APPENDIX C
LABORATORY DATA

APPENDIX C.1

LABORATORY DATA

FMSM - December 2004 Field Subsurface Exploration

Soil 1

FULLER, MOSSBARGER, SCOTT & MAY ENGINEERS

Summary of Soil Tests

Project Name	Big Sandy Plant - Unit 2 - Final Site Selection	Project Number	LX2004107
Source	Soil 1 - B-1 @ 5.0'-15.0'	Lab ID	6
County	Lawrence	Date Received	12-10-04
Sample Type	Bag	Date Reported	12-22-04

Test Results

Natural Moisture Content

Test Method: ASTM D 2216

Moisture Content (%): 5.5

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
3"	75	
2"	50	
1 1/2"	37.5	
1"	25	100.0
3/4"	19	99.6
3/8"	9.5	96.8
No. 4	4.75	94.5
No. 10	2	93.4
No. 40	0.425	78.0
No. 200	0.075	49.0
	0.02	37.9
	0.005	27.3
	0.002	19.8
estimated	0.001	16.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	5.5	6.6
Coarse Sand	1.1	15.4
Medium Sand	15.4	---
Fine Sand	29.0	29.0
Silt	21.7	29.2
Clay	27.3	19.8

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	28
Plastic Limit:	17
Plasticity Index:	11
Activity Index:	0.55

Moisture-Density Relationship

Test Method: ASTM D 698 Method B

Maximum Dry Density (lb/ft^3):	120.0
Maximum Dry Density (kg/m^3):	1922
Optimum Moisture Content (%):	12.8
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.70

Classification

Unified Group Symbol:	SC
Group Name:	Clayey sand
AASHTO Classification:	A-6 (2)

Comments:

Reviewed by:

FULLER, MOSSBARGER, SCOTT & MAY ENGINEERS

Particle-Size Analysis of Soils
ASTM D 422

Project Name: Big Sandy Plant - Unit 2 - Final Site Selection
Project Number: LX2004107
Source: Soil 1 - B-1 @ 5.0'-15.0'
Lab ID: 6

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: Angular
Particle Hardness: Hard and Durable

Tested By: NW
Test Date: 12-13-2004
Date Received: 12-10-2004

Maximum Particle size: 1" Seive

Sieve Size	% Passing
3"	
2"	
1 1/2"	
1"	100.0
3/4"	99.6
3/8"	96.8
No. 4	94.5
No. 10	93.4

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: Total Sample

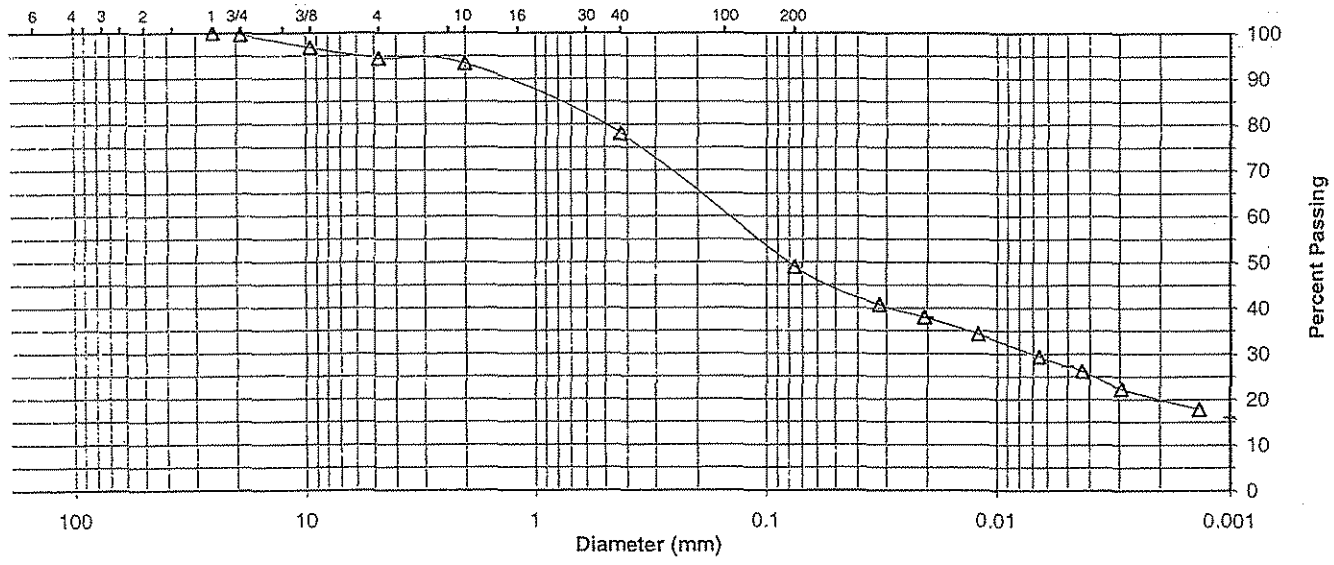
Specific Gravity: 2.7

Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	78.0
No. 200	49.0
0.02 mm	37.9
0.005 mm	27.3
0.002 mm	19.8
0.001 mm	16.0

Particle Size Distribution

ASTM						
AASHTO						



Comments

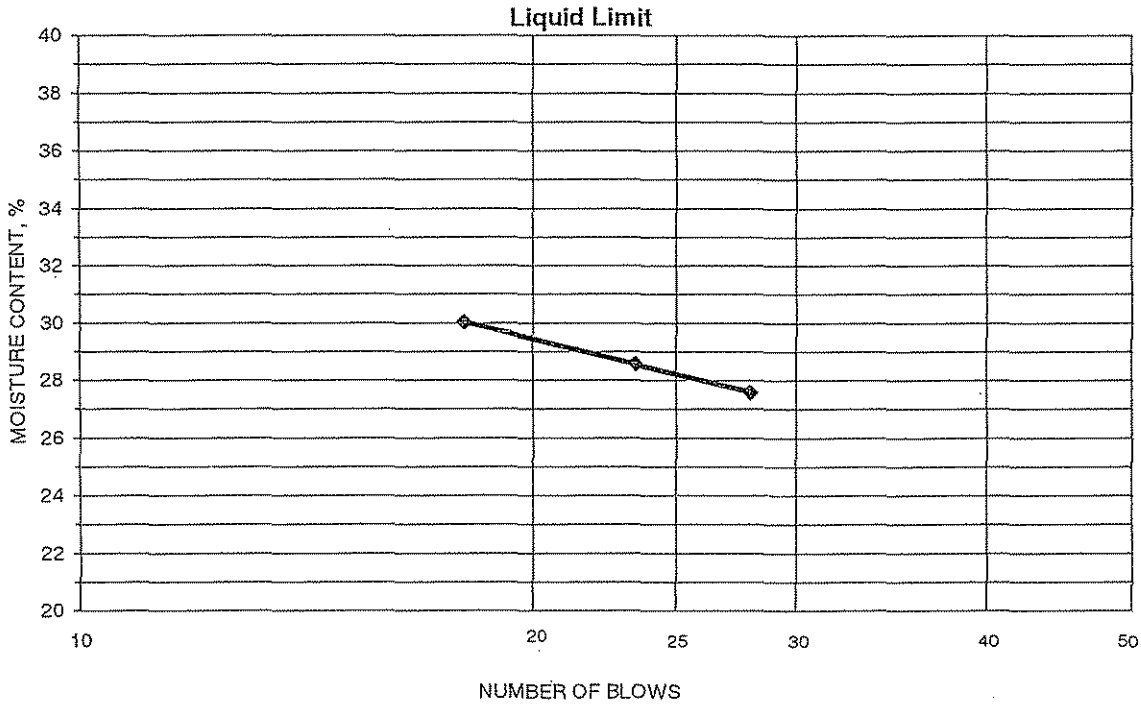
Reviewed By: KAG

FMSM ENGINEERS

ATTERBERG LIMITS

Project	Big Sandy Plant - Unit 2 - Final Site Selection	Project No.	LX2004107
Source	Soil 1 - B-1 @ 5.0'-15.0'	Lab ID	6
		% + No. 40	22
Tested By	KWS	Test Method	ASTM D 4318 Method A
Test Date	12-15-2004	Prepared	Dry
		Date Received	12-10-2004

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
19.61	17.82	11.33	28	27.6	
18.75	17.11	11.37	23.5	28.6	
19.21	17.43	11.50	18	30.0	28



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
18.41	17.37	11.33	17.2	17	11
17.99	17.06	11.52	16.8		

Remarks: _____

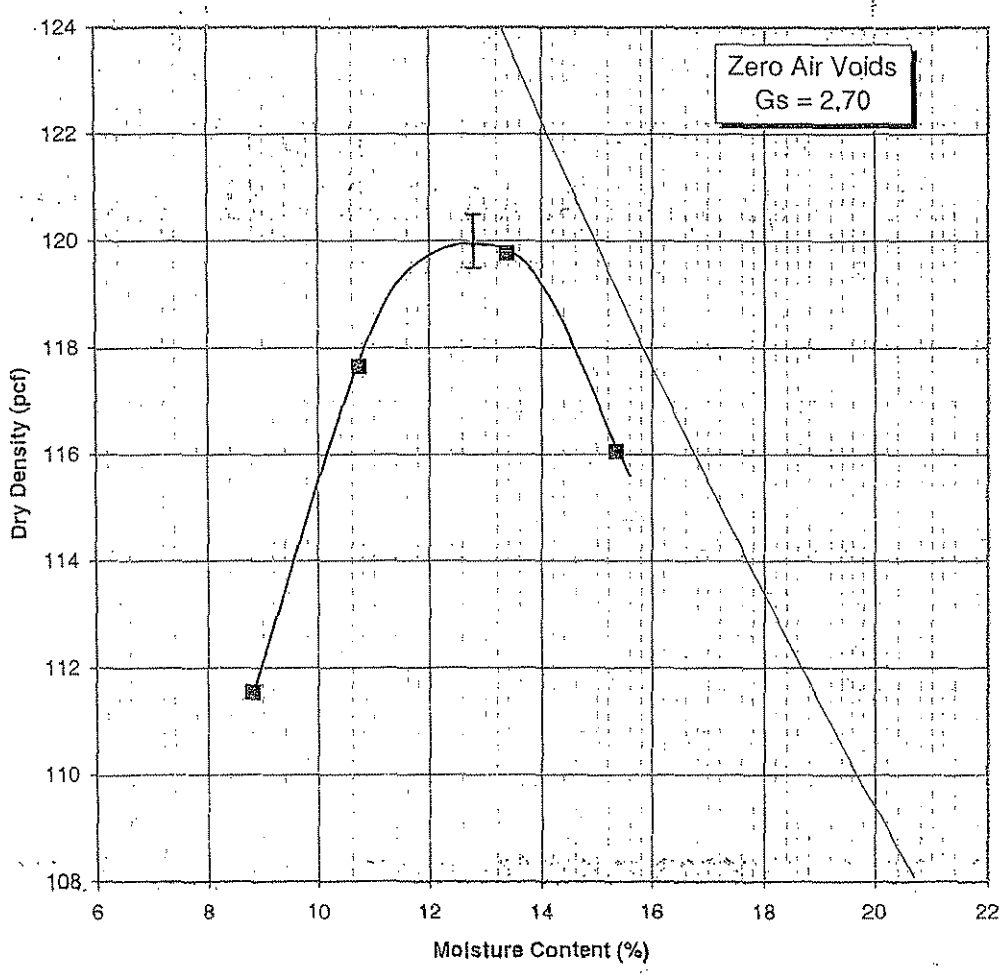
Reviewed By KDG

Moisture-Density Data Sheet

Project: Big Sandy Plant - Unit 2 - Final Site Selection
Source: Soil 1 - B-1 @ 5.0'-15.0'
Sample Description: Clayey sand (SC), brown
Visual Notes:
Prepared: Moist Oversized Fraction: 3 % Rammer: Manual

Project No.: LX2004107
Sample No.: 6
Nmc: 5.5 %
Test Method: ASTM D 698 - Method B
Gs - Fines: ASTM D 854

Mold Weight 4228 grams		Moisture Determination				
Wet Weight plus Mold (grams)	Wet Weight minus Mold (grams)	Wet Soil and Can Weight (grams)	Dry Soil and Can Weight (grams)	Can Weight (grams)	Water Content (%)	Dry Density (pcf)
6244	2016	712.86	627.96	74.85	15.3	116.1
6273	2045	757.50	676.94	74.93	13.4	119.8
6056	1828	701.23	650.42	74.46	8.8	111.5
6190	1962	752.54	686.82	74.82	10.7	117.7



Maximum Dry Density 120.0 PCF
Optimum Moisture Content 12.8 %

MSM ENGINEERS

Hydraulic Conductivity of Saturated Porous Materials
Using a Flexible Wall Permeameter
ASTM D 5084-90

Project Name	Big Sandy Plant - Unit 2 - Final Siting Study			Project No.	LX2004107
Source	Soil 1 - B-1@ 5.0' - 15.0'			Test ID	6@572
Visual Classification	Clayey sand (SC), brown			Prepared By	MEN
Compacted	Mod. 0 in. spacer	Specific Gravity	2.7 ASTM D854-A	Date	1-3-05
		Maximum Dry Density (pcf)	120	Percent of Maximum	106.8
Permeant:	De-aired tap water				
Selection and Preparation Comments:	Modified Effort, -3/8" material.				

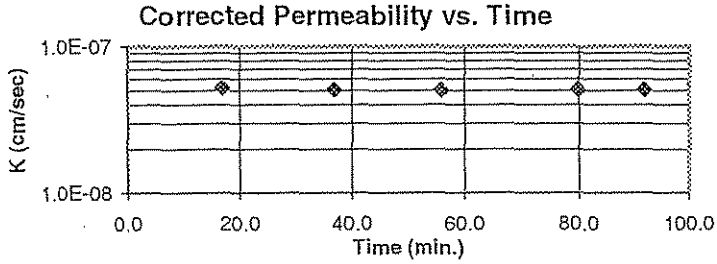
Specimens (if compacted) were compacted in a Proctor Mold as follows: The Maximum Dry Density was converted to Wet Density, this mass was divided by 4 (layers) and 3 of the 4 layers were compacted into the mold using a Proctor Hammer using 25 blows per layer. The density was varied by reducing the height of the drop by the amount listed beside "Compacted". The specimen was trimmed from the bottom two layers.

	Initial Specimen Data	After Consolidation Data	After Test Data
Height (in.)	2.5093	2.4939	2.4965
Diameter (in.)	2.8047		2.8076
Moisture Content (%)	9.9		11.8
Dry Unit Weight (pcf)	128.1		128.5
Void Ratio	0.316		0.312
Degree of Saturation (%)	84.4		101.9

Final Pressures (psi)	
Chamber	75
Influent	70
Effluent	65

Applied Head Difference (psi)	5
Back Pressure Saturated to (psi)	65
Maximum Effective Consolidation Stress (psi)	10
Minimum Effective Consolidation Stress (psi)	5

						Hydraulic Conductivity			
Date	Clock (24H:M)	Temp. °F	Bottom Head	Top Head	Test Time (sec)	k (m/s)	k (cm/s)	k @ 20° C (m/s)	k @ 20° C (cm/s)
1-5-05	9:08	72.0	21.99	3.61	0	---	---	---	---
1-5-05	9:25	72.0	21.84	3.77	1.02E+03	5.5E-10	5.5E-08	5.2E-10	5.2E-08
1-5-05	9:45	72.0	21.66	3.94	1.20E+03	5.3E-10	5.3E-08	5.0E-10	5.0E-08
1-5-05	10:04	72.0	21.50	4.11	1.14E+03	5.3E-10	5.3E-08	5.0E-10	5.0E-08
1-5-05	10:28	72.0	21.28	4.31	1.44E+03	5.3E-10	5.3E-08	5.1E-10	5.1E-08
1-5-05	10:40	72.0	21.17	4.41	7.20E+02	5.4E-10	5.4E-08	5.1E-10	5.1E-08



A gradient of approximately 55 was used for this test. This gradient exceeds ASTM guidelines for maximum gradient, but was used to achieve the requestors desired test duration. Examination of the sample shows no signs of material loss or clogging that may affect test results.

Average Hydraulic Conductivity @ 20° C (last 4 determinations)	m/s	5.05E-10	cm/s	5.05E-08
Average Hydraulic Conductivity @ 20° C (last run)	m/s	5.09E-10	cm/s	5.09E-08

Reviewed by: KDG

Fuller Mossbarger Scott & May ENGINEERS

HYDRAULIC CONDUCTIVITY TEST RESULTS

FGD DISPOSAL FACILITY FINAL SITE SELECTION
BIG SANDY PLANT - UNIT 2
LAWRENCE COUNTY, KENTUCKY

BORING NO.: B-1

$$K = \frac{CQ}{2(pi)LH} \ln(L/r)$$

WHERE: K = HYDRAULIC CONDUCTIVITY (CM/SEC)
Q = FLOW RATE (GAL/MIN)
L = TEST INTERVAL (FT)
H = TOTAL HEAD (FT) (1 PSI = 2.31 FT)
r = HOLE RADIUS (FT)
= 0.125
C = CONVERSION FACTOR (CM-MIN-CU.FT)/(FT-SEC-GAL)
=0.0679

TEST INTERVAL DEPTH (FT)			GAGE PRESSURE (PSI)	FLOW RATE (GAL/MIN)	TOTAL HEAD (FT)	HYDRAULIC CONDUCTIVITY (CM/SEC)	STRATIGRAPHY
35.5	-	47.0	24	0.020	96.6	8.8E-07	Shale / Sandstone / Shale
47.0	-	57.0	28	0.053	116.6	2.2E-06	Shale / Sandstone / Shale
57.0	-	67.0	34	0.013	140.5	4.4E-07	Shale
67.0	-	77.0	38	0.003	159.7	8.9E-08	Shale
77.0	-	87.0	44	0.040	183.5	1.0E-06	Shale / Sandstone / Shale
87.0	-	97.0	48	0.040	202.8	9.3E-07	Shale
97.0	-	107.0	50	0.020	217.4	4.4E-07	Shale
107.0	-	117.0	50	0.080	227.4	1.7E-06	Shale
117.0	-	127.0	50	0.127	237.4	2.5E-06	Shale
127.0	-	137.0	50	0.040	247.4	7.7E-07	Shale
137.0	-	147.0	50	0.040	257.4	7.4E-07	Shale
147.0	-	157.0	50	0.040	267.4	7.1E-07	Shale / Sandstone
157.0	-	167.0	50	0.060	277.4	1.0E-06	Sandstone / Shale / Sandstone
167.0	-	177.0	50	0.060	287.4	9.9E-07	Sandstone
177.0	-	187.0	50	0.060	297.4	9.6E-07	Sandstone
187.0	-	197.0	50	0.147	307.4	2.3E-06	Sandstone / Shale / Sandstone
197.0	-	207.0	50	0.200	317.4	3.0E-06	Sandstone
207.0	-	217.0	50	0.100	327.4	1.4E-06	Sandstone
217.0	-	227.0	50	0.180	337.4	2.5E-06	Sandstone / Shale
227.0	-	237.0	50	0.160	347.4	2.2E-06	Shale
237.0	-	247.0	50	0.060	357.4	8.0E-07	Shale

Note: When no flow occurred during the 15-minute water pressure test, a value of 0.003 gpm (1/2 the smallest division on the water meter divided by 15 minutes) was used to determine the hydraulic conductivity of the test interval.

Soil 3

FMSM ENGINEERS

Summary of Soil Tests

Project Name	Big Sandy Plant - Unit 2 - Final Site Selection	Project Number	LX2004107
Source	Soil 3 - B-8 @ 5.0'-9.0'	Lab ID	14
County	Lawrence	Date Received	12-10-04
Sample Type	Bag	Date Reported	12-16-04

Test Results

Natural Moisture Content

Test Method: ASTM D 2216

Moisture Content (%): 13.4

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
3"	75	
2"	50	
1 1/2"	37.5	
1"	25	
3/4"	19	100.0
3/8"	9.5	99.0
No. 4	4.75	97.3
No. 10	2	95.1
No. 40	0.425	83.8
No. 200	0.075	40.3
	0.02	33.7
	0.005	24.2
	0.002	19.3
estimated	0.001	16.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	2.7	4.9
Coarse Sand	2.2	11.3
Medium Sand	11.3	---
Fine Sand	43.5	43.5
Silt	16.1	21.0
Clay	24.2	19.3

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	22
Plastic Limit:	16
Plasticity Index:	6
Activity Index:	0.32

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.70

Classification

Unified Group Symbol: SC-SM

Group Name: Silty, clayey sand

AASHTO Classification: A-4 (0)

Comments:

Reviewed by: KDG

FMSM ENGINEERS

Particle-Size Analysis of Soils
ASTM D 422

Project Name: Big Sandy Plant - Unit 2 - Final Site Selection
Project Number: LX2004107
Source: Soil 3 - B-8 @ 5.0'-9.0'
Lab ID: 14

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: Rounded
Particle Hardness: Hard and Durable

Tested By: DC
Test Date: 12-13-2004
Date Received: 12-10-2004

Maximum Particle size: 3/4" Seive

Sieve Size	% Passing
3"	
2"	
1 1/2"	
1"	
3/4"	100.0
3/8"	99.0
No. 4	97.3
No. 10	95.1

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: Total Sample

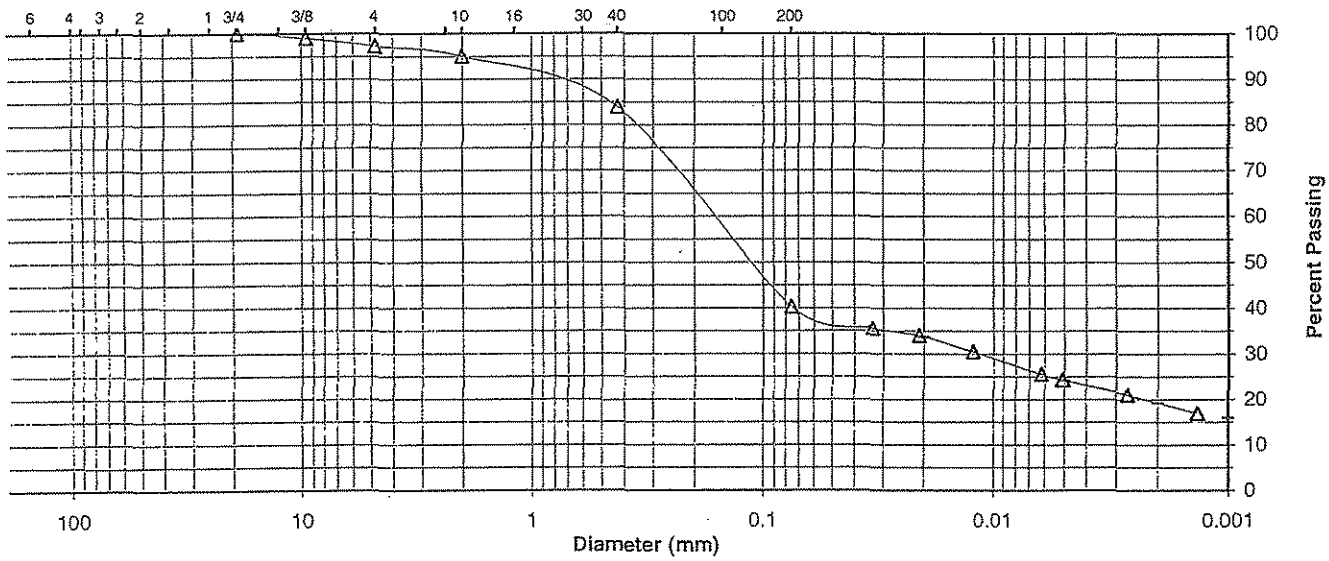
Specific Gravity: 2.7

Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	83.8
No. 200	40.3
0.02 mm	33.7
0.005 mm	24.2
0.002 mm	19.3
0.001 mm	16.0

Particle Size Distribution

ASTM							
AASHTO							



Comments

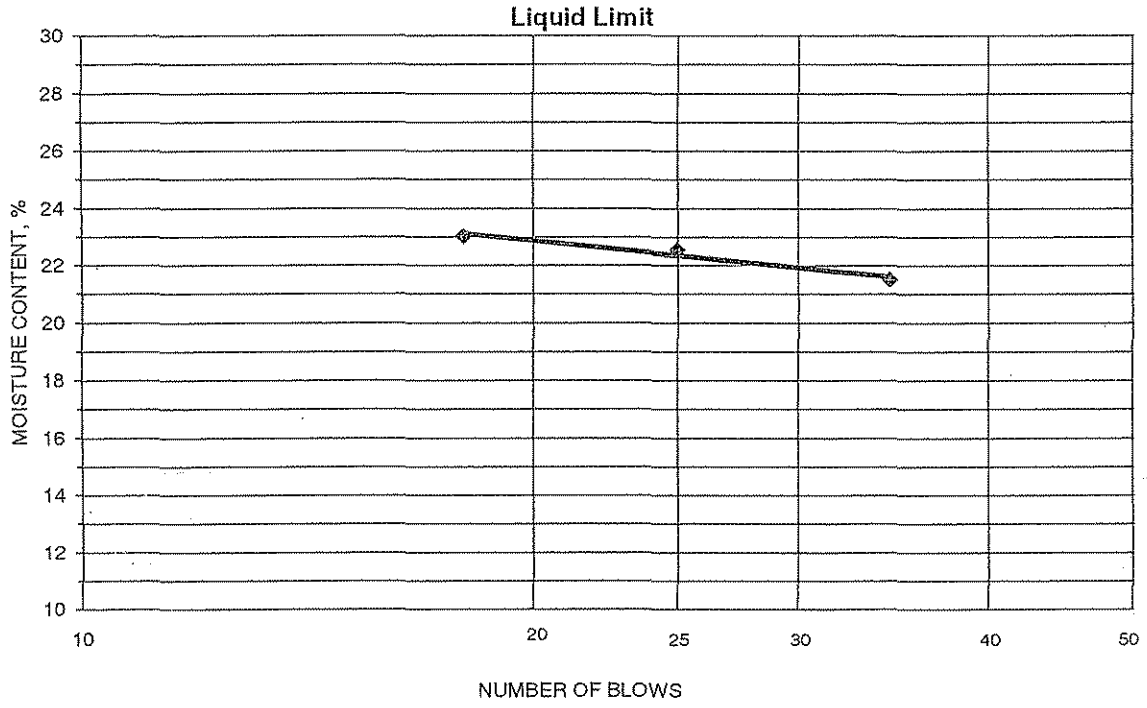
Reviewed By

FMSM ENGINEERS

ATTERBERG LIMITS

Project	Big Sandy Plant - Unit 2 - Final Site Selection	Project No.	LX2004107
Source	Soil 3 - B-8 @ 5.0'-9.0'	Lab ID	14
		% + No. 40	16
Tested By	KWS	Test Method	ASTM D 4318 Method A
Test Date	12-14-2004	Prepared	Dry
		Date Received	12-10-2004

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
19.24	17.76	11.33	18	23.0	
20.66	18.96	11.42	25	22.5	
21.38	19.61	11.38	34.5	21.5	22



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
18.17	17.26	11.37	15.4	16	6
17.97	17.09	11.45	15.6		

Remarks: _____

Reviewed By KDG

Soil 4

FMSM ENGINEERS

Summary of Soil Tests

Project Name	Big Sandy Plant - Unit 2 - Final Site Selection	Project Number	LX2004107
Source	Soil 4 - B-2 @ 15.0'-20.0'	Lab ID	7
County	Lawrence	Date Received	12-10-04
Sample Type	Bag	Date Reported	12-21-04

Test Results

Natural Moisture Content

Test Method: ASTM D 2216

Moisture Content (%): 14.4

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
3"	75	
2"	50	
1 1/2"	37.5	
1"	25	100.0
3/4"	19	99.9
3/8"	9.5	96.8
No. 4	4.75	83.9
No. 10	2	71.0
No. 40	0.425	56.7
No. 200	0.075	46.9
	0.02	35.3
	0.005	18.0
	0.002	11.2
estimated	0.001	7.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	16.1	29.0
Coarse Sand	12.9	14.3
Medium Sand	14.3	---
Fine Sand	9.8	9.8
Silt	28.9	35.7
Clay	18.0	11.2

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit: 31
Plastic Limit: 20
Plasticity Index: 11
Activity Index: 1.00

Moisture-Density Relationship

Test Method: ASTM D 698 Method B

Maximum Dry Density (lb/ft^3): 129.6
Maximum Dry Density (kg/m^3): 2076
Optimum Moisture Content (%): 9.8
Over Size Correction %: N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%): N/A
Compacted Dry Density (lb/ft^3): N/A
Compacted Moisture Content (%): N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size: No. 10
Specific Gravity at 20° Celsius: 2.81

Classification

Unified Group Symbol: SC
Group Name: Clayey sand with gravel

AASHTO Classification: A-6 (2)

Comments:

Reviewed by:

FMSM ENGINEERS

Particle-Size Analysis of Soils
ASTM D 422

Project Name: Big Sandy Plant - Unit 2 - Final Site Selection
Project Number: LX2004107
Source: Soil 4 - B-2 @ 15.0'-20.0'
Lab ID: 7

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: Angular
Particle Hardness: Hard and Durable

Tested By: SCW / DC
Test Date: 12-13-2004
Date Received: 12-10-2004

Maximum Particle size: 1" Seive

Sieve Size	% Passing
3"	
2"	
1 1/2"	
1"	100.0
3/4"	99.9
3/8"	96.8
No. 4	83.9
No. 10	71.0

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: Total Sample

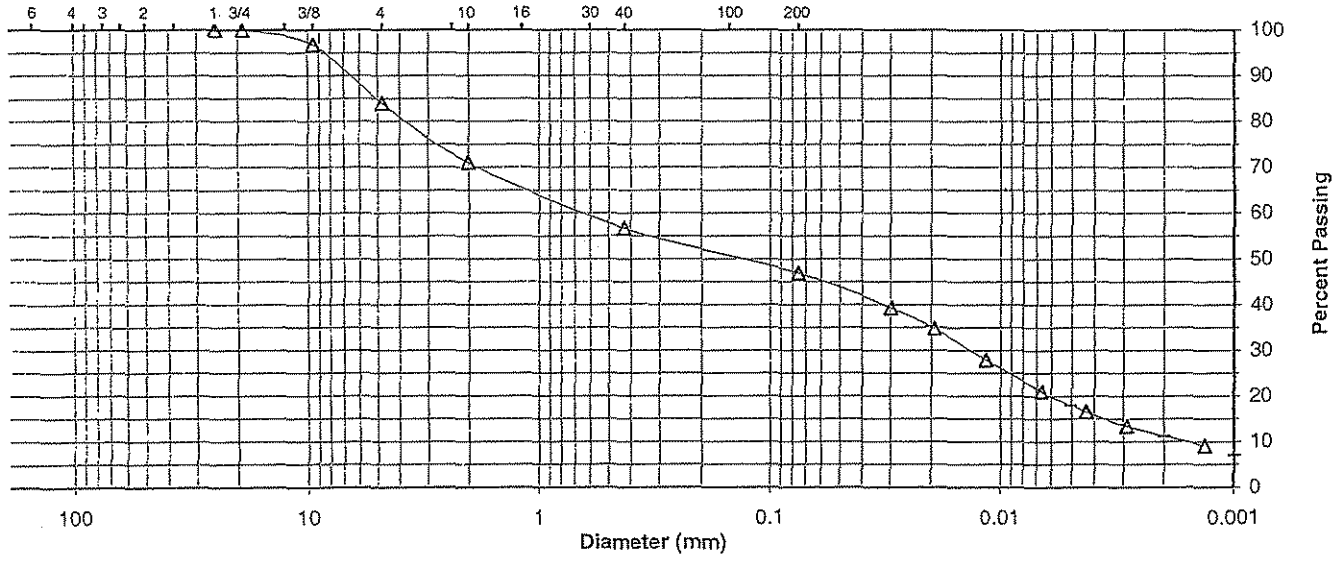
Specific Gravity: 2.81

Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	56.7
No. 200	46.9
0.02 mm	35.3
0.005 mm	18.0
0.002 mm	11.2
0.001 mm	7.0

Particle Size Distribution

ASTM							
AASHTO							



Comments

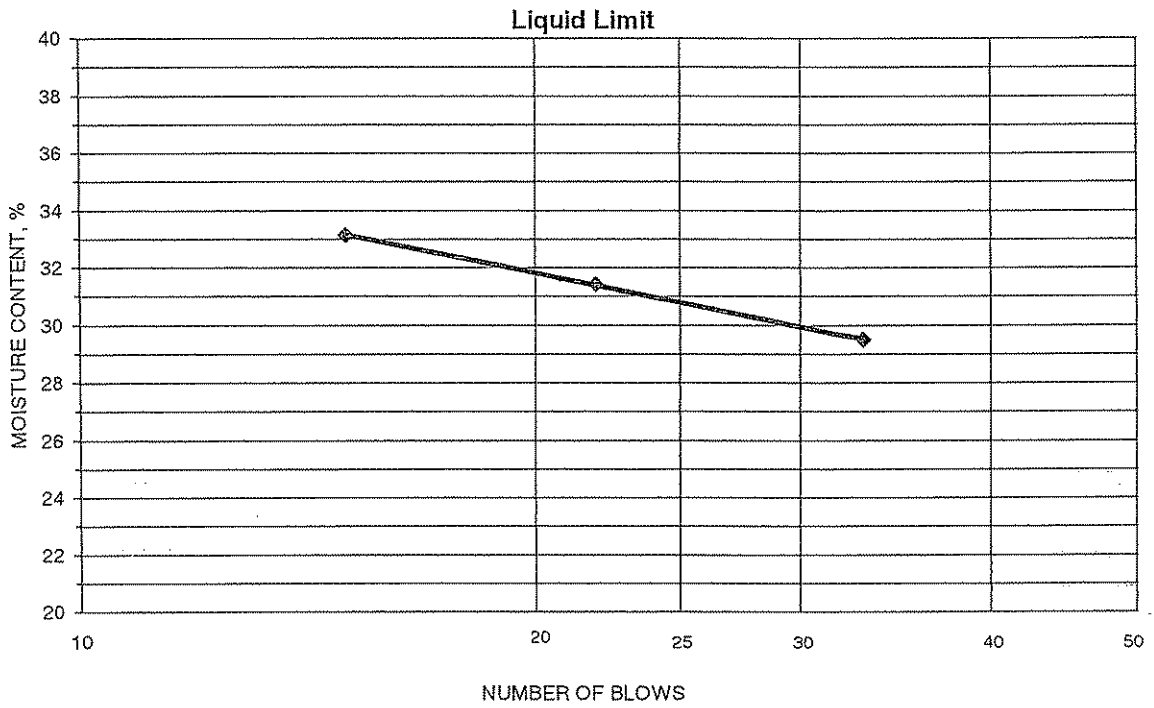
Reviewed By: KDG

FMSM ENGINEERS

ATTERBERG LIMITS

Project	Big Sandy Plant - Unit 2 - Final Site Selection	Project No.	LX2004107
Source	Soil 4 - B-2 @ 15.0'-20.0'	Lab ID	7
		% + No. 40	43
Tested By	KWS	Test Method	ASTM D 4318 Method A
Test Date	12-15-2004	Prepared	Dry
		Date Received	12-10-2004

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
19.74	17.80	11.22	33	29.5	
17.61	16.08	11.21	22	31.4	
19.53	17.38	10.89	15	33.1	31



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
17.82	16.70	11.04	19.8	20	11
18.27	17.11	11.14	19.4		

Remarks: _____

Reviewed By KDG

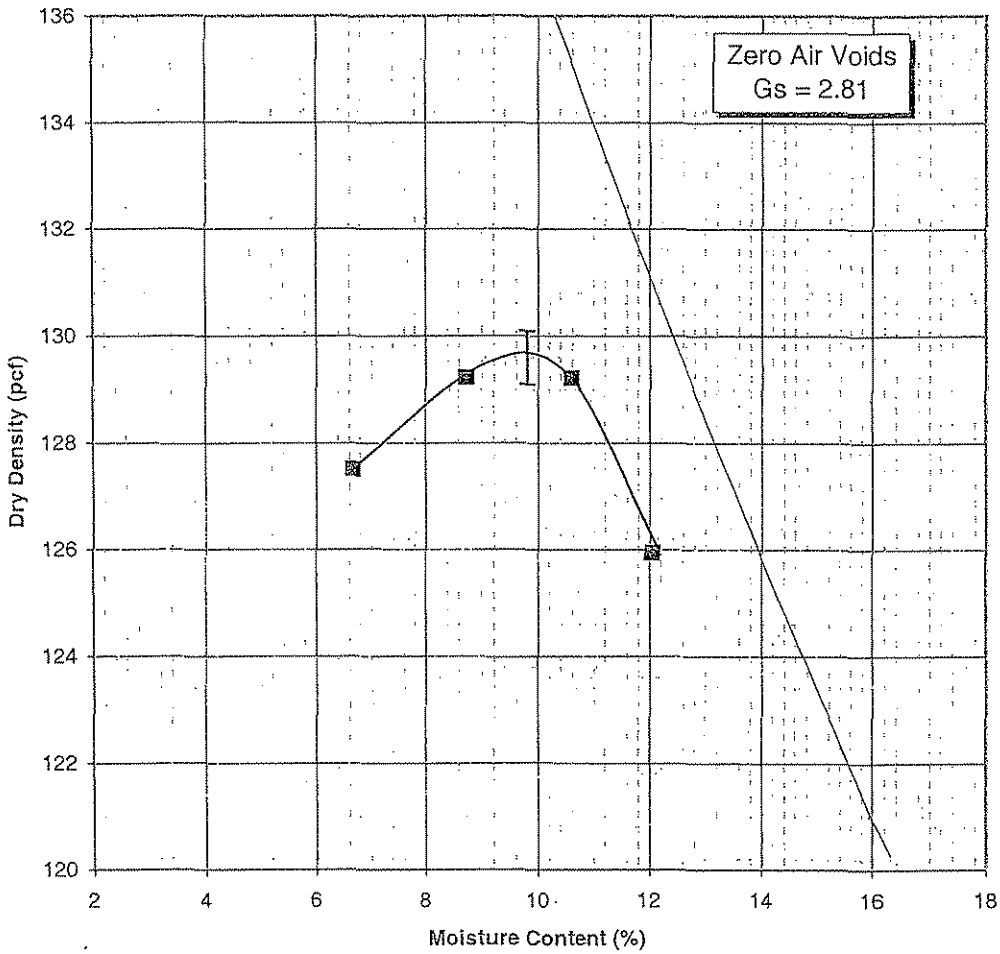
Fuller Mossbarger Scott & May

FMSM ENGINEERS

Moisture-Density Data Sheet

Project: Big Sandy Plant - Unit 2 - Final Site Selection
Project No.: LX2004107
Source: Soil 4 - B-2 @ 15.0'-20.0'
Sample No.: 7
Sample Description: Clayey sand with gravel (SC), gray brown
Nmc: 14.4 %
Visual Notes:
Test Method: ASTM D 698 - Method B
Prepared: Moist
Oversized Fraction: 3 %
Rammer: Manual
Gs - Fines: ASTM D 854

Mold Weight 4234 grams		Moisture Determination				
Wet Weight plus Mold (grams)	Wet Weight minus Mold (grams)	Wet Soil and Can Weight (grams)	Dry Soil and Can Weight (grams)	Can Weight (grams)	Water Content (%)	Dry Density (pcf)
6386	2152	797.97	728.77	75.10	10.6	129.2
6359	2125	822.77	742.29	74.59	12.1	125.9
6350	2116	649.23	602.97	73.15	8.7	129.2
6282	2048	726.46	685.71	74.55	6.7	127.5



Maximum Dry Density 129.6 PCF
Optimum Moisture Content 9.8 %

KDG

Hydraulic Conductivity of Saturated Porous Materials
Using a Flexible Wall Permeameter
ASTM D 5084-90

ENGINEERS

Project Name	Big Sandy Plant - Unit 2 - Final Siting Study			Project No.	LX2004107
Source	Soil 4 - B-2 @ 15.0' - 20.0'			Test ID	7@556
Visual Classification	Clayey sand with gravel (SC), brown			Prepared By	MEN
Compacted	Std. 0 in. spacer	Specific Gravity	2.81 ASTM D854-A	Date	12-14-04
		Maximum Dry Density (pcf)		Percent of Maximum	
Permeant:	De-aired tap water	LL 31	PL 20	PI	11

Selection and Preparation Comments: Standard Effort, -3/8" material.

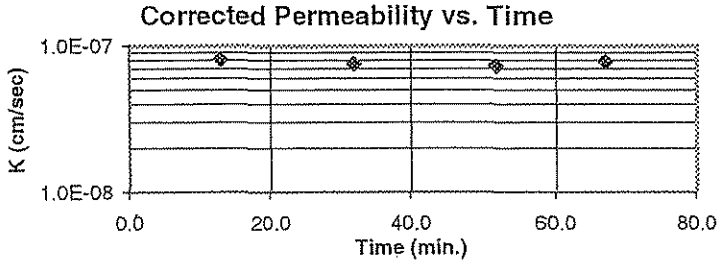
Specimens (if compacted) were compacted in a Proctor Mold as follows: The Maximum Dry Density was converted to Wet Density, this mass was divided by 4 (layers) and 3 of the 4 layers were compacted into the mold using a Proctor Hammer using 25 blows per layer. The density was varied by reducing the height of the drop by the amount listed beside "Compacted". The specimen was trimmed from the bottom two layers.

	Initial Specimen Data	After Consolidation Data	After Test Data
Height (in.)	2.5170	2.4897	2.4897
Diameter (in.)	2.7940		2.7906
Moisture Content (%)	12.8		14.3
Dry Unit Weight (pcf)	121.7		123.4
Void Ratio	0.441		0.422
Degree of Saturation (%)	81.5		95.2

Final Pressures (psi)	
Chamber	75
Influent	70
Effluent	65

Applied Head Difference (psi)	5
Back Pressure Saturated to (psi)	65
Maximum Effective Consolidation Stress (psi)	10
Minimum Effective Consolidation Stress (psi)	5

						Hydraulic Conductivity			
Date	Clock (24H:M)	Temp. °F	Bottom Head	Top Head	Test Time (sec)	k (m/s)	k (cm/s)	k @ 20° C (m/s)	k @ 20° C (cm/s)
12-22-04	9:55	72.0	22.01	3.63	0	---	---	---	---
12-22-04	10:08	72.0	21.83	3.81	7.80E+02	8.5E-10	8.5E-08	8.0E-10	8.0E-08
12-22-04	10:27	72.0	21.59	4.06	1.14E+03	7.9E-10	7.9E-08	7.5E-10	7.5E-08
12-22-04	10:47	72.0	21.34	4.31	1.20E+03	7.7E-10	7.7E-08	7.3E-10	7.3E-08
12-22-04	11:02	72.0	21.14	4.51	9.00E+02	8.2E-10	8.2E-08	7.8E-10	7.8E-08



A gradient of approximately 54.8 was used for this test. This gradient exceeds ASTM guidelines for maximum gradient, but was used to achieve the requestors desired test duration. Examination of the sample shows no signs of material loss or clogging that may affect test results.

Average Hydraulic Conductivity @ 20° C (last 4 determinations)	m/s	7.67E-10	cm/s	7.67E-08
Average Hydraulic Conductivity @ 20° C (last run)	m/s	7.67E-10	cm/s	7.67E-08

Reviewed by: KG

Soil 5

FMSM ENGINEERS

Summary of Soil Tests

Project Name	Big Sandy Plant - Unit 2 - Final Site Selection	Project Number	LX2004107
Source	Soil 5 (Fill) - TP-1 @ 3.0'-8.0'	Lab ID	21_22
County	Lawrence	Date Received	12-10-04
Sample Type	Bag Composite	Date Reported	12-16-04

Test Results

Natural Moisture Content

Test Not Performed

Moisture Content (%): N/A

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
3"	75	
2"	50	
1 1/2"	37.5	
1"	25	100.0
3/4"	19	94.4
3/8"	9.5	83.2
No. 4	4.75	76.1
No. 10	2	70.5
No. 40	0.425	60.1
No. 200	0.075	48.8
	0.02	39.5
	0.005	24.1
	0.002	15.3
estimated	0.001	11.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	23.9	29.5
Coarse Sand	5.6	10.4
Medium Sand	10.4	---
Fine Sand	11.3	11.3
Silt	24.7	33.5
Clay	24.1	15.3

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	33
Plastic Limit:	20
Plasticity Index:	13
Activity Index:	0.87

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.72

Classification

Unified Group Symbol: SC

Group Name: Clayey sand with gravel

AASHTO Classification: A-6 (3)

Comments:

Reviewed by: KDL

FMSM ENGINEERS

Particle-Size Analysis of Soils
ASTM D 422

Project Name: Big Sandy Plant - Unit 2 - Final Site Selection
Project Number: LX2004107
Source: Soil 5 (Fill) - TP-1 @ 3.0'-8.0'
Lab ID: 21_22

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: Angular
Particle Hardness: Hard and Durable

Tested By: DC
Test Date: 12-13-2004
Date Received: 12-10-2004

Maximum Particle size: 1" Seive

Sieve Size	% Passing
3"	
2"	
1 1/2"	
1"	100.0
3/4"	94.4
3/8"	83.2
No. 4	76.1
No. 10	70.5

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: Total Sample

Specific Gravity: 2.72

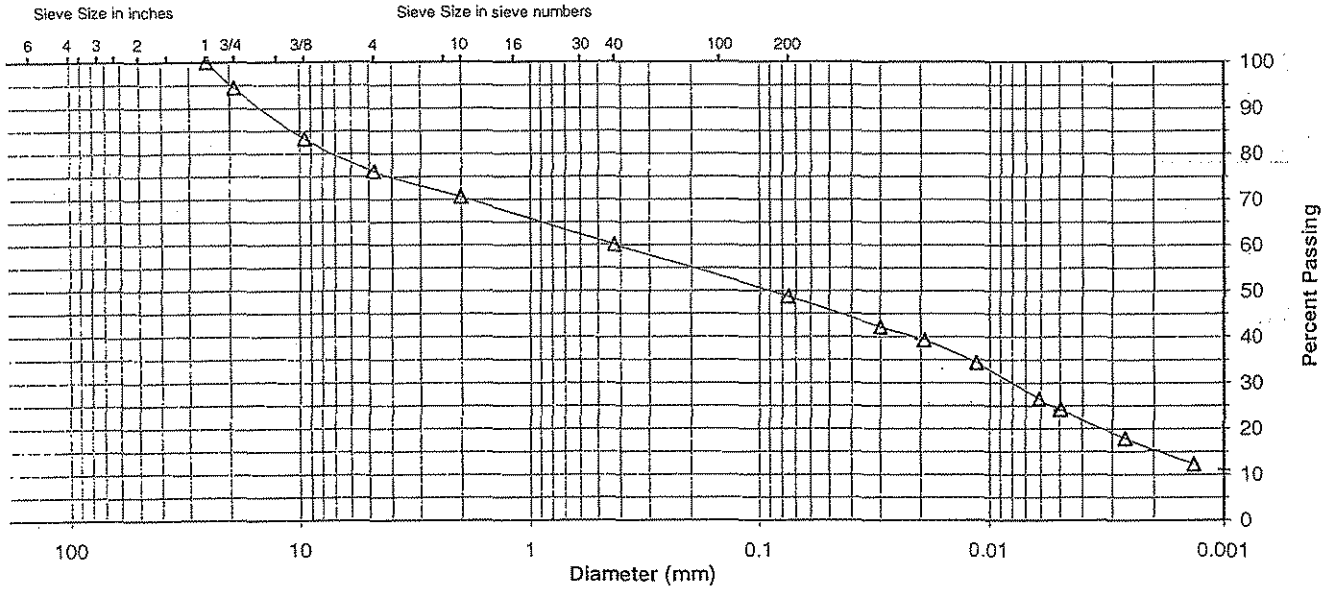
Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	60.1
No. 200	48.8
0.02 mm	39.5
0.005 mm	24.1
0.002 mm	15.3
0.001 mm	11.0

Particle Size Distribution

ASTM	Coarse Gravel	Fine Gravel	C. Sand	Medium Sand	Fine Sand	Silt	Clay
	5.6	18.3	5.6	10.4	11.3	24.7	24.1

AASHTO	Gravel	Coarse Sand	Fine Sand	Silt	Clay
	29.5	10.4	11.3	33.5	15.3



Comments

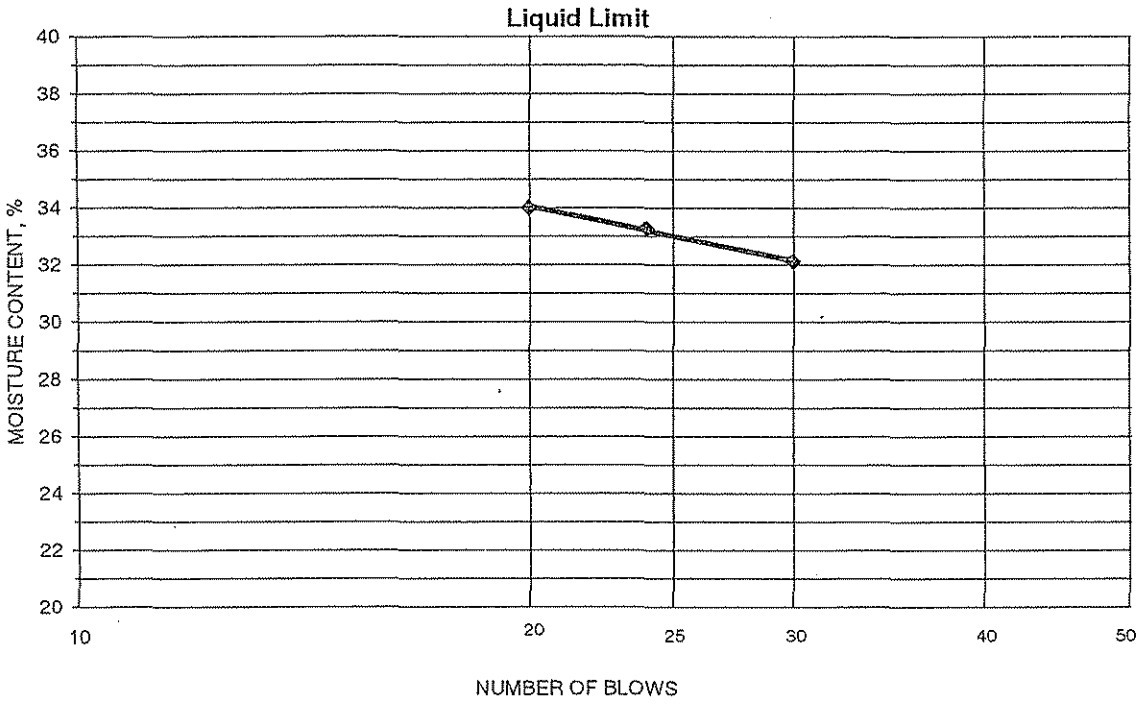
Reviewed By: KM

FMSM ENGINEERS

ATTERBERG LIMITS

Project	Big Sandy Plant - Unit 2 - Final Site Selection	Project No.	LX2004107
Source	Soil 5 (Fill) - TP-1 @ 3.0'-8.0'	Lab ID	21_22
		% + No. 40	40
Tested By	KWS	Test Method	ASTM D 4318 Method A
Test Date	12-14-2004	Prepared	Dry
		Date Received	12-10-2004

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
18.94	17.01	11.00	30	32.1	
19.73	17.55	11.00	24	33.3	
19.05	17.04	11.13	20	34.0	33



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
17.47	16.38	10.84	19.7	20	13
17.85	16.76	11.19	19.6		

Remarks: _____

Reviewed By KDL

FMSM ENGINEERS

Summary of Soil Tests

Project Name	Big Sandy Plant - Unit 2 - Final Site Selection	Project Number	LX2004107
Source	Soil 5 (Fill) - TP-2 @ 3.0' and 8.0'	Lab ID	23_24
County	Lawrence	Date Received	12-10-04
Sample Type	Grab Bag	Date Reported	12-16-04

Test Results

Natural Moisture Content

Test Not Performed

Moisture Content (%): N/A

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
3"	75	
2"	50	
1 1/2"	37.5	100.0
1"	25	97.7
3/4"	19	87.2
3/8"	9.5	71.3
No. 4	4.75	58.5
No. 10	2	49.4
No. 40	0.425	42.5
No. 200	0.075	35.3
	0.02	27.6
	0.005	16.0
	0.002	9.1
estimated	0.001	6.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	41.5	50.6
Coarse Sand	9.1	6.9
Medium Sand	6.9	---
Fine Sand	7.2	7.2
Silt	19.3	26.2
Clay	16.0	9.1

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	32
Plastic Limit:	20
Plasticity Index:	12
Activity Index:	1.33

Moisture-Density Relationship

Test Not Performed

Maximum Dry Density (lb/ft^3):	N/A
Maximum Dry Density (kg/m^3):	N/A
Optimum Moisture Content (%):	N/A
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.75

Classification

Unified Group Symbol: GC

Group Name: Clayey gravel with sand

AASHTO Classification: A-2-6 (0)

Comments:

Reviewed by: TLK

Fuller Mossbarger Scott & May ENGINEERS

Particle-Size Analysis of Soils
ASTM D 422

Project Name: Big Sandy Plant - Unit 2 - Final Site Selection
Project Number: LX2004107
Source: Soil 5 (Fill) - TP-2 @ 3.0' and 8.0'
Lab ID: 23_24

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: Angular
Particle Hardness: Hard and Durable

Tested By: DC
Test Date: 12-13-2004
Date Received 12-10-2004

Maximum Particle size: 1 1/2" Seive

Sieve Size	% Passing
3"	
2"	
1 1/2"	100.0
1"	97.7
3/4"	87.2
3/8"	71.3
No. 4	58.5
No. 10	49.4

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: Total Sample

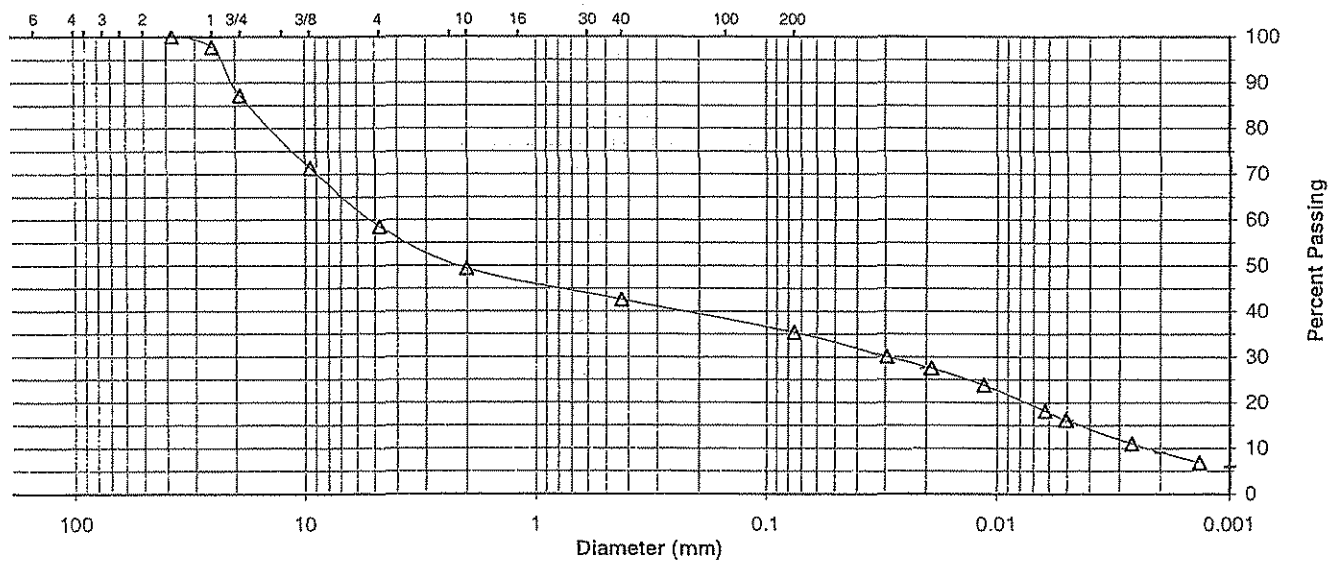
Specific Gravity 2.75

Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	42.5
No. 200	35.3
0.02 mm	27.6
0.005 mm	16.0
0.002 mm	9.1
0.001 mm	6.0

Particle Size Distribution

ASTM							
AASHTO							



Comments

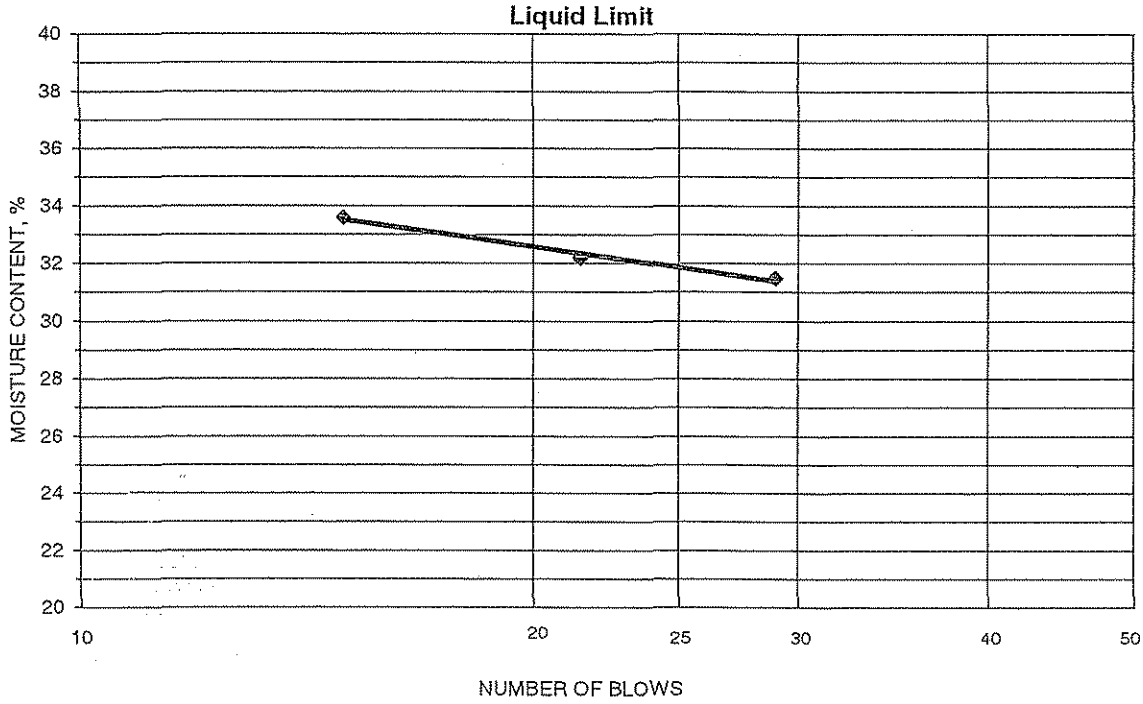
Reviewed By

FULLER, MOSSBARGER, SCOTT & MAY ENGINEERS

ATTERBERG LIMITS

Project	Big Sandy Plant - Unit 2 - Final Site Selection	Project No.	LX2004107
Source	Soil 5 (Fill) - TP-2 @ 3.0' and 8.0'	Lab ID	23_24
		% + No. 40	58
Tested By	KWS	Test Method	ASTM D 4318 Method A
Test Date	12-14-2004	Prepared	Dry
		Date Received	12-10-2004

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
20.61	18.41	11.42	29	31.5	
20.86	18.55	11.37	21.5	32.2	
20.27	18.11	11.68	15	33.6	32



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
18.23	17.15	11.66	19.7	20	12
18.06	16.96	11.54	20.3		

Remarks: _____

Reviewed By _____

APPENDIX C.2

LABORATORY DATA

FMSM – September/November 2005 Field Subsurface Exploration

Soil 6

Fuller Mossbarger Scott & May ENGINEERS

Summary of Soil Tests

Project Name	Final Design and Permitting, Big Sandy Plant - Unit 2	Project Number	LX2005099
Source	BB-R1 (1 of 2), 6.0'-9.5' & BB-R1 (2 of 2), 6.0'-9.5' (Soil 6)	Lab ID	128
County	Lawrence	Date Received	11-7-05
Sample Type	Bag Composite	Date Reported	11-30-05

Test Results

Natural Moisture Content

Test Method: ASTM D 2216

Moisture Content (%): 13.6

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
3"	75	
2"	50	
1 1/2"	37.5	
1"	25	
3/4"	19	
3/8"	9.5	
No. 4	4.75	
No. 10	2	100.0
No. 40	0.425	98.7
No. 200	0.075	95.0
	0.02	79.3
	0.005	67.7
	0.002	49.2
estimated	0.001	40.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	0.0	0.0
Coarse Sand	0.0	1.3
Medium Sand	1.3	---
Fine Sand	3.7	3.7
Silt	27.3	45.8
Clay	67.7	49.2

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit: 48
Plastic Limit: 21
Plasticity Index: 27
Activity Index: 0.55

Moisture-Density Relationship

Test Method: ASTM D 698 Method A

Maximum Dry Density (lb/ft^3): 110.5
Maximum Dry Density (kg/m^3): 1770
Optimum Moisture Content (%): 15.9
Over Size Correction %: N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%): N/A
Compacted Dry Density (lb/ft^3): N/A
Compacted Moisture Content (%): N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size: No. 10
Specific Gravity at 20° Celsius: 2.83

Classification

Unified Group Symbol: CL
Group Name: Lean clay

AASHTO Classification: A-7-6 (28)

Comments:

Reviewed by:

Fuller Mossbarger Scott & May ENGINEERS

Particle-Size Analysis of Soils
ASTM D 422

Project Name: Final Design and Permitting, Big Sandy Plant - Unit 2
Project Number: LX2005099
Source: BB-R1 (1 of 2), 6.0'-9.5' & BB-R1 (2 of 2), 6.0'-9.5' (Soil 6)
Lab ID: 128

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: N/A
Particle Hardness: N/A

Tested By: DC
Test Date: 11-16-2005
Date Received: 11-07-2005

Maximum Particle size: No. 10 Sieve

Sieve Size	% Passing
3"	
2"	
1 1/2"	
1"	
3/4"	
3/8"	
No. 4	
No. 10	100.0

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: Total Sample

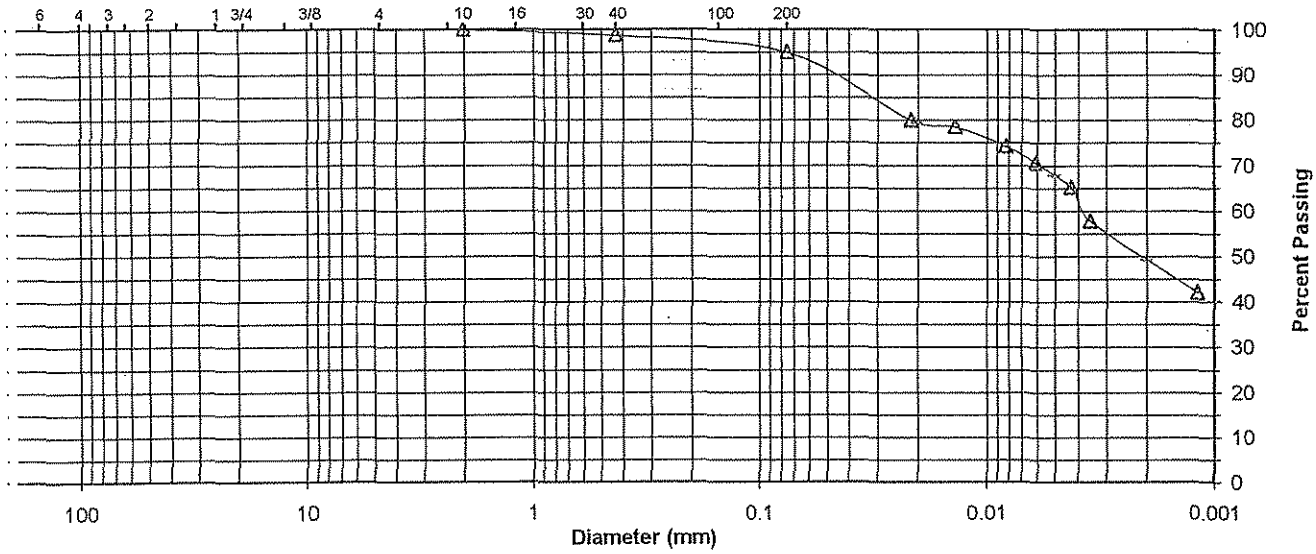
Specific Gravity: 2.83

Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	98.7
No. 200	95.0
0.02 mm	79.3
0.005 mm	67.7
0.002 mm	49.2
0.001 mm	40.0

Particle Size Distribution

ASTM							
AASHTO							



Comments

Reviewed By

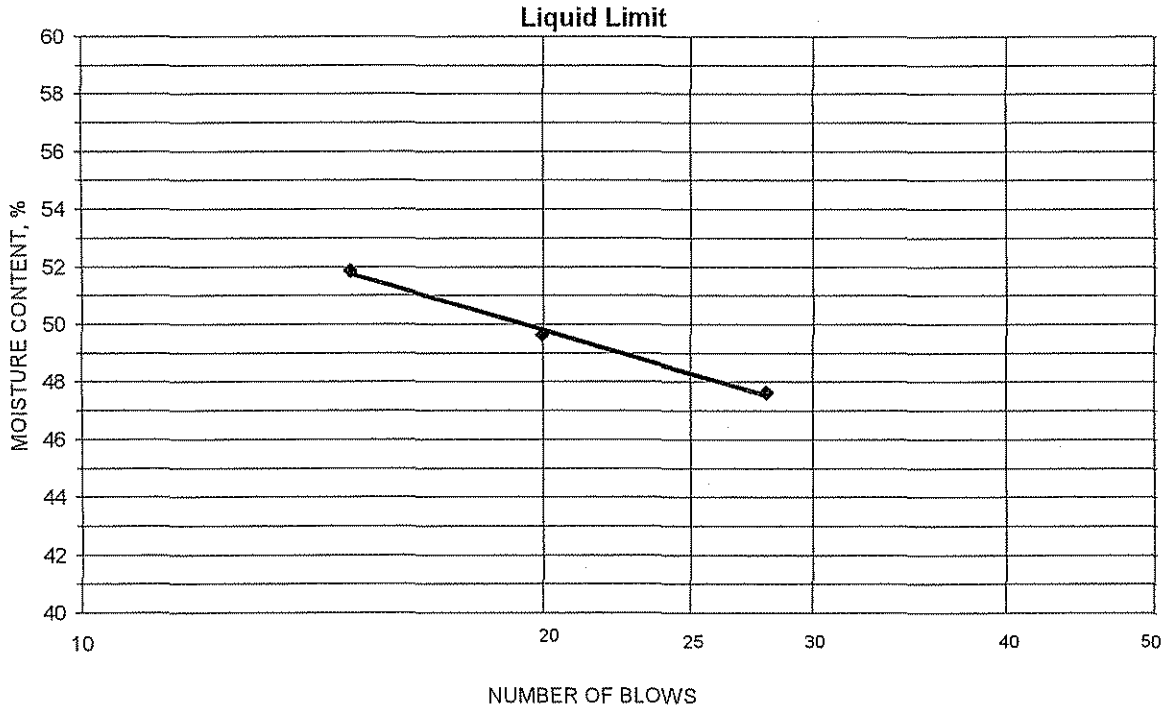
Fuller Mossbarger Scott & May

ENGINEERS

ATTERBERG LIMITS

Project	Final Design and Permitting, Big Sandy Plant - Unit 2	Project No.	LX2005099
Source	BB-R1 (1 of 2), 6.0'-9.5' & BB-R1 (2 of 2), 6.0'-9.5' (Soil 6)	Lab ID	128
		% + No. 40	1
Tested By	KWS	Test Method	ASTM D 4318 Method A
Test Date	11-28-2005	Prepared	Dry
		Date Received	11-07-2005

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
18.96	16.47	11.24	28	47.6	
18.67	16.13	11.01	20	49.6	
20.23	17.14	11.18	15	51.8	48



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
17.64	16.55	11.29	20.7	21	27
16.95	15.95	11.18	21.0		

Remarks: _____

Reviewed By _____

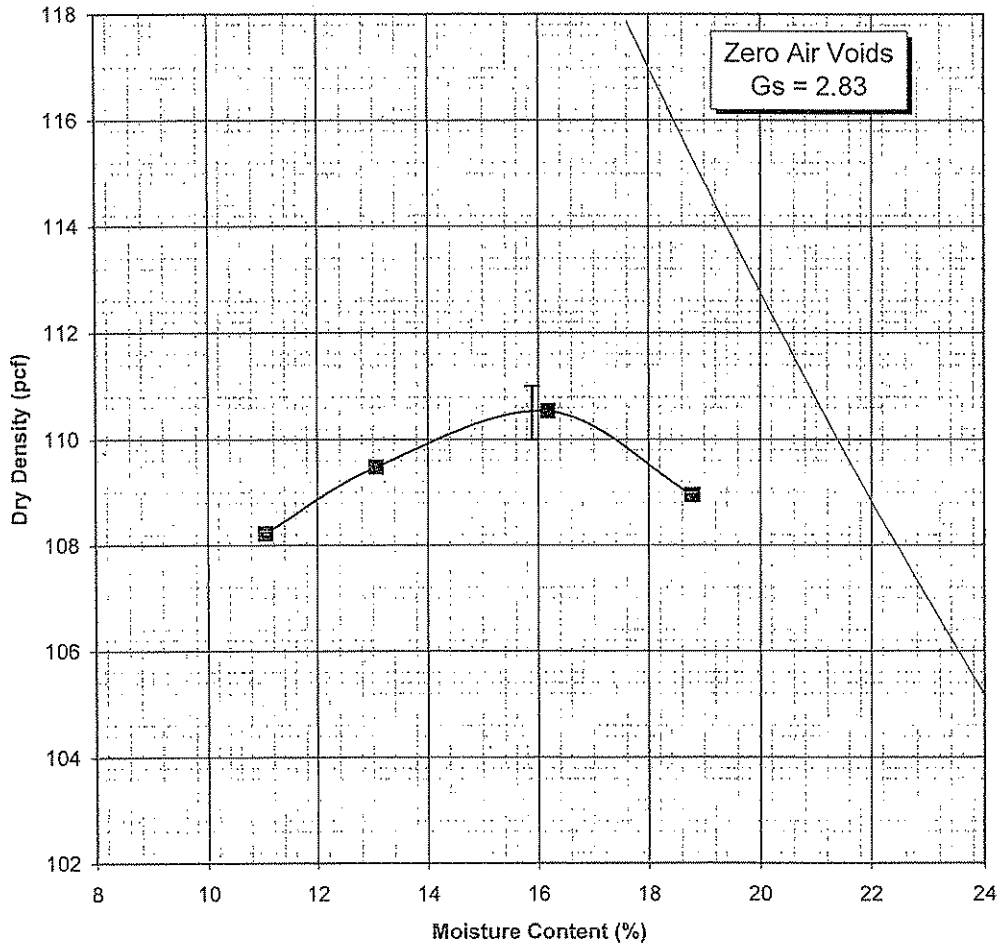
Fuller Mossbarger Scott & May

FMSM ENGINEERS

Moisture-Density Data Sheet

Project: Final Design and Permitting, Big Sandy Plant - Unit 2 — Project No.: LX2005099
Source: BB-R1 (1 of 2), 6.0'-9.5' & BB-R1 (2 of 2), 6.0'-9.5' (Soil 6) — Sample No.: 128
Sample Description: Lean clay (CL), red brown — Nmc: 13.6 %
Visual Notes: — Test Method: ASTM D 698 - Method A
Prepared: Moist — Oversized Fraction: 0 % — Rammer: Manual — Gs - Fines: ASTM D 854

Mold Weight 4264 grams		Moisture Determination				
Wet Weight plus Mold (grams)	Wet Weight minus Mold (grams)	Wet Soil and Can Weight (grams)	Dry Soil and Can Weight (grams)	Can Weight (grams)	Water Content (%)	Dry Density (pcf)
6128	1864	575.33	517.38	73.85	13.1	109.5
6198	1934	580.80	510.49	76.14	16.2	110.5
6074	1810	652.24	594.67	74.20	11.1	108.2
6213	1949	569.35	490.96	73.86	18.8	108.9



Maximum Dry Density 110.5 PCF
Optimum Moisture Content 15.9 %

Fuller Mossbarger Scott & May

MSM ENGINEERS

Hydraulic Conductivity of Saturated Porous Materials
Using a Flexible Wall Permeameter
ASTM D 5084-90

Project Name	Final Design and Permitting, Big Sandy Plant - Unit 2			Project No.	LX2005099
Source	BB-R1 (1 of 2), 6.0' - 9.5', and BB-R1(2 of 2), 6.0' - 9.5' (Soil 6)			Test ID	128@305
Visual Classification	Lean clay (CL), red brown			Prepared By	KDG
Compacted	Std. 0 in. spacer	Specific Gravity	2.8 ASTM D854-A	Date	12-5-05
		Maximum Dry Density (pcf)	110.5	Percent of Maximum	104.0
Permeant:	De-aired tap water	LL	48 PL 21	PI	27
Selection and Preparation Comments:	Standard Effort, -No.4 material.				

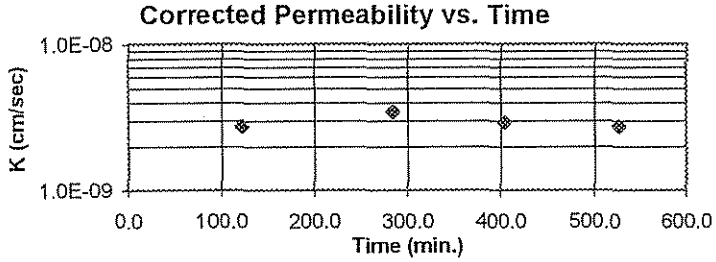
Specimens (if compacted) were compacted in a Proctor Mold as follows: The Maximum Dry Density was converted to Wet Density, this mass was divided by 4 (layers) and 3 of the 4 layers were compacted into the mold using a Proctor Hammer using 19 blows per layer. The density was varied by reducing the height of the drop by the amount listed beside "Compacted". The specimen was trimmed from the bottom two layers.

	Initial Specimen Data	After Consolidation Data	After Test Data
Height (in.)	1.3958	1.4192	1.4196
Diameter (in.)	2.8037		2.8337
Moisture Content (%)	17.6		21.6
Dry Unit Weight (pcf)	114.9		110.6
Void Ratio	0.522		0.581
Degree of Saturation (%)	94.3		104.2

Final Pressures (psi)	
Chamber	75
Influent	70
Effluent	65

Applied Head Difference (psi)	5
Back Pressure Saturated to (psi)	65
Maximum Effective Consolidation Stress (psi)	10
Minimum Effective Consolidation Stress (psi)	5

						Hydraulic Conductivity			
Date	Clock (24H:M)	Temp. °F	Bottom Head	Top Head	Test Time (sec)	k (m/s)	k (cm/s)	k @ 20° C (m/s)	k @ 20° C (cm/s)
12-9-05	8:00	70.0	22.21	3.39	0	---	---	---	---
12-9-05	10:02	70.0	22.11	3.49	7.32E+03	2.8E-11	2.8E-09	2.7E-11	2.7E-09
12-9-05	12:45	70.0	21.94	3.66	9.78E+03	3.5E-11	3.5E-09	3.4E-11	3.4E-09
12-9-05	14:45	70.0	21.83	3.76	7.20E+03	3.0E-11	3.0E-09	2.9E-11	2.9E-09
12-9-05	16:47	70.0	21.73	3.86	7.32E+03	2.8E-11	2.8E-09	2.7E-11	2.7E-09



A gradient of approximately 98.9 was used for this test. This gradient exceeds ASTM guidelines for maximum gradient, but was used to achieve the requestors desired test duration. Examination of the sample shows no signs of material loss or clogging that may affect test results.

Average Hydraulic Conductivity @ 20° C (last 4 determinations)	m/s	2.94E-11	cm/s	2.94E-09
Average Hydraulic Conductivity @ 20° C (last run)	m/s	2.94E-11	cm/s	2.94E-09

Reviewed by: _____

Fuller Mossbarger Scott & May ENGINEERS

Summary of Soil Tests

Project Name	Final Design and Permitting, Big Sandy Plant - Unit 2	Project Number	LX2005099
Source	HC-S4, 6.1'-10.5' & FB-S3, 0.3'-10.7' (Soil 6)	Lab ID	130
County	Lawrence	Date Received	11-7-05
Sample Type	Bag Composite	Date Reported	11-30-05

Test Results

Natural Moisture Content

Test Method: ASTM D 2216

Moisture Content (%): 15.2

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
3"	75	
2"	50	
1 1/2"	37.5	
1"	25	
3/4"	19	
3/8"	9.5	100.0
No. 4	4.75	98.9
No. 10	2	96.2
No. 40	0.425	90.6
No. 200	0.075	84.2
	0.02	75.2
	0.005	55.4
	0.002	36.4
estimated	0.001	29.2

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	1.1	3.8
Coarse Sand	2.7	5.6
Medium Sand	5.6	---
Fine Sand	6.4	6.4
Silt	28.8	47.8
Clay	55.4	36.4

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	46
Plastic Limit:	23
Plasticity Index:	23
Activity Index:	0.64

Moisture-Density Relationship

Test Method: ASTM D 698 Method A

Maximum Dry Density (lb/ft^3):	111.4
Maximum Dry Density (kg/m^3):	1785
Optimum Moisture Content (%):	16.3
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.81

Classification

Unified Group Symbol: CL

Group Name: Lean clay with sand

AASHTO Classification: A-7-6 (20)

Comments:

Reviewed by:

Fuller Mossberger Scott & May ENGINEERS

Particle-Size Analysis of Soils
ASTM D 422

Project Name: Final Design and Permitting, Big Sandy Plant - Unit 2
Project Number: LX2005099
Source: HC-S4, 6.1'-10.5' & FB-S3, 0.3'-10.7' (Soil 6)
Lab ID: 130

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: Angular
Particle Hardness: Hard and Durable

Tested By: DC
Test Date: 11-17-2005
Date Received: 11-07-2005

Maximum Particle size: 3/8" Sieve

Sieve Size	% Passing
3"	
2"	
1 1/2"	
1"	
3/4"	
3/8"	100.0
No. 4	98.9
No. 10	96.2

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: Total Sample

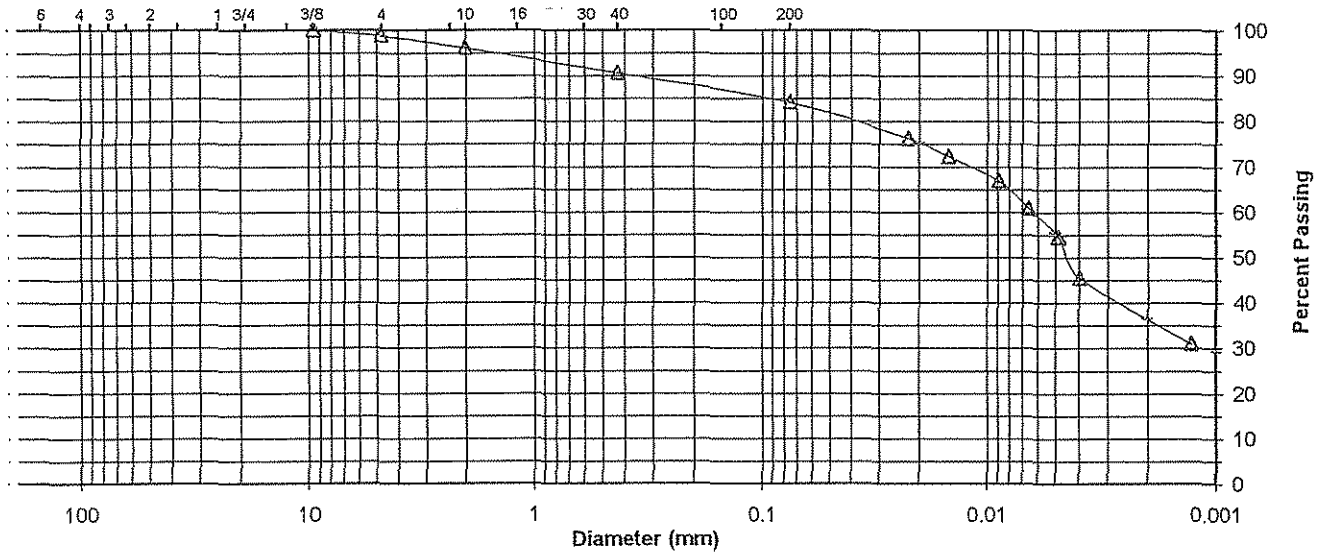
Specific Gravity: 2.81

Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	90.6
No. 200	84.2
0.02 mm	75.2
0.005 mm	55.4
0.002 mm	36.4
0.001 mm	29.2

Particle Size Distribution

ASTM							
AASHTO							



Comments

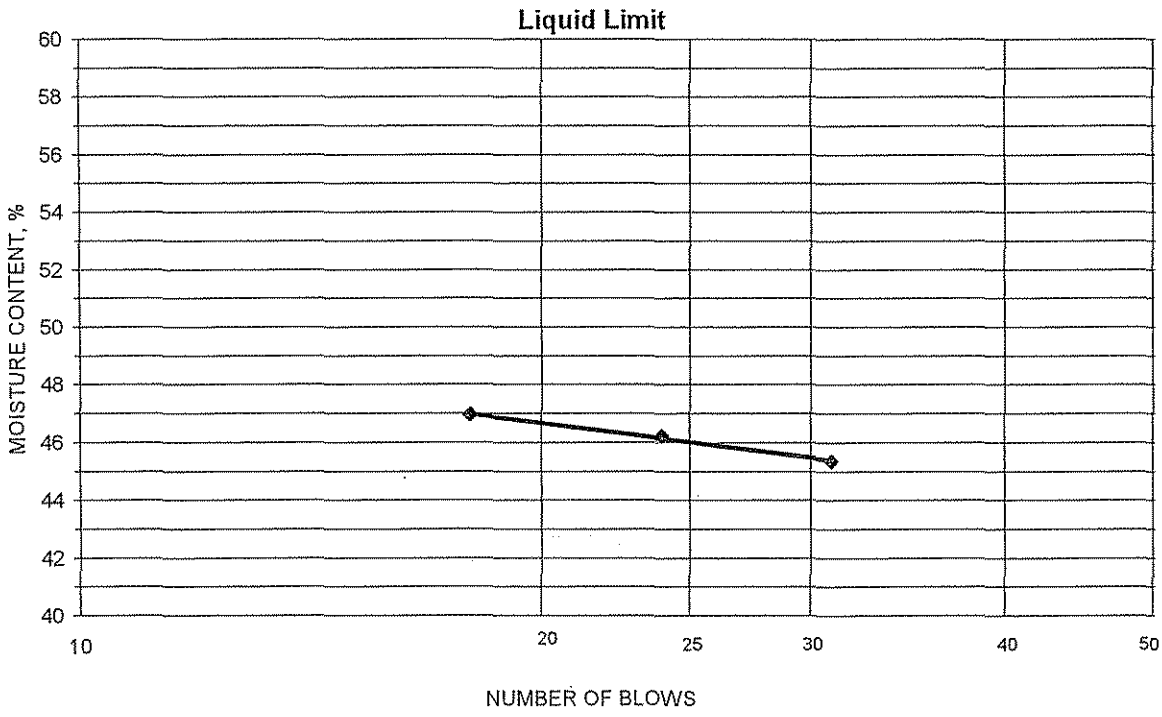
Reviewed By

Fuller Mossbarger Scott & May ENGINEERS

ATTERBERG LIMITS

Project	Final Design and Permitting, Big Sandy Plant - Unit 2	Project No.	LX2005099
Source	HC-S4, 6.1'-10.5' & FB-S3, 0.3'-10.7' (Soil 6)	Lab ID	130
		% + No. 40	9
Tested By	KWS	Test Method	ASTM D 4318 Method A
Test Date	11-28-2005	Prepared	Dry
		Date Received	11-07-2005

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
19.64	16.88	11.00	18	46.9	
19.20	16.65	11.13	24	46.2	
18.67	16.34	11.20	31	45.3	46



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
17.95	16.70	11.30	23.1	23	23
18.22	16.90	11.19	23.1		

Remarks: _____

Reviewed By _____

Fuller Mossbarger Scott & May

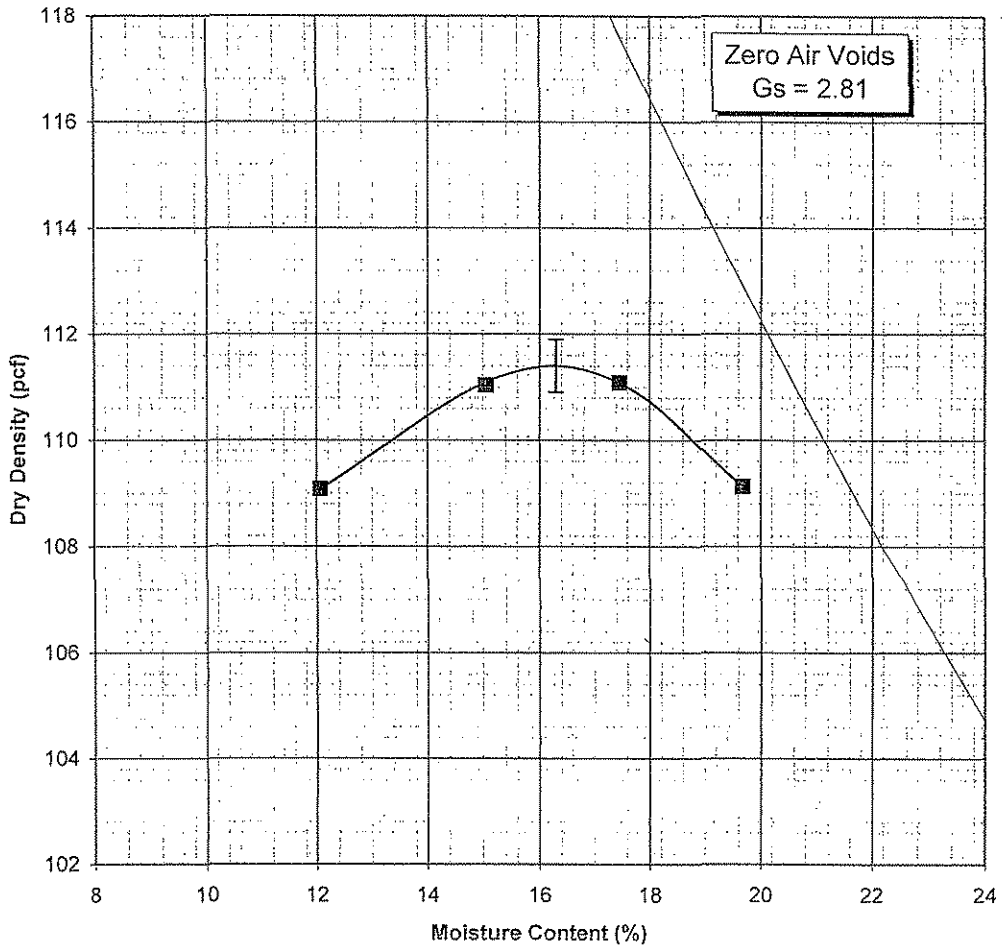
EMSM ENGINEERS

Moisture-Density Data Sheet

Project: Final Design and Permitting, Big Sandy Plant - Unit 2
Source: HC-S4, 6.1'-10.5' & FB-S3, 0.3'-10.7' (Soil 6)
Sample Description: Lean clay with sand (CL), light brown
Visual Notes:
Prepared: Moist Oversized Fraction: 1 % Rammer: Manual

Project No.: LX2005099
Sample No.: 130
Nmc: 15.2 %
Test Method: ASTM D 698 - Method A
Gs - Fines: ASTM D 854

Mold Weight 4264 grams		Moisture Determination				
Wet Weight plus Mold (grams)	Wet Weight minus Mold (grams)	Wet Soil and Can Weight (grams)	Dry Soil and Can Weight (grams)	Can Weight (grams)	Water Content (%)	Dry Density (pcf)
6229	1965	582.60	507.03	74.26	17.5	111.1
6231	1967	601.14	514.30	73.28	19.7	109.1
6188	1924	595.39	527.02	73.18	15.1	111.0
6105	1841	647.21	585.53	74.64	12.1	109.1



Maximum Dry Density 111.4 PCF
Optimum Moisture Content 16.3 %

Fuller Mossbarger Scott & May

EMSM ENGINEERS

Hydraulic Conductivity of Saturated Porous Materials
Using a Flexible Wall Permeameter
ASTM D 5084-90

Project Name	Final Design and Permitting, Big Sandy Plant - Unit 2			Project No.	LX2005099
Source	HC-S4, 6.1' - 10.5', and FB-S3, 0.3' - 10.7' (Soil 6)			Test ID	130@301
Visual Classification	Lean clay with sand (CL), light brown			Prepared By	KDG
Compacted	Std. 0 in. spacer	Specific Gravity	2.77 ASTM D854-A	Date	12-5-05
		Maximum Dry Density (pcf)	111.4	Percent of Maximum	100.9
Permeant:	De-aired tap water	LL	46 PL 23	PI	23

Selection and Preparation Comments: Standard Effort, -No.4 material.

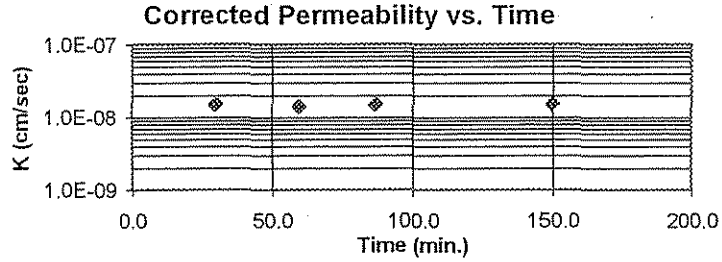
Specimens (if compacted) were compacted in a Proctor Mold as follows: The Maximum Dry Density was converted to Wet Density, this mass was divided by 4 (layers) and 3 of the 4 layers were compacted into the mold using a Proctor Hammer using 19 blows per layer. The density was varied by reducing the height of the drop by the amount listed beside "Compacted". The specimen was trimmed from the bottom two layers.

	Initial Specimen Data	After Consolidation Data	After Test Data
Height (in.)	1.4004	1.4022	1.4027
Diameter (in.)	2.8067		2.8198
Moisture Content (%)	18.2		21.0
Dry Unit Weight (pcf)	112.3		111.1
Void Ratio	0.539		0.556
Degree of Saturation (%)	93.4		104.4

Final Pressures (psi)	
Chamber	75
Influent	70
Effluent	65

Applied Head Difference (psi)	5
Back Pressure Saturated to (psi)	65
Maximum Effective Consolidation Stress (psi)	10
Minimum Effective Consolidation Stress (psi)	5

						Hydraulic Conductivity			
Date	Clock (24H:M)	Temp. °F	Bottom Head	Top Head	Test Time (sec)	k (m/s)	k (cm/s)	k @ 20° C (m/s)	k @ 20° C (cm/s)
12-9-05	8:36	70.0	22.07	3.63	0	---	---	---	---
12-9-05	9:06	70.0	21.94	3.77	1.80E+03	1.5E-10	1.5E-08	1.5E-10	1.5E-08
12-9-05	9:36	70.0	21.81	3.89	1.80E+03	1.4E-10	1.4E-08	1.4E-10	1.4E-08
12-9-05	10:03	70.0	21.69	4.01	1.62E+03	1.5E-10	1.5E-08	1.5E-10	1.5E-08
12-9-05	11:06	70.0	21.41	4.30	3.78E+03	1.5E-10	1.5E-08	1.5E-10	1.5E-08



A gradient of approximately 98.5 was used for this test. This gradient exceeds ASTM guidelines for maximum gradient, but was used to achieve the requestors desired test duration. Examination of the sample shows no signs of material loss or clogging that may affect test results.

Average Hydraulic Conductivity @ 20° C (last 4 determinations)	m/s	1.45E-10	cm/s	1.45E-08
Average Hydraulic Conductivity @ 20° C (last run)	m/s	1.45E-10	cm/s	1.45E-08

Reviewed by:

Soil 7

Fuller Mossbarger Scott & May ENGINEERS

Gradation Analysis
ASTM D 422

Project Name: Final Design and Permitting, Big Sandy Plant - Unit 2 | Project Number: LX2005099
Source: BB-F2, 99.0'-100.5' (Soil 7) | Lab ID: 71

Particle Shape: Angular | Particle Hardness: Hard and Durable | Prepared: ASTM D 1140 Method A

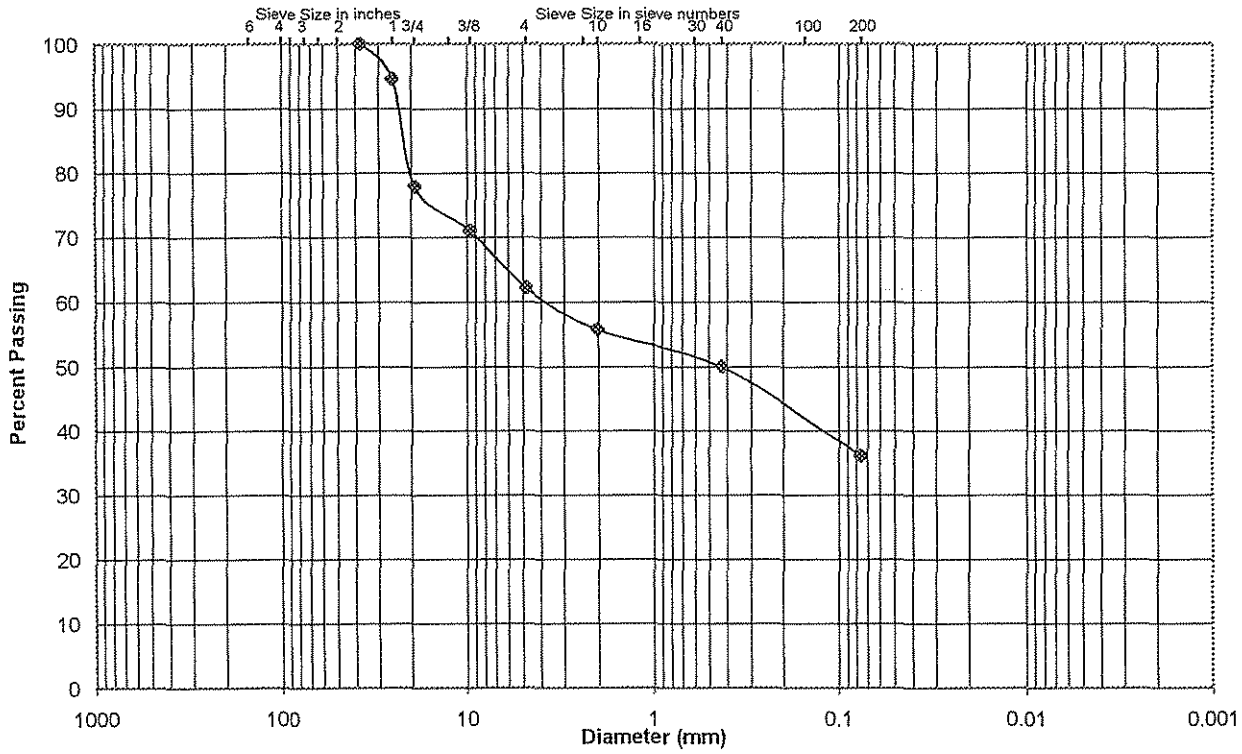
Tested by: AKS | Test Date: 11-17-2005 | Date Received: 11-07-2005

Sample Dry Mass (g): 336.14 | Analysis based on: Total Sample

Moisture Content (%): 12.8

Sieve Size	Grams Retained	% Retained	% Passing
6"			
3"			
1 1/2"	0	0.0	100.0
1"	18.53	5.5	94.5
3/4"	56.31	16.8	77.7
3/8"	23.15	6.9	70.8
No. 4	29.47	8.7	62.1
No. 10	21.49	6.4	55.7
No. 40	19.53	5.8	49.9
No. 200	46.44	13.8	36.1
Pan	121.65	36.2	---

Particle Size Distribution



Comments

Reviewed By

Fuller Mossbarger Scott & May ENGINEERS

Gradation Analysis
ASTM D 422

Project Name: Final Design and Permitting, Big Sandy Plant - Unit 2 | Project Number: LX2005099
Source: BB-F2, 101.5'-103.0' (Soil 7) | Lab ID: 72

Particle Shape: Angular | Particle Hardness: Weathered and Friable | Prepared: ASTM D 1140 Method A

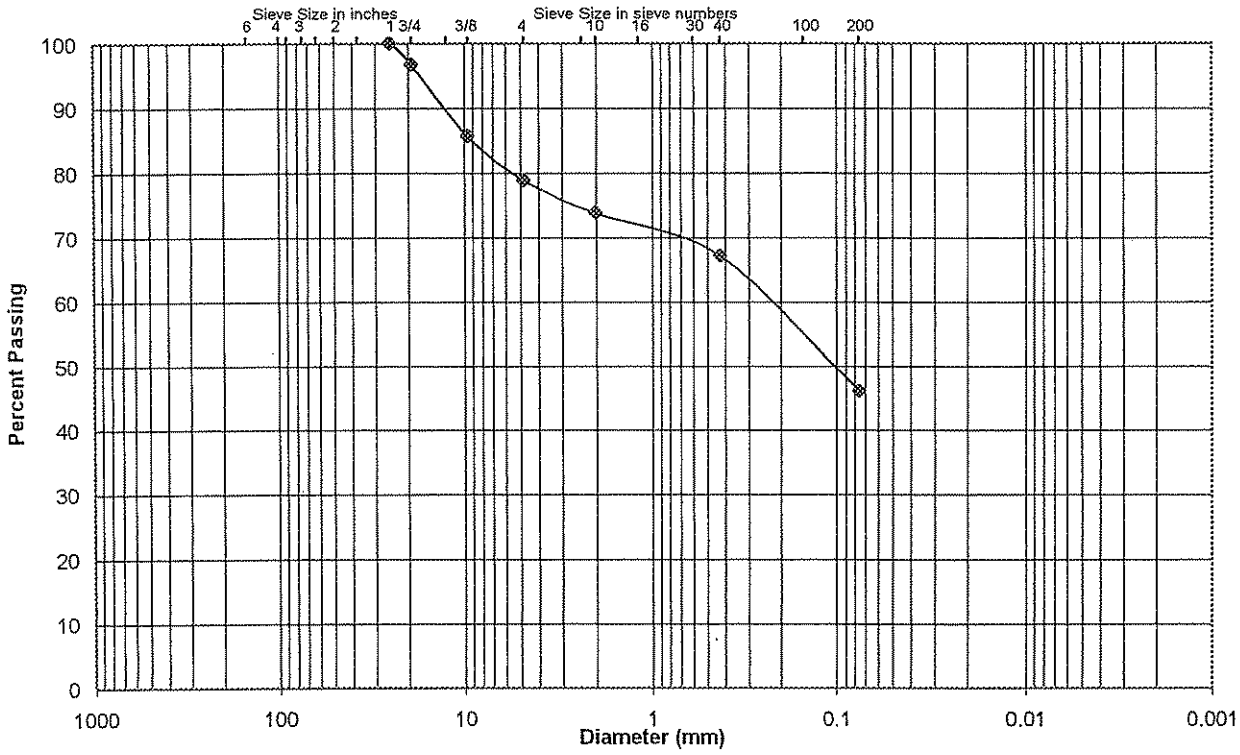
Tested by: AMC | Test Date: 11-22-2005 | Date Received: 11-07-2005

Sample Dry Mass (g): 387.72 | Analysis based on: Total Sample

Moisture Content (%): 13.5

Sieve Size	Grams Retained	% Retained	% Passing
6"			
3"			
1 1/2"			
1"	0	0.0	100.0
3/4"	12.91	3.3	96.7
3/8"	43.14	11.2	85.5
No. 4	26.17	6.7	78.8
No. 10	19.4	5.0	73.8
No. 40	26.02	6.7	67.1
No. 200	81.51	21.0	46.1
Pan	179.32	46.3	---

Particle Size Distribution



Comments

Reviewed By

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Gradation Analysis
ASTM D 422

Project Name: Final Design and Permitting, Big Sandy Plant - Unit 2 | Project Number: LX2005099
Source: BB-F2, 104.0'-105.5' (Soil 7) | Lab ID: 73

Particle Shape: Angular | Particle Hardness: Hard and Durable | Prepared: ASTM D 1140 Method A

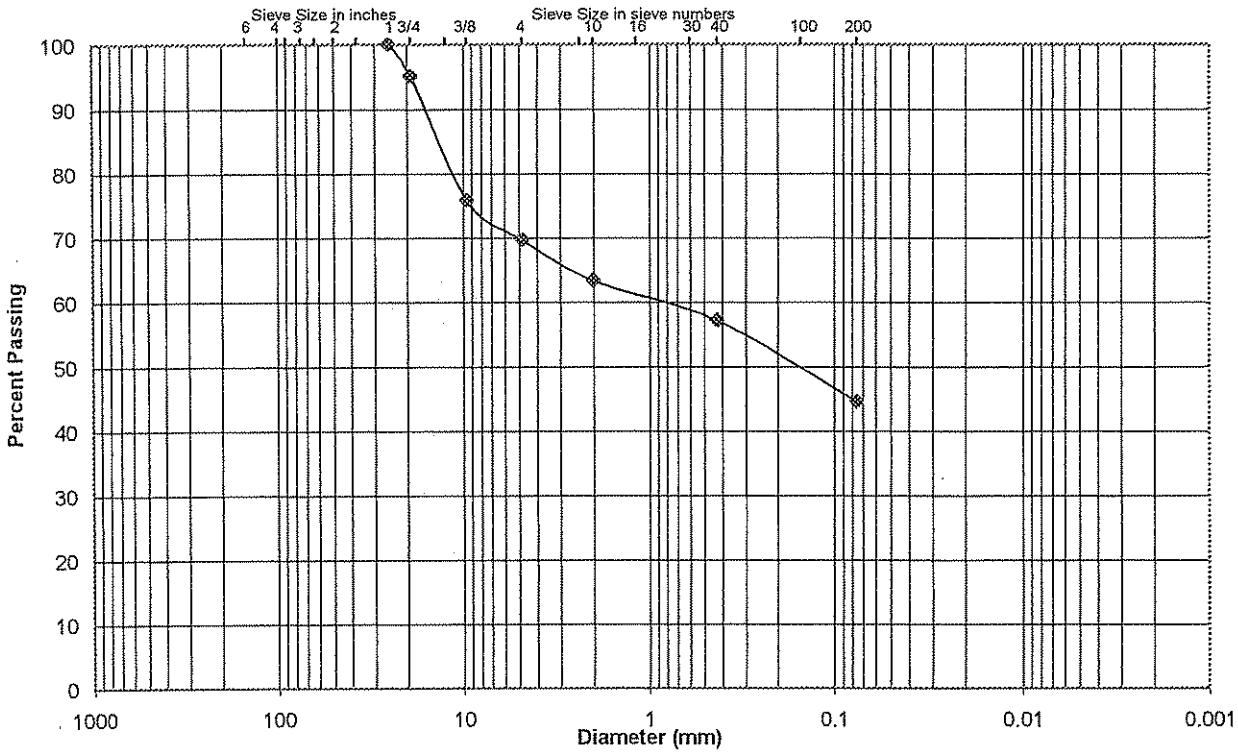
Tested by: AKS | Test Date: 11-19-2005 | Date Received: 11-07-2005

Sample Dry Mass (g): 337.57 | Analysis based on: Total Sample

Moisture Content (%): 14.0

Sieve Size	Grams Retained	% Retained	% Passing
6"			
3"			
1 1/2"			
1"	0	0.0	100.0
3/4"	16.56	4.9	95.1
3/8"	65.06	19.3	75.8
No. 4	21.01	6.2	69.6
No. 10	21.29	6.3	63.3
No. 40	21.12	6.3	57.0
No. 200	42	12.4	44.6
Pan	151	44.7	---

Particle Size Distribution



Comments

Reviewed By

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Gradation Analysis
ASTM D 422

Project Name: Final Design and Permitting, Big Sandy Plant - Unit 2 | Project Number: LX2005099
Source: BB-F2, 109.0'-110.5' (Soil 7) | Lab ID: 74

Particle Shape: Rounded | Particle Hardness: Hard and Durable | Prepared: ASTM D 1140 Method A

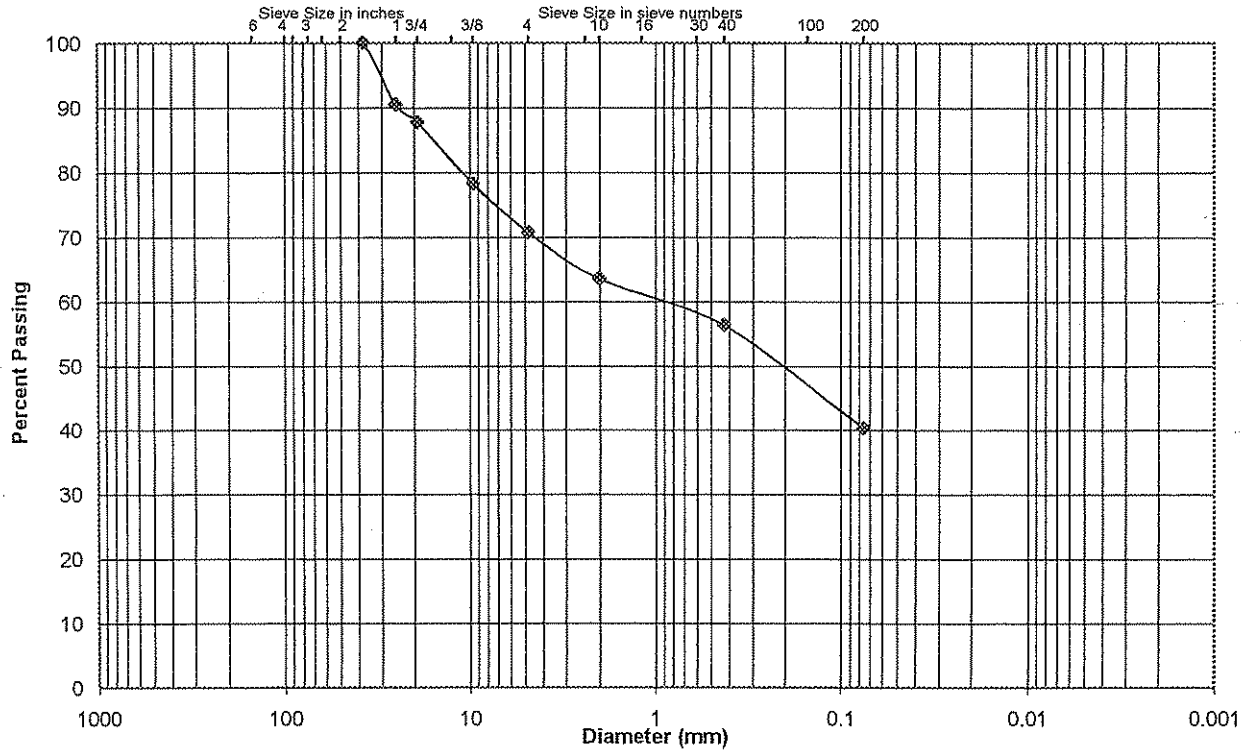
Tested by: AMC | Test Date: 11-22-2005 | Date Received: 11-07-2005

Sample Dry Mass (g): 335.59 | Analysis based on: Total Sample

Moisture Content (%): 14.8

Sieve Size	Grams Retained	% Retained	% Passing
6"			
3"			
1 1/2"	0	0.0	100.0
1"	32.13	9.6	90.4
3/4"	9.07	2.7	87.7
3/8"	32.1	9.5	78.2
No. 4	25	7.5	70.7
No. 10	24.18	7.2	63.5
No. 40	24.18	7.2	56.3
No. 200	54.01	16.1	40.2
Pan	135.81	40.5	---

Particle Size Distribution



Comments

Reviewed By

Fuller Mossbarger Scott & May ENGINEERS

Gradation Analysis
ASTM D 422

Project Name: Final Design and Permitting, Big Sandy Plant - Unit 2 | Project Number: LX2005099
Source: BB-F2, 114.0'-115.5' (Soil 7) | Lab ID: 75

Particle Shape: Rounded | Particle Hardness: Weathered and Friable | Prepared: ASTM D 1140 Method A

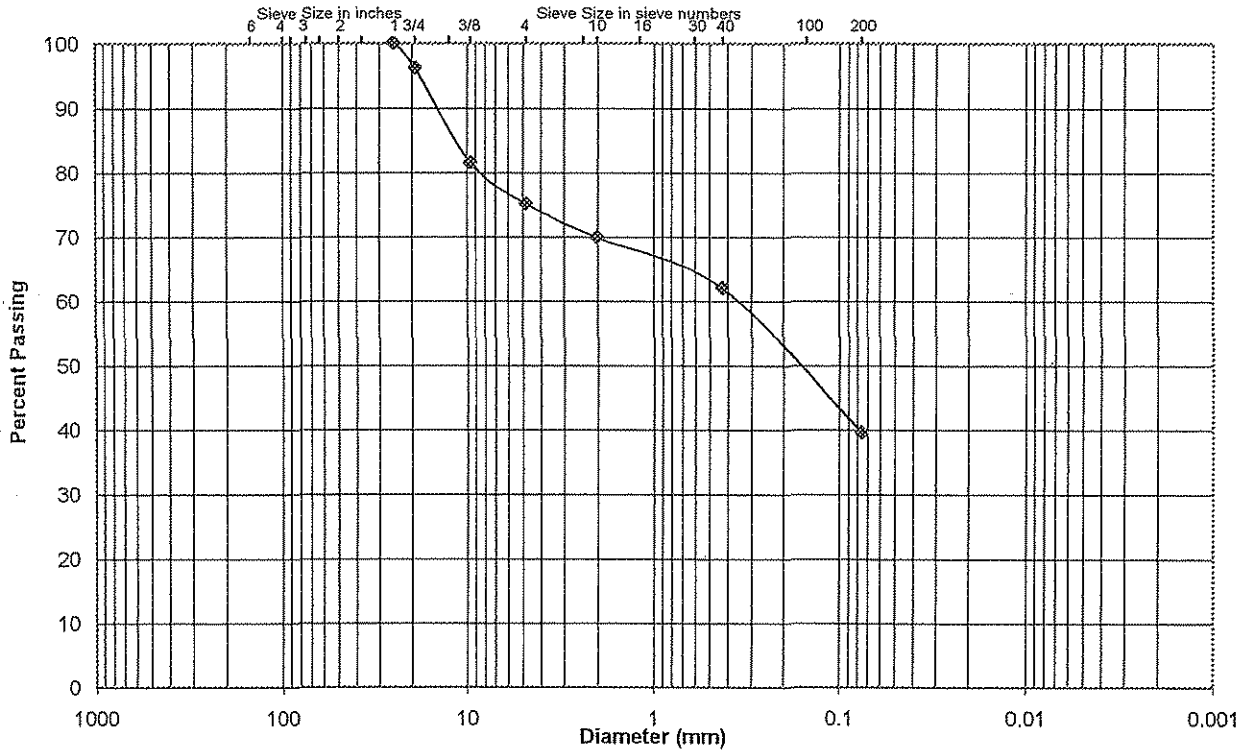
Tested by: AKS | Test Date: 11-17-2005 | Date Received: 11-07-2005

Sample Dry Mass (g): 326.13 | Analysis based on: Total Sample

Moisture Content (%): 15.1

Sieve Size	Grams Retained	% Retained	% Passing
6"			
3"			
1 1/2"			
1"	0	0.0	100.0
3/4"	12.5	3.8	96.2
3/8"	47.91	14.7	81.5
No. 4	20.94	6.4	75.1
No. 10	17.03	5.3	69.8
No. 40	25.6	7.8	62.0
No. 200	73.24	22.5	39.5
Pan	129.29	39.6	---

Particle Size Distribution



Comments

Reviewed By

Fuller Mossberger Scott & May ENGINEERS

Gradation Analysis
ASTM D 422

Project Name: Final Design and Permitting, Big Sandy Plant - Unit 2 | Project Number: LX2005099
Source: BB-F2, 119.0'-120.5' (Soil 7) | Lab ID: 76

Particle Shape: Rounded | Particle Hardness: Weathered and Friable | Prepared: ASTM D 1140 Method A

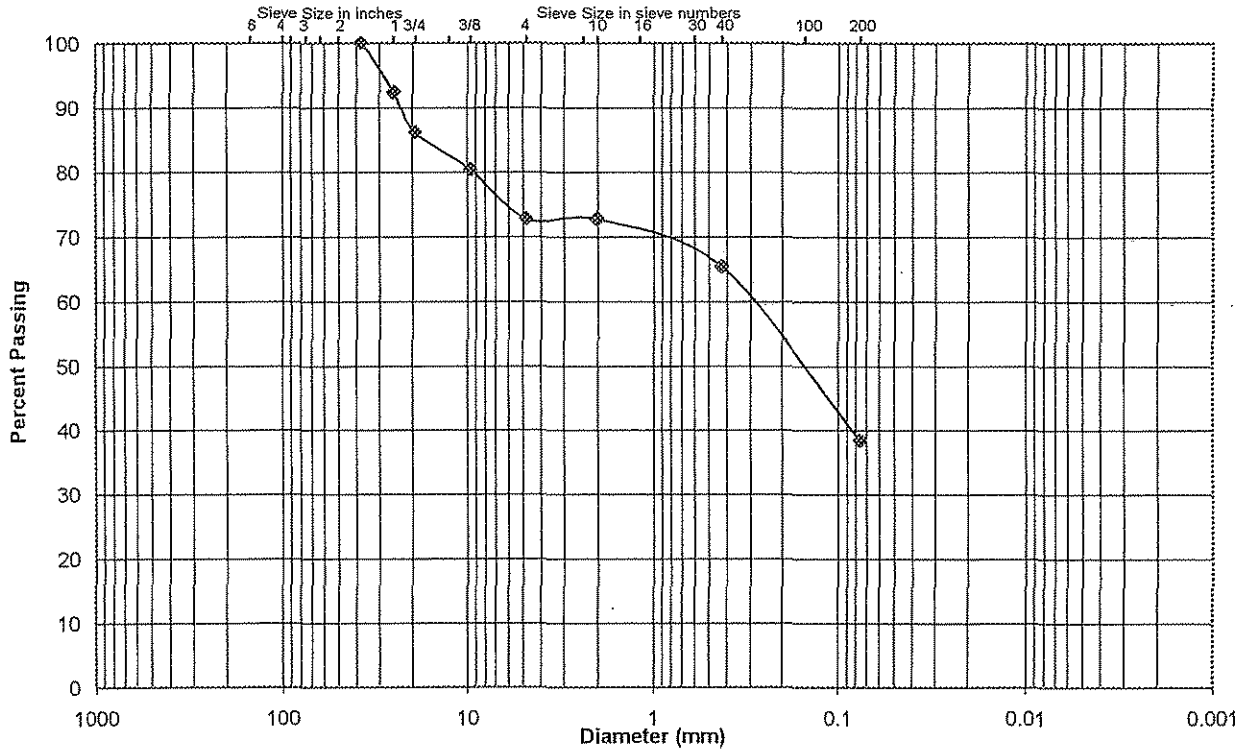
Tested by: AMC | Test Date: 11-22-2005 | Date Received: 11-07-2005

Sample Dry Mass (g): 335.99 | Analysis based on: Total Sample

Moisture Content (%): 13.9

Sieve Size	Grams Retained	% Retained	% Passing
6"			
3"			
1 1/2"	0	0.0	100.0
1"	25.81	7.7	92.3
3/4"	21	6.2	86.1
3/8"	19.35	5.8	80.3
No. 4	25.57	7.6	72.7
No. 10	0.14	0.0	72.7
No. 40	24.88	7.4	65.3
No. 200	90.41	27.0	38.3
Pan	129.14	38.4	---

Particle Size Distribution



Comments

Reviewed By

Soil 8

Fuller Mossbarger Scott & May ENGINEERS

Summary of Soil Tests

Project Name	Final Design and Permitting, Big Sandy Plant - Unit 2	Project Number	LX2005099
Source	FB-S4, 0.0'-6.5' & FB-S1, 0.2'-5.5' (Soil 8)	Lab ID	129
County	Lawrence	Date Received	11-7-05
Sample Type	Bag Composite	Date Reported	11-30-05

Test Results

Natural Moisture Content

Test Method: ASTM D 2216

Moisture Content (%): 20.8

Particle Size Analysis

Preparation Method: ASTM D 421
Gradation Method: ASTM D 422
Hydrometer Method: ASTM D 422

Particle Size		%
Sieve Size	(mm)	Passing
3"	75	
2"	50	
1 1/2"	37.5	
1"	25	
3/4"	19	
3/8"	9.5	
No. 4	4.75	100.0
No. 10	2	97.8
No. 40	0.425	85.8
No. 200	0.075	69.6
	0.02	64.9
	0.005	49.2
	0.002	37.9
estimated	0.001	32.0

Plus 3 in. material, not included: 0 (%)

	ASTM	AASHTO
Range	(%)	(%)
Gravel	0.0	2.2
Coarse Sand	2.2	12.0
Medium Sand	12.0	---
Fine Sand	16.2	16.2
Silt	20.4	31.7
Clay	49.2	37.9

Atterberg Limits

Test Method: ASTM D 4318 Method A
Prepared: Dry

Liquid Limit:	43
Plastic Limit:	20
Plasticity Index:	23
Activity Index:	0.61

Moisture-Density Relationship

Test Method: ASTM D 698 Method A

Maximum Dry Density (lb/ft^3):	105.7
Maximum Dry Density (kg/m^3):	1693
Optimum Moisture Content (%):	20.3
Over Size Correction %:	N/A

California Bearing Ratio

Test Not Performed

Bearing Ratio (%):	N/A
Compacted Dry Density (lb/ft^3):	N/A
Compacted Moisture Content (%):	N/A

Specific Gravity

Test Method: ASTM D 854
Prepared: Dry

Particle Size:	No. 10
Specific Gravity at 20° Celsius:	2.74

Classification

Unified Group Symbol: CL

Group Name: Sandy lean clay

AASHTO Classification: A-7-6 (15)

Comments:

Reviewed by:

Fuller Mossbarger Scott & May ENGINEERS

Particle-Size Analysis of Soils
ASTM D 422

Project Name: Final Design and Permitting, Big Sandy Plant - Unit 2
Project Number: LX2005099
Source: FB-S4, 0.0'-6.5' & FB-S1, 0.2'-5.5' (Soil 8)
Lab ID: 129

Sieve analysis for the Portion Coarser than the No. 10 Sieve

Test Method: ASTM D 422
Prepared using: ASTM D 421

Particle Shape: Angular
Particle Hardness: Hard and Durable

Tested By: DC
Test Date: 11-17-2005
Date Received 11-07-2005

Maximum Particle size: No. 4 Sieve

Sieve Size	% Passing
3"	
2"	
1 1/2"	
1"	
3/4"	
3/8"	
No. 4	100.0
No. 10	97.8

Analysis for the portion Finer than the No. 10 Sieve

Analysis Based on: Total Sample

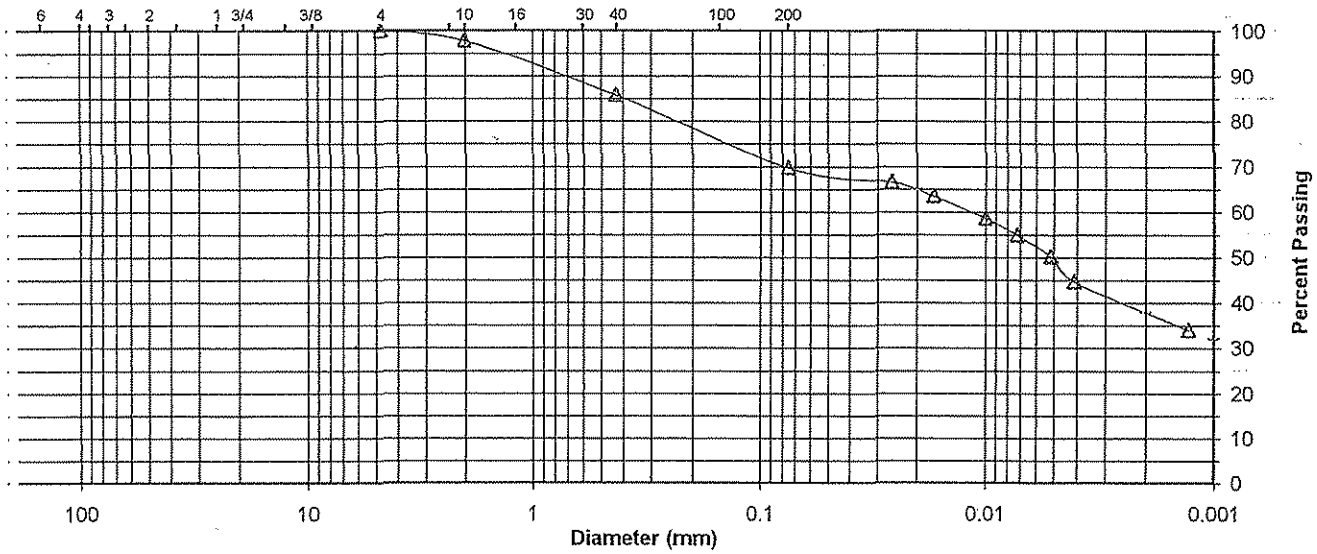
Specific Gravity 2.74

Dispersed using: Apparatus A - Mechanical, for 1 minute

No. 40	85.8
No. 200	69.6
0.02 mm	64.9
0.005 mm	49.2
0.002 mm	37.9
0.001 mm	32.0

Particle Size Distribution

ASTM							
AASHTO							



Comments

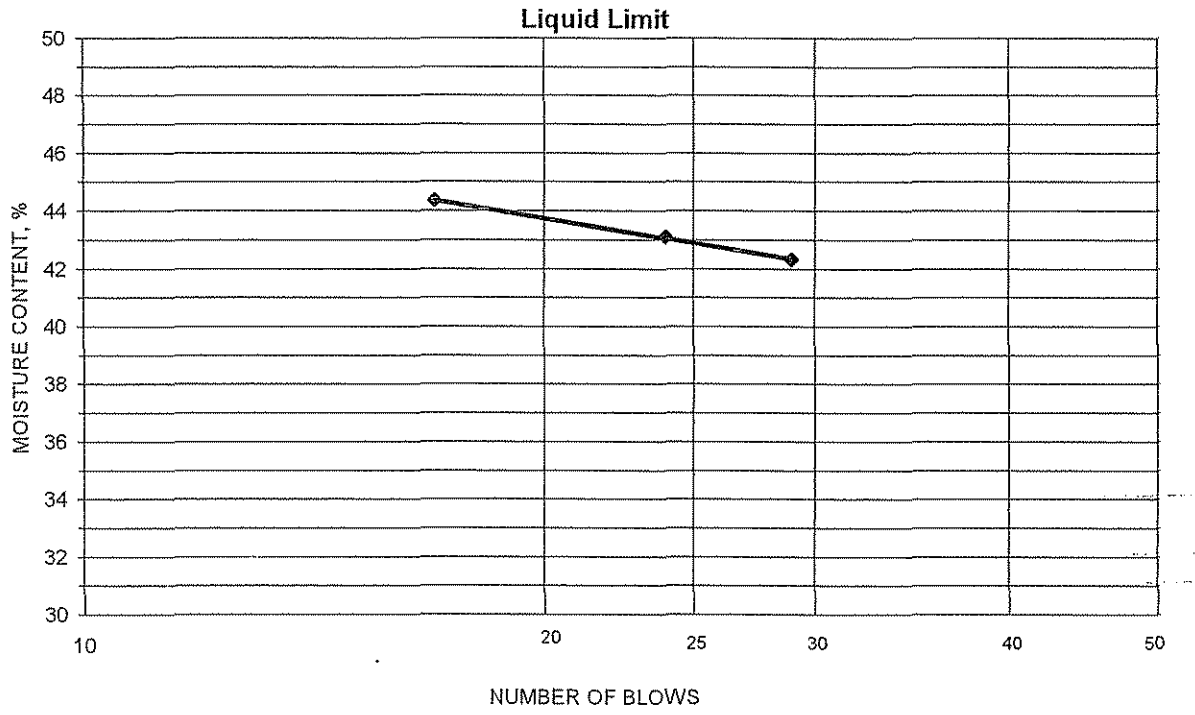
Reviewed By

Fuller Mossbarger Scott & May ENGINEERS

ATTERBERG LIMITS

Project	Final Design and Permitting, Big Sandy Plant - Unit 2	Project No.	LX2005099
Source	FB-S4, 0.0'-6.5' & FB-S1, 0.2'-5.5' (Soil 8)	Lab ID	129
		% + No. 40	14
Tested By	KWS	Test Method	ASTM D 4318 Method A
Test Date	11-28-2005	Prepared	Dry
		Date Received	11-07-2005

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
19.30	16.72	10.90	17	44.3	
19.06	16.72	11.29	24	43.1	
20.21	17.52	11.16	29	42.3	43



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
17.58	16.54	11.17	19.4	20	23
17.46	16.37	10.93	20.0		

Remarks: _____

Reviewed By _____

Fuller Mossbarger Scott & May

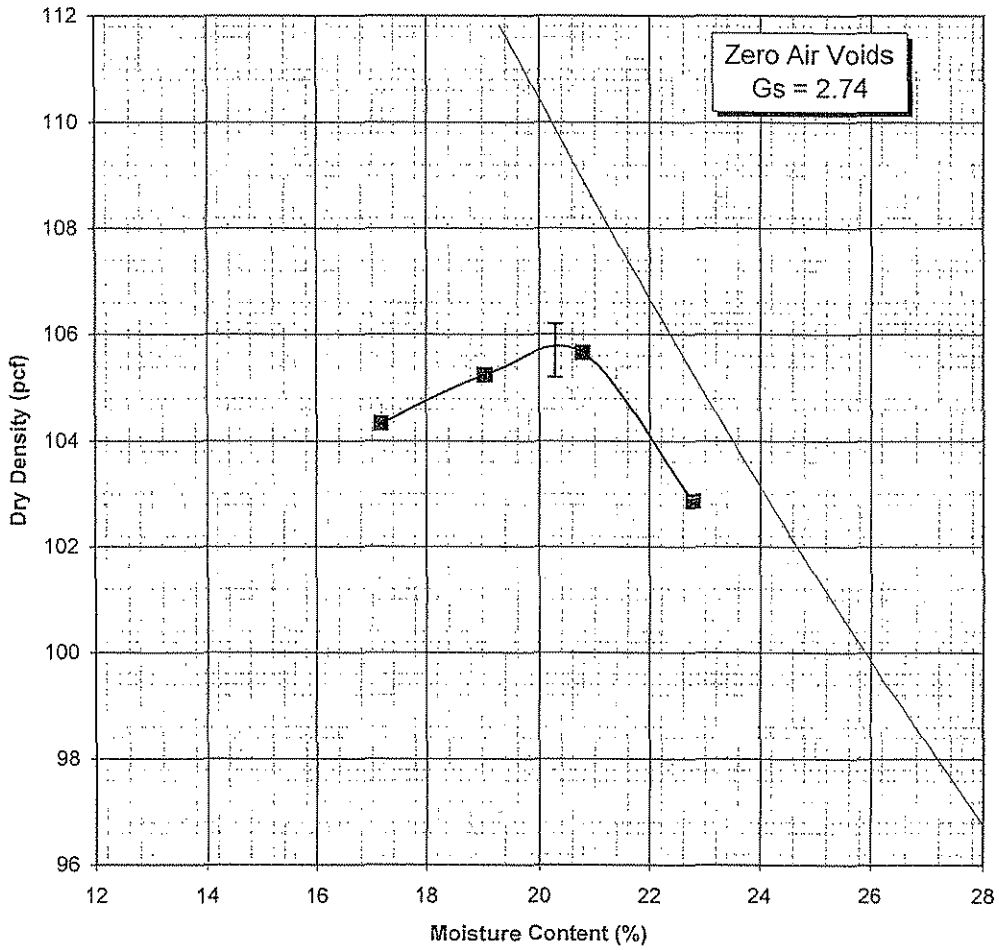
MSM ENGINEERS

Moisture-Density Data Sheet

Project: Final Design and Permitting, Big Sandy Plant - Unit 2
Source: FB-S4, 0.0'-6.5' & FB-S1, 0.2'-5.5' (Soil 8)
Sample Description: Sandy lean clay (CL), light brown
Visual Notes:
Prepared: Moist Oversized Fraction: < 5 % Rammer: Manual

Project No.: LX2005099
Sample No.: 129
Nmc: 20.8 %
Test Method: ASTM D 698 - Method A
Gs - Fines: ASTM D 854

Mold Weight 4263 grams		Moisture Determination				
Wet Weight plus Mold (grams)	Wet Weight minus Mold (grams)	Wet Soil and Can Weight (grams)	Dry Soil and Can Weight (grams)	Can Weight (grams)	Water Content (%)	Dry Density (pcf)
6185	1922	585.61	497.54	74.12	20.8	105.7
6150	1887	551.80	475.35	74.30	19.1	105.2
6165	1902	588.13	492.55	73.14	22.8	102.9
6104	1841	549.34	479.69	74.25	17.2	104.3



Maximum Dry Density 105.7 PCF
Optimum Moisture Content 20.3 %

Fuller Mossbarger Scott & May

FMSM ENGINEERS

Hydraulic Conductivity of Saturated Porous Materials
Using a Flexible Wall Permeameter
ASTM D 5084-90

Project Name	Final Design and Permitting, Big Sandy Plant - Unit 2					Project No.	LX2005099
Source	FB-S4, 0.0' - 6.5', and FB-S1, 0.2' - 5.5' (Soil 8)					Test ID	129@287
Visual Classification	Sandy lean clay (CL), light brown					Prepared By	KDG
Compacted	Std. 0 in. spacer	Specific Gravity	2.77	ASTM D854-A		Date	12-5-05
		Maximum Dry Density (pcf)	105.7			Percent of Maximum	98.1
Permeant:	De-aired tap water	LL	43	PL	20	PI	23

Selection and Preparation Comments: Standard Effort, -No.4 material.

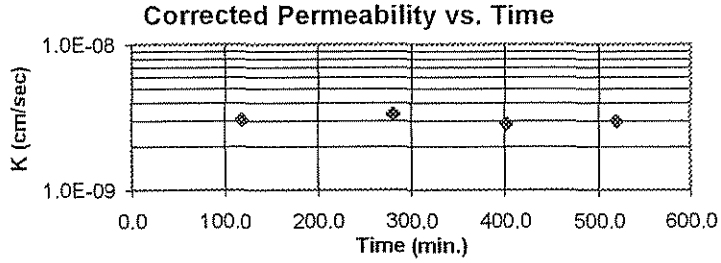
Specimens (if compacted) were compacted in a Proctor Mold as follows: The Maximum Dry Density was converted to Wet Density, this mass was divided by 4 (layers) and 3 of the 4 layers were compacted into the mold using a Proctor Hammer using 19 blows per layer. The density was varied by reducing the height of the drop by the amount listed beside "Compacted". The specimen was trimmed from the bottom two layers.

	Initial Specimen Data	After Consolidation Data	After Test Data
Height (in.)	1.3980	1.3724	1.3727
Diameter (in.)	2.8047		2.8044
Moisture Content (%)	22.3		23.4
Dry Unit Weight (pcf)	103.7		105.6
Void Ratio	0.668		0.637
Degree of Saturation (%)	92.5		101.9

Final Pressures (psi)	
Chamber	75
Influent	70
Effluent	65

Applied Head Difference (psi)	5
Back Pressure Saturated to (psi)	65
Maximum Effective Consolidation Stress (psi)	10
Minimum Effective Consolidation Stress (psi)	5

						Hydraulic Conductivity			
Date	Clock (24H:M)	Temp. °F	Bottom Head	Top Head	Test Time (sec)	k (m/s)	k (cm/s)	k @ 20° C (m/s)	k @ 20° C (cm/s)
12-9-05	8:02	70.0	22.36	3.27	0	---	---	---	---
12-9-05	10:01	70.0	22.25	3.38	7.14E+03	3.1E-11	3.1E-09	3.0E-11	3.0E-09
12-9-05	12:44	70.0	22.09	3.55	9.78E+03	3.4E-11	3.4E-09	3.3E-11	3.3E-09
12-9-05	14:45	70.0	21.98	3.65	7.26E+03	2.9E-11	2.9E-09	2.8E-11	2.8E-09
12-9-05	16:42	70.0	21.88	3.76	7.02E+03	3.0E-11	3.0E-09	2.9E-11	2.9E-09



A gradient of approximately 98.7 was used for this test. This gradient exceeds ASTM guidelines for maximum gradient, but was used to achieve the requestors desired test duration. Examination of the sample shows no signs of material loss or clogging that may affect test results.

Average Hydraulic Conductivity @ 20° C (last 4 determinations)	m/s	3.02E-11	cm/s	3.02E-09
Average Hydraulic Conductivity @ 20° C (last run)	m/s	3.02E-11	cm/s	3.02E-09

Reviewed by:

APPENDIX C.3

LABORATORY DATA

AEP – February 2009 Borrow

Soil 10

SUMMARY OF MATERIAL PROPERTIES

PROJECT: BIG SANDY FLY ASH DAM - 2009 Clay Test Pits
NUMBER:

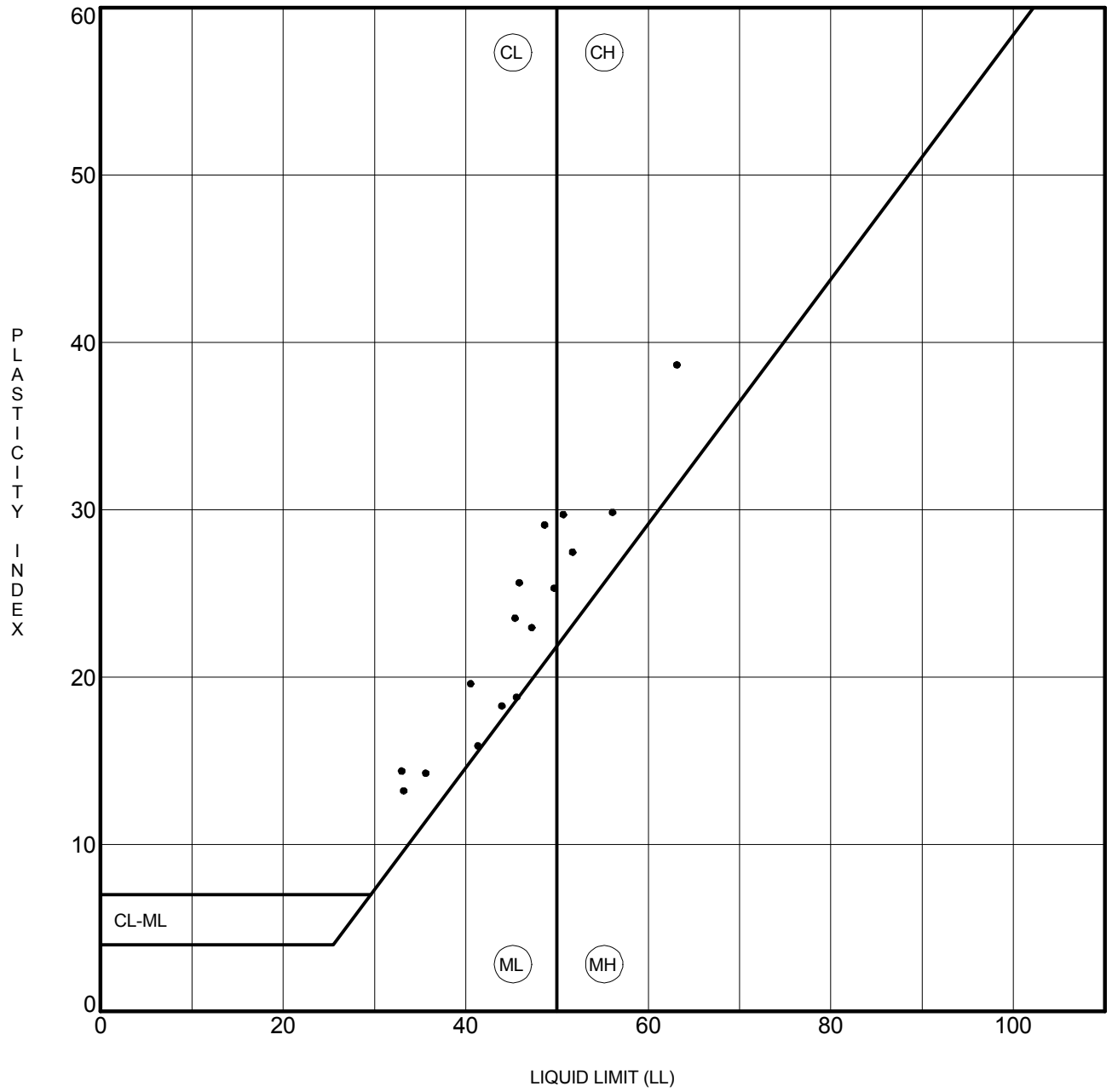
Sample Number	Depth ft.	ASTM Description	ASTM Class.	Max. Dry Density pcf	Optimum Moisture %	Liquid Limit %	Plastic Limit %	Gravel %	Sand %	<#200 Sieve %	<.002 mm %	Sp.G	Prmblty cm/sec	Nat. Moist. %
TP-0901	1.5	LEAN CLAY	CL	110.3	15.9	45.9	20.2	0.0	11.4	88.6	47.3			22.3
TP-0902	4.0	FAT CLAY with SAND	CH	111.1	16.9	50.7	21.0	0.0	17.3	82.7	49.8			24.5
TP-0903	0.5	FAT CLAY	CH	106.8	19.3	49.7	24.4	0.0	1.9	98.1	46.0		2.22E-08	23.9
TP-0905	2.5	LEAN CLAY	CL	106.8	17.8	47.2	24.3	0.0	1.3	98.7	42.6			20.4
TP-0906	1.0	FAT CLAY	CH	99.3	23.0	63.1	24.5	0.6	2.9	96.5	60.6			27.6
TP-0907	0.5	LEAN CLAY	CL	110.5	17.8	48.6	19.5	0.0	7.9	92.1	51.2			17.6
TP-0908	0.5	FAT CLAY	CH	107.9	18.9	51.7	24.2	1.7	5.7	92.5	43.8		2.14E-08	22.9
TP-0909	0.5	LEAN CLAY	CL	108.3	17.5	45.4	21.9	1.9	9.2	88.9	40.9			20.5
TP-0910	0.2	FAT CLAY	CH	98.0	24.0	56.1	26.2	0.2	9.9	89.9	53.8			22.5
TP-0911	0.3	LEAN CLAY	CL	112.7	16.4	40.5	20.9	0.0	8.1	91.9	40.3		1.32E-07	18.8
TP-0912	0.5	LEAN CLAY	CL	102.5	21.0	41.3	25.4	0.0	4.3	95.7	24.4			29.3
TP-0913	0.8	LEAN CLAY	CL	108.3	18.4	33.2	20.0	0.0	11.6	88.3	28.6		1.51E-07	20.8
TP-0914	0.8	LEAN CLAY	CL	105.7	19.8	35.6	21.4	0.1	5.1	94.8	34.9			21.9
TP-0915	0.5	LEAN CLAY	CL	101.8	21.4	43.9	25.7	0.0	6.2	93.8	29.8			26.6
TP-0916	0.5	LEAN CLAY	CL	99.6	23.5	45.6	26.8	0.0	3.2	96.8	24.0			27.6
TP-0917	0.0	LEAN CLAY	CL	121.0	12.2	33.0	18.6	0.0	0.7	99.3	27.3			12.2

JOB NO.: _____ DATE: 3/18/09

PROJECT: BIG SANDY FLY ASH DAM

LOCATION: 2009 Clay Test Pits

MATERIAL: _____



ATTERBERG LIMITS RESULTS

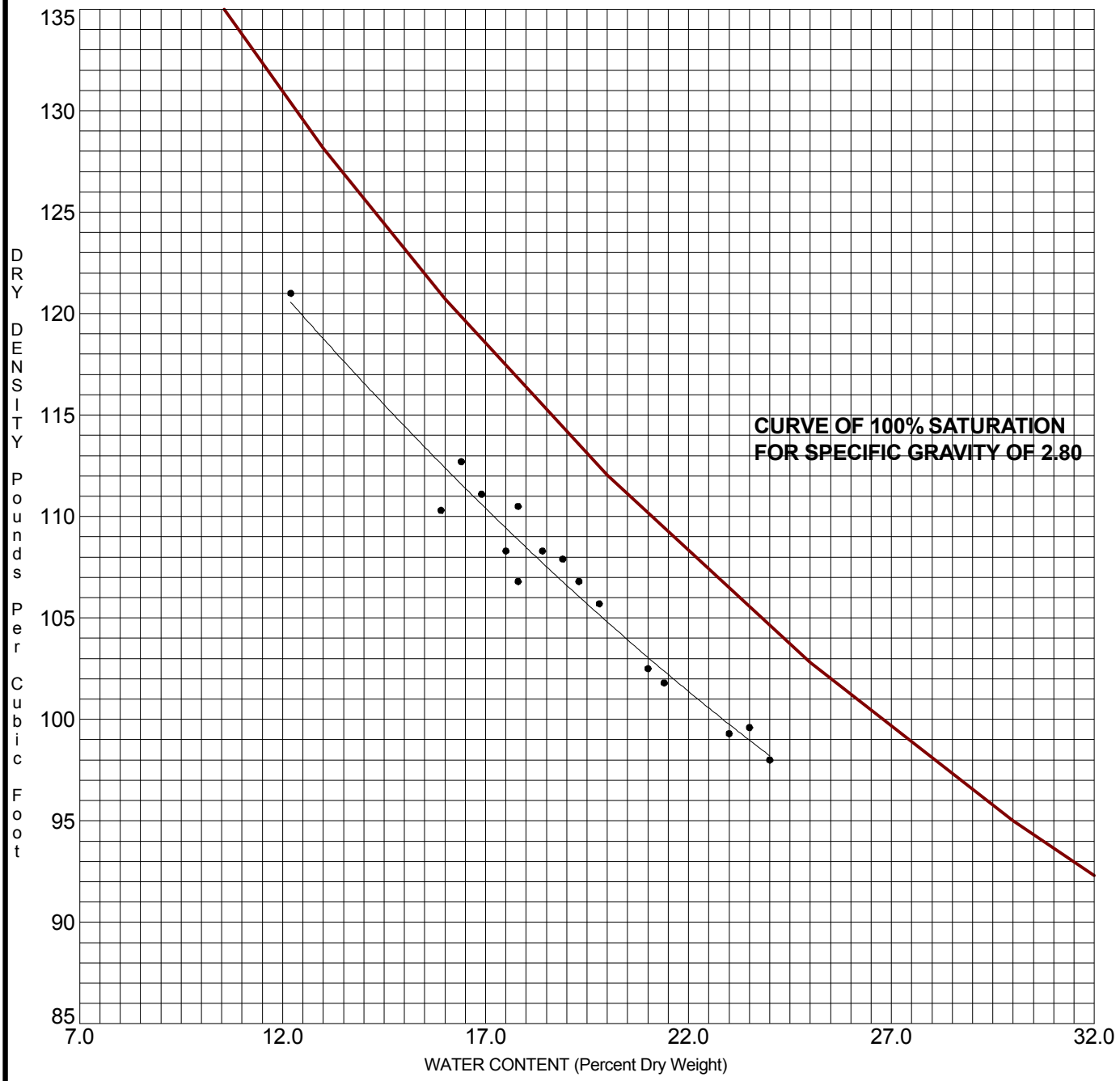
American Electric Power Service Corp.

Groveport, Ohio

JOB NO. _____ DATE: 3/18/09

PROJECT BIG SANDY FLY ASH DAM

LOCATION: 2009 Clay Test Pits



MAXIMUM DRY DENSITY vs OPTIMUM MOISTURE CONTENT

American Electric Power Service Corp.

Groveport, Ohio

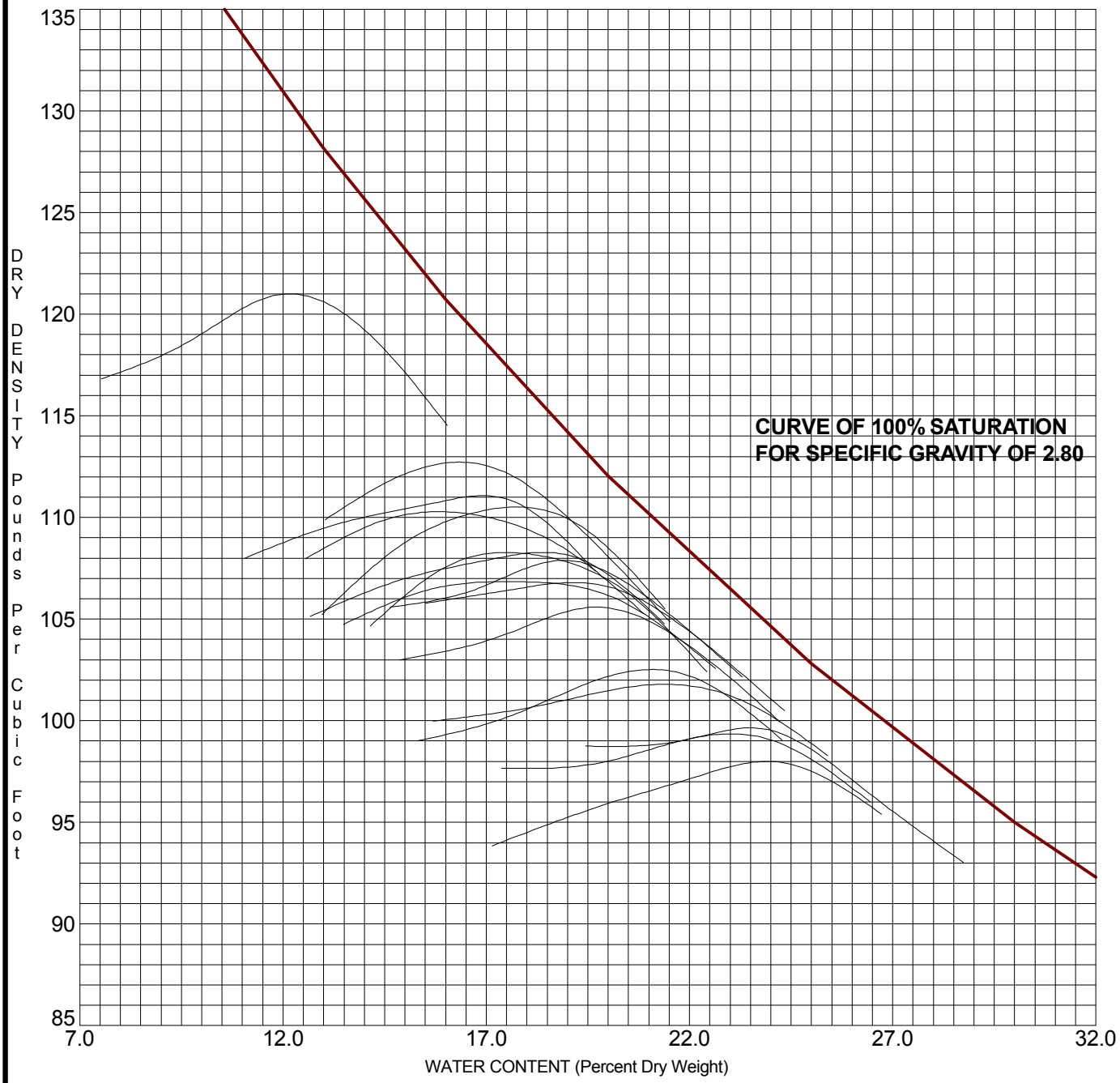
JOB NO. _____ DATE: 3/18/09

PROJECT BIG SANDY FLY ASH DAM

LOCATION: 2009 Clay Test Pits

SOURCE OF MATERIAL Clay Test Pits - 2009

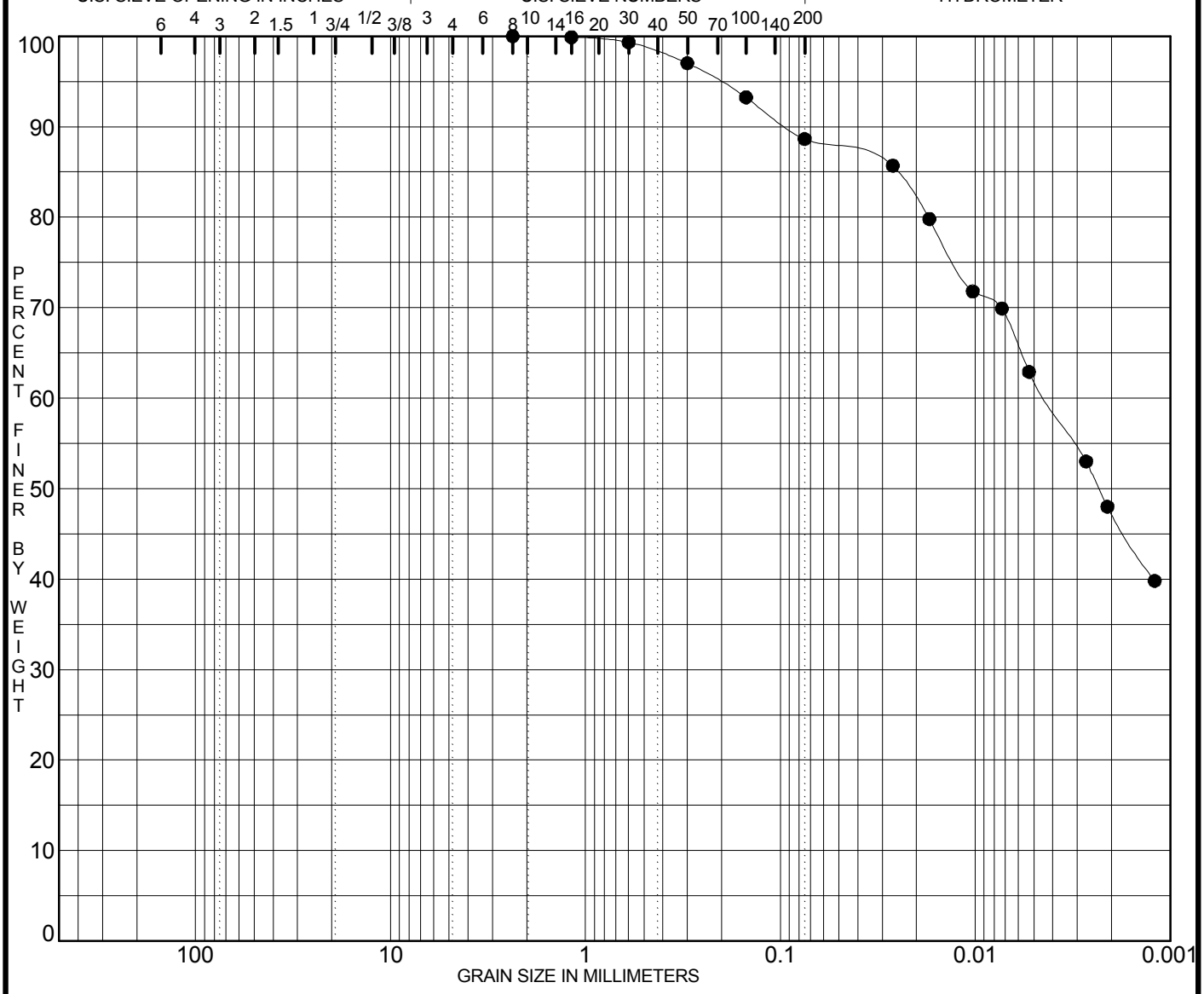
METHOD **D698-07 Mthd A**



MOISTURE-DENSITY RELATIONSHIP

American Electric Power Service Corp.

Groveport, Ohio



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	MC%	LL	PL	PI	Sp.Gr.
● **TP-0901**	**1.5**		**22.3**	**45.9**	**20.2**	**25.6**	
		LEAN CLAY CL					
		Test Pit Sample - 1.5'-8.0'					

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **TP-0901**	**1.5**	**2.360**	**0.004**			**0.0**	**11.4**	**88.6**	**47.3**

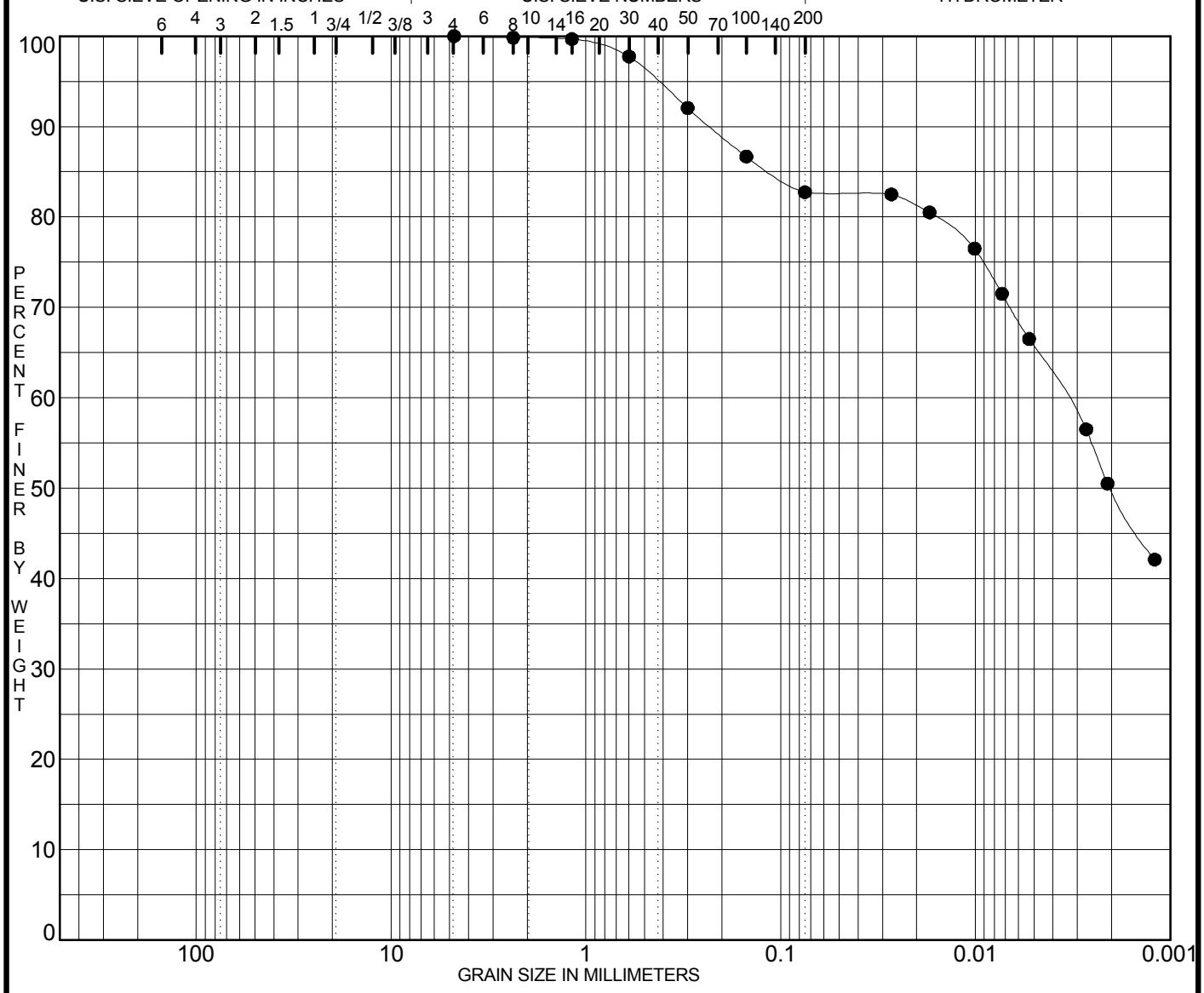
PROJECT **BIG SANDY FLY ASH DAM - 2009 Clay Test Pits** JOB NO.

DATE **3/18/09**

GRADATION CURVES

American Electric Power Service Corp.

Groveport, OH 43125



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Sp.Gr.
●	**TP-0902**	**4.0**		**24.5**	**50.7**	**21.0**	**29.7**	
			FAT CLAY with SAND CH					
			Test Pit Sample - 4.0'-10.0'					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
●	**TP-0902**	**4.0**	**4.750**	**0.003**			**0.0**	**17.3**	**82.7**	**49.8**

PROJECT **BIG SANDY FLY ASH DAM - 2009 Clay Test Pits**

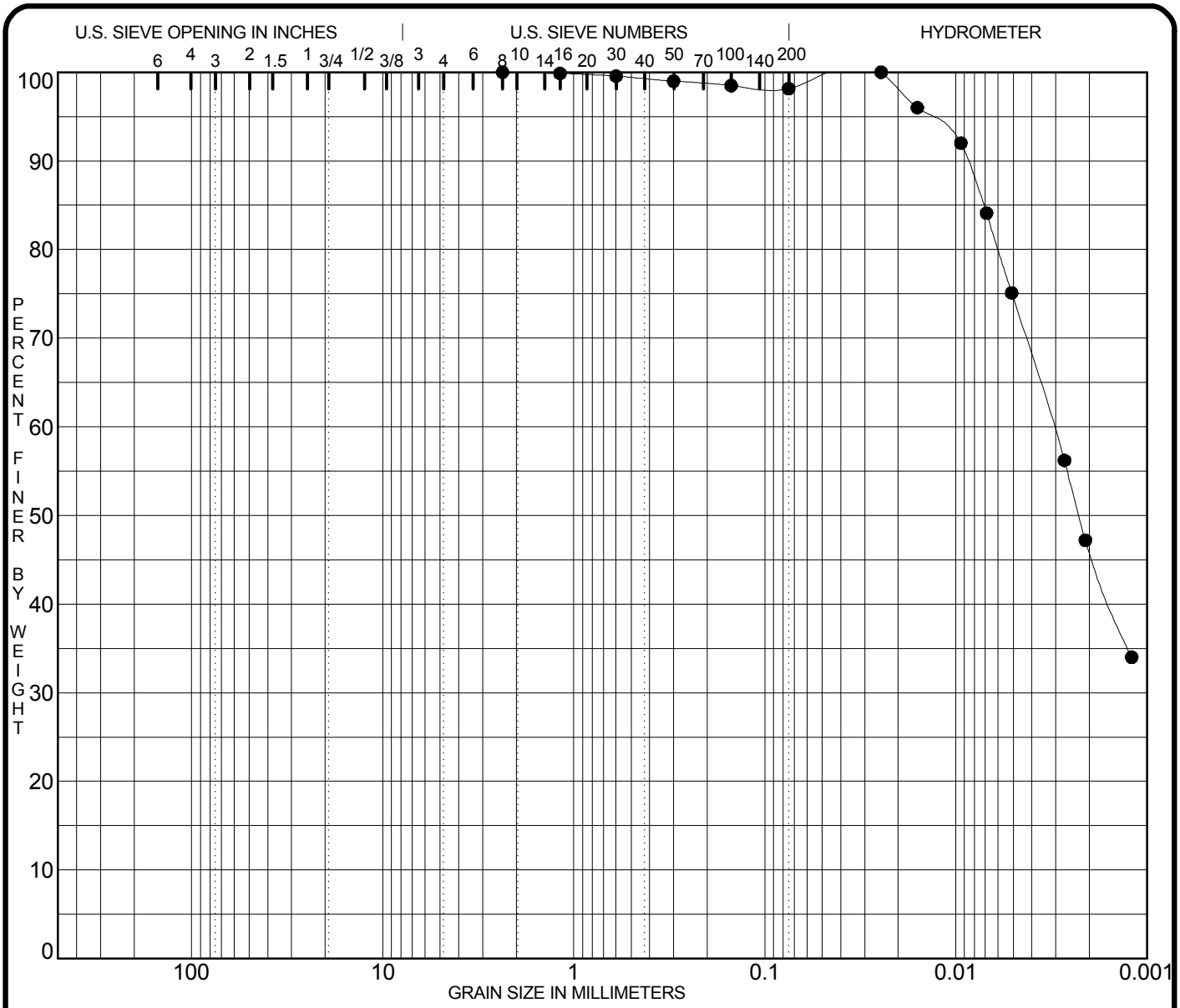
JOB NO.

DATE **3/18/09**

GRADATION CURVES

American Electric Power Service Corp.

Groveport, OH 43125



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	MC%	LL	PL	PI	Sp.Gr.
● **TP-0903**	**0.5**		**23.9**	**49.7**	**24.4**	**25.3**	
		FAT CLAY CH					
		Test Pit Sample - 0.5'-3.4'					

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **TP-0903**	**0.5**	**2.360**	**0.003**			**0.0**	**1.9**	**98.1**	**46.0**

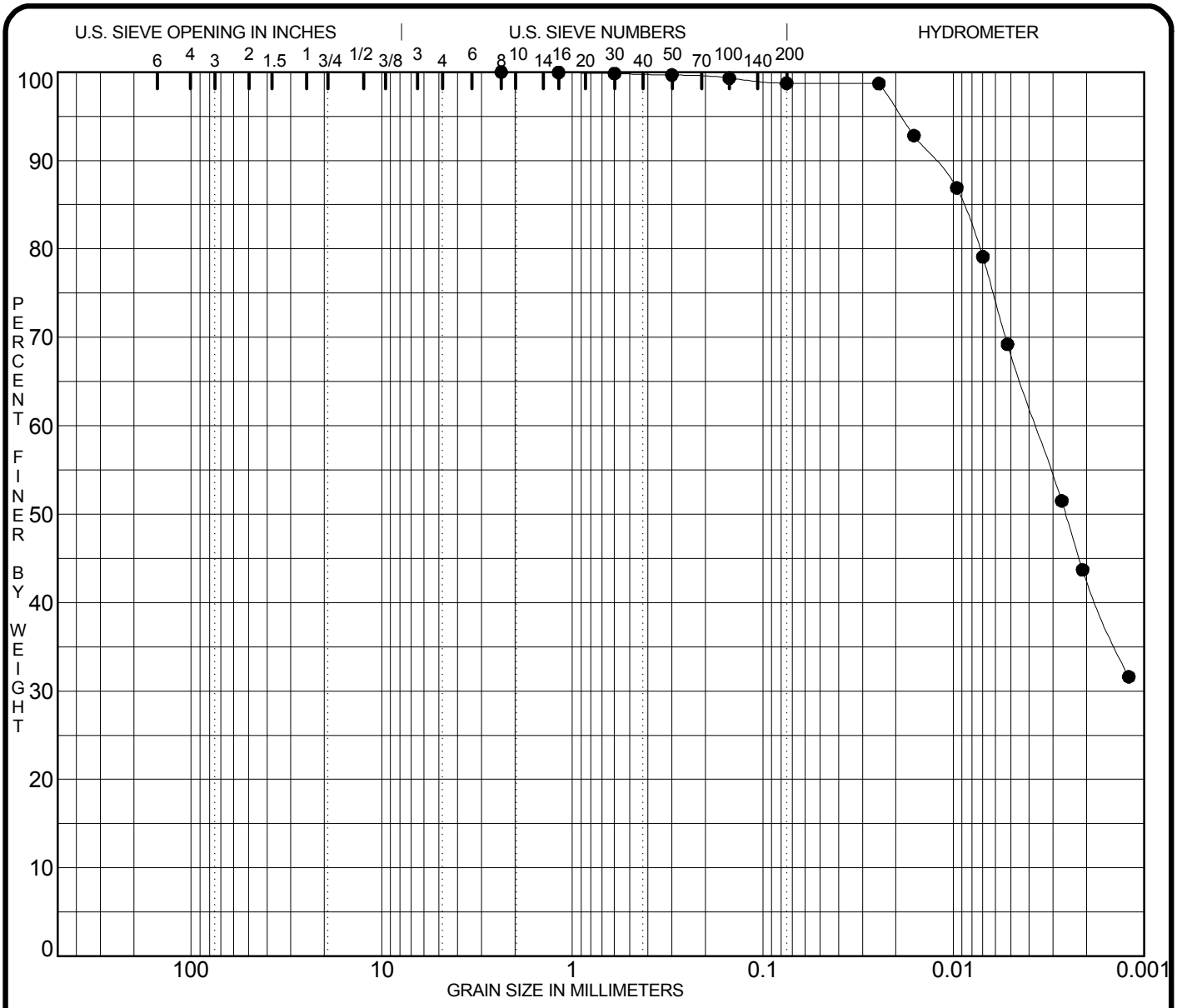
PROJECT **BIG SANDY FLY ASH DAM - 2009 Clay Test Pits** JOB NO.

DATE **3/18/09**

GRADATION CURVES

American Electric Power Service Corp.

Groveport, OH 43125



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	MC%	LL	PL	PI	Sp.Gr.
● **TP-0905**	**2.5**		**20.4**	**47.2**	**24.3**	**23.0**	
		LEAN CLAY CL					
		Test Pit Sample - 2.5'-7.0'					

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **TP-0905**	**2.5**	**2.360**	**0.004**			**0.0**	**1.3**	**98.7**	**42.6**

PROJECT **BIG SANDY FLY ASH DAM - 2009 Clay Test Pits**

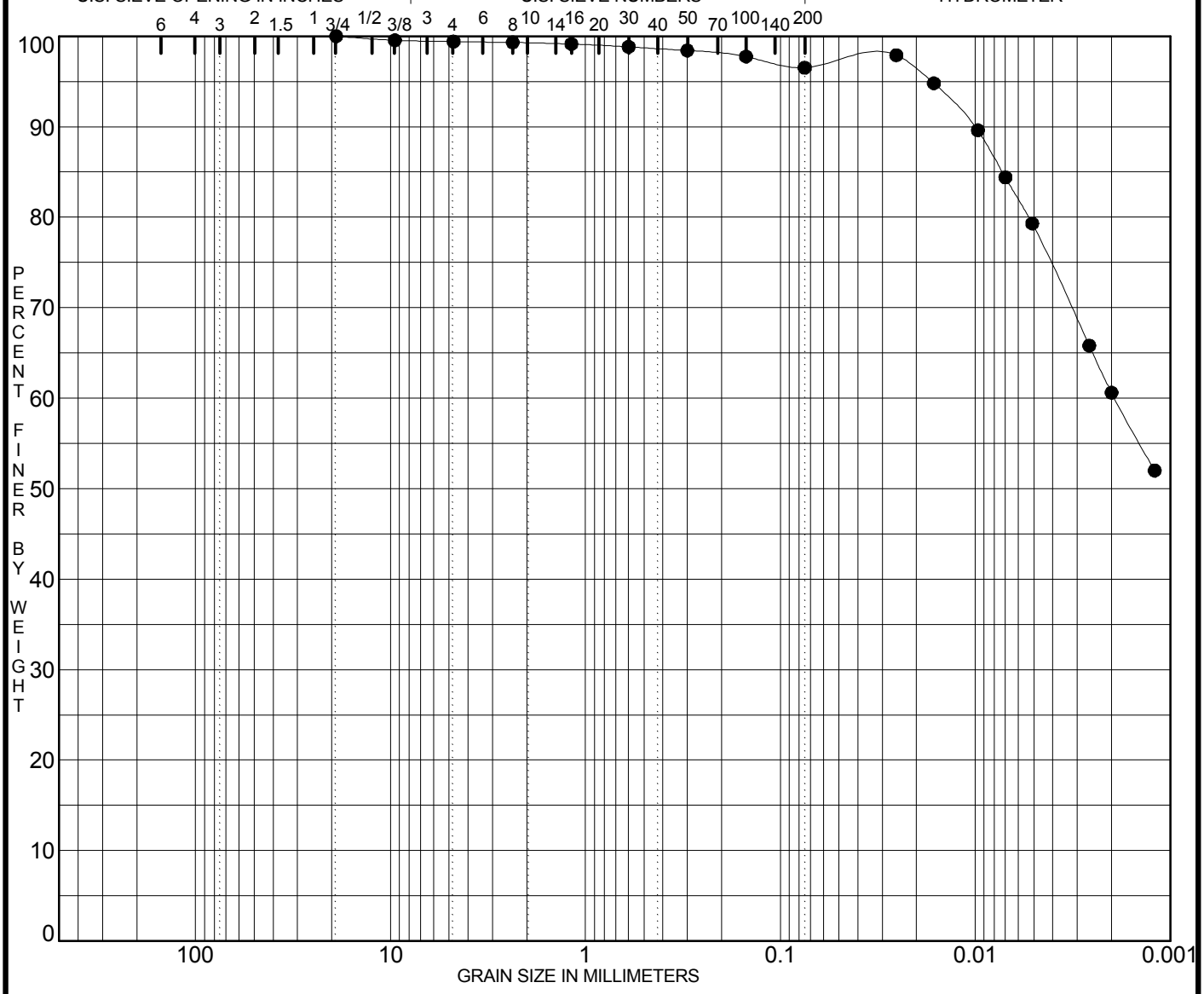
JOB NO.

DATE **3/18/09**

GRADATION CURVES

American Electric Power Service Corp.

Groveport, OH 43125



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Sp.Gr.
●	**TP-0906**	**1.0**		**27.6**	**63.1**	**24.5**	**38.7**	
			FAT CLAY CH					
			Test Pit Sample - 1.0'-3.2'					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
●	**TP-0906**	**1.0**	**19.000**	**0.002**			**0.6**	**2.9**	**96.5**	**60.6**

PROJECT **BIG SANDY FLY ASH DAM - 2009 Clay Test Pits** JOB NO.

DATE **3/18/09**

GRADATION CURVES

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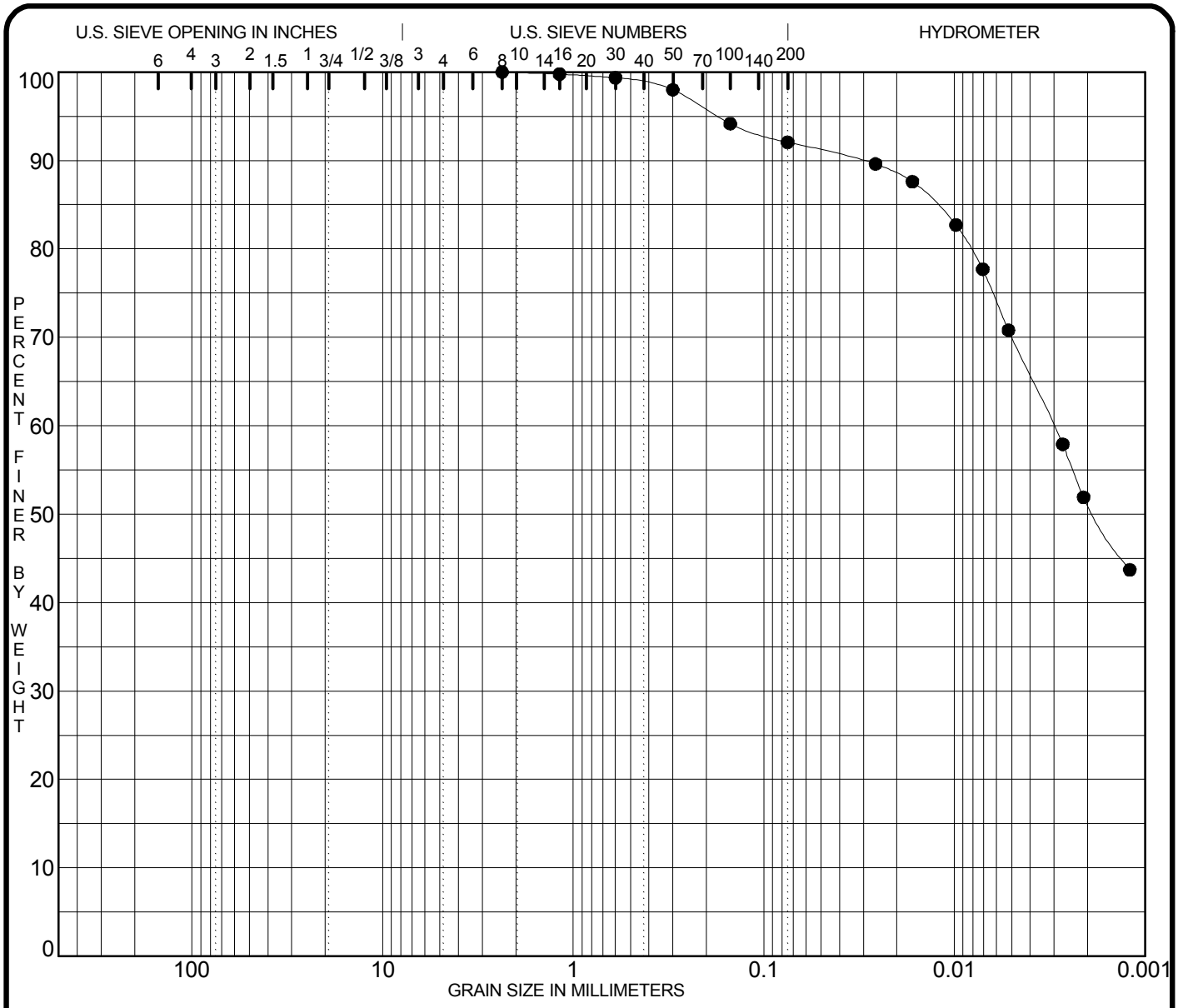


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	MC%	LL	PL	PI	Sp.Gr.
● **TP-0907**	**0.5**		**17.6**	**48.6**	**19.5**	**29.1**	
		LEAN CLAY CL					
		Test Pit Sample - 0.5'-6.3'					

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **TP-0907**	**0.5**	**2.360**	**0.003**			**0.0**	**7.9**	**92.1**	**51.2**

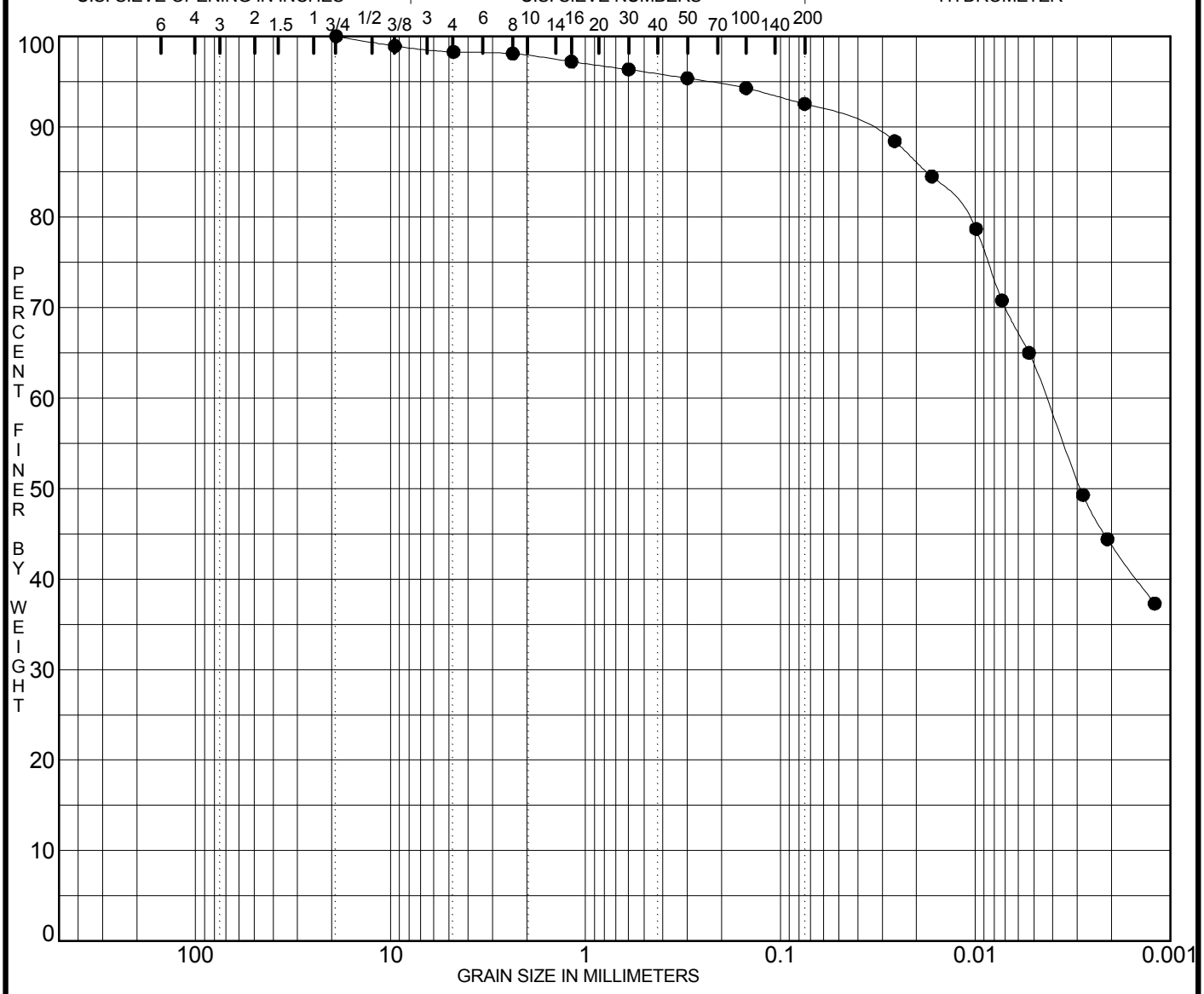
PROJECT **BIG SANDY FLY ASH DAM - 2009 Clay Test Pits** JOB NO.

DATE **3/18/09**

GRADATION CURVES

American Electric Power Service Corp.

Groveport, OH 43125



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	MC%	LL	PL	PI	Sp.Gr.
● **TP-0908**	**0.5**		**22.9**	**51.7**	**24.2**	**27.5**	
		FAT CLAY CH					
		Test Pit Sample - 0.5'-11.0'					

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **TP-0908**	**0.5**	**19.000**	**0.004**			**1.7**	**5.7**	**92.5**	**43.8**

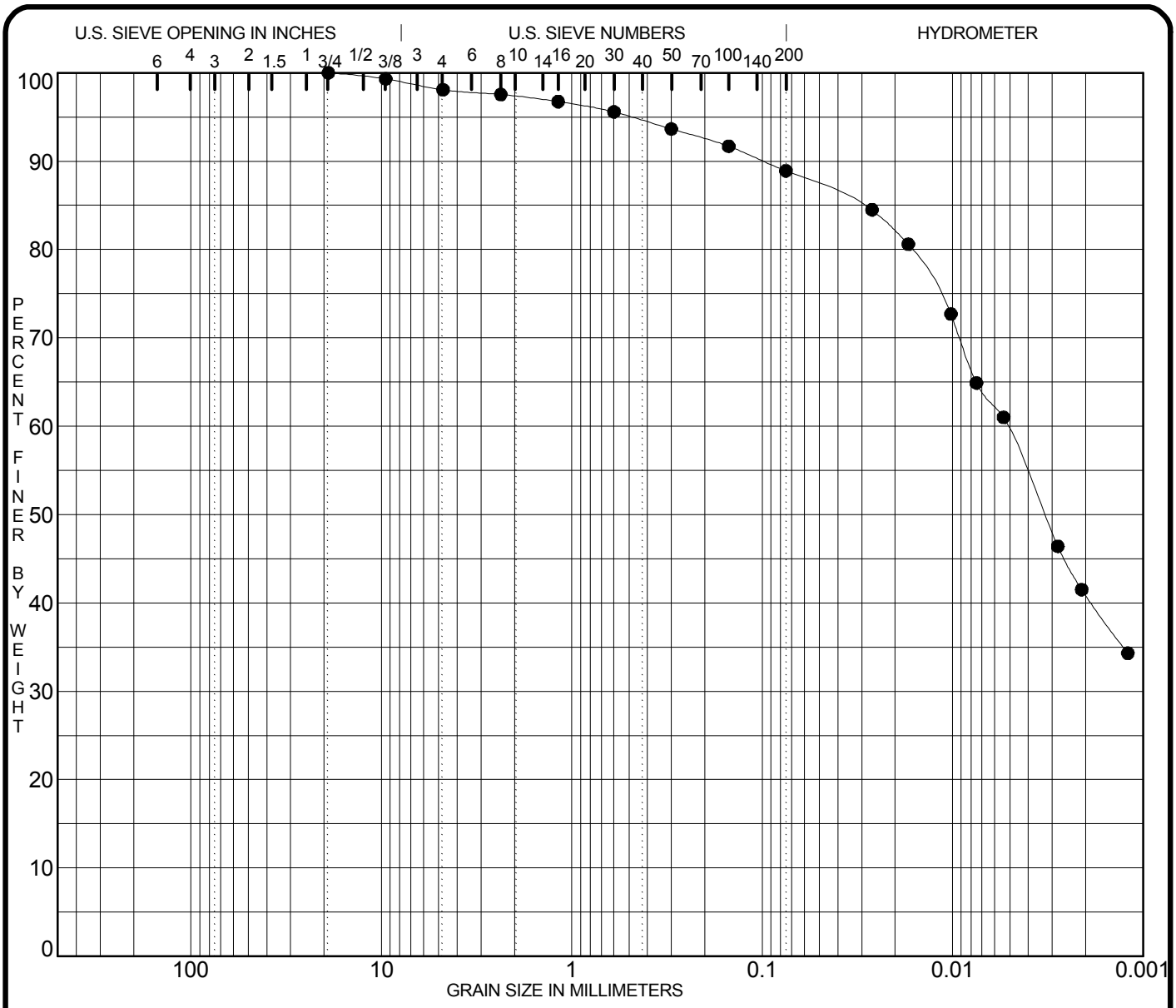
PROJECT **BIG SANDY FLY ASH DAM - 2009 Clay Test Pits** JOB NO.

DATE **3/18/09**

GRADATION CURVES

American Electric Power Service Corp.

Groveport, OH 43125



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	MC%	LL	PL	PI	Sp.Gr.
● **TP-0909**	**0.5**		**20.5**	**45.4**	**21.9**	**23.5**	
		LEAN CLAY CL					
		Test Pit Sample - 0.5'-10					

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Fines	%<.002
● **TP-0909**	**0.5**	**19.000**	**0.005**			**1.9**	**9.2**	**88.9**	**40.9**

PROJECT **BIG SANDY FLY ASH DAM - 2009 Clay Test Pits** JOB NO.

DATE **3/18/09**

GRADATION CURVES

American Electric Power Service Corp.

Groveport, OH 43125

JOB NO. _____ DATE: 3/18/09

PROJECT BIG SANDY FLY ASH DAM

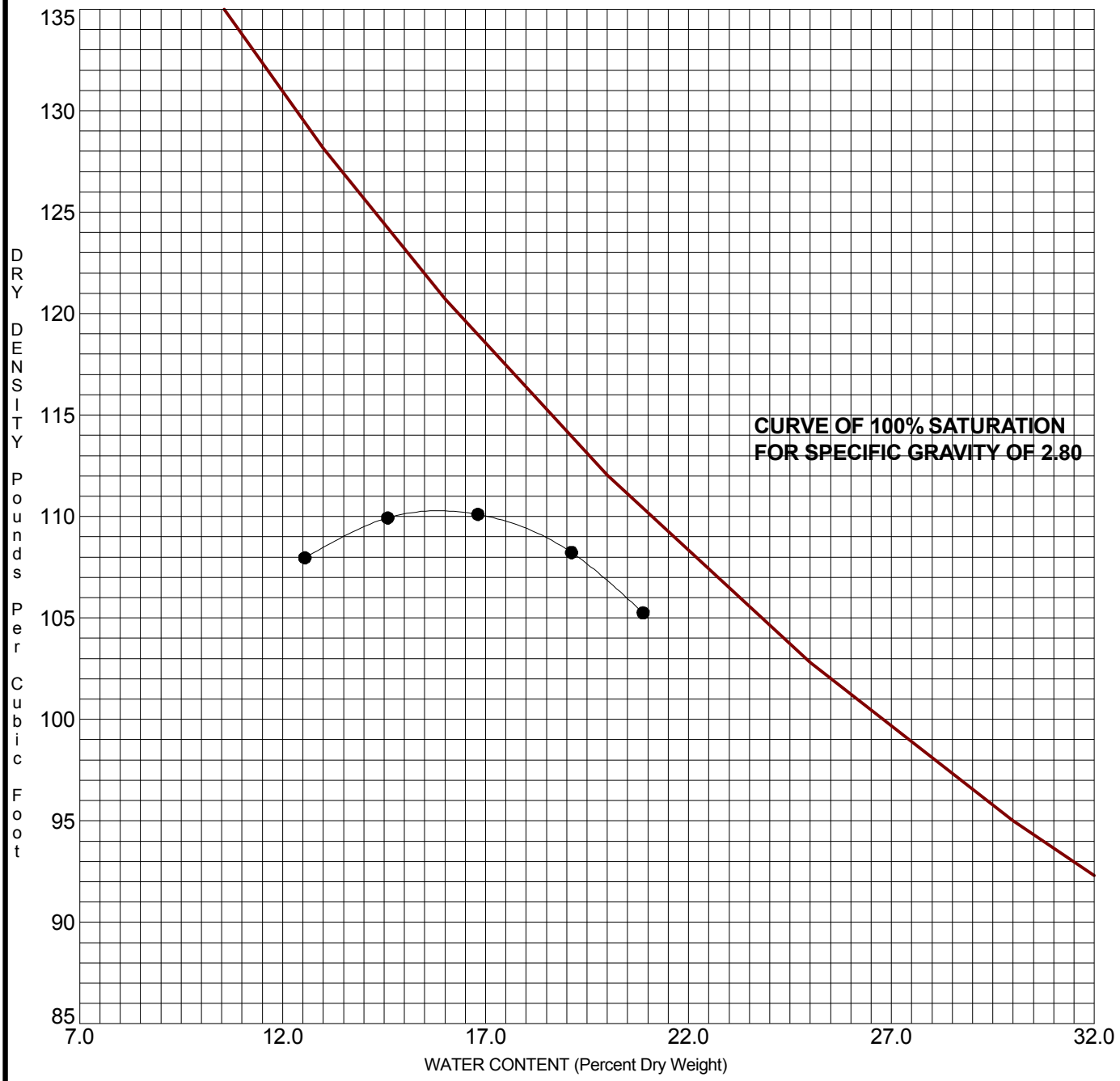
LOCATION: 2009 Clay Test Pits

SOURCE OF MATERIAL TP-0901 DEPTH 1.5 FT.

DESCRIPTION OF MATERIAL Test Pit Sample - 1.5'-8.0'

ASTM DESCRIPTION LEAN CLAY CL

METHOD **D698-07 Mthd A** MAX. DRY DENSITY **110.3 PCF** OPTIMUM MOISTURE **15.9 %**



MOISTURE-DENSITY RELATIONSHIP

American Electric Power Service Corp.

Groveport, Ohio

JOB NO. _____ DATE: 3/18/09

PROJECT BIG SANDY FLY ASH DAM

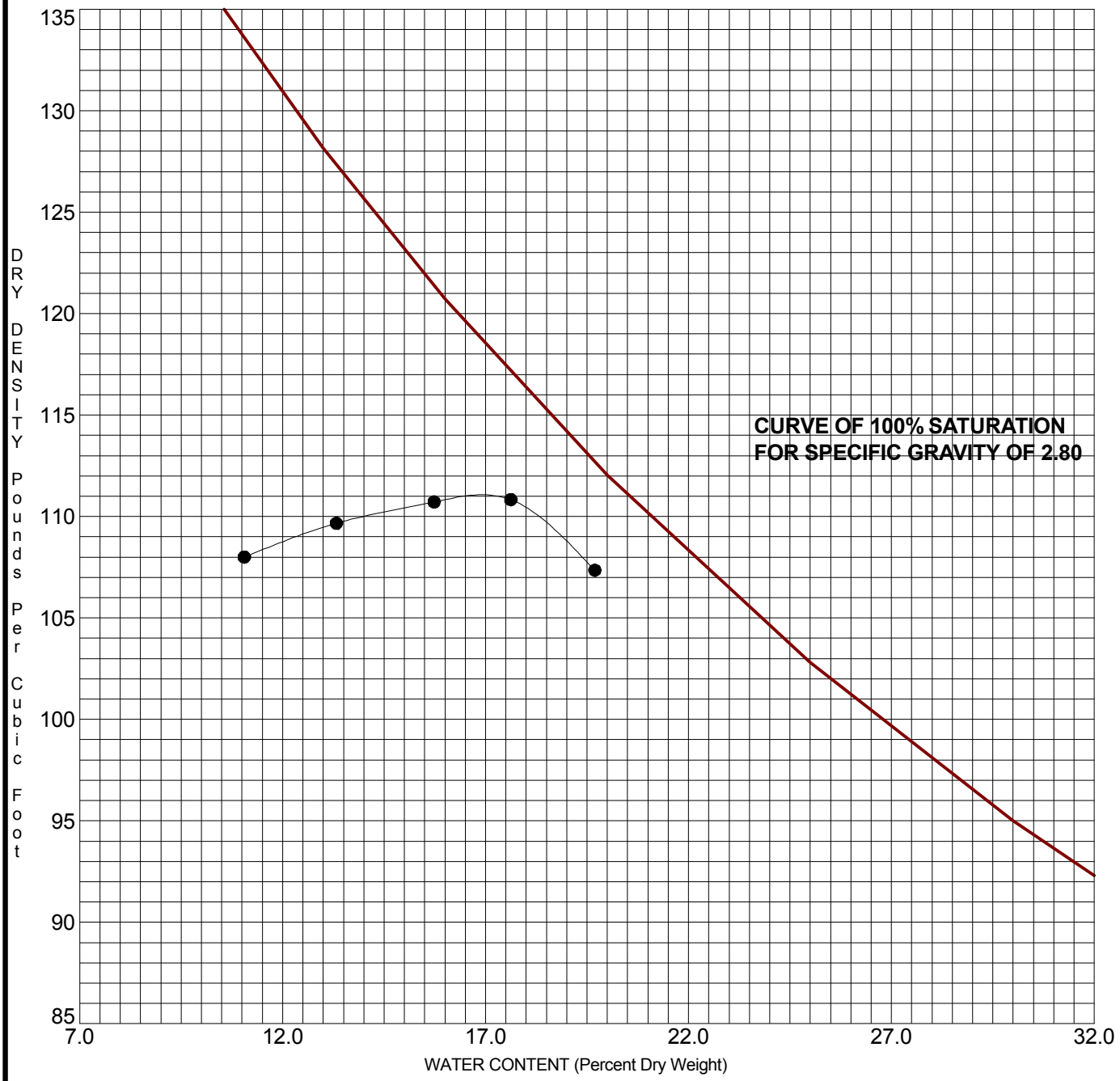
LOCATION: 2009 Clay Test Pits

SOURCE OF MATERIAL TP-0902 DEPTH 4.0 FT.

DESCRIPTION OF MATERIAL Test Pit Sample - 4.0'-10.0'

ASTM DESCRIPTION FAT CLAY with SAND CH

METHOD **D698-07 Mthd A** MAX. DRY DENSITY **111.1 PCF** OPTIMUM MOISTURE **16.9 %**



MOISTURE-DENSITY RELATIONSHIP

American Electric Power Service Corp.

Groveport, Ohio

JOB NO. _____ DATE: 3/18/09

PROJECT BIG SANDY FLY ASH DAM

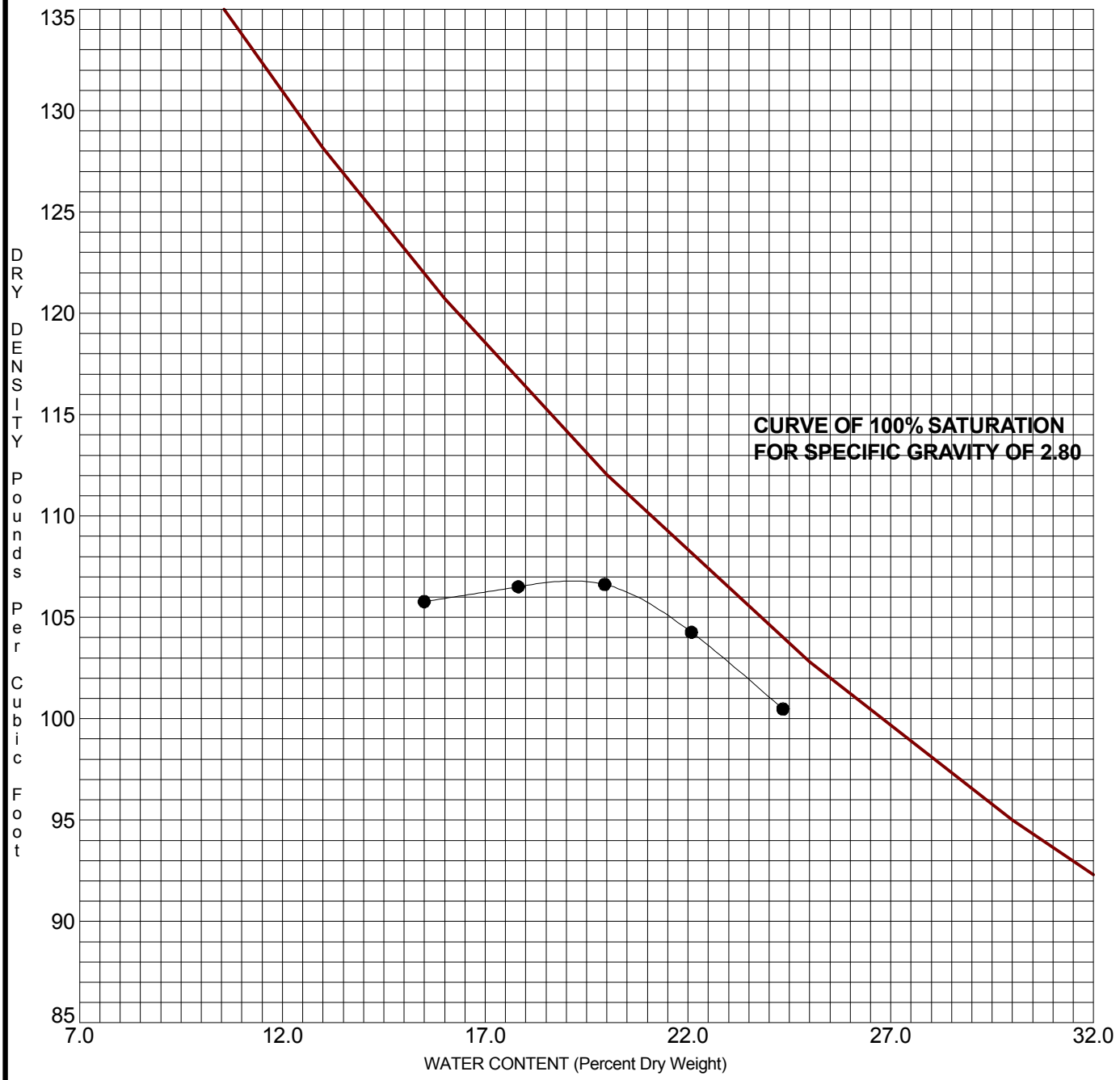
LOCATION: 2009 Clay Test Pits

SOURCE OF MATERIAL TP-0903 DEPTH 0.5 FT.

DESCRIPTION OF MATERIAL Test Pit Sample - 0.5'-3.4'

ASTM DESCRIPTION FAT CLAY CH

METHOD **D698-07 Mthd A** MAX. DRY DENSITY **106.8 PCF** OPTIMUM MOISTURE **19.3 %**



MOISTURE-DENSITY RELATIONSHIP

American Electric Power Service Corp.

Groveport, Ohio

JOB NO. _____ DATE: 3/18/09

PROJECT BIG SANDY FLY ASH DAM

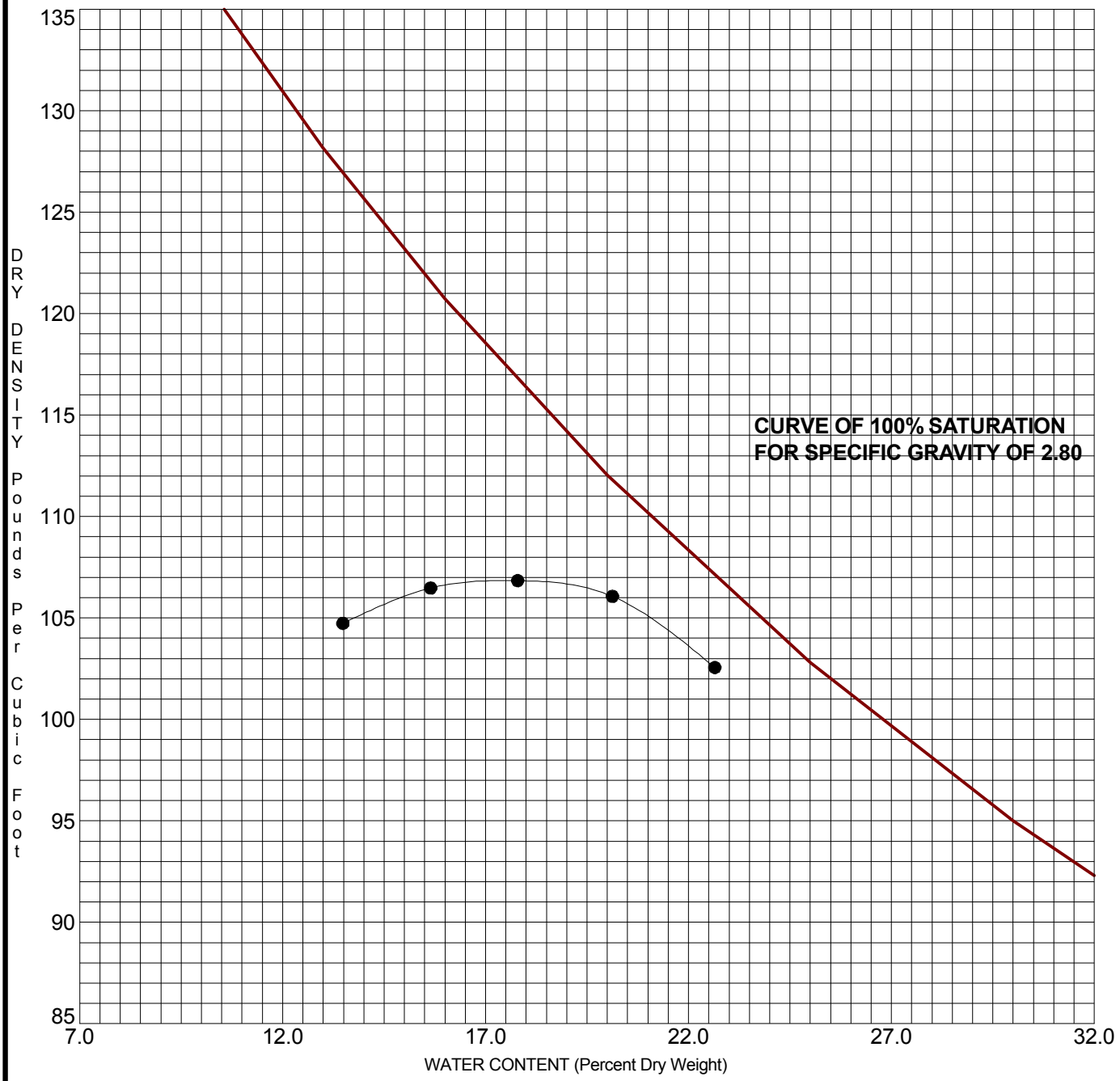
LOCATION: 2009 Clay Test Pits

SOURCE OF MATERIAL TP-0905 DEPTH 2.5 FT.

DESCRIPTION OF MATERIAL Test Pit Sample - 2.5'-7.0'

ASTM DESCRIPTION LEAN CLAY CL

METHOD **D698-07 Mthd A** MAX. DRY DENSITY **106.8 PCF** OPTIMUM MOISTURE **17.8 %**



MOISTURE-DENSITY RELATIONSHIP

American Electric Power Service Corp.

Groveport, Ohio

JOB NO. _____ DATE: 3/18/09

PROJECT BIG SANDY FLY ASH DAM

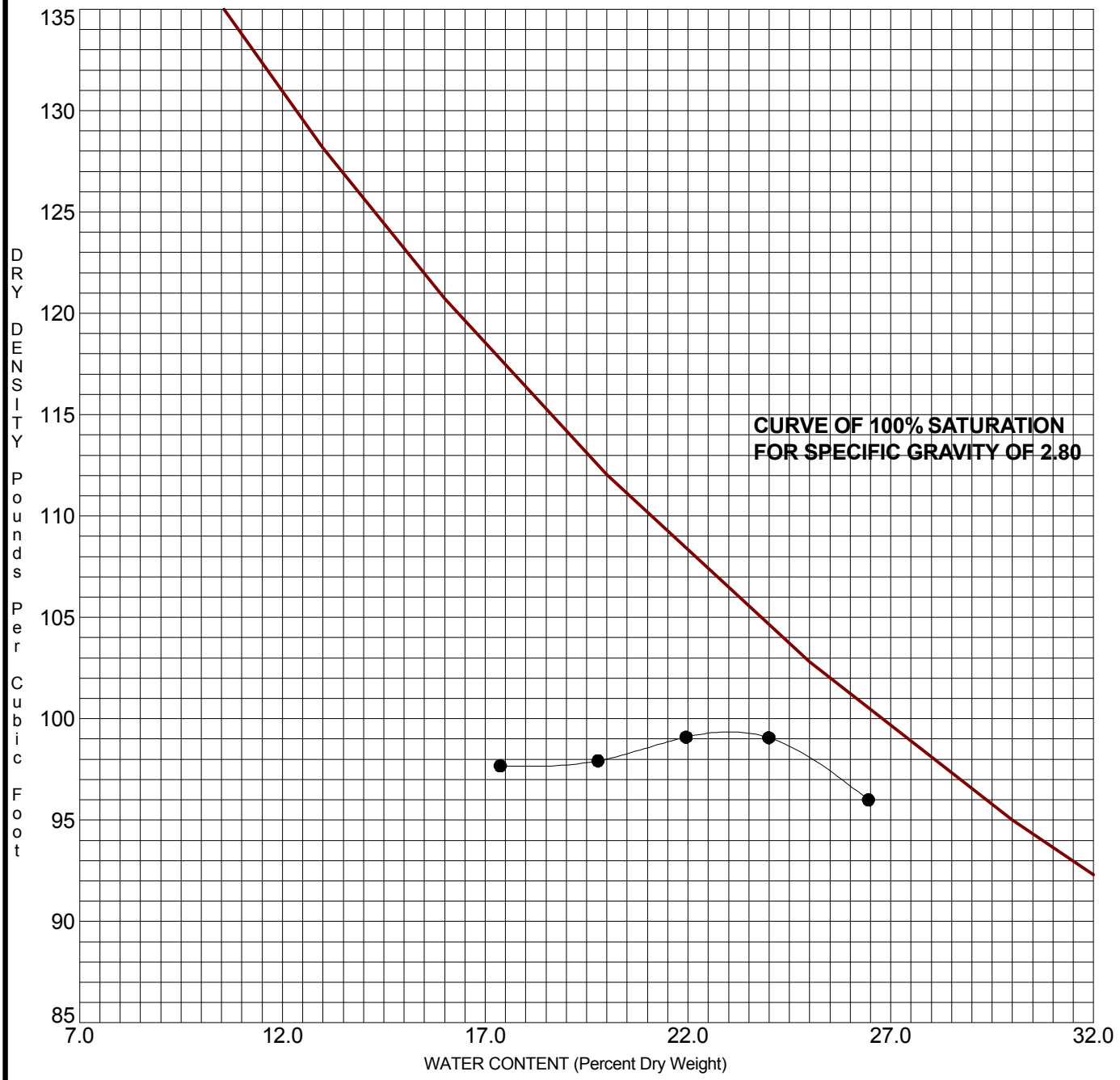
LOCATION: 2009 Clay Test Pits

SOURCE OF MATERIAL TP-0906 DEPTH 1.0 FT.

DESCRIPTION OF MATERIAL Test Pit Sample - 1.0'-3.2'

ASTM DESCRIPTION FAT CLAY CH

METHOD **D698-07 Mthd A** MAX. DRY DENSITY **99.3 PCF** OPTIMUM MOISTURE **23.0 %**



MOISTURE-DENSITY RELATIONSHIP

American Electric Power Service Corp.

Groveport, Ohio

JOB NO. _____ DATE: 3/18/09

PROJECT BIG SANDY FLY ASH DAM

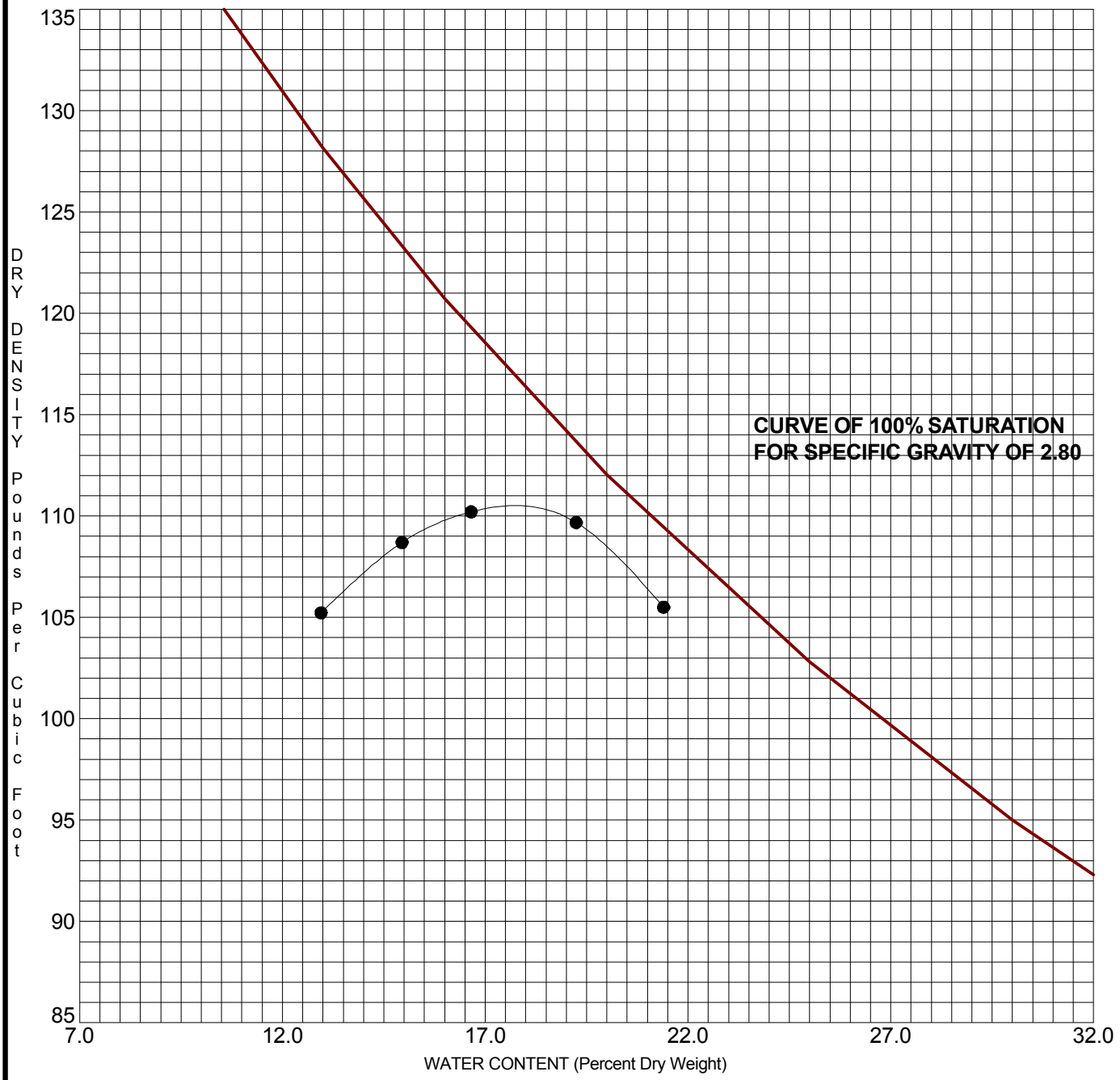
LOCATION: 2009 Clay Test Pits

SOURCE OF MATERIAL TP-0907 DEPTH 0.5 FT.

DESCRIPTION OF MATERIAL Test Pit Sample - 0.5'-6.3'

ASTM DESCRIPTION LEAN CLAY CL

METHOD **D698-07 Mthd A** MAX. DRY DENSITY **110.5 PCF** OPTIMUM MOISTURE **17.8 %**



MOISTURE-DENSITY RELATIONSHIP

American Electric Power Service Corp.

Groveport, Ohio

JOB NO. _____ DATE: 3/18/09

PROJECT BIG SANDY FLY ASH DAM

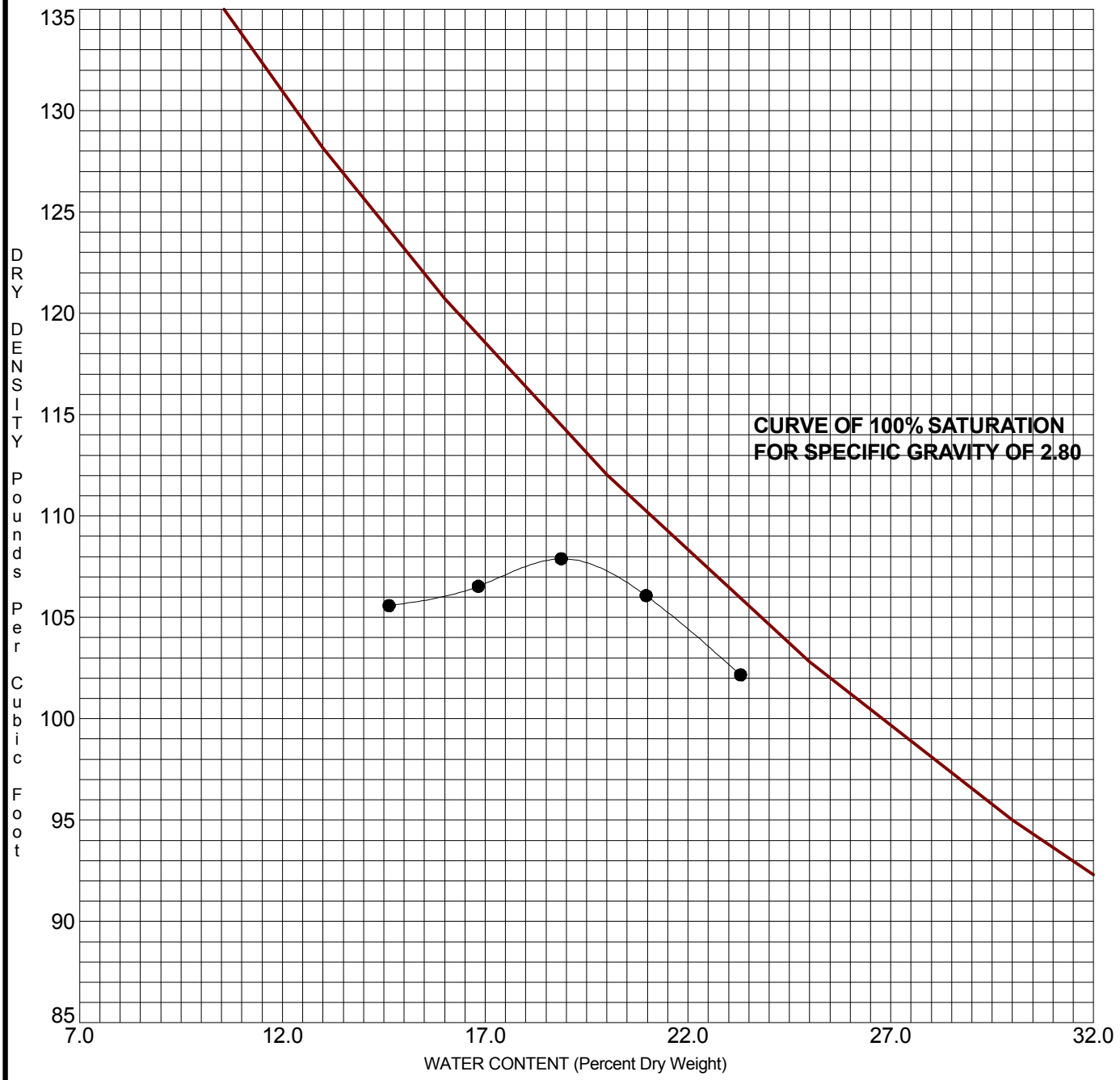
LOCATION: 2009 Clay Test Pits

SOURCE OF MATERIAL TP-0908 DEPTH 0.5 FT.

DESCRIPTION OF MATERIAL Test Pit Sample - 0.5'-11.0'

ASTM DESCRIPTION FAT CLAY CH

METHOD **D698-07 Mthd A** MAX. DRY DENSITY **107.9 PCF** OPTIMUM MOISTURE **18.9 %**



MOISTURE-DENSITY RELATIONSHIP

American Electric Power Service Corp.

Groveport, Ohio

JOB NO. _____ DATE: 3/18/09

PROJECT BIG SANDY FLY ASH DAM

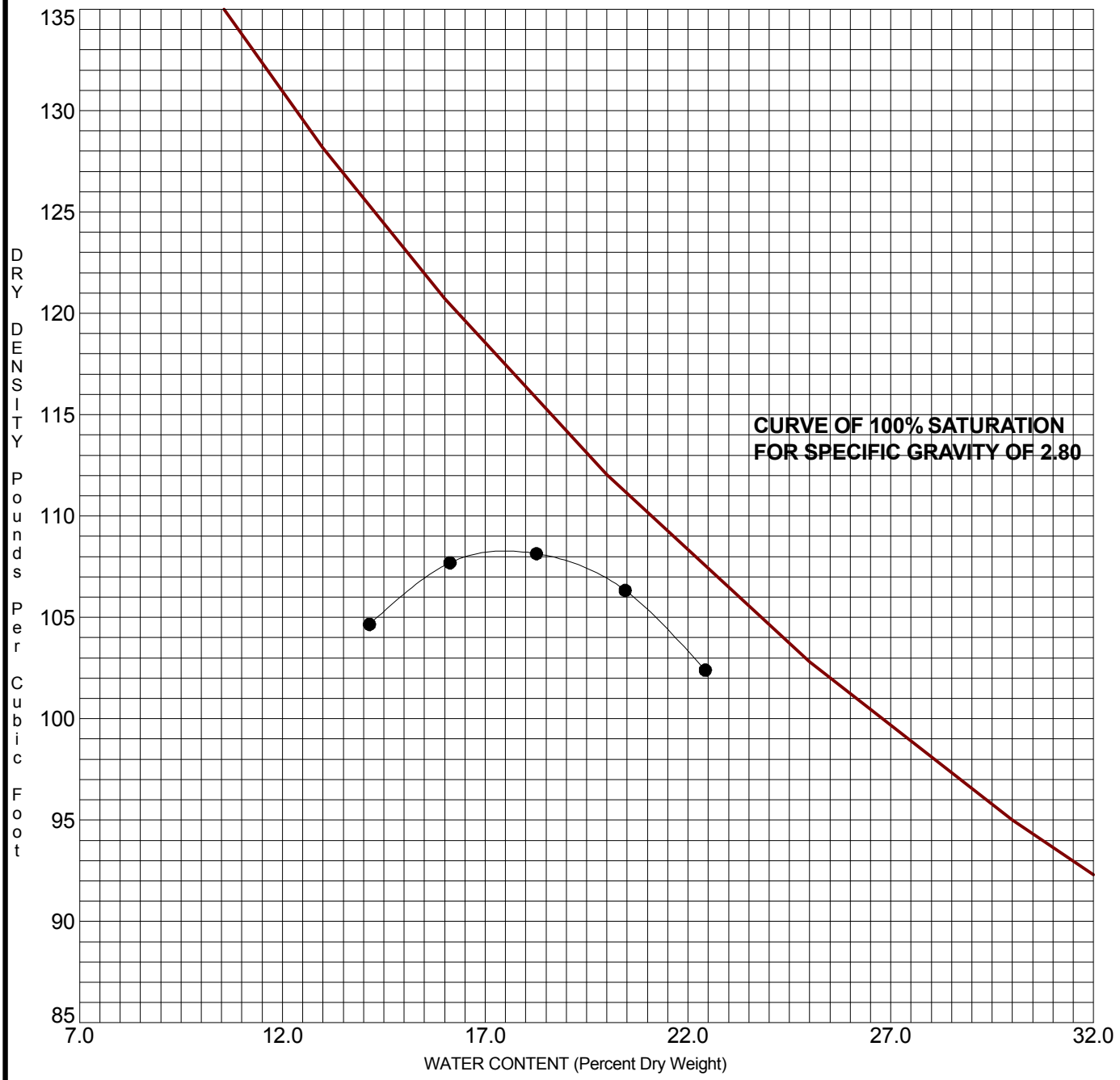
LOCATION: 2009 Clay Test Pits

SOURCE OF MATERIAL TP-0909 DEPTH 0.5 FT.

DESCRIPTION OF MATERIAL Test Pit Sample - 0.5'-10

ASTM DESCRIPTION LEAN CLAY CL

METHOD **D698-07 Mthd A** MAX. DRY DENSITY **108.3 PCF** OPTIMUM MOISTURE **17.5 %**



MOISTURE-DENSITY RELATIONSHIP

American Electric Power Service Corp.

Groveport, Ohio

JOB NO. _____ DATE: Mar 18, 09

PROJECT BIG SANDY FLY ASH DAM

LOCATION: 2009 Clay Test Pits

SOURCE OF MATERIAL	TP-0903	DEPTH	0.5 ft.
DESCRIPTION OF MATERIAL	Test Pit Sample - 0.5'-3.4'		
ASTM DESCRIPTION	FAT CLAY CH		

MAX. DRY DENSITY, pcf	106.8	OPTIMUM MOISTURE, %	19.3
SPECIFIC GRAVITY			
SAMPLE HGT., mm	65.130	SAMPLE DIA., mm	70.960
CHAMBER PRESSURE, psi	80.0	BACK PRESSURE, psi	70.0
B-PARAMETER	0.99	EFFECTIVE PRESSURE, psi	10.0
INITIAL HEAD, mm	1813.8		

	BEFORE	AFTER
WATER CONTENT, %	21.9	26.2
WET DENSITY, pcf	124.8	
DRY DENSITY, pcf	102.4	
SATURATION, %		
VOID RATIO		

PERMEABILITY COEFFICIENT K, cm/sec 2.22E-08

FLEXIBLE-MEMBRANE PERMEABILITY TEST

American Electric Power Service Corp.

Groveport, Ohio

AEP

JOB NO. _____ DATE: Mar 18, 09

PROJECT BIG SANDY FLY ASH DAM

LOCATION: 2009 Clay Test Pits

SOURCE OF MATERIAL	TP-0908	DEPTH	0.5 ft.
DESCRIPTION OF MATERIAL	Test Pit Sample - 0.5'-11.0'		
ASTM DESCRIPTION	FAT CLAY CH		

MAX. DRY DENSITY, pcf	107.9	OPTIMUM MOISTURE, %	18.9
SPECIFIC GRAVITY			
SAMPLE HGT., mm	66.820	SAMPLE DIA., mm	71.100
CHAMBER PRESSURE, psi	80.0	BACK PRESSURE, psi	70.0
B-PARAMETER	0.97	EFFECTIVE PRESSURE, psi	10.0
INITIAL HEAD, mm	1808.8		

	BEFORE	AFTER
WATER CONTENT, %	20.8	24.1
WET DENSITY, pcf	125.0	
DRY DENSITY, pcf	103.5	
SATURATION, %		
VOID RATIO		

PERMEABILITY COEFFICIENT K, cm/sec **2.14E-08**

FLEXIBLE-MEMBRANE PERMEABILITY TEST

American Electric Power Service Corp.

Groveport, Ohio

APPENDIX C.4

LABORATORY DATA

URS – May 2012 Field Subsurface Exploration

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MOISTURE CONTENT

ASTM D 2216-05 (SOP-S1)

Client	URS
Client Reference	AEP BIG SANDY LF 13815141
Project No.	2012-245-01

Lab ID	01	02	03	04	05
Boring No.	HB-1	HB-2/ SB-1	HB-7/ SB-2	HB-7/ SB-2	HB-7/ SB-2
Depth (ft)	2-4	8-10	0-2	4-6	8-10
Sample No.	NA	NA	NA	NA	NA
Tare Number	49	10	37	38	25
Wt. of Tare & WS (gm)	50.45	60.98	58.58	168.17	199.17
Wt. of Tare & DS (gm)	44.12	53.1	51.53	145.35	181.11
Wt. of Tare (gm)	8.35	8.58	8.43	8.35	8.2
Wt. of Water (gm)	6.33	7.88	7.05	22.82	18.06
Wt. of DS (gm)	35.77	44.52	43.1	137	172.91
Water Content (%)	**17.7**	**17.7**	**16.4**	**16.7**	**10.4**

Lab ID	06	07	08	09	10
Boring No.	HB-7/ SB-2	HB-7/ SB-2	HB-7/ SB-2	PB-2	PB-2
Depth (ft)	12-14	16-18	20-22	57-59	70-72
Sample No.	NA	NA	NA	NA	NA
Tare Number	31	57	50	16	46
Wt. of Tare & WS (gm)	189.88	189.58	201.23	64.3	40.61
Wt. of Tare & DS (gm)	162.67	169.87	177.69	54.76	35.97
Wt. of Tare (gm)	8.28	8.3	8.64	8.36	8.42
Wt. of Water (gm)	27.21	19.71	23.54	9.54	4.64
Wt. of DS (gm)	154.39	161.57	169.05	46.4	27.55
Water Content (%)	**17.6**	**12.2**	**13.9**	**20.6**	**16.8**

Notes : *NA*

Tested By PC *Date* 5/22/12 *Checked By* JN *Date* 5/23/12

DCN: CT-S1 DATE 1-21-10 REVISION: 3

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MOISTURE CONTENT

ASTM D 2216-05 (SOP-S1)

Client	URS
Client Reference	AEP BIG SANDY LF 13815141
Project No.	2012-245-01

Lab ID	11	12	14	15	16
Boring No.	PB-4	PB-5	PB-6	PB-6	PB-7
Depth (ft)	107-109	39-41	82-84	98-99.3	122-124
Sample No.	NA	NA	NA	NA	NA
Tare Number	65	43	5	18	40
Wt. of Tare & WS (gm)	57.82	52.19	57.62	40.36	54.51
Wt. of Tare & DS (gm)	52.54	44.8	51.44	34.61	48.82
Wt. of Tare (gm)	8.72	8.3	8.47	8.28	8.38
Wt. of Water (gm)	5.28	7.39	6.18	5.75	5.69
Wt. of DS (gm)	43.82	36.5	42.97	26.33	40.44
Water Content (%)	**12.0**	**20.2**	**14.4**	**21.8**	**14.1**

Lab ID	17	18	19	20	21
Boring No.	PB-7	PB-7	PB-8	SB-4	SB-4
Depth (ft)	107-109	117-119	147-149	2.5-4.5	0-2
Sample No.	NA	NA	NA	S2	S1
Tare Number	45	21	30	7	11
Wt. of Tare & WS (gm)	50.14	50.62	50.4	57.91	163.48
Wt. of Tare & DS (gm)	42.16	45.07	45.16	49.54	133.68
Wt. of Tare (gm)	8.52	8.28	8.41	8.16	8.51
Wt. of Water (gm)	7.98	5.55	5.24	8.37	29.8
Wt. of DS (gm)	33.64	36.79	36.75	41.38	125.17
Water Content (%)	**23.7**	**15.1**	**14.3**	**20.2**	**23.8**

Notes : *NA*

Tested By PC *Date* 5/22/12 *Checked By* JW *Date* 5/23/12

DCN: CT-S1 DATE 1-21-10 REVISION: 3

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MOISTURE CONTENT

ASTM D 2216-05 (SOP-S1)

Client	URS
Client Reference	AEP BIG SANDY LF 13815141
Project No.	2012-245-01

Lab ID	22	23	24	25	26
Boring No.	SB-4	SB-6	SB-6	SB-7	HB-5
Depth (ft)	5-7	2.5-4.5	5-7	5-7	4-6
Sample No.	S3	S2	S3	S3	NA
Tare Number	9	51	23	22	20
Wt. of Tare & WS (gm)	250.31	64.02	48.19	46.92	114.78
Wt. of Tare & DS (gm)	223.2	52.45	39.1	43.29	100.23
Wt. of Tare (gm)	8.25	8.38	8.28	8.42	8.35
Wt. of Water (gm)	27.11	11.57	9.09	3.63	14.55
Wt. of DS (gm)	214.95	44.07	30.82	34.87	91.88
Water Content (%)	**12.6**	**26.3**	**29.5**	**10.4**	**15.8**

Lab ID	27
Boring No.	HB-5
Depth (ft)	6-8
Sample No.	NA
Tare Number	32
Wt. of Tare & WS (gm)	153.13
Wt. of Tare & DS (gm)	133.07
Wt. of Tare (gm)	8.72
Wt. of Water (gm)	20.06
Wt. of DS (gm)	124.35
Water Content (%)	**16.1**

Notes : *NA*

Tested By PC *Date* 5/22/12 *Checked By* JW *Date* 5/23/12

DCN: CT-S1 DATE 1-21-10 REVISION: 3

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PERCENT PASSING # 200 SIEVE

ASTM D 1140-00 (SOP-S54)

Client	URS CORPORATION
Client Reference	AEP Big Sandy LF 13815141
Project No.	2012-245-01

Lab Id.	01	02	15	20	23
Boring No.	HB-1	HB-2 / SB-1	PB-6	SB-4	SB-6
Depth (ft)	2-4	8-10	98-99.3	2.5-4.5	2.5-4.5
Sample No.	NA	NA	NA	S2	S2
Tare Number	1416	1423	1438	1450	1433
Wt. of Tare & WS (gm)	342.49	335.22	284.48	279.13	283.66
Wt. of Tare & DS (gm)	342.49	335.22	284.48	279.13	283.66
Wt. of Tare (gm)	145.7	143.89	144.62	144.97	144.74
Wt. of Water (gm)	0	0	0	0	0
Wt. of DS (gm)	196.79	191.33	139.86	134.16	138.92
Water Content (%)	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Wt. of Washed Soil & Tare	208.81	161.13	199.65	149.7	159.12
Percent Passing #200	**67.9**	**91.0**	**60.7**	**96.5**	**89.6**

Lab Id.	25	26	27
Boring No.	SB-7	HB-5	HB-5
Depth (ft)	5-7	4-6	6-8
Sample No.	S3	NA	NA
Tare Number	1447	1418	1449
Wt. of Tare & WS (gm)	277.55	633.87	824.39
Wt. of Tare & DS (gm)	277.55	633.87	824.39
Wt. of Tare (gm)	145.46	145.25	145.64
Wt. of Water (gm)	0	0	0
Wt. of DS (gm)	132.09	488.62	678.75
Water Content (%)	**0.0**	**0.0**	**0.0**
Wt. of Washed Soil & Tare	182.88	401.5	488.6
Percent Passing #200	**71.7**	**47.6**	**49.5**

Tested By JP *Date* 6/5/12 *Checked By* KC *Date* 6-7-12

DCN: CT-S54 DATE: 12/30/05 REVISION: 3

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	HB-1
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	2-4
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-01	Soil Description	**BROWN LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

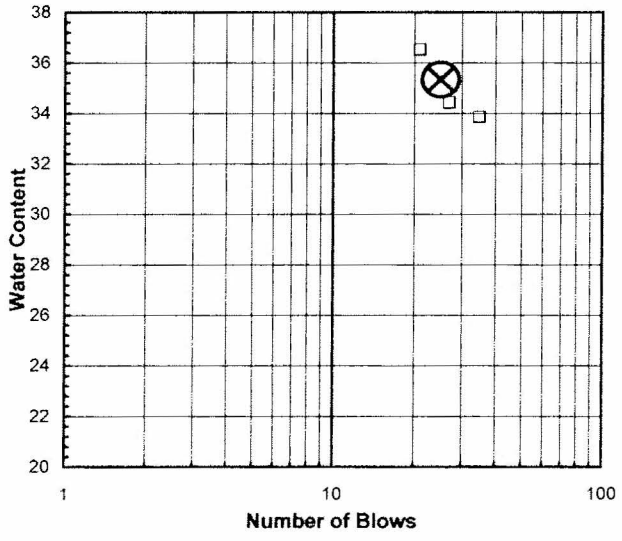
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	279	284	378	**U**
Wt. of Tare & WS (gm)	39.28	39.88	35.10	**L**
Wt. of Tare & DS (gm)	33.76	34.37	29.02	**T**
Wt. of Tare (gm)	17.45	18.36	12.37	**I**
Wt. of Water (gm)	5.5	5.5	6.1	**P**
Wt. of DS (gm)	16.3	16.0	16.7	**O**
				I
Moisture Content (%)	**33.8**	**34.4**	**36.5**	**N**
Number of Blows	**35**	**27**	**21**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	387	388	
Wt. of Tare & WS (gm)	25.30	17.69	
Wt. of Tare & DS (gm)	24.38	16.68	
Wt. of Tare (gm)	18.96	11.03	
Wt. of Water (gm)	0.9	1.0	
Wt. of DS (gm)	5.4	5.7	
Moisture Content (%)	**17.0**	**17.9**	**-0.9**

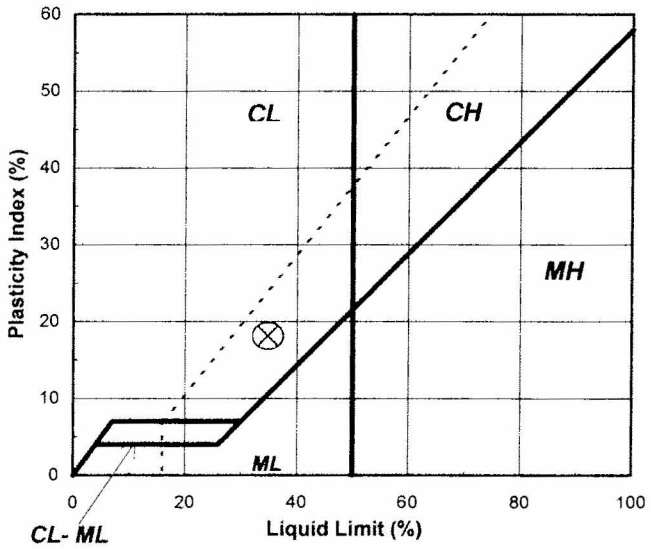
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**35**
Plastic Limit (%)	**17**
Plasticity Index (%)	**18**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 6/1/12 *Checked By* VC *Date* 6-4-12

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	HB-2 / SB-1
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	8-10
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-02	Soil Description	**BROWN LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

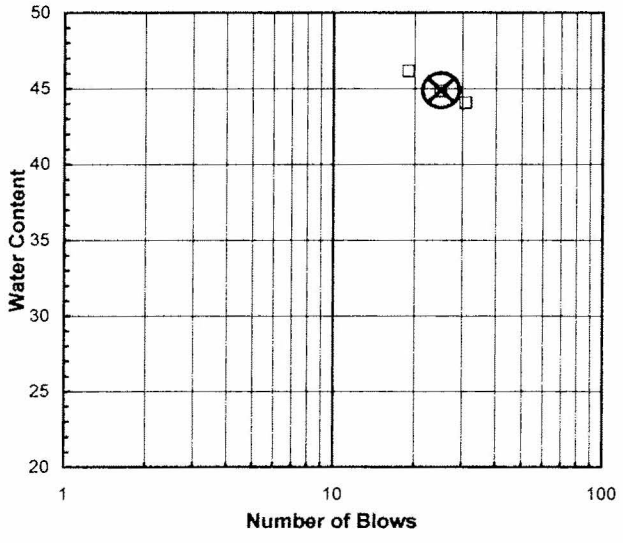
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	117	329	380	**U**
Wt. of Tare & WS (gm)	42.12	39.39	33.95	**L**
Wt. of Tare & DS (gm)	35.42	32.87	27.22	**T**
Wt. of Tare (gm)	20.20	18.32	12.63	**I**
Wt. of Water (gm)	6.7	6.5	6.7	**P**
Wt. of DS (gm)	15.2	14.6	14.6	**O**
				I
Moisture Content (%)	**44.0**	**44.8**	**46.1**	**N**
Number of Blows	**31**	**25**	**19**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	410	411	
Wt. of Tare & WS (gm)	17.09	19.91	
Wt. of Tare & DS (gm)	16.04	18.85	
Wt. of Tare (gm)	10.92	13.79	
Wt. of Water (gm)	1.1	1.1	
Wt. of DS (gm)	5.1	5.1	
Moisture Content (%)	**20.5**	**20.9**	**-0.4**

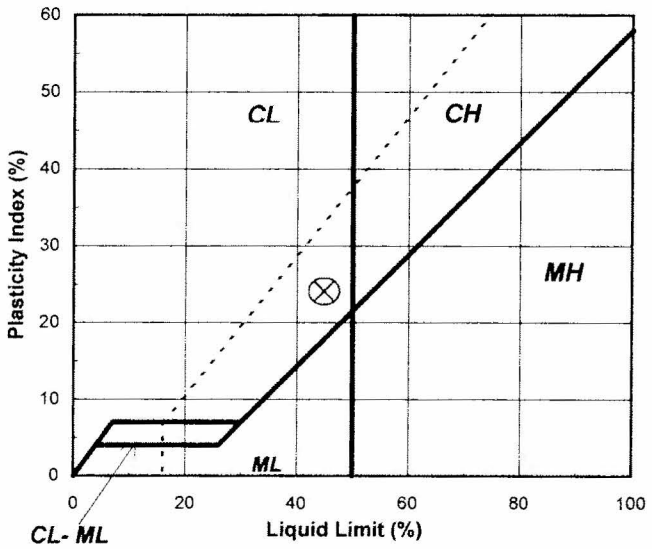
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**21**
Plasticity Index (%)	**24**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 6/1/12 *Checked By* KC *Date* 6-4-12

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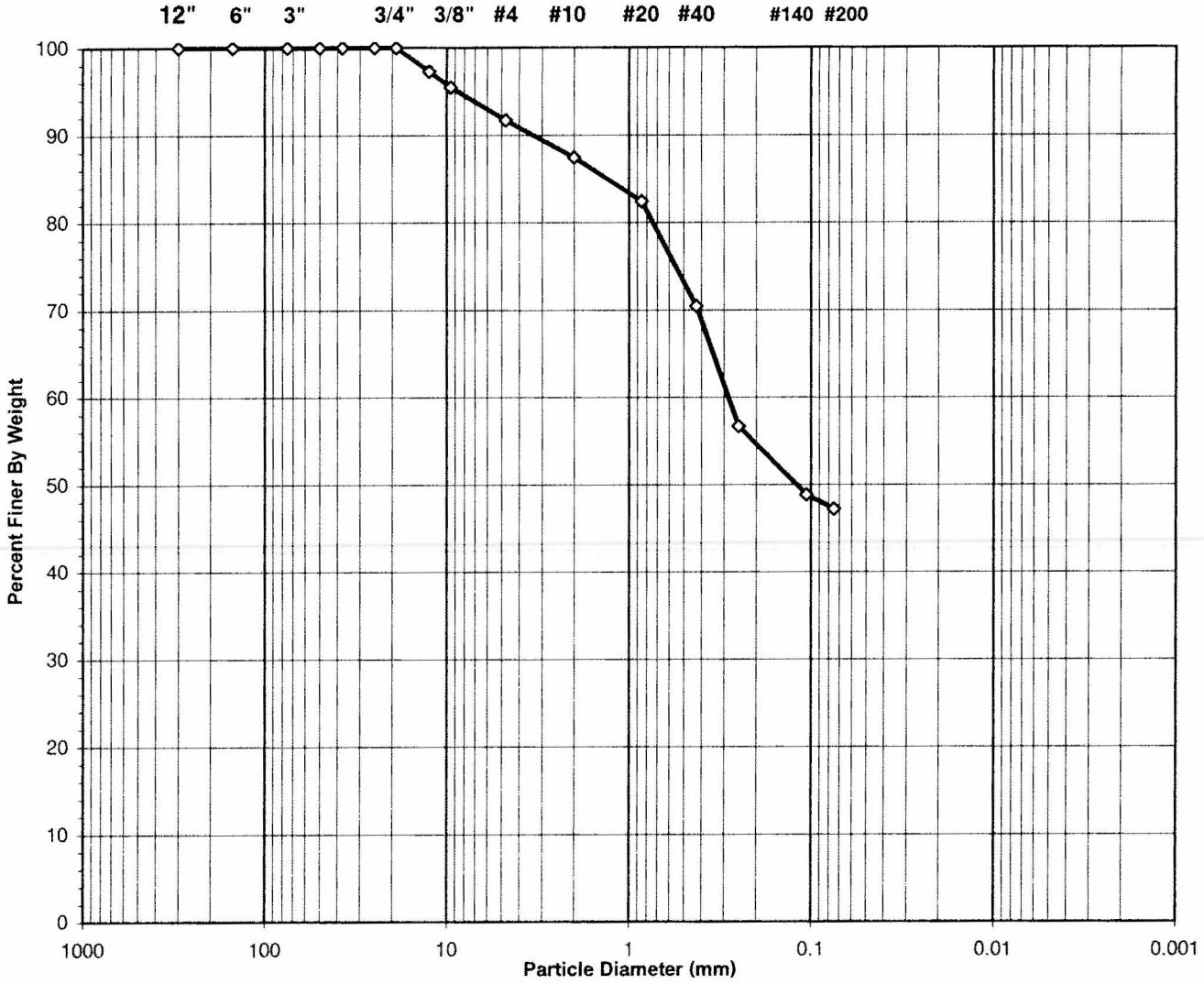
SIEVE ANALYSIS
ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	HB-7 / SB-2
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	0-2
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-03	Soil Color	**BROWN**

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***SC, TESTED***

USCS Classification ***CLAYEY SAND***

Tested By MC Date 6/4/12 Checked By KC Date 6-4-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	HB-7 / SB-2
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	0-2
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-03	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1456	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	518.09	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	518.09	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	145.28	Weight of Tare (gm)	NA
Weight of Water (gm)	0.00	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	372.81	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**0.0**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	372.81
Dry Weight - 3/4" Sample (gm)	196.9	Weight of minus #200 material (gm)	175.94
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	196.87
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	10.10	2.71	2.71	97.29	**97.29**
3/8"	9.50	6.76	1.81	4.52	95.48	**95.48**
#4	4.75	14.03	3.76	8.29	91.71	**91.71**
#10	2.00	15.95	4.28	12.56	87.44	**87.44**
#20	0.850	18.67	5.01	17.57	82.43	**82.43**
#40	0.425	44.68	11.98	29.56	70.44	**70.44**
#60	0.250	51.33	13.77	43.33	56.67	**56.67**
#140	0.106	29.26	7.85	51.17	48.83	**48.83**
#200	0.075	6.09	1.63	52.81	47.19	**47.19**
Pan	-	175.94	47.19	100.00	-	-

Tested By MC Date 6/4/12 Checked By KC Date 6-4-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	HB-7 / SB-2
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	0-2
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-03	Soil Description	**BROWN LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

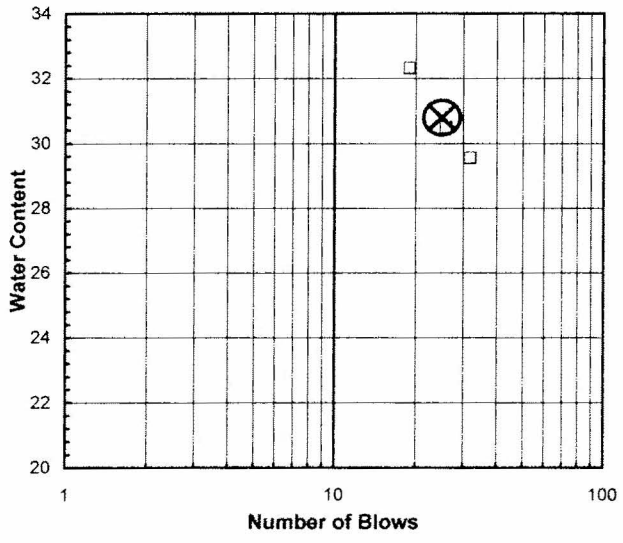
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	402	421	429	**U**
Wt. of Tare & WS (gm)	33.43	41.40	33.13	**L**
Wt. of Tare & DS (gm)	28.05	36.30	27.67	**T**
Wt. of Tare (gm)	9.84	19.57	10.77	**I**
Wt. of Water (gm)	5.4	5.1	5.5	**P**
Wt. of DS (gm)	18.2	16.7	16.9	**O**
				I
Moisture Content (%)	**29.5**	**30.5**	**32.3**	**N**
Number of Blows	**32**	**26**	**19**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	360	361	
Wt. of Tare & WS (gm)	25.94	23.86	
Wt. of Tare & DS (gm)	24.53	22.77	
Wt. of Tare (gm)	16.63	16.80	
Wt. of Water (gm)	1.4	1.1	
Wt. of DS (gm)	7.9	6.0	
Moisture Content (%)	**17.8**	**18.3**	**-0.4**

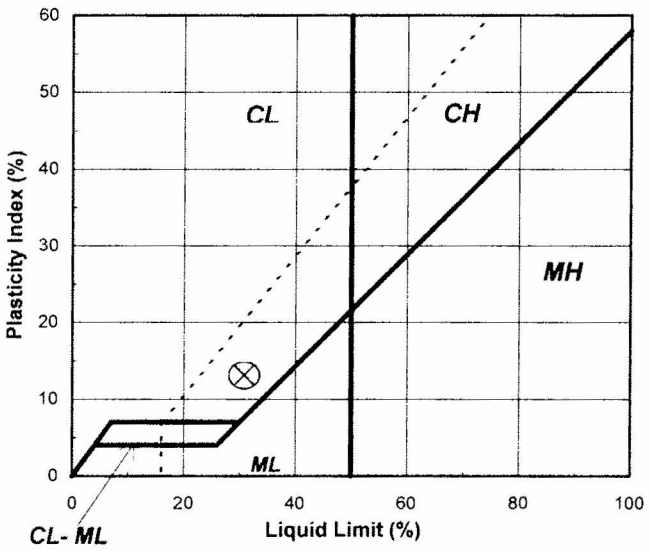
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**31**
Plastic Limit (%)	**18**
Plasticity Index (%)	**13**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 6/1/12 *Checked By* KC *Date* 6-4-12

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	HB-7/SB-2
Client Reference	AEP BIG SANDY LF 13815141	Depth (ft)	4-6
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-04	Soil Description	**BROWN LEAN CLAY**

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

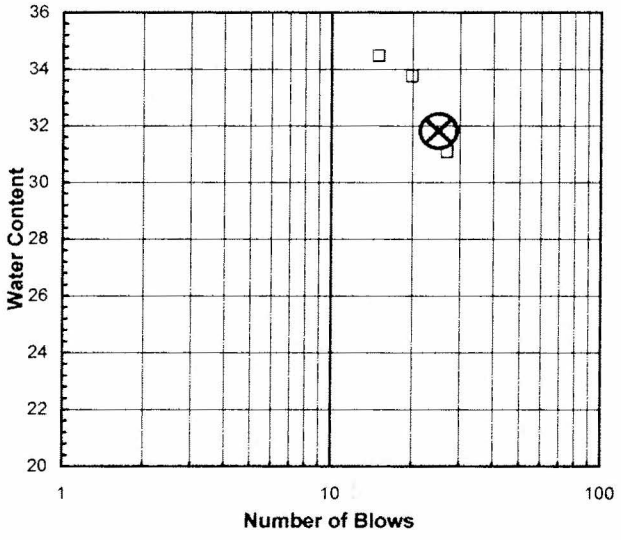
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	40A	410	416	**U**
Wt. of Tare & WS (gm)	40.92	34.79	39.66	**L**
Wt. of Tare & DS (gm)	35.35	28.77	33.04	**T**
Wt. of Tare (gm)	17.42	10.93	13.83	**I**
Wt. of Water (gm)	5.6	6.0	6.6	**P**
Wt. of DS (gm)	17.9	17.8	19.2	**O**
				I
Moisture Content (%)	**31.1**	**33.7**	**34.5**	**N**
Number of Blows	**27**	**20**	**15**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	287	376	
Wt. of Tare & WS (gm)	25.83	21.38	
Wt. of Tare & DS (gm)	24.79	20.34	
Wt. of Tare (gm)	18.80	14.36	
Wt. of Water (gm)	1.0	1.0	
Wt. of DS (gm)	6.0	6.0	
Moisture Content (%)	**17.4**	**17.4**	**0.0**

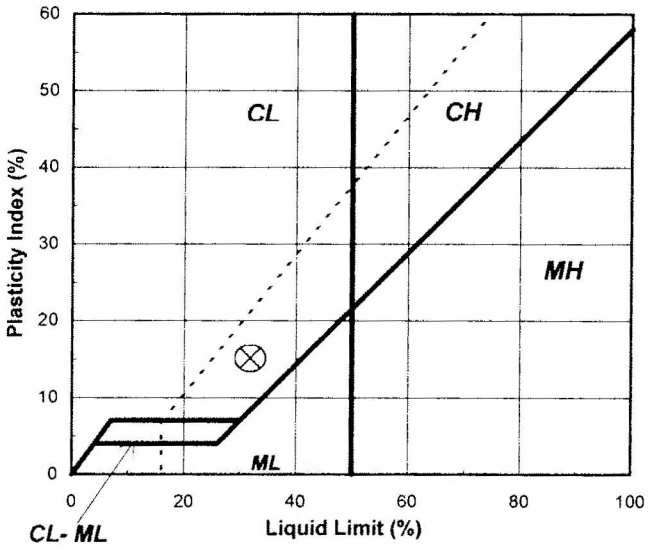
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**32**
Plastic Limit (%)	**17**
Plasticity Index (%)	**15**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By MC *Date* 5/29/12 *Checked By* KC *Date* 6-30-12

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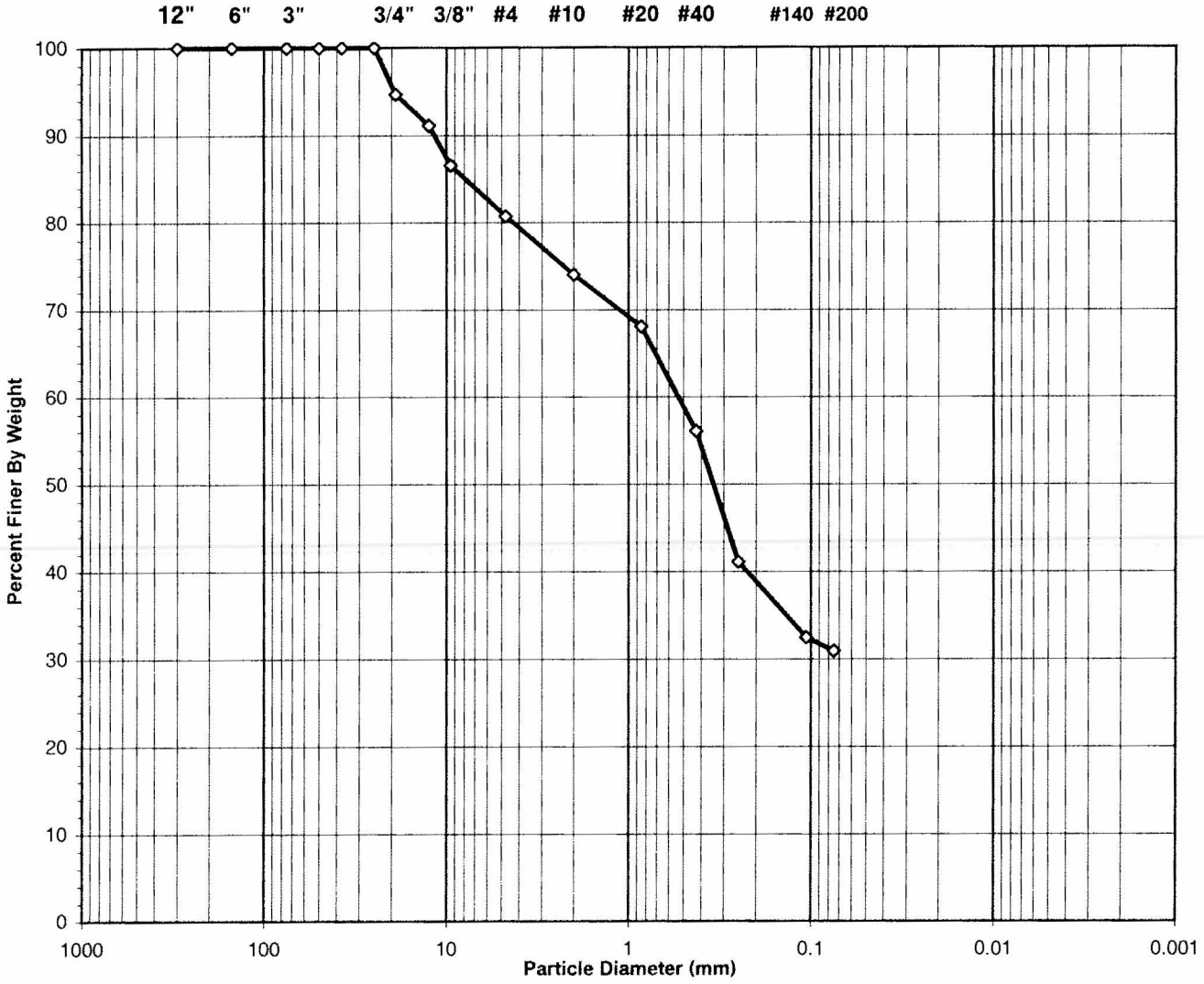
SIEVE ANALYSIS
ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	HB-7/SB-2
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	8-10
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-05	Soil Color	**BROWN**

	SIEVE ANALYSIS		HYDROMETER
USCS	gravel	sand	silt and clay



USCS Symbol ***sc, ASSUMED***

USCS Classification ***CLAYEY SAND WITH GRAVEL***

Tested By PC Date 5/30/12 Checked By KC Date 5-31-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	HB-7/SB-2
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	8-10
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-05	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1445	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	851.50	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	785.10	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	146.21	Weight of Tare (gm)	NA
Weight of Water (gm)	66.40	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	638.89	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**10.4**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	638.89
Dry Weight - 3/4" Sample (gm)	407.6	Weight of minus #200 material (gm)	197.48
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	441.41
Dry Weight + 3/4" Sample (gm)	33.84		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	33.84	5.30	5.30	94.70	**94.70**
1/2"	12.50	22.83	3.57	8.87	91.13	**91.13**
3/8"	9.50	29.30	4.59	13.46	86.54	**86.54**
#4	4.75	37.16	5.82	19.27	80.73	**80.73**
#10	2.00	42.86	6.71	25.98	74.02	**74.02**
#20	0.850	37.92	5.94	31.92	68.08	**68.08**
#40	0.425	76.69	12.00	43.92	56.08	**56.08**
#60	0.250	95.70	14.98	58.90	41.10	**41.10**
#140	0.106	55.17	8.64	67.53	32.47	**32.47**
#200	0.075	9.94	1.56	69.09	30.91	**30.91**
Pan	-	197.48	30.91	100.00	-	-

Tested By PC Date 5/30/12 Checked By KC Date 5-31-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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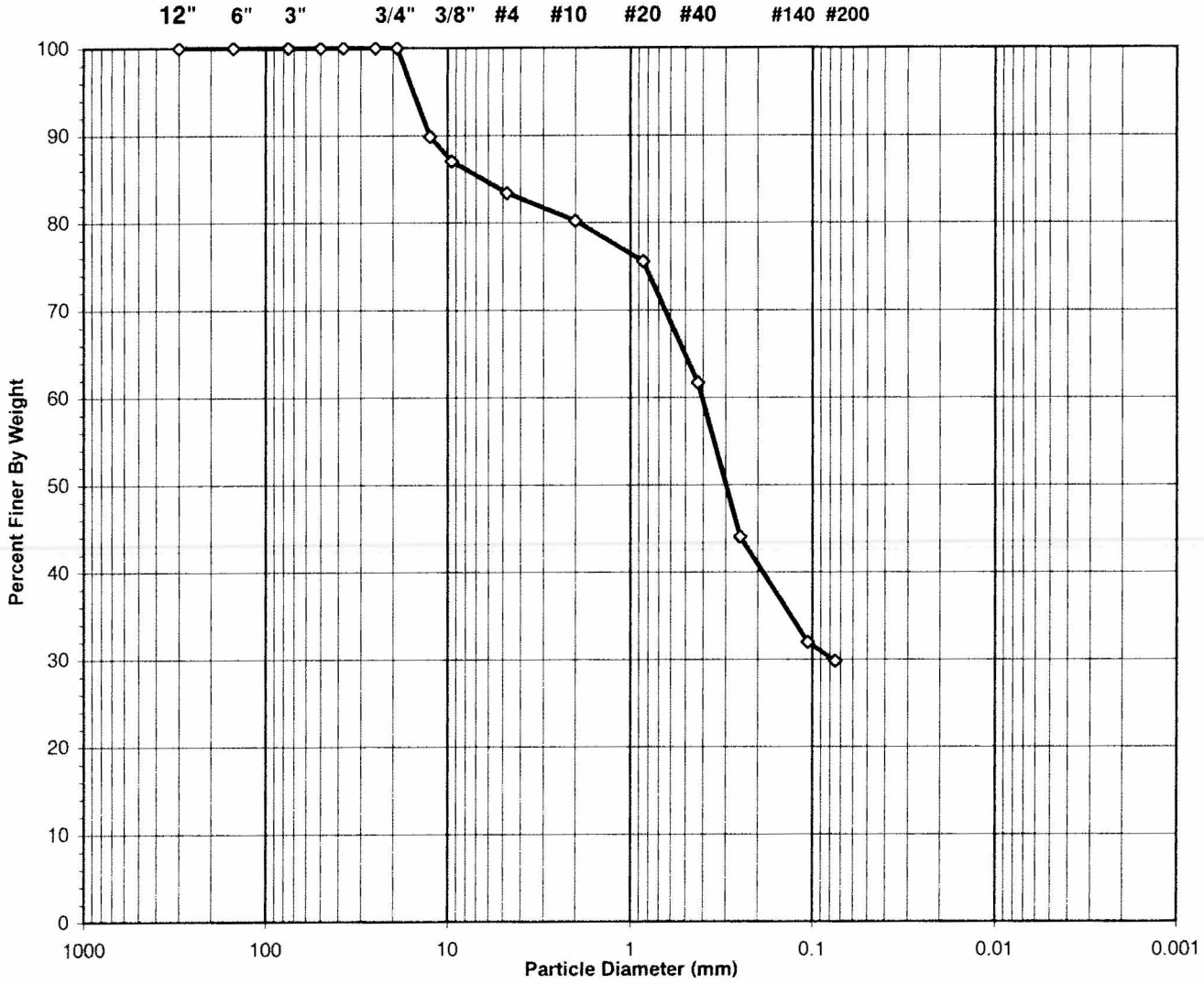
SIEVE ANALYSIS
ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	HB-7 / SB-2
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	16-18
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-07	Soil Color	**BROWN**

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***SC-SM, TESTED***

USCS Classification ***SILTY, CLAYEY SAND WITH GRAVEL***

Tested By MC Date 6/4/12 Checked By KC Date 6-4-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	HB-7 / SB-2
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	16-18
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-07	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1440	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	991.68	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	991.68	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	145.74	Weight of Tare (gm)	NA
Weight of Water (gm)	0.00	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	845.94	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**0.0**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	845.94
Dry Weight - 3/4" Sample (gm)	594.1	Weight of minus #200 material (gm)	251.85
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	594.09
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	85.92	10.16	10.16	89.84	**89.84**
3/8"	9.50	23.79	2.81	12.97	87.03	**87.03**
#4	4.75	30.71	3.63	16.60	83.40	**83.40**
#10	2.00	27.05	3.20	19.80	80.20	**80.20**
#20	0.850	39.16	4.63	24.43	75.57	**75.57**
#40	0.425	117.39	13.88	38.30	61.70	**61.70**
#60	0.250	149.43	17.66	55.97	44.03	**44.03**
#140	0.106	101.99	12.06	68.02	31.98	**31.98**
#200	0.075	18.65	2.20	70.23	29.77	**29.77**
Pan	-	251.85	29.77	100.00	-	-

Tested By MC Date 6/4/12 Checked By KC Date 6-4-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	HB-7 / SB-2
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	16-18
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-07	Soil Description	**BROWN SILTY CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

Liquid Limit Test	**1**	**2**	**3**
Tare Number	213	339	414
Wt. of Tare & WS (gm)	43.00	41.41	36.89
Wt. of Tare & DS (gm)	39.02	37.79	32.91
Wt. of Tare (gm)	18.88	19.63	13.70
Wt. of Water (gm)	4.0	3.6	4.0
Wt. of DS (gm)	20.1	18.2	19.2
Moisture Content (%)	**19.8**	**19.9**	**20.7**
Number of Blows	**29**	**24**	**17**

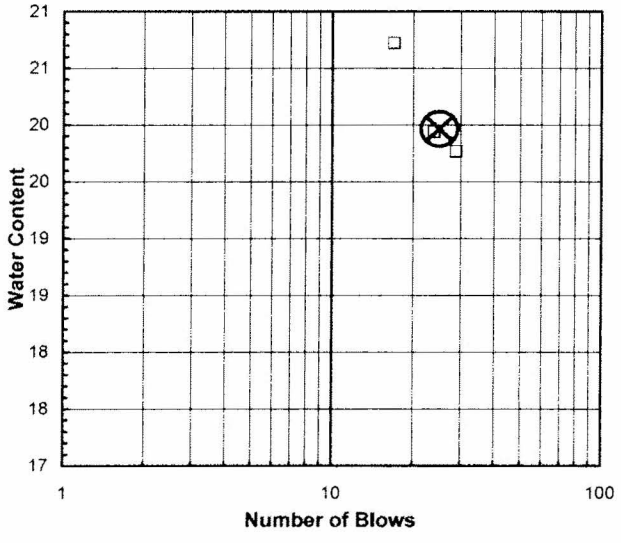
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	423	426	
Wt. of Tare & WS (gm)	22.89	23.46	
Wt. of Tare & DS (gm)	21.86	22.51	
Wt. of Tare (gm)	15.00	15.87	
Wt. of Water (gm)	1.0	0.9	
Wt. of DS (gm)	6.9	6.6	
Moisture Content (%)	**15.0**	**14.3**	**0.7**

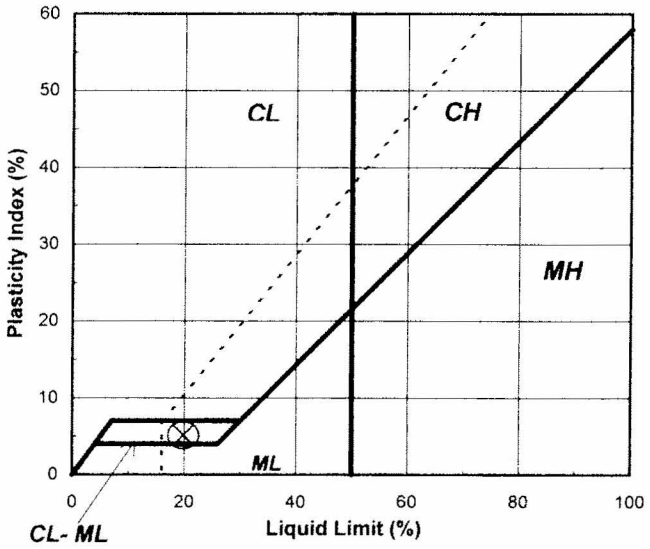
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**20**
Plastic Limit (%)	**15**
Plasticity Index (%)	**5**
USCS Symbol	**CL-ML**

Flow Curve



Plasticity Chart



Tested By MC *Date* 6/1/12 *Checked By* KC *Date* 6-4-12

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	PB-2
Client Reference	AEP BIG SANDY LF 13815141	Depth (ft)	57-59
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-09	Soil Description	**BROWN LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

Liquid Limit Test	**1**	**2**	**3**
Tare Number	282	316	377
Wt. of Tare & WS (gm)	40.39	40.37	35.98
Wt. of Tare & DS (gm)	35.78	35.72	31.04
Wt. of Tare (gm)	18.14	18.33	13.14
Wt. of Water (gm)	4.6	4.7	4.9
Wt. of DS (gm)	17.6	17.4	17.9
Moisture Content (%)	**26.1**	**26.7**	**27.6**
Number of Blows	**33**	**26**	**20**

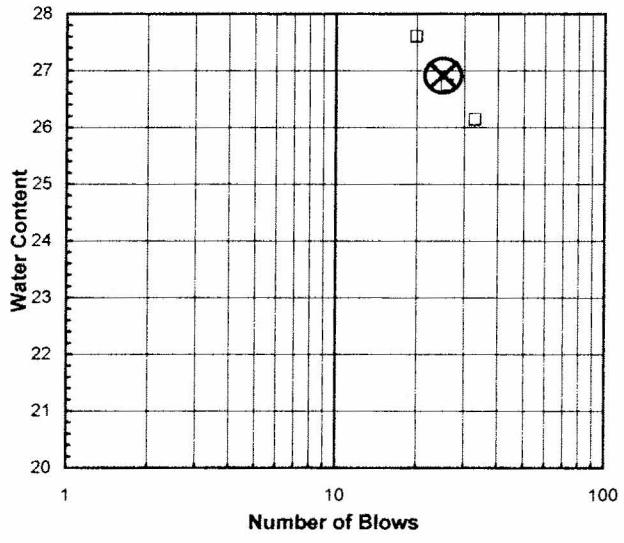
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	189	368	
Wt. of Tare & WS (gm)	25.99	24.02	
Wt. of Tare & DS (gm)	25.13	23.24	
Wt. of Tare (gm)	19.65	17.96	
Wt. of Water (gm)	0.9	0.8	
Wt. of DS (gm)	5.5	5.3	
Moisture Content (%)	**15.7**	**14.8**	**0.9**

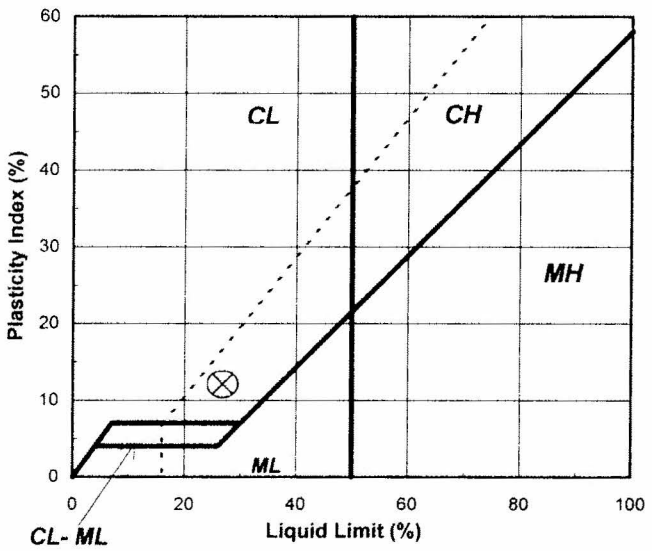
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**27**
Plastic Limit (%)	**15**
Plasticity Index (%)	**12**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 5/29/12 *Checked By* KC *Date* 5-30-12

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INTEGRITY IN TESTING

ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	PB-2
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	70-72
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-10	Soil Description	**BROWN / GRAY SILTY CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

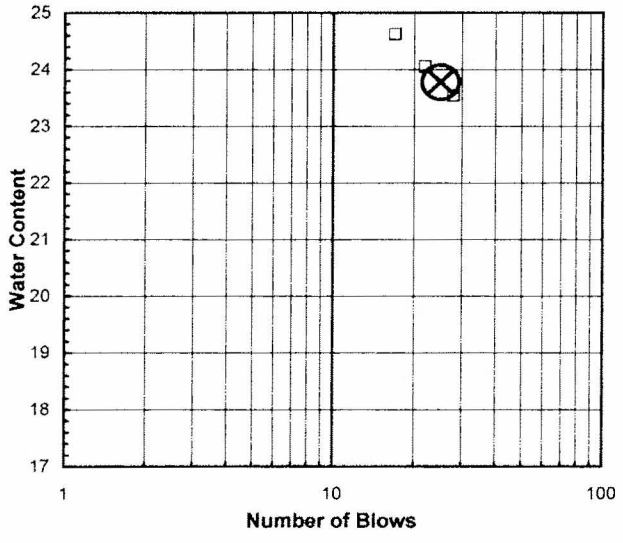
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	365	366	393	**U**
Wt. of Tare & WS (gm)	39.49	39.83	37.47	**L**
Wt. of Tare & DS (gm)	34.62	35.41	33.33	**T**
Wt. of Tare (gm)	13.93	17.03	16.51	**I**
Wt. of Water (gm)	4.9	4.4	4.1	**P**
Wt. of DS (gm)	20.7	18.4	16.8	**O**
				I
Moisture Content (%)	**23.5**	**24.0**	**24.6**	**N**
Number of Blows	**28**	**22**	**17**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	2301	2303	
Wt. of Tare & WS (gm)	26.71	25.51	
Wt. of Tare & DS (gm)	25.73	24.46	
Wt. of Tare (gm)	19.80	18.38	
Wt. of Water (gm)	1.0	1.1	
Wt. of DS (gm)	5.9	6.1	
Moisture Content (%)	**16.5**	**17.3**	**-0.7**

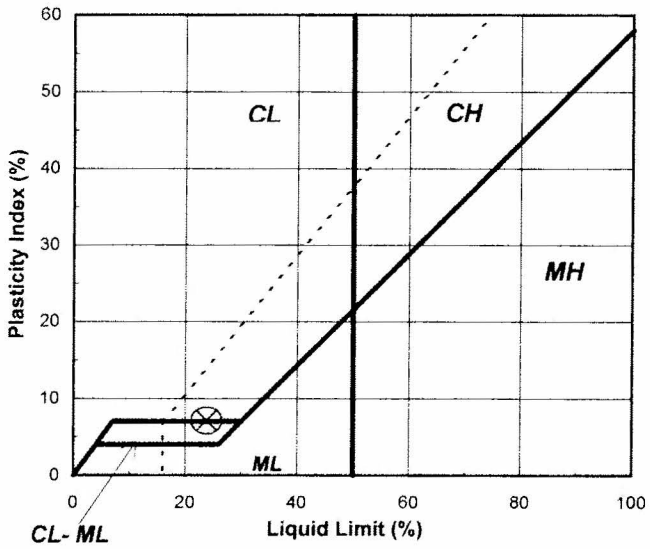
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**24**
Plastic Limit (%)	**17**
Plasticity Index (%)	**7**
USCS Symbol	**CL-ML**

Flow Curve



Plasticity Chart



Tested By MC *Date* 6/1/12 *Checked By* MC *Date* 6-4-12

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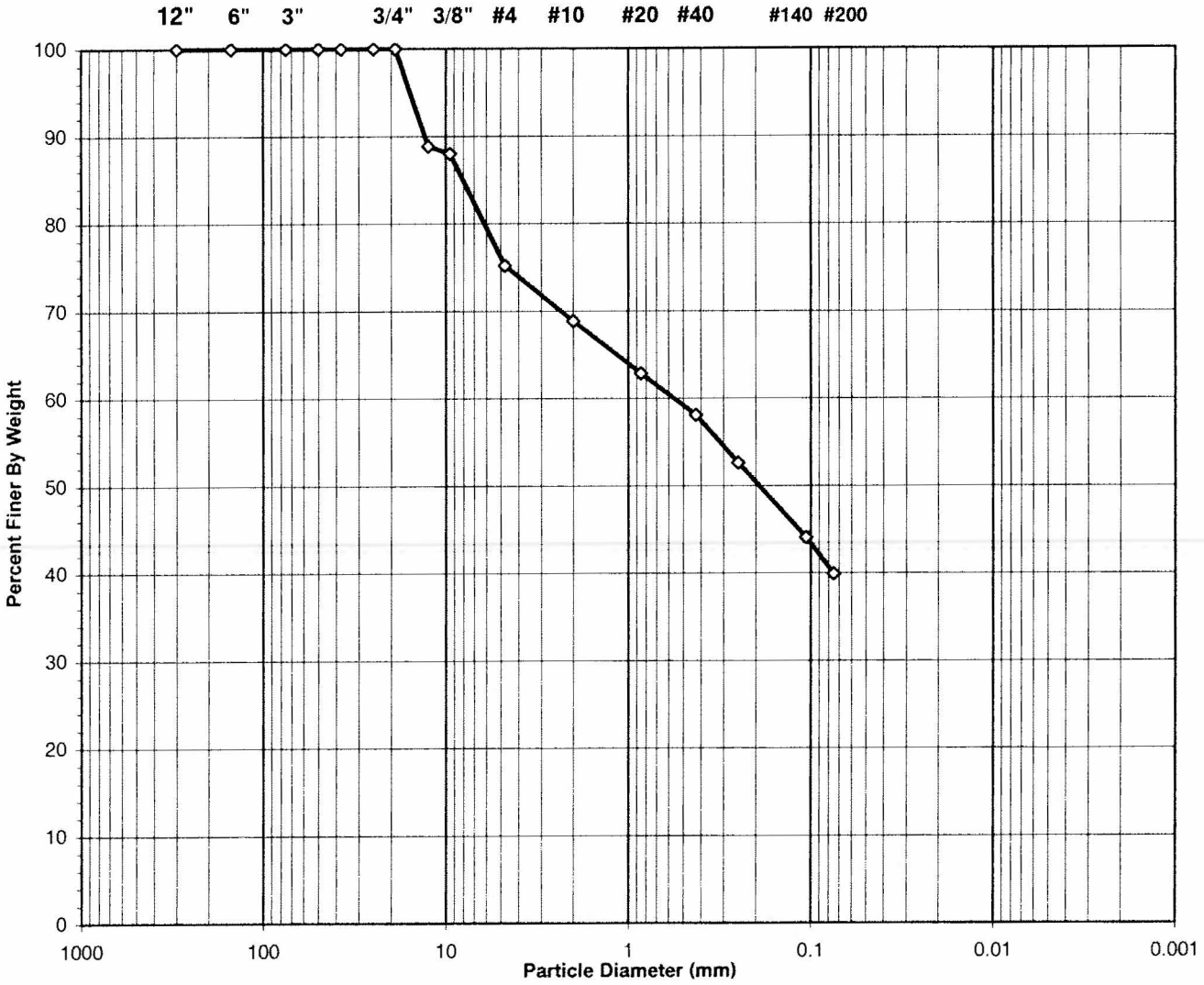
INTEGRITY IN TESTING

SIEVE ANALYSIS
ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-4
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	107-109
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-11	Soil Color	**BROWN / GRAY**

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***SC, TESTED***

USCS Classification ***CLAYEY SAND WITH GRAVEL***

Tested By MC Date 6/4/12 Checked By KC Date 6-4-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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INTEGRITY IN TESTING

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-4
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	107-109
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-11	Soil Color	**BROWN / GRAY**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1439	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	302.60	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	302.60	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	145.63	Weight of Tare (gm)	NA
Weight of Water (gm)	0.00	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	156.97	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**0.0**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	156.97
Dry Weight - 3/4" Sample (gm)	94.4	Weight of minus #200 material (gm)	62.62
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	94.35
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	17.50	11.15	11.15	88.85	**88.85**
3/8"	9.50	1.36	0.87	12.02	87.98	**87.98**
#4	4.75	20.10	12.80	24.82	75.18	**75.18**
#10	2.00	9.96	6.35	31.17	68.83	**68.83**
#20	0.850	9.40	5.99	37.15	62.85	**62.85**
#40	0.425	7.45	4.75	41.90	58.10	**58.10**
#60	0.250	8.61	5.49	47.38	52.62	**52.62**
#140	0.106	13.41	8.54	55.93	44.07	**44.07**
#200	0.075	6.56	4.18	60.11	39.89	**39.89**
Pan	-	62.62	39.89	100.00	-	-

Tested By MC Date 6/4/12 Checked By KC Date 6-4-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	PB-4
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	107-109
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-11	Soil Description	**BROWN / GRAY LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

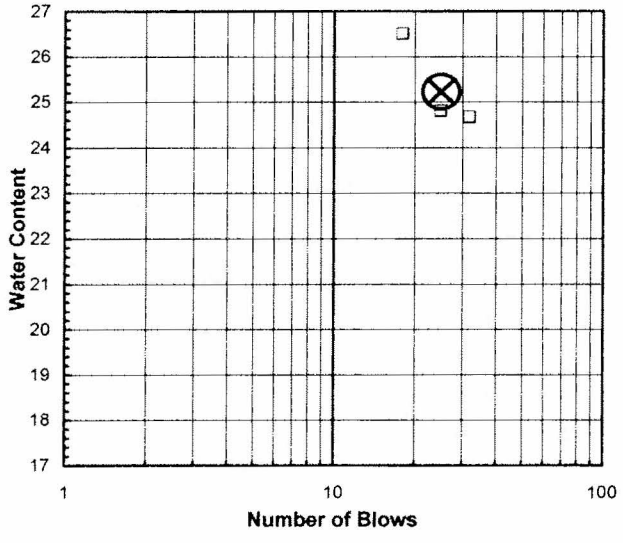
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	40A	31	392	**U**
Wt. of Tare & WS (gm)	33.24	34.55	27.10	**L**
Wt. of Tare & DS (gm)	30.11	31.55	24.45	**T**
Wt. of Tare (gm)	17.42	19.45	14.45	**I**
Wt. of Water (gm)	3.1	3.0	2.7	**P**
Wt. of DS (gm)	12.7	12.1	10.0	**O**
				I
Moisture Content (%)	**24.7**	**24.8**	**26.5**	**N**
Number of Blows	**32**	**25**	**18**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	317	355	
Wt. of Tare & WS (gm)	24.82	24.43	
Wt. of Tare & DS (gm)	24.03	23.61	
Wt. of Tare (gm)	18.74	18.18	
Wt. of Water (gm)	0.8	0.8	
Wt. of DS (gm)	5.3	5.4	
Moisture Content (%)	**14.9**	**15.1**	**-0.2**

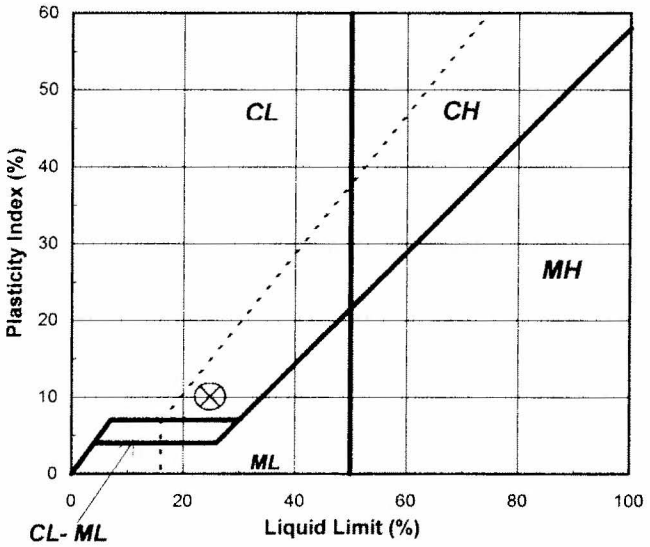
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**25**
Plastic Limit (%)	**15**
Plasticity Index (%)	**10**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 6/1/12 *Checked By* KC *Date* 6-4-12

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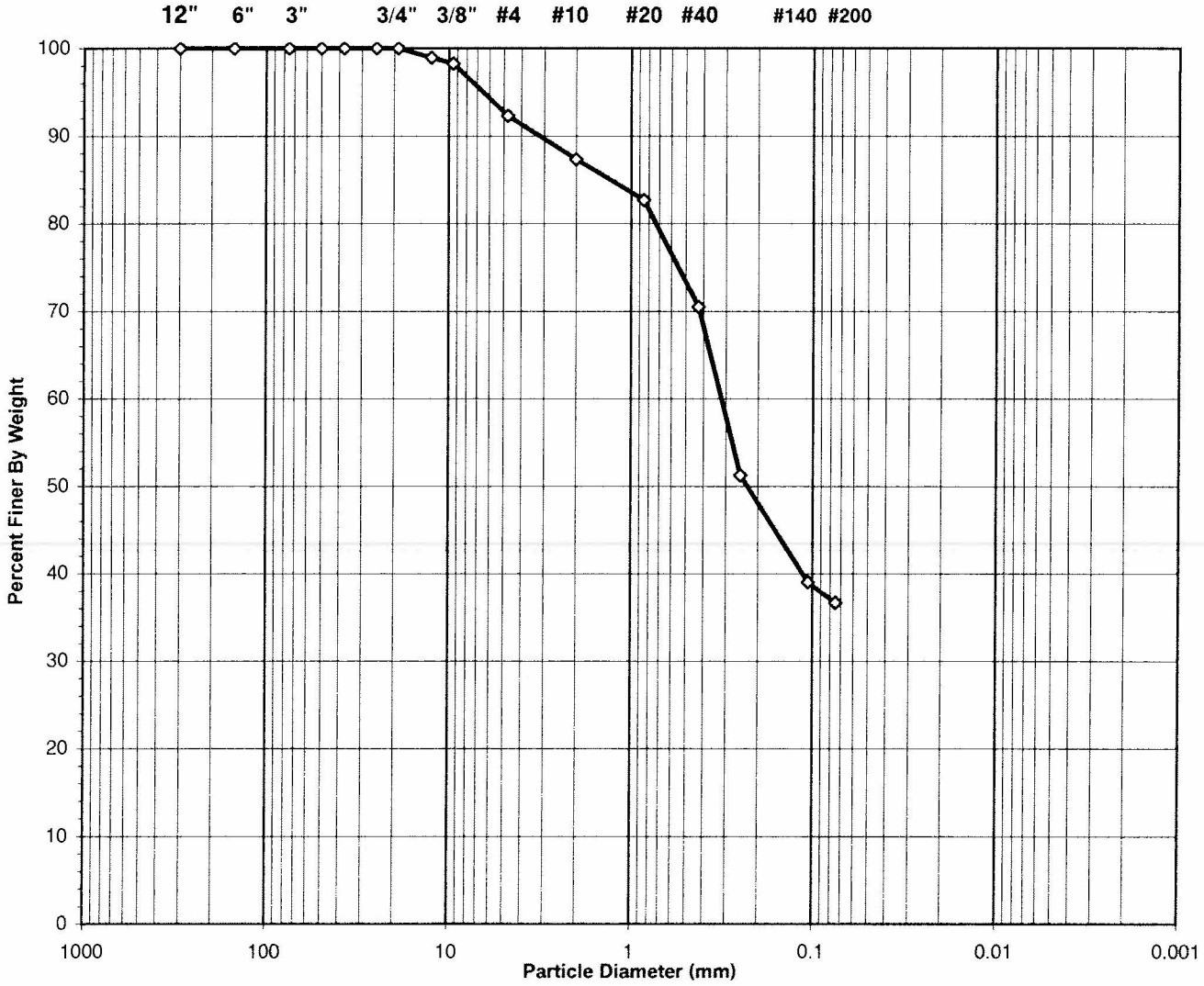
SIEVE ANALYSIS
ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-5
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	39-41
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-12	Soil Color	**BROWN**

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol ***SC-SM, TESTED***

USCS Classification ***SILTY, CLAYEY SAND***

Tested By MC Date 6/4/12 Checked By KC Date 6-4-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-5
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	39-41
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-12	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1417	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	322.57	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	322.57	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	146.78	Weight of Tare (gm)	NA
Weight of Water (gm)	0.00	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	175.79	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**0.0**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	175.79
Dry Weight - 3/4" Sample (gm)	111.4	Weight of minus #200 material (gm)	64.44
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	111.35
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	1.91	1.09	1.09	98.91	**98.91**
3/8"	9.50	1.17	0.67	1.75	98.25	**98.25**
#4	4.75	10.46	5.95	7.70	92.30	**92.30**
#10	2.00	8.71	4.95	12.66	87.34	**87.34**
#20	0.850	8.16	4.64	17.30	82.70	**82.70**
#40	0.425	21.41	12.18	29.48	70.52	**70.52**
#60	0.250	33.87	19.27	48.75	51.25	**51.25**
#140	0.106	21.52	12.24	60.99	39.01	**39.01**
#200	0.075	4.14	2.36	63.34	36.66	**36.66**
Pan	-	64.44	36.66	100.00	-	-

Tested By MC Date 6/4/12 Checked By KC Date 6-4-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	PB-5
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	39-41
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-12	Soil Description	**BROWN SILTY CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

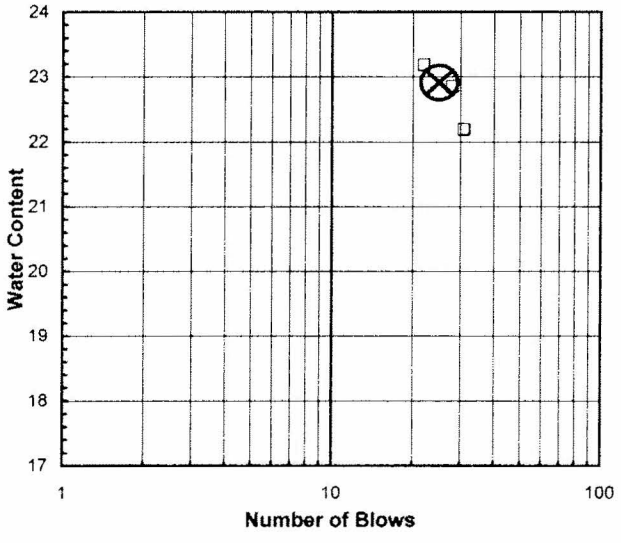
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	245	0	390	**U**
Wt. of Tare & WS (gm)	41.84	43.04	38.00	**L**
Wt. of Tare & DS (gm)	37.88	38.78	33.74	**T**
Wt. of Tare (gm)	20.03	20.13	15.36	**I**
Wt. of Water (gm)	4.0	4.3	4.3	**P**
Wt. of DS (gm)	17.9	18.7	18.4	**O**
				I
Moisture Content (%)	**22.2**	**22.8**	**23.2**	**N**
Number of Blows	**31**	**28**	**22**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	301	312	
Wt. of Tare & WS (gm)	25.31	27.40	
Wt. of Tare & DS (gm)	24.42	26.30	
Wt. of Tare (gm)	18.71	19.30	
Wt. of Water (gm)	0.9	1.1	
Wt. of DS (gm)	5.7	7.0	
Moisture Content (%)	**15.6**	**15.7**	**-0.1**

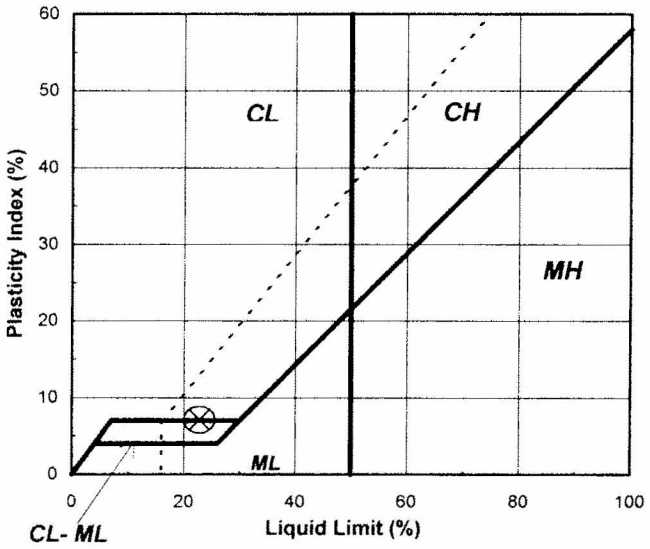
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**23**
Plastic Limit (%)	**16**
Plasticity Index (%)	**7**
USCS Symbol	**CL-ML**

Flow Curve



Plasticity Chart



Tested By MC *Date* 6/1/12 *Checked By* KC *Date* 6-4-12

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SIEVE ANALYSIS
ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-5
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	52-54
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-13	Soil Color	**BROWN**

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay

USCS Symbol ***sc, ASSUMED***

USCS Classification ***CLAYEY SAND***

Tested By PC Date 5/30/12 Checked By KC Date 5-31-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-5
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	52-54
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-13	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1453	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	390.13	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	363.62	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	145.58	Weight of Tare (gm)	NA
Weight of Water (gm)	26.51	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	218.04	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**12.2**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	218.04
Dry Weight - 3/4" Sample (gm)	132.3	Weight of minus #200 material (gm)	85.79
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	132.25
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	8.75	4.01	4.01	95.99	**95.99**
#10	2.00	10.36	4.75	8.76	91.24	**91.24**
#20	0.850	6.82	3.13	11.89	88.11	**88.11**
#40	0.425	34.59	15.86	27.76	72.24	**72.24**
#60	0.250	42.93	19.69	47.45	52.55	**52.55**
#140	0.106	23.58	10.81	58.26	41.74	**41.74**
#200	0.075	5.22	2.39	60.65	39.35	**39.35**
Pan	-	85.79	39.35	100.00	-	-

Tested By PC Date 5/30/12 Checked By KC Date 5-31-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	PB-6
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	98-99.3
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-15	Soil Description	**GRAY LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

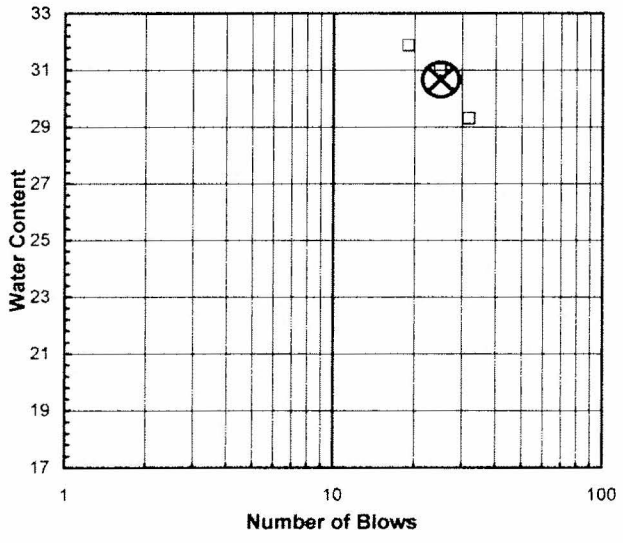
Liquid Limit Test	**1**	**2**	**3**	**MULTIPOINT**
Tare Number	296	349	375	
Wt. of Tare & WS (gm)	32.64	31.42	27.75	
Wt. of Tare & DS (gm)	29.50	28.33	24.23	
Wt. of Tare (gm)	18.78	18.36	13.18	
Wt. of Water (gm)	3.1	3.1	3.5	
Wt. of DS (gm)	10.7	10.0	11.1	
Moisture Content (%)	**29.3**	**31.0**	**31.9**	
Number of Blows	**32**	**25**	**19**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	383	386	
Wt. of Tare & WS (gm)	24.58	26.88	
Wt. of Tare & DS (gm)	23.71	25.99	
Wt. of Tare (gm)	18.56	20.62	
Wt. of Water (gm)	0.9	0.9	
Wt. of DS (gm)	5.2	5.4	
Moisture Content (%)	**16.9**	**16.6**	**0.3**

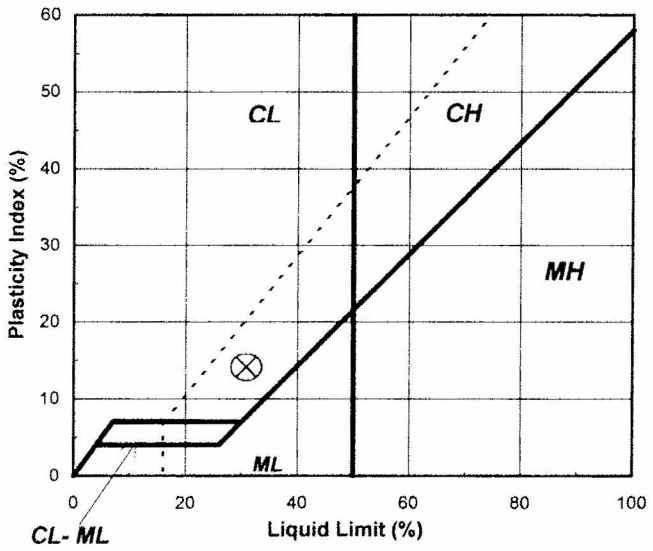
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**31**
Plastic Limit (%)	**17**
Plasticity Index (%)	**14**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 6/1/12 *Checked By* KC *Date* 6-4-12

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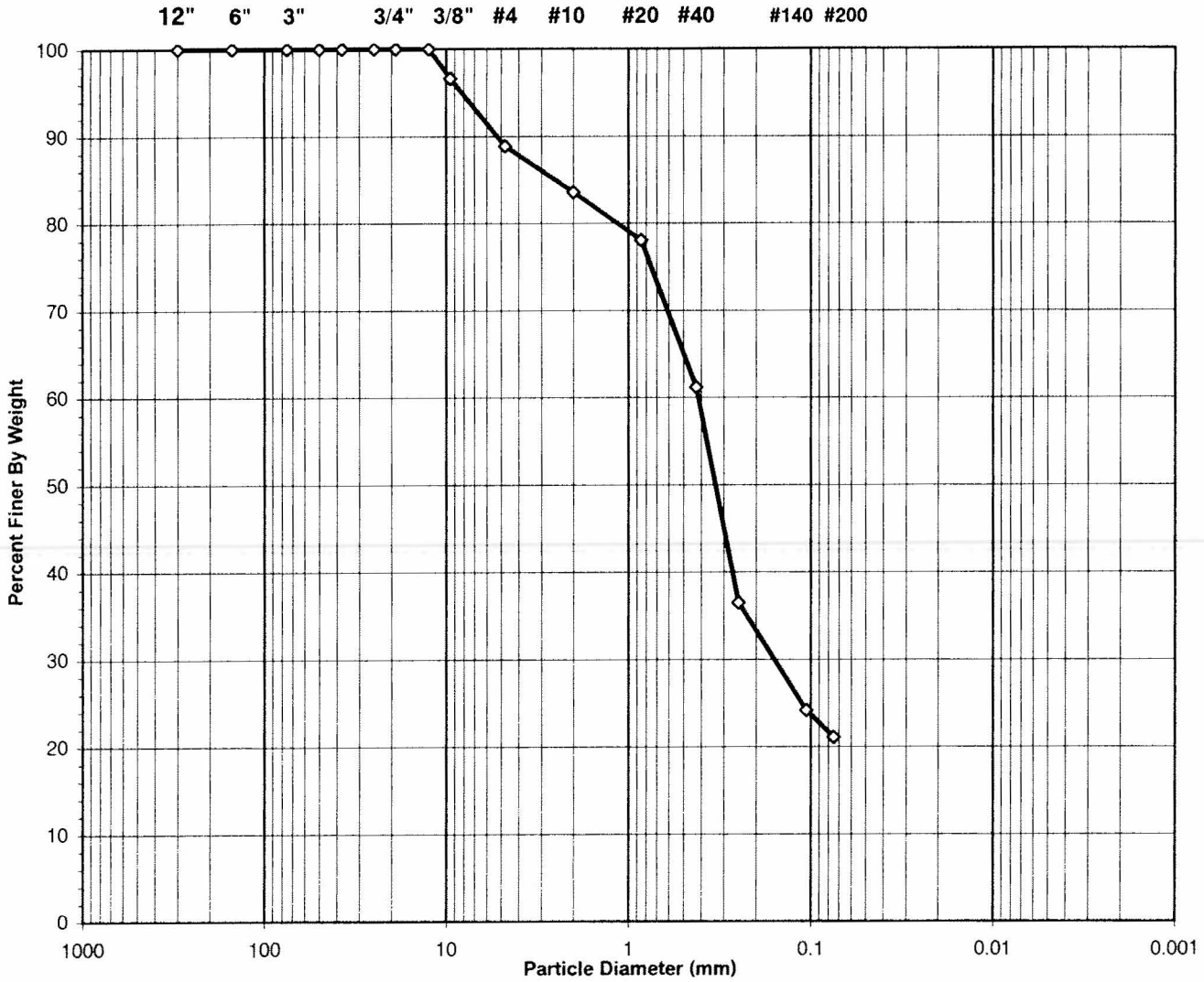
SIEVE ANALYSIS
ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-7
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	122-124
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-16	Soil Color	**BROWN**

	SIEVE ANALYSIS		HYDROMETER
USCS	gravel	sand	silt and clay



USCS Symbol ***sm, ASSUMED***

USCS Classification ***SILTY SAND***

UNABLE TO RUN HYDROMETER

Tested By MC Date 6/8/12 Checked By VC Date 6-8-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-7
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	122-124
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-16	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1427	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	367.08	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	341.01	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	145.66	Weight of Tare (gm)	NA
Weight of Water (gm)	26.07	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	195.35	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**13.3**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	195.35
Dry Weight - 3/4" Sample (gm)	154.2	Weight of minus #200 material (gm)	41.15
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	154.20
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	6.58	3.37	3.37	96.63	**96.63**
#4	4.75	15.13	7.75	11.11	88.89	**88.89**
#10	2.00	10.38	5.31	16.43	83.57	**83.57**
#20	0.850	10.82	5.54	21.97	78.03	**78.03**
#40	0.425	32.90	16.84	38.81	61.19	**61.19**
#60	0.250	48.23	24.69	63.50	36.50	**36.50**
#140	0.106	24.07	12.32	75.82	24.18	**24.18**
#200	0.075	6.09	3.12	78.94	21.06	**21.06**
Pan	-	41.15	21.06	100.00	-	-

Tested By MC Date 6/8/12 Checked By KC Date 6-8-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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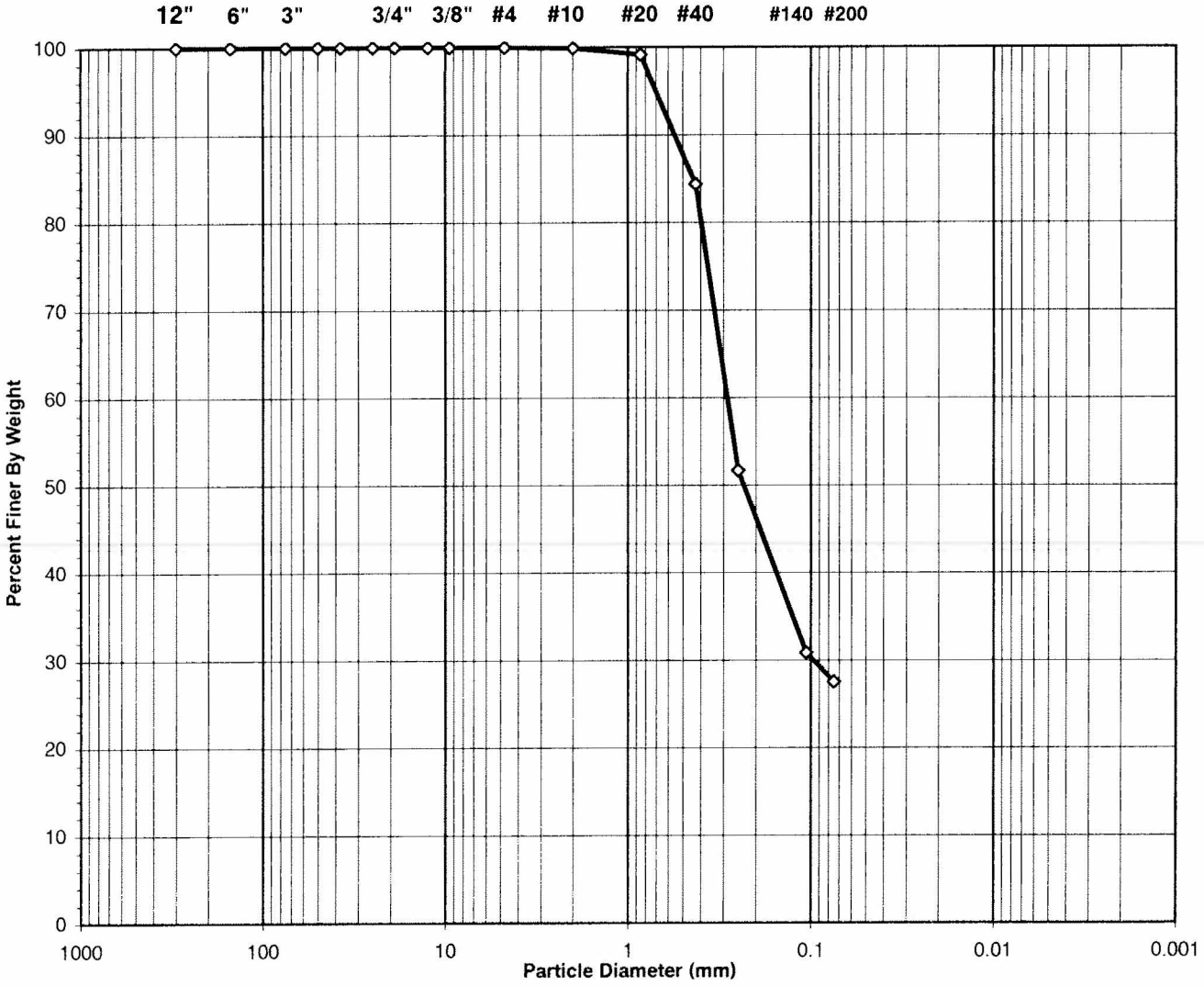
SIEVE ANALYSIS
ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-7
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	107-109
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-17	Soil Color	**BROWN**

	SIEVE ANALYSIS		HYDROMETER
USCS	gravel	sand	silt and clay



USCS Symbol ***sc, ASSUMED***

USCS Classification ***CLAYEY SAND***

Tested By PC Date 5/30/12 Checked By KC Date 5-31-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-7
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	107-109
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-17	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	637	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	295.32	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	257.84	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	97.48	Weight of Tare (gm)	NA
Weight of Water (gm)	37.48	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	160.36	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**23.4**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	160.36
Dry Weight - 3/4" Sample (gm)	116.2	Weight of minus #200 material (gm)	44.15
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	116.21
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	0.14	0.09	0.09	99.91	**99.91**
#20	0.850	1.19	0.74	0.83	99.17	**99.17**
#40	0.425	23.72	14.79	15.62	84.38	**84.38**
#60	0.250	52.44	32.70	48.32	51.68	**51.68**
#140	0.106	33.41	20.83	69.16	30.84	**30.84**
#200	0.075	5.31	3.31	72.47	27.53	**27.53**
Pan	-	44.15	27.53	100.00	-	-

Tested By PC Date 5/30/12 Checked By KL Date 5-31-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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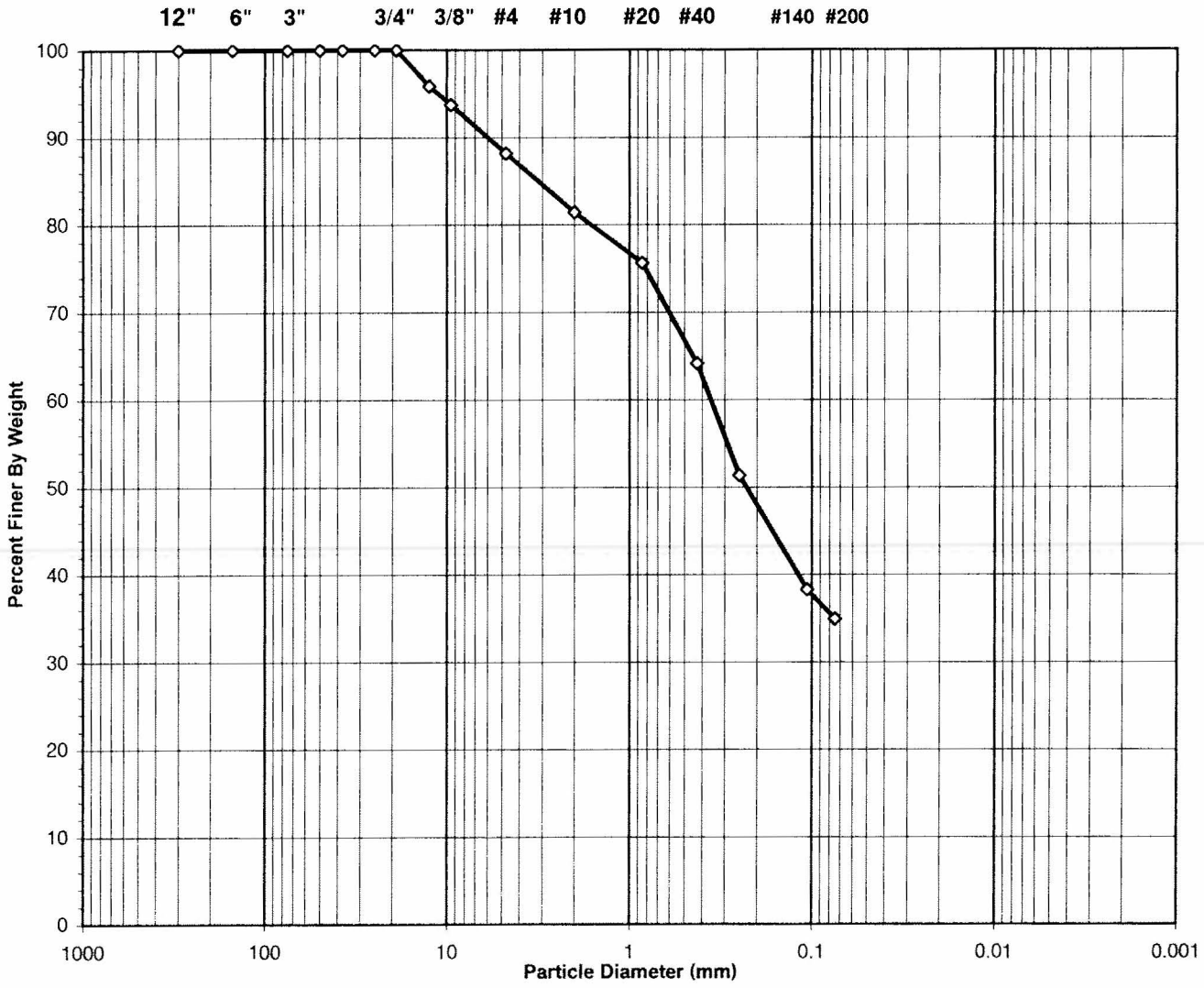
SIEVE ANALYSIS
ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-7
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	117-119
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-18	Soil Color	**GRAY**

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***sc, ASSUMED***

USCS Classification ***CLAYEY SAND***

Tested By PC Date 5/30/12 Checked By KC Date 5-31-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-7
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	117-119
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-18	Soil Color	**GRAY**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	686	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	251.95	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	231.61	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	95.98	Weight of Tare (gm)	NA
Weight of Water (gm)	20.34	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	135.63	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**15.0**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	135.63
Dry Weight - 3/4" Sample (gm)	88.3	Weight of minus #200 material (gm)	47.37
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	88.26
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	5.60	4.13	4.13	95.87	**95.87**
3/8"	9.50	2.88	2.12	6.25	93.75	**93.75**
#4	4.75	7.57	5.58	11.83	88.17	**88.17**
#10	2.00	9.17	6.76	18.59	81.41	**81.41**
#20	0.850	7.85	5.79	24.38	75.62	**75.62**
#40	0.425	15.52	11.44	35.83	64.17	**64.17**
#60	0.250	17.39	12.82	48.65	51.35	**51.35**
#140	0.106	17.73	13.07	61.72	38.28	**38.28**
#200	0.075	4.55	3.35	65.07	34.93	**34.93**
Pan	-	47.37	34.93	100.00	-	-

Tested By PC Date 5/30/12 Checked By KC Date 5-31-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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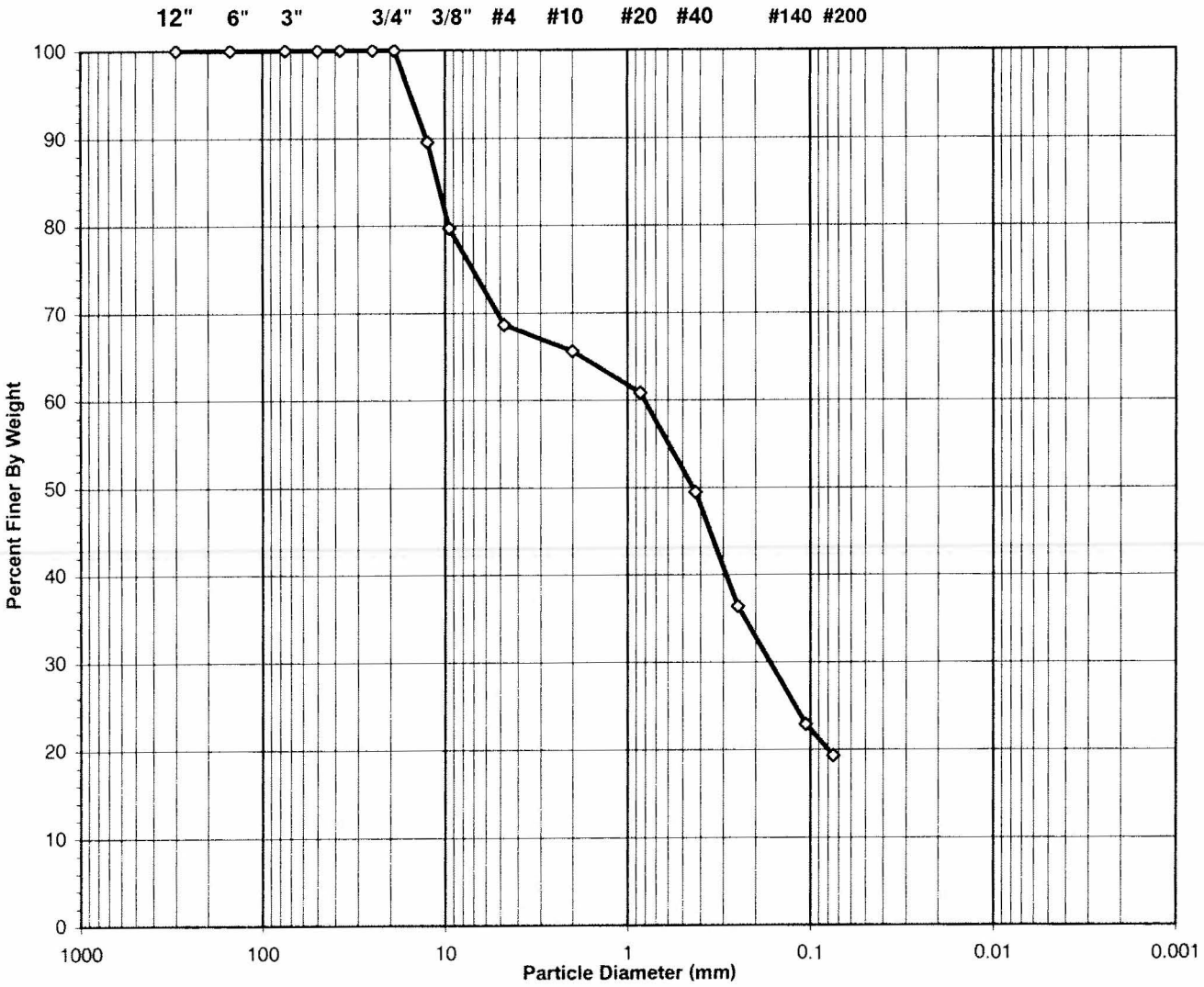
SIEVE ANALYSIS
ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-8
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	147-149
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-19	Soil Color	**BROWN**

	SIEVE ANALYSIS		HYDROMETER
USCS	gravel	sand	silt and clay



USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND WITH GRAVEL (NON-PLASTIC FINES)***

Tested By MC Date 6/4/12 Checked By KC Date 6-4-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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WASH SIEVE ANALYSIS

ASTM D 422-63 (2007) SOP-S3

Client	URS CORPORATION	Boring No.	PB-8
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	147-149
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-19	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	958	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	252.22	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	242.03	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	99.89	Weight of Tare (gm)	NA
Weight of Water (gm)	10.19	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	142.14	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**7.2**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	142.14
Dry Weight - 3/4" Sample (gm)	114.7	Weight of minus #200 material (gm)	27.46
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	114.68
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	14.85	10.45	10.45	89.55	**89.55**
3/8"	9.50	13.99	9.84	20.29	79.71	**79.71**
#4	4.75	15.75	11.08	31.37	68.63	**68.63**
#10	2.00	4.31	3.03	34.40	65.60	**65.60**
#20	0.850	6.78	4.77	39.17	60.83	**60.83**
#40	0.425	16.15	11.36	50.53	49.47	**49.47**
#60	0.250	18.63	13.11	63.64	36.36	**36.36**
#140	0.106	19.13	13.46	77.10	22.90	**22.90**
#200	0.075	5.09	3.58	80.68	19.32	**19.32**
Pan	-	27.46	19.32	100.00	-	-

Tested By MC Date 6/4/12 Checked By KC Date 6-4-12

DCN: CT-S3C DATE 6-25-98 REVISION: 2

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ATTERBERG LIMIT

ASTM D 4318-00 (SOP - S4)

Client	URS CORPORATION	Boring No.	PB-8
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	147-149
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-19	Visual	**BROWN SILT**
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By JP *Date* 6/1/12 *Checked By* KC *Date* 6-1-12

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	SB-4
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	2.5-4.5
Project No.	2012-245-01	Sample No.	S2
Lab ID	2012-245-01-20	Soil Description	**BROWN LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

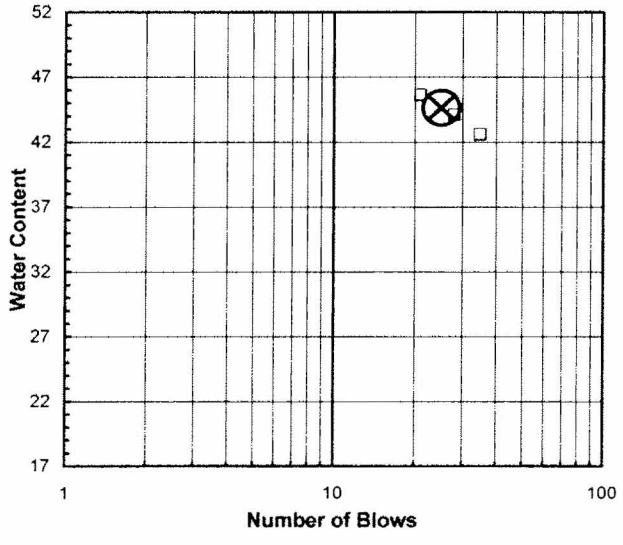
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	363	367	416	**U**
Wt. of Tare & WS (gm)	39.78	42.88	35.71	**L**
Wt. of Tare & DS (gm)	32.60	36.00	28.86	**T**
Wt. of Tare (gm)	15.73	20.39	13.84	**I**
Wt. of Water (gm)	7.2	6.9	6.9	**P**
Wt. of DS (gm)	16.9	15.6	15.0	**O**
				I
Moisture Content (%)	**42.6**	**44.1**	**45.6**	**N**
Number of Blows	**35**	**28**	**21**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	354	394	
Wt. of Tare & WS (gm)	24.85	21.14	
Wt. of Tare & DS (gm)	23.65	19.80	
Wt. of Tare (gm)	18.45	14.07	
Wt. of Water (gm)	1.2	1.3	
Wt. of DS (gm)	5.2	5.7	
Moisture Content (%)	**23.1**	**23.4**	**-0.3**

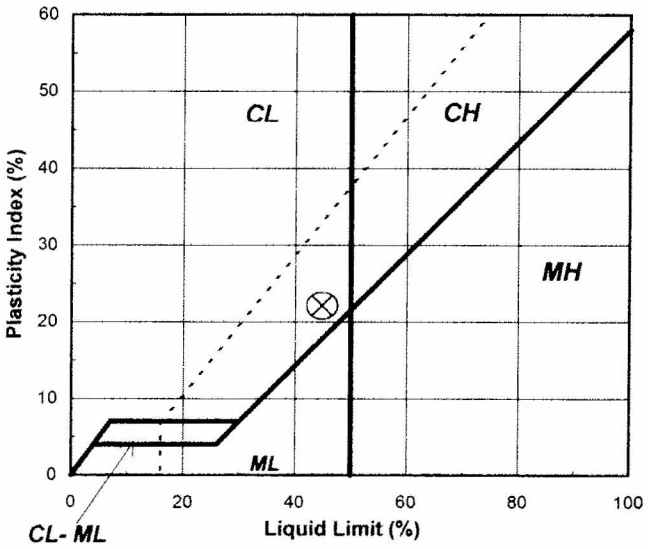
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**23**
Plasticity Index (%)	**22**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By MC *Date* 6/1/12 *Checked By* KC *Date* 6-4-12

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	SB-6
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	2.5-4.5
Project No.	2012-245-01	Sample No.	S2
Lab ID	2012-245-01-23	Soil Description	**BROWN FAT CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

Liquid Limit Test	**1**	**2**	**3**
Tare Number	120	403	404
Wt. of Tare & WS (gm)	33.73	34.51	34.52
Wt. of Tare & DS (gm)	27.84	28.44	27.87
Wt. of Tare (gm)	17.87	18.59	17.32
Wt. of Water (gm)	5.9	6.1	6.7
Wt. of DS (gm)	10.0	9.9	10.6
Moisture Content (%)	**59.1**	**61.6**	**63.0**
Number of Blows	**32**	**27**	**21**

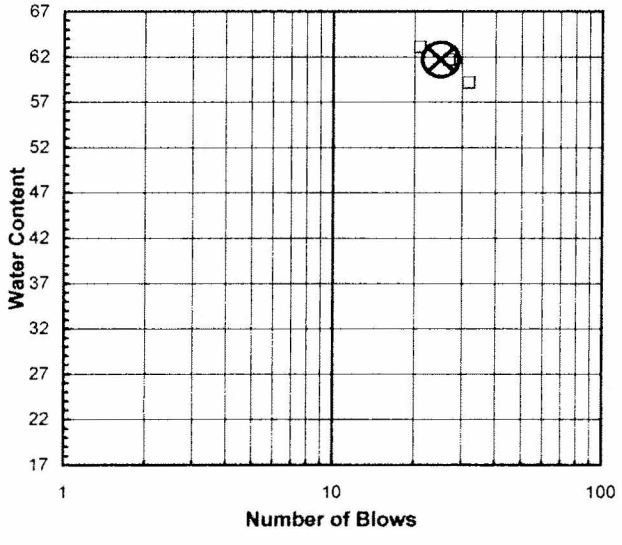
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	409	412	
Wt. of Tare & WS (gm)	20.92	25.55	
Wt. of Tare & DS (gm)	19.71	24.34	
Wt. of Tare (gm)	14.88	19.42	
Wt. of Water (gm)	1.2	1.2	
Wt. of DS (gm)	4.8	4.9	
Moisture Content (%)	**25.1**	**24.6**	**0.5**

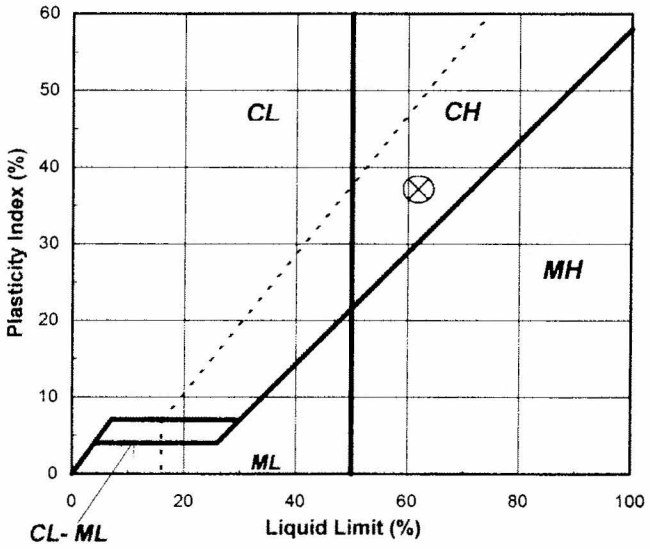
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**62**
Plastic Limit (%)	**25**
Plasticity Index (%)	**37**
USCS Symbol	**CH**

Flow Curve



Plasticity Chart



Tested By MC *Date* 6/1/12 *Checked By* KC *Date* 6-4-12

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	SB-6
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	5-7
Project No.	2012-245-01	Sample No.	S3
Lab ID	2012-245-01-24	Soil Description	**BROWN/BLACK FAT CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

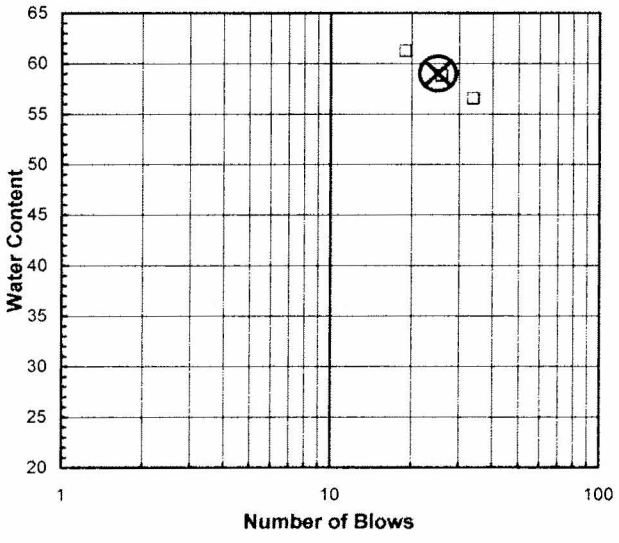
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	38	297	319	**U**
Wt. of Tare & WS (gm)	39.07	38.83	38.62	**L**
Wt. of Tare & DS (gm)	31.58	31.05	30.90	**T**
Wt. of Tare (gm)	18.33	17.81	18.29	**I**
Wt. of Water (gm)	7.5	7.8	7.7	**P**
Wt. of DS (gm)	13.3	13.2	12.6	**O**
				I
Moisture Content (%)	**56.5**	**58.8**	**61.2**	**N**
Number of Blows	**34**	**26**	**19**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	394	421	
Wt. of Tare & WS (gm)	20.13	25.71	
Wt. of Tare & DS (gm)	18.71	24.30	
Wt. of Tare (gm)	14.06	19.57	
Wt. of Water (gm)	1.4	1.4	
Wt. of DS (gm)	4.7	4.7	
Moisture Content (%)	**30.5**	**29.8**	**0.7**

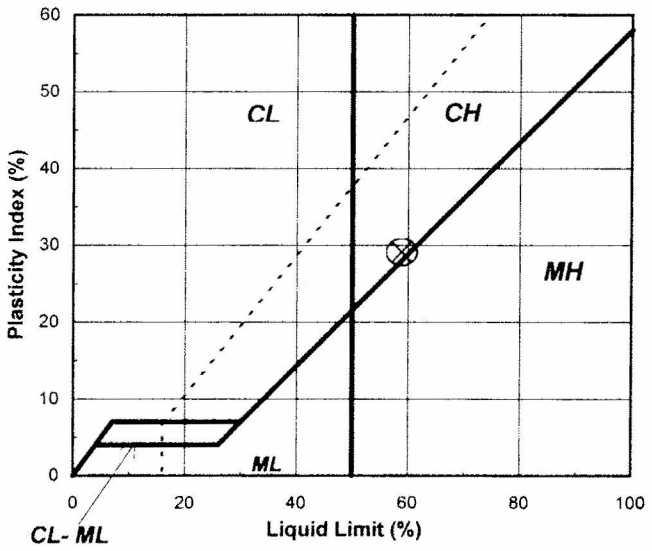
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**59**
Plastic Limit (%)	**30**
Plasticity Index (%)	**29**
USCS Symbol	**CH**

Flow Curve



Plasticity Chart



Tested By BS *Date* 6/5/12 *Checked By* KC *Date* 6-6-12

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ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	SB-7
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	5-7
Project No.	2012-245-01	Sample No.	S3
Lab ID	2012-245-01-25	Soil Description	**BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

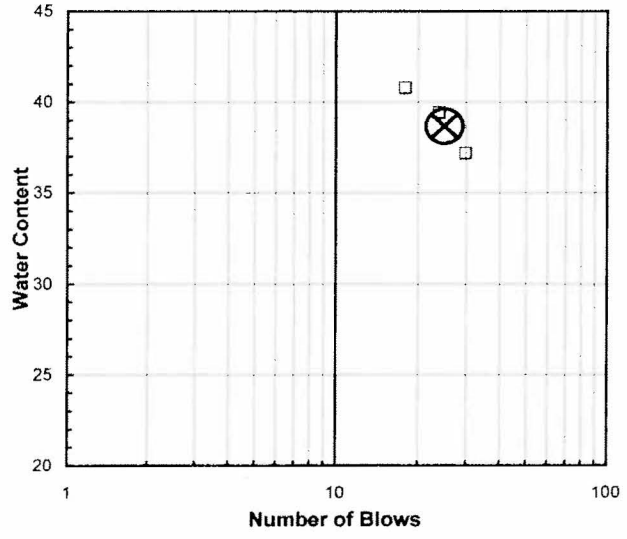
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	367	390	414	**U**
Wt. of Tare & WS (gm)	40.56	35.73	37.78	**L**
Wt. of Tare & DS (gm)	35.09	29.97	30.80	**T**
Wt. of Tare (gm)	20.37	15.35	13.68	**I**
Wt. of Water (gm)	5.5	5.8	7.0	**P**
Wt. of DS (gm)	14.7	14.6	17.1	**O**
				I
Moisture Content (%)	**37.2**	**39.4**	**40.8**	**N**
Number of Blows	**30**	**24**	**18**	T

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	117	329	
Wt. of Tare & WS (gm)	26.14	24.40	
Wt. of Tare & DS (gm)	25.22	23.61	
Wt. of Tare (gm)	20.11	19.48	
Wt. of Water (gm)	0.9	0.8	
Wt. of DS (gm)	5.1	4.1	
Moisture Content (%)	**18.0**	**19.1**	**-1.1**

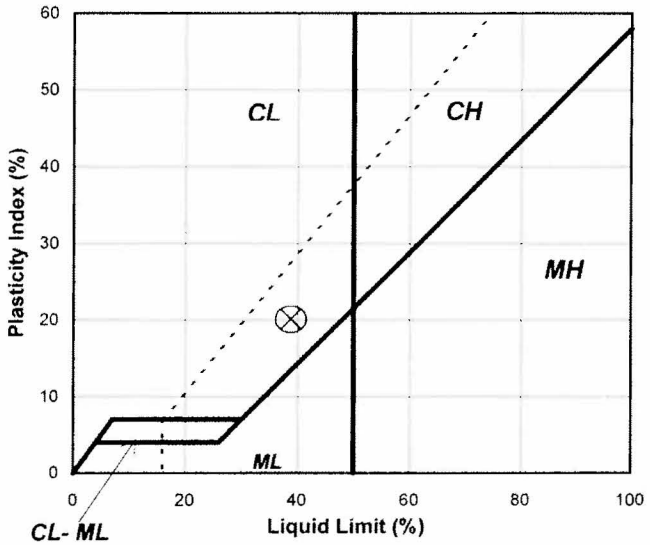
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**39**
Plastic Limit (%)	**19**
Plasticity Index (%)	**20**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By MC *Date* 6/4/12 *Checked By* Jam *Date* 6-5-12

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INTEGRITY IN TESTING

ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	HB-5
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	4-6
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-26	Soil Description	**BROWN LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

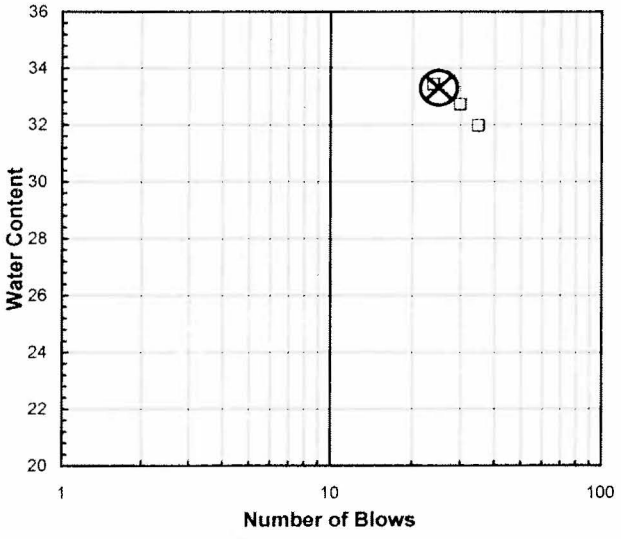
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	120	310	404	**U**
Wt. of Tare & WS (gm)	41.17	38.97	39.29	**L**
Wt. of Tare & DS (gm)	35.53	33.99	33.79	**T**
Wt. of Tare (gm)	17.88	18.76	17.33	**I**
Wt. of Water (gm)	5.6	5.0	5.5	**P**
Wt. of DS (gm)	17.7	15.2	16.5	**O**
				I
Moisture Content (%)	**32.0**	**32.7**	**33.4**	**N**
Number of Blows	**35**	**30**	**24**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	387	389	
Wt. of Tare & WS (gm)	25.00	21.14	
Wt. of Tare & DS (gm)	24.13	20.22	
Wt. of Tare (gm)	18.97	14.61	
Wt. of Water (gm)	0.9	0.9	
Wt. of DS (gm)	5.2	5.6	
Moisture Content (%)	**16.9**	**16.4**	**0.5**

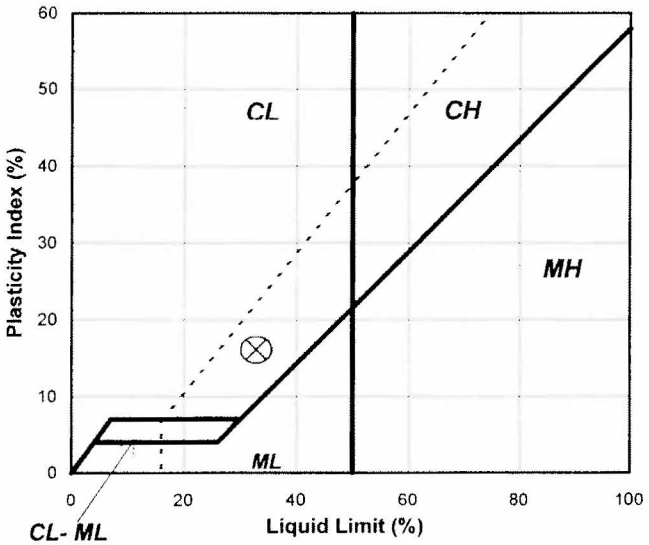
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**33**
Plastic Limit (%)	**17**
Plasticity Index (%)	**16**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 6/4/12 *Checked By* Jm *Date* 6-5-12

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INTEGRITY IN TESTING

ATTERBERG LIMITS

ASTM D 4318-10 / AASHTO T89 (SOP - S4A)

Client	URS CORPORATION	Boring No.	HB-5
Client Reference	AEP Big Sandy LF 13815141	Depth (ft)	6-8
Project No.	2012-245-01	Sample No.	NA
Lab ID	2012-245-01-27	Soil Description	**BROWN LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

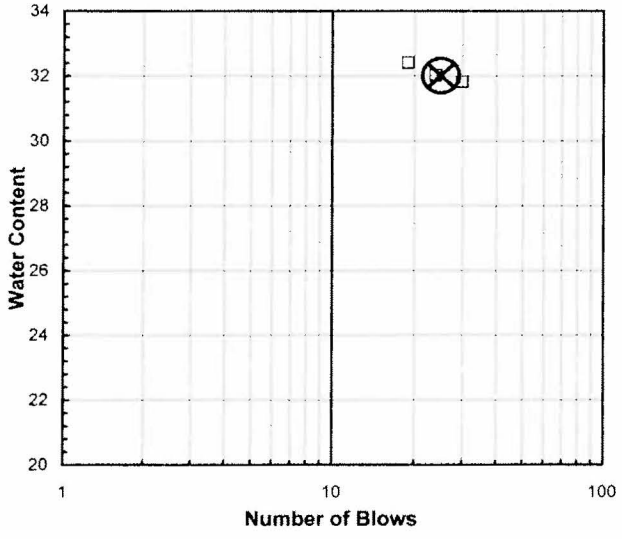
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	378	402	429	**U**
Wt. of Tare & WS (gm)	32.84	34.44	33.40	**L**
Wt. of Tare & DS (gm)	27.90	28.47	27.86	**T**
Wt. of Tare (gm)	12.37	9.82	10.76	**I**
Wt. of Water (gm)	4.9	6.0	5.5	**P**
Wt. of DS (gm)	15.5	18.7	17.1	**O**
				I
Moisture Content (%)	**31.8**	**32.0**	**32.4**	**N**
Number of Blows	**30**	**24**	**19**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	359	392	
Wt. of Tare & WS (gm)	19.36	20.82	
Wt. of Tare & DS (gm)	18.52	19.94	
Wt. of Tare (gm)	12.98	14.44	
Wt. of Water (gm)	0.8	0.9	
Wt. of DS (gm)	5.5	5.5	
Moisture Content (%)	**15.2**	**16.0**	**-0.8**

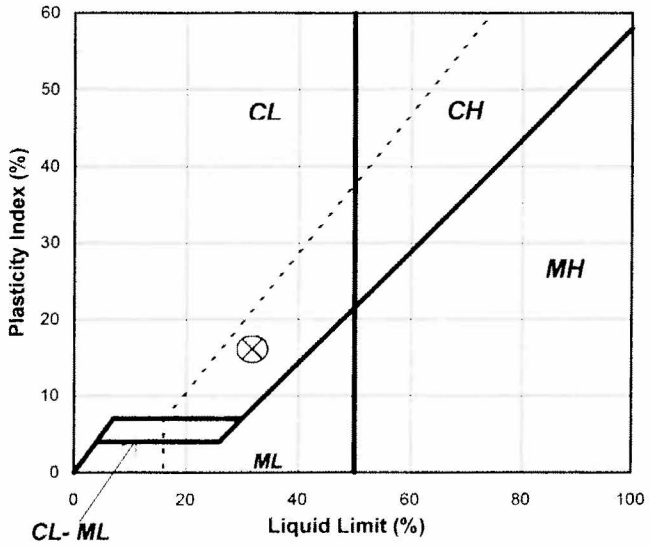
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**32**
Plastic Limit (%)	**16**
Plasticity Index (%)	**16**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By JW *Date* 6/4/12 *Checked By* [signature] *Date* 6-5-12