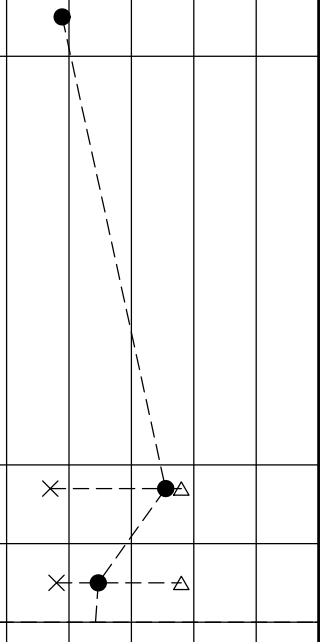
SURFACE ELEVATION +764.91

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
					.	
5.0						
10.0		RB				
15.0						
20.0	1	OST			Sample 1: Attempted sample. Little tube penetration. Possible sand and gravel. No recovery.	
		RB			21.0	
	3	SS			Sample 2: Attempted sample with Osterberg sampler from 21 to 23.5 ft. Little penetration with sampler. Possible sand and gravel. Pushed split spoon. 23.0 Clayey fine to coarse sand, some fine to coarse gravel, trace silt - brown - wet (SC)	
25.0						
30.0		RB				
35.0					36.0	
	4	OST			Silty clay, little fine to medium sand - gray (CL)	
					38.5	
40.0	5	OST			Silty clay, some fine to medium sand - gray (CL)	
					41.0	
					. . . continued	

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



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: **09-402B**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +764.91 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
	6	OST			Clayey silt, some fine sand - gray - saturated (CL-ML)	
					43.5	
45.0	7	OST			Silty fine to medium sand, trace clay - gray - saturated (SM)	
	8	OST				
50.0	9	OST				
51.0					51.0	
					End of Boring Borehole advanced to 18.0 ft. with power auger. Borehole advanced from 18.0 to 48.5 ft. with rock bit and drilling fluid. Casing used: 35 ft. of 4 in. Borehole grouted upon completion. OST = Osterberg Sampler	

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)

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

WL: **Not Observed**	BORING STARTED: **2/15/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556095.94**	BORING COMPLETED: **2/15/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2438839.3**	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: **09-404**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

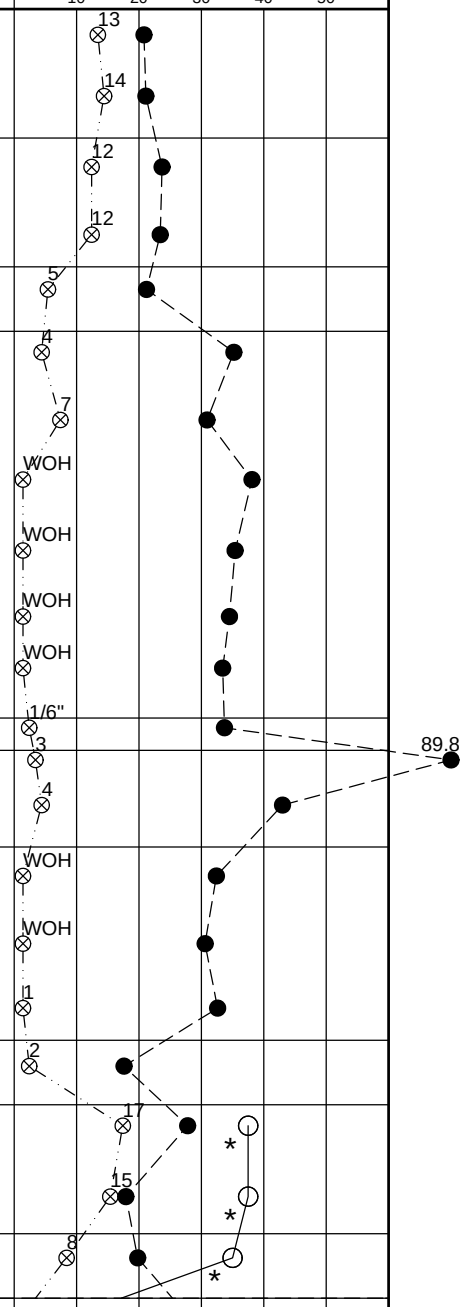
UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1 2 3 4 5)

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	
	1	SS			Fill: Sandy silt-sized ash - gray - medium dense - moist (ML) (FA) Failed	
	2	SS				
4.0						
5.0	3	SS			Fill: Silt and sand-sized ash, little clay - gray - medium dense - saturated (ML) (FA & BA) Failed	
	4	SS				
8.0						
	5	SS			Fill: Silty sand-sized ash - gray - loose - saturated (SM) (FA & BA) Failed	
10.0						
	6	SS			Fill: Silt-sized ash, little clay, trace to little fine sand - gray - loose to very loose - saturated (ML) (FA) Failed	
	7	SS				
15.0	8	SS				
	9	SS				
	10	SS				
20.0	11	SS				
22.0						
	12	SS			Fill: Silt, little clay - brown and black - very loose - moist to wet (ML)	
23.0	12A	SS			Sample 12: Fly ash intermixed with sample	
25.0	13	SS			Fill: Silty fine to medium sand-sized ash, little clay - gray - very loose to loose - saturated (SM) (FA & BA) Failed	
26.0						
	14	SS			Fill: Silt-sized ash, trace clay and fine sand - gray - very loose - saturated (ML) (FA) Failed	
	15	SS				
30.0						
	16	SS				
32.0						
	17	SS			Fill: Silty fine to medium sand-sized ash, little clay, trace fine gravel - gray - very loose - saturated (SM) (FA & BA) Failed	
34.0						
35.0	18	SS			Silty clay, little fine to medium gravel and fine to coarse sand - brown and gray - very stiff (CL)	
	19	SS				
38.0						
	20	SS			Silty clay, trace fine to medium gravel and fine to medium sand - brown and gray - very 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: **09-404**
	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)	
		21	SS			Clayey silt, trace fine sand - brown and gray - stiff (CL-ML)	
		22	SS				
						44.0	
45.0		23	SS			Clayey silt, little fine sand - gray - very loose (CL-ML)	
						46.0	
		24	SS			Silty fine sand, little clay and coarse gravel - gray - very loose - saturated (SM)	
		25	SS				
50.0						50.0	
		26	SS			Sand and silt, little clay - gray - very loose to loose - saturated (ML)	
		27	SS				
						54.0	
55.0		28	SS			Silt and fine sand, little clay - gray - medium dense - moist to wet (ML)	
		29	SS				
						58.0	
		30	SS			Sandy silt - gray - very dense - moist (ML)	
59.3		30A	SS			59.0	
						59.3 Weathered shale - gray	
						End of Boring	

Boring advanced to 6.0 ft. with power auger.
Boring advanced from 6.0 to 58.0 with rock bit and drilling fluid.
Borehole grouted upon completion.
Automatic-CME hammer used for Standard Penetration Tests.
Casing used: 8 ft. of 4 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	
1.9 ft. WS	**2/16/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
556363	**2/17/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2439083.64	**CME-850/JD**	**RCR**	**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 **09-404A**

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 +763.62		
5.0		PA			.		
10.0							
15.0							
20.0							
25.0		RB					
30.0							
35.0							
					39.0		

Pneumatic piezometer installed at 31.0 feet

Disturbed samples retrieved following completion of vane shear testing.

Moisture contents not available for samples obtained by pushing split spoon.

Vane Shear Test #1 at 40.5 ft.
Peak Su = 2050 psf, Remolded Su = 475 psf

. . . 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: **09-404A**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +763.62 (Continued)

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}
40.0	1	ST			Silty clay, little fine sand - brown and gray - very stiff (CL)	
					41.0 **Pneumatic piezometer installed at 41.0 feet**	
	2	ST			42.0 Sandy silt, trace clay - gray - saturated (ML)	
	2A	ST			43.0 Silty clay, little fine sand - gray - stiff (CL)	
	3	ST			44.2 Silt, trace fine to coarse sand, little clay - gray - saturated (ML)	
45.0	3A	ST			45.0 Clayey silt, little fine to medium sand - gray - saturated - stiff (CL-ML)	
	4	SS			Vane Shear Test #2 at 42.5 ft. Peak Su = 1750 psf, Remolded Su = 400 psf	
	5	SS			Vane Shear Test #3 at 44.5 ft. Peak Su = 1125 psf, Remolded Su = 75 psf	
					49.0 Silty fine sand, trace fine gravel, little clay - gray - saturated - very loose (SM)	
50.0					**Pneumatic piezometer installed at 47.0 feet**	
					Vane Shear Test #4 at 46.5 ft. Peak Su = 1500 psf, Remolded Su = 275 psf	
					Vane Shear Test #5 at 48.5 ft. Peak Su = 1375 psf, Remolded Su = 175 psf	
55.0		RB				
60.0					60.0 **Pneumatic piezometer installed at 59.0 feet**	
					End of Boring Boring advanced to 8.0 ft. with power auger. Boring advanced from 8.0 to 60.0 ft. with rock bit and drilling fluid. Pneumatic Piezometers installed at 31.0, 41.0, 47.0 and 59.0 ft. Borehole backfilled upon completion.	

* 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	
Not Observed	**2/20/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
556359.69	**2/21/09**	**KKB**	**2** **2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2439086.98	**CME-850/BZ**	**RCR**	**60095742**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-404B**

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 +763.56	
5.0		PA			.	
10.0						
15.0						
20.0		RB				
25.0					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.	
30.0						
35.0	1	OST			Sample 1 and Sample 2: Due to coarse/hard material, piston did not push tube - little to no recovery.	
	2	OST				
					38.0	
40.0	3	ST3			Clayey silt, little fine sand - gray - moist (CL-ML)	
					40.5	
					. . . continued	

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

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**

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-404B**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +763.56 (Continued)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		4	OST			Silty clay, some fine to coarse sand - brown and gray (CL)	
	43.0						
		5	OST			Clayey silt, some fine to coarse sand - gray - moist to wet (CL-ML)	
45.0		5A	OST				
	45.5						
		6	OST			Sample 6 was not opened.	
	48.0						
		7	OST			Sample 7 was not opened.	
50.0		7A	OST				
	50.5						
50.5						End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 48.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in. ST3 = 3 in. Shelby tube OST = Osterberg Sampler	

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)

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	**2/17/09**	**Chicago Area - 01**	
NORTHING **556357.9**	BORING COMPLETED **2/20/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2439089.6**	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: **09-406**

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 +764.33	
		1	SS			Fill: Sandy fine to coarse gravel, trace silt - gray - medium dense to dense - moist to wet (GW)	
		2	SS				
5.0		3	SS			Sample 3: Equipment breakdown prevented recording blow counts from 5 to 5.5 ft. (SPT based on first 12 in.)	
						6.0	
		4	SS			Fill: Silt-sized ash, trace fine sand, trace clay - gray - loose - moist (ML) (FA) Failed	
		5	SS			Refusal of auger on rip-rap at 6 ft.; offset 5 ft. north and redrilled to 6 ft.	
10.0						10.0	
		6	SS			Fill: Silt-sized ash, trace fine sand - gray - very loose to loose - saturated (ML) (FA) Unfailed	
		7	SS			13.5	
		7A	SS			Fill: Silty clay, little fine to medium sand, trace fine gravel - reddish brown and dark gray - hard to stiff (CL)	
15.0		8	SS			15.0	
		8A	SS			Fill: Silty fine to coarse sand-sized ash, little clay - gray - medium dense to dense - saturated (SM) (BA) Unfailed	
		9	SS				
		10	SS				
20.0						20.0	
		11	SS			Fill: Sandy clay mixed with fine to coarse sand-sized ash, little silt, trace fine to coarse gravel and wood fragments - black and dark gray - loose - saturated (SC)	
						22.0	
		12	SS			Silty clay, little fine gravel and fine to coarse sand - brown - stiff to very stiff (CL)	
25.0		13	SS				
		14	SS				
		15	SS				
30.0							
		16	SS			Driller's note: 100% drilling loss while drilling from 30 to 32 ft. Casing extended to 30 ft.	
		17	SS				
						34.0	
35.0		18	SS			Silty clay and fine to medium sand, trace fine gravel - gray - soft (CL)	
		19	SS				
						38.0	
		20	SS			Clayey silt and fine to medium sand - gray - very loose - moist (CL-ML)	
40.0							
						. . . continued	

Penetrometer values: 40, 17, 4, 9, 3, 8, 4/6", 10/6", 20, 33, 21, 4, 6, 3, 8, 6, 13, 18, WOR, WOH, WOH

*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: **09-406**

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 +764.33 (Continued)	
	21	SS			Clayey silt and fine to medium sand - gray - very loose - moist (CL-ML)	WOR
					42.0	
	22	SS			Silty clay, some fine sand - gray - soft (CL)	WOH
45.0	23	SS			Sample 23: Sample fell 3 ft. under weight of rods.	WOR
		RB			48.0	
	24	SS			Silt and fine sand, little clay - gray - very loose to loose - moist to wet (ML)	WOR
50.0	25	SS				WOH
	26	SS				2
55.0	27	SS				6
					56.0	
	28	SS			Fine sand and silt, little clay - gray - dense to medium dense - wet (ML)	32
	29	SS				28
60.0					60.0	
		RB			Driller's note: Possible bedrock noted while drilling from 60 to 62 ft.	
62.0					62.0	
					End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 62.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 30 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: **10.0 ft. WS**	BORING STARTED: **2/10/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556709.89**	BORING COMPLETED: **2/11/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2439331.95**	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: **09-406A**

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	
5.0		PA				
10.0						
15.0						
20.0		RB				
25.0						
30.0					Disturbed samples retrieved following completion of vane shear testing.	
					34.0	
35.0	1	ST			Silty clay, little fine to medium sand - gray - very stiff (CL) Vane Shear Test #1 at 35.5 ft. Peak Su >2025 psf	
					36.0	
	2	ST			Silty clay, some fine to medium sand - gray - very stiff (CL)	
					38.0	
					. . . 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: **09-406A**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +764.42 (Continued)

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}
	3	ST			Vane Shear Test #2 at 37.0 ft. Peak Su >2150 psf, Remolded Su = 375 psf	
40.0	4	ST			40.4 Clayey silt, little fine to medium sand - gray - moist - medium (CL-ML)	
	4A	ST			Vane Shear Test #3 at 38.5 ft. Peak Su = 450 psf, Remolded Su = 200 psf	
	5	ST			42.0 Sandy silt, little clay - gray - wet (ML) Vane Shear Test #4 at 40.5 ft. Peak Su >2100 psf, Remolded Su = 500 psf	
45.0	6	ST			Silty clay, some fine to medium sand - gray -medium (CL)	
	7	ST			46.0 Vane Shear Test #5 at 42.5 ft. Peak Su = 700 psf, Remolded Su = 250 psf Vane Shear Test #6 at 44.5 ft. Peak Su = 700 psf, Remolded Su = 175 psf	
	8	ST			48.0 Clayey silt, little fine to medium sand - gray - medium - saturated (CL-ML)	
50.0					50.0 Vane Shear Test #7 at 46.5 ft. Peak Su = 825 psf, Remolded Su = 200 psf Sandy silt, little clay - gray - saturated (ML) Vane Shear Test #8 at 48.5 ft. Peak Su = 950 psf, Remolded Su = 150 psf Vane Shear Test #9 at 50.0 ft. Peak Su = 1000 psf, Remolded Su = 100 psf End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 48.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 25 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	
Not Observed	**2/12/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
556712.49	**2/12/09**	**KKB**	**2** **2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2439334.28	**Mobile B-57 (V.H.)/MB**	**RCR**	**60095742**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-408**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +764.76

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)
	1	SS			Fill: Silt-sized ash, trace to little clay and fine sand - gray - very loose to loose - moist to saturated (ML) (FA) Failed		3
	2	SS					4
5.0	3	SS					5
	4	SS					3
	5	SS					4
10.0	6	SS					3
	7	SS					1
15.0	8	SS					2
	9	SS					3
	10	SS					3
20.0	11	SS					2
	12	SS					3
25.0	13	SS					WOH
	14	SS					2
	15	SS					3
30.0	16	SS					3
	17	SS					2
	18	SS			**Pneumatic piezometer installed at 34.0 feet**		1
35.0	18A	SS			35.5 Sample 18A: Organic Content = 3.62%		WOH
	19	SS			36.0 Silt, little clay, trace fine sand with interbedded silt-sized ash slimes - black - very loose - wet (ML) & (FA)		2
					38.0		*

. . . 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: **09-408**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +764.76 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
40.0	20	SS			Clayey silt, little fine to medium sand - gray - very loose - moist (CL-ML)	
	21	SS			Clayey silt, little fine to medium sand - gray - very loose - moist (CL-ML) **Pneumatic piezometer installed at 40.0 feet**	
	22	SS			42.0 Sandy silt, little to some clay - gray - very loose - moist (ML)	
45.0	23	SS			46.0	
	24	SS			Silty fine to medium sand - gray - loose - saturated (SM)	
	25	SS			48.0 Clayey sand, some silt - gray - very loose - saturated (SC)	
50.0	26	SS			50.0 Silty fine to medium sand, little clay - gray - very loose to loose - saturated (SM)	
	27	SS			54.0	
55.0	28	SS			Silty fine to medium sand, little clay - brownish gray - medium dense to dense - saturated (SM)	
	29	SS				
	30	SS				
60.0	31	SS			62.0	
	32	SS			Fine to medium sand, little silt and fine to coarse gravel - gray - extremely dense (SP-SM)	
64.0		RB			64.0 Sandstone noted **Pneumatic piezometer installed at 63.0 feet**	

End of Boring
Borehole advanced to 6.0 ft. with power auger.
Borehole advanced from 6.0 to 64.0 ft. with rock bit and drilling fluid.
Borehole backfilled upon completion.
Casing used: 8 ft. of 4 in.
Pneumatic Piezometers installed at 34, 40, and 63 feet.
Automatic-CME Hammer used for Standard Penetration Tests.
WOH = Weight of Hammer
WOR = Weight of Rod
(FA) = Fly Ash

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)

WOH, WOR, 1, 1, 4, WOR, WOH, 9, 26, 26, 16, 48, 98/11"

* Calibrated Penetrometer

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

WL: **Dry to 8.0 ft.**	BORING STARTED: **3/9/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556900.86**	BORING COMPLETED: **3/10/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2439698.9**	RIG/FOREMAN: **CME-850/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: **09-408A**

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 +764.35	
5.0		PA				
10.0						
15.0						
20.0		RB				
25.0						
30.0						
35.0					Disturbed samples retrieved following completion of vane shear testing. Vane Shear Test #1 at 36.5 ft. Peak Su = 1425 psf, Remolded Su = 250 psf Vane Shear Test #2 at 38.5 ft. Peak Su = 2000 psf, Remolded Su = 325 psf	
	1	ST			35.0 36.0 Fill: Silt-sized ash, trace fine sand and clay - gray - saturated (ML) (FA) Unfailed	
	1A	ST			37.0 Organic silt, some clay, trace fine sand - gray - wet (OH)	
	2	SS+			Clayey silt and fine to medium sand - gray- saturated (CL-ML) 39.0	

. . . 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: **09-408A**

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 +764.35 (Continued)	
40.0	3	SS+			Samples 2, 3, 4 and 5: No recovery with Shelby tubes. Obtained sample by pushing 3-in. split spoon.	
					41.0 Clayey silt, little fine to medium sand - gray - stiff - moist to wet (CL-ML)	
	4	SS+			Silty clay and fine to medium sand - gray - stiff (CL)	
					43.0	
	5	SS+			Silt and fine sand, some clay - brown - saturated (ML)	
45.0					45.0	
					Vane Shear Test #3 at 40.5 ft. Peak Su = 1775 psf, Remolded Su = 225 psf Vane Shear Test #4 at 42.5 ft. Peak Su = 1875 psf, Remolded Su = 300 psf Vane Shear Test #5 at 44.5 ft. Peak Su > 1975 psf	
50.0						
55.0		RB				
60.0						
65.0						
68.0					68.0	
					End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 68.0 ft. with rock bit and drilling fluid. Borehole grouted and inclinometer casing installed to 67.0 ft. Casing used: 8 ft. of 4 in. SS+ = 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	BORING STARTED	AECOM OFFICE	
Not Observed	**3/10/09**	**Chicago Area - 01**	
NORTHING **556898.39**	BORING COMPLETED **3/11/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2439701.33**	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: **09-408B**
	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 +764.15	
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					15.0	
	1	OST			Fill: Silt-sized ash, trace to little fine sand, trace to little clay - gray - saturated (ML) (FA) Failed Sample OST-1: Organic Content = 0.44%	
	2	OST				
20.0	3	OST				
	4	OST				
25.0		RB				
30.0	5	OST			32.5	
	6	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 6 description. Sample 6: No sample recovered for water content testing.	
35.0					35.5	
	7	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 7 description.	
					38.0	
					. . . 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: **09-408B**

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 +764.15 (Continued)	
		8	OST			Sandy silt, little clay - gray - saturated (ML)	
40.0		8A	OST				
						40.5	
		9	OST			Clayey silt, little fine to medium sand - gray - saturated (CL-ML)	
						43.0	
		10	OST			Sandy silt, little clay - gray - saturated (ML)	
45.0						45.5	
		11	OST			Sample 11 was not opened.	
						48.0	
		12	OST			Sample 12 was not opened.	
50.0						50.5	
50.5						End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 48.0 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: **3/11/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556896.51**	BORING COMPLETED: **3/12/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2439704.82**	RIG/FOREMAN: **CME-850/JD**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

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**

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 +762.61	
	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						
	6	SS			Fill: Silt-sized ash, little fine to medium sand - gray - medium dense - saturated (ML) (FA) Unfailed	
	7	SS				
14.0						
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				
	10	SS*				
18.5						
	10A	SS			Fill: Silt-sized ash, trace to little clay - gray - loose to medium dense - saturated (ML) (FA) Unfailed	
20.0	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						
	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				
	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: **09-409**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +762.61 (Continued)

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
		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)	
		25	SS				
50.0						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	
						End of Boring	

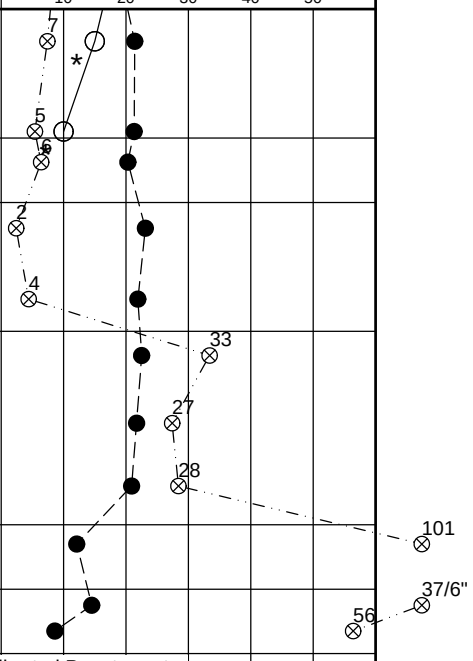
Borehole advanced to 8.0 ft. with power auger.
Borehole advanced from 8.0 to 58.0 ft. with rock bit and drilling fluid.
Casing used: 10 ft. of 4 in.
Automatic-Diedrich Hammer used for Standard Penetration Tests.
SS* = SPT value based on first 6 in.
WOH = Weight of Hammer
(FA) = Fly Ash
(BA) = Bottom Ash

*Calibrated Penetrometer

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)



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: **2/5/09**	AECOM OFFICE: **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

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	
	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*			Fill: Sandy silt, little fine to coarse gravel, trace clay - gray - medium dense - moist (ML)	
6.5	4A	SS				
8.0					Fill: Sandy silt-sized ash, little fine to coarse gravel - gray- loose - wet (ML-SM) (FA) Unfailed	
	5	SS*				
10.0					Fill: Silty fine to medium sand-sized ash, little fine to medium gravel, trace clay - gray - extremely dense - wet (SM) (FA & BA) Unfailed	
	6	SS				
	7	SS			Fill: Silty clay, little fine to medium sand - reddish brown - stiff (CL) Unfailed	
15.0	8	SS				
	9	SS				
17.5						
18.0	9A	SS			Fill: Silty fine to medium sand-sized ash, little clay - gray - medium dense - moist (SM) (BA) Unfailed	
	10	SS				
20.0					Fill: Silty clay, and fine to coarse sand, trace fine gravel - reddish brown - stiff (CL) Unfailed	
	.	SS				
	.	SS			No sample recovery from 20.0 to 24.5 ft.	
24.5						
25.0	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)	
	15	SS				
35.0	16	SS				
	17	SS				
38.5						
40.0	18	SS			Sandy silt, little clay, trace fine to medium gravel - brown and gray - very loose - wet (ML)	
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.	WOH
					43.5	
45.0	20	SS			Silt and fine sand, some to little clay, trace gravel - brown and gray - very loose - saturated (ML)	WOH
	21	SS			Sample 21: WOH advanced sampler 2.5 ft.	WOH
					48.0	
	22	SS			Silty fine to medium sand, little clay - brown - very loose - saturated (SM)	1
50.0	23	SS			51.0	1/6"
	23A	SS			52.0 Silty fine to medium sand, little clay - gray - very loose - saturated (SM)	3
	24	SS			Sandy silt, little clay, trace fine to medium gravel - brown and gray - medium dense - saturated (ML)	13
					54.0	27/6"
	24A	SS			54.5 Silty fine to medium sand, trace clay and fine gravel - reddish brown - very dense - saturated (SM)	
55.0	25	SS			56.5 Silty fine to medium sand, little clay - gray - medium dense - saturated (SM)	11
	26	SS			Silty fine to medium sand, trace clay - brown - dense - saturated (SM)	36
					58.5	48/6"
59.0	27	SS*			59.0 Sandy fine to medium gravel (weathered shale), little silt and clay - brown and gray - extremely dense - saturated (GM)	

*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	BORING STARTED	AECOM OFFICE	
4.0 ft. WS; 12.0 ft. BCR; 4.0 ft. ACR	**2/8/09**	**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**

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)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +762.08	
					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			Vane Shear Test #3 at 17.5 ft. Peak Su = 2425 psf, Remolded Su = 300 psf	
	2	SS			17.5 18.5 Fill: Silty fine to medium sand-sized ash, trace fine gravel - gray - saturated (SM) (FA) Unfailed	
	2A	SS				
20.0		RB			20.0	
	3	SS			Fill: Silty clay, little fine sand - reddish brown (CL)	
					22.0 Fill: Silty fine to medium sand-sized ash - gray - saturated (SM) (FA) & (BA)	
		RB			22.5	
	4	SS			Vane Shear Test #4 at 20.0 ft. Peak Su = 1425 psf, Remolded Su = 225 psf	
					24.5	
25.0		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	
					Sample 5: Poor recovery.	
30.0		RB			Vane Shear Test #6 at 25.0 ft. Peak Su = 925 psf, Remolded Su = 100 psf Drilled without sampling	
					Vane Shear Test #7 at 27.5 ft. Peak Su = 1825 psf, Remolded Su = 125 psf	
					32.0	
	6	SS			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

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	
	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	
24.0					Note: 70% Drilling fluid lost while drilling from 22 to 24 ft.	
25.0	13	SS			Clayey fine to coarse sand, little fine to coarse gravel - brown - loose - wet (SC)	
26.0					Weathered shale noted	
	14	SS			Sandy silt, little fine to medium gravel, trace clay - dark brown - loose - moist to wet (ML)	
28.0					Weathered shale noted	
	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**

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*			48.5 Weathered shale - dark brown and gray	
						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	

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)

8 — 47 — 67 — 43/6" — 80/6"

*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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-413**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

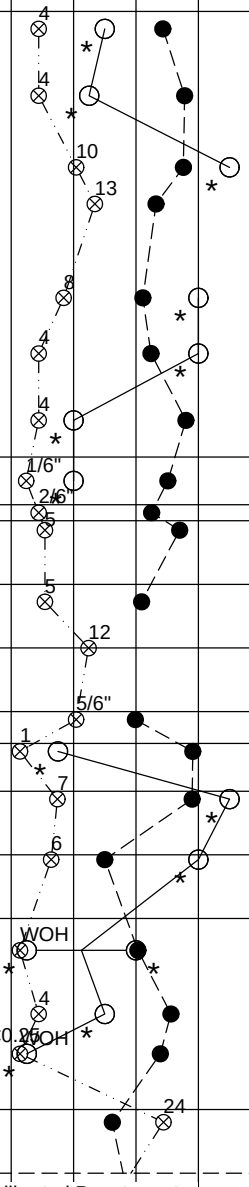
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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		Fill: Silty fine to medium sand-sized ash, trace clay - gray - loose - saturated (SM) (FA) Unfailed	
				24.0	
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**

SURFACE ELEVATION +764.42 (Continued)

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}
	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.	
					44.0	
45.0	20A	SS			Silty fine to coarse sand, little fine to medium gravel, trace clay - gray - medium dense to dense - moist to wet (SM)	
		RB			Sample 20A: Weathered shale noted	
	21	SS				
	22	SS			49.0	
	22A	SS			Weathered shale - gray	
50.0	23	SS*				
		DB			50.5	
	R 1	DB			51.0	
	RUN 2	DB			Conasauga Shale. Greenish to greenish gray shaley limestone. Moderately weathered, soft to moderately hard, thinly bedded. Most of core is shattered.	
					53.4	
55.0	RUN 3	DB			Conasauga Shale. Dark green to brown shale. Moderately weathered to fresh, soft, fissile, laminated to thinly bedded. Bedding approx. 20º from horizontal.	
60.0					60.5	
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.	

Run #	Depth (ft.)	Recovery (%)	RQD (%)	Fracture Frequ.
1	50.5 - 51.0	100*	0	Undetermined

*May not be representative because much of the core is broken

Run #	Depth (ft.)	Recovery (%)	RQD (%)	Fracture Frequ.
2	51.0 - 53.4	100*	0	Undetermined

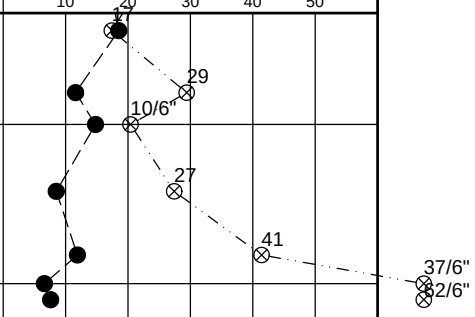
*May not be representative because much of the core is broken

Run #	Depth (ft.)	Recovery (%)	RQD (%)	Fracture Frequ.
3	53.4 - 60.5	40.8*	0	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: **Dry to 14.0 ft.; 18.0 ft. BCR & ACR**	BORING STARTED: **1/28/09**	AECOM OFFICE: **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

ROCK CORE PHOTOGRAPHIC LOG

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

Photo No.	Date:
09-413	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)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE / RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
				SURFACE ELEVATION +764.49	
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	
	1	ST		6.0 Fill: Silty clay, some fine gravel, some fine to coarse sand - reddish brown - stiff (CL)	
	2	ST		8.0 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	
	4	ST		12.0 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	5	ST			
		SS		16.0 Vane Shear Test #5 at 15.5 ft. Peak Su = 1925 psf, Remolded Su = 1500 psf	
20.0		RB		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				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	
	6	ST		27.5 Silt and fine to coarse sand, trace fine gravel, little clay - brown - saturated (ML)	
30.0		SS		29.5 No sample recovery from 29.5 to 31.5 ft. with Shelby tube or split spoon. Vane met refusal at 31.5 ft.	
	7	SS		31.5 Silt and fine to coarse sand, trace fine gravel, little clay - brown (ML) Coarse gravel noted from 31.5 to 32.5 ft.	
35.0	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				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	
				. . . continued	

* Calibrated Penetrometer

* 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**

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-413A**

PROJECT NAME
Kingston Dredge Cell Failure RCA

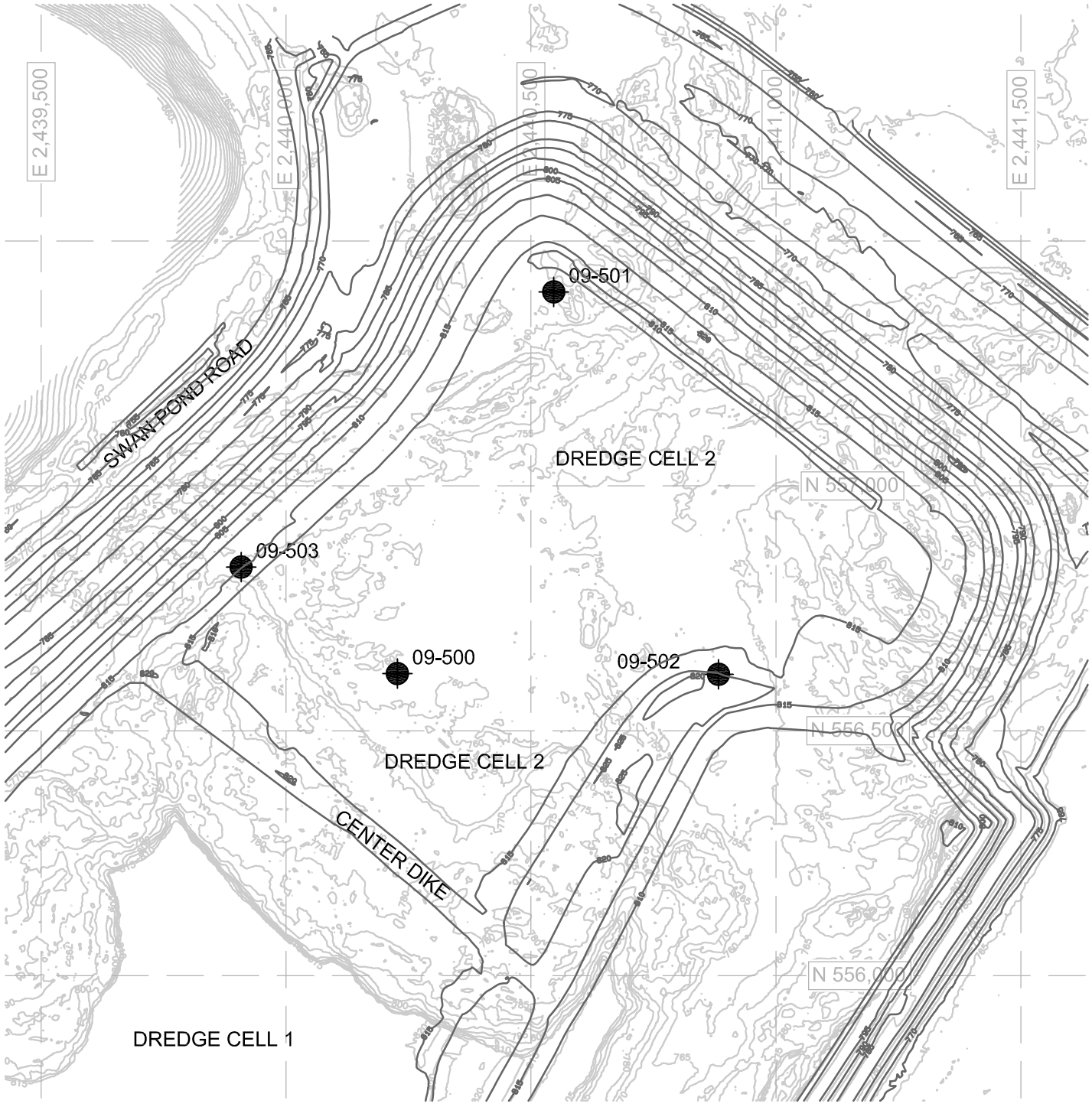
ARCHITECT-ENGINEER
OGC

SITE LOCATION
714 Swan Pond Road; Harriman, Tennessee

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 +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**



LEGEND

09-500 500 SERIES SOIL BORINGS AND CPTu SOUNDINGS LOCATIONS (AECOM 2009)

PRE-FAILURE CONTOURS

POST FAILURE CONTOURS

NOTES:
1. BASE MAP BASED ON LIDAR DATA COLLECTED ON DECEMBER 24, 2008
2. HORIZONTAL DATUM: NAD 27 (TENNESSEE LAMBERT)
3. VERTICAL DATUM: NGVD 29

N

0 300

1" = 300'

AECOM

847.279.2500
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500 SERIES EXPLORATION LOCATION

ROOT CAUSE ANALYSIS
TVA KINGSTON DREDGE CELL FAILURE
ON DECEMBER 22, 2008
KINGSTON FOSSIL PLANT
HARRIMAN, TENNESSEE

Drawn :	CJH	6/12/2009
Checked:	LWB	6/12/2009
Approved:	WHW	6/12/2009
PROJECT NUMBER	60095742	
FIGURE NUMBER	2E-5	

09-500 Series

AECOM

Boring/Sounding ID	Ground Surface Elevation (GSE)	Easting	Northing
09-500	757.29	2,440,227.18	556,616.93
09-500A	757.01	2,440,219.59	556,621.48
09-500B	757.63	2,440,227.89	556,623.46
09-501	765.02	2,440,546.47	557,396.40
09-501B	765.02	N/A	N/A
09-502	752.85	2,440,882.74	556,615.38
09-502A	753.16	2,440,871.62	556,622.76
09-502B	752.82	2,440,872.59	556,618.26
09-503	764.65	2,439,865.48	556,860.52
09-503A	768.25	2,439,913.02	556,831.96
09-503B	765.21	2,439,872.28	556,856.59
09-503B1	768.11	2,439,908.30	556,834.33

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-500**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +757.29

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)
	1	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose - saturated (ML) (FA) Failed		2
2.0							
	2	SS			Fill: Silty fine to medium sand-sized ash, little fine gravel - gray - very loose - saturated (SM) (BA & FA) Failed		2
5.0	3	SS					1
	4	SS					1
8.0							
	5	SS			Fill: Sandy silt-sized ash, trace clay - gray - very loose - saturated (ML) (FA) Failed		2
10.0	6	SS					2
	7	SS					2
15.0	8	SS					WOR
	9	SS					WOR
	10	SS					WOH
20.0	11	SS					WOH
	12	SS					WOR
	12A	SS			Sample 12A: Brown silty clay intermixed		
25.0	13	SS					WOR
	14	SS					WOR
28.0							
	15	SS			Fill: Silt, little clay and fine sand interbedded with silt-sized ash slimes - black and gray - very loose - saturated (ML) & (FA) Unfailed		WOH
29.0							
30.0	15A	SS					
	16	SS			Sample 15: Organic Content = 5.68%		WOR
31.0							1/6"
	16A	SS			Fill: Silty fine to medium sand-sized ash - gray - very loose - saturated (SM) (BA) Unfailed		1/6"
31.5	16B	SS					
	17	SS			Silt, little clay - dark brown and black - very loose - saturated (ML)		WOH
34.0							
35.0	18	SS			Silty clay, some fine to medium sand - brown and gray- soft (CL)		WOH
36.0					Silty clay, some fine to medium sand - gray - soft (CL)		
	19	SS			Silty clay, some fine to medium sand - brown and gray - stiff (CL)		16
38.0							
	20	SS			Silty medium to coarse sand, some clay, little fine to coarse gravel - brown and gray - medium dense - moist		9
40.0							

71.5

. . . 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: **09-500**
	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 +757.29 (Continued)		
	21	SS			to wet (SM)		2/6"
	21A	SS			41.0 Silty medium to coarse sand, little fine to medium gravel - gray - loose - saturated (SM)		* 7/6"
	22	SS			42.0 Silty clay, some fine to medium sand - gray- stiff (CL)		17
45.0	23	SS			Silty medium to coarse sand, little fine gravel - brown and gray - medium dense - saturated (SM)		21
	24	SS			46.0 Silty medium to coarse sand, little to some fine to coarse gravel, trace clay - gray - medium dense - saturated (SM)		5
	25	SS			48.0 Sandy clay, little to some silt, trace fine gravel - brownish gray - stiff (CL)		* 5/6"
50.0	25A	SS			49.0 Clayey fine to coarse sand, little silt, trace fine to coarse gravel - gray - medium dense - moist to wet (SC)		8/6"
	26	SS			50.0 Silty fine to coarse sand, little fine to medium gravel - brown and gray - medium dense - moist to wet (SM)		11/6"
	26A	SS			51.6 Silty fine to medium sand, trace clay - gray - medium dense - wet (SM)		14/6"
	26B	SS			52.0 Weathered shale - gray		50/2"
		RB			Conasauga Shale. Dark green, greenish gray to black shale. Moderately weathered, soft to moderately hard, fissile, finely laminated to thinly bedded. Bedding approx. 15º from horizontal.		
55.0	RUN 1	DB			Run # 1 — Depth (ft.) 52.0 - 60.2 — Recovery (%) 69.5 — RQD (%) 0 — Fracture Frequ. > 20 / ft.		
60.0					60.2 Conasauga Shale. Gray to dark gray and black shale. Fresh, moderately hard, finely laminated to thinly bedded, black shale rip-up clasts throughout. Most solid core to date. Bedding approx. 15º from horizontal.		
	RUN 2	DB			Run # 2 — Depth (ft.) 60.2 - 66.2 — Recovery (%) 80.0 — RQD (%) 43 — Fracture Frequ. 2/ft. to 63 ft. 3 - >3 below 63 ft.		
65.0					66.2		
67.0		RB			67.0		

End of Boring
Borehole advanced to 6.0 ft. with power auger.
Borehole advanced from 6.0 to 52.0 ft. with rock bit and drilling fluid.
Borehole advanced from 52.0 to 66.2 ft. with diamond coring bit and drilling fluid.
Borehole advanced from 52.0 to 67.0 ft. with rock bit and drilling fluid following completion of rock coring.
Borehole grouted upon completion and inclinometer casing installed to 67.0 ft.
Casing used: 7 ft. of 4 in. and 54 ft. of 3 in.
Automatic-CME 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	
1.8 ft. WD	**2/27/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
556616.93	**3/2/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440227.18	**CME-850/JD**	**RCR**	**60095742**

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

AECOM

ROCK CORE PHOTOGRAPHIC LOG

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

Photo No.	**Date:**
09-500	3-22-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-500 Run 1 (52.0 – 60.2')

Conasauga Shale

AECOM

ROCK CORE PHOTOGRAPHIC LOG

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

Photo No.	**Date:**
09-500	3-22-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-500 Run 2 (60.2 – 66.2')

Conasauga Shale

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-500A**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

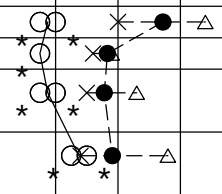
SURFACE ELEVATION +757.01

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					Disturbed samples retrieved following completion of vane shear testing.	
20.0		RB				
25.0					Vane Shear Test #1 at 31.0 ft. Peak Su = 1700 psf, Remolded Su = 375 psf Vane Shear Test #2 at 32.5 ft. Peak Su = 1600 psf, Remolded Su = 500 psf Vane Shear Test #3 at 34.5 ft. Peak Su = 1400 psf, Remolded Su = 300 psf Vane Shear Test #4 at 36.0 ft. Peak Su >2000 psf	
30.0					30.0	
	1	ST			31.0 Silty clay, trace fine sand - brownish gray - moist - stiff (CL)	
	1A	ST			32.0 Sandy silt, little clay - gray - saturated (ML)	
	2	ST			Silty clay, trace fine gravel, some fine to coarse sand - gray - moist - stiff (CL)	
35.0					34.0	
	3	ST			Silty clay, trace fine sand - brown - moist - stiff to very stiff (CL)	
36.0					36.0	
					End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 36.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in.	

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



*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	
Not Observed	**3/4/09**	**Chicago Area - 01**	
NORTHING **556621.48**	BORING COMPLETED **3/5/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2440219.59**	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: **09-500B**

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 +757.63	
5.0		PA				
10.0		RB				
	1	OST			10.0 — Fill: Sandy silt-sized ash, trace clay - gray - saturated (ML) (FA) Failed Sample OST-1: Organic Content = 1.11% 12.5	
15.0		RB				
20.0					20.0	
	2	OST			Fill: Sandy silt-sized ash, trace clay - gray - saturated (ML) (FA) Failed	
	2A	OST			22.5	
		RB			**Pneumatic Piezometer Installed at 22.0 feet**	
25.0					24.0	
	3	OST			Sample OST-3: Organic Content = 1.05% Fill: Sandy silt-sized ash, trace clay - gray - saturated (ML) (FA) Failed 26.5	
	4	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 4 description.	
30.0					29.0	
	5	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 5 description. **Pneumatic Piezometer Installed at 30.0 feet**	
	5A	OST			31.5	
	6	OST			Silty clay, little fine to medium sand - gray (CL)	
	6A	OST			34.0	
35.0	7	OST			Clayey silt, little fine to medium sand - gray - saturated (CL-ML) **Pneumatic Piezometer Installed at 34.0 feet**	
	7A	OST			36.5	
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: **09-500B**

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 +757.63 (Continued)	
45.0		RB				
50.0					**Pneumatic Piezometer Installed at 51.0 feet**	
52.0					52.0 End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 ft. to 52.0 ft. with rock bit and drilling fluid. Pneumatic Piezometers installed at 22.0, 30.0, 34.0 and 51.0 ft. Casing used: 8.0 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: **3/3/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556623.46**	BORING COMPLETED: **3/3/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2440227.89**	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: **09-501**

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	
		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	
		5	SS			8.0	
		5A	SS			8.4	
		5B	SS			Fill: Silty fine to coarse sand-sized ash, trace fine gravel - gray - medium dense - saturated (SM) (BA) Failed	
10.0						8.8	
		6A	SS			Fill: Sandy silt sized ash, trace clay - gray - medium dense - saturated (ML) (FA) Failed	
		6B	SS			11.8	
		7	SS			Fill: Silty fine to coarse sand sized ash, trace fine gravel - gray - medium dense - saturated (SM) (BA) Failed	
						12.0	
		8A	SS			Fill: Silty clay, little fine to medium sand, trace fine gravel and roots - reddish brown (CL) Note: Sample disturbed	
15.0						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	
		10	SS			Fill: Sandy silt-sized ash, trace clay - gray - medium dense - saturated (ML) (FA) Failed Note: Bottom ash present.	
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**

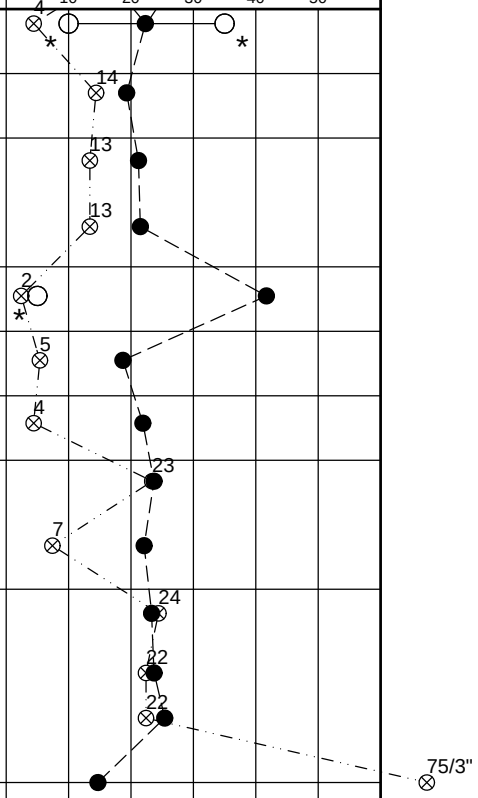
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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)	
42.0					Sample 20: Gray fine sand pockets and plant fibers noted.	
	21	SS			Silty fine to coarse sand, some clay, trace fine gravel - gray - medium dense - saturated (SM)	
44.0						
45.0	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						
	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)	
54.0						
55.0	27	SS			Sandy silt, little to trace clay - gray and reddish brown - medium dense to loose - saturated (ML)	
	28	SS				
58.0						
	29	SS			Silty fine to medium sand, trace clay - gray to reddish brown - medium dense - saturated (SM)	
60.0						
	30	SS				
	31	SS				
64.0						
64.8	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.	
					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: **09-501B**
Offset 6 ft. NE of 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+/-	
		PA				
5.0		RB				
10.0						
15.0						
20.0						
		RB				
25.0						
30.0						
35.0						
37.5						
38.1	1	OST			Sample 1: Poor recovery. Recovered sample. Placed into jar. Sandy silt, little clay, trace fine gravel - brown - moist (ML)	
		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: **09-501B** **Offset 6 ft. NE of 09-501**
	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 765.02+/- (Continued)		
45.0		RB					
					46.5 Osterberg sample attempted at 46.5 ft. No penetration of sampler.		
	2	SS			Silty fine to medium sand, little clay - gray - wet - dense (SM) 48.5		33
50.0	3	OST			Sample 3: Osterberg sampler did not fully extend Sample 3 was not opened. 50.0		
					End of Boring Borehole advanced to 5.0 ft. with power auger. Borehole advanced from 5.0 to 50.0 ft. with rock 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		

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

WL **Not Observed**	BORING STARTED **4/3/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING	BORING COMPLETED **4/3/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING	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: **09-502**

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 +752.85	
	1	SS			Fill: Sandy silt-sized ash, trace clay - gray - very loose to loose - saturated (ML) (FA) Failed	3
	2	SS			After drilling, retrieved sample from 6 to 8 ft. Borehole caved in to 1.5 ft.	3
5.0	3	SS			Casing installed to 8 ft.	2
	4	SS			After drilling to 38 ft., casing extended 13 ft.	6
	5	SS			After drilling to 44 ft., casing extended to 18 ft.	1
10.0	6	SS				1
	7	SS				1
15.0	8	SS				1
	9	SS				4
	10	SS				4
20.0	11	SS			Sample 11: No sample recovery	WOH
	12	SS			23.0	WOH
	12A	SS			Silty clay, some fine sand - brown - soft (CL)	WOH
25.0	13	SS			26.0	* 9 *
	14	SS			Sandy silt, little to some clay - brown - medium dense - moist (ML) 28.0	12
	15	SS			Silty fine to medium sand, little clay - reddish brown - loose to medium dense - moist (SM)	8
30.0	16	SS				16
	17	SS			34.0	5
35.0	18	SS			Silty fine to medium sand, little clay - gray - very loose to loose - saturated (SM)	1
	19	SS				WOH
	20	SS				WOH
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: **09-502**

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 +752.85 (Continued)		
	21	SS			Silty fine to medium sand, little clay - gray - very loose to loose - saturated (SM)		5
42.0							
	22	SS			Silty fine to medium sand, trace clay - gray - medium dense - moist (SM)		22
45.0	23	SS			Sample 23: Weathered shale noted in lower tip of sample.		13
45.5							
		RB			Driller's note: Apparent shale bedrock		
47.5							
					End of Boring Boring advanced to 6.0 ft. with power auger. Boring advanced from 6.0 to 47.5 ft. with rock bit and drilling fluid. Casing used: 18 ft. of 4 in. Automatic-Diedrich 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: **At Surface**	BORING STARTED: **3/5/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556615.38**	BORING COMPLETED: **3/5/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2440882.74**	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: **09-502A**

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 +753.16	
5.0		PA				
10.0						
15.0		RB			Disturbed samples retrieved following completion of vane shear testing.	
20.0					Sample 1: No recovery with Shelby tube. Pushed 2.5-inch split-spoon to sample recovery.	
22.0	1	**2.5"**			Silty clay, some fine to medium sand - brown - very stiff (CL)	
24.0	2	ST			Sandy silt, little clay - brown - moist (ML)	
25.0						
26.0					Vane Shear Test #1 at 24.0 ft. Peak Su > 1975 psf Vane Shear Test #2 at 24.5 ft. Peak Su = 2950 psf, Remolded Su = 1325 psf Vane Shear Test #3 at 25.5 ft. Peak Su = 3425 psf, Remolded Su = 950 psf	
30.0		RB				
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 **2**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-502A**

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 +753.16 (Continued)		
45.0		RB					
50.0		RB					
51.5					51.5 End of Boring Borehole advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 to 51.5 feet with rock bit and drilling fluid. Borehole grouted upon completion and inclinometer installed to 51.5 ft. Casing used: 8 ft. of 4 in, 2.5" = 2.5 inch split-spoon used for Penetration Test		

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: **556622.76**	BORING COMPLETED: **3/5/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2440871.62**	RIG/FOREMAN: **D-50/BZ**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-502B**

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 +752.82	
		PA		.	
5.0				5.0	
	1	OST		Fill: Sandy silt-sized ash, trace clay - gray - saturated (ML) (FA) Failed	
				7.5	
		RB			
10.0				10.0	
	2	OST		Fill: Sandy silt-sized ash, trace clay - gray - saturated (ML) (FA) Failed	
				12.5	
15.0		RB			
				19.5 **Pneumatic Piezometer installed at 20.0 ft.**	
20.0	3	OST		Fill: Sandy silt-sized ash, trace clay - gray - saturated (ML) (FA) Failed	
	3A	OST		22.0	
	4	OST		See UMass Direct Shear Test results (DeGroot, 2009) for Sample 4 description.	
				Pneumatic Piezometer installed at 24.5 ft.	
25.0				24.5	
30.0		RB		**Pneumatic Piezometer installed at 31.0 ft.**	
35.0				36.0	
	5	OST		Sample 5 was not opened.	
				38.5	
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: **09-502B**

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 +752.82 (Continued)		
		.			**Pneumatic Piezometer installed at 43.0 ft.**		
43.5					43.5		
					End of Boring Borehole advanced to 5.0 ft. with power auger. Borehole advanced from 5.0 to 43.5 ft. with rock bit and drilling fluid. Installed Pneumatic Piezometers at 20.0, 24.5, 31.0, and 43.0 ft. 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: **3/8/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556618.26**	BORING COMPLETED: **3/8/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2440872.59**	RIG/FOREMAN: **D-50/RT**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-503**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +764.65

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)
		1	SS			Fill: Silt-sized ash, little fine sand - gray - very loose - moist (ML) (FA) Failed		3
		2	SS					2
						4.0		
5.0		3	SS			Fill: Silt-sized ash, little fine sand - gray - very loose - saturated (ML) (FA) Failed		2
						6.0		
		4	SS			Fill: Silt-sized ash, little fine sand - gray - loose - moist (ML) (FA) Failed		4
						8.0		
		5	SS			Fill: Silt-sized ash, little fine sand - gray - loose to very loose - saturated (ML) (FA) Failed		4
10.0		6	SS					5
		7	SS					4
15.0		8	SS					1
		9	SS					1
		10	SS					1
20.0		11	SS					3
		12	SS					2
25.0		3	SS					3
		14	SS					1
		15	SS					2
30.0		16	SS					4
		17	SS					4
						33.5		
		17A	SS			34.0 Clayey silt, little fine sand - gray with brown and black - very loose (CL-ML)		1/6"
35.0		18	SS					WOH
						36.0 Silt, little fine to medium sand and clay - gray - very loose (ML)		
		19	SS			Silty clay, little fine to coarse sand - brown - stiff (CL)		18 *
		20	SS			Sample 19: Gravel-sized sandstone fragments noted from 37.8 to 37.9 ft.		4 *
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: **09-503**

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 +764.65 (Continued)	
	21	SS			Clayey silt, little to some fine to medium sand - brown and reddish brown - stiff (CL-ML)	
	22	SS				
45.0	23	SS			46.0	
	24	SS			Silty fine to medium sand, little to trace clay - brownish gray - very loose - saturated (SM)	
	25	SS				
50.0					50.0	
	26	SS			Silty fine to medium sand, little to trace clay - brownish gray - very loose to medium dense - saturated (SM)	
	27	SS				
55.0	28	SS			56.0	
	29	SS			Silty fine to medium sand, trace clay - gray - medium dense - moist (SM)	
					57.7 S-29: Shale noted in lower tip of sample	
		RB			Driller's note: Extremely hard drilling. Unable to obtain split spoon sample.	
60.0					60.0	
	30	SS			Silty fine to medium sand, little fine to medium gravel - gray - dense - wet (SM)	
					62.0	
	31	SS			Silty fine to coarse sand, little fine to coarse gravel - gray - dense - wet (SM)	
					64.0	
65.0	32	SS			Weathered shale - gray	
					65.5	
		RB			Driller's Note: Apparent shale bedrock	
70.0						
75.0						
77.0					77.0	
					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 77.0 ft. with rock bit and drilling fluid.	* 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: **09-503**

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 +764.65 (Continued)		
						Borehole grouted upon completion. Inclinometer installed to 76.0 ft. Casing used: 8.75 ft. of 4 in. Automatic-CME Hammer used for Standard Penetration Tests. (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**	BORING STARTED: **3/12/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556860.52**	BORING COMPLETED: **3/13/09**	ENTERED BY: **KKB**	SHEET NO.: **3** OF: **3**
EASTING: **2439865.48**	RIG/FOREMAN: **CME-850/JD**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-503A**

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 +768.25		
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							
35.5	1	ST			Clayey silt, little fine to medium sand - gray - very stiff - saturated (CL-ML)		
		RB			Vane Shear Test #1 at 37.0 ft.		
38.5	2	ST			Peak Su = 3375 psf, Remolded Su = 625 psf		
					. . . 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: **09-503A**

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 +768.25 (Continued)	
	2A	ST			Silty clay, little fine to medium sand - brown - very stiff (CL)	
40.0		RB			Vane Shear Test #2 at 38.5 ft. Peak Su = 2200 psf, Remolded Su = 425 psf	
	3	ST			Vane Shear Test #3 at 41.0 ft. Peak Su = 2625 psf, Remolded Su = 1700 psf	
41.5					Clayey silt, little fine to medium sand - brown - very stiff - moist (CL-ML)	
	4	ST			Vane Shear Test #4 at 43.0 ft. Peak Su = 3575 psf, Remolded Su = 1100 psf	
43.5					End of Boring	
					Borehole advanced to 7.0 ft. with power auger.	
					Borehole advanced from 7.0 to 41.5 ft. with rock bit and drilling fluid.	
					Borehole backfilled after completion.	
					Casing used: 7.5 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: **3/16/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556831.96**	BORING COMPLETED: **3/16/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2439913.02**	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: **09-503B**

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 +765.21	
					Borehole abandoned due to unstable ground.	
5.0		PA				
8.0					8.0	
					End of Boring Borehole advanced to 7.0 ft. with power auger. Casing used: 8 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: **3/13/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556856.59**	BORING COMPLETED: **3/15/09**	ENTERED BY: **KKB**	SHEET NO.: **1** OF **1**
EASTING: **2439872.28**	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: **09-503-B1**

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 +768.11	
					.	
5.0		PA				
10.0						
15.0		RB				
20.0					**Pneumatic Piezometer installed at 20.5 ft.**	
					23.0	
25.0	1	OST			Fill: Silty clay and sandy silt-sized ash, little fine to coarse gravel - reddish brown, gray and yellow (CL)	
					25.5	
30.0						
					31.0	
	2	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 2 description.	
					Pneumatic Piezometer installed at 33.0 ft.	
	2A	OST			33.5	
35.0		RB				
					35.5	
	3	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 3 description.	
	3A	OST			38.0	
	4	OST			Silty clay, little fine to medium sand - brown (CL)	
40.0					**Pneumatic Piezometer installed at 39.0 ft.**	
	4A	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 6/9/09

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-503-B1**

PROJECT NAME
Kingston Dredge Cell Failure RCA

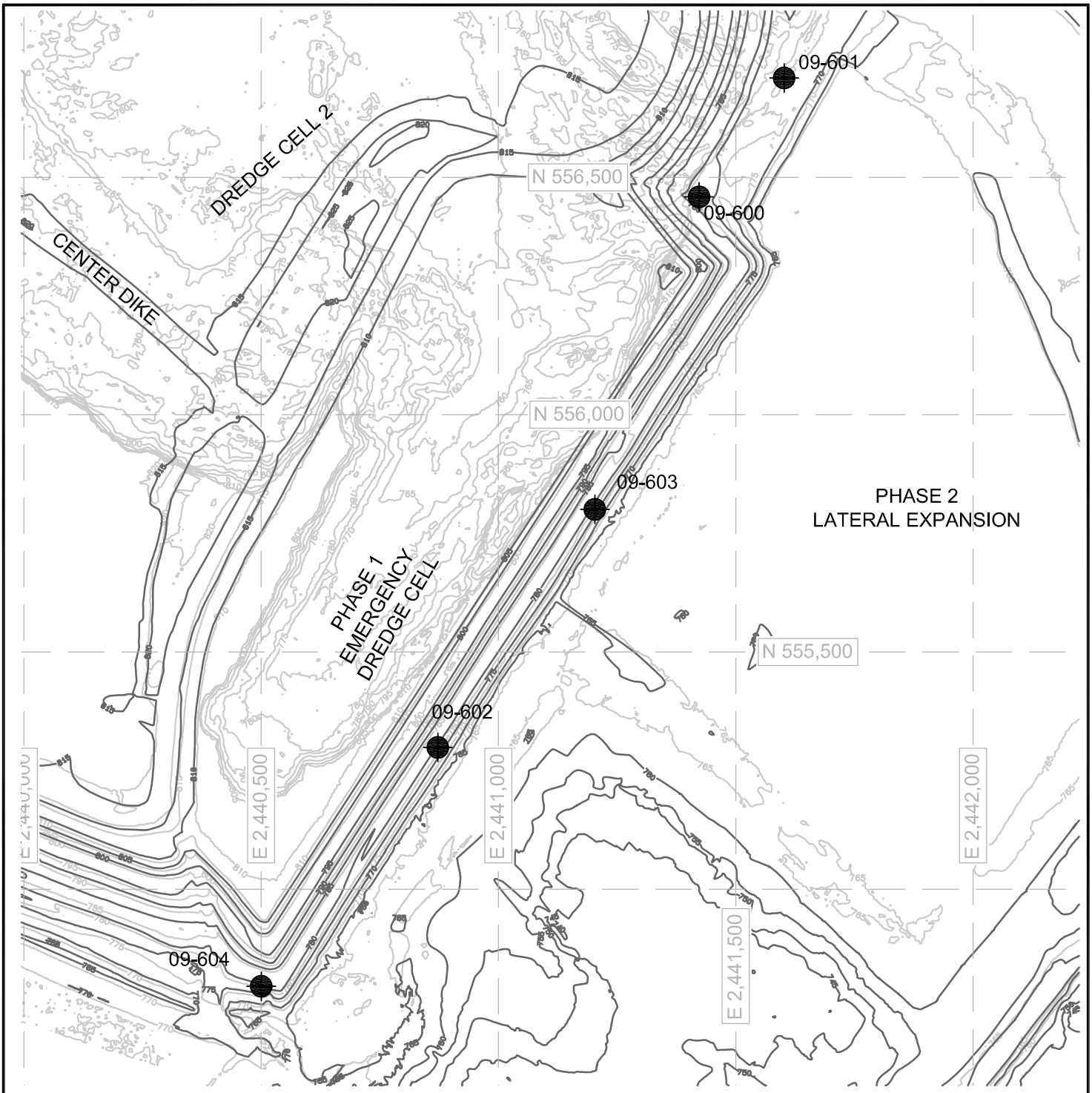
ARCHITECT-ENGINEER
OGC

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 +768.11 (Continued)		
45.0							
50.0		RB					
55.0					**Pneumatic Piezometer installed at 54.0 ft.**		
59.0					59.0 **Pneumatic Piezometer installed at 58.0 ft.**		
					End of Boring Borehole advanced to 7.0 ft. with power auger. Borehole advanced from 7.0 to 59.0 ft. with rock bit and drilling fluid. Casing used: 7.5 ft. of 4 in. Pneumatic Piezometers installed at 20.5, 33.0, 39.0, 54.0 and 58.0 ft. 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 **3/15/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **556834.33**	BORING COMPLETED **3/15/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2439908.3**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**



LEGEND

09-600 600 SERIES SOIL BORINGS AND CPTu SOUNDINGS LOCATIONS (AECOM 2009)

PRE-FAILURE CONTOURS

POST FAILURE CONTOURS

NOTES:
1. BASE MAP BASED ON LIDAR DATA COLLECTED ON DECEMBER 24, 2008
2. HORIZONTAL DATUM: NAD 27 (TENNESSEE LAMBERT)
3. VERTICAL DATUM: NGVD 29

N

0 300

1" = 300'

AECOM

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600 SERIES EXPLORATION LOCATION

ROOT CAUSE ANALYSIS
TVA KINGSTON DREDGE CELL FAILURE
ON DECEMBER 22, 2008
KINGSTON FOSSIL PLANT
HARRIMAN, TENNESSEE

Drawn :	DJD	6/12/2009
Checked:	LWB	6/12/2009
Approved:	WHW	6/12/2009
PROJECT NUMBER	60095742	
FIGURE NUMBER	2E-6	

09-600 Series

AECOM

Boring/Sounding ID	Ground Surface Elevation (GSE)	Easting	Northing
09-600	776.35	2,441,424.47	556,462.75
09-600A	777.30	2,441,420.77	556,462.43
09-600B	776.66	2,441,421.34	556,470.71
09-601	773.44	2,441,602.14	556,709.83
09-601A	775.08	2,441,601.62	556,707.26
09-601B	775.05	2,441,608.65	556,706.84
09-602	781.50	2,440,865.75	555,306.82
09-602A	781.10	2,440,865.49	555,315.89
09-602B	781.42	2,440,861.82	555,302.15
09-603	780.61	2,441,187.46	555,809.89
09-603A	780.55	2,441,185.06	555,805.42
09-603B	780.56	2,441,182.45	555,801.16
09-604	782.48	2,440,526.16	554,800.42
09-604A	782.39	2,440,515.37	554,803.16
09-604B	782.36	2,440,521.03	554,801.95
09-605	781.74	2,441,498.35	556,277.45
09-605A	781.81	2,441,493.19	556,269.03
09-605B	781.64	2,441,498.96	556,273.05

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-600**

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 +776.35	
	1	SS			Fill: Silty fine sand-sized ash, trace clay - gray - loose to medium dense - moist (SM) (FA) Unfailed	
	2	SS				
5.0	3	SS				
					6.0	
	4	SS			Fill: Sandy silt-sized ash - gray - medium dense to very loose - moist (ML) (FA) Unfailed	
	5	SS				
10.0	6	SS			Sample 6: Brown silty clay intermixed with ash	
					12.0	
	7	SS			Fill: Silt-sized ash, trace clay and fine sand - gray - very loose - saturated (ML) (FA) Unfailed	
15.0					15.0 Sample 7: One hammer blow advanced sampler 36 in.	
	8	SS			Fill: Silty fine to medium sand-sized ash, trace fine gravel - gray - medium dense - moist (SM) (BA) Unfailed	
					17.0	
	9	SS			Fill: Sandy silt-sized ash, little clay, trace fine gravel - gray - loose to very loose - saturated (ML) (FA) Unfailed	
20.0	10	SS			Sample 9: Fine to medium gravel.	
	11	SS				
	12	SS				
25.0	13	SS				
	14	SS			28.3	
	14A	SS			28.5 Fill: Silty fine to medium sand-sized ash, little fine gravel - gray - very loose - saturated (SM) (FA) Unfailed	
	14B	SS				
30.0	15	SS			29.0	
	15A	SS			30.0 Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose - saturated (ML) (FA) Unfailed	
	16	SS*				
	16A	SS			Fill: Silty fine sand-sized ash, trace clay - gray - very loose - saturated (SM) (FA) Unfailed	
35.0	17	SS			Fill: Silt-sized ash, little clay, trace fine sand - gray - very loose - saturated (ML) (FA) Unfailed	
	18	SS			Sample 16A: WOH advanced sampler 2.5 ft. Sample 18: Final hammer blow advanced sampler from 36.5 to 38.5 ft.	
40.0	19	SS			Sample 20: Final hammer blow advanced sampler from 42.0 to 43.0 ft.	
	20	SS				

5 22 26 16 10 2 WOH 12 3 5 2 1 WOH WOH WOH WOH * 2 * 1 3 2 WOH

. . . 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

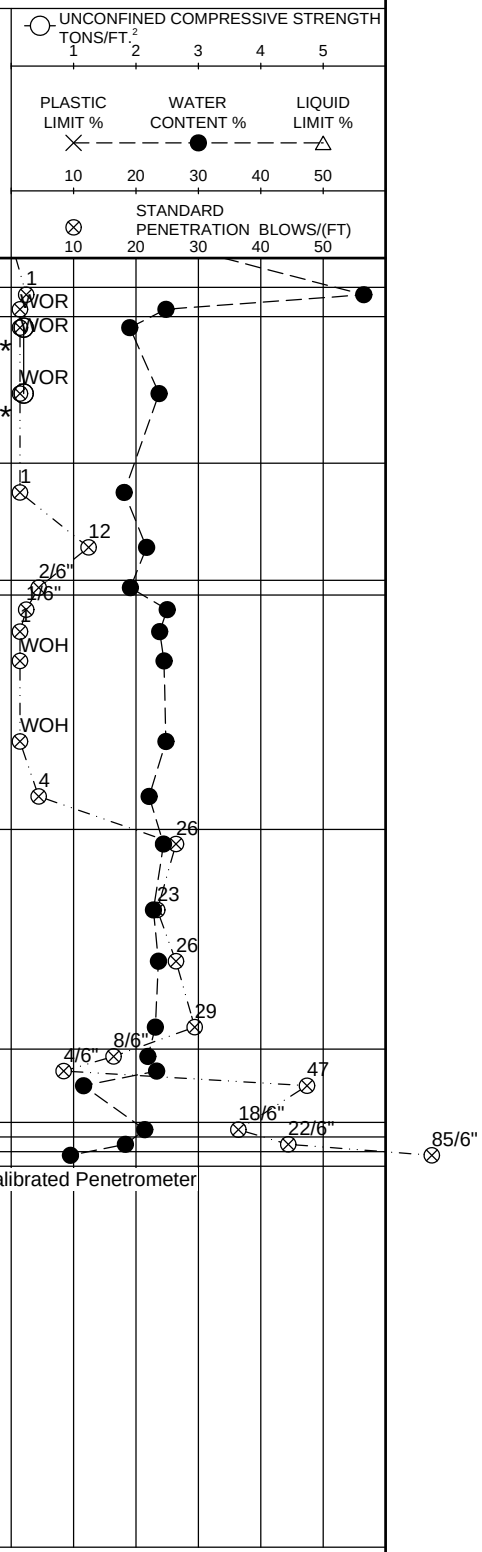
SHEET NO. 1 OF 2

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-600**
	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 +776.35 (Continued)	
45.0		21	SS			45.0	
		21A	SS				
		22	SS*			46.0 Silt, little clay with interbedded silt-sized ash slimes - gray with black seams - very loose - moist (ML) (FA)	
		22A	SS			Unfailed Sample 21A: Organic Content = 3.49%	
50.0		23	SS			Silty clay, little fine to medium sand - gray and brown - soft to medium (CL) Sample 22: WOR advanced sampler 2.5 ft. Sample 23: WOR advanced sampler 3.0 ft.	
		24	SS			51.0 Sandy silt, little clay - brown and gray - very loose to medium dense - moist to wet (ML)	
		25	SS				
55.0		26	SS*			55.0 55.5 Silty fine to medium sand, trace clay - brown and gray - loose - moist to wet (SM)	
		26A	SS				
		26B	SS				
		27	SS			Silty fine to medium sand - brown and gray - very loose to loose - saturated (SM)	
60.0		28	SS				
		29	SS			63.5	
65.0		30	SS			Silty fine to medium sand - brown and gray - medium dense - saturated (SM)	
		31	SS				
		32	SS				
70.0		33	SS			71.0	
		33A	SS			Silty fine to medium sand - light brown - loose to dense - saturated (SM)	
		34	SS*				
		34A	SS			Sample 34A: Medium to coarse gravel noted	
		35	SS*			73.5 74.0 Silty fine to coarse sand, little clay, trace fine gravel -	
		35A	SS				
75.0		35B	SS			74.5 brown to black and gray - dense - wet (SM)	
						75.0 Clayey silt, little fine to coarse sand, trace shale - brown - dense - moist (ML)	
						Weathered shale - gray	
						End of Boring	
						Boring advanced to 15.0 ft. with power auger.	
						Boring advanced from 15.0 to 73.5 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	BORING STARTED	AECOM OFFICE	
10.0 ft. WS	**1/17/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
556462.75	**1/18/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441424.47	**Mobile B-57 (V.H.)/MB**	**RCR**	**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 **09-600A**

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 +777.30	
5.0		PA				
10.0						
15.0						
20.0						
25.0		RB				
30.0						
35.0						
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 6/8/09

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-600A**
	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 +777.30 (Continued)		
45.0		RB			Disturbed samples retrieved following completion of vane shear testing. Sample 1: No recovery with Shelby tube. Pushed split-spoon for recovery. Recovery was possible wash.		
45.5	1	SS			Fill: Silt-sized ash, trace fine sand, little clay - gray - saturated (ML) (FA) Unfailed Sample 1: No recovery with Shelby tube. Pushed split spoon for recovery. Recovered sample was possible wash.		
47.5	2	ST			Silty clay and fine to medium sand - brown and gray - very stiff to stiff (CL) Vane Shear Test #1 at 47.5 ft. Peak Su = 1925 psf, Remolded Su = 700 psf Vane Shear Test #2 at 48.8 ft. Peak Su = 1600 psf, Remolded Su = 350 psf		* *
49.5	3	ST			Silty clay, little fine to medium sand - brown - medium to stiff (CL) Vane Shear Test #3 at 51.5 ft. Peak Su = 1925 psf, Remolded Su = 325 psf		* *
50.0					End of Boring Boring advanced to 6.0 ft. with power auger. Boring advanced from 6.0 to 49.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 10 ft. of 4 in.		
51.5							

*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 @ 6.0 ft.	**3/9/09**	**Chicago Area - 01**	
NORTHING **556462.43**	BORING COMPLETED **3/9/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441420.77**	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 6/8/09

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-600B**

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 +776.66	
5.0		PA			.	
10.0						
15.0						
20.0		RB				
25.0						
30.0						
32.0						
	1	OST			Silt-sized ash, little fine sand - gray - saturated (ML) (FA) Unfailed	
34.5 / 35.0					.	
		RB				
40.0						
					. . . continued	

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

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**

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-600B**
	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 +776.66 (Continued)		
		RB		.		
				44.0		
45.0	2	OST		See UMass Direct Shear Test results (DeGroot, 2009) for Sample 2 description. **Piezometer Installed at 46.0 ft.**		
				46.5		
	3	OST		Sample 3: No recovery of sample. Sample lost in borehole during retrieval.		
				49.0		
50.0	4	OST		Clayey silt, little fine to medium sand - brown and gray - saturated (CL-ML)		
				51.5		
		RB		.		
55.0				55.0		
	5	OST		Silt, trace clay and sand - brown - saturated (ML) **Piezometer Installed at 56.0 ft.**		
57.5				57.5		
				End of Boring Boring advanced to 8.0 ft. with power auger. Boring advanced from 8.0 to 57.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 10 ft. of 4 in. Piezometers installed at 46.0 and 56.0 ft. (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	
Not Observed	**1/19/09**	**Chicago Area - 01**	
NORTHING **556470.71**	BORING COMPLETED **1/19/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441421.34**	RIG/FOREMAN **D-50/RT**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

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

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 +773.44	
			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)	
5.0		2	SS			(FA) Unfailed 5.0	
		3	SS			Fill: Silty fine to medium sand-sized ash, trace clay - brown and gray - medium dense - moist (SM) (FA) Unfailed	
		4	SS			7.0 Sample 3: Sample intermixed with brown silty clay.	
10.0		5	SS			9.0 Fill: Silt-sized ash, little fine sand - gray - loose - moist (ML) (FA) Unfailed	
		6	SS			Fill: Fine to medium sand-sized ash, little silt - gray - medium dense - moist (SP-SM) (FA) Unfailed	
		7	SS				
15.0						15.0	
		8	SS			Fill: Silty fine to coarse sand-sized ash, little clay - gray - loose - moist (SM)	
						17.0 (BA) Unfailed	
		9	SS			Fill: Sandy silt-sized ash, little clay - gray - loose - moist (ML)	
20.0		10	SS			19.0 (FA) Unfailed	
		11	SS			Fill: Silty fine to coarse sand-sized ash - gray - medium dense to very loose - moist (SM) (FA & BA) Unfailed	
		12	SS				
25.0		13	SS				
		14	SS			29.5	
30.0		15	SS			Fill: Silt-sized ash, little fine sand - gray - loose to very loose - wet (ML) (FA) Unfailed	
		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				
		19B	SS			39.5 Silty clay, little fine to medium sand - brown and gray - soft to medium (CL)	
40.0		20	SS				
		20A	SS			Clayey silt, little fine sand - brown - medium dense to very loose - moist (CL-ML)	

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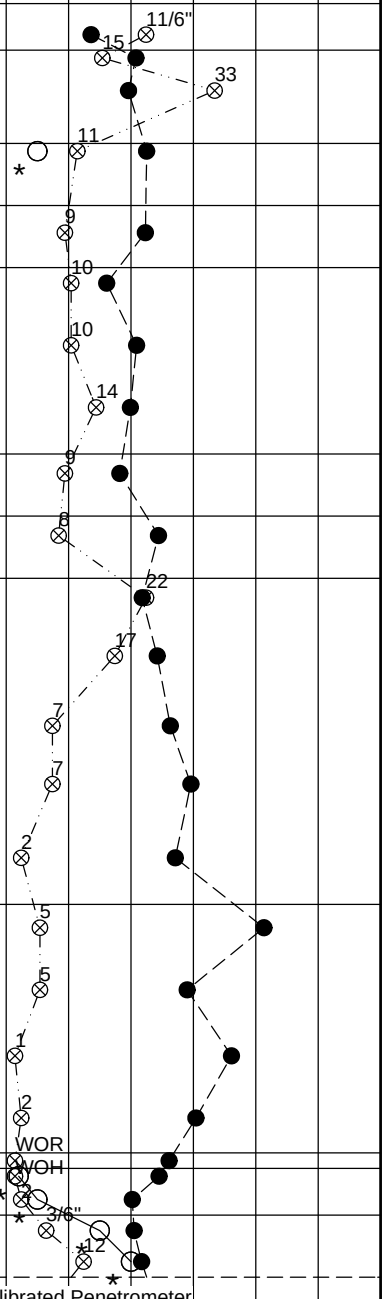


* Calibrated Penetrometer

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**

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 +773.44 (Continued)		
	21	SS			Clayey silt, little fine sand - brown - medium dense to very loose - moist (CL-ML)		3
45.0	22	SS					
					45.5		
	23	SS			Silty sand, little clay - brown - very loose to medium dense - saturated (SM)		1
	24	SS					3
50.0							
	25	SS					WOH
					52.0 Sample 25A: Sample noted as wet - not saturated		7/6"
	25A	SS			Sandy silt, little clay - brown - very loose - saturated (ML)		
	26	SS					WOH
55.0							
	27	SS					WOH
	28	SS*			58.0		WOH
	28A	SS			Sandy silt, little clay - gray - very loose - saturated (ML)		WOH
60.0							
	29	SS					1
					62.5		
	30	SS			Silty fine to medium sand, trace clay - gray - medium dense - moist to wet (SM)		10
					64.5		
65.0	31	SS*			65.0 Sandy silt, trace clay - brown, black and gray - very loose - saturated (ML)		WOH
	31A	SS			65.5		WOH
	31B	SS			Silty fine to medium sand, trace clay and fine gravel - brown and gray - very loose - wet (SM)		61
	32	SS					42
					68.5 Silty fine to medium sand, trace fine gravel - brown and gray - dense to very dense - wet (SM)		150/6"
69.0	33	SS*			69.0 Clayey silt, little sand and fine to coarse gravel and weathered shale - brown and black - extremely dense - moist (CL-ML)		

* Calibrated Penetrometer

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

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	BORING COMPLETED	ENTERED BY	SHEET NO. OF
556709.83	**1/19/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441602.14	**Mobile B-57 (V.H.)/MB**	**RCR**	**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: **09-601A**

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 +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**

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 Vane Shear Test #3 at 42.5 ft. Peak Su = 3775 psf, Remolded Su = 975 psf	
					44.0	
45.0	3	ST				
					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.	

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)

* 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**

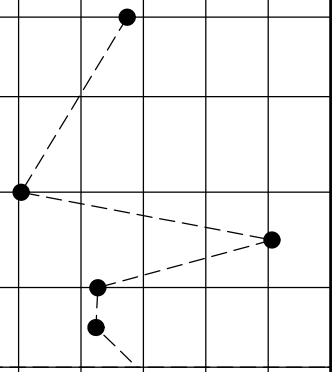
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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						
					29.5 Recovery information not available	
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**

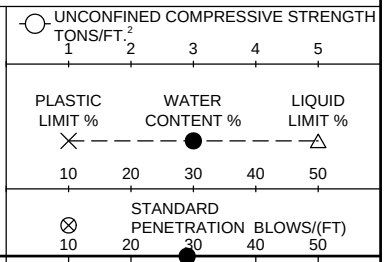
SHEET NO. **1** OF **2**

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

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
					SURFACE ELEVATION +775.05 (Continued)	
	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	BORING STARTED	AECOM OFFICE	
Not Observed	3/17/09	Chicago Area - 01	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
556706.84	3/17/09	KKB	2 2
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441608.65	D-50/RT	RCR	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: **09-602**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

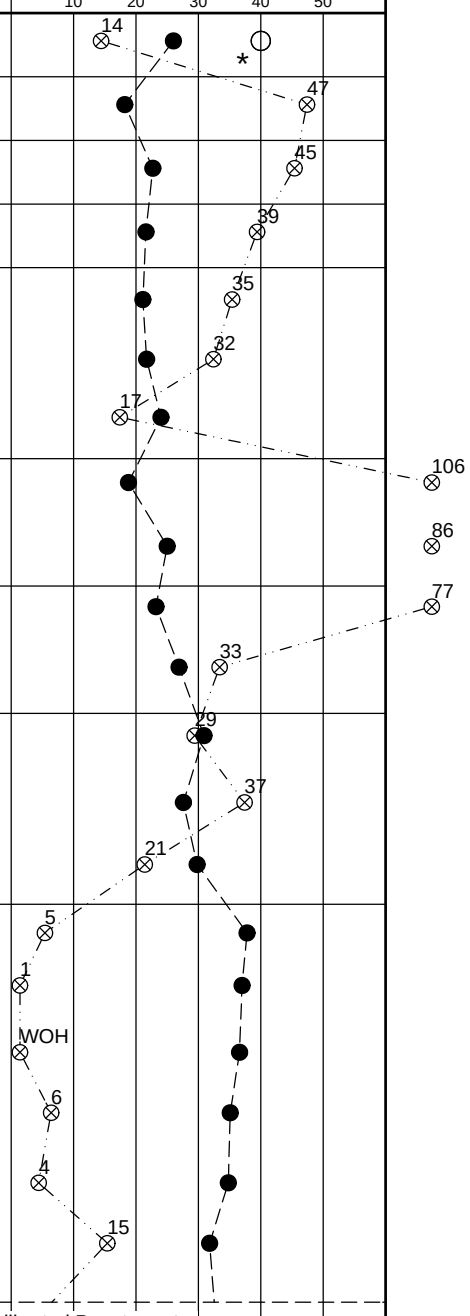
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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 +781.50	
	1	SS			Fill: Silty clay, little fine gravel and fine to coarse sand - reddish brown - hard (CL)	
					2.0	
	2	SS			Fill: Silty fine to medium sand-sized ash, little clay - gray - dense - moist (SM) (BA) Unfailed	
					4.0	
5.0	3	SS			Fill: Silt-sized ash, little fine sand - gray - dense - moist (ML) (FA) Unfailed	
					6.0	
	4	SS			Fill: Silty fine to medium sand-sized ash, little clay - gray - dense - moist (SM) (FA) Unfailed	
					8.0	
	5	SS			Fill: Sandy silt-sized ash - gray - dense to medium dense - moist (ML) (FA) Unfailed	
10.0	6	SS				
	7	SS				
					14.0	
15.0	8	SS			Fill: Silty fine to coarse sand-sized ash, little clay and fine to medium gravel - gray - extremely dense - moist (SM) (BA) Unfailed	
	9	SS				
					18.0	
	10	SS			Fill: Sandy silt-sized ash, little fine gravel - gray - extremely dense to dense - moist (ML) (FA) Unfailed	
20.0	11	SS				
					22.0	
	12	SS			Fill: Silty fine to coarse sand-sized ash, little fine to medium gravel - gray - medium dense to dense - saturated (SM) (BA) Unfailed	
25.0	13	SS				
	14	SS				
					28.0	
	15	SS			Fill: Silt-sized ash, little fine sand - gray - very loose to medium dense - saturated (ML) (FA) Unfailed	
30.0	16	SS				
	17	SS				
35.0	18	SS				
	19	SS				
	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 3

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-602**

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 +781.50 (Continued)	
	21	SS			Fill: Silt-sized ash, little fine sand - gray - very loose to medium dense - saturated (ML) (FA) Unfailed Sample 21: Final blow advanced sampler 2 ft.	
	22	SS				
					44.5	
45.0	22A	SS			45.0 Fill: Medium to coarse sand-sized ash, trace silt - gray - loose - saturated (SP) (BA) Unfailed	
	23	SS			45.8	
	23A	SS			46.1 Fill: Sandy silt-sized ash - gray - very loose - saturated (ML) (FA) Unfailed	
	23B	SS			Fill: Medium to coarse sand-sized ash, trace fine gravel - gray - loose - saturated (SP) (BA) Unfailed	
50.0	24	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose - saturated (ML) (FA) Unfailed Sample 23B: Final blow advanced sampler 1 ft. No recovery from 51 to 53 ft.	
	.	SS				
	25	SS				
55.0					55.0	
	26	SS			Silty clay, little fine to medium sand - brown - stiff (CL)	
	27	SS			Sample 27: Gray fine sand inclusions noted.	
60.0	28	SS				
					61.0	
	29	SS			Clayey silt, little to some fine to medium sand - brown - medium to stiff (CL-ML)	
	30	SS			64.0	
65.0	30A	SS			Sandy clay, some silt - stiff to soft (CL)	
	31	SS			66.0	
	31A	SS			Silty fine to medium sand, little to some clay - gray - very loose - saturated (SM)	
	32	SS				
70.0	33	SS			Sample 33: WOH advanced sampler 3 ft.	
	34	SS			73.0	
	34A	SS			Clayey silt, little to some fine to medium sand, trace organics - gray - very loose - moist (CL-ML)	
75.0	35	SS				
					76.5	
	36	SS*			77.0 Fine to medium sand, little silt - gray - medium dense - moist (SP-SM)	
	36A	SS			78.5 Silty fine to coarse sand, little fine gravel - brown and gray - extremely dense - saturated (SM) Weathered shale noted.	
80.0		RB			Apparent bedrock	

. . . 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**

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-602**
	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 +781.50 (Continued)		
		RB			Apparent bedrock		
85.0					85.0		
					End of Boring Boring advanced to 10.0 ft. with power auger. Boring advanced from 10.0 to 85 ft. with rock bit and drilling fluid. Borehole grouted and inclinometer installed to 85 ft. 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	
14.0 ft. WD	**3/11/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
555306.82	**3/12/09**	**KKB**	**3 3**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440865.75	**Mobile B-57 (V.H.)/MB**	**RCR**	**60095742**

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-602A**

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 +781.10	
5.0		PA				
10.0						
15.0						
20.0						
25.0						
30.0		RB				
35.0						
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 6/8/09

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-602A**
	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 +781.10 (Continued)	
45.0					Disturbed samples retrieved following completion of vane shear testing.	
50.0					Sample 1: No recovery with Shelby tube. Pushed 3 in. split spoon to obtain sample recovery.	
55.0	1	SS			55.0 Silty clay, little fine to medium sand - brown - stiff (CL) Vane Shear Test #1 at 55.5 ft. Peak Su = 1350 psf, Remolded Su = 750 psf	
		RB			57.0	
60.0					Vane Shear Test #2 at 62.5 ft. Peak Su >2050 psf	
	2	ST			61.5 Clayey silt, little fine to medium sand - brown - very stiff - moist (CL-ML)	
	3	ST			63.5 Clayey silt and fine sand - gray - saturated - very stiff to stiff (CL-ML) Vane Shear Test #3 at 63.5 ft. Peak Su = 3975 psf, Remolded Su = 1350 psf	
65.0	4	SS			65.5 Vane Shear Test #4 at 64.5 ft. Peak Su = 1450 psf, Remolded Su = 600 psf	
67.5					67.5 Silty fine to medium sand, little clay - gray - saturated (SM) Sample 4: No recovery with Shelby tube. Pushed 3 in. split-spoon to obtain sample recovery. Vane Shear Test #5 at 66.0 ft. Peak Su = 1600 psf, Remolded Su = 475 psf	
					End of Boring Boring advanced to 8 ft. with power auger. Borehole advanced from 8 ft to 65.5 ft. with rock bit and drilling fluid. Borehole grouted after completion. Casing used: 10 ft. of 4 in. Automatic-Mobile Hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 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	
Not Observed	**3/19/09**	**Chicago Area - 01**	
NORTHING **555315.89**	BORING COMPLETED **3/19/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440865.49**	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

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-602B**

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 +781.42		
					.		
5.0		PA					
10.0							
15.0							
20.0		RB					
25.0					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.		
30.0							
					32.0		
	1	OST			Sample 1 was not opened.		
	1A	OST			34.5		
35.0							
40.0							
		RB					
					. . . continued		

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-602B**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +781.42 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
45.0					48.0	
	2	OST			Sample 2 was not opened.	
50.0	2A	OST			50.5	
	3	OST			Sample 3 was not opened.	
	3A	OST			53.0	
		RB			54.0	
55.0	4	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 4 description.	
	4A	OST			56.5	
60.0		RB				
65.0					65.0	
	5	OST			Sandy silt, little clay - gray - saturated (ML)	
	5A	OST			67.5	
		RB				
70.0					70.0	
	6	OST			Sample 6 was not opened.	
72.5	6A	OST			72.5	
					End of Boring Boring advanced to 8 ft. with power auger. Borehole advanced from 8 ft. to 70 ft. with rock bit and drilling fluid. Borehole grouted after completion. Casing used: 23 ft. of 4 in.	

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)

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

WL: **Not Observed**	BORING STARTED: **3/18/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555302.15**	BORING COMPLETED: **3/18/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2440861.82**	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 6/8/09

AECOM	CLIENT: Tennessee Valley Authority	LOG OF BORING NUMBER: 09-603
	PROJECT NAME: Kingston Dredge Cell Failure RCA	ARCHITECT-ENGINEER: OGC

SITE LOCATION: 714 Swan Pond Road; Harriman, Tennessee

SURFACE ELEVATION +780.61

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL
	1	SS			1.2 Fill: Silty clay, little fine to coarse sand, trace fine to coarse gravel - reddish brown - very stiff (CL) Bottom ash seam noted from 0.4 to 0.8 ft.
	2	SS			Fill: Silt-sized ash, little fine sand - gray - dense to medium dense - moist to saturated (ML) (FA) Unfailed
5.0	3	SS			
	4	SS			
	5	SS			
10.0	6	SS			
	7	SS			
15.0	8	SS			
	9	SS			16.4 Fill: Silty fine to coarse sand-sized ash, little fine to medium gravel - gray - medium dense - saturated (SM) (BA) Unfailed
20.0	10	SS			
	11	SS			
	12	SS			22.8 Fill: Silt-sized ash, little fine sand - gray - medium dense to very loose - saturated (ML) (FA) Unfailed
25.0	13	SS			
	14	SS			Sample 14: WOR and one blow advanced sampler 3.5 ft.
30.0	15	SS			Sample 15: One blow advanced sampler 2.5 ft.
	16	SS			
35.0	17	SS			
	18	SS			36.0 Fill: Silty fine to medium sand-sized ash - gray - medium dense - saturated (SM) (FA & BA) Unfailed
	19	SS			38.6 Fill: Silt-sized ash, little fine sand - gray - very loose to loose - saturated (ML) (FA) Unfailed
40.0					

. . . 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)

13, *, 37, 24, 36, 55, 18, 49, 58, 26, 18, 20, 10, 2, WOH, WOH, WOR, 6, 10, 2

*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 6/8/09

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-603**

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 +780.61 (Continued)		
	20	SS			Fill: Silt-sized ash, little fine sand - gray - very loose to loose - saturated (ML) (FA) Unfailed		4
	21	SS					2
45.0	22	SS					2
	23	SS					5
	24	SS					3
50.0					50.5		WOH
	25	SS			Silty clay, trace fine sand - gray - soft (CL)		
					52.5		
	26	SS			Silty fine to medium sand, little to some clay - brown with gray - loose to medium dense - moist (SM)		6
55.0	27	SS					6
	28	SS					6
	29	SS					14
60.0	30	SS					5
					62.5		
	31	SS			Silty fine to medium sand, some clay - gray - very loose - wet (SM)		WOH
					64.5		
65.0	32	SS			Silty fine to medium sand, little to trace clay - gray - very loose to loose - saturated (SM)		WOR
	33	SS					4
					69.0		
70.0	34	SS			Silty fine to medium sand, trace clay - gray - medium dense - saturated (SM)		13
	35	SS					12
	36	SS					17
75.0					75.0		
76.0	37	SS			Weathered shale - gray		63/6"
					76.0		
					Pneumatic Piezometer installed at 76.0 ft		* Calibrated Penetrometer
					End of Boring Boring advanced to 10.0 ft. with power auger. Boring advanced from 10.0 to 76.0 ft. with rock bit and drilling fluid. Pneumatic piezometer installed at 76 ft. Borehole backfilled upon completion.		
					. . . 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 6/8/09

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-603**

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 +780.61 (Continued)		
					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 **12.0 ft. WS; 10.0 ft. BCR; 8.0 ft. ACR**	BORING STARTED **3/9/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **555809.89**	BORING COMPLETED **3/10/09**	ENTERED BY **KKB**	SHEET NO. **3** OF **3**
EASTING **2441187.46**	RIG/FOREMAN **Mobile B-57 (V.H.)/MB**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-603A**

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 +780.55		
5.0					.		
10.0							
15.0							
20.0		RB					
25.0							
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 **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: 09-603A
	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 +780.55 (Continued)		
45.0		RB			**Pneumatic Piezometer installed at 48.0 ft.**		
50.0					Vane Shear Test #1 at 51.5 ft. Peak Su >1900 psf		
55.0							
56.0					56.0 **Pneumatic piezometer installed at 56.0 ft.**		
					End of Boring Borehole advanced to 56.0 ft. with rock bit and drilling fluid. Pneumatic piezometers installed at 48.0 and 56.0 ft. 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	BORING STARTED	AECOM OFFICE	
Not Observed	3/10/09	Chicago Area - 01	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
555805.42	3/10/09	KKB	2 2
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441185.06	Mobile B-57 (V.H.)/MB	RCR	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: **09-603B**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

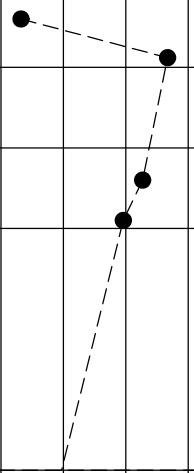
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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 +780.56	
5.0		PA			.	
10.0						
15.0		RB				
20.0						
25.0					25.0	
	1	OST			Fill: Silt-sized ash, trace fine gravel, trace fine to coarse sand - gray - saturated (ML) (FA) Unfailed	
	1A	OST			27.5	
		RB				
30.0					30.0	
	2	OST			Fill: Silt-sized ash, trace fine to medium sand - gray - saturated (ML) (FA) Unfailed	
	2A	OST			32.5	
35.0		RB				
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**

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-603B**
	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 +780.56 (Continued)	
	3	OST			Fill: Silt-sized ash, trace fine gravel, trace fine to coarse sand - gray - saturated (ML) (FA) Unfailed	
					42.5	
		RB				
45.0					45.0	
	4	OST			Fill: Silt-sized ash, trace fine gravel, trace fine to coarse sand - gray - saturated (ML) (FA) Unfailed	
	4A	OST			47.5	
		RB				
					49.0	
50.0	5	OST			Fill: Silt-sized ash, trace fine to medium sand, some clay - gray - saturated (ML) (FA) Unfailed	
51.5	5A	OST			51.5	
					End of Boring Borehole advanced to 10.0 ft. with power auger. Borehole advanced from 10.0 ft. to 49.0 ft. with rock bit and drilling fluid. Casing used: 10 ft. of 4 in. Borehole grouted upon completion.	

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	**3/10/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
555801.16	**3/11/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441182.45	**Mobile B-57 (V.H.)/MB**	**RCR**	**60095742**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-604**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +782.48

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 gravel - reddish brown - stiff to very stiff (CL)	
		2	SS				
						3.0	
		2A	SS			Fill: Sandy silt-sized ash - gray - medium dense to loose - moist to wet (ML) (FA) Unfailed	
5.0		3	SS				
		4	SS			Obstruction encountered at 4.5 ft. Boring offset 10 ft. Reported elevation and coordinates reflect offset boring location.	
		5	SS				
10.0		6	SS				
		7	SS				
						14.0	
15.0		8	SS			Fill: Silty fine to coarse sand-sized ash, trace silt - gray - dense to medium dense - saturated to wet (SM) (BA) Unfailed	
		9	SS				
						18.0	
		10	SS			Fill: Silty fine to coarse sand-sized ash - gray - medium dense - wet (SM) (FA & BA) Unfailed	
20.0		11	SS				
						22.0	
		12	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray- loose - saturated (ML) (FA) Unfailed	
25.0		13	SS				
		14	SS			Sample 14: Organic material and wood fragments noted	
						28.0	
		15	SS			Fill: Fine to coarse sand-sized ash, trace silt and fine gravel - gray - very loose to medium dense - saturated (SP) (BA) Unfailed	
30.0		16	SS				
		17	SS				
						33.5	
		17A	SS			34.0 Fill: Silty fine to medium sand-sized ash - gray - medium dense - saturated (SM) (FA) Unfailed	
35.0		18	SS				
						36.0 Fill: Sandy silt-sized ash, little clay, trace fine gravel - gray - medium dense - saturated (ML) (FA & BA) Unfailed	
		19	SS				
		20	SS			Fill: Silty fine to coarse sand-sized ash, little gravel, trace clay - gray - medium dense to very loose - saturated (SM) (BA) Unfailed	
40.0							

. . . continued

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) (5 10 20 30 40 50)

7/6" 10 11 8 7 23 26 35 27 14 10 15 7 5 3 5 10 13/6" 26 21 12

*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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-604**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

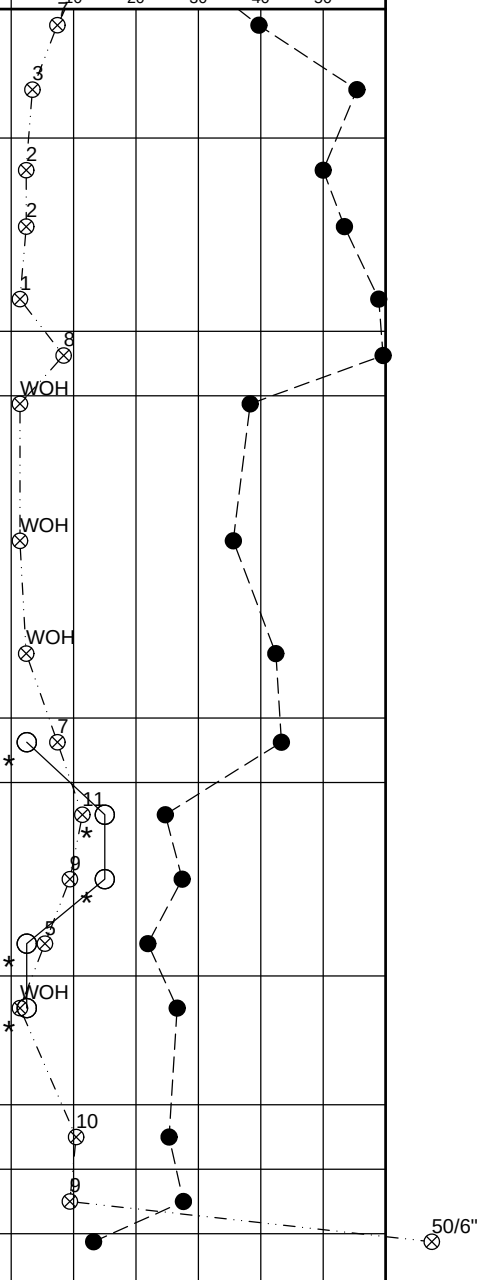
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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 +782.48 (Continued)	
	21	SS			Fill: Silty fine to coarse sand-sized ash, little gravel, trace clay - gray - medium dense to very loose - saturated (SM) (BA) Unfailed	
	22	SS				
					44.0	
45.0	23	SS			Fill: Silt-sized ash, little fine sand and clay - gray - very loose - saturated (ML) (FA) Unfailed	
	24	SS				
	25	SS				
50.0					50.0	
	26	SS			Fill: Silty fine to coarse sand-sized ash, little clay - gray - loose - saturated (SM) (BA) Unfailed	
					52.0	
	27	SS			Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose - saturated (ML) (FA) Unfailed Sample 27, 28: Sampler fell 42 inches following one hammer blow	
55.0	28	SS				
60.0	29	SS			Sample 29: Sampler fell 36 inches following two hammer blows	
					62.0	
	30	SS			Silty clay, little fine to medium sand - brown and gray - soft (CL)	
					64.0	
65.0	31	SS			Silty clay, little to some fine to medium sand - brown and gray - stiff to soft (CL)	
	32	SS				
	33	SS				
70.0					70.0	
	34	SS			Silty clay, some fine sand - gray - soft (CL) Sample 34: Sampler fell 48 inches following one hammer blow	
					74.0	
75.0	35	SS			Silty fine to medium sand - gray - medium dense - saturated (SM) Sample 35: WOR for first 12 inches	
					76.0	
	36	SS			Fine to medium sand, trace silt - gray - loose - saturated (SP)	
					78.0	
	37	SS			Silty fine to medium sand, little fine gravel - gray - extremely dense - saturated (SP-SM)	
80.0		RB			80.0	
					. . . 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. 2 OF 3

WORK IN PROGRESS WITH DATE 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/8/09

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-604**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +782.48 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE / RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
	RUN 1	DB		81.5 Run # 1 — Depth (ft.) 80.0 - 81.5 — Recovery (%) 0 — RQD (%) --- — Fracture Frequ. ---	
		RB		83.0 Rock bit to 83.0 ft.	
85.0	RUN 2	DB		Conasauga Shale. Dark grayish black to black shale. Fresh, moderately hard, fissile zones, highly fractured, finely laminated to thinly bedded. Some fractures display slickensides. Bedding approx. 15º - 20º from horizontal. Run # 2 — Depth (ft.) 83.0 - 88.0 — Recovery (%) 76.0 — RQD (%) 0 — Fracture Frequ. 1 - 3 / ft.*	
				88.0 *Likely higher but core shattered by drilling.	
90.0	RUN 3	DB		Conasauga Shale. Dark grayish black to black shale. Fresh, moderately hard, fissile zones, highly fractured, finely laminated to thinly bedded. Some fractures display slickensides. Bedding approx. 15º - 20º from horizontal. With high angle fractures visible in larger pieces. Run # 3 — Depth (ft.) 88.0 - 94.0 — Recovery (%) 55.0 — RQD (%) 0 — Fracture Frequ. > 10 / ft.	
94.0				94.0 End of Boring	

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)

* Calibrated Penetrometer

Boring advanced to 10.0 ft. with power auger.
Boring advanced from 10.0 to 83.0 ft. with rock bit and drilling fluid.
Boring advanced from 83.0 to 94.0 ft. with diamond coring bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 8.5 ft. of 4 in. and 83.0 ft. of 3 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: **14.0 ft. WS**	BORING STARTED: **2/26/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **554800.42**	BORING COMPLETED: **2/27/09**	ENTERED BY: **KKB**	SHEET NO. **3** OF **3**
EASTING: **2440526.16**	RIG/FOREMAN: **Mobile B-57 (V.H.)/MB**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

ROCK CORE PHOTOGRAPHIC LOG

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

Photo No.	**Date:**
09-604	3-22-2009

Direction Photo Taken:

Vertical

Description:

Boring 09-604
Runs 1, 2, & 3
(80.0 – 94.0')

Conasauga Shale

Run 1 had no recovery.

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-604A**

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 +782.39	
5.0		PA				
10.0						
15.0						
20.0						
25.0		RB				
30.0						
35.0						
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 6/8/09

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-604A**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +782.39 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
45.0						
50.0		RB				
55.0					Disturbed samples retrieved following completion of vane shear testing.	
60.0					Vane Shear Test #1 at 62.5 ft. Peak Su = 2025 psf, Remolded Su = 850 psf **Pneumatic Piezometer installed at 63.0 ft.** Vane Shear Test #2 at 64.5 ft. Peak Su = 3575 psf, Remolded Su = 1400 psf	
64.0						
65.0	1	ST			Silty clay, little to some fine to medium sand - gray - very stiff (CL) Vane Shear Test #3 at 66.5 ft. Peak Su = 3550 psf, Remolded Su = 1350 psf	
	2	ST				
68.0		ST			Vane Shear Test #4 at 68.5 ft. Peak Su = 2750 psf, Remolded Su = 850 psf	
70.0					No recovery from 68 to 70 ft.	
	3	ST			Silty fine sand, little clay - gray (SM) Vane Shear Test #5 at 70.5 ft. Peak Su = 2350 psf, Remolded Su = 550 psf	
72.0	4	ST			Clayey silt, little fine to medium sand - gray - saturated (CL-ML)	
74.0					Vane Shear Test #6 at 72.0 ft. Peak Su = 2175 psf, Remolded Su = 500 psf Vane Shear Test #7 at 74.0 ft. Peak Su = 3450 psf, Remolded Su = 825 psf End of Boring Boring advanced to 8 ft. with power auger. Borehole advanced from 8 ft to 74 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Pneumatic Piezometer installed at 63 ft.	

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

* 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	
Not Observed	**3/2/09**	**Chicago Area - 01**	
NORTHING **554803.16**	BORING COMPLETED **3/2/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2440515.37**	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 6/8/09

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-604B**

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 +782.36	
5.0		PA				
10.0						
15.0					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.	
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 **2**

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-604B**
	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 +782.4 (Continued)	
45.0				45.0	
	1	OST		Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Unfailed	
				47.5	
50.0		RB			
55.0	2	OST		Sample 2: No recovery **Pneumatic piezometer installed at 56.0 ft.**	
				56.0	
	3	OST		Fill: Silt-sized ash, trace fine sand, trace clay - gray - saturated (ML) (FA) Unfailed Sample OST-3: Organic Content = 0.60%	
	3A	OST			
60.0	4	OST		Sample OST-4: Organic Content = 2.77%	
	4A	OST			
	5	OST		61.4	
	5A	OST		Silty clay, little fine to medium sand - brown and gray (CL)	
65.0	6	OST			
	6A	OST			
	7	OST			
	7A	OST			
70.0	8	OST			
	9	OST			
73.5	9A	OST		73.5	
				End of Boring Boring advanced to 10.0 ft. with power auger. Boring advanced from 10.0 to 71.0 ft. with rock bit and drilling fluid. Pneumatic piezometer installed at 56 ft. Casing used: 40.0 ft. of 4 in.	

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	**3/1/09**	**Chicago Area - 01**	
WL	BORING COMPLETED	ENTERED BY	SHEET NO. OF
	3/2/09	**KKB**	**2 2**
WL	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
	Mobile B-57 (V.H.)/MB	**RCR**	**60095742**

AECOM LOG 60095742-2009 BORINGS.GPJ FS_DATATEMPLATE.GDT 6/22/09

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-605**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +781.74

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} / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % / STANDARD PENETRATION BLOWS/(FT)
	1	SS		Fill: Silty clay, little fine to coarse sand, trace fine to coarse gravel - reddish brown - hard to very stiff (CL)		16, 12/6"
	2	SS		2.5		
	2A	SS		Fill: Silty fine to coarse sand-sized ash, trace clay and fine gravel - gray- dense - moist (SM) (FA & BA) Unfailed		37
				4.0		
5.0	3	SS		Fill: Sandy silt-sized ash, trace gravel - gray - medium dense - moist (ML) (FA) Unfailed		18
	4	SS				19
	5	SS				22
10.0				10.0		
	6	SS		Fill: Silty fine to medium sand-sized ash - gray - medium dense -moist (SM) (FA & BA) Unfailed		25
	7	SS				29
15.0	8	SS				38
	9	SS				39
				18.0		
	10	SS		Fill: Sandy silt-sized ash, trace clay - gray - medium dense to dense - moist (ML) (FA) Unfailed		30
20.0				20.0		
	11	SS		Fill: Silty fine to coarse sand-sized ash, trace clay - gray - medium dense - moist to wet (SM) (BA) Unfailed		17
	12	SS				15
				23.5		
	12A	SS		Fill: Silt-sized ash, little fine sand, trace clay - gray - loose - saturated (ML) (FA) Unfailed		2/6"
25.0	13	SS				4
				25.5		
	13A	SS		26.0 Fill: Medium to coarse sand-sized ash, little silt - gray - loose - saturated (SP-SM) (BA) Unfailed		3/6"
	14	SS		Fill: Silt-sized ash, little fine sand and trace clay - gray - very loose - saturated (ML) (FA) Unfailed		2
	15	SS				WOH
30.0	16	SS				WOH
	17	SS				WOH
				34.0		
35.0	18	SS		35.0 Fill: Sandy silt-sized ash - gray - loose - saturated (ML) (FA & BA) Unfailed		6
	18A	SS		36.0 Fill: Silt-sized ash, little fine sand, trace clay - gray - very loose - saturated (ML) (FA) Unfailed		2/6"
	19	SS		37.0		3/6"
	19A	SS		Fill: Fine to coarse sand-sized ash, little silt - gray - loose - saturated (SP-SM) (BA) Unfailed		6
	20	SS				11
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 6/8/09

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-605**

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 +781.74 (Continued)	
	21	SS		Fill: Silt-sized ash, little clay, trace fine sand - gray -medium dense to very loose - saturated (ML) (FA) Unfailed	
	22	SS			
45.0	23	SS			
	24	SS			
				48.0	
	25	SS		49.0 Silt, little clay interbedded with silt-sized ash slimes, trace fine to medium sand - dark gray to black - very loose - saturated (ML) & (FA)	
50.0	25A	SS		50.0	
	26	SS		Clayey silt, little fine to medium sand - gray - very loose - wet (CL-ML)	
				52.0	
	27	SS		Silty clay, little fine to medium sand - brown and gray - medium (CL)	
				54.0 Clayey silt, little fine to medium sand - brown and gray - soft (CL-ML)	
55.0	28	SS		Sandy silt, little to some clay - brown to gray - loose - moist (ML)	
				56.0	
	29	SS		Silty clay, little fine to coarse sand - brown and gray - stiff (CL)	
				58.0	
	30	SS		59.0 Clayey silt, little to some fine to coarse sand - brown and gray - stiff - moist (CL-ML)	
60.0	30A	SS		Silty fine to medium sand, little to trace clay - gray - loose to very loose - wet - saturated (SM)	
	31	SS			
	32	SS			
				64.0	
65.0	33	SS		Silty fine to medium sand, trace clay - orangish brown - very loose - saturated (SM)	
				66.0	
	34	SS		Silty fine to medium sand - orangish brown - loose - saturated (SM)	
	35	SS			
70.0				70.0	
	36	SS		Fine to coarse sand, little silt - orangish brown - medium dense - saturated (SP-SM)	
	37	SS			
				73.5	
	37A	SS		Silty fine to medium sand, little gravel, trace fine to medium clay - brown - extremely dense - saturated (SM)	
	38	SS			
75.0		RB		75.0	
	39	SS		75.8 Borehole caved in at 37 ft. after sampling to 74.5 ft. and remaining open over night. Drilled to 75.0 ft.	
				Weathered shale - dark brown and gray	
				Driller's Note: Apparent shale bedrock	
		RB			
80.0					

55/6"

55/4"

. . . 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 6/8/09

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-605**

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 +781.74 (Continued)	
					Driller's Note: Apparent shale bedrock	
82.0					82.0	
					End of Boring Boring advanced to 18.0 ft. with power auger. Boring advanced from 18.0 to 82.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Installed inclinometer to 82 ft. Casing used: 18 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 (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 20.0 ft. WD**	BORING STARTED: **2/23/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556277.45**	BORING COMPLETED: **2/25/09**	ENTERED BY: **KKB**	SHEET NO. **3** OF **3**
EASTING: **2441498.35**	RIG/FOREMAN: **D-50/JC**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-605A**

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 +781.81	
5.0		PA			.	
10.0						
15.0						
20.0						
25.0		RB				
30.0						
35.0					Disturbed samples retrieved following completion of vane shear testing	
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: **09-605A**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +781.81 (Continued)

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)
				.		
				Disturbed samples retrieved following completion of vane shear testing		
45.0		RB		Sample 4: No sample recovery with Shelby tube. Obtained sample with 3-inch split-spoon. Sample 5: No sample recovery with Shelby tube or 3-inch split-spoon after several attempts.		
				49.5		
50.0	1	ST		Silty clay, little fine to medium sand - brown and gray - medium (CL) Vane Shear Test #1 at 50.5 ft. Peak Su = 925 psf, Remolded Su = 450 psf		* *
				51.5		
	2	ST		Clayey silt, little fine to medium sand - gray - medium - moist (CL-ML) Vane Shear Test #2 at 52.5 ft. Peak Su = 550 psf, Remolded Su = 100 psf		* *
55.0	3	ST		53.5		
				55.5 Silty clay, little fine to medium sand - reddish brown - stiff (CL) Vane Shear Test #3 at 54.5 ft. Peak Su = 1025 psf, Remolded Su = 75 psf		
	4	SS+		57.5		
	5	SS+		Silty clay and fine to medium sand - brown - very stiff (CL) Vane Shear Test #4 at 56.5 ft. Peak Su >1975 psf		
59.5				59.5 Sample 5: No recovery. Vane Shear Test #5 at 58.0 ft. Peak Su = 2825 psf, Remolded Su = 2075 psf		
				End of Boring Borehole advanced from 7.0 ft. with power auger. Borehole advanced from 7.0 to 57.5 ft. with rock bit and drilling fluid. Casing used: 10 ft. of 4 in. SS+ = 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	BORING STARTED	AECOM OFFICE	
Dry to 7.0 ft. WD	**3/1/09**	**Chicago Area - 01**	
NORTHING **556269.03**	BORING COMPLETED **3/1/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441493.19**	RIG/FOREMAN **D-50/JC**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-605B**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +781.64

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				
20.0							
25.0							
30.0		1	OST			**Pneumatic piezometer installed at 28.0 ft.** Sample OST-1: Organic Content = 0.06%	
		2	OST			Sample OST-2: Organic Content = 0.14%	
		2A	OST				
35.0		3	OST			Sample OST-3: Organic Content = 3.51%	
		3A	OST				
			RB				
40.0		4	OST			Sample OST-4: Organic Content = 0.63%	

. . . continued

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)

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: **09-605B**
	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)

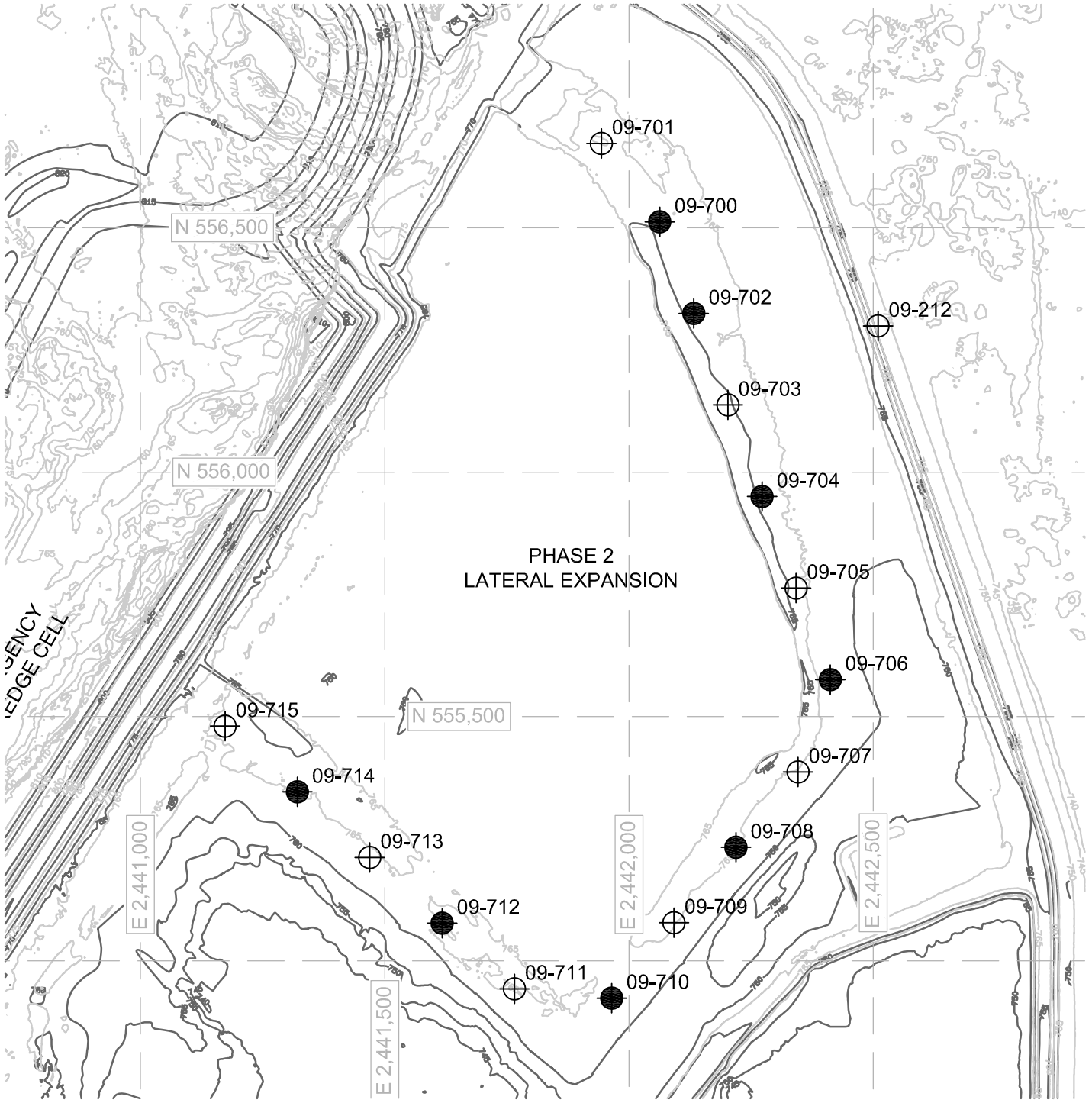
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

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 +781.64 (Continued)	
	4A	OST			**Pneumatic piezometer installed at 42.0 ft.**	
	5	OST			Sample OST-5: Organic Content = 0.26%	
	5A	OST				
45.0	6	OST			Sample OST-6: Organic Content = 0.20%	
	6A	OST			47.0	
	7	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 7 description.	
					Pneumatic piezometer installed at 49.0 ft. 49.5	
50.0	8	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 8 description.	
	8A	OST			52.0	
	9	OST			Silty clay, little fine to medium sand - brown and gray (CL)	
	9A	OST				
55.0	10	OST				
					57.0	
	11	ST3			Clayey silt, little fine to medium sand - brown and gray - saturated (CL-ML)	
	11A	ST3			59.5	
60.0						
65.0						
		RB				
70.0						
75.0					**Pneumatic piezometer installed at 76.0 ft.**	
77.0					77.0	
					End of Boring Borehole advanced from 7.0 ft. with power auger. Borehole advanced from 7.0 to 77.0 ft. with rock bit and drilling fluid. Casing used: 27 ft. of 4 in. Pneumatic piezometers installed at 28.0, 42.0, 49.0, and 76.0 ft.	

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	**2/25/09**	**Chicago Area - 01**	
NORTHING **556273.05**	BORING COMPLETED **2/27/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2441498.96**	RIG/FOREMAN **D-50/JC**	APP'D BY **RCR**	AECOM JOB NO. **60095742**



LEGEND

09-700 700 SERIES SOIL BORINGS (AECOM 2009)

09-700 CPTu SOUNDINGS LOCATIONS (AECOM 2009)

PRE-FAILURE CONTOURS

POST FAILURE CONTOURS

NOTES:
1. BASE MAP BASED ON LIDAR DATA COLLECTED ON DECEMBER 24, 2008
2. HORIZONTAL DATUM: NAD 27 (TENNESSEE LAMBERT)
3. VERTICAL DATUM: NGVD 29

N

0 300

1" = 300'

AECOM

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700 SERIES EXPLORATION LOCATION

ROOT CAUSE ANALYSIS
TVA KINGSTON DREDGE CELL FAILURE
ON DECEMBER 22, 2008
KINGSTON FOSSIL PLANT
HARRIMAN, TENNESSEE

Drawn :	DJD	06/12/2009
Checked:	LWB	6/12/2009
Approved:	WHW	6/12/2009
PROJECT NUMBER	60095742	
FIGURE NUMBER	2E-7	

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09-700 Series

AECOM

Boring/Sounding ID	Ground Surface Elevation (GSE)	Easting	Northing
09-700	764.55	2,442,058.49	556,511.08
09-700-2	764.49	2,442,057.06	556,513.21
09-700A	764.48	2,442,059.45	556,508.83
09-700B	764.63	2,442,061.54	556,501.64
09-702	764.40	2,442,137.60	556,325.37
09-704	764.57	2,442,277.86	555,951.66
09-706	763.58	2,442,418.13	555,578.92
09-708	763.64	2,442,216.09	555,235.77
09-708A1	763.71	2,442,210.85	555,241.33
09-708A2	763.65	2,442,209.76	555,239.63
09-710	762.98	2,441,961.70	554,926.60
09-712	763.83	2,441,617.48	555,085.11
09-712A1	763.77	2,441,614.03	555,081.81
09-712A2	763.67	2,441,619.09	555,087.96
09-712A3	763.73	2,441,620.95	555,086.54
09-714	764.16	2,441,323.20	555,356.02

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-700**

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 +764.55		
	1	SS			Fill: Silty fine to coarse sand-sized ash - tray - medium dense to loose - moist (SM) (BA) Unfailed		21
	2	SS					10
5.0	3	SS					7
					6.0		
	4	SS			Fill: Silt-sized ash, little to trace clay, trace sand - gray- very loose to loose - saturated (ML) (FA) Unfailed		2
	5	SS					1
10.0	6	SS					WOH
	7	SS					WOH
15.0	8	SS					WOR
	9	SS					WOR
	10	SS					WOR
20.0	11	SS					5
	12	SS					WOH
					24.0		
25.0	13	SS			Silty clay, some fine to medium sand - grayish brown - soft to medium (CL)		WOR * *
					26.0		
	.	.			See Boring Log 09-700-2		
		RB					
30.0							
					32.0		
	14	SS			Silty fine to medium sand, little to trace clay - brown - very loose - saturated (SM)		1
35.0	15	SS					WOH
					36.0		
	16	SS			Fine to medium sand, little silt, trace clay - brown - very loose - saturated (SP-SM)		2
	17	SS					1
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: **09-700**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

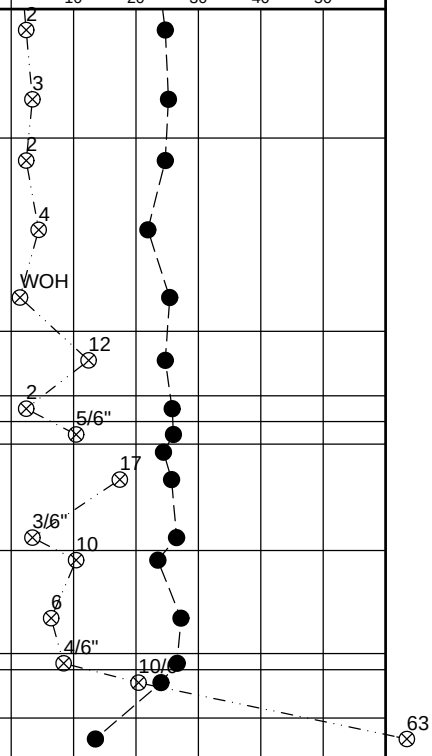
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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 +764.55 (Continued)	
	18	SS			Fine to medium sand, little silt, trace clay - brown - very loose - saturated (SP-SM)	
	19	SS				
					44.0	
45.0	20	SS			Silty fine to medium sand, trace to little clay - brown- very loose to loose- saturated (SM)	
	21	SS				
	22	SS				
50.0					50.0	
	23	SS			Fine to medium sand, trace silt - brown - medium dense - moist to wet (SP-SM)	
					52.0	
	27	SS			52.8 Silty fine to medium sand, little clay - light gray - very loose - moist to wet (SM)	
	24A	SS			53.5	
	24B	SS			Silty fine to medium sand, trace clay - reddish brown - medium dense - moist to wet (SM)	
55.0	25	SS				
					Fine to medium sand, trace silt - brown - medium dense to loose - saturated (SP-SM)	
	26	SS			56.8	
	26A	SS			Silty fine to medium sand, trace clay - dark brown and gray - medium dense to loose - saturated (SM)	
	27	SS				
60.0					60.0	
	28	SS			60.5 Fine to medium sand, trace silt - gray - loose - saturated (SP)	
	28A	SS				
					62.0 Weathered shale - reddish brown	
	29	SS			Weathered shale - gray	
					64.0	
65.0		RB			Driller's Note: Apparent shale or boulders	
					65.0	
					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 65.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 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	
4.0 ft. WS	**3/17/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
556511.08	**3/17/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2442058.49	**Mobile B-57 (G.B.)/BZ**	**RCR**	**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: **09-700-2** **Offset 3' W from 09-700**
PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

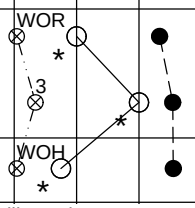
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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	
					.	
5.0		PA				
10.0						
15.0		RB				
20.0						
25.0						
					26.0	
	1	SS			Silty clay, trace fine to coarse sand - brown - stiff to very stiff (CL)	
	2	SS				
30.0					30.0	
	3	SS			Silty clay, some fine sand - brown - medium (CL)	
32.0					32.0	
					End of Boring Borehole advanced to 6 ft. with power auger. Borehole advanced from 6 to 32 ft. with rock bit and drilling fluid. Borehole backfilled upon completion. Casing used: 8 ft. of 4 in. Automatic-Mobile Hammer used for Standard Penetration Tests. WOH = Weight of Hammer WOR = Weight of Rod	* 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: **3/17/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556513.21**	BORING COMPLETED: **3/18/09**	ENTERED BY: **KKB**	SHEET NO.: **1** OF **1**
EASTING: **2442057.06**	RIG/FOREMAN: **Mobile B-57 (G.B.)/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: **09-700A**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

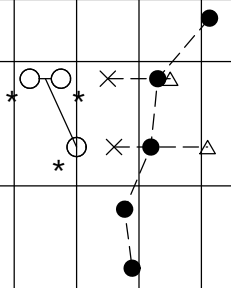
SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

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 +764.48	
		PA			.	
5.0						
10.0						
15.0		RB				
20.0						
					Disturbed samples retrieved following completion of vane shear testing.	
23.0						
	1	ST			Fill: Silt-sized ash, trace fine sand, little clay - gray - saturated (ML) (FA) Unfailed Vane Shear Test #1 at 24.5 ft. Peak Su = 500 psf, Remolded Su = 50 psf	
25.0						
25.0	2	ST			Silty clay, little to some fine to medium sand - brown and gray - stiff (CL) Vane Shear Test #2 at 26.5 ft. Peak Su = 1250 psf, Remolded Su = 700 psf	
	3	ST				
29.0					Vane Shear Test #3 at 28.5 ft. Peak Su = 1925 psf, Remolded Su = 925 psf	
30.0	4	ST			Silty fine sand, little to some clay - brown and gray - moist to wet (SM) Vane Shear Test #4 at 30.5 ft. Peak Su = 1500 psf, Remolded Su = 350 psf	
	5	ST			Vane Shear Test #5 at 32.0 ft. Peak Su = 1775 psf, Remolded Su = 300 psf	
33.0					33.0	
					End of Boring Boring advanced to 6 ft. with power auger. Borehole advanced from 6 ft to 31.0 ft. with rock bit and drilling fluid. Borehole grouted after 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	
Not Observed	**3/17/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
556508.83	**3/18/09**	**KKB**	**1 1**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2442059.45	**Mobile B-57 (G.B.)/BZ**	**RCR**	**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: **09-700B**
	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 +764.63	
					.	
5.0						
		RB				
10.0						
15.0					15.0	
	1	OST			Sample 1 was not opened.	
					17.5	
		RB				
20.0					20.0	
	2	OST			Sample 2 was not opened.	
					22.5	
	3	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 3 description.	
25.0					25.0	
	4	OST			Sample 4 was not opened.	
					27.5	
	5	OST			Sample 5 was not opened.	
30.0					30.0	
	6	OST			Sample 6 was not opened.	
32.5					32.5	
					End of Boring Boring advanced to 8 ft. with power auger. Borehole advanced from 8 ft. to 32.5 ft. with rock bit and drilling fluid. Borehole backfilled after 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	BORING STARTED	AECOM OFFICE	
Not Observed	**3/20/09**	**Chicago Area - 01**	
NORTHING **556501.64**	BORING COMPLETED **3/20/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2442061.54**	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 **09-702**

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 +764.40		
	1	SS			Fill: Silty fine to coarse sand-sized ash - gray - medium dense - moist (SM) (FA & BA) Unfailed		22
	2	SS					14
					3.2		
	2A	SS			Fill: Silt-sized ash, trace fine sand - gray - medium dense to very loose - wet (ML) (FA) Unfailed Sample 3: Bottom ash seams noted.		6/6"
5.0	3	SS					6
	4	SS					1
	5	SS					1
10.0	6	SS					WOH
	7	SS					WOH
15.0	8	SS					WOH
	9	SS					WOR
	10	SS					WOR
20.0	11	SS					1
	12	SS			Sample 12: Bottom ash seam (medium dense) noted.		11
25.0	13	SS					WOR
	14	SS			26.5		WOR
	14A	SS			Silty clay, little fine to medium sand - dark brown and black - soft (CL)		1
					28.0		
	15	SS			Silty fine to medium sand, little clay - reddish brown - loose to very loose - wet (SM)		4
30.0	16	SS					8
	17	SS					5
35.0	18	SS					7
	19	SS					4
	20	SS					1
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: **09-702**

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 +764.40 (Continued)	
	21	SS			Silty fine to medium sand, little clay - reddish brown - loose to very loose - wet (SM)	
	22	SS				
45.0	23	SS				
	24	SS			47.0	
	24A	SS			Silty fine to medium sand - gray - loose to medium dense - saturated (SM)	
	25	SS				
50.0	26	SS			52.0	
	27	SS			Silt, some fine sand, little clay, trace organics - gray - medium dense - saturated (ML)	
	28	SS*			54.5	
55.0	28A	SS			Silty fine to medium sand, little to trace clay - gray - loose to medium dense - saturated (SM)	
	29	SS			58.0	
	30	SS			59.0 Sandy fine to coarse gravel (weathered shale and sandstone) - dark brown and black - extremely dense - saturated (GP)	
60.0	31	SS			61.0 Silty clay and weathered shale - dark brown and gray - hard (CL)	
	32	SS			61.8 Weathered shale - dark gray and black	
		RB			Driller's note: apparent bedrock	
64.0					64.0	
					End of Boring Borehole advanced to 6.0 ft. with power auger. Borehole advanced from 6.0 to 64.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in. Safety 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: **3.2 ft. WS**	BORING STARTED: **2/16/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **556325.37**	BORING COMPLETED: **2/17/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2442137.6**	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 **09-704**

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 +764.57		
	1	SS			Fill: Silty sand-sized ash - gray - medium dense - moist (SM) (FA) Unfailed		21
	2	SS			Note: Bottom ash seams noted		12
					4.0		
5.0	3	SS			Fill: Silt-sized ash, trace clay and sand - gray - very loose to loose - saturated (ML) (FA) Unfailed		3
	4	SS					2
	5	SS					3
10.0							1
	6	SS					
	7	SS					WOH
15.0	8	SS					WOH
	9	SS					WOR
	10	SS					WOR
20.0	10A	SS			20.0		6
	11	SS			Fill: Silty fine to medium sand-sized ash - gray - very loose - saturated (SM) (FA & BA) Unfailed		1
					22.0		
	12	SS			Fill: Silt-sized ash, trace fine sand and clay - gray - very loose - saturated (ML) (FA) Unfailed		WOH
25.0	13	SS					WOH
	14	SS					WOR
	14A	SS			27.8		WOR
					28.0 Silt, little clay, trace fine sand interbedded with silt-sized ash slimes - brown and gray - very loose - wet (ML)		1
	15	SS			30.0 Clayey silt, some fine to medium sand - brown - very loose (CL-ML)		
30.0	16	SS			Clayey silt, some fine to medium sand, trace gravel - brown - loose to very loose (CL-ML)		3
	17	SS					4
35.0	18	SS					4
	19	SS					2
					38.0		
	20	SS			Sandy silt, little to some clay - brown - very loose - saturated (ML)		2
40.0					40.0		
					. . . continued		

66.8

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: **09-704**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +764.57 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	STANDARD PENETRATION BLOWS/(FT)
	21	SS			Silty fine to medium sand, little to trace clay - brown - very loose - saturated (SM)		1
	22	SS					1
45.0	23	SS					1
	24	SS					1
	25	SS					2
50.0					50.0		
	26	SS			Silty fine to medium sand, trace clay - brown - very loose to loose - saturated (SM)		1
	27	SS					6
					54.0		
55.0	28	SS			Silty fine to coarse sand, trace clay - brown - medium dense - saturated (SM)		24
	29	SS					14
	30	SS					16
60.0					60.0		
	31	SS			Silty fine to coarse sand, little fine to coarse gravel, trace clay - reddish brown - very dense - moist to wet (SM)		58
					62.0		
	32	SS			Severely weathered shale - brown		60/6"
					63.0		
65.0		RB			Apparent shale bedrock		
66.0					66.0		
					End of Boring Boring advanced to 6.0 ft. with power auger. Boring advanced from 6.0 to 66.0 ft. with roller bit and drilling fluid. Borehole grouted upon completion. Casing used: 10 ft. of 4 in. Safety 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		

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

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

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

WL: **3.9 ft. WS**	BORING STARTED: **2/17/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555951.66**	BORING COMPLETED: **2/19/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2442277.86**	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 **09-706**

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 +763.58	
	1	SS			Fill: Silty fine to coarse sand-sized ash - gray - medium dense to loose - moist to wet (SM) (BA) Unfailed	
	2	SS				
5.0	3	SS				
	4	SS				
					8.0	
	5	SS			Fill: Silty fine to coarse sand-sized ash, trace clay - gray - loose - saturated (SM) (FA & BA) Unfailed	
10.0	6	SS				
					12.0	
	7	SS			Fill: Silt, little fine sand, trace clay - gray- very loose to loose - saturated (ML) (FA) Unfailed	
15.0	8	SS				
	9	SS			Note: Sample 9 - No recovery	
	10	SS				
20.0	11	SS				
	12	SS				
25.0	13	SS				
					25.0	
	13A	SS			Silt, little clay and fine to medium sand - black and dark gray - very loose - saturated (ML)	
					26.0	
	14	SS*				
					26.5	
	14A	SS			Clayey silt, little fine to medium sand - gray with black and brown - very loose (CL-ML)	
					28.0	
	15	SS			Silty fine to medium sand, little clay - brown - very loose - saturated (SM)	
30.0					Silty clay, little fine to medium sand - brown - stiff (CL)	
	16	SS				
					32.0	
	17	SS			Silty sand, little clay - brown - loose to very loose - wet to saturated (SM)	
35.0	18	SS				
	19	SS				
	20	SS				
40.0						

. . . continued

WOR

* 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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-706**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +763.58 (Continued)

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)
	21	SS			Silty sand, little clay - brown - loose to very loose - wet to saturated (SM)		2
42.0							
	22	SS			Silty fine to medium sand, little to trace clay - brown - very loose - saturated (SM)		3
45.0	23	SS					1
	24	SS					1
	25	SS					3
50.0							
	26	SS			Silty fine to medium sand, little clay - brown - very loose - saturated (SM)		3
52.0							
	27	SS			Silty fine to medium sand, little to trace clay - brown - loose - saturated (SM)		9
55.0	28	SS			Driller's Note: Boulders from 54.5 to 56.5 ft.		4
55.5							
	28A	SS			Sandy fine to coarse gravel, trace silt - brown - extremely dense - saturated (GP)		60/6"
56.5							
	29	SS			Fine to medium sand, trace silt and fine to coarse gravel - brown - extremely dense - saturated (SP)		82
58.0							
	30	SS			Sample 29: Sandstone noted		119
59.5							
60.0	31	SS*			Weathered shale - brown and black		50/3"
59.8							
		RB			Weathered shale - gray		
62.0					Driller's Note: Apparent shale bedrock		
62.0							

End of Boring
Boring advanced to 6.0 ft. with power auger.
Boring advanced from 6.0 to 62.0 ft. with roller bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 10 ft. of 4 in.
Safety hammer used for Standard Penetration Tests.
SS* = SPT value based on first 6 in. or less.
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: **3.9 ft. WS**	BORING STARTED: **2/19/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555578.92**	BORING COMPLETED: **2/19/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2442418.13**	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: **09-708**

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 +763.64	
	1	SS			Fill: Silty fine to medium sand-sized ash - gray - medium dense - moist (SM) (FA) Unfailed	
2.0						
	2	SS			Fill: Sandy silt-sized ash - gray - loose - moist (ML) (FA) Unfailed	
4.0						
5.0	3	SS			Fill: Silt-sized ash, trace fine sand - gray - very loose - saturated (ML) (FA) Unfailed	
	4	SS				
	5	SS				
10.0	6	SS				
	7	SS				
14.0						
15.0	8	SS			Fill: Silty medium to coarse sand-sized ash - gray - very loose - saturated (SM) (BA) Unfailed Sample 8: Silt-sized seams noted	
	9	SS				
18.0						
	10	SS			Fill: Fine to medium sand-sized ash, little silt - gray - very loose - saturated (SP-SM) (BA) Unfailed	
20.0						
	11	SS			Fill: Silt-sized ash, little to trace clay - gray - very loose to loose - saturated (ML) (FA) Unfailed	
	12	SS				
25.0	13	SS				
	14	SS				
	15	SS				
29.0						
30.0	15A	SS			Silt, little clay, some fine to medium sand - dark gray and black - very loose - saturated (ML)	
	16	SS				
31.0						
	16A	SS			Clayey silt, little fine sand - dark gray - very loose - saturated (CL-ML)	
32.0						
	17	SS			Clayey silt, little fine to medium sand, trace organics - brown - very loose - saturated (CL-ML)	
33.0						
	17A	SS			Silty clay, little fine to medium sand - brown - medium (CL)	
35.0	18	SS				
36.0						
	19	SS			Sandy silt, little clay - brown - loose - wet (ML)	
37.0						
	19A	SS			Silty clay, some fine sand, trace fine gravel - brown and gray - very stiff (CL)	
	20	SS				
39.0						
40.0	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 6/9/09

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-708**

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 +763.64 (Continued)	
		21	SS			Sandy silt, little to some clay - brown and gray - medium dense to loose - moist to wet (ML)	
		22	SS			Sample 22: No recovery	
						44.0	
45.0		23	SS			Clayey fine to medium sand, little silt - gray - very loose - saturated (SC)	
		24	SS			48.0	
		25	SS			Silty fine to medium sand, little clay - gray - loose - saturated (SM)	
50.0						50.0	
		26	SS			Silty fine to medium sand, trace clay - grayish brown to brown - very loose to loose - saturated (SM)	
		26A	SS				
		27	SS				
55.0		28	SS			56.0	
		29	SS			Silty fine to medium sand, little fine to coarse gravel, trace clay - gray and brownish gray - dense to extremely dense - saturated (SM)	
		30	SS			Note: Gray sandstone and light gray and green shale noted	
60.0		31	SS/RB			60.5	
		32	SS			Weathered shale - gray	
		33	SS			61.8	
			RB			Driller's Note: Apparent shale bedrock	
64.5						64.5	
						End of Boring Boring advanced to 6.0 ft. with power auger. Boring advanced from 6.0 to 64.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 9 ft. of 4 in. Safety 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

Penetration values: 10, 7, 3, 1, 4, 2, 2, 2, 7, 41, 96/10", 75/2", 100, 50/3"

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: **2/24/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555235.77**	BORING COMPLETED: **2/25/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2442216.09**	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: **09-708A1**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +763.71

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}
5.0		PA			
10.0					
15.0		RB			
20.0				Disturbed samples retrieved following completion of vane shear testing.	
25.0					
				Samples 1, 2, and 3: No recovery with Shelby tube. Pushed split spoon for sample recovery.	
28.0					
	1	2.5"		Fill: Silt-sized ash, trace fine sand, little clay - gray - saturated (ML) (FA) Unfailed	
30.0				Vane Shear Test #1 at 29.5 ft. Peak Su = 700 psf, Remolded Su = 150 psf	
	2	2.5"		Silty clay and fine to medium sand - gray - medium (CL)	
32.0				Vane Shear Test #2 at 31.5 ft. Peak Su = 975 psf, Remolded Su = 200 psf	
	3	2.5"		Silt and fine to medium sand, some clay - gray - saturated (ML)	
34.0				Vane Shear Test #3 at 33.5 ft. Peak Su = 500 psf, Remolded Su = 425 psf	
35.0	4	ST			
36.0				Silty clay, little fine to medium sand - brown - stiff (CL)	
				Vane Shear Test #4 at 35.5 ft. Peak Su = 1400 psf, Remolded Su = 675 psf	
				End of Boring	
				Boring advanced to 8 ft. with power auger.	
				. . . continued	

* Calibrated Penetrometer

* Calibrated Penetrometer

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

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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-708A1**

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 +763.71 (Continued)		
						Borehole advanced from 8 ft to 34.0 ft. with rock bit and drilling fluid. Borehole backfilled after completion. Casing used: 8 ft. of 4 in. (FA) = Fly Ash **2.5"** = 2.5 in. split spoon		

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

WL: **Not Observed**	BORING STARTED: **3/21/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555241.33**	BORING COMPLETED: **3/21/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2442210.85**	RIG/FOREMAN: **CME-850/BZ**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-708A2**
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 +763.65		
5.0		PA					
10.0							
15.0		RB					
20.0							
25.0							
30.0		VST			Vane Shear Test #1 at 29.5 ft. Peak Su = 400 psf, Remolded Su = 75 psf Vane Shear Test #2 at 31.0 ft. Peak Su = 1200 psf, Remolded Su = 100 psf Vane Shear Test #3 at 33.0 ft. Peak Su = 1025 psf, Remolded Su = 475 psf		
35.0					Vane Shear Test #4 at 35.5 ft.		
35.5					35.5 Peak Su = 1850 psf, Remolded Su = 950 psf End of Boring Boring advanced to 8 ft. with power auger. Borehole advanced from 8 ft to 28.0 ft. with rock bit and drilling fluid. Borehole backfilled after 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: **3/21/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555239.63**	BORING COMPLETED: **3/21/09**	ENTERED BY: **KKB**	SHEET NO.: **1** OF **1**
EASTING: **242209.76**	RIG/FOREMAN: **CME-850/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: **09-710**

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 +762.98

DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}	STANDARD PENETRATION BLOWS/(FT)
		1	SS			Fill: Silty sand-sized ash, trace clay - gray - loose to very loose - moist to wet (SM) (FA & BA) Unfailed		8
		2	SS					5
5.0		3	SS					3
						6.0		
		4	SS			Fill: Silt-sized ash, little fine sand - gray - very loose - saturated (ML) (FA) Unfailed		2
		5	SS					2
10.0						10.0		WOH
		6	SS			Fill: Sandy silt-sized ash - gray - very loose - saturated (ML) (BA) Unfailed		WOH
						12.0		
		7	SS			Fill: Silt-sized ash, trace to little sand, trace clay - gray- very loose - saturated (ML) (FA) Unfailed		WOH
15.0		8	SS					WOH
		9	SS					WOR
		10	SS					WOR
20.0		11	SS					WOR
		12	SS			Sample 12 & 13: Fine to medium sand-sized ash (BA) seams noted		1
25.0		13	SS					1
						26.0		
		14	SS			Fill: Silt-sized ash, little to trace fine to medium sand seams, trace clay - gray - very loose - saturated (SM) (FA) Unfailed		3
		15	SS					3
30.0								WOR
		16	SS					
		17	SS					WOR
35.0		18	SS					1
		19	SS					WOR
						38.0		
40.0		20	SS			Silty clay, little fine to medium sand - gray and brown - stiff to medium (CL)		3 *

. . . 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: **09-710**

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 +762.98 (Continued)	
		21	SS			Silty clay, little fine to medium sand - gray and brown - stiff to medium (CL)	
	42.0						
		22	SS			Silty clay and fine to medium sand - brown and gray with reddish brown - stiff to medium (CL)	
45.0		23	SS				
	46.0						
		24	SS			Silty clay, some fine to medium sand, trace fine to medium gravel - gray - stiff (CL)	
	48.0						
		25	SS			Silty clay, some fine to medium sand - gray- soft (CL)	
	49.0						
50.0		25A	SS			Silty fine to medium sand, little to trace clay - gray - loose to very loose - saturated (SM)	
		26	SS				
		27	SS				
55.0		28	SS				
	56.0						
		29	SS			Silty fine sand, little fine to coarse gravel, trace clay - gray - medium dense - saturated (SM)	
	58.0					Sample 29: Gravel-sized sandstone noted in lower tip	
	58.6	30	SS			Sandy medium to coarse gravel, weathered sandstone - gray (GP)	
60.0	59.5					Weathered shale - dark gray	
			RB			Driller's Note: Apparent shale bedrock	
62.5	62.5						
						End of Boring Boring advanced to 6.0 ft. with power auger. Boring advanced from 6.0 to 62.5 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 9 ft. of 4 in. Safety 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: **3.0 ft. WS**	BORING STARTED: **2/25/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **554926.6**	BORING COMPLETED: **2/26/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2441961.7**	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 **09-712**

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 +763.83		
	1	SS			Fill: Medium to coarse sand-sized ash, trace silt - gray - medium dense - moist (SP) (BA) Unfailed		12
2.2	2	SS			Fill: Silt-sized ash, little to trace fine sand - gray - medium dense to very loose - saturated (ML) (FA) Unfailed		20
5.0	3	SS					13
	4	SS					7
	5	SS					2
10.0	6	SS					6
	7	SS					5
15.0	8	SS					2
	9	SS					2
	10	SS					WOR
20.0	11	SS					1
	12	SS					WOH
25.0	13	SS					6
	14	SS					4
	15	SS					2
30.0	16	SS					3
	17	SS					WOH
35.0	18	SS					WOR
	19	SS					WOR
					. . . 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: **09-712**
	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 +763.83 (Continued)		
		20	SS			38.5		WOR
		20A	SS			Silt, little clay, little fine sand - gray - very loose - saturated (ML) 39.5		1
40.0		20B	SS			40.0		2
		21	SS			Silty fine sand, little clay- brownish gray - very loose - saturated (SM) Sample 20B Plant fibers noted 42.0		WOH
		22	SS			Sandy silt, little clay - gray - very loose - saturated (ML) Clayey silt, little fine to medium sand - gray with brown - soft to medium - moist to wet (CL-ML)		3
45.0		23	SS					3
		24	SS			48.0		5
		25	SS			Silty fine to medium sand, little to trace clay - gray - very loose to loose - saturated (SM)		1
50.0		26	SS					WOH
		27	SS			54.0		4
		28	SS			Silty fine to medium sand, trace clay - gray - loose - saturated (SM)		7
55.0		29	SS			58.0		6
		30	SS			Gravelly fine to coarse sand, trace silt and clay - gray - very dense - saturated (SP-SM)		61
60.0		31	SS			60.0 Sample 30: Gravel layer noted at 59.5 ft. Gray weathered shale noted in lower tip		70
		32	SS			61.5 No sample recovery		62/6"
			RB			62.5 Weathered shale - gray		
65.0						Apparent shale bedrock 65.0		
						End of Boring Boring advanced to 6.0 ft. with power auger. Boring advanced from 6.0 to 65.0 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 8 ft. of 4 in. Safety 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: **6.0 ft. WS**	BORING STARTED: **2/26/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555085.11**	BORING COMPLETED: **2/26/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2441617.48**	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: **09-712-A1**

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 +763.77	
5.0		PA			.	
10.0						
15.0						
20.0						
25.0		RB				
30.0					Disturbed samples retrieved following completion of vane shear testing.	
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 **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: **09-712-A1**

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 +763.77 (Continued)	
					41.5 .	
	1	ST			Sandy silt, little clay - brown - wet (ML)	
	2	ST			Vane Shear Test #1 at 43.0 ft. Peak Su = 425 psf, Remolded Su = 75 psf	
					44.5	
45.0	3	ST			Silty fine sand, little clay - brown - wet (SM)	
					46.0 Vane Shear Test #2 at 44.5 ft. Peak Su >1025 psf	
47.5	4	ST			47.5 Sandy silt, little clay - brown - saturated (ML)	
					Vane Shear Test #3 at 46.0 ft. Peak Su >2050 psf	
					Vane Shear Test #4 at 47.5 ft. Peak Su = 1650 psf, Remolded Su = 375 psf	
					End of Boring	
					Boring advanced to 6.0 ft. with power auger.	
					Boring advanced from 6.0 to 46.0 ft. with rock bit and drilling fluid.	
					Borehole grouted upon completion.	
					Casing used: 9 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: **3/8/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555081.81**	BORING COMPLETED: **3/8/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2441614.03**	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 **09-712-A2**

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 +763.67	
5.0		PA				
10.0						
15.0						
20.0						
25.0		RB				
30.0						
35.0					Disturbed samples retrieved following completion of vane shear testing.	
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: **09-712-A2**

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 +763.67 (Continued)	
					Disturbed sample obtained by pushing split spoon.	
					42.0	
	1	**2.5"**			Clayey silt, little fine to medium sand - gray - stiff - wet (CL-ML)	
					44.0 Vane Shear Test #1 at 43.0 ft.	
45.0	2	**2.5"**			Peak Su >1050 psf	
					Silty clay and fine to medium sand - brown and gray - stiff to very stiff (CL)	
	3	**2.5"**			47.0 Vane Shear Test #2 at 44.5 ft.	
48.0	3A	**2.5"**			48.0 Peak Su = 1750 psf, Remolded Su = 500 psf	
					Vane Shear Test #3 at 46.0 ft.	
					Peak Su = 3450 psf, Remolded Su = 700 psf	
					Silty clay and fine to medium sand - brown - stiff (CL)	
					Vane Shear Test #4 at 47.5 ft.	
					Peak Su = 1875 psf, Remolded Su = 625 psf	
					End of Boring	
					Boring advanced to 8 ft. with power auger.	
					Borehole advanced from 8 ft to 46.0 ft. with rock bit and drilling fluid.	
					Borehole backfilled after completion.	
					Casing used: 8 ft. of 4 in.	
					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: **Not Observed**	BORING STARTED: **3/22/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **555087.96**	BORING COMPLETED: **3/22/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2441619.09**	RIG/FOREMAN: **CME-850/BZ**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-712-A3**

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 +763.73		
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 **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: **09-712-A3**

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)
			RB			SURFACE ELEVATION +763.73 (Continued)		
45.0			VST			Vane Shear Test #1 at 43.0 ft. Peak Su >975 psf Vane Shear Test #2 at 44.5 ft. Peak Su >1925 psf Vane Shear Test #3 at 46.0 ft. Peak Su >4125 psf		
47.5						47.5 Vane Shear Test #4 at 47.5 ft. Peak Su = 3825 psf, Remolded Su = 525 psf End of Boring Boring advanced to 8 ft. with power auger. Borehole advanced from 8 ft to 41.5 ft. with rock bit and drilling fluid. Borehole grouted after 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	BORING STARTED	AECOM OFFICE	
Not Observed	**3/22/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
555086.54	**3/22/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441620.95	**CME-850/BZ**	**RCR**	**60095742**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-714**

PROJECT NAME: **Kingston Dredge Cell Failure RCA**

ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +764.16

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)
	1	SS			Fill: Sandy silt-sized ash - gray - loose to medium dense - moist (ML) (FA) Unfailed		8
	2	SS					19
	2A	SS			3.5		
5.0	3	SS			Fill: Silty fine to medium sand-sized ash - gray - medium dense - moist (SM) (BA) Unfailed		20
	4	SS			6.0 Sample 2A: Silt-sized ash noted. Fill: Silt-sized ash, trace to little fine sand, trace clay - gray - medium dense to very loose - saturated (ML) (FA) Unfailed		13
	5	SS					11
10.0	6	SS					4
	7	SS					4
15.0	8	SS					2
	9	SS					3
	10	SS					4
20.0	11	SS					3
	12	SS					6
25.0	13	SS					2
	14	SS			28.0		1
	15	SS			Fill: Sandy silt-sized ash, trace clay - gray- very loose - saturated (ML) (FA) Unfailed		2
30.0					30.0		
	16	SS			Fill: Silt-sized ash, trace to little fine sand, trace clay - gray - very loose - saturated (ML) (FA) Unfailed		2
	17	SS					2
	18	SS			34.5		2
35.0	18A	SS			Clayey silt, some fine to medium sand - grayish brown - very loose (CL-ML)		2
					36.0		
	19	SS			Silty clay, little fine to medium sand - brown and gray - soft (CL)		3 *
	20	SS			39.0		2/6" * 6
40.0	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 6/9/09

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-714**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +764.16 (Continued)

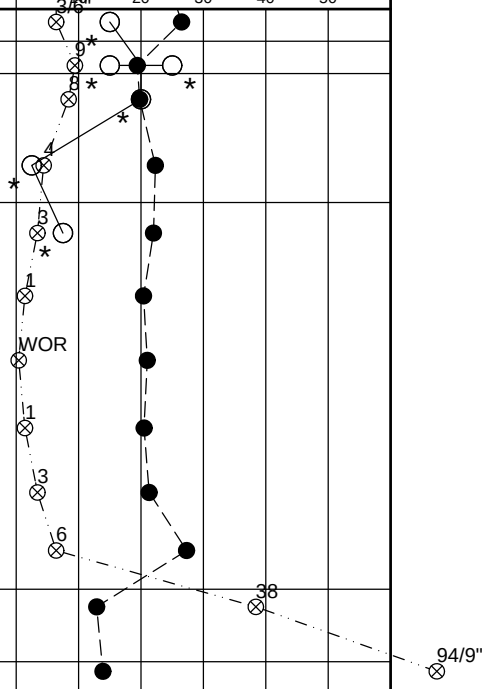
DEPTH(FT)	ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL
		21	SS			41.0 Clayey silt, some fine to medium sand - brown and gray - stiff to very stiff (CL-ML)
		21A	SS			42.0 Silty clay, little fine to medium sand - gray - stiff to very stiff (CL)
		22	SS			Clayey silt and fine to medium sand - brown and gray - very stiff to soft - saturated (CL-ML)
45.0		23	SS			Sample 22: Gravel-sized sandstone noted at lower tip of sample 46.0
		24	SS			Silty fine to medium sand, little clay - gray - very loose to loose - saturated (SM)
		25	SS			
50.0		26	SS			
		27	SS			
55.0		28	SS			
		29	SS			58.0
		30	SS			Fine to coarse sand, trace silt and clay - gray - dense - saturated (SP-SM)
60.0						60.3
		31	SS			61.3 Weathered shale - gray
			RB			Apparent shale bedrock
64.3						64.3
						End of Boring Boring advanced to 6.0 ft. with power auger. Boring advanced from 6.0 to 64.25 ft. with rock bit and drilling fluid. Borehole grouted upon completion. Casing used: 9 ft. of 4 in. Safety hammer used for Standard Penetration Tests. SS* = SPT value based on first 6 in. WOR = Weight of Rod (FA) = Fly Ash (BA) = Bottom Ash

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)

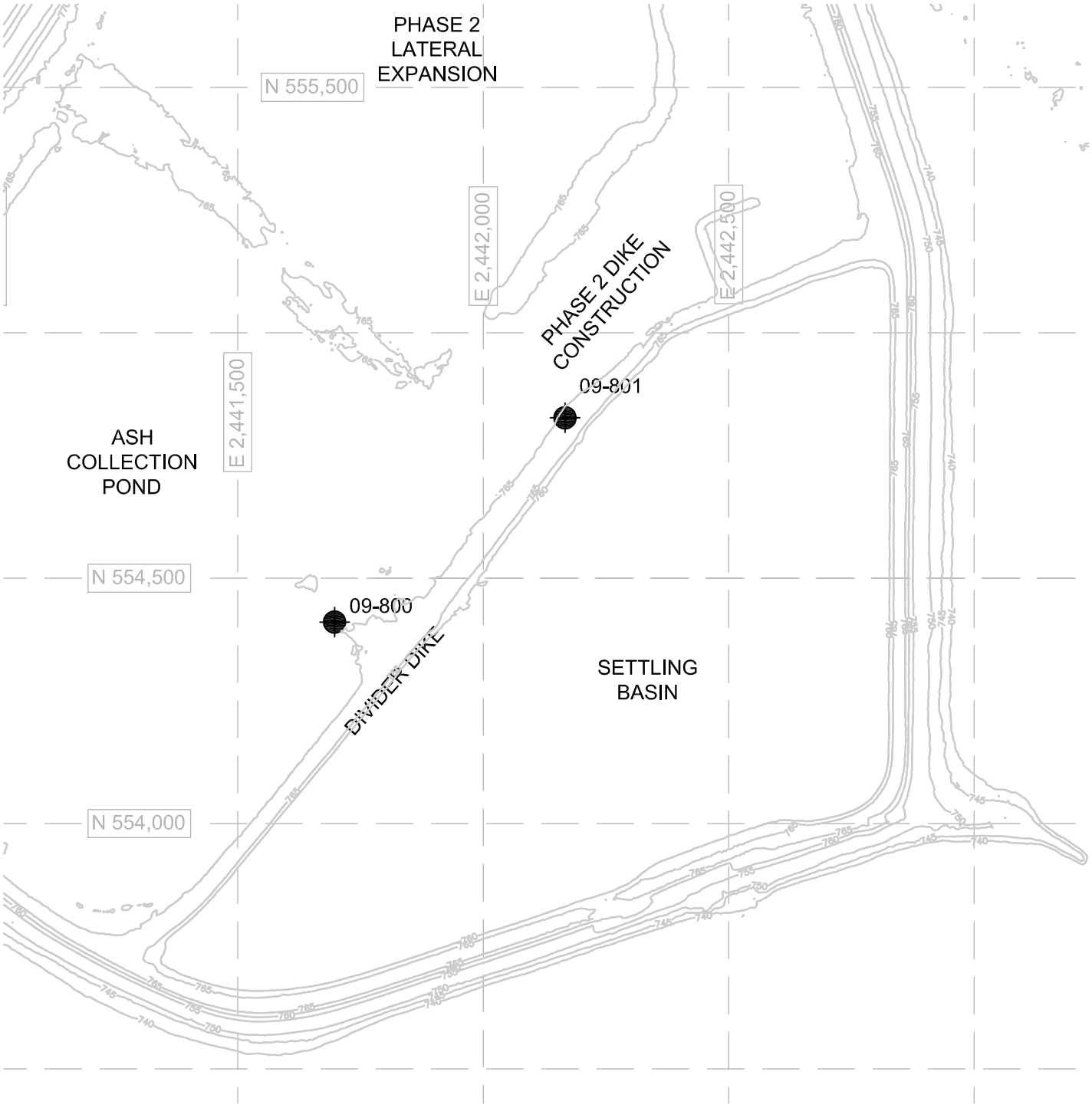


*Calibrated Penetrometer

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	**2/26/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
555356.02	**2/27/09**	**KKB**	**2 2**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2441323.2	**D-25/BM**	**RCR**	**60095742**

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



LEGEND

09-800 800 SERIES SOIL BORINGS AND CPTu SOUNDINGS LOCATIONS (AECOM 2009)

PRE-FAILURE CONTOURS

POST FAILURE CONTOURS

NOTES:
1. BASE MAP BASED ON LIDAR DATA COLLECTED ON DECEMBER 24, 2008
2. HORIZONTAL DATUM: NAD 27 (TENNESSEE LAMBERT)
3. VERTICAL DATUM: NGVD 29

N

0 300

1" = 300'

800 SERIES EXPLORATION LOCATION

ROOT CAUSE ANALYSIS
TVA KINGSTON DREDGE CELL FAILURE
ON DECEMBER 22, 2008
KINGSTON FOSSIL PLANT
HARRIMAN, TENNESSEE

Drawn :	DTB	6/12/2009
Checked:	LWB	6/12/2009
Approved:	WHW	6/12/2009
PROJECT NUMBER	60095742	
FIGURE NUMBER	2E-8	

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www.aecom.com

09-800 Series

AECOM

Boring/Sounding ID	Ground Surface Elevation (GSE)	Easting	Northing
09-800	763.09	2,441,700.05	554,405.13
09-800A	762.90	2,441,696.46	554,409.62
09-800B	762.62	2,441,689.35	554,406.39
09-801	765.26	2,442,159.64	554,811.85
09-801A	765.13	2,442,156.12	554,807.61
09-801B	765.30	2,442,157.67	554,807.46

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-800**

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 +763.09		
	1	SS			Fill: Silty fine to medium sand-sized ash - dark gray - dense to loose - moist (SM) (FA) Unfailed Note: 2 inches topsoil noted on top of sample		36
	2	SS					9
					4.0		2
5.0	3	SS			Fill: Silty medium to coarse sand-sized ash - gray - very loose - saturated (SM) (BA) Unfailed		WOR
	4	SS					
	5	SS			9.5		2
10.0	6	SS			Fill: Silt-sized ash, trace to little fine sand and trace clay - gray - medium dense to very loose - saturated (ML) (FA) Unfailed		10
	7	SS					3
15.0	8	SS					WOH
	9	SS			Sample 9: Wood fragments noted		1
					18.0		
	10	SS			Fill: Silty fine to medium sand-sized ash - gray - very loose - saturated (SM) (FA) Unfailed		WOH
20.0	11	SS			Sample 10: Coarse sand and fine gravel-sized bottom ash (BA) noted		2
					21.9		
	12	SS			Fill: Fine to medium sand-sized ash - little silt - gray - very loose - saturated (SP-SM) (BA) Unfailed Note: Sample 12 - Silt-sized ash (FA) seams noted		3
25.0	13	SS					1
	14	SS*			26.4		WOH
	14A	SS			Fill: Silty fine to medium sand-sized ash - gray - very loose - saturated (SM) (FA) Unfailed		WOH
					28.0		
	15	SS			Silt and little fine to medium sand, trace clay - black - very loose - wet (ML)		3
30.0					30.0		
	16	SS			Clayey silt, some fine to medium sand - brown to gray - very loose - moist to wet (CL-ML)		1
					32.0		
	17	SS			Sandy silt, little clay - brown to gray - very loose - moist to wet (ML)		1
					34.0		
35.0	18	SS			Clayey silt, some fine to medium sand - orangish brown - very loose - moist to wet (CL-ML)		2
	18A	SS			35.8		1/6"
	19	SS			Silty fine to medium sand, trace clay - orangish brown - loose - saturated (SM)		5
	20	SS*			38.5		4/6"
	20A	SS			Silty sand, some clay, trace fine gravel - brown - loose to medium dense - wet (SM)		9
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**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-800**

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 +763.09 (Continued)		
		21	SS			Silty sand, some clay, trace fine gravel - brown - loose to medium dense - wet (SM)		17
						42.0		
		22	SS			Weathered shale - dark brown		44
45.0		23	SS			45.0		98/8"
						45.2 Weathered shale - gray		
			RB			Apparent shale bedrock		
48.0						48.0		
						End of Boring		

Borehole advanced to 6.0 ft. with power auger.
Borehole advanced from 6.0 to 48.0 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 8 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: **4.4 ft. WD**	BORING STARTED: **2/22/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **554405.13**	BORING COMPLETED: **2/23/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2441700.05**	RIG/FOREMAN: **Mobile B-57 (G.B.)/BZ**	APP'D BY: **RCR**	AECOM JOB NO.: **60095742**

AECOM

CLIENT
Tennessee Valley Authority

LOG OF BORING NUMBER **09-800A**

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 +762.90	
5.0		PA				
10.0						
15.0						
20.0		RB			Disturbed samples retrieved following completion of vane shear testing.	
25.0						
					29.0	
30.0	1	ST			Clayey silt, little fine to medium sand - brown and gray - very stiff - saturated (CL-ML)	
					30.5	
	2	ST			Vane Shear Test #1 at 30.5 ft. Peak Su = 2125 psf, Remolded Su = 425 psf	
					32.5	
	3	ST			Clayey silt and fine sand - brown and gray - very stiff - saturated (CL-ML) Vane Shear Test #2 at 32.0 ft. Peak Su = 2550 psf, Remolded Su = 625 psf	
35.0						
					35.5	
35.5					Silty fine sand, some clay - brown - wet (SM) Vane Shear Test #3 at 35.0 ft. Peak Su = 1800 psf, Remolded Su = 425 psf	
					End of Boring Boring advanced to 7 ft. with power auger. Borehole advanced from 7 ft. to 33.5 ft. with rock bit and drilling fluid. Borehole grouted after 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 **3/17/09**	AECOM OFFICE **Chicago Area - 01**	
NORTHING **554409.62**	BORING COMPLETED **3/17/09**	ENTERED BY **KKB**	SHEET NO. **1** OF **1**
EASTING **2441696.46**	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: **09-800B**

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 +762.62	
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.	
					14.0	
15.0	1	OST			Sample 1 was not opened.	
					16.5	
	2	OST			Sample 2 was not opened.	
					19.0	
20.0	3	OST			Sample 3 was not opened.	
					21.5	
25.0		RB				
					26.5	
	4	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 4 description.	
	4A	OST			29.0	
30.0	5	OST			Sample 5 was not opened.	
	5A	OST			31.5	
		RB			33.0	
	6	OST			Sample 6 was not opened.	
35.0	6A	OST			35.5	
35.5					End of Boring Boring advanced to 7 ft. with power auger. Borehole advanced from 7 ft. to 33.0 ft. with rock bit and drilling fluid. Borehole grouted after completion. Casing used: 13.5 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: **3/17/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **554406.39**	BORING COMPLETED: **3/17/09**	ENTERED BY: **KKB**	SHEET NO.: **1** OF **1**
EASTING: **2441689.35**	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: **09-801**

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 +765.26	
	1	SS			0.5 Fill: Silty clay, little to some fine to coarse sand - reddish brown and brown (CL)	
	1A	SS			Fill: Silty fine to coarse sand-sized ash - gray - medium dense to very loose - moist (SM) (BA) Unfailed	
	2	SS				
5.0	3	SS				
	4	SS				
	5	SS				
10.0	6	SS			Sufficient sample not available for moisture content testing of Samples 6 and 7	
	7	SS			14.0	
15.0	8	SS			Fill: Silty fine to coarse sand-sized ash - gray - loose to very loose - saturated (SM) (FA & BA) Unfailed	
	9	SS			18.0	
	10	SS			Fill: Silty fine to coarse sand-sized ash, trace clay - gray - loose - saturated (SM)	
20.0					20.0 (BA) Unfailed	
	11	SS			Fill: Silt-sized ash, little fine sand - gray - medium dense to loose - saturated (ML) (FA) Unfailed	
	12	SS				
25.0	13	SS				
	14	SS			28.0	
	15	SS			Fill: Silt-sized ash, little fine sand, 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	

. . . 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**

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-801**
	PROJECT NAME: **Kingston Dredge Cell Failure RCA**	ARCHITECT-ENGINEER: **OGC**

SITE LOCATION: **714 Swan Pond Road; Harriman, Tennessee**

SURFACE ELEVATION +765.26 (Continued)

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)
	20	SS			39.0 Fill: Clayey silt-sized ash - gray with black - very loose - moist (CL-ML) (FA)		WOH
40.0	20A	SS			40.0 Sample 20: Ash intermixed with clayey silt		WOH
	21	SS			Clayey silt, some fine to medium sand - grayish brown - very loose - moist (CL-ML)		WOR
	22	SS			Silty clay, some fine to medium sand - brown and gray - soft to medium (CL)		WOR
45.0	23	SS			44.0 Clayey silt, little to some fine to medium sand - brown and gray - loose - moist (CL-ML)		4
	24	SS			46.0 Silty clay, some fine to coarse sand - brown - very stiff (CL)		7
	25	SS			48.0 Clayey silt, little to some fine to medium sand - brown and gray - loose (CL-ML)		WOH
50.0	25A	SS			49.0 Silty clay, trace fine to medium sand - brown -medium (CL) 50.0		3
	26	SS			Silty fine to medium sand, some clay - gray - very loose - wet (SM)		WOH
	27	SS					WOR
55.0	28	SS					WOH
	29	SS			56.0 Silty fine to medium sand, little clay - gray - very loose to loose - saturated (SM)		1
	30	SS					5
60.0	31	SS			Sample 31: Sandstone noted in lower tip of sample 61.0		50/6"
		RB			Driller's note: Apparent bedrock or boulder		
64.0					64.0		

End of Boring
Borehole advanced to 6.0 ft. with power auger.
Borehole advanced from 6.0 to 64.0 ft. with rock bit and drilling fluid.
Borehole grouted upon completion.
Casing used: 7.5 ft. of 4 in.
Automatic-CME 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	
14.0 ft. WS	**3/18/09**	**Chicago Area - 01**	
NORTHING **554811.85**	BORING COMPLETED **3/18/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2442159.64**	RIG/FOREMAN **CME-850/JD**	APP'D BY **RCR**	AECOM JOB NO. **60095742**

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-801A**

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 +765.13		
5.0							
10.0							
15.0							
20.0		RB					
25.0							
30.0							
35.0					Disturbed samples retrieved following completion of vane shear testing.		
37.5	1	ST			Silty clay, little fine to medium sand - gray - stiff (CL)		
39.5					. . . 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 6/9/09

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-801A**

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 +765.13 (Continued)	
	2	ST			Clayey silt, trace fine gravel, some fine to coarse sand - gray - stiff - saturated (CL-ML)	
					Vane Shear Test #1 at 39.5 ft.	
41.5					Peak Su = 1500 psf, Remolded Su = 300 psf	
	3	ST			Silty clay, little fine to medium sand - brown and gray - stiff to very stiff (CL)	
					Vane Shear Test #2 at 41.5 ft.	
45.0	4	ST			Peak Su = 1400 psf, Remolded Su = 425 psf	
					Vane Shear Test #3 at 43.5 ft.	
	5	ST			Peak Su = 1600 psf, Remolded Su = 350 psf	
47.5					Vane Shear Test #4 at 45.5 ft.	
	6	ST			Peak Su >1925 psf	
	6A	ST			Silty clay and fine to medium sand - brown and gray - very stiff to stiff (CL)	
50.0	7	ST			Vane Shear Test #5 at 47.5 ft.	
					Peak Su = 2700 psf, Remolded Su = 500 psf	
	8	ST			Vane Shear Test #6 at 49.5 ft.	
					Peak Su = 1425 psf, Remolded Su = 550 psf	
53.5					Vane Shear Test #7 at 51.5 ft.	
					Peak Su = 1175 psf, Remolded Su = 250 psf	
55.0	9	ST			Silty fine to medium sand, little clay - gray (SM)	
55.5					Vane Shear Test #8 at 53.5 ft.	
					Peak Su = 1300 psf, Remolded Su = 375 psf	
					Vane Shear Test #9 at 55.5 ft.	
					Peak Su = 1000 psf, Remolded Su = 325 psf	
					End of Boring	
					Borehole advanded to 18.0 ft. with power auger.	
					Borehole advanced from 18.0 to 55.5 ft. with rock bit and drilling fluid.	
					Borehole grouted after 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: **3/20/09**	AECOM OFFICE: **Chicago Area - 01**	
NORTHING: **554807.61**	BORING COMPLETED: **3/20/09**	ENTERED BY: **KKB**	SHEET NO.: **2** OF **2**
EASTING: **2442156.12**	RIG/FOREMAN: **CME-850/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: **09-801B**

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 +765.30	
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					10.0	
	1	OST			Sample 1 not opened.	
					12.5	
		RB				
15.0					15.0	
	2	OST			Sample 2: Poor sample recovery. Sample placed into jar.	
					17.5	
		RB				
20.0						
		RB				
25.0						
30.0					30.0	
	3	OST			Sample 3 not opened.	
	3A	OST			32.5	
		RB				
35.0					35.0	
	4	OST			Sample 4 not opened.	
	4A	OST			37.5	
	5	OST			See UMass Direct Shear Test results (DeGroot, 2009) for Sample 5 description.	
40.0	5A	OST			40.0	
	6	OST			Sample 6 not opened.	
					42.5	
45.0					. . . 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 6/11/09

AECOM	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-801B**
	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)

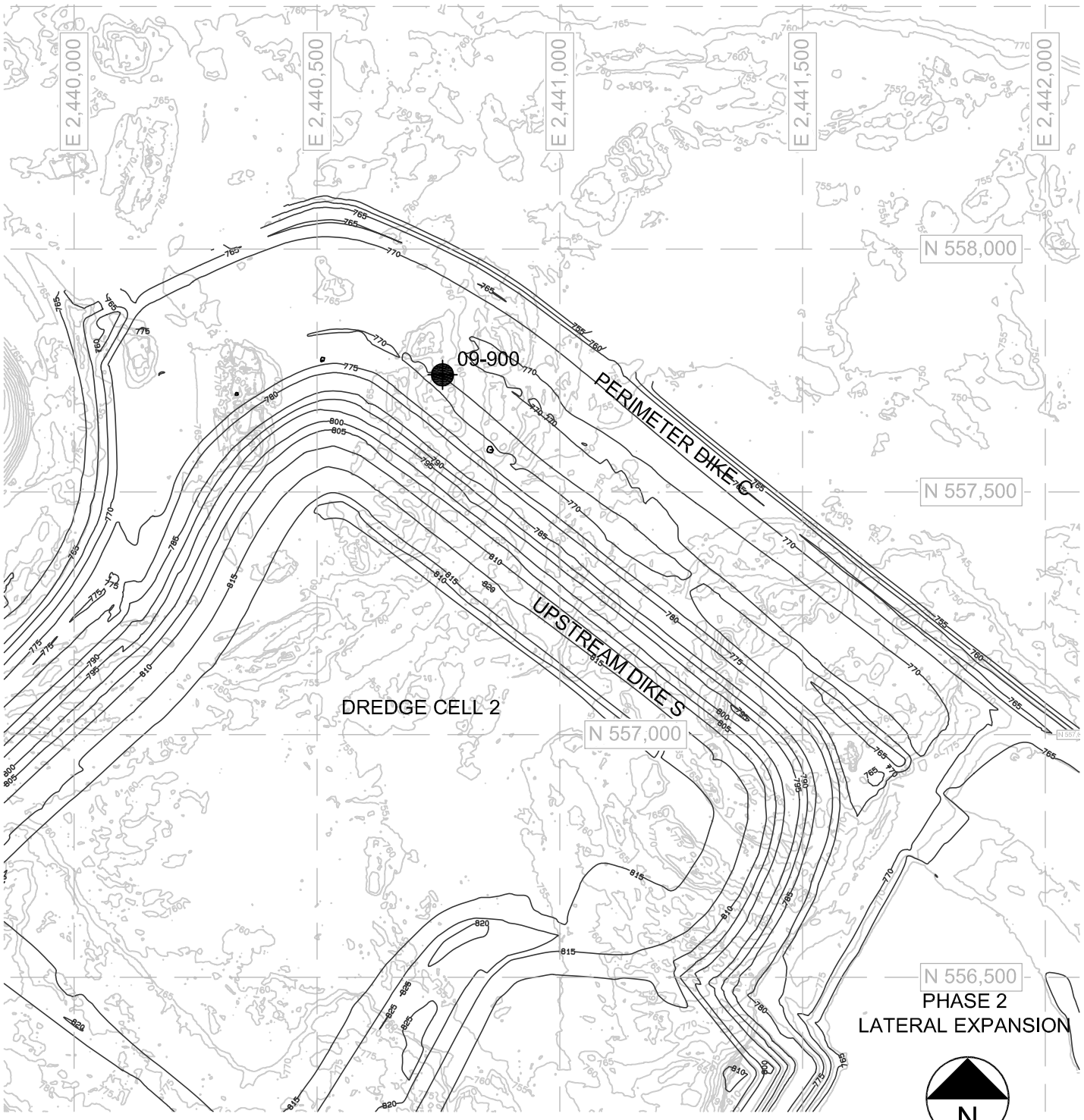
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % (10 20 30 40 50)

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 +765.30 (Continued)	
		RB				
50.0					50.0	
	7	OST			Sample 7 not opened.	
					52.5	
		RB				
55.0					55.0	
	8	OST			Sample 8 not opened.	
57.5	8A	OST			57.5	
					End of Boring Borehold advanced to 8.0 ft. with power auger. Borehole advanced from 8.0 ft. to 55.5 ft. with rock bit and drilling fluid. Borehole grouted after 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	BORING STARTED	AECOM OFFICE	
Not Observed	**3/19/09**	**Chicago Area - 01**	
NORTHING **554807.46**	BORING COMPLETED **3/19/09**	ENTERED BY **KKB**	SHEET NO. **2** OF **2**
EASTING **2442157.67**	RIG/FOREMAN **CME-850/BZ**	APP'D BY **RCR**	AECOM JOB NO. **60095742**



LEGEND

09-900 — 900 SERIES ROCK CORES AND CROSS HOLE SEISMIC TEST LOCATIONS (AECOM 2009)

PRE-FAILURE CONTOURS

POST FAILURE CONTOURS

NOTES:
1. BASE MAP BASED ON LIDAR DATA COLLECTED ON DECEMBER 24, 2008
2. HORIZONTAL DATUM: NAD 27 (TENNESSEE LAMBERT)
3. VERTICAL DATUM: NGVD 29

0 300

1" = 300'

AECOM

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900 SERIES EXPLORATION LOCATION

ROOT CAUSE ANALYSIS
TVA KINGSTON DREDGE CELL FAILURE
ON DECEMBER 22, 2008
KINGSTON FOSSIL PLANT
HARRIMAN, TENNESSEE

Drawn :	DTB	6/12/2009
Checked:	LWB	6/12/2009
Approved:	WHW	6/12/2009
PROJECT NUMBER	60095742	
FIGURE NUMBER	2E-9	

09-900 Series

AECOM

Boring/Sounding ID	Ground Surface Elevation (GSE)	Easting	Northing
09-900SH1	766.08	2,440,758.43	557,741.09
09-900SH2	766.13	2,440,756.84	557,731.26
09-900SH3	766.27	2,440,756.01	557,721.36

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	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 +766.08		
					.		
5.0		PA					
10.0							
15.0							
20.0							
25.0		RB					
30.0							
35.0							
40.0							
					. . . continued		

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

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**

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	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 +766.08 (Continued)		
					.		
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		

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

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

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	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 +766.08 (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	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557741.09	2/16/09	KKB	3 3
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440758.43	Mobile B-57 (V.H.)/MB	RCR	60095742

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		
5.0		PA					
10.0							
15.0							
20.0							
25.0		RB					
30.0							
35.0							
					. . . continued		

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

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**

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

SURFACE ELEVATION +766.13 (Continued)

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)
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 # 1 — Depth (ft.) 50.0 - 57.5 — Recovery (%) 69.3 — RQD (%) 4.4 — Fracture Frequ. > 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 # 2 — Depth (ft.) 57.5 - 66.0 — Recovery (%) 50.0 — RQD (%) 0 — Fracture Frequ. > 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 # 3 — Depth (ft.) 66.0 - 71.0 — Recovery (%) 50.0 — RQD (%) 0 — Fracture Frequ. > 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 # 4 — Depth (ft.) 71.0 - 79.0 — Recovery (%) 56.3 — RQD (%) 14.6 — Fracture Frequ. > 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

SURFACE ELEVATION +766.13 (Continued)

DEPTH(FT) / ELEVATION(FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.^{3}
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				
90.0					Driller's note: Difficulty advancing split barrel due to blocking of the barrel. Reduced runs to length of 1 - 3 ft.	
					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	

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

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	BORING STARTED	AECOM OFFICE	
Not Observed	**2/17/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557731.26	**2/19/09**	**KKB**	**4 4**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440756.84	**Mobile B-57 (V.H.)/MB**	**RCR**	**60095742**

AECOM

ROCK CORE PHOTOGRAPHIC LOG

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

AECOM

CLIENT: **Tennessee Valley Authority**

LOG OF BORING NUMBER: **09-900-SH3**

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 +766.27	
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-SH3**

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 +766.27 (Continued)	
45.0		RB			.	
50.0						
55.0						
60.0						
65.0		RB				
70.0						
75.0						
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	CLIENT: **Tennessee Valley Authority**	LOG OF BORING NUMBER: **09-900-SH3**
	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 +766.27 (Continued)		
85.0					.		
90.0		RB					
95.0							
100.0							
105.0					105.0 End of Boring Borehole advanced to 8 ft. with power auger Borehole advanced from 8 to 105 ft. with rock bit and drilling fluid. Casing used: 70 ft. of 3 in., 40 ft. of 4 in.		

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	**2/24/09**	**Chicago Area - 01**	
NORTHING	BORING COMPLETED	ENTERED BY	SHEET NO. OF
557721.36	**2/25/09**	**KKB**	**3 3**
EASTING	RIG/FOREMAN	APP'D BY	AECOM JOB NO.
2440756.01	**Mobile B-57 (V.H.)/MB**	**RCR**	**60095742**