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Appendix A

INVESTIGATION OF POTENTIAL CLAY LINER BORROW SITE AT AMEREN CALLAWAY PLANT
Revised August 2013

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REITZ & JENS, INC.
CONSULTING ENGINEERS

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May 25, 2011

Mr. Kevin Gerhardt, P.E.
Ameren Missouri
3700 S Lindbergh Blvd., Mail Code F-604
St. Louis, Missouri 63127

RE: Report of Callaway Clay Borrow Site for
Labadie Plant Utility Waste Landfill
Franklin County, Missouri

Dear Mr. Gerhardt:

This report presents our findings and estimated quantity of available clay borrow based on the twelve (12) boring made at the Callaway borrow site. This borrow site is located in Callaway County approximately one mile east of the Callaway Power Plant on County Road 448 (see Figure 1). The purpose of these borings is to provide data on the subsurface conditions, which was used to quantify the clay borrow that could be used for the installation of clay liner and cover at the Labadie Plant Utility Waste Landfill.

Field Investigation

The borings were made at the approximate locations shown in Figure 1. The borings were located along existing gravel roads or existing farm roads so damage would be limited. The borings were located in the field using a hand-held GPS unit. The elevations at the borings were taken from GoogleEarth™ at the locations of the borings.

The borings were made on March 17 and 18, 2011, by Midwest Drilling, Inc. of Florissant, Missouri, under subcontract to Reitz & Jens. The borings were advanced using 4.25-in. outside diameter solid-stem continuous flight augers (CFA). The borings were drilled to termination depths ranging from 14 feet to 31 feet, with some borings terminating on intact bedrock. The borings were backfilled with cuttings, gravel, and Bentonite chips. The top 5 feet of each boring was backfilled with Bentonite chips to limit direct infiltration from the surface. Any remaining cuttings were mounded on the boring in anticipation of some subsequent settling.

Samples of subsurface soils were obtained at about 2.5-foot intervals in the top 10 feet, and at 5-foot intervals below 10 feet. Samples were taken using either: 1) a hydraulically pushed, 3-inch O.D., thin-wall Shelby tube sampler in general accordance with ASTM D1587 “Thin-Walled Tube Sampling for Geotechnical Purposes”; or 2) a 2-inch O.D., split-spoon sampler driven by an automatic SPT hammer in conjunction with a Standard Penetration Test, in general accordance with

ASTM D1586 “Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils”. The Shelby tube samples were trimmed and then sealed with a tight-fitting plastic cap and duct tape. Loose materials were removed from the upper end of the tube and the length of the recovered sample was measured. The top end of the tube was then sealed with a tight-fitting plastic cap and duct tape. The disturbed split-spoon samples obtained were visually classified in the field and sealed in glass jars to prevent loss of moisture, for later testing in the laboratory. The Shelby tubes were extruded in our lab immediately prior to testing.

The field investigation was completed under the direction of a Reitz & Jens geologist, with instructions from a geotechnical engineer, who determined the sampling intervals, termination depth, and logged the borings. The borings were logged in the field based upon cuttings, drilling characteristics and recovered samples. The boring logs were subsequently modified as appropriate based on laboratory test results. The boring logs are attached in Figure 2-1 through 2-12. The key and notes for the boring log are shown in Figure 2-0.

Ground water measurements were made during drilling, and some borings were left open to obtain a water measurement the following day. The ground water levels observed during drilling are only representative of the time during sampling. The ground water level will fluctuate with precipitation and seasonally. Water levels were as shallow as 8.5 feet in Boring B-5; but many of the borings were completely dry after drilling. This may be an indication of pockets of perched water.

Laboratory Testing

All recovered samples were visually described in general accordance with the ASTM procedures. Geotechnical soil tests performed included water content and density (ASTM D2216), Atterberg Limits (ASTM D4318), soil finer than the #200 sieve (ASTM D1140), and sieve size analysis of soil (ASTM D422). The results of these tests appear on the individual boring logs, and a summary of the data is shown in Figure 3. The sieve size analyses were performed on samples where more than 10% by weight was retained on the #200 sieve. The results of the sieve analyses are reported in Figures 4-1 through 4-21.

We collected the left-over materials from the Shelby tubes and produced two composite samples for further laboratory testing. The first composite contains silt and low plastic silty clay, and the second contained high plastic clay. Compaction tests were performed on both composites using the Standard Proctor procedure according to ASTM D698. The results are presented in Figures 5-1 and 5-2. Atterberg Limits were also performed and reported on Figures 5-1 and 5-2. A hydraulic conductivity test according to ASTM 5084 was completed using the silty clay Proctor point compacted nearest to 95% of the maximum dry unit weight and on the wet side of the optimum moisture content. This sample had a hydraulic conductivity of 1.1×10^{-8} cm/sec. This result is presented in Figure 6. The measured hydraulic conductivity is below the required 1×10^{-7} cm/sec, thus qualifying this material as liner quality clay. We expect clays with liquid limits greater than that tested (37%) and compacted to a similar degree would have hydraulic conductivities equal to or less than composite sample that was tested. This would qualify nearly all materials described in the boring logs as low plastic silty clay, low plastic clay, medium to high plastic clay, and high plastic clay without significant amounts of sand and gravel, as suitable for liner material.

Estimate of Available Clay Borrow

The potential borrow area was broken down into five smaller borrow areas denoted as "BA #" in Figure 1. Two of the borrow areas, BA-1 and BA-4, were split due to shallow rock and thin deposits of clay. These areas which have little to no available clay are denoted as BA-1A and BA-4A and were not included in our calculations.

The linear footage of liner quality clay in each boring was estimated using only clay with a liquid limit greater than 40 and which did not have a significant amount of sand and gravel. We judge that clays with these parameters will result in hydraulic conductivities of less than $1x10^{-7}$ cm/sec when compacted. The linear footage of liner quality clay is shown parentheses on Figure 1 next to the individual boring number. The calculation for the individual borrow areas is presented in Figure 7 (top). The total estimated amount of liner quality clay in all five borrow areas is roughly 4.4 million cubic yards. This calculation is based on the assumption that the borrow area is flat and that the clay extends horizontally throughout each borrow area. These assumptions were used because of the lack of topographic survey data and the limited number of borings.

A second calculation was made in the same manner as the first, but using all fine-grain soils (silts and low plastic clays) that did not have significant amounts of sand and gravel. The calculation for the individual borrow areas is presented in Figure 7 (bottom). The total estimated amount of fine-grain soil in all five borrow areas is roughly 5.6 million cubic yards. We believe that almost all of the fine-grain soil would be suitable for compacted clay liner, or the additional 1.2 million cubic yards would definitely be suitable for top cover.

Please let us know if you have any questions regarding this report. We appreciate this opportunity to continue our working relationship you and Ameren Missouri.

Sincerely,
REITZ & JENS, Inc.

Kyle E Kocher, P.E.
Project Engineer

Jeff L. Fouse, P.E.
Project Manager

The following figures are attached and complete this report:

Figure 1	Callaway Borrow Area
Figure 2-0	Key to Boring Logs
Figures 2-1 to 2-12	Log of Borings B-1 to B-12
Figure 3	Laboratory Test Summary
Figures 4-1 to 4-21	Sieve Analyses
Figures 5-1 and 5-2	Standard Proctors
Figure 6	Hydraulic Conductivity
Figure 7	Clay Volume Calculation

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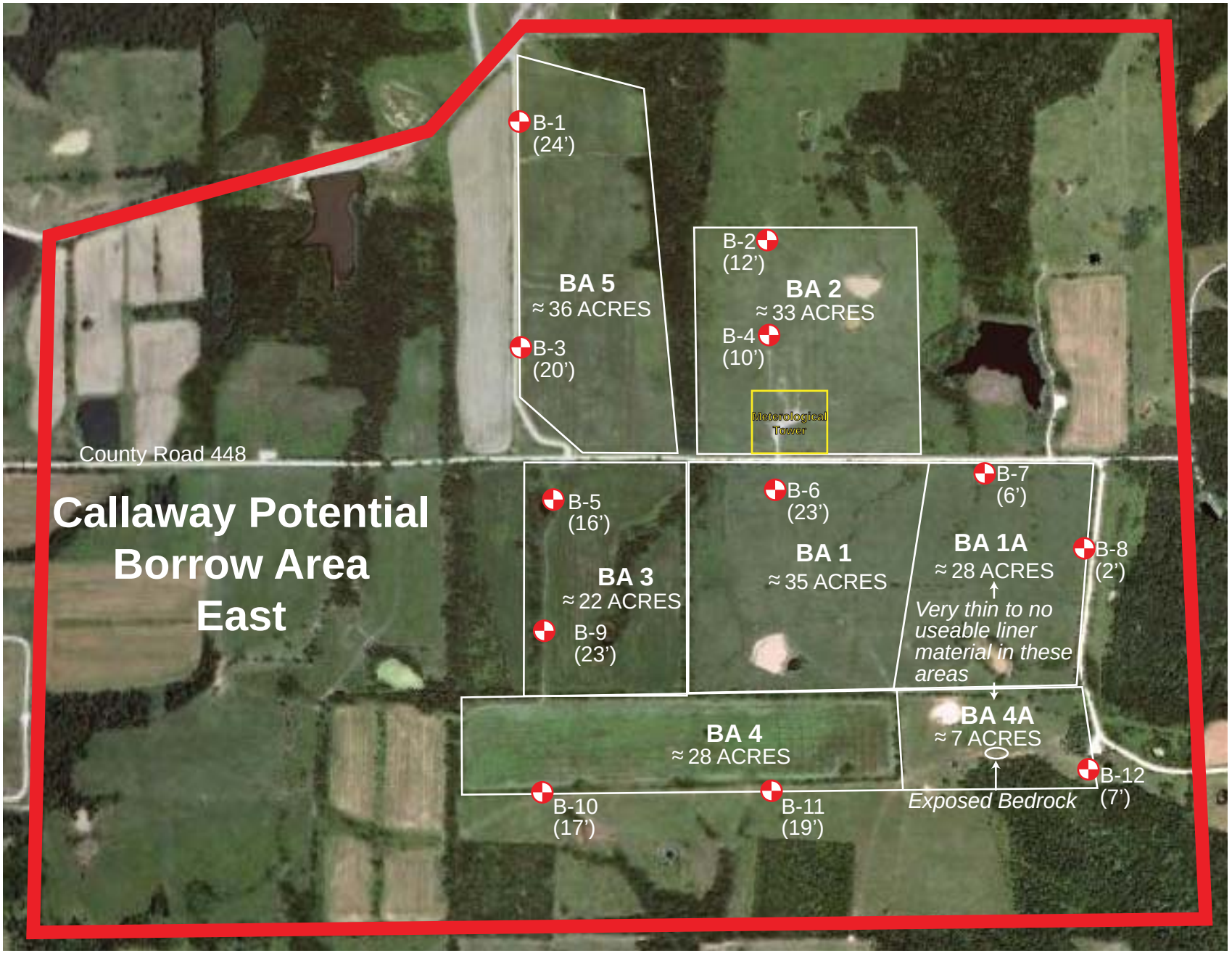


Callaway Borrow Area
Boring Number
(L.F. of liner quality clay)

KEY TO BORING LOGS

Symbol	Description
Strata symbols	
	Gravel frac
	Low-high plasticity clays
	Description not given for: "OZ"
	High plasticity clay
	Description not given for: "O:"
	Topsoil
	Description not given for: "O="
	Description not given for: "NR"
	Low plasticity clay
	Description not given for: "C-3"
	Silty sand
	Shale

Symbol	Description
	Description not given for: "OY"
	Description not given for: "LWU"
Misc. Symbols	
▲	Description not given for: "FTRANGLE"
■	Description not given for: "FSQUARE"
	Water table during drilling
	Water table at boring completion
Soil Samplers	
	Standard penetration test
	Undisturbed thin wall Shelby tube

Notes:

1. Exploratory borings were drilled on 03-17-11 using a 4-inch diameter continuous flight power auger.

2. No free water was encountered at the time of drilling or when re-checked the following day.

3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

REITZ & JENS, INC.
CONSULTING ENGINEERS

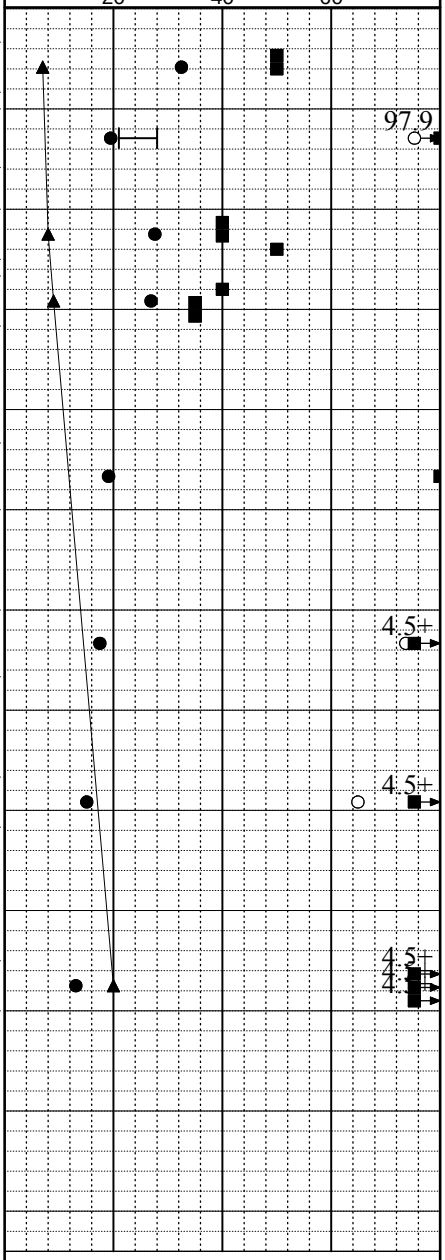
BORING LOG B-1

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1070025 E 1850593
ELEVATION: 821 DATUM:
DATE DRILLED: 03-17-11

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						8-inches of crushed limestone		
					78	CLAY (CL-CH), brown and gray, moderately plastic, slightly silty, stiff, moist	3-3-4	32.5
					95	Silty CLAY (CL-ML), brown and tan, with lignite and limonite, dry	110.5	19.5
	816							
6					100	CLAY (CH), light brown and gray, high plastic, moist, dry	3-3-5	27.6
					94	With trace fine sand and fine gravel	3-4-5	26.9
	810							
12					100	Becoming gray	110.3	19.1
	804							
18					100	With fine sand	113.2	17.5
	798				100	Becoming gray and orange brown, with medium to fine sand	117.7	15.1
24								
	792				100	Sandy CLAY (CH), golden brown, high plastic, fine grain sand, with silt lenses, very stiff	4-9-11	13.1
30						Boring terminated in sandy clay at 30'- 0" NOTE: Bulk sample taken at 13'-20'		
	786							
36								

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60



DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING ___ FEET
Y BORING DRY AT COMPLETION OF DRILLING
AT ___ FEET AFTER ___ HOURS
AT ___ FEET AFTER ___ HOURS

PIEZOMETER: INSTALLED AT ___ FEET

SCHEDULE CJG-ST1

Figure 2-1 Sheet 1 of 1

File: 2008012455

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG B-2

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1069272 E 1852010
ELEVATION: 813 DATUM:
DATE DRILLED: 03-17-11

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						5-inches of topsoil		
	810				83	Silty CLAY (CL), brown and gray, trace lignite and limonite, firm, moist	2-2-4	29.1
					92	Becoming dry	106.7	19.0
6								
					100	CLAY (CH), red-brown, high plastic, with lignite and limonite, stiff	3-3-5	21.5
	804				71	Becoming gray brown	102.9	22.8
12								
					100	With fine sand, trace medium sand	110.5	16.8
	798							
18					100	Highly weathered sandstone with chert gravel	50/3.5"	
	792					Boring terminated in weathered sandstone at 18'-9.5"		
						NOTE: Bulk sample taken 10'-13'		
24								
	786							
30								
	780							
36								

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60

94.0
88.8
4.5+
▲100+

DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING ___ FEET
Y BORING DRY AT COMPLETION OF DRILLING
AT ___ FEET AFTER ___ HOURS
AT ___ FEET AFTER ___ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

SCHEDULE CJG-ST1

Figure 2-2 Sheet 1 of 1

File: 2008012455

REITZ & JENS, INC.
CONSULTING ENGINEERS

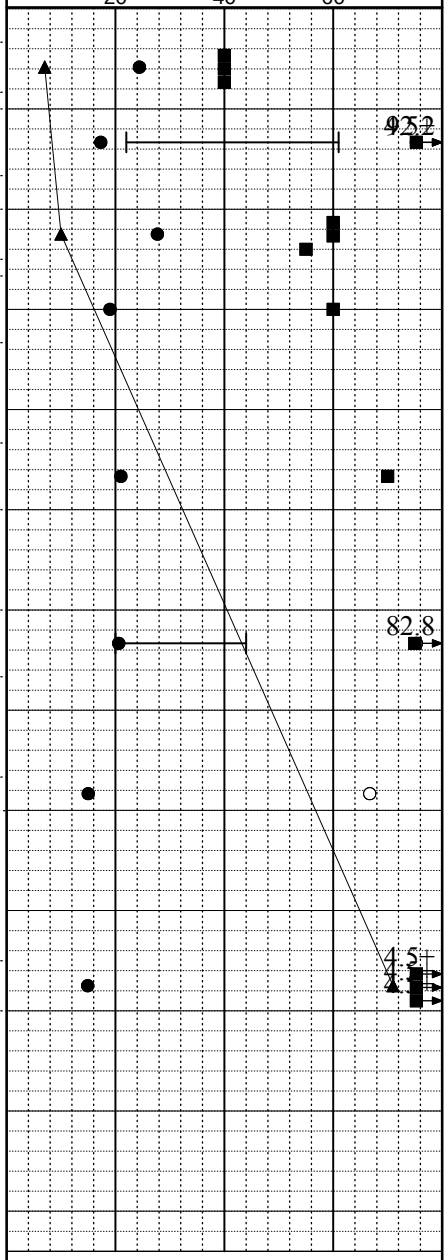
BORING LOG B-3

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1068835 E 1850564
ELEVATION: 822 DATUM:
DATE DRILLED: 03-17-11

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0	822					8-inches of gravel and topsoil		
					100	Silty CLAY (CL), brown and gray, trace lignite and limonite, stiff, moist	2-3-4	24.4
					100	CLAY (CH), brown and gray, high plastic, slightly silty, dry	107.3	17.3
6	816				100		3-4-6	27.7
					38	Becoming tannish gray	107.8	19.0
12	810				100		107.2	21.0
18	804				100	CLAY (CL), gray, with fine sand, trace fine gravel	107.4	20.6
					100	Becoming very sandy and gravelly	115.0	15.0
24	798					Shaley CLAY, golden, with chert gravel and rock residuum		
					100		17-32-39	14.9
30	792					Boring terminated in shaley clay at 30'- 0" NOTE: Bulk sample taken 1'-10'		
36	786							

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
▲ STANDARD PENETRATION TEST N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60



DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING ___ FEET
Y BORING DRY AT COMPLETION OF DRILLING
AT ___ FEET AFTER ___ HOURS
AT ___ FEET AFTER ___ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

SCHEDULE CJG-ST1

Figure 2-3 Sheet 1 of 1

File: 2008012455

REITZ & JENS, INC.
CONSULTING ENGINEERS

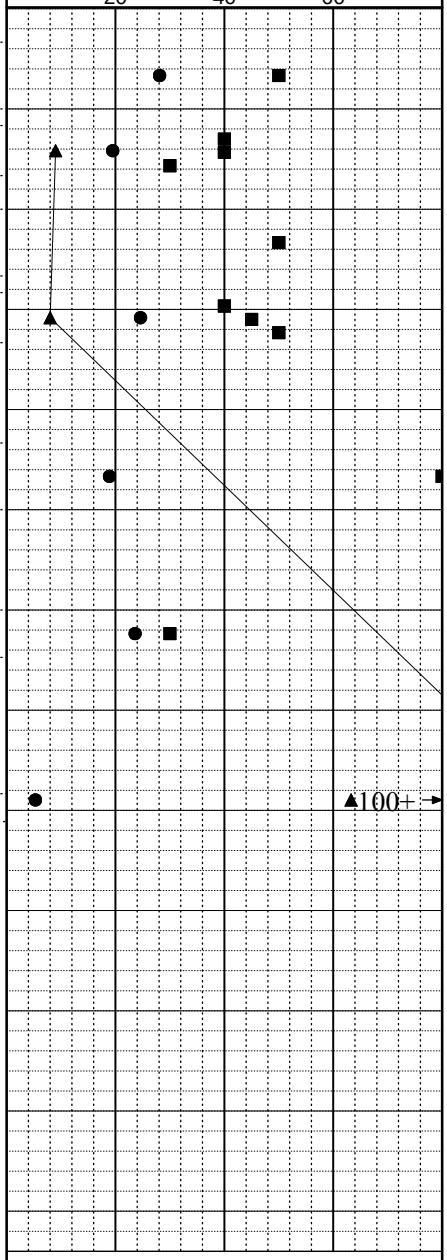
BORING LOG B-4

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1068562 E 1852007
ELEVATION: 821 DATUM:
DATE DRILLED: 03-17-11

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						5-inches of topsoil		
					92	Silty CLAY (CL), gray-brown, with lignite and limonite, stiff, moist	95.6	28.1
	816				100	Becoming dry	4-4-5	19.5
6					21	No recovery		
					100	CLAY (CH), gray and golden, high plastic	2-3-5	24.6
	810							
12					100	With sand and trace fine gravel	111.4	18.9
	804							
18					100	Silty SAND (SM), golden and gray, trace clay, with layers of clayey silt, dry, hard	100.2	23.6
						Shale, maroon		
	798							
24					100	Boring terminated in shale at 24'-0" NOTE: Bulk sample taken 15'-24'	50/4.5"	5.3
	792							
30								
	786							
36								

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60



DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING ___ FEET
Y BORING DRY AT COMPLETION OF DRILLING
AT ___ FEET AFTER ___ HOURS
AT ___ FEET AFTER ___ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

SCHEDULE CJG-ST1

Figure 2-4 Sheet 1 of 1

File: 2008012455

REITZ & JENS, INC.
CONSULTING ENGINEERS

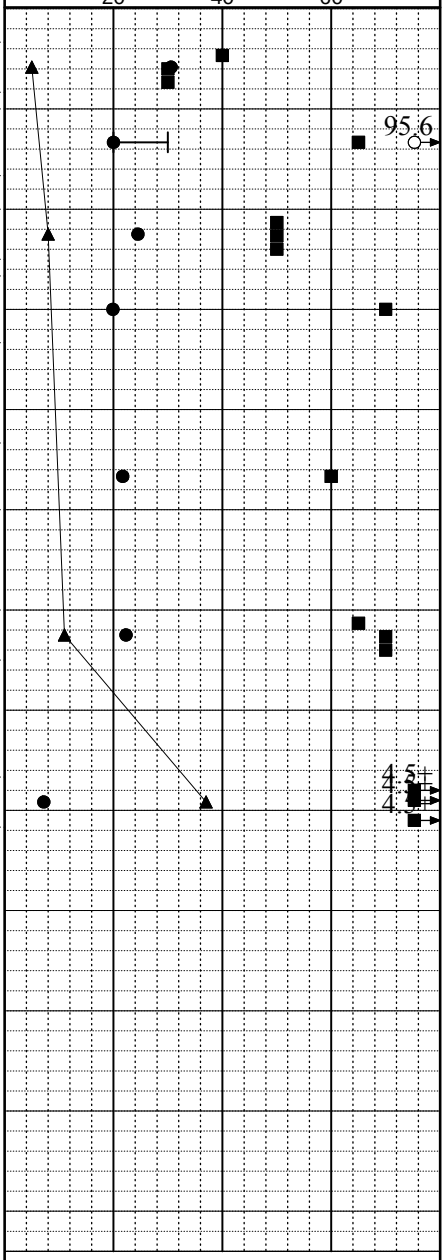
BORING LOG B-5

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1068017 E 1850704
ELEVATION: 823 DATUM:
DATE DRILLED: 03-17-11

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0	822					2-inches of topsoil		
					94	Silty CLAY (CL), gray-brown, firm, moist	2-2-3	30.6
					100	With lignite and limonite	108.2	20.0
6	816				100	CLAY (CH), gray and golden, high plastic, stiff, dry	3-3-5	24.5
					100		108.6	19.9
12	810				92		106.0	21.7
18	804				100	With fine sand	3-4-7	22.3
						Weathered shale with sandstone and siltstone gravel, hard, dry		
24	798				89		4-13-24	7.2
						Boring terminated in weathered shale at 24'-6"		
						NOTE: Bulk sample taken 15'-18.5'		
30	792							
36	786							

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60



DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING 22 FEET
N BORING DRY AT COMPLETION OF DRILLING
AT 8.5 FEET AFTER 24 HOURS
AT ____ FEET AFTER ____ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

SCHEDULE CJG-ST1

File: 2008012455

Figure 2-5 Sheet 1 of 1

REITZ & JENS, INC.
CONSULTING ENGINEERS

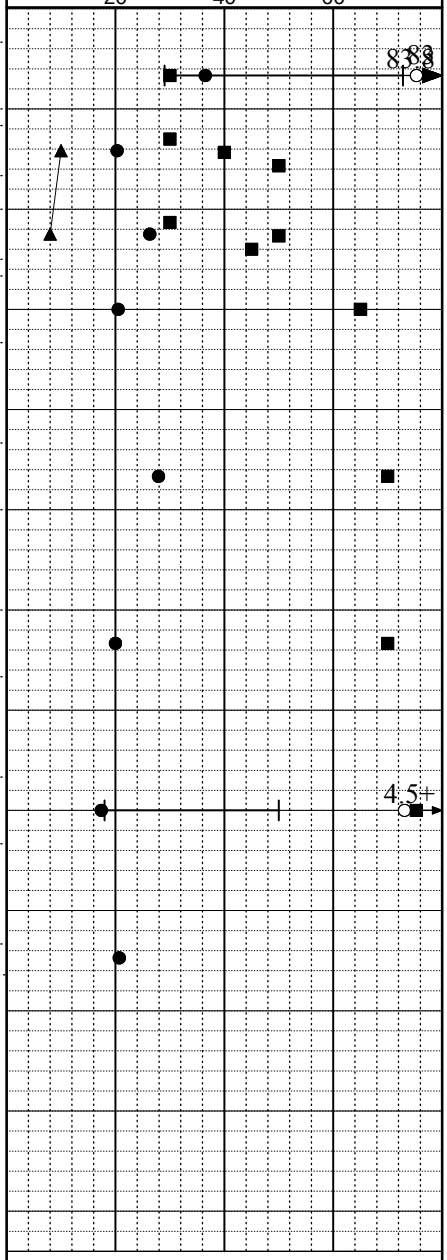
BORING LOG B-6

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1067907 E 1852069
ELEVATION: 822 DATUM:
DATE DRILLED: 03-18-11

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0	822					4-inches of topsoil		
					46	CLAY (CH), golden and red-brown, high plastic, with fine sand, stiff, moist	85.1	36.5
					100	Silty CLAY (CL), gray-brown, with lignite	2-5-5	20.3
6	816				100	CLAY (CH), gray-brown, high plastic, dry	2-4-4	26.3
					100		108.8	20.5
12	810				100		95.5	27.9
18	804				100		110.9	20.0
24	798				100	With fine sand, dry	114.8	17.4
		▽			100	With fine gravel	103.7	20.7
30	792					Boring terminated at tube refusal on rock at 28'-10" NOTE: Bulk sample taken 10'-13.5'		
36	786							

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60



DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING 28.5 FEET
N BORING DRY AT COMPLETION OF DRILLING
AT ____ FEET AFTER ____ HOURS
AT ____ FEET AFTER ____ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

SCHEDULE CJG-ST1

File: 2008012455

REITZ & JENS, INC.
CONSULTING ENGINEERS

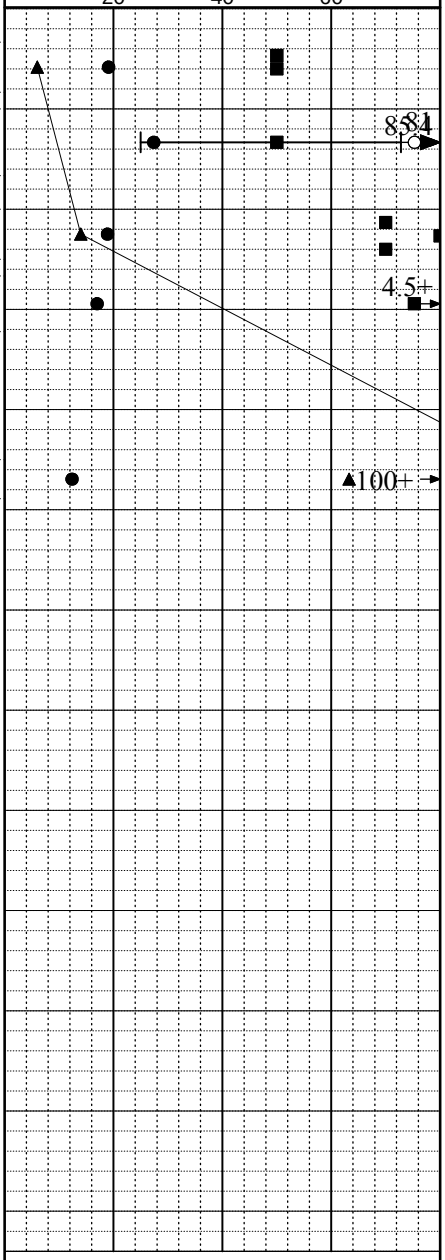
BORING LOG B-7

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1068084 E 1852942
ELEVATION: 809 DATUM:
DATE DRILLED: 03-18-11

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						7.5-inches of crushed limestone		
					83	Silty CLAY (CL), gray-brown, firm, dry	3-3-3	19.1
						CLAY (CH), gray and tan, trace fine sand		
					67		95.6	27.4
	804							
6					100	Becoming golden, trace fine gravel, dry, very stiff	3-6-8	18.9
					80	Shaley CLAY (CH), golden and maroon, with chert gravel	121.0	17.0
	798							
12					100		17-50/5.5"	12.4
						Boring terminated at auger refusal on limestone at 15'-0"		
						NOTE: Bulk sample taken 10'-13.5'		
	792							
18								
	786							
24								
	780							
30								
	774							
36								

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60



DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING ___ FEET
Y BORING DRY AT COMPLETION OF DRILLING
AT ___ FEET AFTER ___ HOURS
AT ___ FEET AFTER ___ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

File: 2008012455

SCHEDULE CJG-ST1
Figure 2-7 Sheet 1 of 1

REITZ & JENS, INC.
CONSULTING ENGINEERS

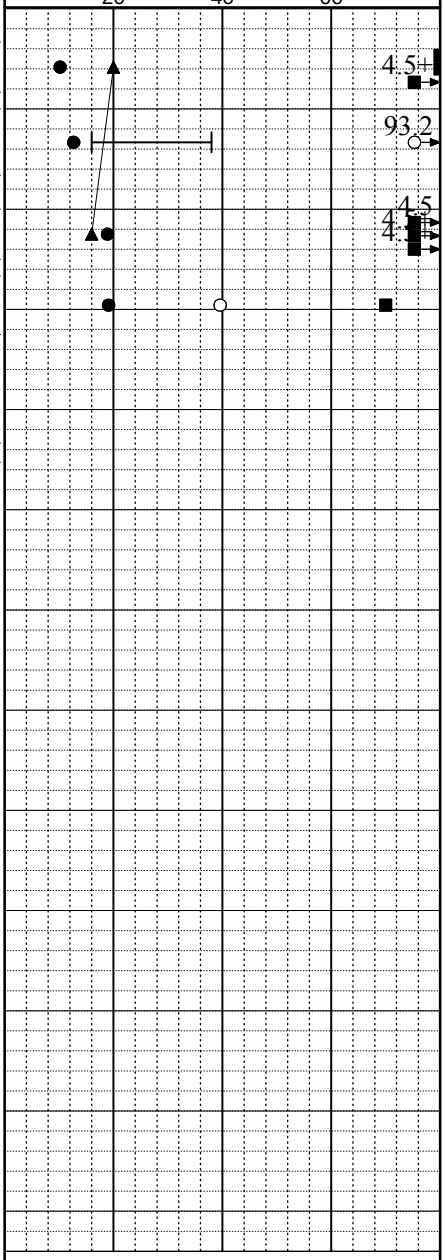
BORING LOG B-8

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1067429 E 1853784
ELEVATION: 816 DATUM:
DATE DRILLED: 03-18-11

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0	816					5-inches of crushed limestone		
					83	Silty CLAY (CL), gray-brown, very stiff, dry	3-6-14	10.2
					54		106.8	12.7
6	810				89	CLAY (CH), golden and gray, high plastic, with fine gravel	4-6-10	18.9
					86	Gravelly CLAY (GC), brown and tan, high plastic, coarse to fine gravel, with fine sand	100.4	19.1
12	804				100	No recovery From 14.5' to 15.5' heavy rocky drilling		
18	798					Boring terminated at auger refusal on limestone at 17'-0" NOTE: Bulk sample taken 1'-15'		
24	792							
30	786							
36	780							



DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING ___ FEET
Y BORING DRY AT COMPLETION OF DRILLING
AT ___ FEET AFTER ___ HOURS
AT ___ FEET AFTER ___ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

SCHEDULE CJG-ST1

Figure 2-8 Sheet 1 of 1

File: 2008012455

REITZ & JENS, INC.
CONSULTING ENGINEERS

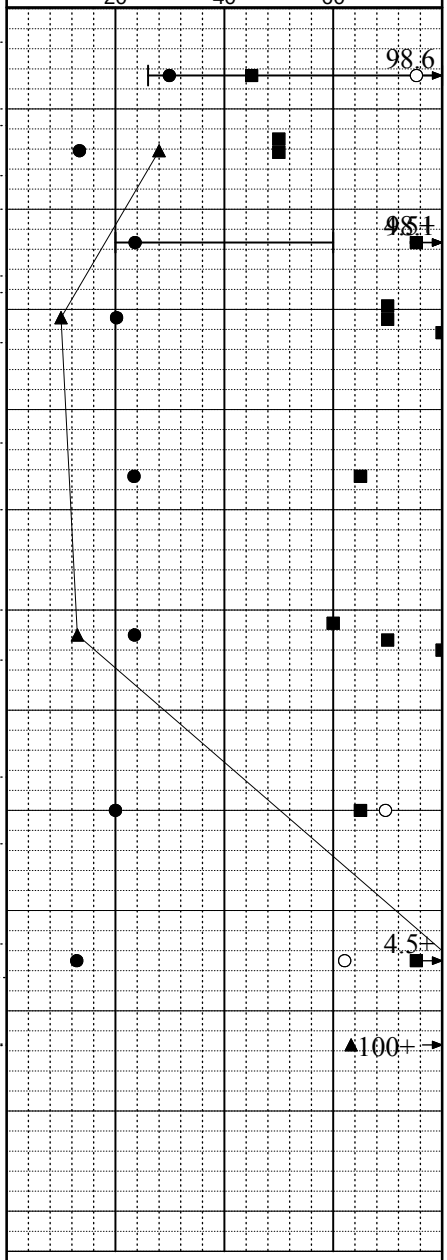
BORING LOG B-9

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1067143 E 1850654
ELEVATION: 834 DATUM:
DATE DRILLED: 03-17-11

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0	834					CLAY (CH), reddish brown and gray, high plastic, with lignite and limonite, moist		
					58		91.0	29.9
					100	Silty CLAY (CL), gray brown, dry, hard	5-12-16	13.4
6	828				100		100.0	23.6
						CLAY (CH), brown and gray, high plastic, slightly silty, stiff		
					100		4-4-6	20.2
12	822				100		104.3	23.4
18	816				100	Becoming golden	3-5-8	23.5
24	810				100	With fine to medium sand	109.3	20.0
					100	Shaley CLAY (CH), brown gray and purple, with weathered limestone, with fine to medium sand	125.9	12.9
30	804				100	Boring terminated at auger refusal on limestone at 31'-1" NOTE: Bulk sample taken 10'-13'	50/.5"	
36	798							

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60



DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING 31 FEET
N BORING DRY AT COMPLETION OF DRILLING
AT 11.1 FEET AFTER 24 HOURS
AT ____ FEET AFTER ____ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

SCHEDULE CJG-ST1

Figure 2-9 Sheet 1 of 1

File: 2008012455

REITZ & JENS, INC.
CONSULTING ENGINEERS

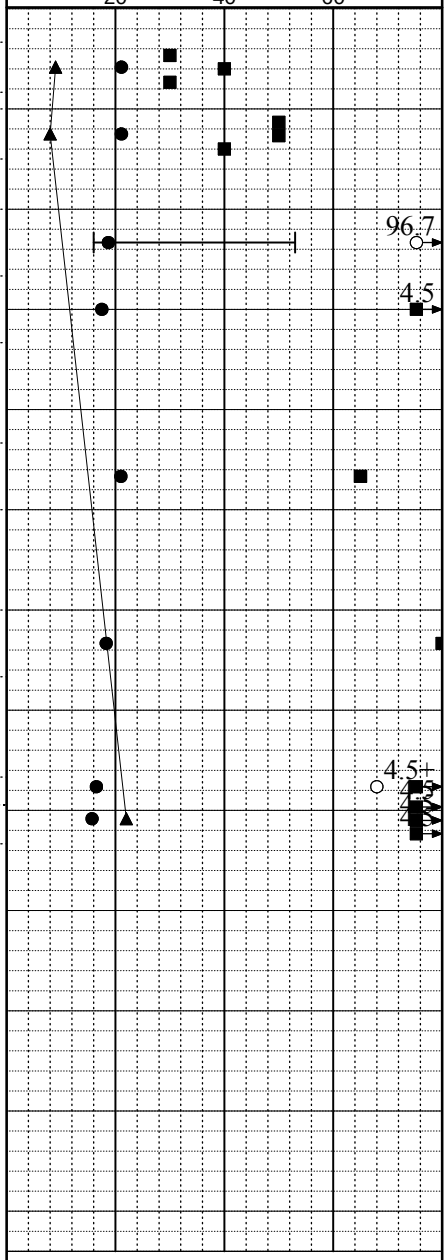
BORING LOG B-10

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1066225 E 1850478
ELEVATION: 833 DATUM:
DATE DRILLED: 03-17-11

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						4-inches of topsoil		
					100	Silty CLAY (CL), brown and tan, with lignite and limonite, moist, stiff	2-4-5	21.1
					100		3-3-5	21.1
	828					CLAY (CH), gray and tan, high plastic, dry		
6					100		107.5	18.7
					100	Becoming golden	113.0	17.5
	822							
12					100	Becoming gray	105.7	21.0
	816	▽						
18					100	Becoming orangish brown, trace fine sand	112.9	18.3
	810	▽			100	Gravelly drilling at 22.5'	116.0	16.5
24					100	With fine to medium sand With fine gravel, very stiff	7-9-13	15.7
						Boring terminated in high plastic clay at 25'-0" NOTE: Bulk sample taken 15'-18.5'		
	804							
30								
	798							
36								

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60



DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING 23.5 FEET
N BORING DRY AT COMPLETION OF DRILLING
AT 16.5 FEET AFTER 18 HOURS
AT ____ FEET AFTER ____ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

SCHEDULE CJG-ST1

Figure 2-10 Sheet 1 of 1

File: 2008012455

REITZ & JENS, INC.
CONSULTING ENGINEERS

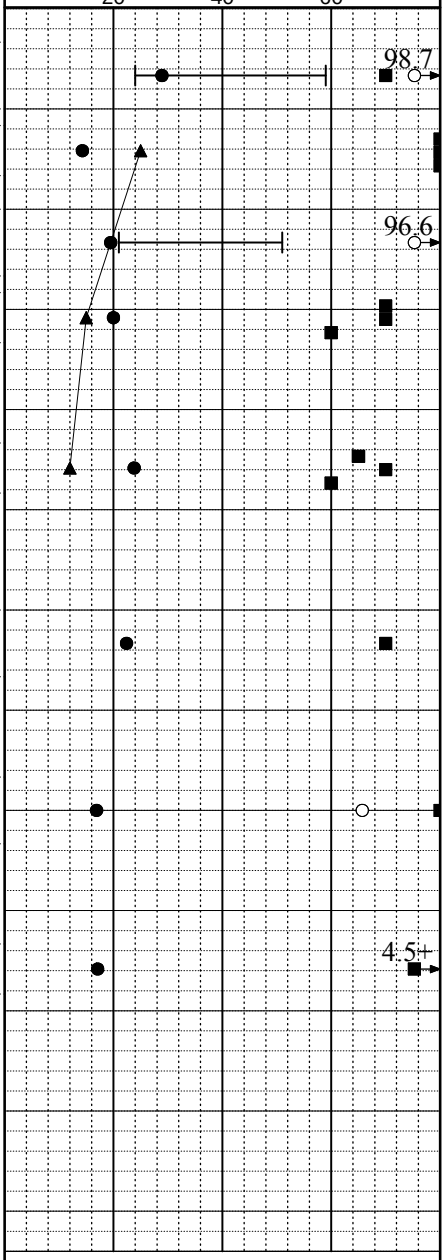
BORING LOG B-11

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1066268 E 1852244
ELEVATION: 836 DATUM:
DATE DRILLED: 03-17-11

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						6-inches of topsoil		
	834				100	CLAY (CH), gray and reddish brown, high plastic, silty, moist	95.2	28.9
					100	Silty CLAY (CL), gray-brown, dry, hard	5-10-15	14.3
6					50	CLAY (CH), tan and gray, high plastic, very stiff	101.0	19.5
	828							
					100	Becoming gray	3-6-9	20.0
12								
	822				100	Becoming gray red-brown and golden, trace fine gravel	3-5-7	23.8
18								
					100	Becoming gray-tan	105.1	22.4
	816							
24					100	Sandy CLAY (CH), tan gray and orangish brown, fine to medium grain sand	117.4	16.9
	810							
					100		116.4	17.1
30						Boring terminated in sandy clay at 29'- 6" NOTE: Bulk sample taken 10'-13.5'		
	804							
36								

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60



DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING ___ FEET
Y BORING DRY AT COMPLETION OF DRILLING
AT ___ FEET AFTER ___ HOURS
AT ___ FEET AFTER ___ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

SCHEDULE CJG-ST1

File: 2008012455

REITZ & JENS, INC.
CONSULTING ENGINEERS

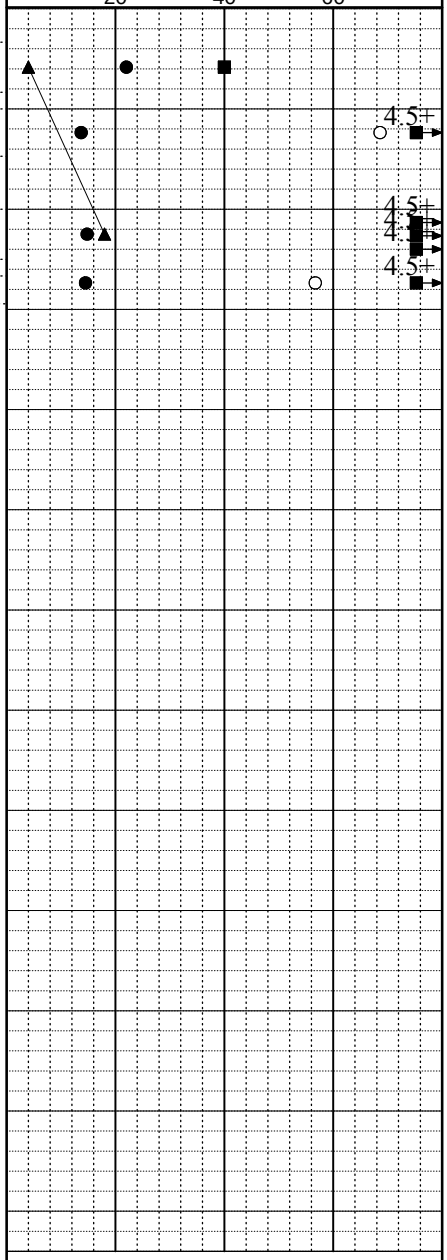
BORING LOG B-12

Labadie Plant Utility Waste Landfill
Potential Clay Borrow at Callaway Plant
CLIENT: **Ameren Missouri**

LOCATION: N 1066354 E 1853688
ELEVATION: 812 DATUM:
DATE DRILLED: 03-17-11

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						1-inch of topsoil		
	810				33	CLAY (CH), brown and gray, high plastic, slightly silty, firm, moist	1-2-2	22.0
					100	With fine to medium sand, dry	116.2	13.7
6						Trace weathered limestone, very stiff		
					89		5-8-10	14.8
	804				100	Sandy CLAY (CH), brown tan gray and orange-brown, high plastic, fine to medium grain sand, with fine to coarse gravel	115.0	14.5
12						Becoming very rocky drilling below 11.5'		
	798					Weathered limestone		
						Boring terminated at auger refusal on limestone at 14'-0" NOTE: Bulk sample taken 6'-14'		
18								
	792							
24								
	786							
30								
	780							
36								

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (SILTS & CLAYS)
PL LL
20 40 60



DRILLER: Midwest Drilling
METHOD: 4.25" CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. David

STRATIFICATION LINES ARE APPROXIMATE SOIL BOUNDARIES ONLY; ACTUAL CHANGES MAY BE GRADUAL OR MAY OCCUR BETWEEN SAMPLES.

WATER LEVELS: DURING DRILLING ___ FEET
Y BORING DRY AT COMPLETION OF DRILLING
AT ___ FEET AFTER ___ HOURS
AT ___ FEET AFTER ___ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

SCHEDULE CJG-ST1

File: 2008012455

Figure 2-12 Sheet 1 of 1

LABORATORY TEST SUMMARY

Client: Ameren Missouri
Project: Labadie UWL
Location: Callaway Borrow Site

Sample Identification				Index Properties							
Boring Number	Sample Number	Depth (ft)	Sample Recovery (inches)	Visual Classification ASTM D2488	Water Content (%) ASTM D2216	Dry Density (pcf)	Liquid Limit ASTM D4318	Plastic Limit ASTM D4318	#200 Wash (Fines Content %) ASTM D2488 If greater than 10% remains on #200 sieve, dry shake with full nest of sieves	Penetrometer (tsf)	Remarks
B-1	SPT-1	1-2.5	14	CL-CH	32.5					2.5	
B-1	ST-2	3-5	20	CL-ML	19.5	110.5	28	21	97.9	4.0	
B-1	SPT-3	6-7.5	18	CH	27.7					2.2	
B-1	SPT-4	8-10	17	CH	26.9					1.8	
B-1	BULK	13-20		CH			69	22	95.7		
B-1	ST-5	13-15	24	CH	19.1	110.3				4.0	
B-1	ST-6	18-20	24	CH, sandy	17.5	113.2			Figure 4-1	4.5+	
B-1	ST-7	23-25	24	CH, sandy	15.1	117.7			Figure 4-2	4.5+	
B-1	SPT-8	28.5-30	18	CH, sandy	13.1					4.5+	
B-2	SPT-1	1-2.5	15	CL, silty	29.1					1.7	
B-2	ST-2	3-5	22	CL, silty	19.0	106.7	32	19	94.0	2.5	
B-2	SPT-3	6-7.5	18	CH	31.5					3.0	
B-2	ST-4	8-10	17	CH	50.6	83.9				3.5	
B-2	BULK	10-13		CH, trace sand			78	22	Figure 4-3		
B-2	ST-5	13-15	24	CH, sandy	16.8	110.5			Figure 4-4	4.5+	Bent Tube
B-2	SPT-6	18.5-20	1.5	Weathered rock							
B-3	SPT-1	1-2.5	18	CL, silty	24.4					2.0	
B-3	ST-2	3-5	24	CH	17.3	107.3	61	22	92.2	4.5+	
B-3	SPT-3	6-7.5	18	CH	27.7					2.9	
B-3	ST-4	8-10	9	CH	19.0	107.8				3.0	
B-3	BULK	1-10		CH			101	33	97.8		
B-3	ST-5	13-15	24	CH	21.0	107.2				3.5	
B-3	ST-6	18-20	24	CL, sandy, trace gravel	20.6	107.4	44	20	Figure 4-5	3.8	
B-3	ST-7	23-25	18	CL, sandy, gravelly	15.0	115.0			Figure 4-6		
B-3	SPT-8	28.5-30	18	Shaley clay	14.9					4.5+	
B-4	ST-1	1-3	22	CL, silty	28.1	95.6				2.5	
B-4	SPT-2	3.5-5	18	CL, silty	19.5					1.8	
B-4	ST-3	6-8	5	CL, silty						2.5	Sample was all fall in, no virgin material
B-4	SPT-4	8.5-10	18	CH	24.7					2.3	
B-4	ST-5	13-15	24	CH, sandy, trace gravel	18.9	111.4				4.0	
B-4	BULK	15-24		CH, sandy			56	21	Figure 4-7		
B-4	ST-6	18-20	21	SM	23.6	100.2				1.5	Not acceptable liner material
B-4	SPT-7	23.5-24	4.5	SHALE	5.3						
B-5	SPT-1	1-2.5	17	CL, silty	30.6					1.7	
B-5	ST-2	3-5	24	CL, silty	20.0	108.2	30	20	95.6	3.3	
B-5	SPT-3	6-7.5	18	CH	24.5					2.5	
B-5	ST-4	8-10	24	CH	19.9	108.6				3.5	
B-5	ST-5	13-15	22	CH	21.7	106.0				3.0	
B-5	BULK	15-18		CH			67	21	93.3		
B-5	SPT-6	18-19.5	18	CH, sandy	22.3					3.4	
B-5	SPT-7	23-24.5	16	Weathered rock	7.2					4.5+	
B-6	ST-1	1-3	11	CH, sandy	36.5	85.1	83	29	Figure 4-8	1.5	
B-6	SPT-2	3.5-5	18	CL	20.3					2.0	
B-6	SPT-3	6-7.5	18	CH	26.3					2.1	
B-6	ST-4	8-10	24	CH	20.5	108.8				3.3	
B-6	BULK	10-13		CH			86	22	96.5		
B-6	ST-5	13-15	24	CH	27.9	95.5				3.5	
B-6	ST-6	18-20	24	CH	20.0	110.9				3.5	
B-6	ST-7	23-25	24	CH, sandy	17.5	114.8	50	18	Figure 4-9	4.5+	
B-6	ST-8	28-30	10	CH, sandy, gravelly	20.7	103.7					Bent Tube

Figure 3
SCHEDULE CJG-ST1

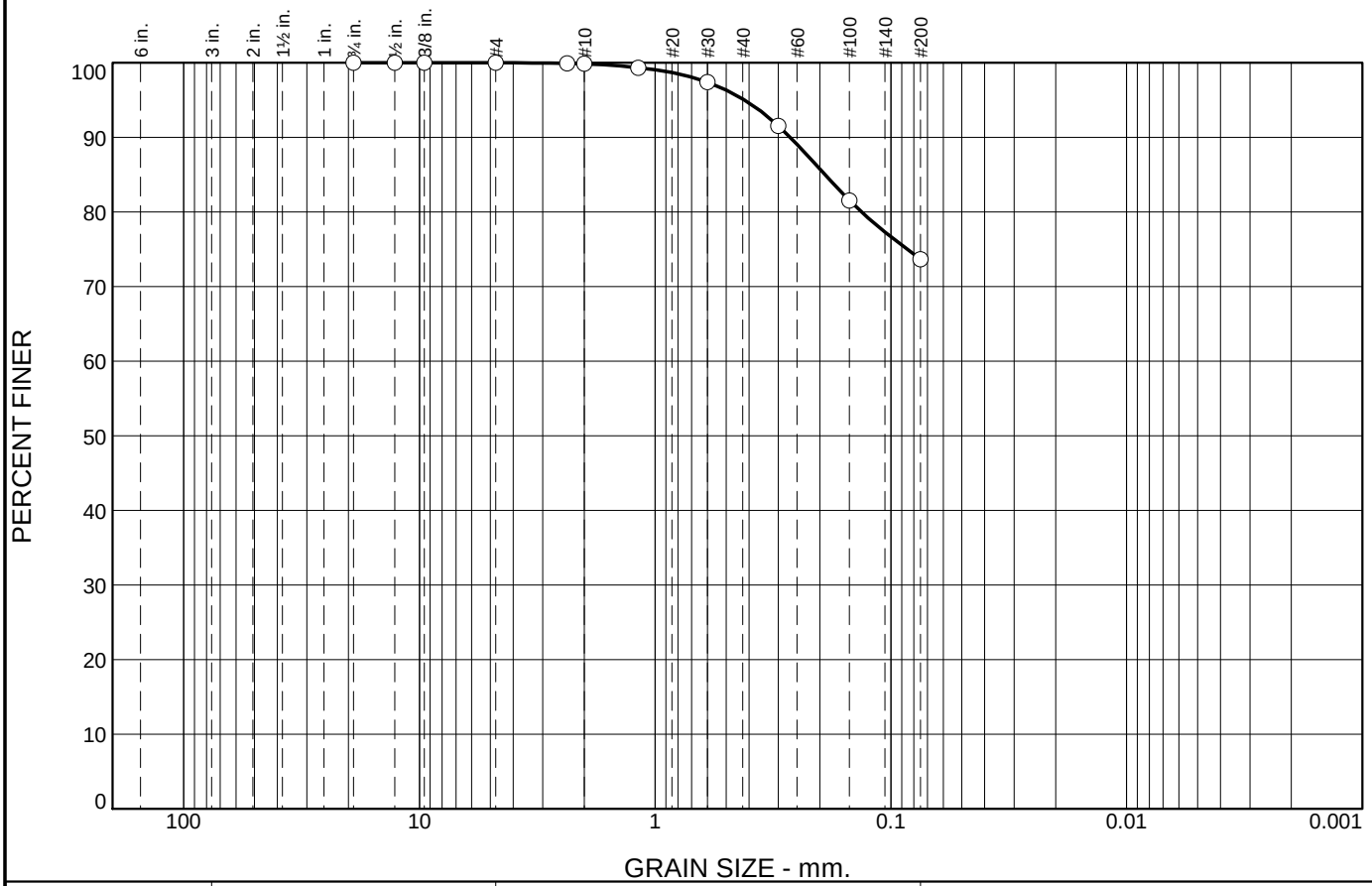
LABORATORY TEST SUMMARY

Client: Ameren Missouri
Project: Labadie UWL
Location: Callaway Borrow Site

Sample Identification				Index Properties							
Boring Number	Sample Number	Depth (ft)	Sample Recovery (inches)	Visual Classification ASTM D2488	Water Content (%) ASTM D2216	Dry Density (pcf)	Liquid Limit ASTM D4318	Plastic Limit ASTM D4318	#200 Wash (Fines Content %) ASTM D2488 If greater than 10% remains on #200 sieve, dry shake with full nest of sieves	Penetrometer (tsf)	Remarks
B-7	SPT-1	1-2.5	15	CL, silty	19.2					2.5	
B-7	ST-2	3-5	16	CH, trace sand	27.4	95.6	81	25	Figure 4-10	2.5	
B-7	SPT3	6-7.5	18	CH, trace sand & gravel	19.0					3.7	
B-7	ST-4	8-10	16	Shaley clay	17.0	121.0				4.5+	
B-7	BULK	8-15		CH, sandy, trace gravel			54	20	Figure 4-11		
B-7	SPT-5	13.5-15	14	Shaley clay	12.4						
B-8	SPT-1	1-2.5	15	CL, silty	10.2					4.2	
B-8	ST-2	3-5	13	CL, silty	12.7	106.8	38	16	93.2		
B-8	SPT-3	6-7.5	16	CH, sandy, gravelly	18.9					4.5+	
B-8	ST-4	8-10	18	GC, sandy	19.1	100.4			Figure 4-12	3.5	
B-8	BULK	1-15		CH, sandy			52	17	Figure 4-13		
B-8	ST-5	13-15	9	GC, sandy							Bent Tube, All Fall-in
B-9	ST-1	1-3	14	CH	29.9	91.0	80	26	99.9	2.3	
B-9	SPT-2	3.5-5	18	CL, silty	13.4					2.5	
B-9	ST-3	6-8	24	CL, silty	19.7	100.0	60	20	98.1	4.5+	
B-9	SPT-4	8.5-10	18	CH	20.2					3.7	
B-9	BULK	10-13		CH			52	18	95.7		
B-9	ST-5	13-15	24	CH	23.4	104.3				3.3	
B-9	SPT-6	18-19.5	18	CH	23.5					3.5	
B-9	ST-7	23-25	24	CH, sandy	20.0	109.3			Figure 4-14	3.3	
B-9	ST-8	28-30	15	Shaley clay, sandy	12.9	125.9			Figure 4-15	4.5+	Bent Tube
B-9	SPT-9	31-32.5	0.5	Limestone							
B-10	SPT-1	1-2.5	18	CL, silty	21.1					1.7	
B-10	SPT-2	3-4.5	18	CL, silty	21.1					2.3	
B-10	ST-3	6-8	24	CH	18.7	107.5	53	16	96.7		
B-10	ST-4	8-10	24	CH	17.5	113.0				4.5	
B-10	ST-5	13-15	24	CH	21.0	105.7				3.3	
B-10	BULK	15-18		CH, sandy			65	18	Figure 4-16		
B-10	ST-6	18-20	24	CH, trace sand	18.3	112.9				4.0	
B-10	ST-7	23-23.6	7	CH, sandy	16.5	116.0			Figure 4-17	4.5+	Bent Tube
B-10	SPT-8	23.6-25.1	18	CH, sandy, gravelly	15.7					4.5	
B-11	ST-1	1-3	24	CH	28.9	95.2	59	24	98.7	3.5	
B-11	SPT-2	3.5-5	18	CL, silty	14.3					4.0	
B-11	ST-3	6-8	12	CH	19.5	101.0	51	21	96.5		
B-11	SPT-4	8.5-10	18	CH	20.0					3.3	
B-11	BULK	10-13		CH			63	16	98.5		
B-11	SPT-5	13-15	18	CH, trace gravel	23.8					3.3	
B-11	ST-6	18-20	24	CH	22.4	105.1				3.5	
B-11	ST-7	23-25	24	CH, sandy	16.9	117.4			Figure 4-18	4.0	
B-11	ST-8	28-29.5	18	CH, sandy	17.1	116.4				4.5+	
B-12	SPT-1	1-2.5	6	CH	22.0					2.0	
B-12	BULK	2.5-10		CH, sandy			74	22	Figure 4-19		
B-12	ST-2	3-5	18	CH, sandy	13.7	116.2			Figure 4-20	4.5+	
B-12	SPT-3	6-7.5	16	CH, sandy, trace gravel	14.8					4.5+	
B-12	ST-4	8-10	10	CH, sandy, gravelly	14.5	115.0			Figure 4-21	4.5+	

Figure 3
SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	4.8	21.4	73.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#8	99.9		
#10	99.9		
#16	99.3		
#30	97.4		
#50	91.5		
#100	81.6		
#200	73.7		

* (no specification provided)

Material Description

CLAY (CH), gray and orangish brown, high plastic, with fine sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 0.1902 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Pruett/C. Cook

Remarks

Sample No.: ST-6 **Source of Sample:** B-1 **Date Sampled:**
Location: **Elev./Depth:** 18
Checked By: K. Kocher **Title:** Engineer

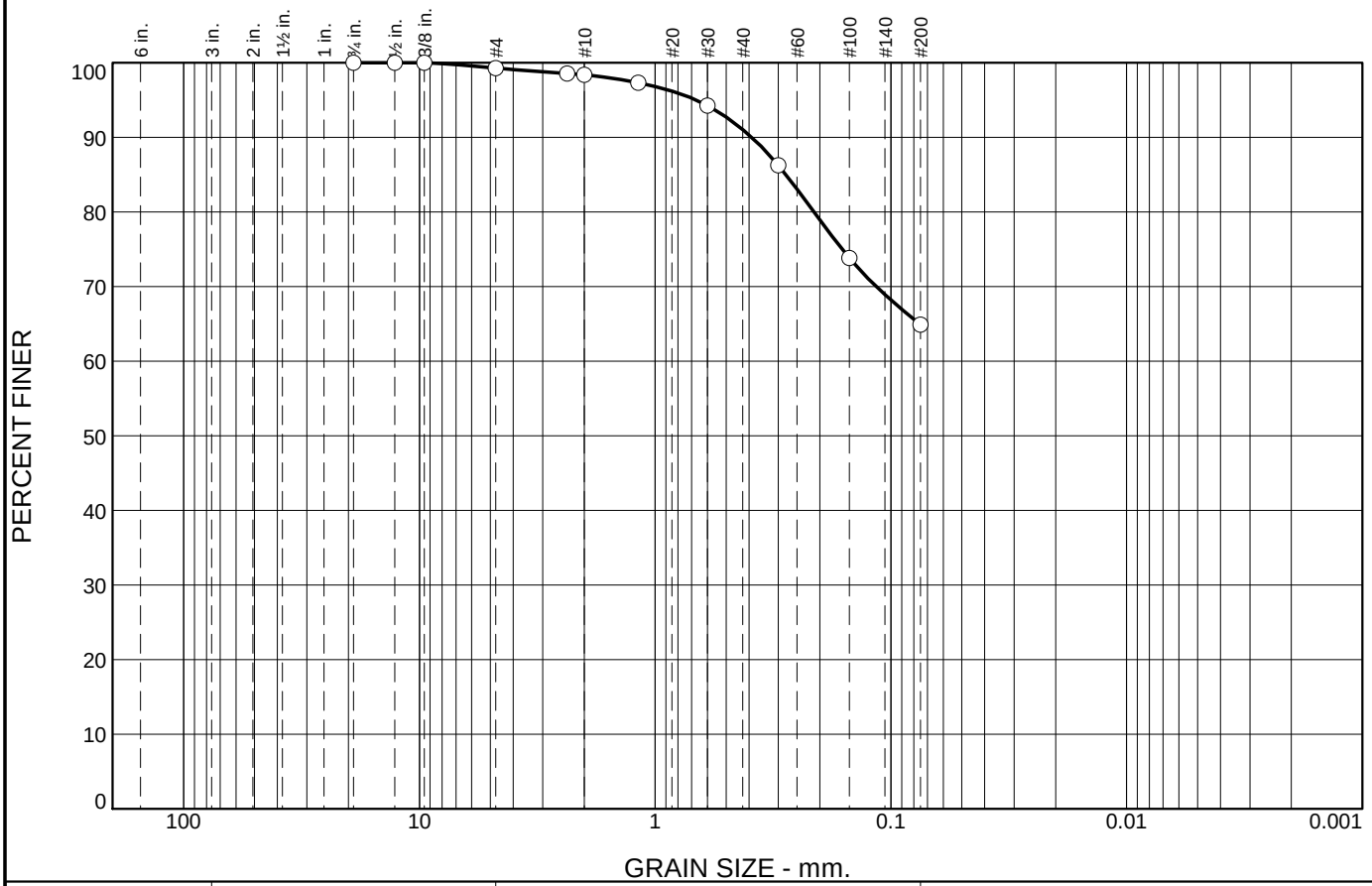
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-1

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	0.9	7.4	26.1	64.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	99.3		
#8	98.6		
#10	98.4		
#16	97.3		
#30	94.3		
#50	86.2		
#100	73.8		
#200	64.9		

* (no specification provided)

Material Description

CLAY (CH), gray and orangish brown, high plastic, with medium to fine grain sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 0.2785 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Pruett/C. Cook

Remarks

Sample No.: ST-7 **Source of Sample:** B-1 **Date Sampled:**
Location: **Elev./Depth:** 23
Checked By: K. Kocher **Title:** Engineer

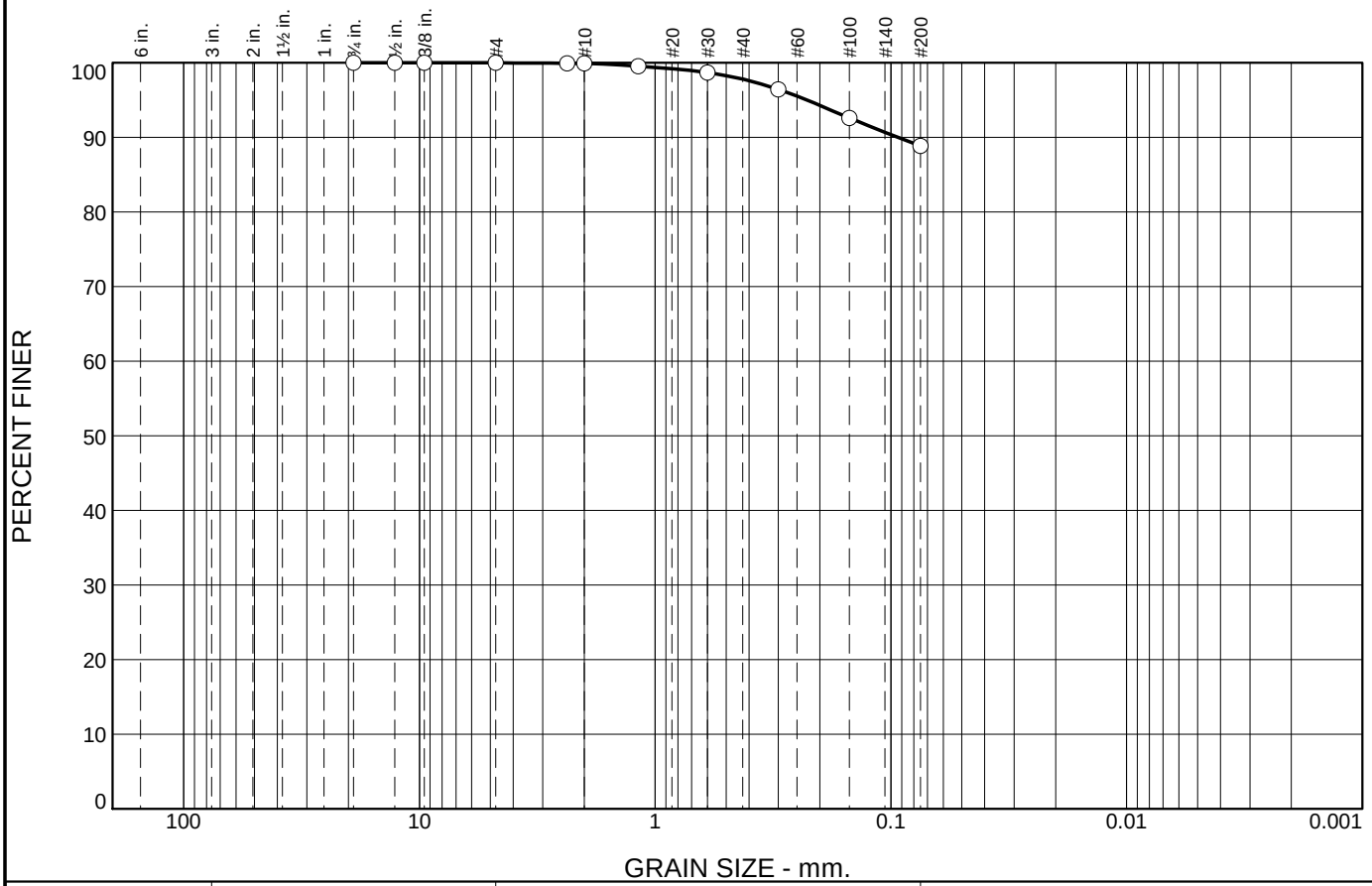
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-2

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	2.1	9.0	88.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#8	99.9		
#10	99.9		
#16	99.5		
#30	98.7		
#50	96.4		
#100	92.6		
#200	88.8		

* (no specification provided)

Material Description

CLAY (CH), golden and grayish tan, high plastic, trace fine sand

Atterberg Limits (ASTM D 4318)

PL= 22 LL= 78 PI= 56

Classification

USCS= CH AASHTO=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Pruett/C. Cook

Remarks

Bag Sample
10'-13'

Sample No.: Bulk **Source of Sample:** **Date Sampled:**
Location: B-2 **Elev./Depth:** 10-13
Checked By: K. Kocher **Title:** Engineer

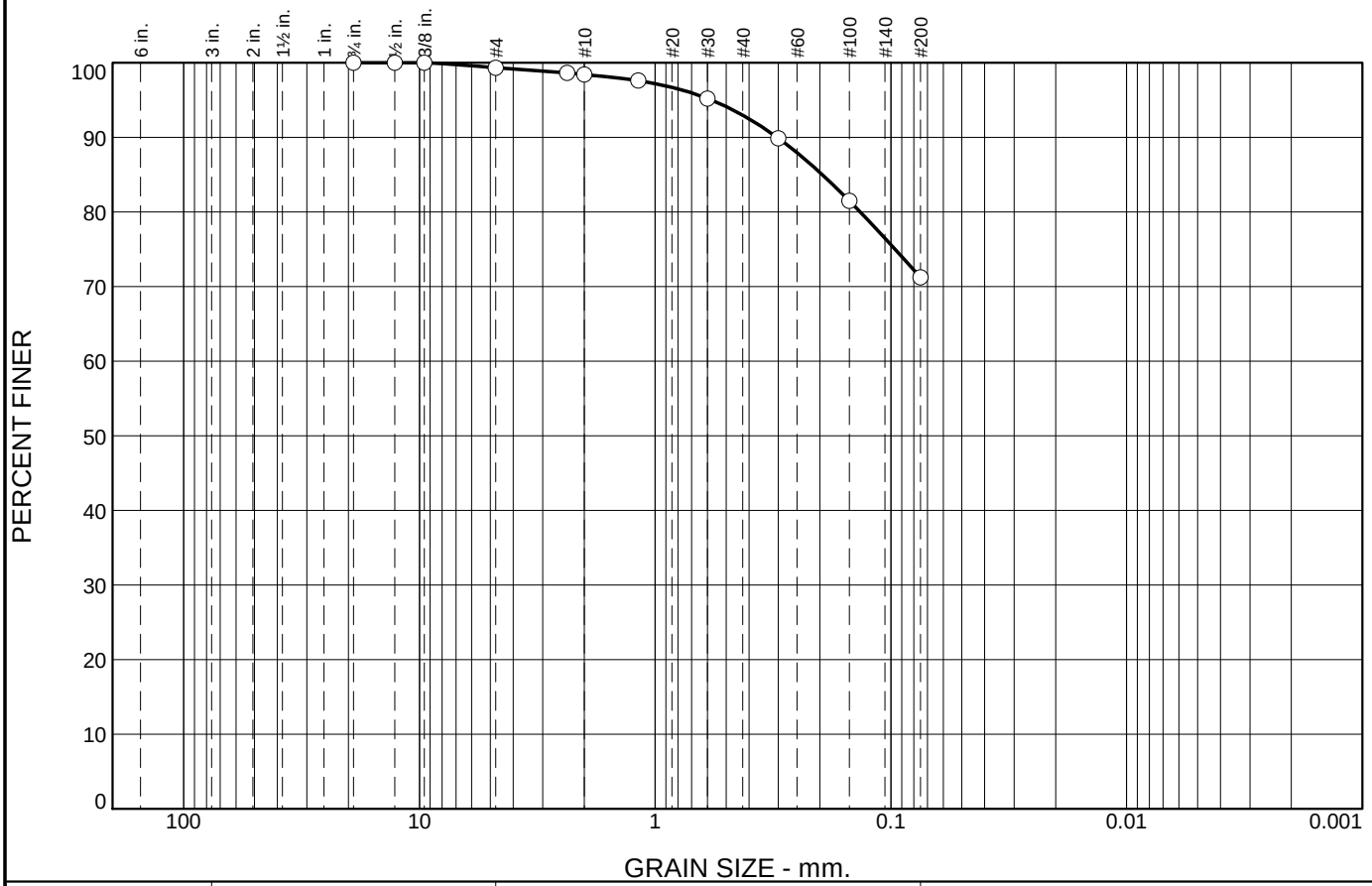
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-3

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	0.9	5.4	21.8	71.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	99.3		
#8	98.6		
#10	98.4		
#16	97.6		
#30	95.2		
#50	89.9		
#100	81.5		
#200	71.2		

* (no specification provided)

Material Description

CLAY (CH), brown and tan, high plastic, with fine sand, trace medium sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 0.1953 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Pruett/C. Cook

Remarks

Sample No.: ST-5 **Source of Sample:** B-2 **Date Sampled:**
Location: **Elev./Depth:** 13
Checked By: K. Kocher **Title:** Engineer

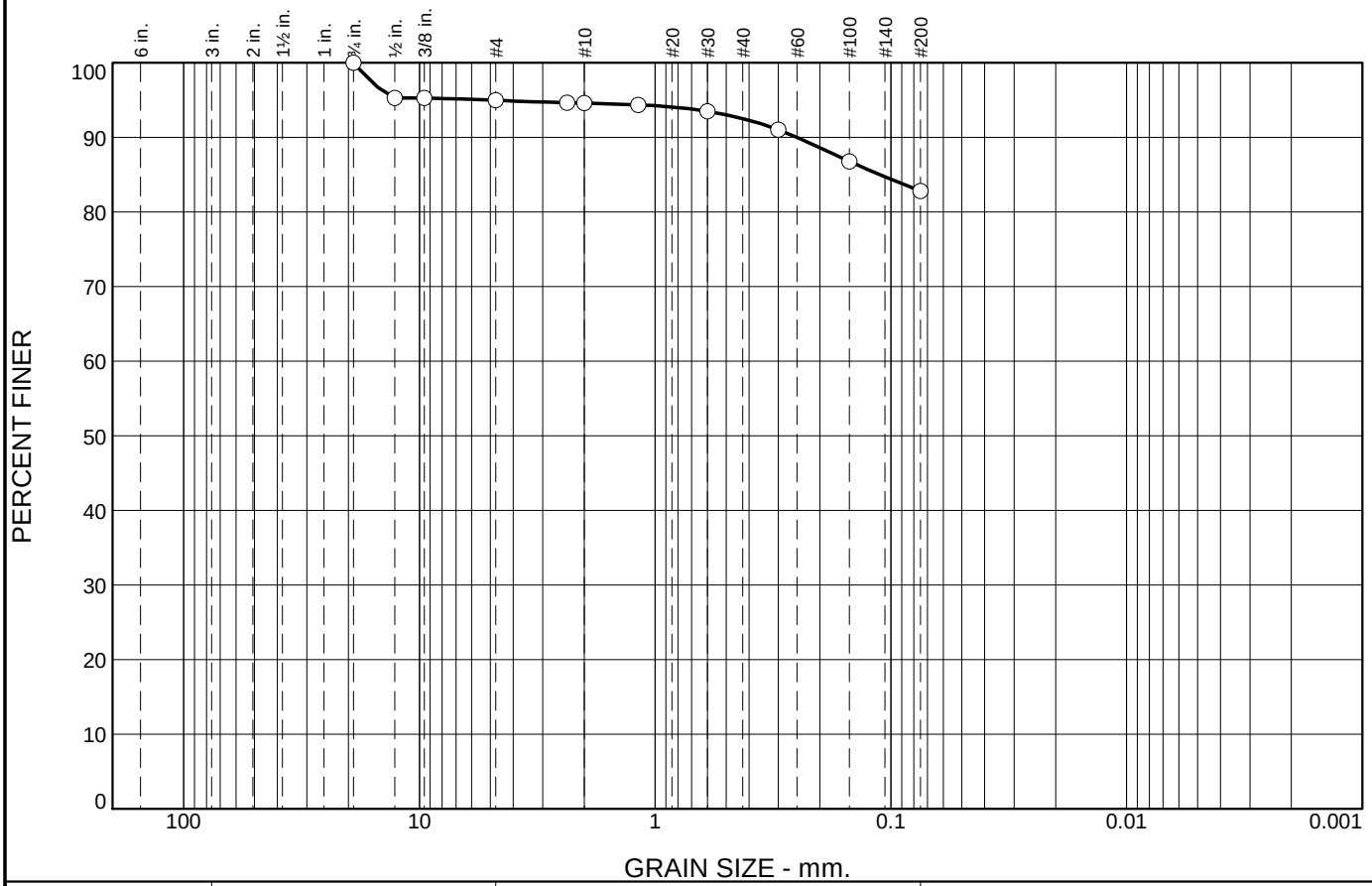
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-4

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.0	0.4	2.1	9.7	82.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	95.3		
3/8	95.3		
#4	95.0		
#8	94.7		
#10	94.6		
#16	94.4		
#30	93.5		
#50	91.0		
#100	86.8		
#200	82.8		

* (no specification provided)

Material Description

CLAY (CL), gray, with fine sand, trace fine gravel

Atterberg Limits (ASTM D 4318)

PL= 20 LL= 44 PI= 24

Classification

USCS= CL AASHTO=

Coefficients

D_{85}= 0.1111 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Pruett/C. Cook

Remarks

Sample No.: ST-6 **Source of Sample:** B-3 **Date Sampled:**
Location: **Elev./Depth:** 18
Checked By: K. Kocher **Title:** Engineer

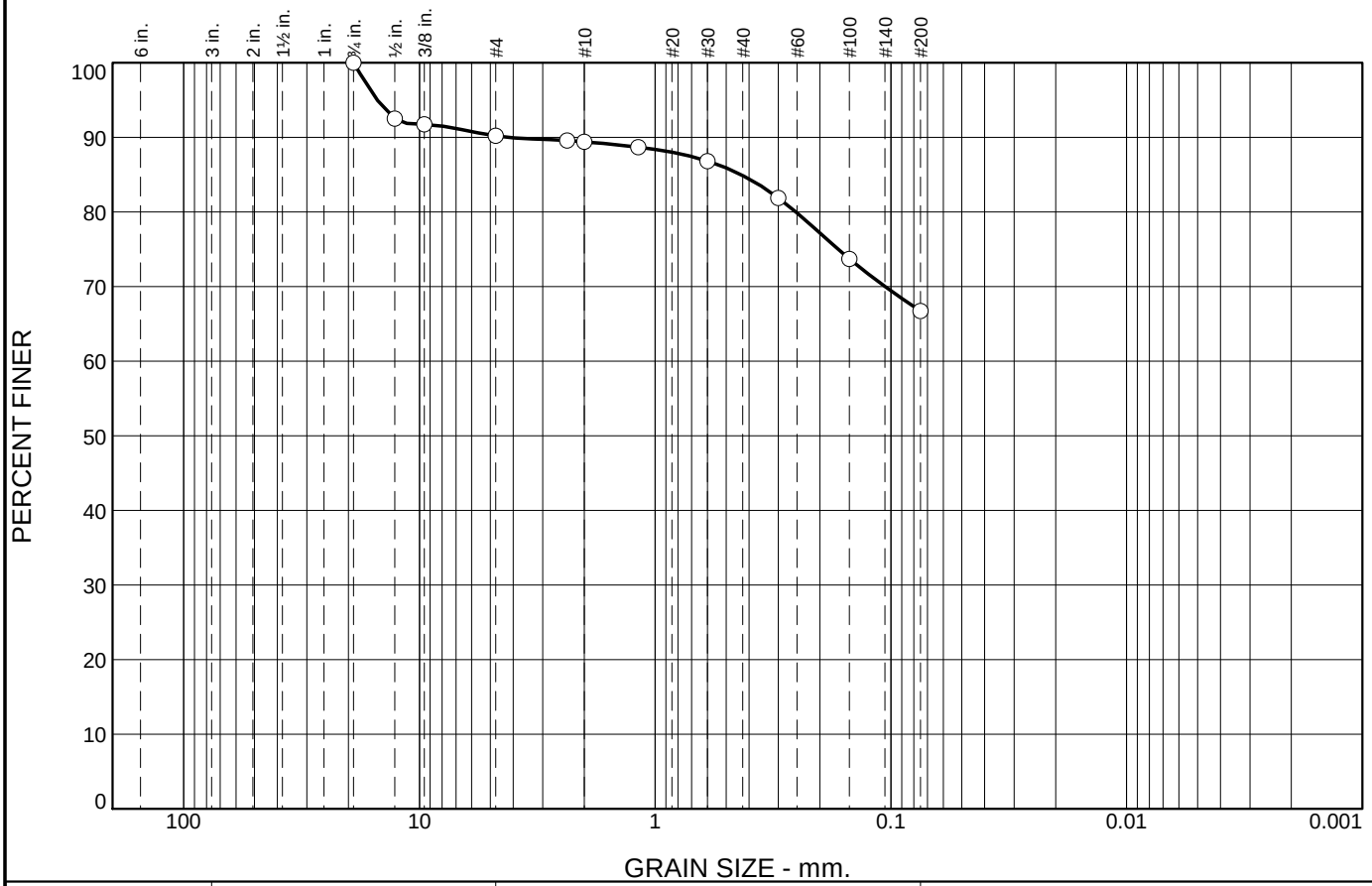
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-5

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.8	0.8	4.5	18.2	66.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	92.5		
3/8	91.7		
#4	90.2		
#8	89.6		
#10	89.4		
#16	88.7		
#30	86.8		
#50	81.9		
#100	73.7		
#200	66.7		

* (no specification provided)

Material Description

CLAY (CL), golden tan and pinkish gray, with fine sand, trace fine gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 0.4333 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Pruett/C. Cook

Remarks

Sample No.: ST-7 **Source of Sample:** B-3 **Date Sampled:**
Location: **Elev./Depth:** 23
Checked By: K. Kocher **Title:** Engineer

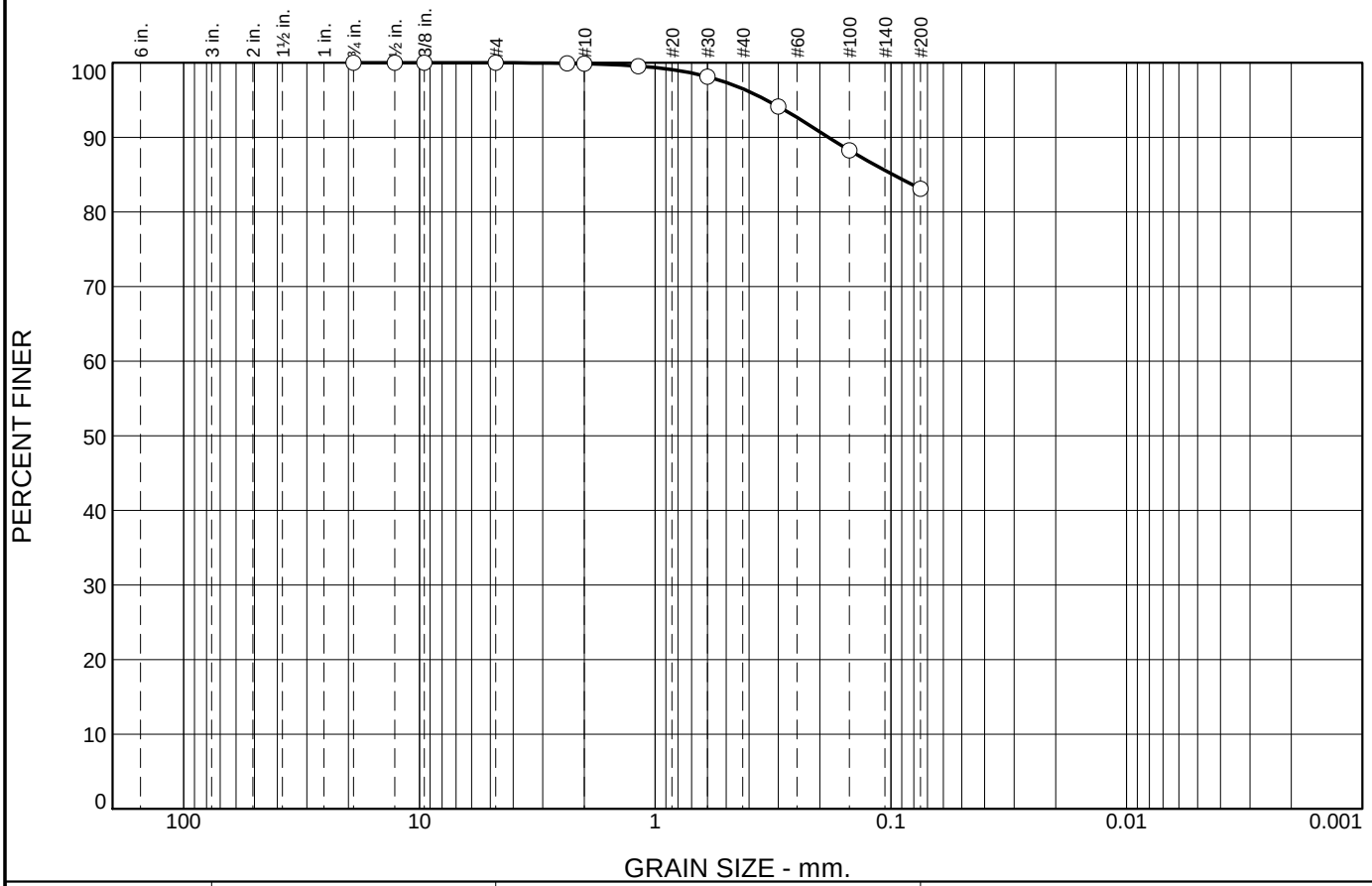
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-6

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	3.4	13.4	83.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#8	99.9		
#10	99.9		
#16	99.6		
#30	98.1		
#50	94.2		
#100	88.3		
#200	83.1		

* (no specification provided)

Material Description

CLAY (CH), golden and tan, high plastic, with fine sand

Atterberg Limits (ASTM D 4318)

PL= 21 LL= 56 PI= 35

Classification

USCS= CH AASHTO=

Coefficients

D_{85}= 0.0979 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Pruett/C. Cook

Remarks

Bag Sample
15' - 25'

Sample No.: Bulk **Source of Sample:** **Date Sampled:**
Location: B-4 **Elev./Depth:** 15-25
Checked By: K. Kocher **Title:** Engineer

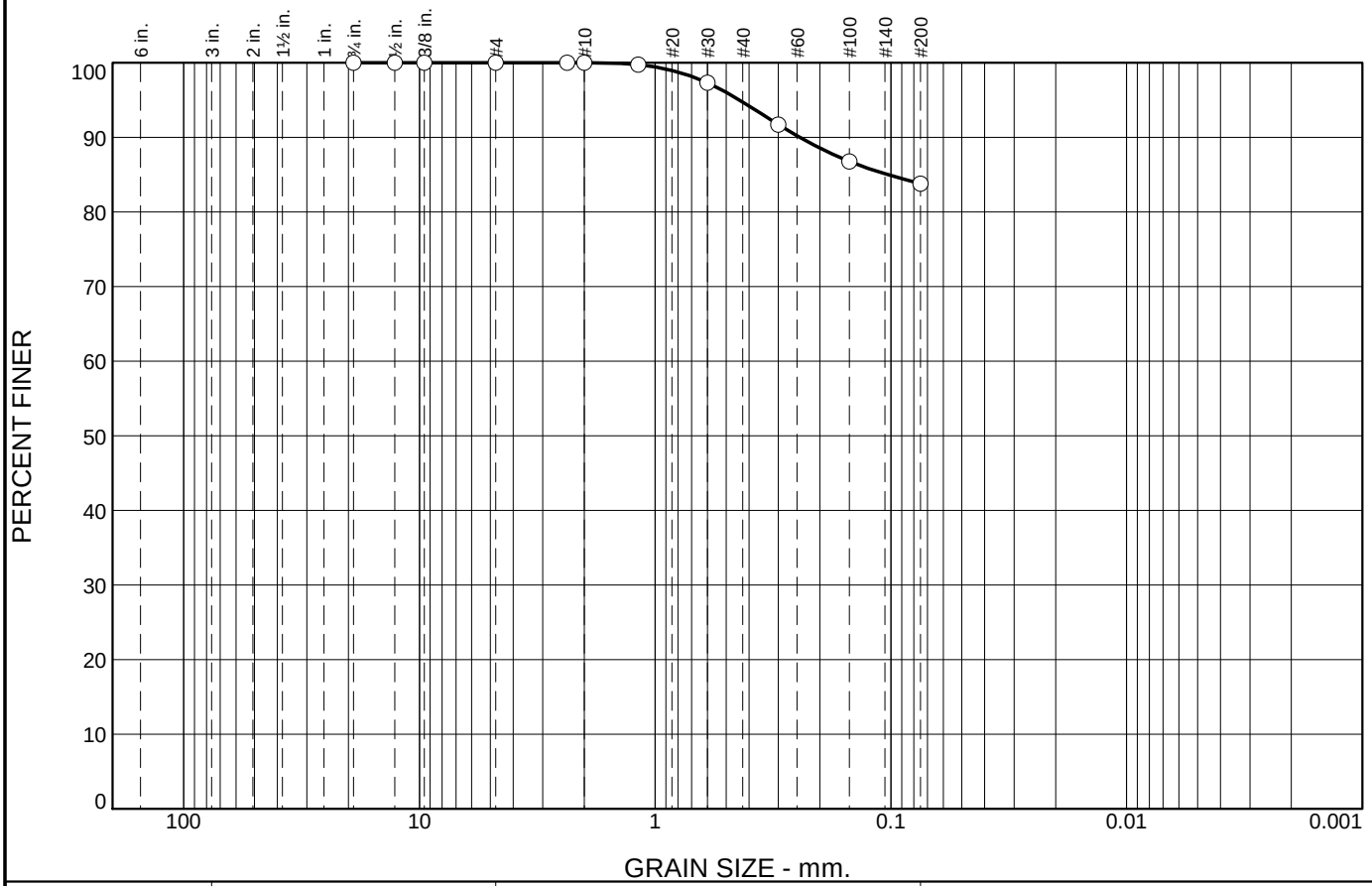
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-7

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	5.3	10.9	83.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#8	100.0		
#10	100.0		
#16	99.7		
#30	97.3		
#50	91.7		
#100	86.8		
#200	83.8		

* (no specification provided)

Material Description

CLAY (CH), golden tan and reddish brown, high plastic, with fine sand

Atterberg Limits (ASTM D 4318)

PL= 29 LL= 83 PI= 58

Classification

USCS= CH AASHTO=

Coefficients

D_{85}= 0.1029 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Crose/C. Cook

Remarks

Sample No.: ST-1 **Source of Sample:** B-6 **Date Sampled:**
Location: **Elev./Depth:** 1
Checked By: K. Kocher **Title:** Engineer

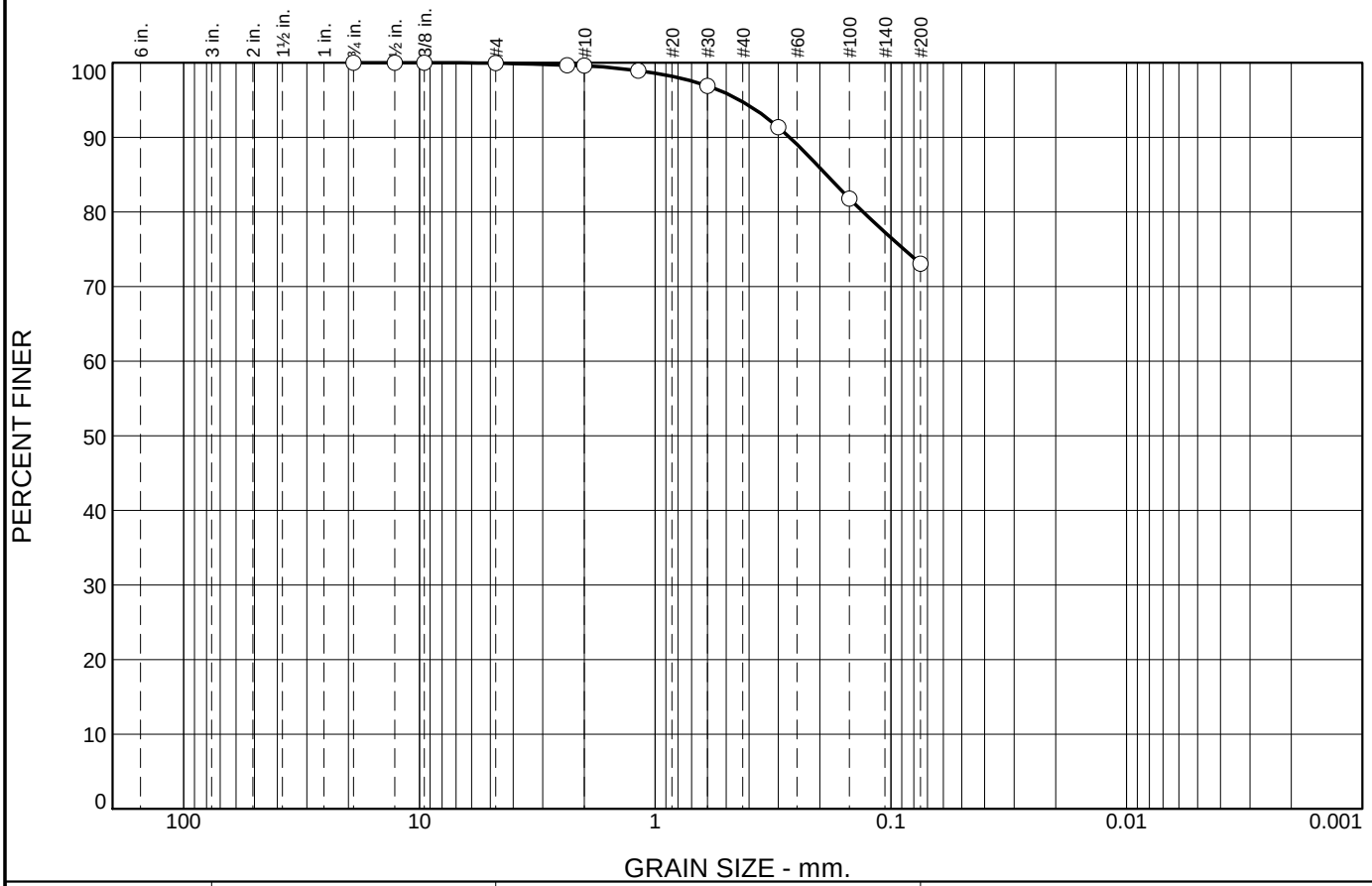
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-8

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	4.8	21.7	73.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#8	99.7		
#10	99.6		
#16	98.9		
#30	96.9		
#50	91.4		
#100	81.8		
#200	73.1		

* (no specification provided)

Material Description

CLAY (CH), gray, high plastic, with fine sand

Atterberg Limits (ASTM D 4318)

PL= 18 LL= 50 PI= 34

Classification

USCS= CH AASHTO=

Coefficients

D_{85}= 0.1875 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Crose/C. Cook

Remarks

Sample No.: ST-7 **Source of Sample:** B-6 **Date Sampled:**
Location: **Elev./Depth:** 23
Checked By: K. Kocher **Title:** Engineer

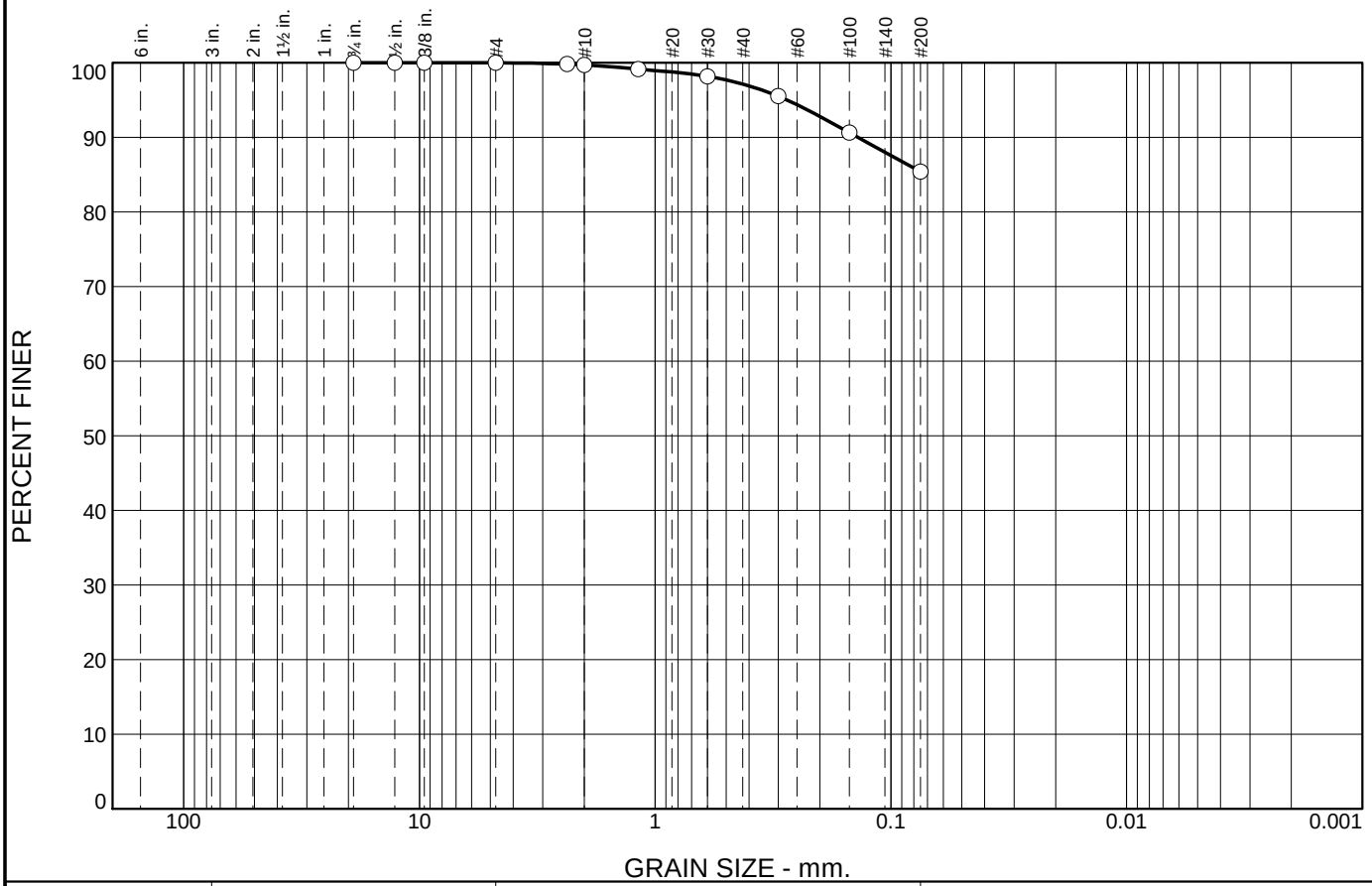
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-9

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	2.5	11.8	85.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#8	99.8		
#10	99.7		
#16	99.1		
#30	98.2		
#50	95.5		
#100	90.6		
#200	85.4		

* (no specification provided)

Material Description

CLAY (CH), gray and tan, high plastic, trace fine sand

Atterberg Limits (ASTM D 4318)

PL= 25 LL= 81 PI= 52

Classification

USCS= CH AASHTO=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-15-11 **Tested By:** C. Cook

Remarks

Sample No.: ST-2 **Source of Sample:** B-7 **Date Sampled:**
Location: **Elev./Depth:** 3
Checked By: K. Kocher **Title:** Engineer

REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-10

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.6	2.1	5.5	13.6	73.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	96.9		
3/8	95.9		
#4	94.4		
#8	92.7		
#10	92.3		
#16	90.8		
#30	88.6		
#50	84.5		
#100	78.5		
#200	73.2		

* (no specification provided)

Material Description

CLAY (CH), golden, high plastic, with maroon shaley clay, with fine sand, trace medium sand and fine gravel

Atterberg Limits (ASTM D 4318)

PL= 20 LL= 54 PI= 26

Classification

USCS= CH AASHTO=

Coefficients

D_{85}= 0.3215 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Pruett/C. Cook

Remarks

Sample No.: Bulk **Source of Sample:** **Date Sampled:**
Location: B-7 **Elev./Depth:** 8-15
Checked By: K. Kocher **Title:** Engineer

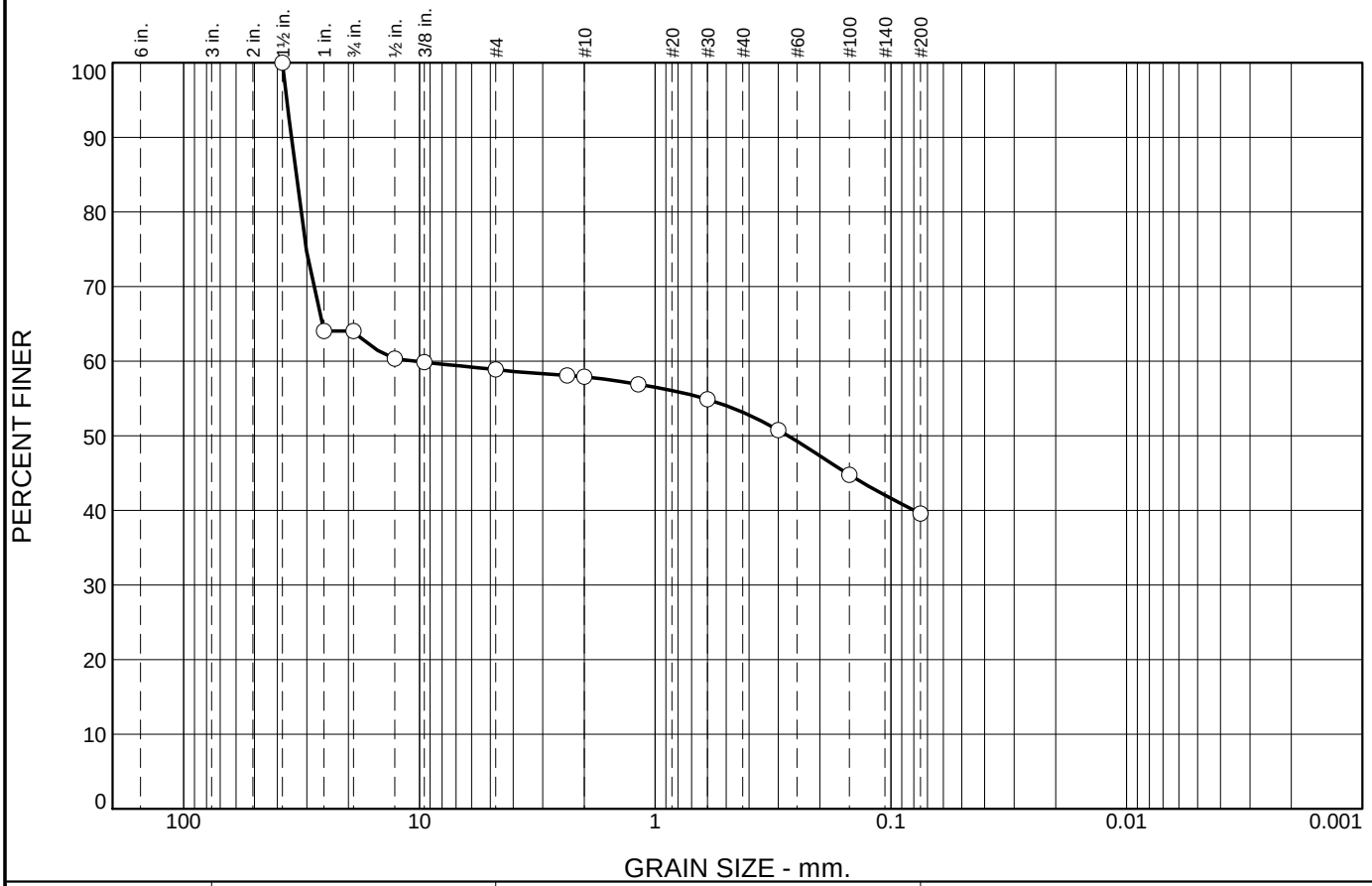
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-11

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	36.0	5.1	1.0	4.7	13.6	39.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	64.0		
3/4	64.0		
1/2	60.3		
3/8	59.9		
#4	58.9		
#8	58.1		
#10	57.9		
#16	56.9		
#30	54.9		
#50	50.8		
#100	44.8		
#200	39.6		

* (no specification provided)

Material Description

Clayey GRAVEL (GC), brown gray and tan, high plastic, coarse grain gravel, with fine grain sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 33.3923 D_{60}= 10.3573 D_{50}= 0.2723
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Crose/C. Cook

Remarks

Sample No.: ST-4 **Source of Sample:** B-8 **Date Sampled:**
Location: **Elev./Depth:** 8
Checked By: K. Kocher **Title:** Engineer

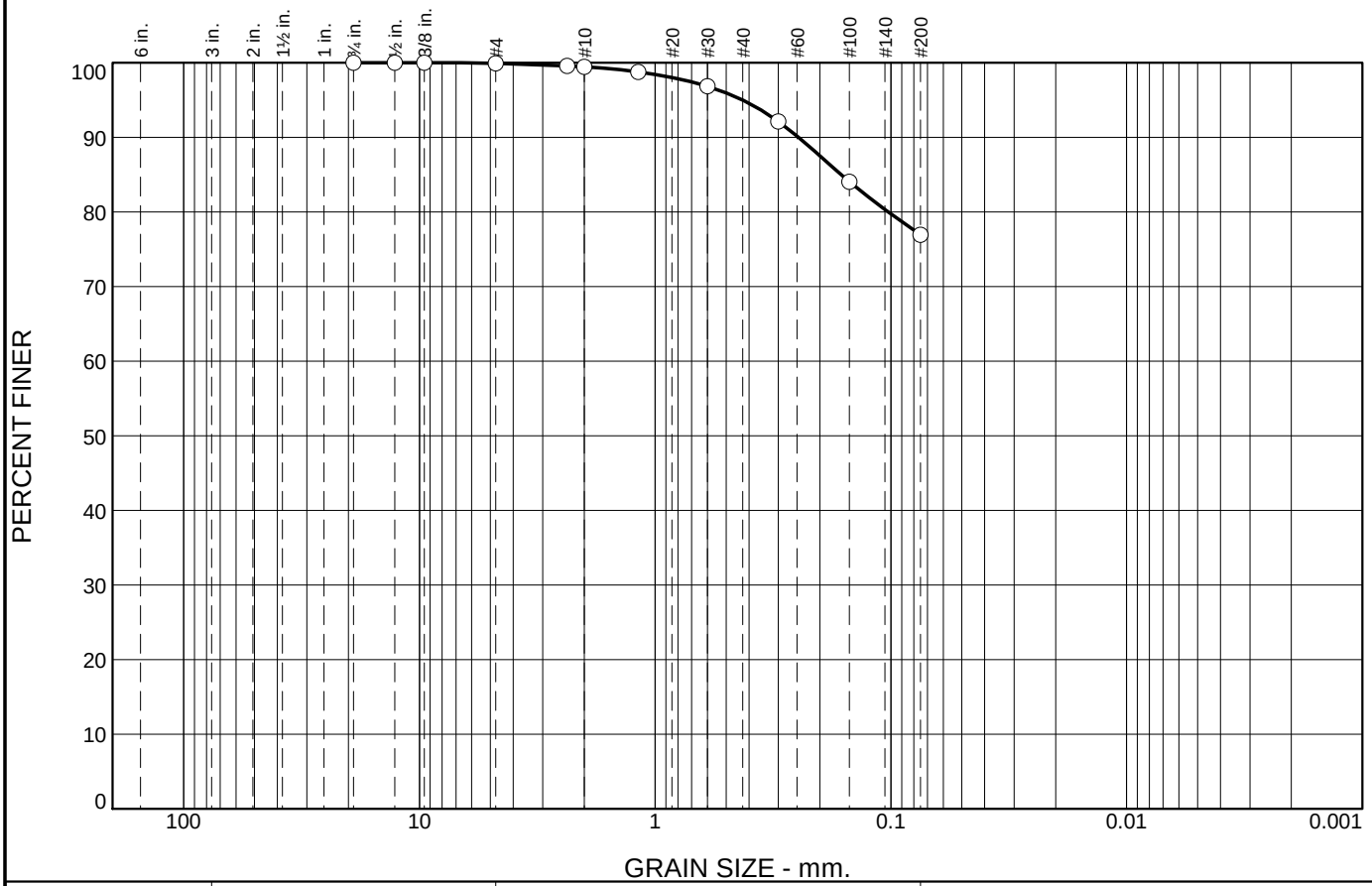
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-12

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.4	4.5	18.1	76.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	99.9		
#8	99.6		
#10	99.5		
#16	98.8		
#30	96.8		
#50	92.1		
#100	84.1		
#200	76.9		

* (no specification provided)

Material Description

CLAY (CH), golden and tan, high plastic, with fine sand

Atterberg Limits (ASTM D 4318)

PL= 17 LL= 52 PI= 35

Classification

USCS= CH AASHTO=

Coefficients

D_{85}= 0.1625 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Pruett/C. Cook

Remarks

Bag Sample
1' - 15'

Sample No.: Bulk **Source of Sample:** **Date Sampled:**
Location: B-8 **Elev./Depth:** 1-15
Checked By: K. Kocher **Title:** Engineer

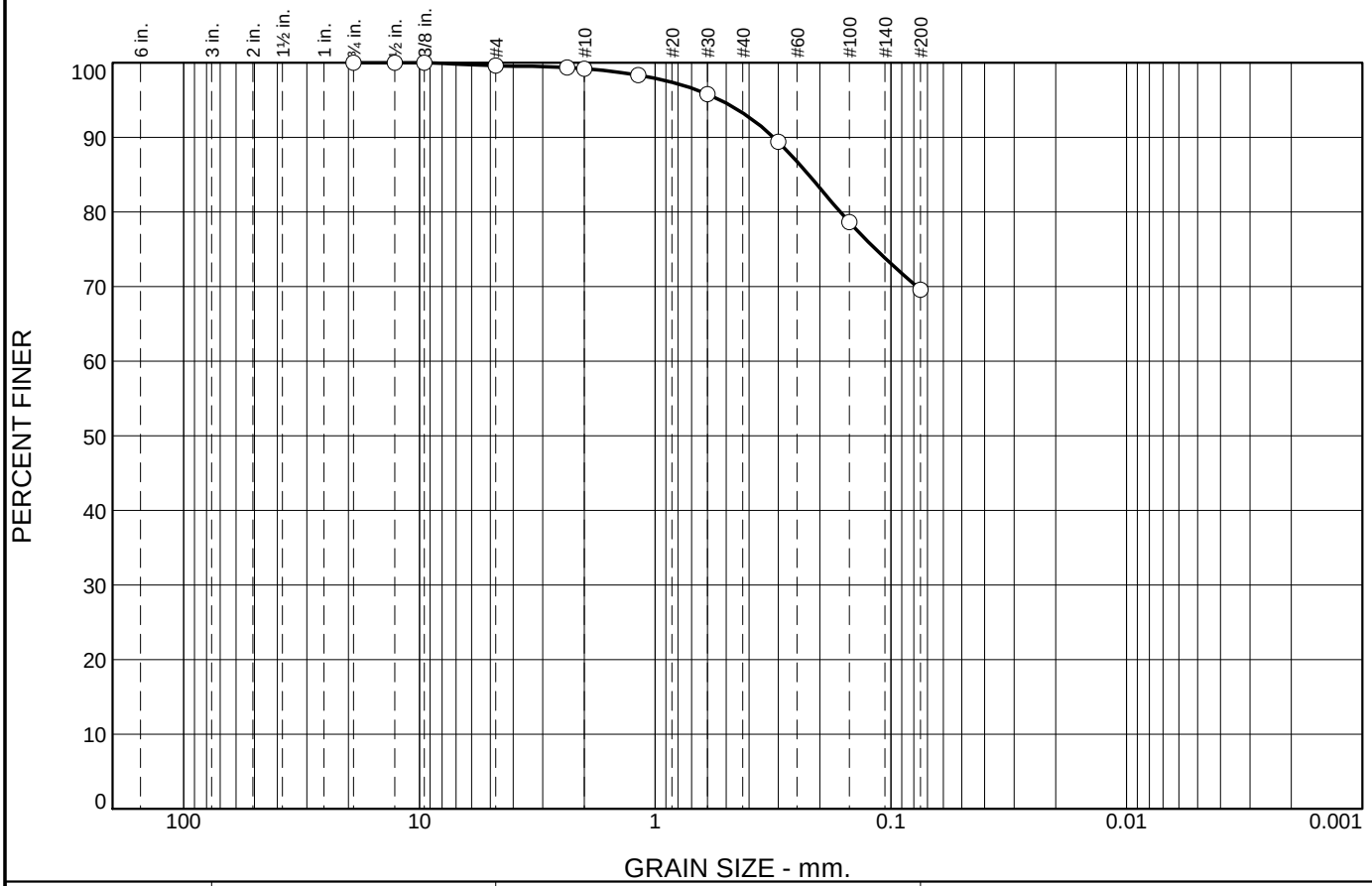
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-13

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	0.4	5.9	23.7	69.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	99.6		
#8	99.4		
#10	99.2		
#16	98.3		
#30	95.8		
#50	89.4		
#100	78.6		
#200	69.6		

* (no specification provided)

Material Description

CLAY (CH), gray and orangish brown, with fine to medium grain sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 0.2233 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-11-11 **Tested By:** J. Crose

Remarks

Sample No.: ST-7 **Source of Sample:** B-9 **Date Sampled:**
Location: **Elev./Depth:** 23
Checked By: K. Kocher **Title:** Engineer

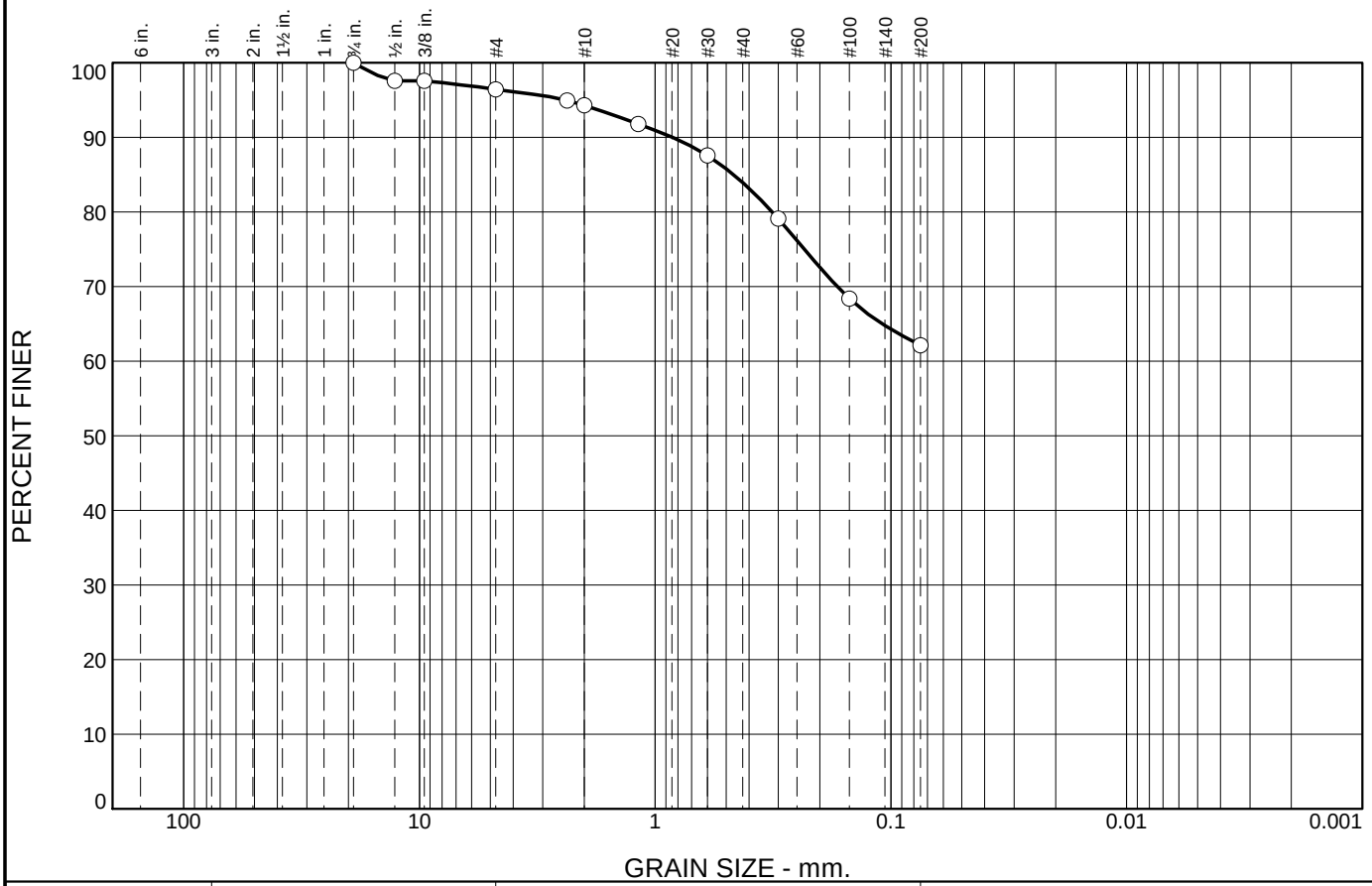
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-14

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.6	2.1	10.4	21.8	62.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	97.6		
3/8	97.6		
#4	96.4		
#8	94.9		
#10	94.3		
#16	91.8		
#30	87.6		
#50	79.1		
#100	68.4		
#200	62.1		

* (no specification provided)

Material Description

Shaley CLAY (CH), brown gray and purple, with weathered limestone, with fine to medium sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 0.4651 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-11-11 **Tested By:** J. Crose

Remarks

Sample No.: ST-8 **Source of Sample:** B-9 **Date Sampled:**
Location: **Elev./Depth:** 28
Checked By: K. Kocher **Title:** Engineer

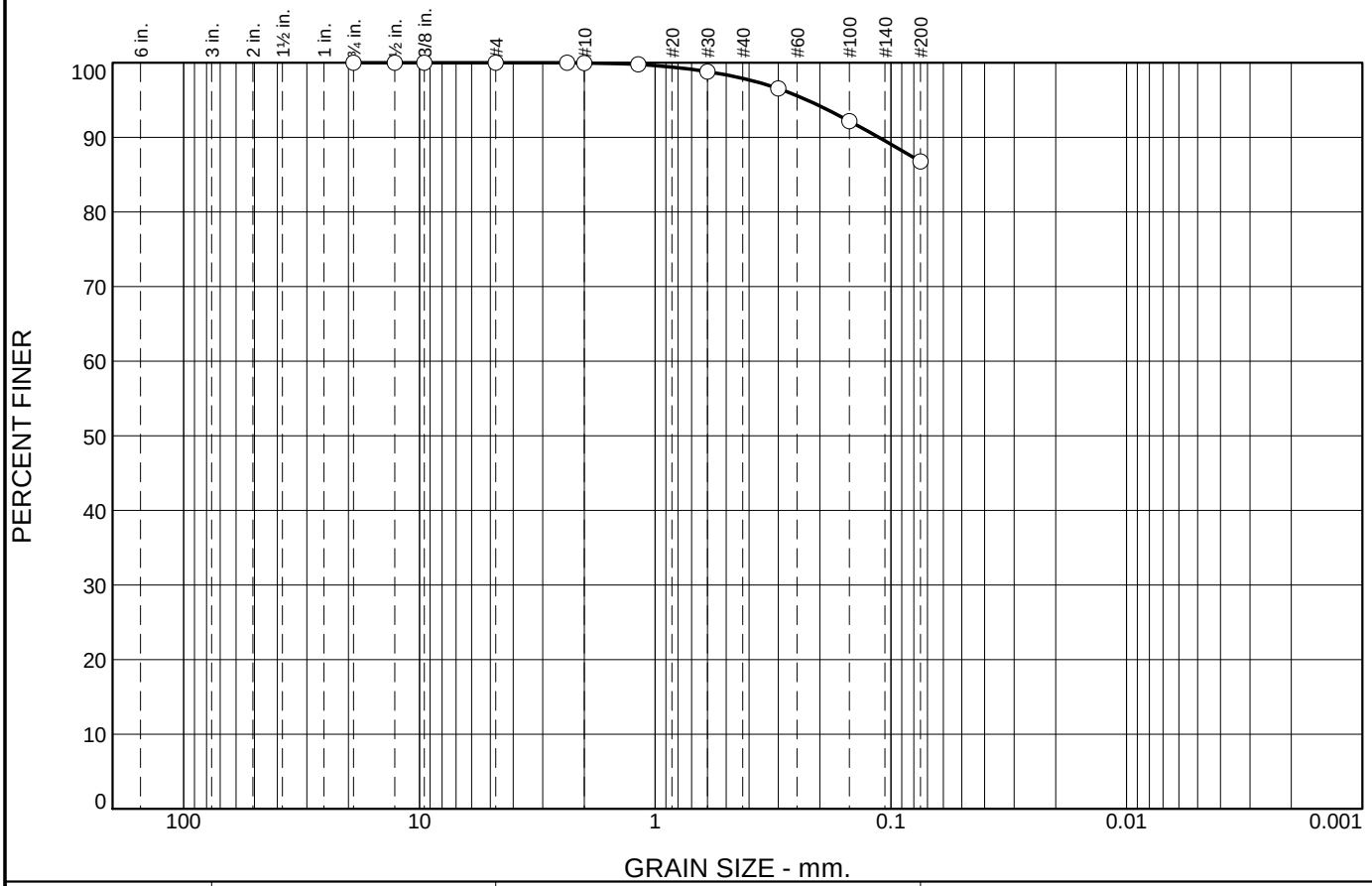
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-15

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	2.0	11.1	86.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#8	100.0		
#10	99.9		
#16	99.8		
#30	98.8		
#50	96.6		
#100	92.2		
#200	86.8		

* (no specification provided)

Material Description

CLAY (CH), golden and gray brown, high plastic, trace fine sand

Atterberg Limits (ASTM D 4318)

PL= 18 LL= 65 PI= 46

Classification

USCS= CH AASHTO=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Pruett/C. Cook

Remarks

Sample No.: Bulk **Source of Sample:** **Date Sampled:**
Location: B-10 **Elev./Depth:** 15-18
Checked By: K. Kocher **Title:** Engineer

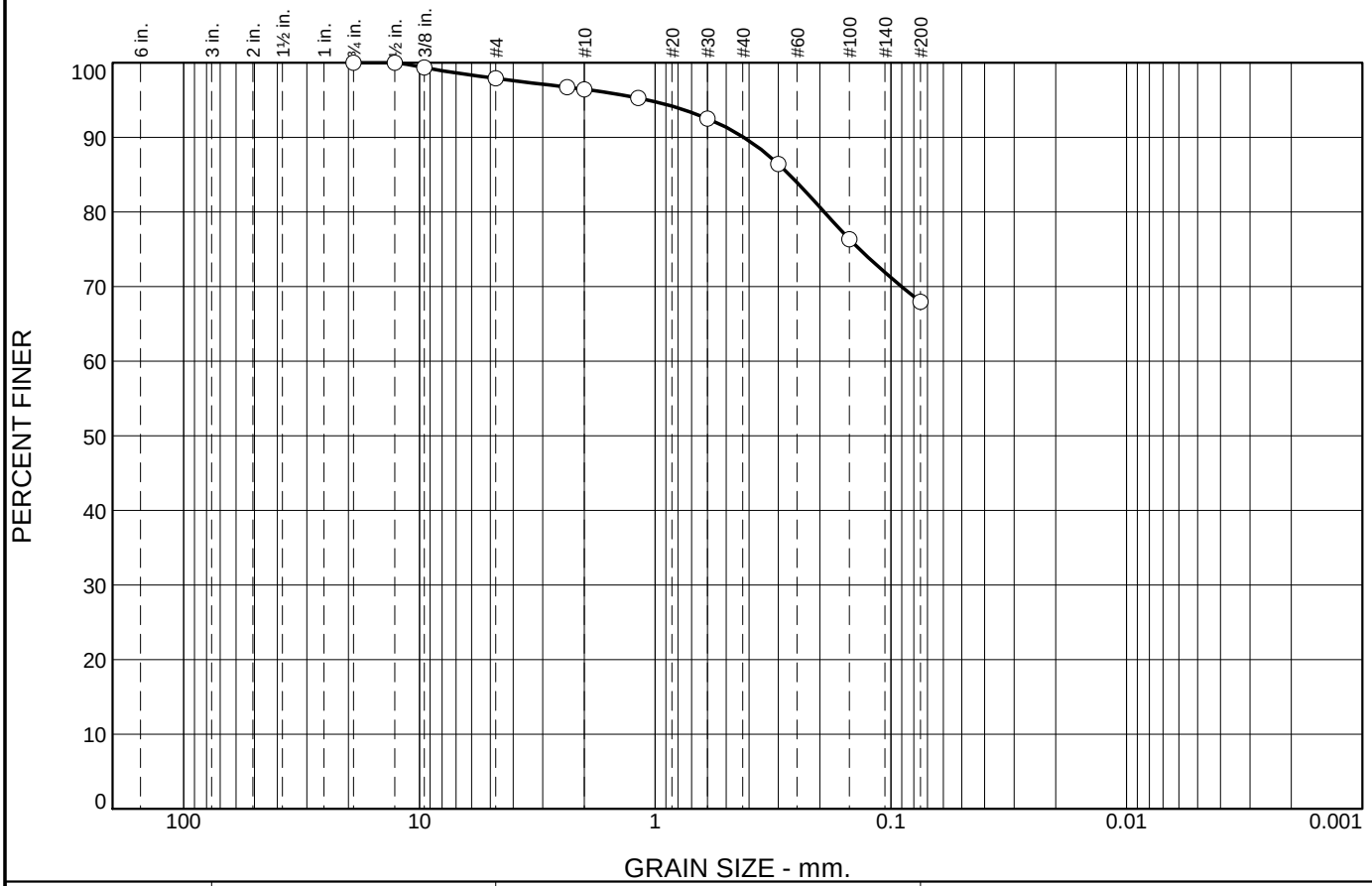
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-16

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.1	1.4	6.4	22.1	68.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	99.4		
#4	97.9		
#8	96.7		
#10	96.5		
#16	95.3		
#30	92.5		
#50	86.4		
#100	76.3		
#200	68.0		

* (no specification provided)

Material Description

CLAY (CH), golden and gray, with fine to medium sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 0.2690 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-11-11 **Tested By:** J. Crose

Remarks

Sample No.: ST-7 **Source of Sample:** B-10 **Date Sampled:**
Location: **Elev./Depth:** 23
Checked By: K. Kocher **Title:** Engineer

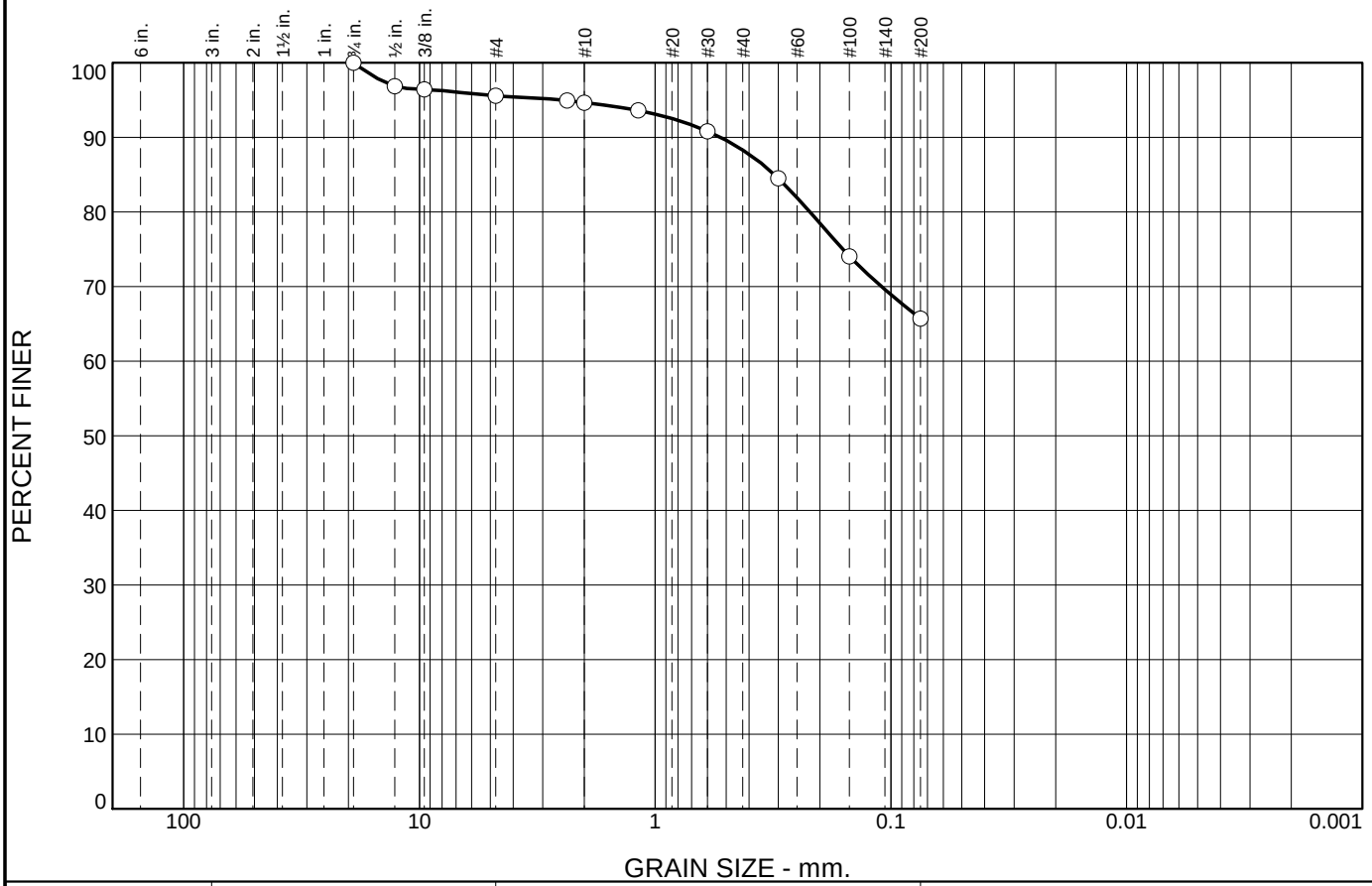
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-17

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.4	0.9	6.4	22.6	65.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	96.9		
3/8	96.4		
#4	95.6		
#8	94.9		
#10	94.7		
#16	93.6		
#30	90.8		
#50	84.5		
#100	74.1		
#200	65.7		

* (no specification provided)

Material Description

Sandy CLAY (CH), brown tan gray and orangish brown, high plastic, fine to medium grain sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 0.3117 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-11-11 **Tested By:** J. Crose

Remarks

Sample No.: ST-7 **Source of Sample:** B-11 **Date Sampled:**
Location: **Elev./Depth:** 23
Checked By: K. Kocher **Title:** Engineer

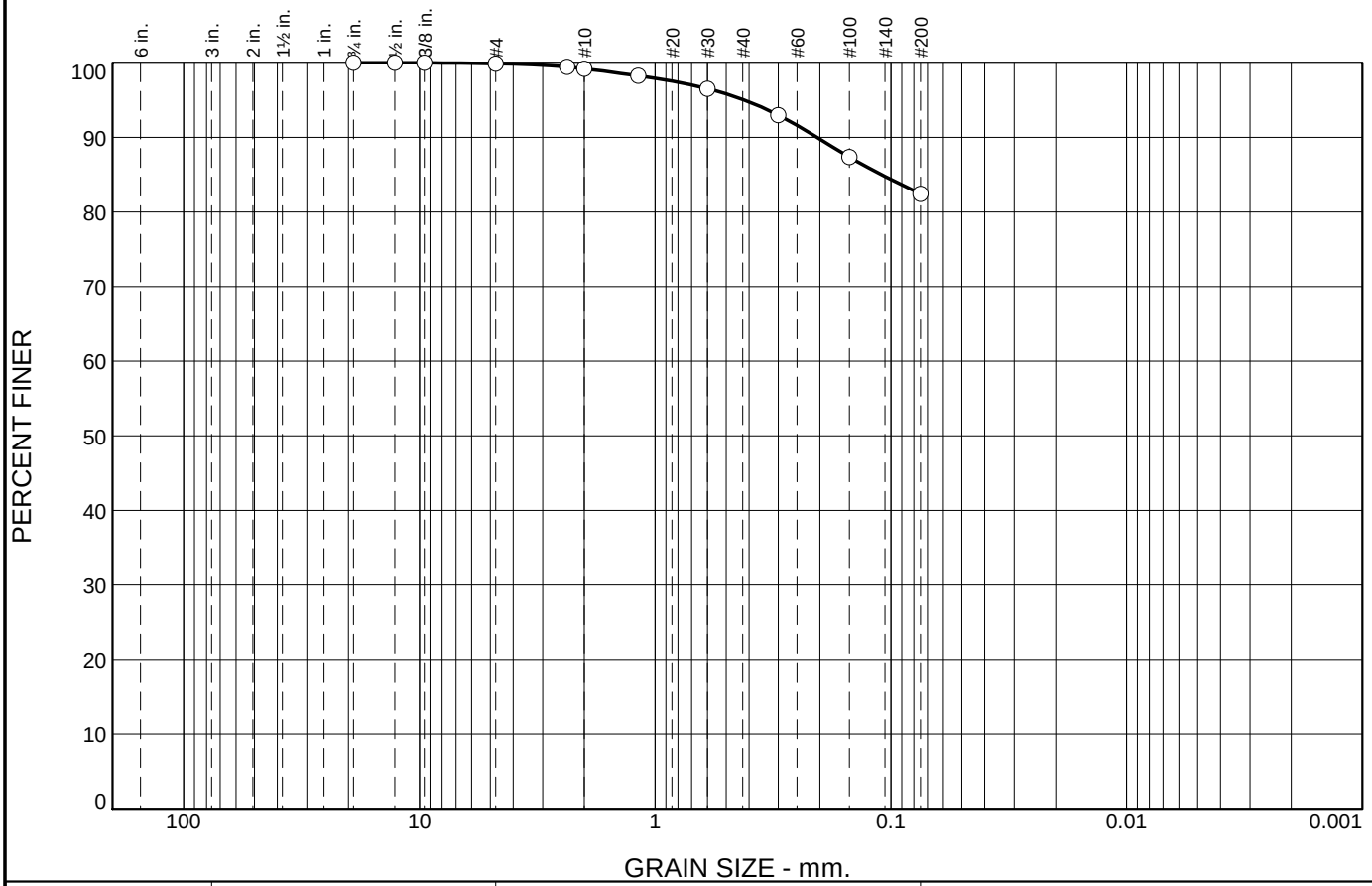
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-18

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.7	4.1	12.7	82.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	99.9		
#8	99.4		
#10	99.2		
#16	98.2		
#30	96.5		
#50	93.0		
#100	87.4		
#200	82.4		

* (no specification provided)

Material Description

CLAY (CH), golden, high plastic, trace fine sand

Atterberg Limits (ASTM D 4318)

PL= 22 LL= 74 PI= 52

Classification

USCS= CH AASHTO=

Coefficients

D_{85}= 0.1095 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-07-11 **Tested By:** J. Pruett/C. Cook

Remarks

Sample No.: Bulk **Source of Sample:** **Date Sampled:**
Location: B-12 **Elev./Depth:** 2.5-10
Checked By: K. Kocher **Title:** Engineer

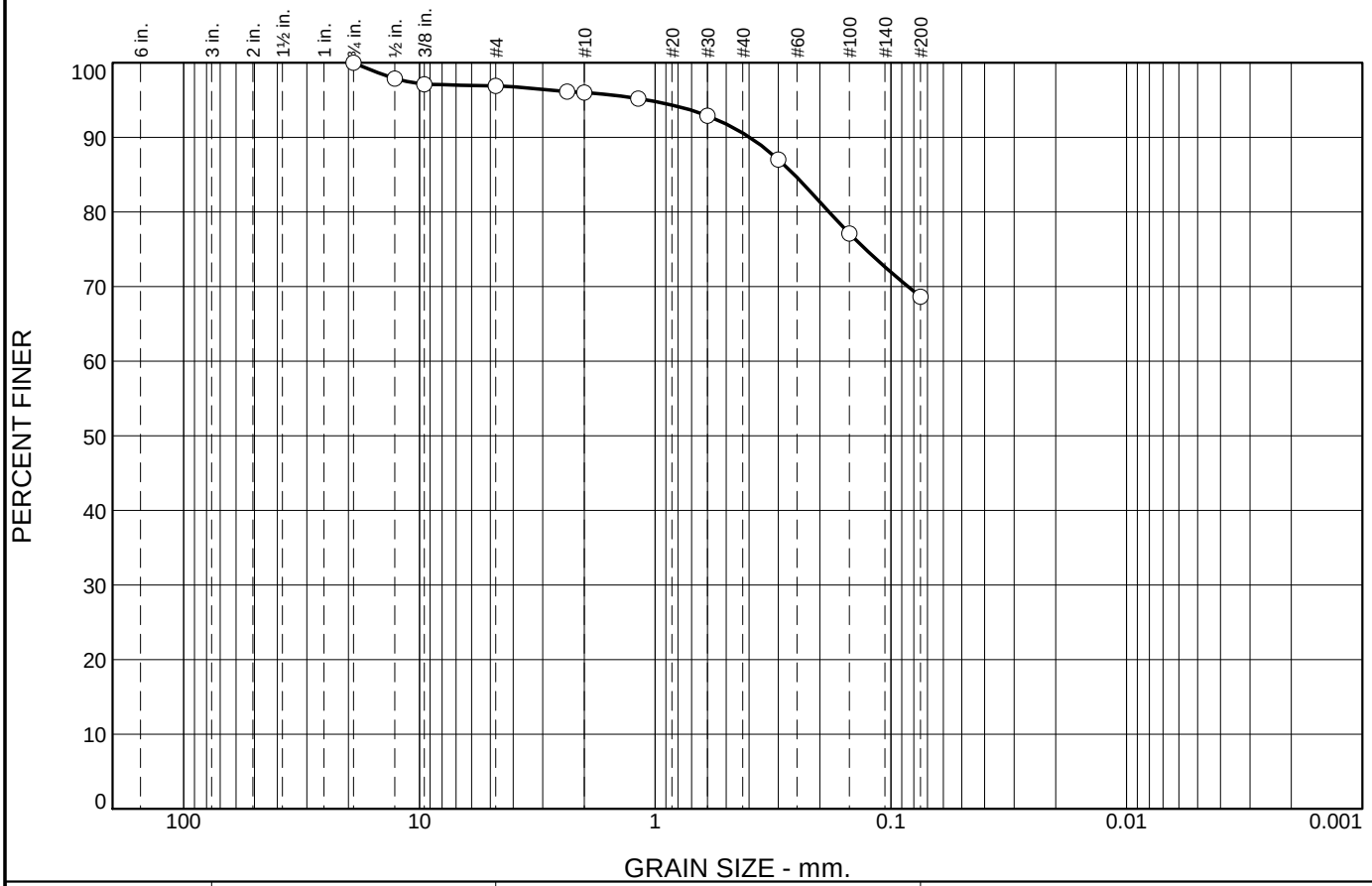
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-19

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.1	0.9	5.4	22.0	68.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	97.9		
3/8	97.1		
#4	96.9		
#8	96.2		
#10	96.0		
#16	95.2		
#30	92.9		
#50	87.0		
#100	77.1		
#200	68.6		

* (no specification provided)

Material Description

CLAY (CH), brownish gray and orange-brown, high plastic, with fine to medium grain sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 0.2567 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-11-11 **Tested By:** J. Crose

Remarks

Sample No.: ST-2 **Source of Sample:** B-12 **Date Sampled:**
Location: **Elev./Depth:** 3
Checked By: K. Kocher **Title:** Engineer

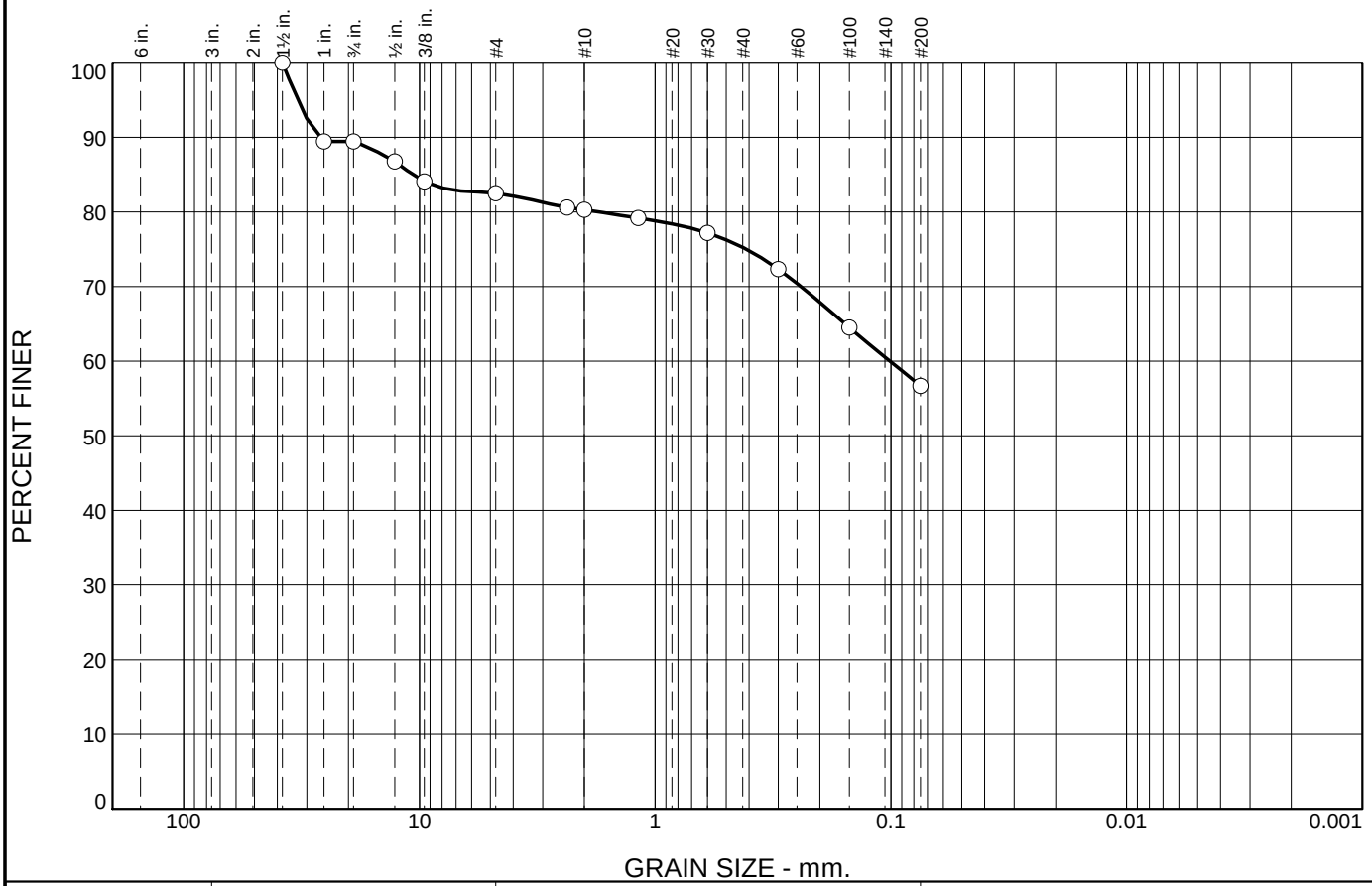
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-20

SCHEDULE CJG-ST1

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.5	7.0	2.2	5.1	18.5	56.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	89.5		
3/4	89.5		
1/2	86.8		
3/8	84.1		
#4	82.5		
#8	80.6		
#10	80.3		
#16	79.2		
#30	77.2		
#50	72.3		
#100	64.5		
#200	56.7		

* (no specification provided)

Material Description

Sandy CLAY (CH), brown tan gray and orange-brown, high plastic, fine to medium grain sand, with fine to coarse gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= SC AASHTO=

Coefficients

D_{85}= 10.6353 D_{60}= 0.1011 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 04-11-11 **Tested By:** J. Crose

Remarks

Sample No.: ST-4 **Source of Sample:** B-12 **Date Sampled:**
Location: **Elev./Depth:** 8
Checked By: K. Kocher **Title:** Engineer

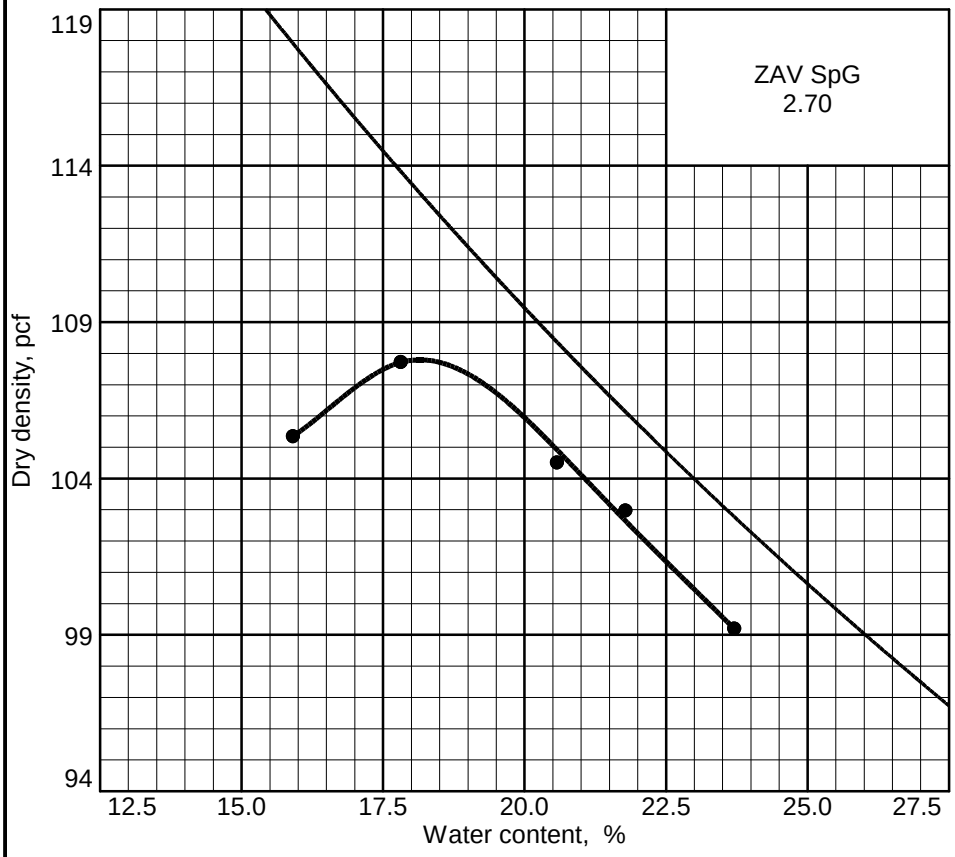
REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill

Project No: 2008012455 **Figure** 4-21

SCHEDULE CJG-ST1

MOISTURE-DENSITY TEST REPORT



Curve No.

Test Specification:
ASTM D 698-00a Method A Standard

Preparation Method	ASTM
Hammer Wt.	5.5 lb.
Hammer Drop	12 in.
Number of Layers	three
Blows per Layer	25
Mold Size	.03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

NM		**LL**	37	**PI**	17
Sp.G. (ASTM D 854)					
%>No.4	0.0	**%<No.200**	93.3		
USCS	CL	**AASHTO**			
Date Sampled					
Date Tested	4/28/11				
Tested By	J. Crose				

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.63	8.79	8.76	8.74	8.65	
WM	4.56	4.56	4.56	4.56	4.56	
WW + T #1	247.88	261.81	338.07	328.92	317.90	
WD + T #1	218.69	228.26	286.71	276.49	263.53	
TARE #1	34.62	40.71	36.76	36.34	34.57	
WW + T #2	317.87	309.88	318.73	328.11	328.19	
WD + T #2	279.71	269.28	271.07	276.81	272.52	
TARE #2	40.63	40.50	39.77	40.84	37.25	
MOISTURE	15.9	17.8	20.6	21.8	23.7	
DRY DENSITY	105.4	107.7	104.5	103.0	99.2	

TEST RESULTS

Maximum dry density = 107.8 pcf

Optimum moisture = 18.1 %

Material Description

Silty CLAY (CL), brown to tan

Remarks:

Sample is a composite of material left over from the Shelby tubes. This material was visually classified as silty clay or clayey silt

Project No. 2008012455 **Client:** Ameren Missouri

Project: Labadie Plant Utility Waste Landfill

● **Location:** Composite: silty clay material

Checked by: K. Kocher

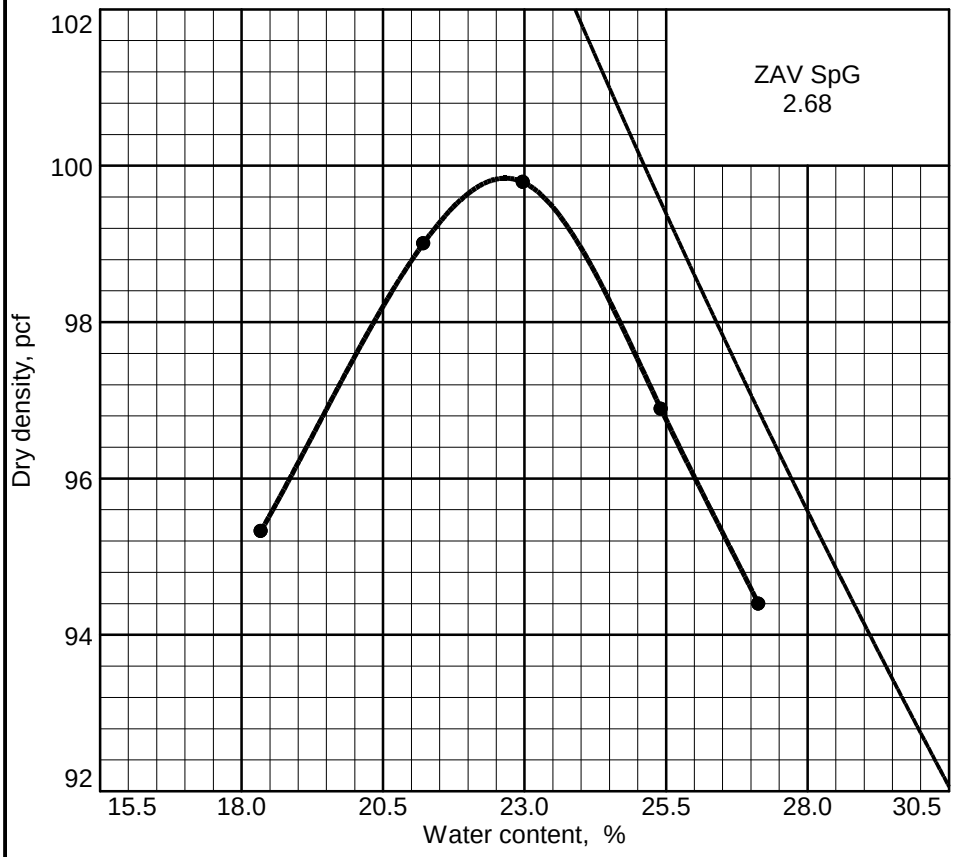
Title: P.E.

REITZ & JENS, INC.
CONSULTING ENGINEERS

Figure 5-1

SCHEDULE CJG-ST1

MOISTURE-DENSITY TEST REPORT



Curve No.

Test Specification:
ASTM D 698-00a Method A Standard

Preparation Method	ASTM
Hammer Wt.	5.5 lb.
Hammer Drop	12 in.
Number of Layers	three
Blows per Layer	25
Mold Size	.03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

NM		**LL** 62	**PI** 43
Sp.G. (ASTM D 854)			
%>No.4		**%<No.200**	91.3
USCS	CH	**AASHTO**	
Date Sampled			
Date Tested	5/3/2011		
Tested By	J. Crose		

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.32	8.56	8.65	8.61	8.56	
WM	4.56	4.56	4.56	4.56	4.56	
WW + T #1	218.80	211.58	293.31	286.21	266.97	
WD + T #1	191.11	181.41	245.76	235.19	217.38	
TARE #1	40.69	40.50	37.73	33.99	32.74	
WW + T #2	254.74	229.19	280.98	300.29	282.30	
WD + T #2	221.77	195.94	235.74	246.67	229.18	
TARE #2	41.32	37.73	39.70	36.07	35.34	
MOISTURE	18.3	21.2	23.0	25.4	27.1	
DRY DENSITY	95.3	99.0	99.8	96.9	94.4	

TEST RESULTS

Maximum dry density = 99.8 pcf

Optimum moisture = 22.7 %

Material Description

CLAY (CH), grey-brown-tan-orangish brown, high platic, with trace fine chert fragments

Remarks:

Sample is a composite of material left over from the Shelby tubes. This material wwas visually classified as high plastic clay

Project No. 2008012455 **Client:** Ameren Missouri

Project: Labadie Plant Utility Waste Landfill

● **Location:** Composite: high plastic clay material

Checked by:

Title:

REITZ & JENS, INC.
CONSULTING ENGINEERS

Figure 5-2

SCHEDULE CJG-ST1

Ameren Missouri; Labadie Power Plant UWL
Calaway Borrow Site
Silty CLAY Composite
Compacted Proctor point 103.0pcf at 21.8% moisture
Hydraulic Conductivity

Soil Conditions	
Pre-test conditions	**Post-test Conditions**
Wet Density = 125.7 (lbs/ft^3)	Wet Density = 128.1 (lbs/ft^3)
% Moisture = 21.7%	% Moisture = 22.9%
Dry Density = 103.3 (lbs/ft^3)	Dry Density = 104.2 (lbs/ft^3)

Test Information	
a (cm^2)=	0.1969
L (cm)=	4.8061
A (cm^2)=	19.4194

Trial 1

Date and Time	Elapsed Time (seconds)	Cell Burette Reading (ml)	Base Burette Reading (ml)	Base Burette Distance from Datum (cm)	Top Burette Reading (ml)	Top Burette Distance from Datum (cm)	Total Head Across Sample (cm of water)	Temperature (℃)	Weighted Average Temp. (℃)	Uncorrected Hydraulic Conductivity (cm/sec)	Correction Factor	Cumulative Time (sec)	Corrected Hydraulic Conductivity (cm/sec)
5/4/11 7:55	0	8.5	10.00	27.200	0.00	78.000	85.979	18.1					
5/4/11 14:25	23400	8.4	9.92	27.606	0.13	77.340	84.912	21.5	19.80	1.30E-08	1.0051515	23400	1.31E-08
5/5/11 9:10	90900	8.7	9.67	28.876	0.44	75.765	82.067	19.8	20.43	1.25E-08	0.9897973	90900	1.24E-08
5/6/11 8:10	173700	8.7	9.38	30.350	0.80	73.936	78.765	19.5	20.06	1.23E-08	0.9988069	173700	1.23E-08
5/9/11 7:15	429600	8.9	8.61	34.261	1.83	68.704	69.621	22.9	20.74	1.20E-08	0.9824633	429600	1.18E-08

Trial 2

Date and Time	Elapsed Time (seconds)	Cell Burette Reading (ml)	Base Burette Reading (ml)	Base Burette Distance from Datum (cm)	Top Burette Reading (ml)	Top Burette Distance from Datum (cm)	Total Head Across Sample (cm of water)	Temperature (℃)	Weighted Average Temp. (℃)	Uncorrected Hydraulic Conductivity (cm/sec)	Correction Factor	Cumulative Time (sec)	Corrected Hydraulic Conductivity (cm/sec)
5/9/11 7:45	0	8.9	10.00	27.200	0.00	78.000	85.979	22.6					
5/10/11 7:30	85500	9.2	9.67	28.876	0.37	76.120	82.423	22.4	22.50	1.20E-08	0.9421229	85500	1.13E-08
5/11/11 8:30	175500	9.2	9.35	30.502	0.77	74.088	78.765	22.4	22.45	1.22E-08	0.9432589	175500	1.15E-08
5/12/11 8:05	260400	9.3	9.07	31.924	1.10	72.412	75.667	22	22.37	1.20E-08	0.9450598	260400	1.13E-08
5/13/11 8:15	347400	9.3	8.79	33.347	1.42	70.786	72.619	22.1	22.29	1.18E-08	0.9468317	347400	1.12E-08

Trial 3

Date and Time	Elapsed Time (seconds)	Cell Burette Reading (ml)	Base Burette Reading (ml)	Base Burette Distance from Datum (cm)	Top Burette Reading (ml)	Top Burette Distance from Datum (cm)	Total Head Across Sample (cm of water)	Temperature (℃)	Weighted Average Temp. (℃)	Uncorrected Hydraulic Conductivity (cm/sec)	Correction Factor	Cumulative Time (sec)	Corrected Hydraulic Conductivity (cm/sec)
5/16/11 7:55	0	10.1	10.00	27.200	0.00	78.000	85.979	19					
5/17/11 7:50	86100	9.9	9.71	28.673	0.32	76.374	82.880	19.2	19.10	1.04E-08	1.0226658	86100	1.06E-08
5/18/11 8:00	173100	9.9	9.43	30.096	0.66	74.647	79.731	20.5	19.48	1.06E-08	1.0131690	173100	1.08E-08
5/19/11 8:00	259500	9.9	9.16	31.467	0.98	73.022	76.733	21.7	20.02	1.07E-08	0.9998188	259500	1.07E-08
5/20/11 8:30	347700	10.0	8.91	32.737	1.28	71.498	73.939	21.8	20.46	1.06E-08	0.9891813	347700	1.05E-08
												H.C.=	**1.1E-08**

CLAY VOLUME CALCULATION

Client: Ameren Missouri
Project: Labadie UWL
Location: Callaway Borrow Site

USING ONLY MODERATE TO HIGH PLASTIC CLAY MATERIAL WITH LOW SAND/GRAVEL CONTENT				
Borrow Area No.	Surface Area (acres)	Thickness of Useable Liner Material (feet)	Volume (acre-ft)	Volume (cubic yards)
1	35	20	700	1130000
2	33	11	363	590000
3	22	19	418	670000
4	28	18	504	810000
5	36	22	792	1280000
		TOTAL	**2777**	**4480000**

USING ALL SILT, LOW PLASTIC CLAY, AND HIGH PLASTIC CLAY MATERIAL WITH LOW SAND/GRAVEL CONTENT				
Borrow Area No.	Surface Area (acres)	Thickness of Useable Liner Material (feet)	Volume (acre-ft)	Volume (cubic yards)
1	35	27	945	1520000
2	33	17	561	910000
3	22	24	528	850000
4	28	21	588	950000
5	36	25	900	1450000
		TOTAL	**3522**	**5680000**

Figure 7

SCHEDULE CJG-ST1

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Appendix A-1

POTENTIAL HAUL ROUTE FOR CLAY BORROW AND SUPPLEMENTAL LABORATORY TESTING

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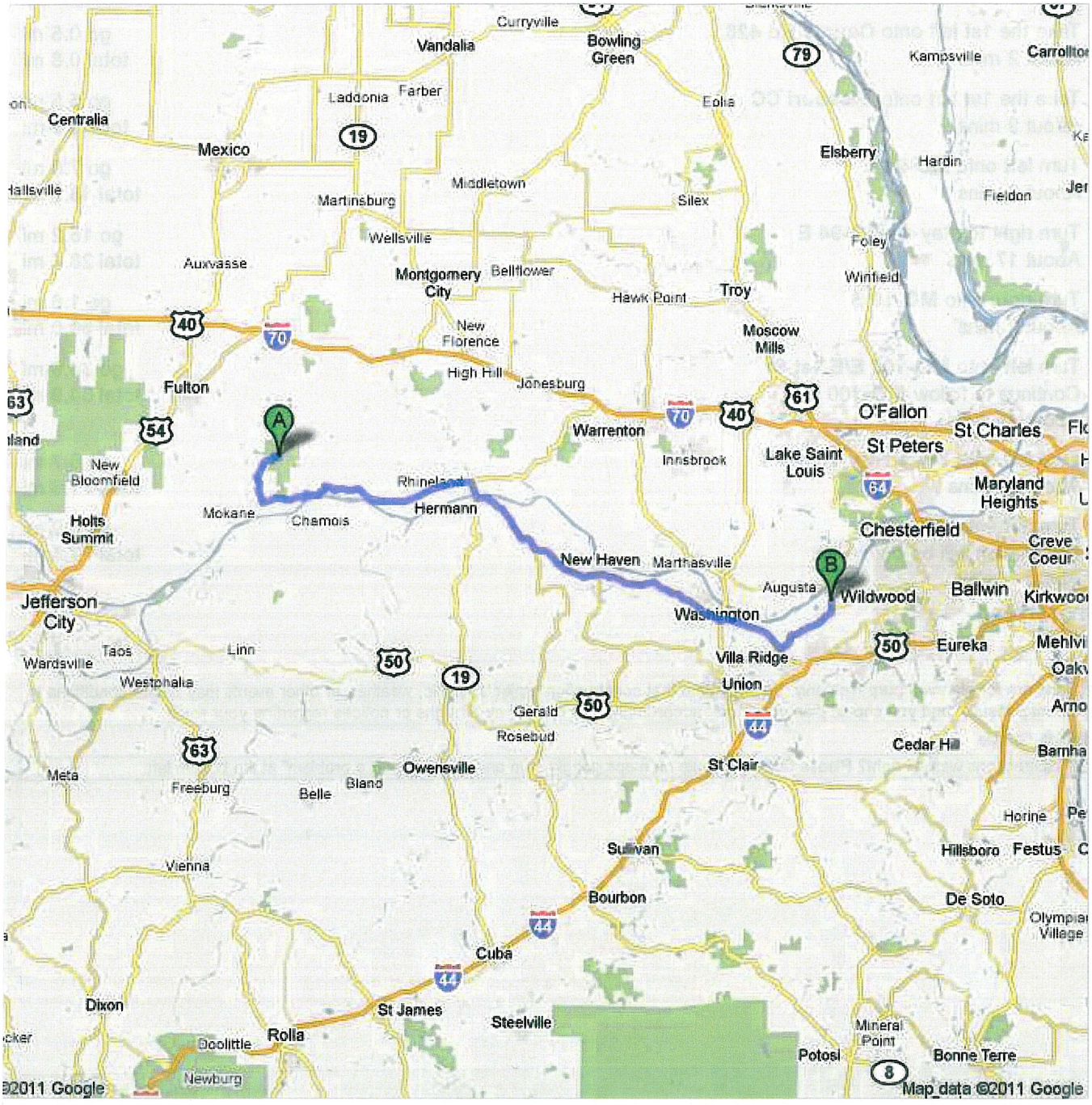
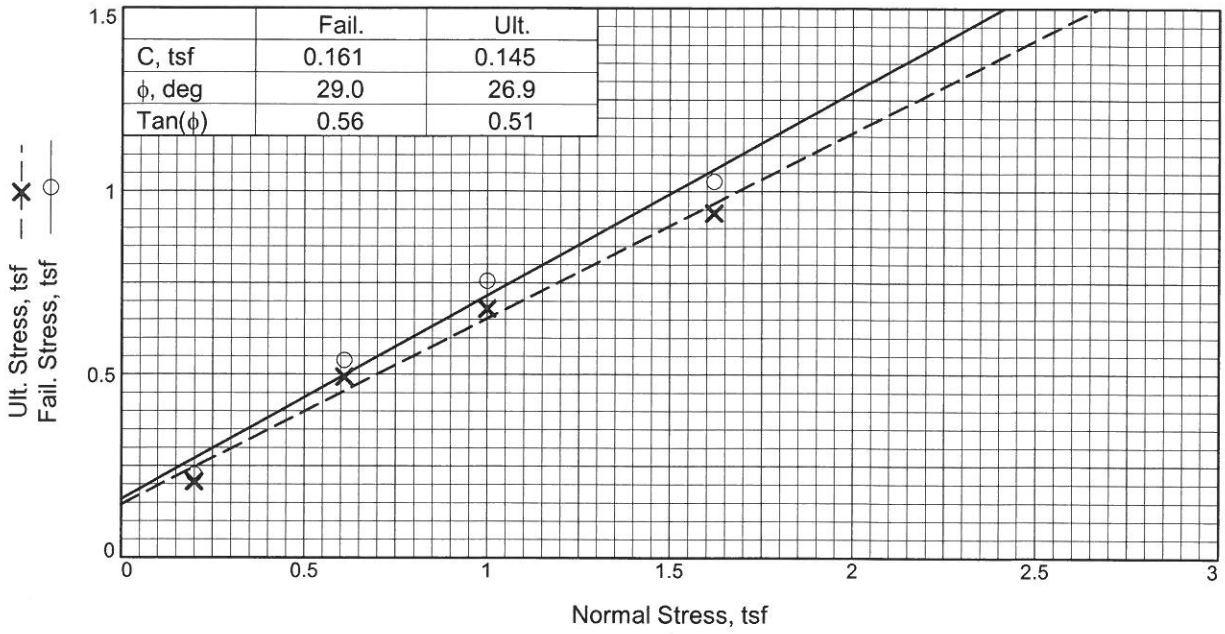
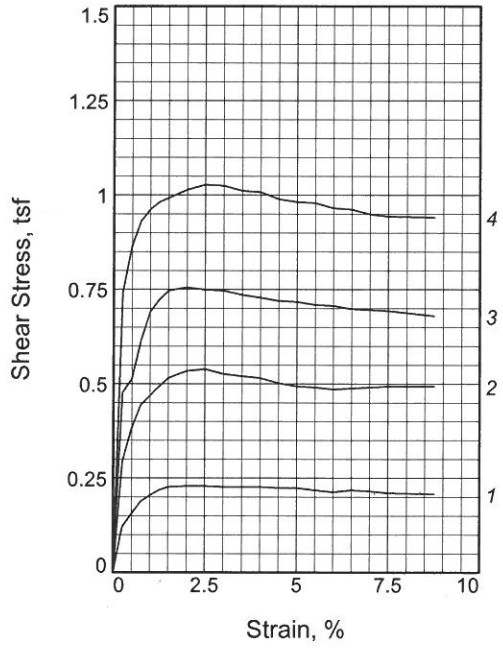
Google maps

Directions to Unknown road
72.5 mi – about 1 hour 40 mins
Callaway to UWL (Davis RD at Labadie Bottom Rd)



Ameren Missouri Labadie UWL
POSSIBLE ROUTE FROM CALLAWAY PLANT
CLAY BORROW SITE TO LABADIE UWL





Sample No.		1	2	3	4
Initial	Water Content, %	24.9	24.9	24.9	24.9
	Dry Density, pcf	98.8	98.8	98.8	98.8
	Saturation, %	96.2	96.2	96.2	96.2
	Void Ratio	0.6933	0.6933	0.6933	0.6933
	Diameter, in.	2.00	2.00	2.00	2.00
	Height, in.	1.28	1.28	1.28	1.28
At Test	Water Content, %	24.9	24.9	24.9	24.9
	Dry Density, pcf	98.8	98.8	98.8	98.8
	Saturation, %	96.2	96.2	96.2	96.2
	Void Ratio	0.6933	0.6933	0.6933	0.6933
	Diameter, in.	2.00	2.00	2.00	2.00
	Height, in.	1.28	1.28	1.28	1.28
Normal Stress, tsf		0.200	0.610	1.000	1.620
Fail. Stress, tsf		0.226	0.539	0.755	1.027
Strain, %		1.5	2.5	2.0	2.5
Ult. Stress, tsf		0.208	0.493	0.679	0.941
Strain, %		8.8	8.8	8.8	8.8
Strain rate, %/min.		0.80	0.80	0.80	0.80

Sample Type: Compacted
Description: CLAY (CH), grey-brown-tan-orangish brown, high platic, with trace fine
LL= 62 **PL=** 19 **PI=** 43
Assumed Specific Gravity= 2.68
Remarks: High plastic clay was sheared against the textured liner from Sioux UWL

Figure A1-2

Client: Ameren Missouri

Project: Labadie Plant Utility Waste Landfill

Location: Composite: high plastic clay material

Proj. No.: 2008012455 **Date Sampled:**

REITZ & JENS, INC.
CONSULTING ENGINEERS

Tested By: J. Crose **Checked By:** K. Kocher

SCHEDULE CJG-ST1

DIRECT SHEAR TEST

11/20/2012

Date:
Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill
Project No.: 2008012455
Location: Composite: high plastic clay material
Description: CLAY (CH), grey-brown-tan-orangish brown, high platic, with trace fine chert fragments Sample is a composite of material left over from shelby tubes that was visually classified as high plastic clay.
Remarks: High plastic clay was sheared against the textured liner from Sioux UWL
Type of Sample: Compacted
Assumed Specific Gravity=2.68 **LL=**62 **PL=**19 **PI=**43

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	329.350		329.350
Moisture content: Dry soil+tare, gms.	271.510		271.510
Moisture content: Tare, gms.	39.160		39.160
Moisture, %	24.9	24.9	24.9
Moist specimen weight, gms.	129.8		
Diameter, in.	2.00	2.00	
Area, in.²	3.14	3.14	
Height, in.	1.28	1.28	
Net decrease in height, in.		0.00	
Wet density, pcf	123.4	123.4	
Dry density, pcf	98.8	98.8	
Void ratio	0.6933	0.6933	
Saturation, %	96.2	96.2	

Test Readings for Specimen No. 1

Primary load ring constant = .1176 lbs. per input unit
Normal stress = 0.2 tsf
Strain rate, %/min. = 0.80
Fail. Stress = 0.226 tsf **at reading no.** 6
Ult. Stress = 0.208 tsf **at reading no.** 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	45.00	5.3	0.3	0.121
2	0.0100	58.00	6.8	0.5	0.156
3	0.0150	70.00	8.2	0.8	0.189
4	0.0200	76.00	8.9	1.0	0.205
5	0.0250	81.00	9.5	1.3	0.218
6	0.0300	84.00	9.9	1.5	0.226
7	0.0400	85.00	10.0	2.0	0.229
8	0.0500	85.00	10.0	2.5	0.229
9	0.0600	84.00	9.9	3.0	0.226
10	0.0700	84.00	9.9	3.5	0.226
11	0.0800	84.00	9.9	4.0	0.226

Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
12	0.0900	83.00	9.8	4.5	0.224
13	0.1000	83.00	9.8	5.0	0.224
14	0.1100	81.00	9.5	5.5	0.218
15	0.1200	79.00	9.3	6.0	0.213
16	0.1300	81.00	9.5	6.5	0.218
17	0.1400	80.00	9.4	7.0	0.216
18	0.1500	78.00	9.2	7.5	0.210
19	0.1750	77.00	9.1	8.8	0.208

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	329.350		329.350
Moisture content: Dry soil+tare, gms.	271.510		271.510
Moisture content: Tare, gms.	39.160		39.160
Moisture, %	24.9	24.9	24.9
Moist specimen weight, gms.	129.8		
Diameter, in.	2.00	2.00	
Area, in.²	3.14	3.14	
Height, in.	1.28	1.28	
Net decrease in height, in.		0.00	
Wet density, pcf	123.4	123.4	
Dry density, pcf	98.8	98.8	
Void ratio	0.6933	0.6933	
Saturation, %	96.2	96.2	

Test Readings for Specimen No. 2

Primary load ring constant = .1176 lbs. per input unit

Normal stress = 0.61 tsf

Strain rate, %/min. = 0.80

Fail. Stress = 0.539 tsf **at reading no.** 8

Ult. Stress = 0.493 tsf **at reading no.** 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	109.00	12.8	0.3	0.294
2	0.0100	142.00	16.7	0.5	0.383
3	0.0150	165.00	19.4	0.8	0.445
4	0.0200	174.00	20.5	1.0	0.469
5	0.0250	183.00	21.5	1.3	0.493
6	0.0300	191.00	22.5	1.5	0.515
7	0.0400	198.00	23.3	2.0	0.534
8	0.0500	200.00	23.5	2.5	0.539
9	0.0600	195.00	22.9	3.0	0.526
10	0.0700	193.00	22.7	3.5	0.520
11	0.0800	191.00	22.5	4.0	0.515
12	0.0900	186.00	21.9	4.5	0.501
13	0.1000	183.00	21.5	5.0	0.493
14	0.1100	182.00	21.4	5.5	0.491

Test Readings for Specimen No. 2

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
15	0.1200	180.00	21.2	6.0	0.485
16	0.1300	181.00	21.3	6.5	0.488
17	0.1400	182.00	21.4	7.0	0.491
18	0.1500	183.00	21.5	7.5	0.493
19	0.1750	183.00	21.5	8.8	0.493

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	329.350		329.350
Moisture content: Dry soil+tare, gms.	271.510		271.510
Moisture content: Tare, gms.	39.160		39.160
Moisture, %	24.9	24.9	24.9
Moist specimen weight, gms.	129.8		
Diameter, in.	2.00	2.00	
Area, in.^{2}	3.14	3.14	
Height, in.	1.28	1.28	
Net decrease in height, in.		0.00	
Wet density, pcf	123.4	123.4	
Dry density, pcf	98.8	98.8	
Void ratio	0.6933	0.6933	
Saturation, %	96.2	96.2	

Test Readings for Specimen No. 3

Primary load ring constant = .1176 lbs. per input unit

Normal stress = 1 tsf

Strain rate, %/min. = 0.80

Fail. Stress = 0.755 tsf **at reading no.** 7

Ult. Stress = 0.679 tsf **at reading no.** 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	177.00	20.8	0.3	0.477
2	0.0100	190.00	22.3	0.5	0.512
3	0.0150	228.00	26.8	0.8	0.615
4	0.0200	256.00	30.1	1.0	0.690
5	0.0250	268.00	31.5	1.3	0.722
6	0.0300	277.00	32.6	1.5	0.747
7	0.0400	280.00	32.9	2.0	0.755
8	0.0500	278.00	32.7	2.5	0.749
9	0.0600	277.00	32.6	3.0	0.747
10	0.0700	273.00	32.1	3.5	0.736
11	0.0800	270.00	31.8	4.0	0.728
12	0.0900	267.00	31.4	4.5	0.720
13	0.1000	266.00	31.3	5.0	0.717
14	0.1100	263.00	30.9	5.5	0.709
15	0.1200	262.00	30.8	6.0	0.706
16	0.1300	259.00	30.5	6.5	0.698
17	0.1400	258.00	30.3	7.0	0.695

Test Readings for Specimen No. 3

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
18	0.1500	257.00	30.2	7.5	0.693
19	0.1750	252.00	29.6	8.8	0.679

Parameters for Specimen No. 4

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	329.350		329.350
Moisture content: Dry soil+tare, gms.	271.510		271.510
Moisture content: Tare, gms.	39.160		39.160
Moisture, %	24.9	24.9	24.9
Moist specimen weight, gms.	129.8		
Diameter, in.	2.00	2.00	
Area, in.²	3.14	3.14	
Height, in.	1.28	1.28	
Net decrease in height, in.		0.00	
Wet density, pcf	123.4	123.4	
Dry density, pcf	98.8	98.8	
Void ratio	0.6933	0.6933	
Saturation, %	96.2	96.2	

Test Readings for Specimen No. 4

Primary load ring constant = .1176 lbs. per input unit

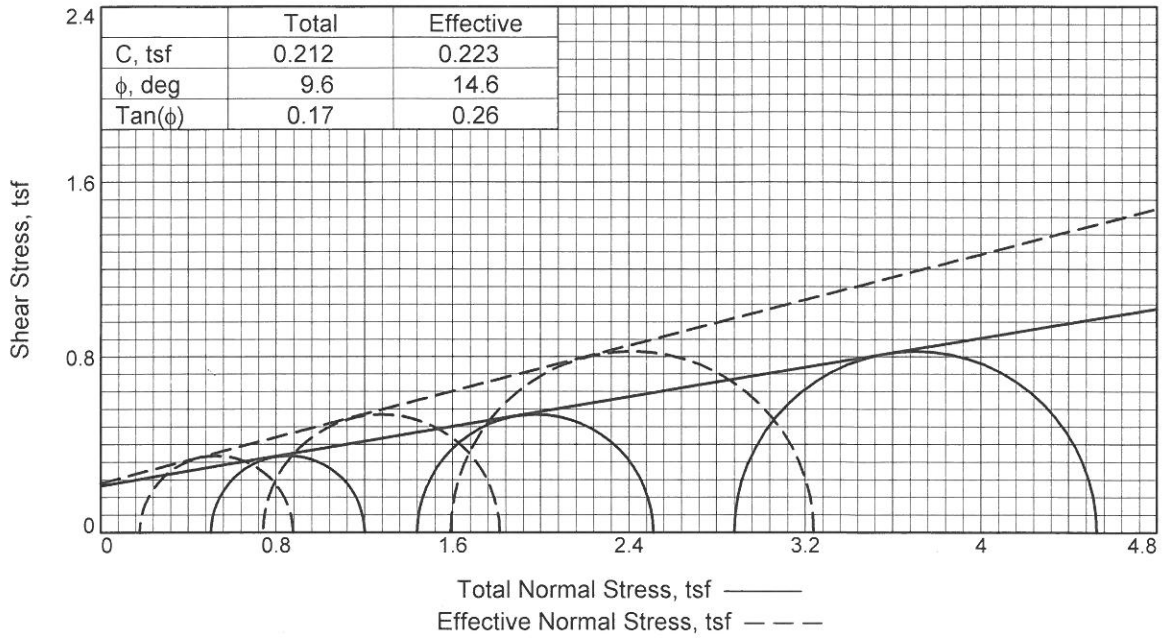
Normal stress = 1.62 tsf

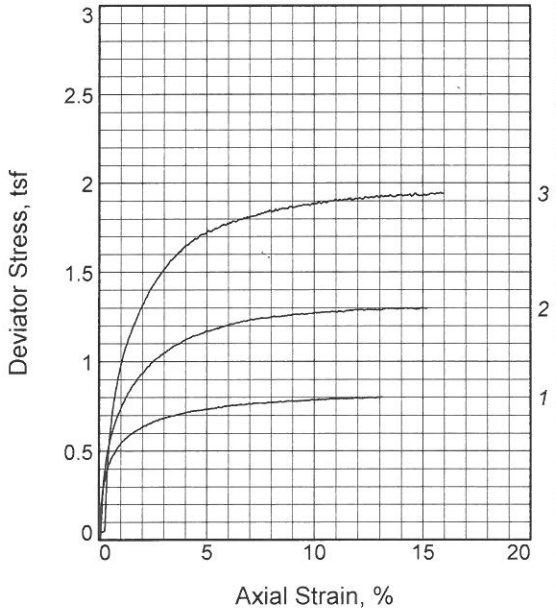
Strain rate, %/min. = 0.80

Fail. Stress = 1.027 tsf **at reading no.** 7

Ult. Stress = 0.941 tsf **at reading no.** 18

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	275.00	32.3	0.3	0.741
2	0.0100	321.00	37.7	0.5	0.865
3	0.0150	346.00	40.7	0.8	0.933
4	0.0200	357.00	42.0	1.0	0.962
5	0.0250	364.00	42.8	1.3	0.981
6	0.0400	376.00	44.2	2.0	1.013
7	0.0500	381.00	44.8	2.5	1.027
8	0.0600	380.00	44.7	3.0	1.024
9	0.0700	375.00	44.1	3.5	1.011
10	0.0800	374.00	44.0	4.0	1.008
11	0.0900	367.00	43.2	4.5	0.989
12	0.1000	364.00	42.8	5.0	0.981
13	0.1100	363.00	42.7	5.5	0.978
14	0.1200	358.00	42.1	6.0	0.965
15	0.1300	357.00	42.0	6.5	0.962
16	0.1400	352.00	41.4	7.0	0.949
17	0.1500	350.00	41.2	7.5	0.943
18	0.1750	349.00	41.0	8.8	0.941





Sample No.		1	2	3
Initial	Water Content, %	26.5	26.6	26.7
	Dry Density, pcf	95.4	95.7	95.8
	Saturation, %	94.4	95.4	95.9
	Void Ratio	0.7535	0.7482	0.7466
	Diameter, in.	2.00	2.00	1.99
	Height, in.	4.08	4.33	4.04
At Test	Water Content, %	27.1	24.4	22.4
	Dry Density, pcf	97.0	101.2	104.6
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.7252	0.6536	0.6003
	Diameter, in.	1.99	1.96	1.93
	Height, in.	4.06	4.25	3.92
Strain rate, %/min.		0.02	0.02	0.02
Back Pressure, tsf		3.96	3.96	3.96
Cell Pressure, tsf		4.46	5.40	6.84
Fail. Stress, tsf		0.70	1.07	1.65
Total Pore Pr., tsf		4.28	4.66	5.25
Ult. Stress, tsf		0.80	1.29	1.92
Total Pore Pr., tsf		4.15	4.60	5.26
$\bar{\sigma}_1$ Failure, tsf		0.88	1.81	3.24
$\bar{\sigma}_3$ Failure, tsf		0.18	0.74	1.59

Type of Test:
CU with Pore Pressures

Sample Type: Compacted (Standard Proctor)

Description: CLAY (CH), grey-brown-tan-orangish brown, high platic, with trace fine chert fragments

Assumed Specific Gravity= 2.68

Remarks: Samples were compacted using the standard proctor between the 25% and 27% moisture. Samples were then trimmed to 2" diameter by 4.0"+ length and tested

Figure A1-3

Client: Ameren Missouri

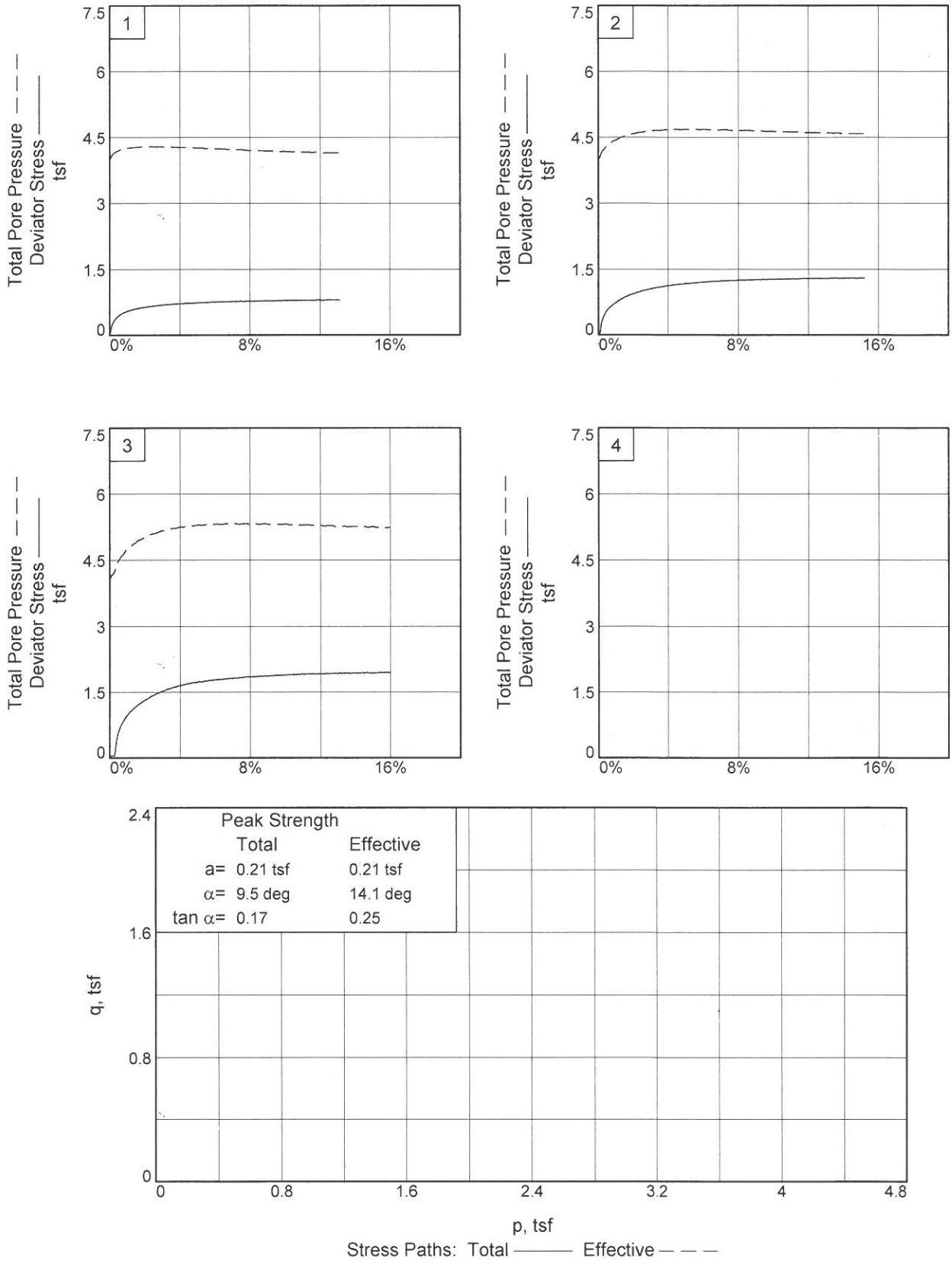
Project: Labadie Plant Utility Waste Landfill

Location: Composite: high plastic clay material (Standard Proctor)

Proj. No.: 2008012455 **Date Sampled:** 7/6/12

REITZ & JENS, INC.
CONSULTING ENGINEERS

Tested By: K. Kocher **Checked By:** J. Fouse



Client: Ameren Missouri
Project: Labadie Plant Utility Waste Landfill
Location: Composite: high plastic clay material (Standard Proctor)
Project No.: 2008012455 **Figure** _____

REITZ & JENS, INC.

Tested By: K. Kocher **Checked By:** J. Fouse

SCHEDULE CJG-ST1

TRIAXIAL CELL SETUP & TAKEDOWN

Project Ameren UE - Callaway Clay Date 6/27/12

Sample ± 25-27% M Depth Compacted using Standard Proctor Method

Description tan + golden HP Clay

Type of Test CU Confining Pressure Differential 7 psi

Cell Number 1 Saturate (before) after Consolidation

Number of Membranes 2 Filter Strips (Yes) No

MOISTURE CONTENT

	INITIAL		FINAL
Tare No.	56	22	Bowl 1
Wet Wt. + Tare	117.37	129.51	605.78
Dry Wt. + Tare	97.08	107.16	513.96
Wt. Water			
Tare Wt.	21.55	22.06	195.04
Dry Soil Wt.			
Moisture %	26.863	26.263	28.791
Avg. w %			

LENGTH CHANGE

STRAIN GAUGE at setup	500
at saturation start	500
at consolidation start	583 (488?)
at axial load start	522

MASS PROPERTIES

Wt. Tube + Soil		gm.
Wt. Tube		gm.
Wt. Soil	404.81	gm.
Tube Diameter		in.
Sample Length		in
tube length		in.
top trim		in.
bottom trim		in.
total trim		in.
sample length		in.
Density constant 4.85/(D^2 * L)		
Wet Density		pcf.
Dry Density		pcf.

SPECIMEN DIMENSIONS in. / mm.

	HEIGHT		DIAMETER	
	Initial	Final	Initial	Final
1	4.0795		T 1.9775	
2	4.0825		M 1.9920	
3	4.0815		B 2.0190	
Avg.	4.08117		1.99617	

Description After Test

Remarks

Failure Sketch

Trimmed By JR
Trimmed Date 6/27/12

Setup By JR
Setup Date 6/27/12

Taken Down By KCK
Take Down Date 6-5-12

Revised 2/12/98

TRIAXIAL CELL SATURATION & BETA FACTOR

PROJECT Ameren Callaway Clay borrow

SAMPLE ≈ 25-27½ M DEPTH

INITIAL CELL PRESSURE 51.0 START DATE 6/27/12

INITIAL PORE PRESSURE 50.0 CELL NUMBER 1

INITIAL TRANSDUCER READING 51.8 TRANSDUCER NUMBER 1

TRIAL DATE	TRIAL TIME	BASE BURETTE READING	CELL PRESSURE	TRANS-DUCER READING	CHANGE IN PRESSURE Transducer Constant			
					CELL DELTA (1)	TRANSDUCER READING CHANGE	TRANSDUCER PRESSURE CHANGE (2)	BETA FACTOR (2/1)
6/29/12	0	7.90	50.0	51.1				
	1	↓	56.0	56.1	5.0		5.0	1.00
	2			56.1	5.0		5.0	1.00
	4			56.1	5.0		5.0	1.00
	8			56.1	5.0		5.0	1.00

OK

TRIAXIAL CELL CONSOLIDATION TEST

PROJECT: Ameren Callaway Clay Borrow

SAMPLE: ≈ 25-2720M DEPTH: 7 psi

CONSOLIDATION CELL PRESSURE: 62.0 CELL NUMBER: 1

CONSOLIDATION PORE PRESSURE: 55.0

DATE	Δ TIME	BURETTE READING	DELTA VOLUME	SUM DELTA VOLUME	~~DELTA~~ TIME	TEMP	REMARKS
7/2/12	0	10.00			10:00		
	6sec	9.48					
	15sec	9.34					
	30sec	9.25					
	1 min	9.13			10:01		
	2	9.01			10:02		
	4	8.87			10:04		
	8	8.70			10:08		
	15	8.52			10:15		
	30	8.25			10:30		
	60	7.90			11:00		
	90	7.63			11:30		
	120	7.41			12:00		
	150	7.23			12:30		
	185	7.03			13:05		
	240	6.77			14:00		
	300	6.54			15:00		
395	~~360~~	6.25			~~16:00~~	1635	
7/3/12	1280	5.28			7:20		
7/3/12	1725	5.18			13:05		
7/4/12	2786	4.99			8:26		
7/5/12	4160	4.92			7:20		

1440 − 160 = 1280

1440 + 185 = 1725

2880 − 94 = 2786

REITZ & JENS, INC. Consulting Engineers Sheet SCHEDULE CJG-ST1 of

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TRIAXIAL CELL AXIAL LOADING TEST

DATE 7-5-12

PROVING RING ______

PROJECT Ameren

SAMPLE Callaway Clay Borrow DEPTH ≈25% to 27% Moisture Compacted to Standard Proctor

INITIAL CELL PRESSURE 62.0 CELL NUMBER 1

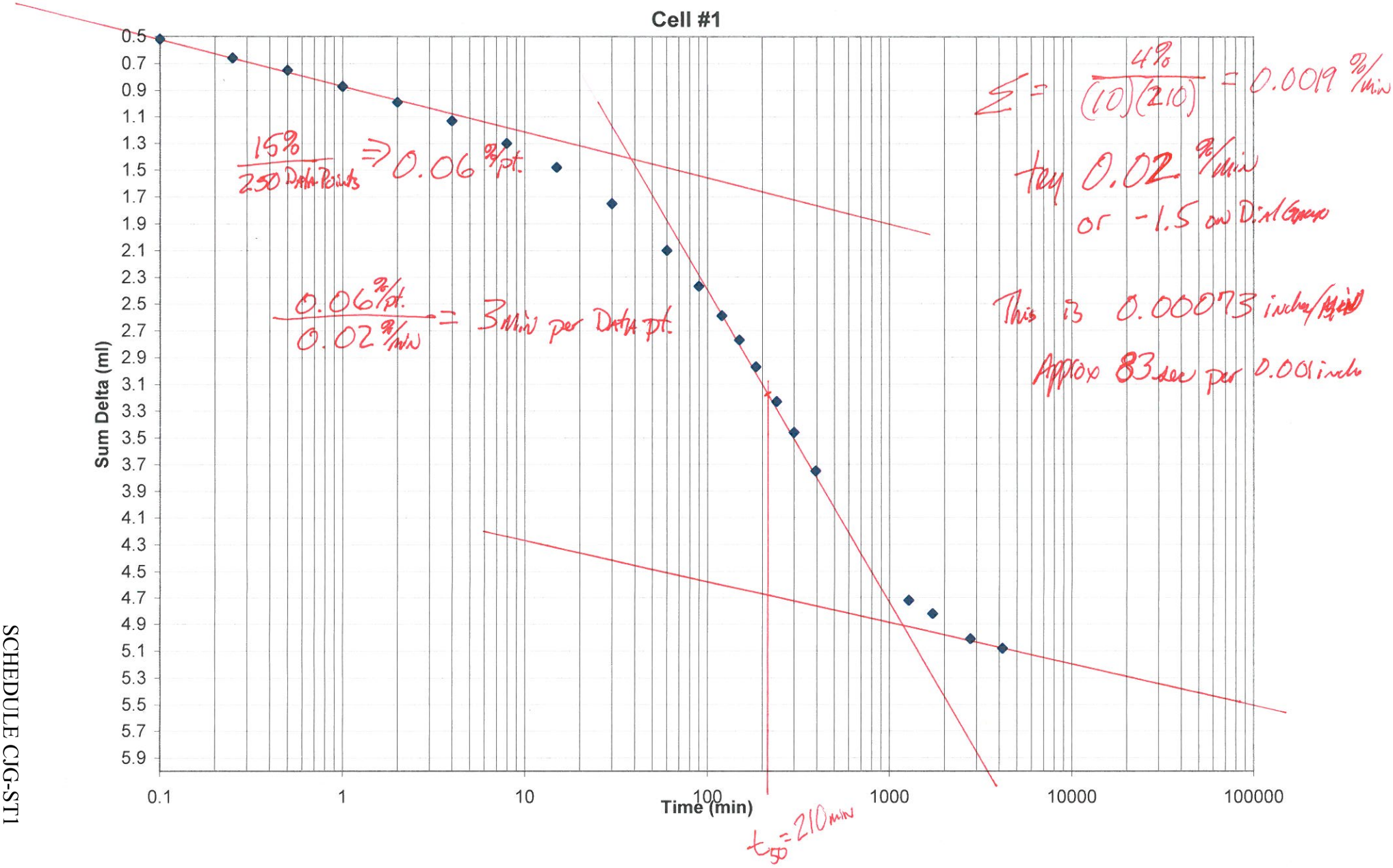
INITIAL PORE PRESSURE 55.0 START DATE 7-5-12

SAMPLE HEIGHT: AT SETUP ≈4.06 inches AT START OF LOADING ______

STRAIN RATE ≈ 0.02 %/min TYPE OF TEST CU

TIME	STRAIN DIAL (.001) IN	LOAD DIAL (.0001) IN	PORE PRESSURE READING	TIME	STRAIN DIAL (.001) IN	LOAD DIAL (.0001) IN	PORE PRESSURE READING
8:31 AM	10	19.0	55.7				

MASS OF TOP CAP & POROUS STONE: ______ g.



SCHEDULE CJG-ST1

TRIAXIAL CELL SETUP & TAKEDOWN

Project Anderson Callahan Borrow Date 7-6-12

Sample CLAY @ 25-27' Depth Compacted @ Standard Proctor

Description HP CLAY Grey & Golden tan, Trace Lignite & Limonite

Type of Test CW Confining Pressure Differential 20 psi

Cell Number 2 Saturate (before) after Consolidation

Number of Membranes 2 Filter Strips (Yes) No

MOISTURE CONTENT

	INITIAL		FINAL
Tare No.	R-123	L-77	Bowl C
Wet Wt. + Tare	333.79	307.97	987.93
Dry Wt. + Tare	270.53	250.95	896.40
Wt. Water			
Tare Wt.	32.06	36.78	554.94
Dry Soil Wt.			
Moisture %	26.639	26.624	26.305
Avg. w %			

LENGTH CHANGE

STRAIN GAUGE at setup	500
at saturation start	500
at consolidation start	491
at axial load start	579

SPECIMEN DIMENSIONS in. / mm.

	HEIGHT		DIAMETER	
	Initial	Final	Initial	Final
1	4.3280		T 2.0025	
2	4.3240		M 1.9985	
3	4.3310		B 2.0005	
Avg.	4.32767		2.0005	

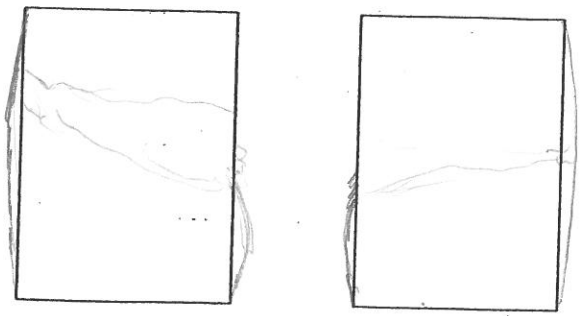
MASS PROPERTIES

Wt. Tube + Soil		gm.
Wt. Tube		gm.
Wt. Soil	432.73	gm.
Tube Diameter		in.
Sample Length		in
tube length		in.
top trim		in.
bottom trim		in.
total trim		in.
sample length		in.
Density constant 4.85/(D^2 * L)		
Wet Density		pcf.
Dry Density		pcf.

Description After Test

Remarks

Failure Sketch



Trimmed By KEK
Trimmed Date 7-6-12

Setup By KEK
Setup Date 7-6-12

Taken Down By KEK
Take Down Date 7-11-12

TRIAXIAL CELL SATURATION & BETA FACTOR

PROJECT American Canyon Borrow

SAMPLE HP CLAY @ 25% to 27% Moisture DEPTH Compacted to Standard Proctor

INITIAL CELL PRESSURE 51.0 START DATE 7-6-12

INITIAL PORE PRESSURE 50.0 CELL NUMBER 2

INITIAL TRANSDUCER READING 51.0 TRANSDUCER NUMBER 2

TRIAL DATE	TRIAL TIME	BASE BURETTE READING	CELL PRESSURE	TRANS-DUCER READING	CHANGE IN PRESSURE Transducer Constant			
					CELL DELTA (1)	TRANSDUCER READING CHANGE	TRANSDUCER PRESSURE CHANGE (2)	BETA FACTOR (2/1)
7-9-12	0	8.70	51.0	50.6				
	1		56.0	55.6	5.0		5.0	1.0
	2		"	55.6	5.0		5.0	1.0
	4 min		"	55.6	5.0		5.0	1.0
			OK					

TRIAXIAL CELL CONSOLIDATION TEST

PROJECT Amazeen Callaway Bureau

SAMPLE HP CLAY @ 25% to 27% Moisture DEPTH Compacted to Standard Proctor

CONSOLIDATION CELL PRESSURE 75.0 CELL NUMBER 2

CONSOLIDATION PORE PRESSURE 55.0

DATE	TIME	BURETTE READING	DELTA VOLUME	SUM DELTA VOLUME	DELTA TIME	TEMP	REMARKS
7-9-12	7:45	10.00			0		
		8.93			.1		
		8.72			.25		
		8.50			.5		
	7:46	8.28			1		
	7:47	8.05			2		
	7:49	7.77			4		
	7:53	7.44			8		
	~~8:00~~				~~15~~		
	8:15	6.47			30		
	8:45	5.68			60		
	9:15	5.08			90		
	9:45	4.58			120		
	10:45	3.76			180		
	11:45	3.10			240		
	13:45	2.10			360		
	16:06	1.24			500		
	16:28	1.15/10.00			520		1 min Loss during Adjustment
7-10-12	8:11	7.44			1466		
	12:24	7.20			1718		
	15:37	7.07			1911		

120
20
140

1440
25
1465

TRIAXIAL CELL AXIAL LOADING TEST

DATE 7-10-12

PROVING RING _____

PROJECT Ameren Callaway CLAY Borrow

SAMPLE CLAY @ 25% to 27% compacted @ the Standard Proctor DEPTH _____

INITIAL CELL PRESSURE 75.0 CELL NUMBER 2

INITIAL PORE PRESSURE 55.0 START DATE _____

SAMPLE HEIGHT: AT SETUP _____ AT START OF LOADING _____

STRAIN RATE ≈0.02 %/min TYPE OF TEST CW

TIME	STRAIN DIAL (.001) IN	LOAD DIAL (.0001) IN	PORE PRESSURE READING	TIME	STRAIN DIAL (.001) IN	LOAD DIAL (.0001) IN	PORE PRESSURE READING
16:19:30	6	22.8	55.6				

MASS OF TOP CAP & POROUS STONE: _____ g.

TRIAXIAL CELL SETUP & TAKEDOWN

Project Ameren Callaway CLAY Borrow Date 7-6-12

Sample CLAY @ 25% - 27% M Depth Compacted with Standard Proctor

Description CLAY (CH), Grey & Goldenbrown, with Lig & Lam.

Type of Test CU Confining Pressure Differential 40 psi

Cell Number 1 Saturate (before) after Consolidation

Number of Membranes 2 Filter Strips (Yes) No

MOISTURE CONTENT

	INITIAL		FINAL
Tare No.	R32	B38	Bowl 3A
Wet Wt. + Tare	311.62	345.24	592.19
Dry Wt. + Tare	254.90	280.92	513.60
Wt. Water			
Tare Wt.	41.30	41.29	197.01
Dry Soil Wt.			
Moisture %	26.554	26.841	
Avg. w %			

LENGTH CHANGE

STRAIN GAUGE at setup 500

at saturation start 500

at consolidation start 488

at axial load start 615

MASS PROPERTIES

Wt. Tube + Soil		gm.
Wt. Tube		gm.
Wt. Soil	400.99	gm.
Tube Diameter		in.
Sample Length		in
tube length		in.
top trim		in.
bottom trim		in.
total trim		in.
sample length		in.
Density constant 4.85/(D^2 * L)		
Wet Density		pcf.
Dry Density		pcf.

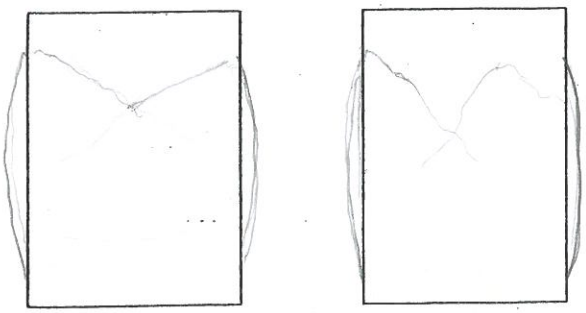
SPECIMEN DIMENSIONS in. / mm.

	HEIGHT		DIAMETER	
	Initial	Final	Initial	Final
1	4.0340		T 1.9955	
2	4.0420		M 1.9895	
3	4.0435		B 1.9900	
Avg.	4.03983		1.99167	

Description After Test

Remarks

Failure Sketch



Trimmed By KEK
Trimmed Date 7-6-12

Setup By KEK
Setup Date 7-6-12

Taken Down By KEK
Take Down Date 7-12-12

revised 2/12/98

TRIAXIAL CELL SATURATION & BETA FACTOR

PROJECT Calloway CLAY

SAMPLE CLAY CH 25%-27% Moisture DEPTH Compacted with Standard Proctor

INITIAL CELL PRESSURE 51.0 START DATE 7-6-12

INITIAL PORE PRESSURE 50.0 CELL NUMBER 1

INITIAL TRANSDUCER READING 51.4 TRANSDUCER NUMBER 1

TRIAL DATE	TRIAL TIME	BASE BURETTE READING	CELL PRESSURE	TRANS-DUCER READING	CHANGE IN PRESSURE Transducer Constant			
					CELL DELTA (1)	TRANSDUCER READING CHANGE	TRANSDUCER PRESSURE CHANGE (2)	BETA FACTOR (2/1)
7-9-12	0	8.04	51.0	50.8				
	1		56.0	55.8	5.0		5.0	1.0
	2		"	55.8	5.0		5.0	1.0
	4min		"	55.8	5.0		5.0	1.0
					OK			
					ReSat. After Leak			
7-9-12	0	1.87	51.0	51.1				
	1		56.0	56.1	5.0		5.0	1.0
	2		"	56.1	5.0		5.0	1.0
	4		"	56.1	5.0		5.0	1.0

TRIAXIAL CELL CONSOLIDATION TEST

PROJECT Ameren Callaway Borrow

SAMPLE HP CL M@ 25% to 27% Moisture DEPTH Compacted to Standard Proctor

CONSOLIDATION CELL PRESSURE 95.0 CELL NUMBER 1

CONSOLIDATION PORE PRESSURE 55.0

DATE	TIME	BURETTE READING	DELTA VOLUME	SUM DELTA VOLUME	DELTA TIME	TEMP	REMARKS
7-9-12	7:50	10.00			0		
		9.20			.1		
		8.65			.25		
		8.41			.5		
	7:51	8.16			1		
	7:52				2		
	7:54				4		
	7:58				8		
	8:05				15		
	8:20				30		
	8:50				60		
	9:20				90		
	9:50				120		
7-10-12	8:25	10.00			0		
		9.13			.1		
		8.95			.25		
		8.78			.5		
	8:26	8.58			1		
	8:27	8.34			2		
	8:29	8.02			4		
	8:33	7.59			8		
	8:40	7.08			15		
	8:55	6.30			30		
	9:25	5.23			60		
	9:55	4.41			90		
	10:25	3.74			120		
	11:25	2.62			180		
	12:25	1.71			240		

Stop! Leaking Re-Saturation

Ran water out top of burette will run test at slowest rate same as 20psi sample

REITZ & JENS, INC. Consulting Engineers Sheet SCHEDULE CJG-ST1 of

TRIAXIAL CELL AXIAL LOADING TEST

DATE ____________

PROVING RING ____________

PROJECT ____________

SAMPLE ____________ DEPTH ____________

INITIAL CELL PRESSURE 95.0 CELL NUMBER 1

INITIAL PORE PRESSURE 55.0 START DATE ____________

SAMPLE HEIGHT: AT SETUP ____________ AT START OF LOADING ____________

STRAIN RATE ≈0.02 TYPE OF TEST CW

TIME	STRAIN DIAL (.001) IN	LOAD DIAL (.0001) IN	PORE PRESSURE READING	TIME	STRAIN DIAL (.001) IN	LOAD DIAL (.0001) IN	PORE PRESSURE READING
16:14:30	4	27.4	55.5				

MASS OF TOP CAP & POROUS STONE: ________ g.

REITZ & JENS, INC. Consulting Engineers

SCHEDULE CJG-ST1

Sheet ________ of ________

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Appendix B

LABORATORY TESTING OF COAL COMBUSTION PRODUCTS FROM LABADIE ENERGY CENTER

Revised August 2013

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APPENDIX B
LABORATORY TESTING OF LABADIE CCP MATERIALS
TABLE OF CONTENTS

NON-PONDED DRY FLY ASH FROM PRECIPITATORS

PONDED FLY ASH FROM EXISTING OPERATION

BOTTOM ASH FROM EXISTING OPERATION

COMBINATIONS OF FLY ASH, BOTTOM ASH, AND GYPSUM

SPECIFIC GRAVITY OF SOLIDS

Pycnometer Method

JOB: Ameren; Labadie CCP Testing
DATE: 8/13/10
BORING: Labadie Dry Fly Ash
TEST BY: J. David
SAMPLE: Bulk
COMPUTED BY: K. Kocher

Sample or Specimen No.			1	2	
Flask No.			7	7	
Temperature of water and soil, T, ^{o}C			21.5	21.5	
Dish No.					
Weight in Grams	Dish + Dry Soil				
	Dish				
	Dry soil	W_s	50.05	50.05	
	Flask + water at T, ^{o}C	W_{bw}	679.33	679.28	
	$W_s + W_{bw}$		729.38	729.33	
	Flask + water + immersed soil	W_{bws}	729.38	711.88	
	Displaced water, $W_s + W_{bw} - W_{bws}$		17.50	17.45	
Correction factor		K	.99968	.99968	
$(W_s K) / (W_s + W_{bw} - W_{bws})$		G_s	2.86	2.87	

Sample Description

#1 Dry fly ash, tan, from precipitators

#2 Dry fly ash, tan, from precipitators

Flask Calibration	Trial				
Weight	Completed				
Temp.	Annually				

SPECIFIC GRAVITY OF SOLIDS

Pycnometer Method

JOB: Ameren CCP Ash Study
BORING: Labadie
SAMPLE: Fly Ash

DATE: 8/13/10
TEST BY: JR
COMPUTED BY: K. Kocher & J. David

Sample or Specimen No.			—		
Flask No.			7		
Temperature of water and soil, T, °C			21.5		
Dish No.			—		
Weight in Grams: Dish + Dry Soil					
Weight in Grams: Dish					
Weight in Grams: Dry soil		W_s	50.05		50.05
Weight in Grams: Flask + water at T, °C		W_{bw}	~~679.33~~		~~679.28~~
Weight in Grams: $W_s + W_{bw}$			~~729.38~~		~~729.33~~
Weight in Grams: Flask + water + immersed soil		W_{bws}	711.88		711.88
Weight in Grams: Displaced water, $W_s + W_{bw} - W_{bws}$			~~17.50~~		~~17.45~~ 17.434
Correction factor		K	~~.99968~~		~~.99968~~ 0.999945
$(W_s K) / (W_s + W_{bw} - W_{bws})$		G_s	~~2.860~~	2.873	2.87 2.884

50,03398/ 2010 Average

Sample Description

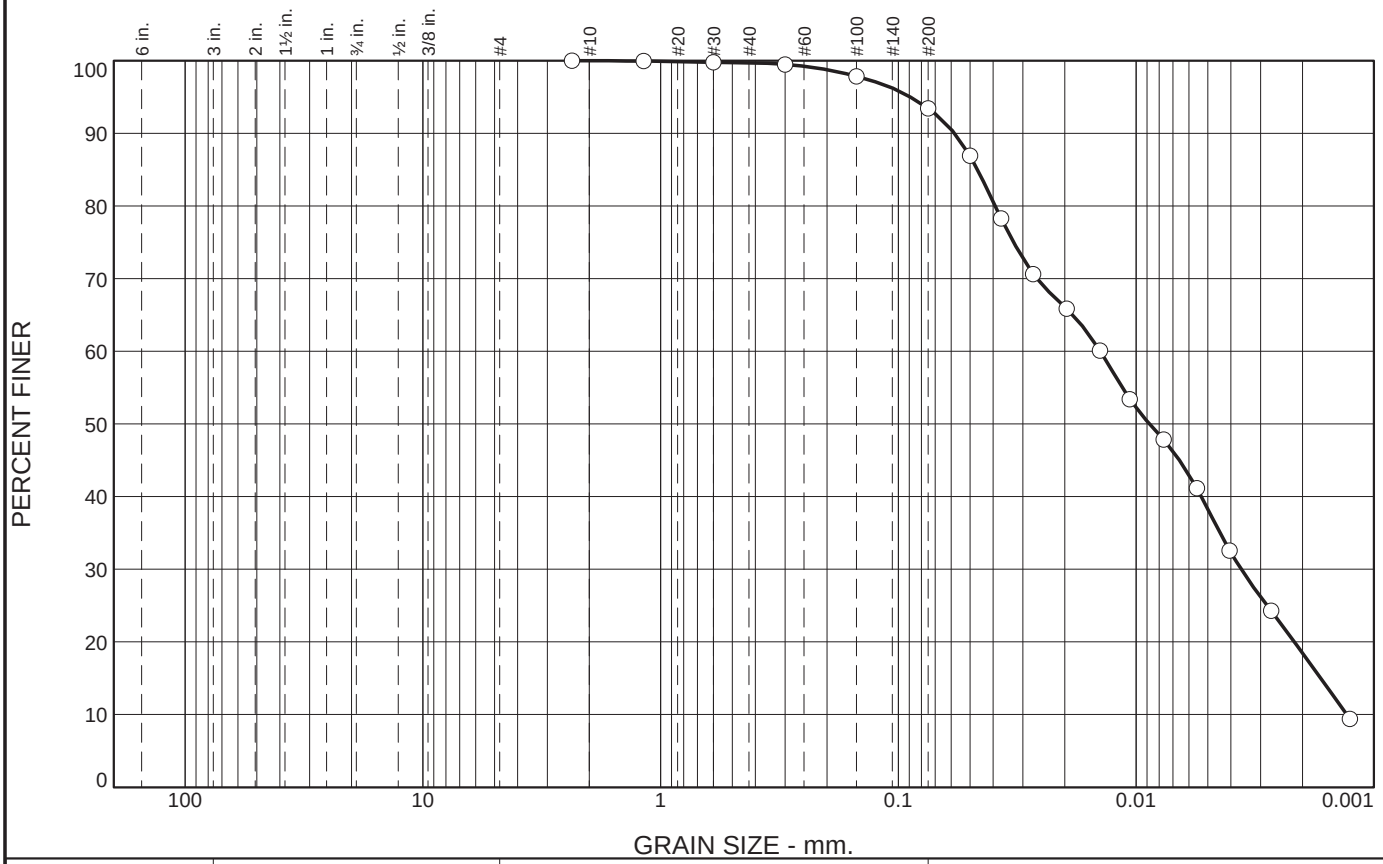
#1 OK OK

#2 Tan Fly Ash (Non-Ponded)

Flask Calibration	Trial				
Weight					
Temp.					

REITZ & JENS, INC.

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	6.3	55.1	38.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#8	100.0		
#16	100.0		
#30	99.8		
#50	99.5		
#100	97.9		
#200	93.4		

* (no specification provided)

Material Description

Tan, dry fly ash, with SHMP

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 0.0464 D_{60}= 0.0141 D_{50}= 0.0088
D_{30}= 0.0036 D_{15}= 0.0017 D_{10}= 0.0013
C_u= 10.86 C_c= 0.71

Date Tested: 1/15/09 **Tested By:** C. Cook

Remarks

Sample No.: Bulk **Source of Sample:** Non-Ponded Dry Fly Ash from Precipitators **Date Sampled:** 12/13/2008
Location: Labadie Fly Ash **Elev./Depth:**
Checked By: K. Kocher **Title:** P.E.

REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: CCP Properties, Labadie Plant

Project No: 2008012455 **Figure**

Tested By: CWC **Checked By:** KEK

SCHEDULE CJG-ST1

GRAIN SIZE DISTRIBUTION TEST DATA

5/20/2011

Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Project Number: 2008012455
Location: Labadie Fly Ash
Sample Number: Bulk
Material Description: Tan, dry fly ash, with SHMP
Sample Date: 12/13/2008
Tested By: C. Cook **Test Date:** 1/15/09
Checked By: K. Kocher **Title:** P.E.
Sieve opening list: (Default opening sizes)

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 174.51
Tare Wt. = 171.18
Minus #200 from wash = 93.3%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
49.99	0.00	0.00	#8	0.00	100.0
			#16	0.01	100.0
			#30	0.11	99.8
			#50	0.25	99.5
			#100	1.07	97.9
			#200	3.28	93.4

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =49.99
Hygroscopic moisture correction:
Moist weight and tare = 0.10
Dry weight and tare = 0.10
Tare weight = 0.00
Hygroscopic moisture = 0.0%
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -5
Meniscus correction only = 1.0
Specific gravity of solids = 2.86
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
0.50	21.9	50.0	45.4	0.0126	51.0	7.9	0.0500	86.9
1.00	21.9	45.5	40.9	0.0126	46.5	8.7	0.0370	78.3
2.00	21.9	41.5	36.9	0.0126	42.5	9.3	0.0271	70.6
4.00	21.9	39.0	34.4	0.0126	40.0	9.7	0.0196	65.9
8.00	21.9	36.0	31.4	0.0126	37.0	10.2	0.0142	60.1
15.00	21.9	32.5	27.9	0.0126	33.5	10.8	0.0107	53.4
30.00	22.3	29.5	25.0	0.0125	30.5	11.3	0.0077	47.8
60.00	22.3	26.0	21.5	0.0125	27.0	11.9	0.0056	41.1
120.00	22.4	21.5	17.0	0.0125	22.5	12.6	0.0040	32.6
278.00	23.4	16.9	12.7	0.0123	17.9	13.4	0.0027	24.3
1439.00	22.0	9.5	4.9	0.0125	10.5	14.6	0.0013	9.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.3	6.3	6.6	55.1	38.3	93.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0013	0.0017	0.0022	0.0036	0.0088	0.0141	0.0392	0.0464	0.0580	0.0889

Fineness Modulus	C_u	C_c
0.03	10.86	0.71

Reitz & Jens, Inc.

GRAIN SIZE ANALYSIS

(Hydrometer Method)

CWL 1/15/09

Job AMEREN - ASH TESTING

Boring No. LABADIE DRY ASH w/ NAX

Depth Bulk

Sample No.

Meniscus Correction (Cm) 1.0

% finer = $\frac{Rcx\ A}{Wo}$ x 100

Lab test by CWL Date 1/15/09

Computed by KEK Date 1/19/09

Checked by KEK Date 1/19/09

Hydrometer No. 68 RS-1

Graduate No. 3

Date	Time	Elapsed Time Min.	Temp C	Hydro Reading (R)	R^1 = R + C_m	Particle Diameter (D) MM	Composite Correction C_c	Rc= R - C_c	Percent Finer Partial	Percent Finer Total
1/19/09	0857		21.9							
		0.5	↓	50						
	58	1.0		45.5						
	59	2.0		41.5						
	0901	4.0		39.0						
	0905	8.0		36.0						
	0912	15	↓	32.5						
	0927	30	22.3	29.5						
	0957	60	↓	26.0						
	1057	120	22.4	21.5						
	~~1257~~	~~240~~	~~23.4~~							
	1335	278	↓	16.9						
1-20-09	0856	1439	22.0	9.5						

Weight In Grams			
	Dish + Dry Soil	(gm)	
	Dish	(gm)	
	Dry Soil	(gm)	

Notes on ASTM Procedure:

1. Cylinder and contents to be turned upside down and back for 60 turns in 60 seconds (counting turn upside down and back as two turns).
2. Hydrometer to be removed from suspension between readings and placed in clean water (spin).

Sample description & Remarks SOIL: 49.99 g NAX: 5.03 g

SCHEDULE CJG-ST1

106

REITZ & JENS, INC.

GRAIN SIZE ANALYSIS

(Sieve or Screen Method)

Project: Ameren Ash Testing
Boring No.: Labadie Ash w/Hex
Sample No.: Bulk
Depth:

Test by: CWK 1/16/09
Entered by: KEK 1/19/09
Checked by: KEK 1/19/09
Testing Date: 1/16/09

U.S. Standard Sieve Size	Sieve Opening (mm)	Sieve Wgt. + Soil (grams)	Sieve Weight (grams)	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Finer by Weight
3-in.	**75**					
2-in.	**50**					
1-1/2 in.	**37.5**					
1 in	**25.4**					
3/4-in.	**19.0**					
1/2-in.	**12.7**					
3/8-in.	**9.5**					
#3	6.35					
#4	**4.75**					
#6	3.35					
#8	**2.36**				0.00	
#10	2.00					
#16	**1.18**				0.01	
#18	1.00					
#20	0.85					
#30	**0.60**				0.11	
#35	0.50					
#40	0.425					
#50	**0.300**				0.25	
#60	0.250					
#70	0.212					
#100	**0.150**				1.07	
#120	0.125					
#140	0.106					
#200	**0.075**				3.28	
Pan					3.33 (total)	
Sample Lost in #200 Wash						
Total Weight in Grams						

Pre #200 wash Weights	
Soil + Tare	
Tare	
Soil	

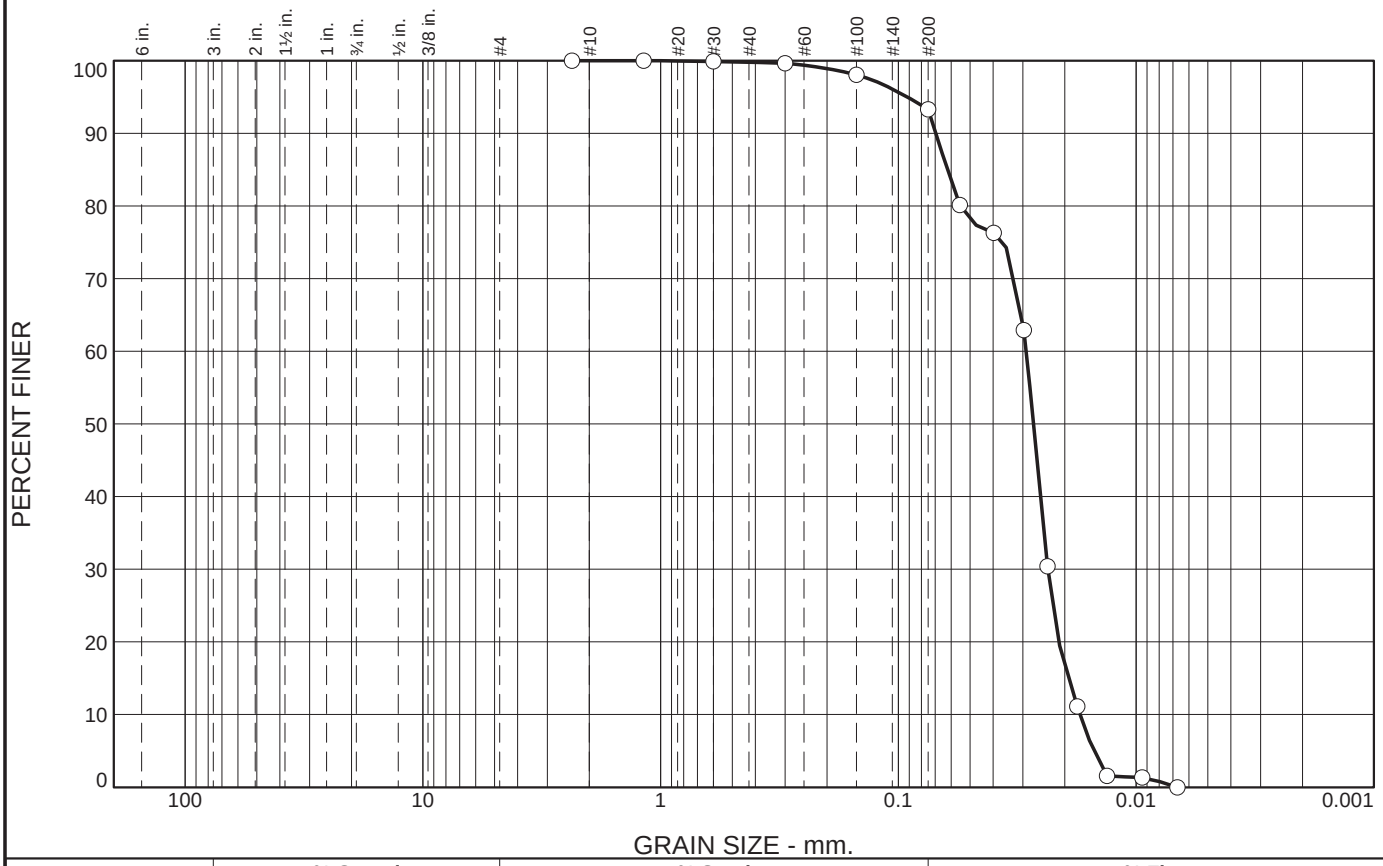
5

Post #200 wash Weights	
Soil + Tare	174.51
Tare	171.18
Soil	3.33

Sample Description & Remarks: Labadie Dry Fly Ash

N:\Lab Cert\Lab Forms\Grain Size Data Form.xls

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	6.5	93.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#8	100.0		
#16	100.0		
#30	99.9		
#50	99.7		
#100	98.1		
#200	93.3		

* (no specification provided)

Material Description

Tan, dry fly ash, without SHMP

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 0.0625 D_{60}= 0.0290 D_{50}= 0.0270
D_{30}= 0.0235 D_{15}= 0.0194 D_{10}= 0.0172
C_u= 1.69 C_c= 1.11

Date Tested: 1/15/09 **Tested By:** C. Cook

Remarks

Sample No.: Bulk **Source of Sample:** Non-Ponded Dry Fly Ash from Precipitators **Date Sampled:** 12/13/08
Location: Labadie Fly Ash **Elev./Depth:**
Checked By: K. Kocher **Title:** P.E.

REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: CCP Properties, Labadie Plant

Project No: 2008012455 **Figure**

Tested By: CWC **Checked By:** KEK

SCHEDULE CJG-ST1

GRAIN SIZE DISTRIBUTION TEST DATA

5/20/2011

Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Project Number: 2008012455
Location: Labadie Fly Ash
Sample Number: Bulk
Material Description: Tan, dry fly ash, without SHMP
Sample Date: 12/13/08
Tested By: C. Cook **Test Date:** 1/15/09
Checked By: K. Kocher **Title:** P.E.
Sieve opening list: (Default opening sizes)

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 173.76
Tare Wt. = 170.11
Minus #200 from wash = 92.7%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
50.05	0.00	0.00	#8	0.00	100.0
			#16	0.00	100.0
			#30	0.05	99.9
			#50	0.17	99.7
			#100	0.96	98.1
			#200	3.35	93.3

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =49.99
Hygroscopic moisture correction:
Moist weight and tare = 0.10
Dry weight and tare = 0.10
Tare weight = 0.00
Hygroscopic moisture = 0.0%
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 1.0
Specific gravity of solids = 2.87
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - 0.164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
0.50	19.8	42.0	41.9	0.0129	43.0	9.2	0.0553	80.1
1.00	19.8	40.0	39.9	0.0129	41.0	9.6	0.0398	76.3
2.00	19.8	33.0	32.9	0.0129	34.0	10.7	0.0297	62.9
4.00	19.8	16.0	15.9	0.0129	17.0	13.5	0.0236	30.4
8.00	19.8	5.9	5.8	0.0129	6.9	15.2	0.0177	11.1
15.00	19.8	0.9	0.8	0.0129	1.9	16.0	0.0133	1.6
30.00	19.2	0.9	0.7	0.0129	1.9	16.0	0.0095	1.3
60.00	19.2	0.2	0.0	0.0129	1.2	16.1	0.0067	0.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.2	6.5	6.7			93.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0172	0.0194	0.0211	0.0235	0.0270	0.0290	0.0550	0.0625	0.0694	0.0915

Fineness Modulus	C_u	C_c
0.02	1.69	1.11

Reitz & Jens, Inc.

GRAIN SIZE ANALYSIS

(Hydrometer Method)

Cac 1/15/09

Job AMEREC - ASH TESTING

Boring No. LABADIE w/o MAX

Depth BULK

Sample No.

Meniscus Correction (Cm) 1

% finer = $\frac{Rcx\ A}{Wo}$ x 100

Not graded

Lab test by JLC Date 1/16/09

Computed by KEL Date 1/20/09

Checked by KEK Date 1/20/09

Hydrometer No. RJ-1

Graduate No. C

Date	Time	*Elapsed Time Min.	Temp C	Hydro Reading (R)	R^1 = R + C_m	Particle Diameter (D) MM	Composite Correction C_c	Rc= R - C_c	Percent* Partial	Finer Total
1/16/09	0915									
		-5	19.8	42						
	0916	1	19.8	40						
	0918	2	19.8	33						
	0919	4	19.8	16						
	0923	8	19.8	5.9						
	0930	15	19.8	0.9						
	0945	30	19.7	0.9						
	1015	60	19.2	0.2						

Weight In Grams			
	Dish + Dry Soil	(gm)	
	Dish	(gm)	
	Dry Soil	(gm)	

Notes on ASTM Procedure:

1. Cylinder and contents to be turned upside down and back for 60 turns in 60 seconds (counting turn upside down and back as two turns).
2. Hydrometer to be removed from suspension between readings and placed in clean water (spin).

Sample description & Remarks 50.04 g Soil / 0g WAX

Labadie Dry Fly Ash

REITZ & JENS, INC.

GRAIN SIZE ANALYSIS

(Sieve or Screen Method)

Project: Ameren

Boring No.: Labadie Ash w/o NA Hex

Sample No.: Bulk

Depth:

Test by: CWC 1/16/09

Entered by: KEK 1/20/09

Checked by: KEK 1/20/09

Testing Date: 1/16/09

U.S. Standard Sieve Size	Sieve Opening (mm)	Sieve Wgt. + Soil (grams)	Sieve Weight (grams)	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Finer by Weight
3-in.	**75**					
2-in.	**50**					
1-1/2 in.	**37.5**					
1 in	**25.4**					
3/4-in.	**19.0**					
1/2-in.	**12.7**					
3/8-in.	**9.5**					
#3	6.35					
#4	**4.75**					
#6	3.35					
#8	**2.36**					
#10	2.00					
#16	**1.18**				0.00	
#18	1.00					
#20	0.85					
#30	**0.60**				0.05	
#35	0.50					
#40	0.425					
#50	**0.300**				0.17	
#60	0.250					
#70	0.212					
#100	**0.150**				0.96	
#120	0.125					
#140	0.106					
#200	**0.075**				3.35	
Pan					3.65 (total)	
Sample Lost in #200 Wash						
Total Weight in Grams						

Pre #200 wash Weights	
Soil + Tare	
Tare	170.11
Soil	

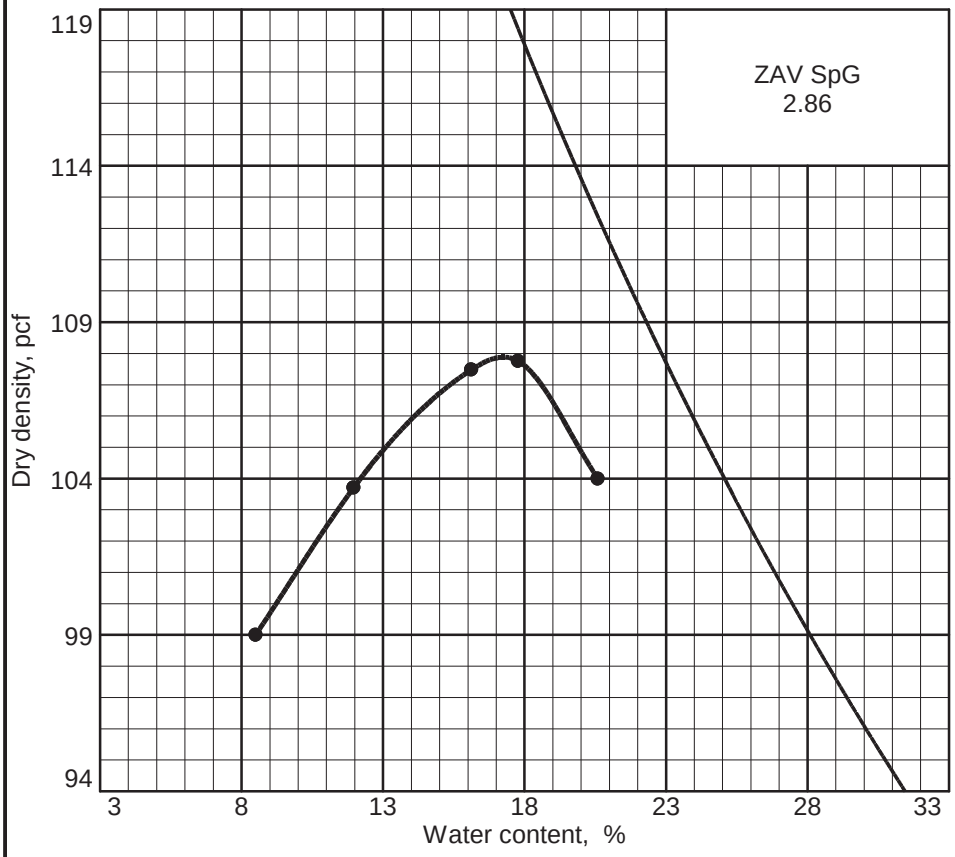
11

Post #200 wash Weights	
Soil + Tare	173.76
Tare	170.11
Soil	3.65

Sample Description & Remarks: Labadie Dry Fly Ash

NJLab Cert\Lab Forms\Grain Size Data Form.xls

MOISTURE-DENSITY TEST REPORT



Curve No.

Test Specification:
ASTM D 698-91 Procedure A Standard

Preparation Method	ASTM
Hammer Wt.	5.5 lb.
Hammer Drop	12 in.
Number of Layers	three
Blows per Layer	25
Mold Size	.03333 cu.ft.

Test Performed on Material Passing No.4 **Sieve**

NM		**LL**	**PI**
Sp.G. (ASTM D 854)	2.86		
%>No.4		**%<No.200**	
USCS		**AASHTO**	
Date Sampled			
Date Tested	1/16/2009		
Tested By	J. David		

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.16	8.45	8.74	8.81	8.76	
WM	4.58	4.58	4.58	4.58	4.58	
WW + T #1	194.80	196.98	238.09	252.30	268.45	
WD + T #1	182.39	179.70	210.96	220.27	229.54	
TARE #1	34.62	37.09	41.04	40.28	40.80	
WW + T #2	230.09	240.59	229.53	271.67	355.14	
WD + T #2	215.11	219.44	203.11	236.85	301.54	
TARE #2	40.76	40.18	40.83	40.71	40.82	
MOISTURE	8.5	12.0	16.1	17.8	20.6	
DRY DENSITY	99.0	103.7	107.5	107.8	104.0	

TEST RESULTS

Maximum dry density = 107.9 pcf

Optimum moisture = 17.3 %

Material Description

Tan, dry fly ash

Remarks:

Project No. 2008012455 **Client:** Ameren Missouri

Project: CCP Properties, Labadie Plant

● **Location:** Labadie Fly Ash

Checked by: K. Kocher

Title: P.E.

REITZ & JENS, INC.
CONSULTING ENGINEERS

Figure

SCHEDULE CJG-ST1

MOISTURE DENSITY TEST DATA

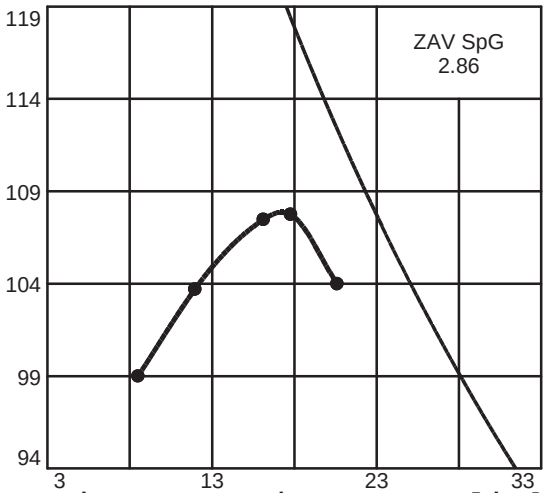
Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Project Number: 2008012455

Specimen Data

Source: Non-Ponded Dry Fly Ash from Precipitators
Sample No.: Bulk
Elev. or Depth: **Sample Length(in./cm.):**
Location: Labadie Fly Ash
Description: Tan, dry fly ash
Sample Date:
Preparation Method: ASTM
USCS: **AASHTO:**
NM: **LL:** **PI:**
Testing Remarks:
Tested By: J. David **Test Date:** 1/16/2009
Checked By: K. Kocher **Title:** P.E.
Percent retained on No.4 sieve:
Percent passing No. 200 sieve: **Specific gravity:** 2.86

Test Data And Results

Type of test: ASTM D 698-91 Procedure A Standard
Mold Dia.: 4.00 in. **Hammer Wt.:** 5.5 lb. **Drop:** 12 in.
Layers: three **Blows per Layer:** 25



POINT NO.	1	2	3	4	5
WM + WS	8.16	8.45	8.74	8.81	8.76
WM	4.58	4.58	4.58	4.58	4.58
WW+T #1	194.80	196.98	238.09	252.30	268.45
WD+T #1	182.39	179.70	210.96	220.27	229.54
TARE #1	34.62	37.09	41.04	40.28	40.80
MOIST #1	8.4	12.1	16.0	17.8	20.6
WW+T #2	230.09	240.59	229.53	271.67	355.14
WD+T #2	215.11	219.44	203.11	236.85	301.54
TARE #2	40.76	40.18	40.83	40.71	40.82
MOIST #2	8.6	11.8	16.3	17.8	20.6
MOISTURE	8.5	12.0	16.1	17.8	20.6
DRY DEN	99.0	103.7	107.5	107.8	104.0

Max dry den= 107.9 pcf **Opt moisture=** 17.3 %

Oversize Correction Not Applied

REITZ & JENS, INC.

MOISTURE DENSITY RELATIONSHIP TEST

(Compaction Curve)

Job Ameren UE Ash Study — Lab Test by JRJ — Date 1/16/09

Boring No. — Computed by KEK & CWL — Date 1/19/09

Depth Bulk — Checked by KEK — Date 1/19/09

Sample No. Labadie Fly Ash — Mold Diam. 4" (in)

Mold Vol. 1/30 (cu. ft.) (Vm) — Mold Height 6 (in)

Notes on ASTM Procedure: Method of Compaction Standard ASTM

1. To obtain moisture content sample, slice molded soil vertically through the center, and immediately take moisture content sample from one face of cut by taking a thin slice from top to bottom. See procedure in Quality Manual.
2. Moisture content sample mass to be: ≥ 100g (A/B) or ≥ 500g (C/D).
3. Only use ram with circular face in compactor for tests on soil.

Test No.	+10%	+13	+16%
Weight of Cylinder & Soil	8.16	8.45	8.74
Weight of Cylinder	4.58	4.58	4.58
Wet Weight of Compacted Soil	3.58	3.87	4.16
Wet Unit Weight - PCF	107.4	116.1	124.8

Moisture Content Determination

Tare No.	R140	B37	R50	R70	B32	R61
Weight of Sample Wet + Tare	194.80	230.09	196.98	240.59	238.09	229.5
Weight of Sample Dry + Tare	182.36	215.11	179.70	219.44	210.96	203.11
Weight of Water						
Weight of Tare	34.62	40.76	37.09	40.18	41.04	40.83
Weight of Dry Soil						
Moisture Content (%)	8.4	8.6	12.1	11.8	16.0	16.3
Average Moisture Content (%)	8.5		12.0		16.1	
Dry Unit Weight - PCF	99.0		103.7		107.5	

Sample Description & Remarks Tan Dry Fly Ash From a Precipitators

REITZ & JENS, INC.

MOISTURE DENSITY RELATIONSHIP TEST

(Compaction Curve)

Job Ameren UE Ash Study — Lab Test by JRD — Date 1/16/09

Boring No. — Computed by KEK & CWC — Date 1/19/09

Depth Bulk — Checked by KEK — Date 1/19/09

Sample No. Labadie Fly Ash dry — Mold Diam. 4" (in)

Mold Vol. 1/30 (cu. ft.) (Vm) — Mold Height 6" (in)

Notes on ASTM Procedure: Method of Compaction Standard ASTM

1. To obtain moisture content sample, slice molded soil vertically through the center, and immediately take moisture content sample from one face of cut by taking a thin slice from top to bottom. See procedure in Quality Manual.
2. Moisture content sample mass to be: ≥ 100g (A/B) or ≥ 500g (C/D).
3. Only use ram with circular face in compactor for tests on soil.

Test No.	+19	+22
Weight of Cylinder & Soil	8.81	8.76
Weight of Cylinder	4.58	4.58
Wet Weight of Compacted Soil	4.23	4.18
Wet Unit Weight - PCF	126.9	125.4

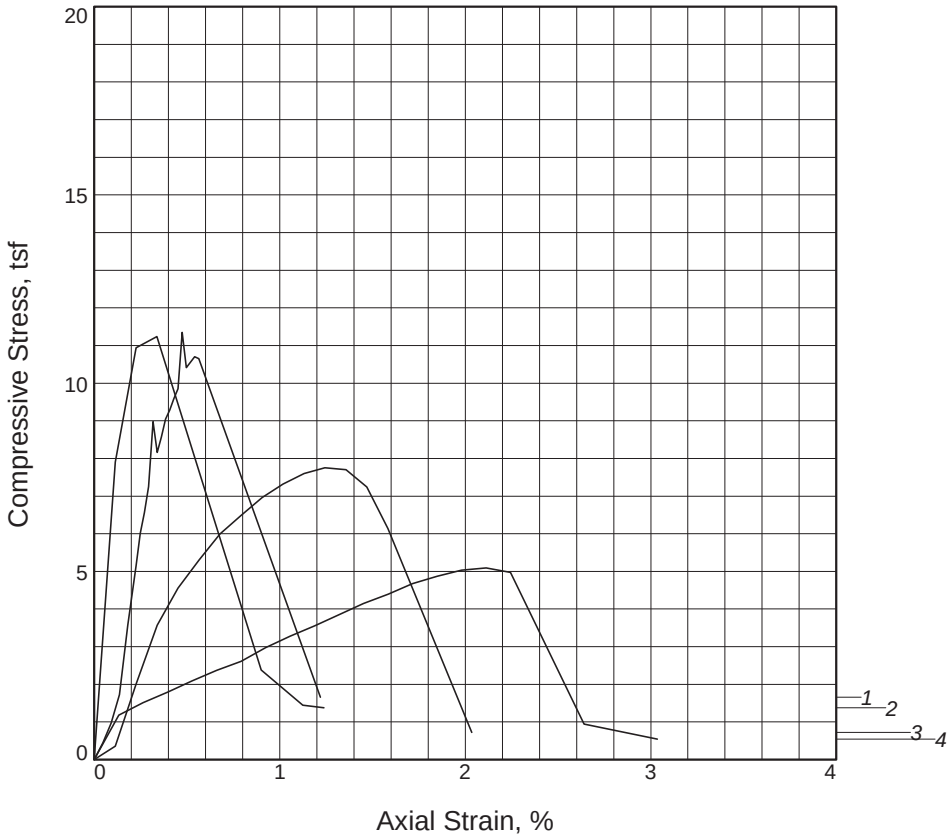
Moisture Content Determination

Tare No.	B-40	B-14	B19	B10
Weight of Sample Wet + Tare	252.30	271.67	268.45	355.14
Weight of Sample Dry + Tare	220.27	236.85	229.54	301.54
Weight of Water				
Weight of Tare	40.28	40.71	40.80	40.82
Weight of Dry Soil				
Moisture Content (%)	17.3	17.8	20.6	20.6
Average Moisture Content (%)	17.8		20.6	
Dry Unit Weight - PCF	107.8		104.0	

Sample Description & Remarks: oozed out of cylinder

TAN Dry Fly Ash from Precipitators

UNCONFINED COMPRESSION TEST



Sample No.	1	2	3	4
Unconfined strength, tsf	11.351	11.235	7.750	5.092
Undrained shear strength, tsf	5.675	5.618	3.875	2.546
Failure strain,	0.5	0.3	1.2	2.1
Strain rate, %/min.	0.51	0.82	0.92	0.85
Water content, %	11.3	15.5	16.3	20.0
Wet density, pcf	116.1	126.8	127.2	126.8
Dry density, pcf	104.3	109.8	109.4	105.6
Saturation, %	50.1	79.4	82.5	91.8
Void ratio	0.6042	0.5239	0.5295	0.5836
Specimen diameter, in.	1.95	1.96	1.99	2.04
Specimen height, in.	4.43	4.45	4.42	3.79
Height/diameter ratio	2.27	2.27	2.22	1.86

Description: Tan, dry fly ash, from precipitators

LL =	**PL =**	**PI =**	**Assumed GS=** 2.68	**Type:** Lab Molded Samples

Project No.: 2008012455
Date: 12/13/2008

Remarks:
testing on 01/20/09, samples from standard proctor

Figure _____

Client: Ameren Missouri

Project: CCP Properties, Labadie Plant

Location: Labadie Fly Ash
Sample Number: Bulk

REITZ & JENS, INC.
CONSULTING ENGINEERS

Tested By: CWC & JJP **Checked By:** KEK

SCHEDULE CJG-ST1

UNCONFINED COMPRESSION TEST

5/20/2011

Date: 12/13/2008
Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Project No.: 2008012455
Location: Labadie Fly Ash
Sample Number: Bulk
Description: Tan, dry fly ash, from precipitators
Remarks: testing on 01/20/09, samples from standard proctor
Type of Sample: Lab Molded Samples
Assumed Specific Gravity=2.68 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial
Moisture content: Moist soil+tare, gms.	261.010
Moisture content: Dry soil+tare, gms.	239.040
Moisture content: Tare, gms.	44.560
Moisture, %	11.3
Moist specimen weight, gms.	404.8
Diameter, in.	1.95
Area, in.²	3.00
Height, in.	4.43
Wet Density, pcf	116.1
Dry density, pcf	104.3
Void ratio	0.6042
Saturation, %	50.1

Test Readings for Specimen No. 1

Strain rate, %/min. = 0.51

Unconfined compressive strength = 11.351 tsf **at reading no.** 16

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0020	18.50	18.5	0.0	0.444
2	0.0040	40.30	40.3	0.1	0.967
3	0.0060	72.00	72.0	0.1	1.726
4	0.0080	149.00	149.0	0.2	3.571
5	0.0100	215.00	215.0	0.2	5.151
6	0.0110	251.00	251.0	0.2	6.012
7	0.0120	274.00	274.0	0.3	6.561
8	0.0130	303.00	303.0	0.3	7.254
9	0.0140	375.00	375.0	0.3	8.975
10	0.0150	341.00	341.0	0.3	8.160
11	0.0160	358.00	358.0	0.4	8.565
12	0.0170	378.00	378.0	0.4	9.041
13	0.0180	388.00	388.0	0.4	9.278
14	0.0190	401.00	401.0	0.4	9.587
15	0.0200	412.00	412.0	0.5	9.847
16	0.0210	475.00	475.0	0.5	11.351

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf
17	0.0220	436.00	436.0	0.5	10.416
18	0.0230	442.00	442.0	0.5	10.557
19	0.0240	448.00	448.0	0.5	10.698
20	0.0250	446.00	446.0	0.6	10.648
21	0.0540	70.00	70.0	1.2	1.660

Parameters for Specimen No. 2

Specimen Parameter	Initial
Moisture content: Moist soil+tare, gms.	180.510
Moisture content: Dry soil+tare, gms.	162.270
Moisture content: Tare, gms.	44.790
Moisture, %	15.5
Moist specimen weight, gms.	444.3
Diameter, in.	1.96
Area, in.²	3.00
Height, in.	4.45
Wet Density, pcf	126.8
Dry density, pcf	109.8
Void ratio	0.5239
Saturation, %	79.4

Test Readings for Specimen No. 2

Strain rate, %/min. = 0.82

Unconfined compressive strength = 11.235 tsf **at reading no.** 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	330.00	330.0	0.1	7.906
2	0.0100	457.00	457.0	0.2	10.937
3	0.0150	470.00	470.0	0.3	11.235
4	0.0400	100.00	100.0	0.9	2.377
5	0.0500	61.00	61.0	1.1	1.447
6	0.0550	58.00	58.0	1.2	1.374

Parameters for Specimen No. 3

Specimen Parameter	Initial
Moisture content: Moist soil+tare, gms.	194.690
Moisture content: Dry soil+tare, gms.	173.490
Moisture content: Tare, gms.	43.420
Moisture, %	16.3
Moist specimen weight, gms.	460.4
Diameter, in.	1.99
Area, in.²	3.12
Height, in.	4.42
Wet Density, pcf	127.2
Dry density, pcf	109.4
Void ratio	0.5295
Saturation, %	82.5

Test Readings for Specimen No. 3

Strain rate, %/min. = 0.92

Unconfined compressive strength = 7.750 tsf **at reading no.** 11

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	15.50	15.5	0.1	0.358
2	0.0100	87.00	87.0	0.2	2.005
3	0.0150	155.00	155.0	0.3	3.569
4	0.0200	198.00	198.0	0.5	4.554
5	0.0250	231.00	231.0	0.6	5.307
6	0.0300	261.00	261.0	0.7	5.989
7	0.0350	283.00	283.0	0.8	6.486
8	0.0400	304.00	304.0	0.9	6.960
9	0.0450	320.00	320.0	1.0	7.318
10	0.0500	332.80	332.8	1.1	7.602
11	0.0550	339.70	339.7	1.2	7.750
12	0.0600	337.90	337.9	1.4	7.701
13	0.0650	318.00	318.0	1.5	7.239
14	0.0700	270.00	270.0	1.6	6.139
15	0.0900	32.00	32.0	2.0	0.724

Parameters for Specimen No. 4

Specimen Parameter	Initial
Moisture content: Moist soil+tare, gms.	217.920
Moisture content: Dry soil+tare, gms.	189.020
Moisture content: Tare, gms.	44.510
Moisture, %	20.0
Moist specimen weight, gms.	410.0
Diameter, in.	2.04
Area, in.²	3.25
Height, in.	3.79
Wet Density, pcf	126.8
Dry density, pcf	105.6
Void ratio	0.5836
Saturation, %	91.8

Test Readings for Specimen No. 4

Strain rate, %/min. = 0.85

Unconfined compressive strength = 5.092 tsf **at reading no.** 15

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf
0	0.0000	0.00	0.0	0.0	0.000
1	0.0050	53.60	53.6	0.1	1.185
2	0.0100	68.70	68.7	0.3	1.517
3	0.0150	81.40	81.4	0.4	1.795
4	0.0200	94.90	94.9	0.5	2.090
5	0.0250	107.90	107.9	0.7	2.373
6	0.0300	118.70	118.7	0.8	2.607
7	0.0350	135.50	135.5	0.9	2.972
8	0.0400	149.70	149.7	1.1	3.279
9	0.0450	162.60	162.6	1.2	3.557
10	0.0550	190.00	190.0	1.5	4.145
11	0.0600	201.90	201.9	1.6	4.399
12	0.0650	214.80	214.8	1.7	4.673
13	0.0700	224.20	224.2	1.8	4.871
14	0.0750	231.80	231.8	2.0	5.030
15	0.0800	235.00	235.0	2.1	5.092
16	0.0850	230.00	230.0	2.2	4.977
17	0.1000	44.00	44.0	2.6	0.948
18	0.1150	25.20	25.2	3.0	0.541

REITZ & JENS, INC.

Unconsolidated Undrained or Unconfined Test

Project: AMEREN - LABADIE

Boring No.: Am Labadie

Sample No.: Labadie Ash

Depth: +10% H_2O of DRY

COMPACTED 1/16/09

Test by: CWC/JSP

Entered by: CWC

Checked by: KEK

Testing Date: 1/20/09

Description of Entire Tube: BROKE DURING TRIMMING

Description of Test Sample: Compacted Ash sample from Standard Proctor at 99.0pcf & 8.5%m

Moisture Contents	Trial 1	Trial 2
Tare #	m-19	m-30
Wet Wt.+Tare	127.52	106.07
Dry Wt.+Tare	119.71	99.83
Wt. of Water		
Tare Wt.	21.66	22.06
Wt. of Soil		
% Moisture	7.97	8.02
Average % Moisture=	7.99	

Sample Density	
Wet Wt. of Sample (grams)	
Diameter of Sample (Inches)	D=
Length of Sample (Inches)	L=
Density Constant $C = (4.85 / (D^2 * L))$	
Wet Density (pcf)	
Dry Density (pcf)	

(Sample Density section crossed out)

Failure Sketch

LOAD: #14

Rate of Load Application 0.5 %/min

Confining Pressure ______ psi

Mass of Top Cap ______ gms

Strain (.001")	Load (lbs)
0	
~~10~~ 1	
~~20~~ 2	
~~30~~ 3	
~~40~~ 4	
~~50~~ 5	
~~60~~ 6	
~~70~~ 7	
~~80~~ 8	
~~90~~ 9	
~~100~~ 10	
~~120~~ 11	
~~140~~ 12	
~~160~~ 13	
~~180~~ 14	
~~200~~ 15	
~~220~~ 16	

Notes:

Strain (.001")	Load (lbs)
~~240~~ 17	
~~260~~ 18	
~~280~~ 19	
~~300~~ 20	
~~350~~ 21	
~~400~~ 22	
~~450~~ 23	
~~500~~ 24	
~~550~~ 25	
600	
650	
700	
750	
800	
850	
900	
1000	

Notes:

REITZ & JENS, INC.

Unconsolidated Undrained or Unconfined Test

Project: Amirix - Labadie
Boring No.: Am-Labadie
Sample No.: Ash Testing
Depth: Nat +13%

Compacted 1/16/09

Test by: CWC / JJP
Entered by: CWC
Checked by: KEK
Testing Date: 1/20/09

Description of Entire Tube: Spec. #1

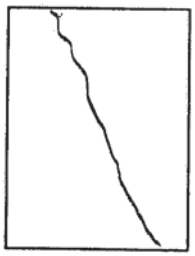
Description of Test Sample: Compacted Ash Sample from Standard Proctor At 103.7 pcf & 12.0%M

Moisture Contents		
	Trial 1	Trial 2
Tare #	M-27	M-35
Wet Wt.+Tare	127.50	134.01
Dry Wt.+Tare	116.58	122.46
Wt. of Water		
Tare Wt.	22.25	22.31
Wt. of Soil		
% Moisture		
Average % Moisture=		11.3

Sample Density	
Wet Wt. of Sample (grams)	404.76
Diameter of Sample (Inches)	D= 1.954
Length of Sample (Inches)	L= 4.430
Density Constant C = (4.85 / (D^2 * L)	
Wet Density (pcf)	110.1
Dry Density (pcf)	104.3

Loads: # 14

Failure Sketch



Rate of Load Application: 0.513 %/min
Confining Pressure: — psi
Mass of Top Cap: ____ gms

Strain (.001")	Load (lbs)
0	0
~~10~~ 2	18.5
~~20~~ 4	40.3
~~30~~ 6	72.1
~~40~~ 8	149
~~50~~ 10	215
~~60~~ 11	251
~~70~~ 12	274
~~80~~ 13	303
~~90~~ 14	325
~~100~~ 15	341
~~120~~ 16	358
~~140~~ 17	375
~~160~~ 18	388
~~180~~ 19	401
~~200~~ 20	412
~~220~~ 21	425

Notes:

Strain (.001")	Load (lbs)
~~240~~ 22	436
~~260~~ 23	442
~~280~~ 24	448
~~300~~ 25	446
~~320~~ 54	20
400	
450	
500	
550	
600	
650	
700	
750	
800	
850	
900	
1000	

Notes:

REITZ & JENS, INC.

Unconsolidated Undrained or Unconfined Test

Project: Ameren - Labadie
Boring No.: Am Labadie
Sample No.: Ash Testing
Depth: Mat # 16%

Compacted 1/16/09

Test by: CWC / JJP
Entered by: CWC
Checked by: KEK
Testing Date: 1/20/09

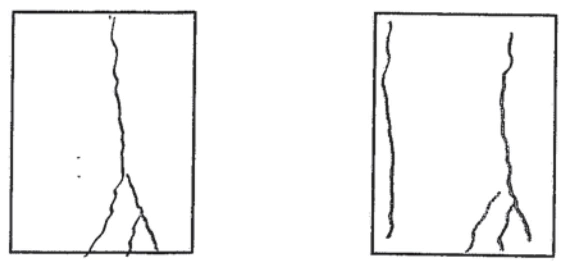
Description of Entire Tube: Spec #2

Description of Test Sample: Compacted Ash Sample from Standard Proctor at 107.5 pcf & 16.1% M

Moisture Contents	Trial 1	Trial 2
Tare #	m-17	m-48
Wet Wt.+Tare	79.67	100.84
Dry Wt.+Tare	71.94	90.30
Wt. of Water		
Tare Wt.	22.49	22.30
Wt. of Soil		
% Moisture		
Average % Moisture=		15.5

Sample Density	
Wet Wt. of Sample (grams)	444.25
Diameter of Sample (Inches)	D= 1.955
Length of Sample (Inches)	L= 4.445
Density Constant $C = (4.85 / (D^2 * L)$	
Wet Density (pcf)	126.8
Dry Density (pcf)	109.8

Failure Sketch



Load #24

Rate of Load Application: 0.8244 %/min
Confining Pressure: 0 psi
Mass of Top Cap: ______ gms

Strain (.001")	Load (lbs)	Notes:
0	0	
~~40~~ 5	330	
~~20~~ 10	457	
~~30~~ 15	470	Peak
~~40~~ 20		
~~50~~ 25		
~~60~~ 30		
~~70~~ 35		
~~80~~ 40	100	
~~90~~ 45		
~~100~~ 50	61.	
~~120~~ 55	58	
~~140~~ 60		
~~160~~ 65		
~~180~~ 70		
~~200~~ 75		
~~220~~ 80		

Strain (.001")	Load (lbs)	Notes:
~~240~~ 85		
~~260~~ 90		
~~280~~ 95		
~~300~~ 100		
~~350~~ 105		
400		
450		
500		
550		
600		
650		
700		
750		
800		
850		
900		
1000		

N:\Lab Cert\Lab Forms\UU and QU Data Sheet.xls

REITZ & JENS, INC.

Unconsolidated Undrained or Unconfined Test

Project: Ameren - Labadie — Test by: CWC / J P

Boring No.: Am Labadie — Entered by: CWC

Sample No.: Ash Testing — Compacted 1/16/09 — Checked by: KEK

Depth: Nat +199. — Testing Date: 1/20/09

Description of Entire Tube: Spec #3

Description of Test Sample: Compaction Ash Sample from Standard Proctor at 107.8 pcf @ 17.8% M

Moisture Contents		
	Trial 1	Trial 2
Tare #	M-41	M-20
Wet Wt.+Tare	95.02	99.67
Dry Wt.+Tare	84.78	88.71
Wt. of Water		
Tare Wt.	21.82	21.60
Wt. of Soil		
% Moisture		
Average % Moisture=		16.3

Sample Density	
Wet Wt. of Sample (grams)	460.40
Diameter of Sample (Inches)	D= 1.992
Length of Sample (Inches)	L= 4.424
Density Constant C = (4.85 / (D^2 * L)	1
Wet Density (pcf)	127.2
Dry Density (pcf)	109.4

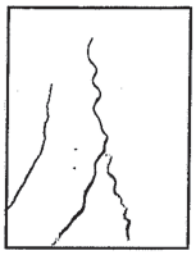
load #24

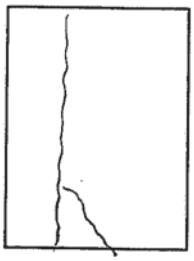
Rate of Load Application: 0.92 %/min

Confining Pressure: — psi

Mass of Top Cap: ____ gms

Failure Sketch





Strain (.001")	Load (lbs)
0	0
~~10~~ 5	15.5
~~20~~ 10	87.
~~30~~ 15	155
~~40~~ 20	198
~~50~~ 25	231
~~60~~ 30	261
~~70~~ 35	283
~~80~~ 40	304
~~90~~ 45	320
~~100~~ 50	332.8
~~120~~ 55	339.7
~~140~~ 60	337.9
~~160~~ 65	318
~~180~~ 70	270
~~200~~ 75	
~~220~~ 80	

Notes:

Strain (.001")	Load (lbs)
~~240~~ 85	
~~260~~ 90	32
~~280~~ 95	
~~300~~ 100	
350	
400	
450	
500	
550	
600	
650	
700	
750	
800	
850	
900	
1000	

Notes:

REITZ & JENS, INC.

Unconsolidated Undrained or Unconfined Test

Project: AMERON LABADIE | Test by: CWC / KEK
Boring No.: LABADIE ASH +22% MOISTURE | Entered by: CWC
Sample No.: COMPACTED 1/16/09 | Checked by: KEK
Depth: Natural +22.0M | Testing Date: 1/20/09

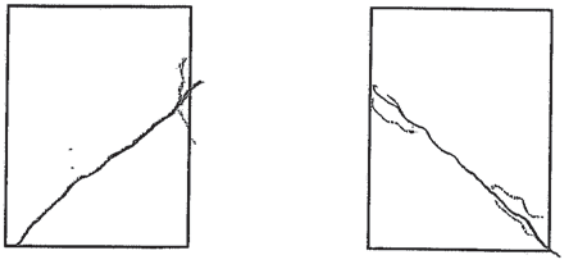
Description of Entire Tube: Spec #4

Description of Test Sample: Compacted Ash Sample from Standard Proctor at 104.0pcf @ 20.6% M

Moisture Contents		
	Trial 1	Trial 2
Tare #	M-8	M-11
Wet Wt.+Tare	104.48	113.44
Dry Wt.+Tare	90.28	98.24
Wt. of Water		
Tare Wt.	22.21	22.30
Wt. of Soil		
% Moisture		
Average % Moisture=		20%

Sample Density	
Wet Wt. of Sample (grams)	410.01
Diameter of Sample (Inches)	D= 2.035
Length of Sample (Inches)	L= 3.788
Density Constant $C = (4.85 / (D^2 * L)$	
Wet Density (pcf)	126.8
Dry Density (pcf)	105.6

Failure Sketch



Rate of Load Application: 0.85 %/min
Confining Pressure: 0 psi
Mass of Top Cap: gms

Strain (.001")	Load (lbs)
0	0
~~10~~ 5	53.6
~~20~~ 10	68.7
~~30~~ 15	81.4
~~40~~ 20	94.9
~~50~~ 25	107.9
60 30	118.7
~~70~~ 35	135.5
~~80~~ 40	149.7
~~90~~ 45	162.6
~~100~~	
~~120~~ 55	190.0
~~140~~ 60	201.9
~~160~~ 65	214.8
~~180~~ 70	224.2
~~200~~ 75	231.8
~~220~~ 80	235.0

Notes:

Strain (.001")	Load (lbs)
~~240~~ 85	230.0
~~260~~ 100	44.0
280 115	25.2
300	
350	
400	
450	
500	
550	
600	
650	
700	
750	
800	
850	
900	
1000	

Notes:

Ameren Missouri; Labadie Power Plant UWL
Utility Waste Landfill, CCP Properties
Material: 100% non-ponded fly ash, material was molded at 22.5% moisture
Hydraulic Conductivity

Soil Conditions	
Pre-test conditions	**Post-test Conditions**
Wet Density = 124.2 (lbs/ft^3)	Wet Density = 128.8 (lbs/ft^3)
% Moisture = 22.5%	% Moisture = 20.1%
Dry Density = 101.4 (lbs/ft^3)	Dry Density = 107.2 (lbs/ft^3)

Test Information	
a (cm^2)=	0.1969
L (cm)=	4.9043
A (cm^2)=	19.4657

Trial 1													
			Base Burette		Top Burette								
Date and Time	Elapsed Time (seconds)	Cell Burette Reading (ml)	Reading (ml)	Distance from Datum (cm)	Reading (ml)	Distance from Datum (cm)	Total Head Across Sample (cm of water)	Temperature (℃)	Weighted Average Temp. (℃)	Uncorrected Hydraulic Conductivity (cm/sec)	Correction Factor	Cumulative Time (sec)	Corrected Hydraulic Conductivity (cm/sec)
3/11/11 11:05	0	16.5	10.00	27.200	0.40	75.968	83.947	21.2					
3/11/11 11:10	300	16.5	9.18	31.366	1.26	71.599	75.413	21.2	21.20	8.86E-06	0.9716241	300	8.61E-06
3/11/11 11:15	600	16.5	8.45	35.074	1.98	67.942	68.047	21.2	21.20	8.68E-06	0.9716241	600	8.43E-06
3/11/11 11:20	900	16.5	7.78	38.478	2.64	64.589	61.290	21.2	21.20	8.67E-06	0.9716241	900	8.42E-06
3/11/11 11:25	1200	16.5	7.21	41.373	3.20	61.744	55.550	21.2	21.20	8.53E-06	0.9716241	1200	8.29E-06
3/11/11 11:30	1500	16.5	6.66	44.167	3.74	59.001	50.013	21.2	21.20	8.56E-06	0.9716241	1500	8.32E-06
3/11/11 11:35	1800	16.5	6.20	46.504	4.20	56.664	45.339	21.2	21.20	8.49E-06	0.9716241	1800	8.25E-06
												H.C.=	**8.3E-06**

Hydraulic Conductivity (ASTM-D 5084)
Flow Rate Calculation

Job------- Labadie UWL
Location- Fly Ash Study
Sample--- Non-Ponded Fly Ash
Depth----- Air Dried
22½% M added #2

a= 0.1969
A= 4.9043
L= 19.4657

Cell No. 3

run water thru 3/10/14

Cell Pressure (p.s.i.)	Base Pressure (p.s.i.)	Top Pressure (p.s.i.)
56.0	55.0	55.5

Date	Time	Elapsed Time Minutes	Cell Reading ML	Base Reading ML	Top Reading ML	Top Head CM	Base Head CM	h CM	Temp.	Hyd. Gradient
3/11/11	11:05	0	16.5	10.00	0.40				21.2	
	11:10	5	16.5	9.18	1.26				21.2	
	11:15	10	16.5	8.45	1.98				21.2	
	11:20	15	16.5	7.78	2.64				21.2	
	11:25	20	16.5	7.21	3.20				21.2	
	11:30	25	16.5	6.66	3.74				21.2	
	11:35	30	16.5	6.20	4.20				21.2	

a x L	t (sec)	2 x A x t	aL/2At	h1	h2	ln(h1/h2)	K	Temp. Cor.	K -Cor.	Hyd. Gradient

TRIAXIAL CELL SETUP & TAKEDOWN

Project Labadie UWL - Fly Ash Study Date 3/9/11

Sample _____ Depth _____

Description Non-Ponded air dried fly ash
@ 22½% M added (#2)

Type of Test perm Confining Pressure Differential _____

Cell Number 3 Saturate before after Consolidation _____

Number of Membranes 1 doubled Filter Strips Yes No

LENGTH CHANGE

STRAIN GAUGE at setup	N/A
at saturation start	
at consolidation start	
at axial load start	

MOISTURE CONTENT

	INITIAL		FINAL
Tare No.			Bowl 10
Wet Wt. + Tare			394.31
Dry Wt. + Tare			361.32
Wt. Water			32.99
Tare Wt.			197.34
Dry Soil Wt.			163.98
Moisture %			20.12
Avg. w %			

Moisture added 22½%

MASS PROPERTIES

Wt. Tube + Soil		gm.
Wt. Tube		gm.
Wt. Soil	189.39	gm.
Tube Diameter		in.
Sample Length		in
tube length		in.
top trim		in.
bottom trim		in.
total trim		in.
sample length		in.
Density constant 4.85/(D^2 * L)		
Wet Density		pcf.
Dry Density		pcf.

SPECIMEN DIMENSIONS in. / mm.

	HEIGHT		DIAMETER	
	Initial	Final	Initial	Final
1	1.9275	1.925	T 1.9505	1.9610
2	1.9310	1.9240	M 1.9505	1.9535
3	1.9285	1.9390	B 1.9605	1.9655
Avg.	1.929	1.930833	1.95783	1.9600

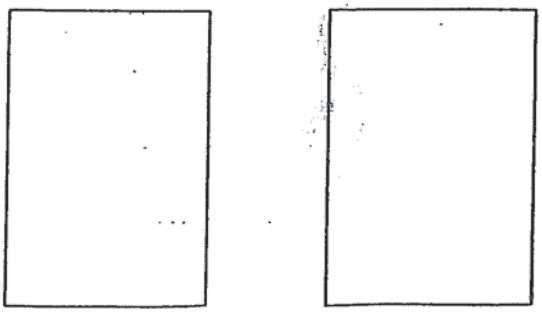
Description After Test

Initial: γ_m = 124.2, %M = 22.5, γ_d = 101.4

Final: γ_m = 128.8, %M = 20.1, γ_d = 107.2

Remarks _____

Failure Sketch



Trimmed By JR
Trimmed Date 3/9/11

Setup By JR
Setup Date 3/9/11

Taken Down By JR
Take Down Date 3/11/11

SCHEDULE CJG-ST1

revised 2/12/98

TRIAXIAL CELL SATURATION & BETA FACTOR

PROJECT American Labradite Fly Ash Study

SAMPLE 100% Non-Bonded Fly Ash mixed at 22.5% MC DEPTH

INITIAL CELL PRESSURE 51.0 START DATE 3/9/11

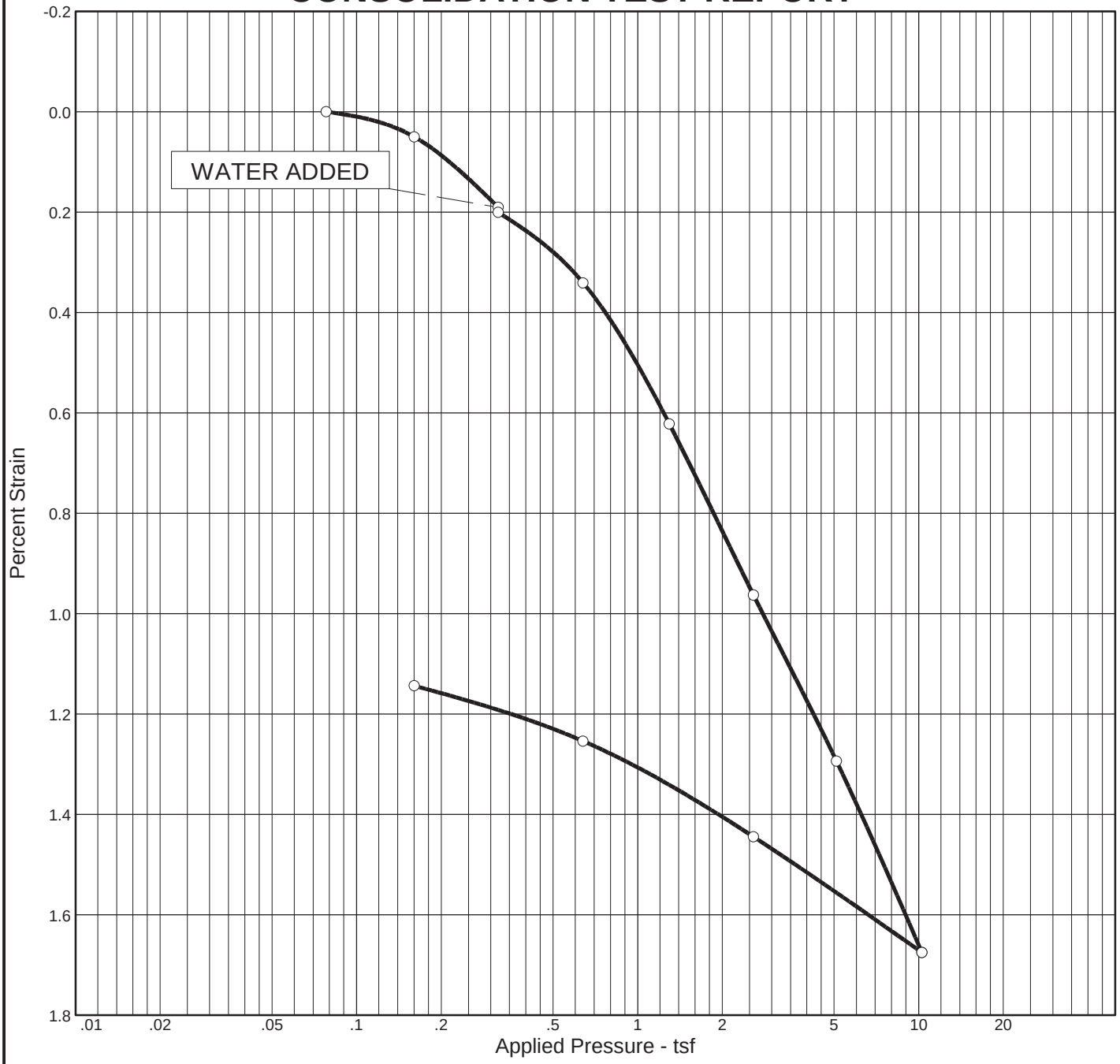
INITIAL PORE PRESSURE 50.0 CELL NUMBER 3

INITIAL TRANSDUCER READING 50.9 TRANSDUCER NUMBER

TRIAL DATE	TRIAL TIME	BASE BURETTE READING	CELL PRESSURE	TRANS-DUCER READING	CHANGE IN PRESSURE Transducer Constant			
					CELL DELTA (1)	TRANSDUCER READING CHANGE	TRANSDUCER PRESSURE CHANGE (2)	BETA FACTOR (2/1)
3/10/11	0	2.774	51.0	50.6				
	1		56.0	55.3	5.0		4.7	0.94
	2		"	55.3	5.0		4.7	0.94
	4		"	55.3	5.0		4.7	0.94

OK KH

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_s	Swell Press. (tsf)	Swell %	e_o
Sat.	Moist.											
33.9 %	8.2 %	108.6			2.87		1.03	0.02	0.00			0.697

MATERIAL DESCRIPTION	USCS	AASHTO
Tan, dry fly ash		

Project No. 2008012455 **Client:** Ameren Missouri

Project: CCP Properties, Labadie Plant

Source: Non-Ponded Dry Fly Ash from **Sample No.:** Bulk

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CONSULTING ENGINEERS

Remarks:

Non-ponded fly ash mixed at 22.5% moisture

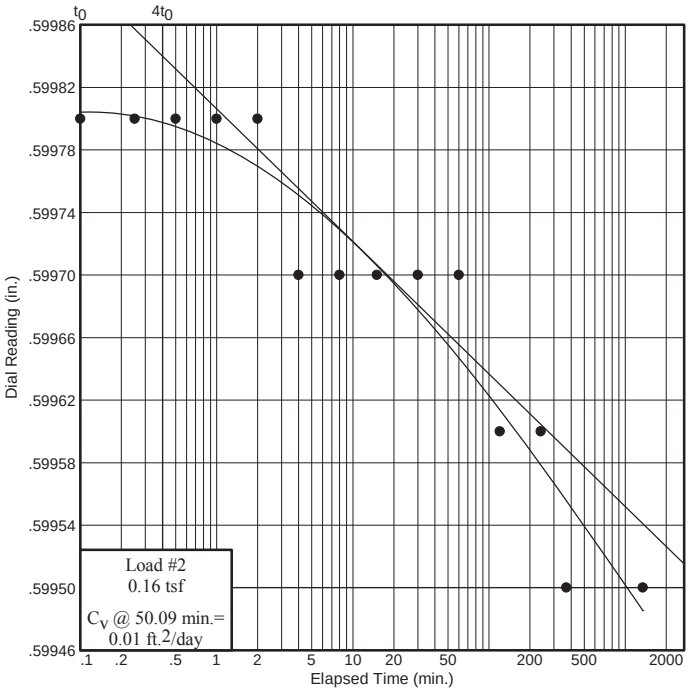
Figure

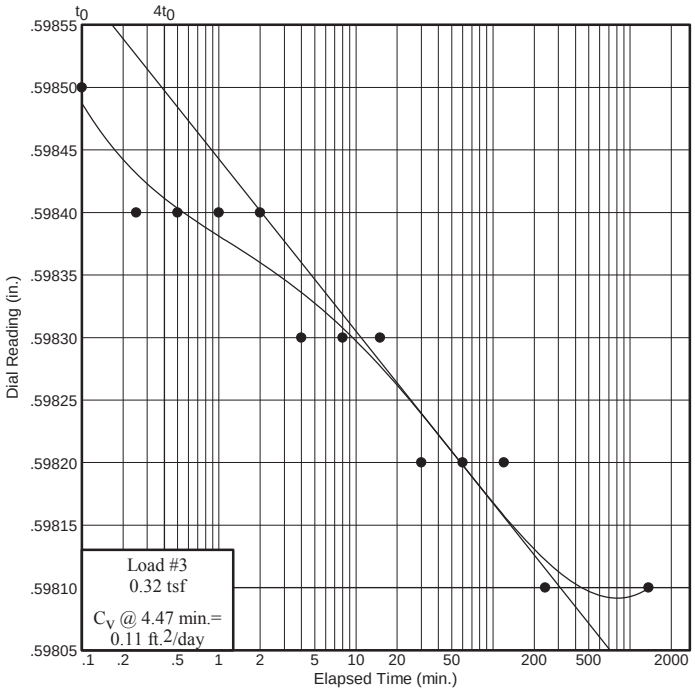
SCHEDULE CJG-ST1

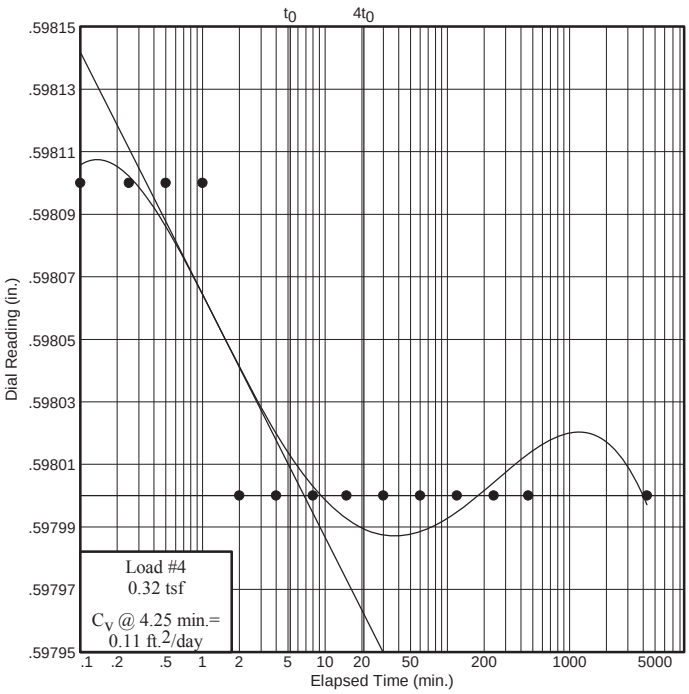
Dial Reading vs. Time

Project No.: 2008012455
Project: CCP Properties, Labadie Plant

Source: Non-Ponded Dry Fly Ash from Precipitators Sample No.: Bulk







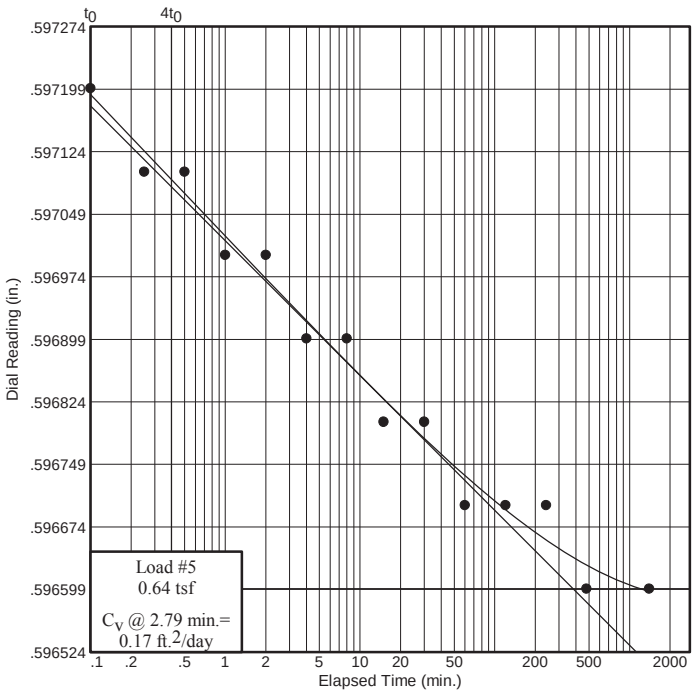


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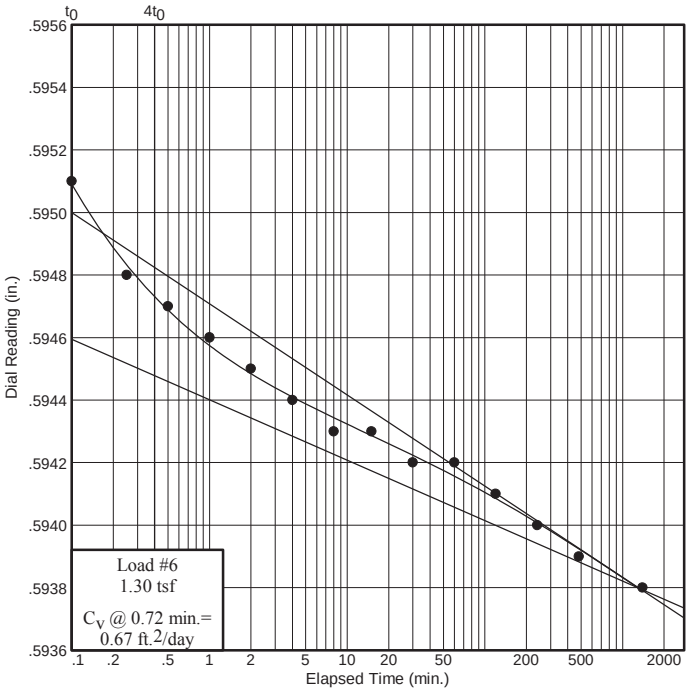
Figure

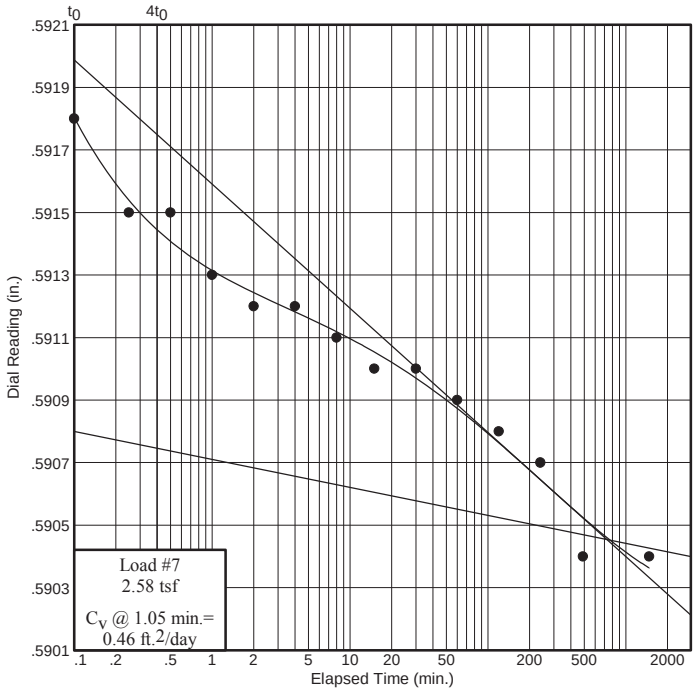
SCHEDULE CJG-ST1

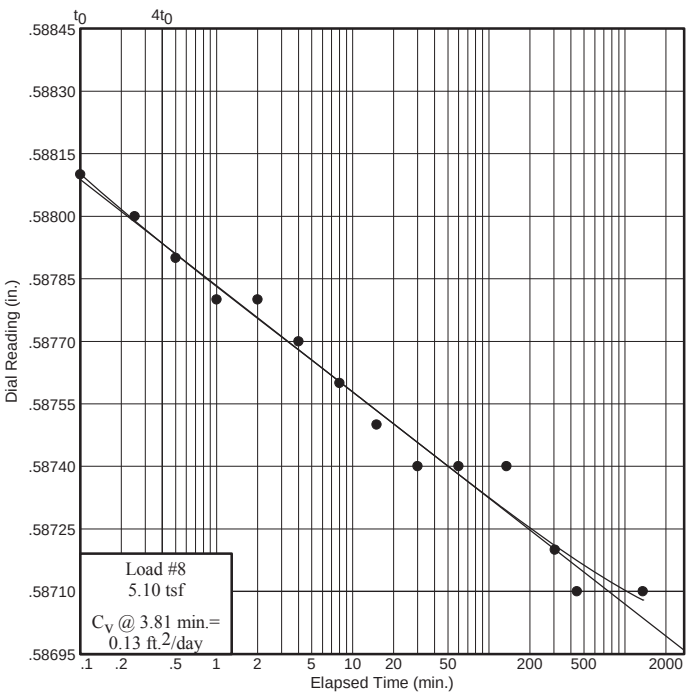
Dial Reading vs. Time

Project No.: 2008012455
Project: CCP Properties, Labadie Plant

Source: Non-Ponded Dry Fly Ash from Precipitators Sample No.: Bulk







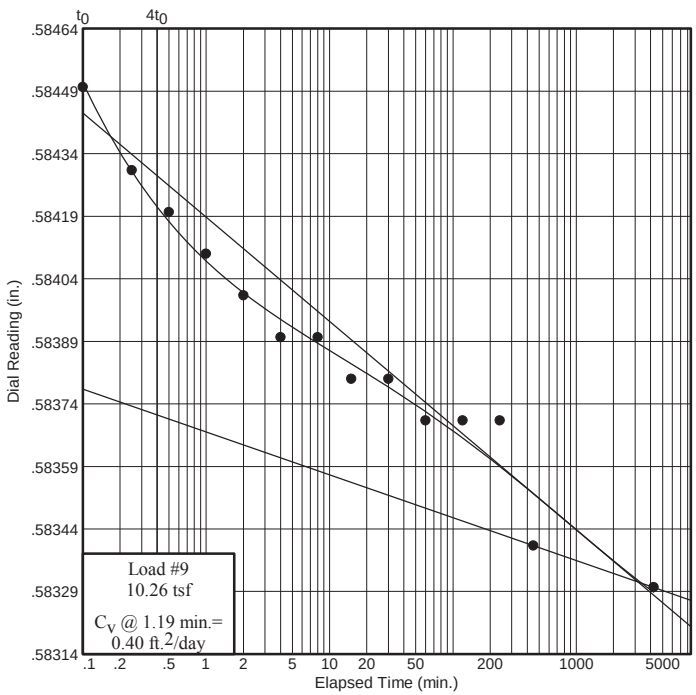


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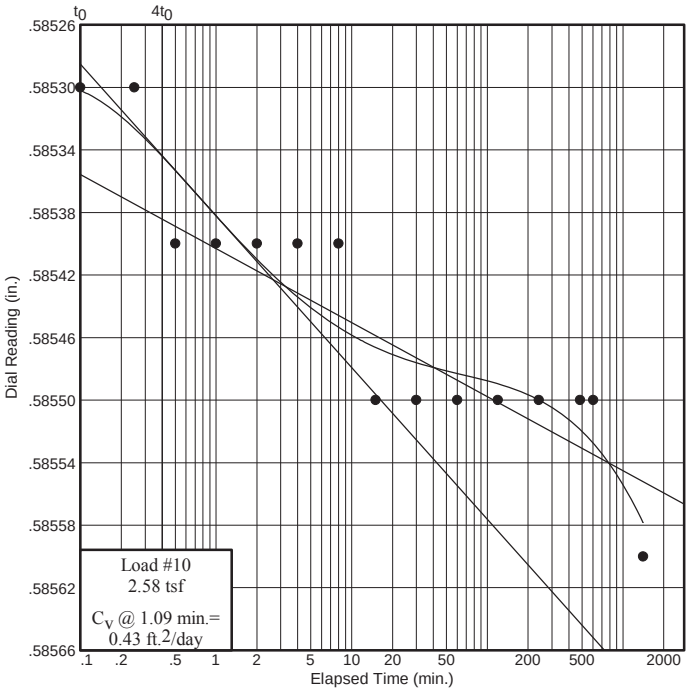
Figure

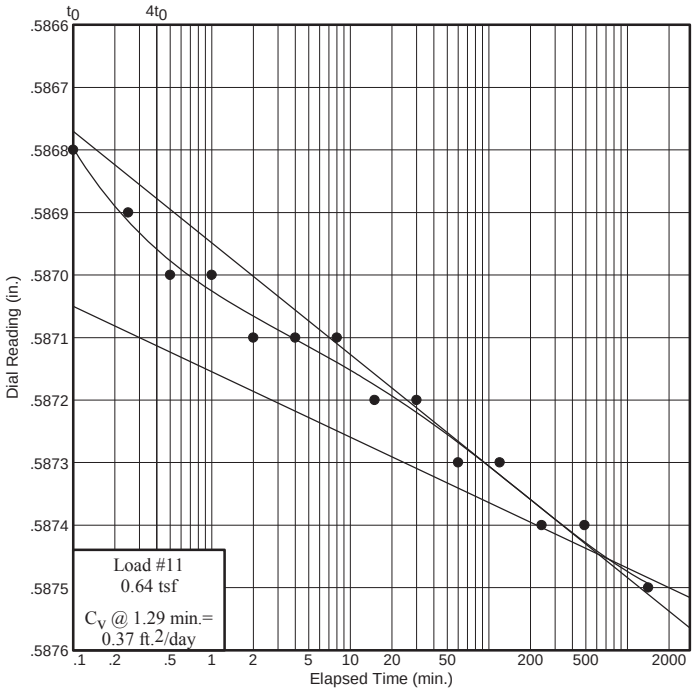
SCHEDULE CJG-ST1

Dial Reading vs. Time

Project No.: 2008012455
Project: CCP Properties, Labadie Plant

Source: Non-Ponded Dry Fly Ash from Precipitators Sample No.: Bulk





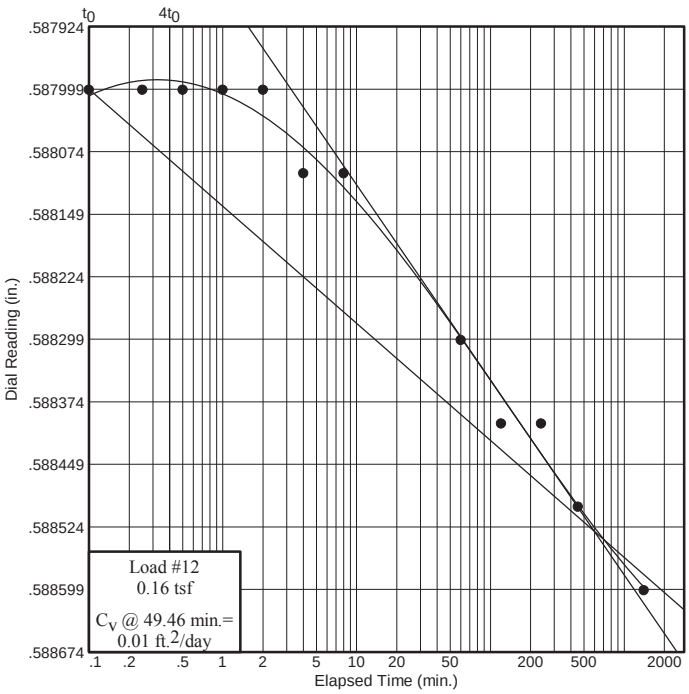


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Figure

SCHEDULE CJG-ST1

SWELL/CONSOLIDATION TEST DATA

Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Project Number: 2008012455

Sample Data

Source: Non-Ponded Dry Fly Ash from Precipitators
Sample No.: Bulk
Elev. or Depth: **Sample Length(in./cm.):**
Location:
Description: Tan, dry fly ash
Liquid Limit: **Plasticity Index:**
USCS: **AASHTO:** **Figure No.:**
Testing Remarks: Non-ponded fly ash mixed at 22.5% moisture

Test Specimen Data

TOTAL SAMPLE	BEFORE TEST	AFTER TEST
Wet w+t = 259.16 g.	**Consolidometer #** = 1	**Wet w+t** = 864.23 g.
Dry w+t = 242.48 g.		**Dry w+t** = 837.80 g.
Tare Wt. = 39.47 g.	**Spec. Gravity** = 2.87	**Tare Wt.** = 700.55 g.
Height = 1.00 in.	**Height** = 1.00 in.	
Diameter = 2.50 in.	**Diameter** = 2.52 in.	
Weight = 150.72 g.	**Defl. Table** = Labadie 100% Fly Ash at 65%M	
Moisture = 8.2 %	**Ht. Solids** = 0.5874 in.	**Moisture** = 19.3 %
Wet Den. = 117.6 pcf	**Dry Wt.** = 141.18 g.	**Dry Wt.** = 137.25 g.*
Dry Den. = 108.6 pcf	**Void Ratio** = 0.697	**Void Ratio** = 0.677
	Saturation = 33.9 %	

*** Final dry weight used in calculations**

End-of-Load Summary

Pressure (tsf)	Final Dial (in.)	Machine Defl. (in.)	C_v (ft.^{2}/day)	C_α	Void Ratio	% Compression /Swell
start	0.60000				0.697	
0.08	0.60000	0.00000			0.697	0.0 Swell
0.16	0.59950	0.00000	0.01	0.000	0.696	0.1 Comprs.
0.32	0.59810	0.00000	0.11	0.000	0.693	0.2 Comprs.
water	0.59800	0.00000	0.11		0.693	0.2 Comprs.
0.64	0.59660	0.00000	0.17	0.000	0.691	0.3 Comprs.
1.30	0.59380	0.00000	0.67	0.000	0.686	0.6 Comprs.
2.58	0.59040	0.00000	0.46	0.000	0.680	1.0 Comprs.
5.10	0.58710	0.00000	0.13	0.000	0.675	1.3 Comprs.
10.26	0.58330	0.00000	0.40	0.000	0.668	1.7 Comprs.
2.58	0.58560	0.00000	0.43		0.672	1.4 Comprs.
0.64	0.58750	0.00000	0.37		0.675	1.3 Comprs.
0.16	0.58860	0.00000	0.01		0.677	1.1 Comprs.

C_c = 0.02 **P_c** = 1.03 tsf **C_s** = 0.00
Collapse percentage = 0.0

CONSOLIDATION TEST

Rev. 4/2000

† – to be completed by Project Engineer

Date 2/22/11 Set-up by JLF

Sample Description: Dry Non-Ponded Fly Ash @ 22½% m (molded @ 22½% m)

USCS: _____ AASHTO: _____

†Project Number _____

†Job American RE, LARADIE LAWL

†Test Hole ASH STUDY

†Sample 22½% †Depth _____

†Sample Type Fly Ash @ 22½% m

†S.G.= 2.86 ☒ Measured ☐ Assumed

L.L.= _____ PP= _____ TSF

P.L.= _____ Torvane= _____ TSF

†Testing Remarks: _____

Test Specific Data

†Deflection Table: _____

Rig No. I Ring I

†Overburden Pressure= _____ kg/cm²

†☐ Check if sample is to be undercut.

Sample Undercut= NONE inch

Sample Height at Test Start= 0.9966 inch

.9799

Untrimmed Sample Data

Wgt. Tube+ Soil= _____ g

Wgt. Tube= _____ g

Wgt. Soil= _____ g

Sample Lgth. (L)= _____ in.

Sample Dia. (D)= 2.493 in.

Tube Constant (k)= _____

k= 4.85/(D²L)

Wet Unit Wgt.= _____ PCF

Initial Moisture Content

Tare No.: R111

Wet Wgt.+Tare= 259.16 g

Dry Wgt.+Tare= 247.48 g

Wgt. Water= 11.68 g

Wgt. Tare= 39.46 g

Wgt. Dry Soil= 208.02 g

Water Content= 8.22 %

Dry Unit Wgt.= 108.6 PCF

Initial Trimmed Sample Data

Trimmed sample in ring without dish.

Wgt. Ring= _____ g

Wet Wgt.+Ring= 650.07 g

Wgt. Wet Soil= 499.35 g

wt. wet soil = 150.72

START 0 = .5567

Hanger Load

†Sequence	†Instructions	Reading	Difference
0.25 kg		.5553	0.0014 in.
✓ 0.5 kg		.5547	0.0020 in.
✓ 1.0 kg		.5542	0.0025 in.
✓ 1.0 kg	ADD WATER	.5535	0.0032 in.
✓ 2.0 kg		.5527	0.0040 in.
✓ 4.0 kg		.5512	0.0055 in.
✓ 8.0 kg		.5495	0.0072 in.
✓ 16.0 kg		.5472	0.0095 in.
✓ 32.0 kg		.5449	0.0118 in.
✓ 8.0 kg		.5469	0.0098 in.
✓ 2.0 kg		.5486	0.0081 in.
✓ 0.5 kg		.5499	0.0068 in.
_____ kg		_____	_____ in.
_____ kg		_____	_____ in.
_____ kg		_____	_____ in.
_____ kg		_____	_____ in.
_____ kg		_____	_____ in.
_____ kg		_____	_____ in.
_____ kg		_____	_____ in.

†☒ **Run Mach. Deflections**

Post-Test Sample Data

Dish No.: 2

Wgt. Dish= 201.20 g

Tare (Ring+Dish)= 700.55 g

Wet Wgt.+Tare= 864.23 g

Dry Wgt.+Tare= 837.80 g

Wgt. Water= 26.43 g

Wgt. Dry Soil= 137.25 g

Water Content= 19.26 %

Squeezings ☒ Check if none.

Tare No.: _____

Dry Wgt.+Tare= _____ g

Wgt. Tare= _____ g

Wgt. Dry Squeezings= _____ g

Total Dry Wgt. Soil= _____ g

†Use final weight of solids? ___

†PROJ.ENGR. JLF

REITZ & JENS, INC. **CONSOLIDATION TEST-TIME SHEET**

Consulting Engineers

R&J Project: Ameren UE Labadie UWL Sheet 1 of 5

Boring: Fly Ash #2 22½% Sample: 1 Depth: _____ Rig: 1

DATE	LOAD kg	TESTER'S INITIALS	TIME	ELAPSED TIME, min.	DIAL READING	NOTES
2/23/11	0.25	JH	0900	0	0 .0000	
				.1	0	
				.25	0	
				.5	0	
			01	1	0	
			02	2	0	
			04	4	0	
			08	8	0	
			15	15	0	
			30	30	0	
			0954	54	0	Reset gauge
	0.50		1000	0	.5999	
				.1	.5998	
				.25	.5998	
				.5	.5998	
			01	1	.5998	
			02	2	.5998	
			04	4	.5997	
			08	8	.5997	
			15	15	.5997	
			30	30	.5997	
			1100	60	.5997	
			1200	120	.5996	
			1400	240	.5996	
			1630	370	.5995	
2/24/11		JH	8:30	1350	.5995	
	1.0	VSP	9:45	0	.5995	
				.1	.5985	
				.25	.5984	
				.5	.5984	
			46	1	.5984	
			47	2	.5984	
			49	4	.5983	
			53	8	.5983	
			10:00	15	.5983	
			15	30	.5982	
			45	60	.5982	
			11:45	120	.5982	
			13:45	240	.5981	
			8:30	1365	.5981	

REITZ & JENS, INC. **CONSOLIDATION TEST-TIME SHEET**

Consulting Engineers

R&J Project: Am UE Labadie UWL Sheet 2 of 25

Boring: FlyASH 22 V2% #2 Sample: 1 Depth: _____ Rig: 1

DATE	LOAD kg	TESTER'S INITIALS	TIME	ELAPSED TIME, min.	DIAL READING	NOTES
2/25/10	1.0 + H_2O	JSP	8:44	0	.5981	added water
				.1	.5981	
				.25	.5981	
				.5	.5981	
			45	1	.5981	
			46	2	.5980	
			48	4	.5980	
			52	8	.5980	
			59	15	.5980	
			9:14	30	.5980	
			9:44	60	.5980	
			10:44	120	.5980	
			12:44	240	.5980	
			16:24	460	.5980	
2/28/11			8:44	4320	.5980	
	2kg		8:56	0	.5980	
				.1	.5972	
				.25	.5971	
				.5	.5971	
			57	1	.5970	
			58	2	.5970	
			9:00	4	.5969	
			04	8	.5969	
			11	15	.5968	
			26	30	.5968	
			56	60	.5967	
			10:56	120	.5967	
			12:56	240	.5967	
			16:56	480	.5966	
3/1/11			8:16	1400	.5966	
	4kg		8:25	0	.5966	
				.1	.5951	
				.25	.5948	
				.5	.5947	
			26	1	.5946	
			27	2	.5945	
			29	4	.5944	
			33	8	.5943	
			40	15	.5943	
			55	30	.5942	
			9:25	60	.5942	
			10:25	120	.5941	
			12:25	240	.5940	
			16:35	490	5939	

REITZ & JENS, INC. **CONSOLIDATION TEST-TIME SHEET**

Consulting Engineers

R&J Project: Am UE Labadieu wL Fly Ash 2012 #2 Sheet 3 of 5

Boring: _____ Sample: 1 Depth: _____ Rig: 1

DATE	LOAD kg	TESTER'S INITIALS	TIME	ELAPSED TIME, min.	DIAL READING	NOTES
3/2/11	4 kg	JSP	7:40	1395	.5938	
	8 kg		7:55	0	.5938	
				.1	.5918	
				.25	.5915	
				.5	.5915	
			56	1	.5913	
			57	2	.5912	
			59	4	.5912	
			8:03	8	.5911	
			10	15	.5910	
			25	30	.5910	
			55	60	.5909	
			9:55	120	.5908	
			11:55	240	.5907	
			16:05	490	.5904	
3/3/11		JR	8:35	1480	.5904	
3/3/11	16.0	JR	9:15	0	0.5904	
				.1	0.5881	
				.25	0.5880	
				.5	0.5879	
			9:16	1	0.5878	
			9:17	2	0.5878	
			9:19	4	0.5877	
			9:23	8	0.5876	
			9:30	15	0.5875	
			9:45	30	0.5874	
			10:15	60	0.5874	
			11:30	125	0.5874	
			~~11:35~~	~~130~~		
			14:20	305	0.5872	
			16:40	445	0.5871	
3/4/11		JSP	07:52	1357	.5871	
	32kg		8:35	0	.5871	
				.1	.5845	
				.25	.5843	
				.5	.5842	
			36	1	.5841	
			37	2	.5840	
			39	4	.5839	
			43	8	.5839	
			50	15	.5838	
			9:05	30	.5838	
			9:35	60	.5837	