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 Amzren Callaway Borrow

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 & Golden brown, 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	197.02
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.

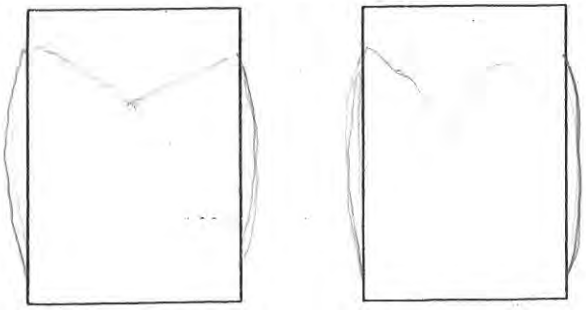
SPECIMEN DIMENSIONS in. / mm.

	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 7-10-12

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

REITZ & JENS, INC. Consulting Engineers Sheet ____ of ____

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	50.0	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 American Callaway Burrow

SAMPLE HP CLAY @ 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		
	Ran water out top of burette will Run test at closest Rate same as 20psi Sample						

LOADING

LOOP 1

Re Saturation

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 Sheet _____ of _____

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Appendix B

LABORATORY TESTING OF COAL COMBUSTION PRODUCTS FROM LABADIE ENERGY CENTER

Revised August 2013

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

			1	2	
Sample or Specimen No.					
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~~
Correction factor		K	~~.99968~~		~~.99968~~
$(W_s K) / (W_s + W_{bw} - W_{bws})$		G_s	~~2.86~~		2.87

50,03398/ 2010 Average

Sample Description

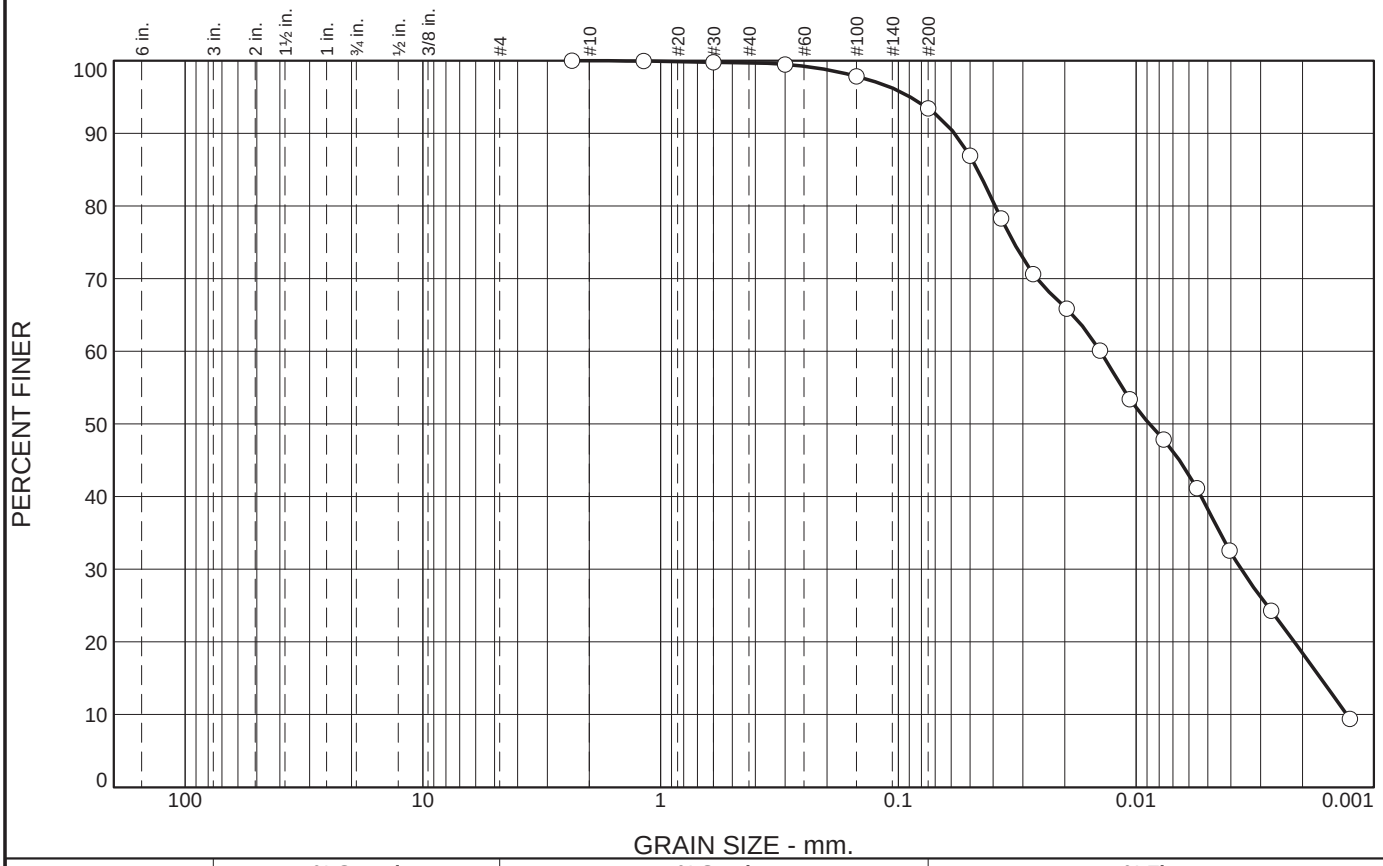
#1

#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

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~~	~~300~~	~~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

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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						

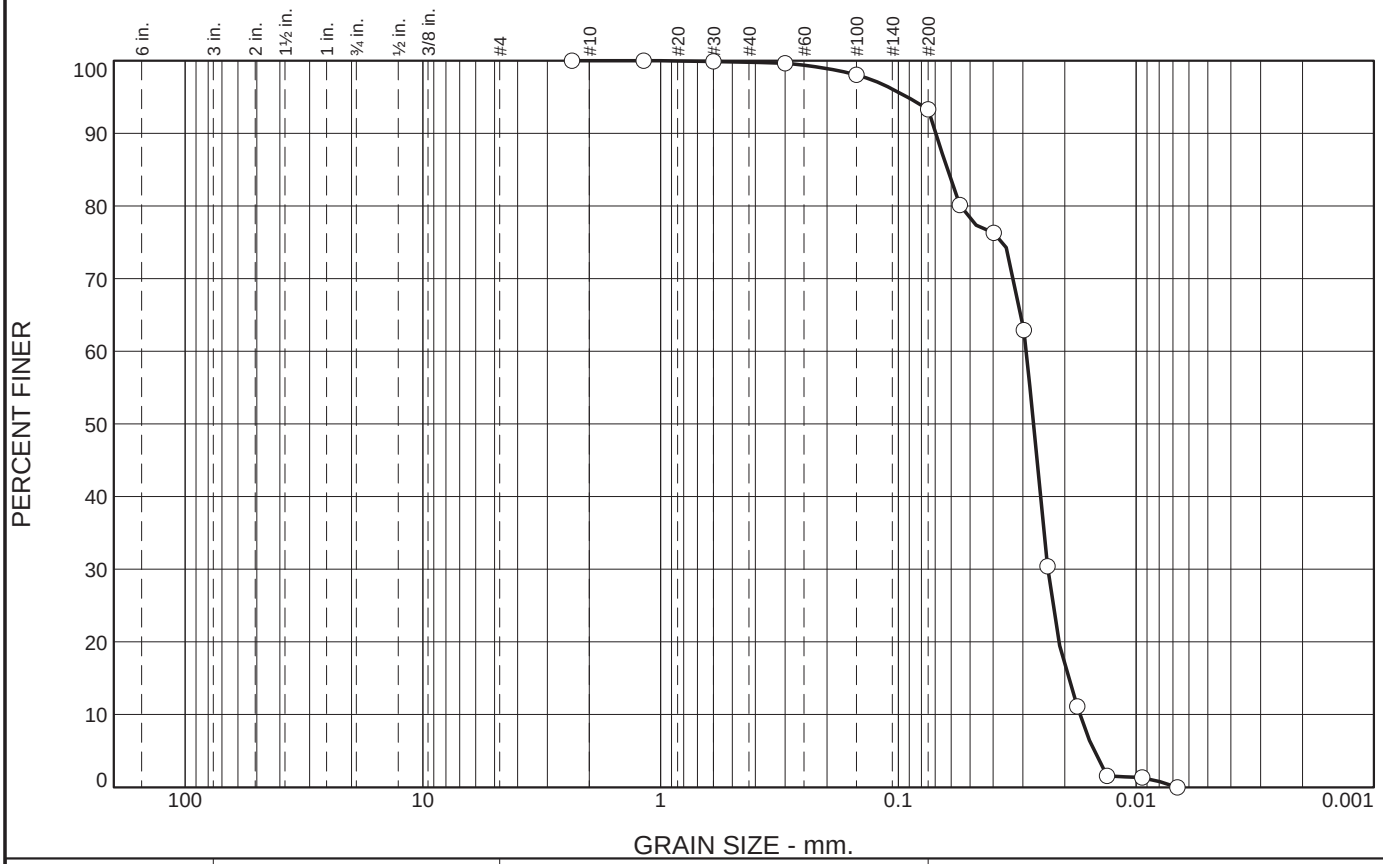
Pre #200 wash Weights	
Soil + Tare	
Tare	
Soil	

5

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

Sample Description & Remarks: Labadie Dry Fly Ash

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

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 applied

Lab test by JLC Date 1/16/09

Computed by KEK 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* Finer Partial	Percent* Finer Total
1/16/09	0915									
		-5	19.8	42						
	0916	1	19.8	40						
	0918	3	19.8	33						
	0919	4	19.8	16						
	0923	8	19.8	5.9						
	0930	15	19.8	0.9						
	0945	30	19.2	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 MAX

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						

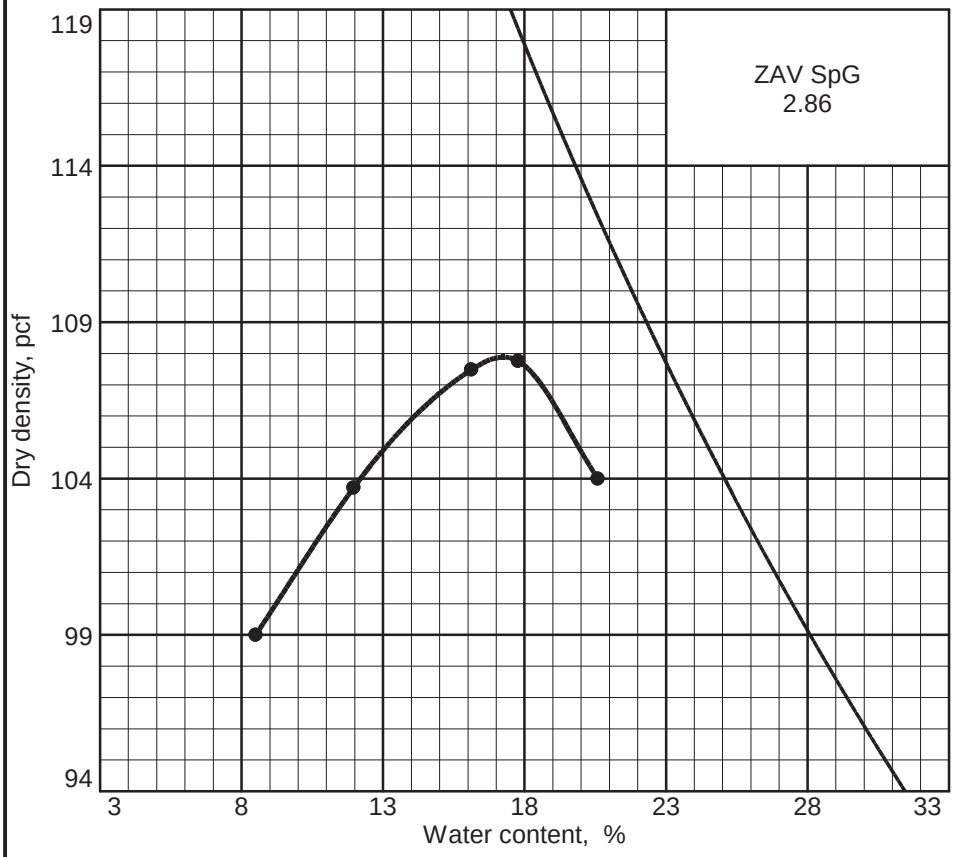
Pre #200 wash Weights	
Soil + Tare	
Tare	170.11
Soil	

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

Sample Description & Remarks: Labadie Dry Fly Ash

N:\Lab 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

MOISTURE DENSITY TEST DATA

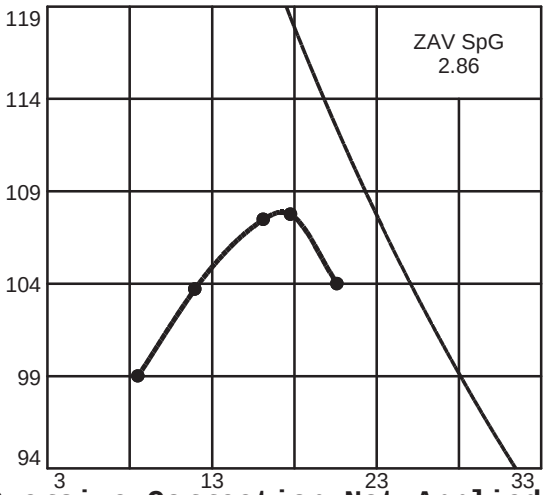
Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Project Number: 2008012455

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	179.75	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 Precipitator

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	

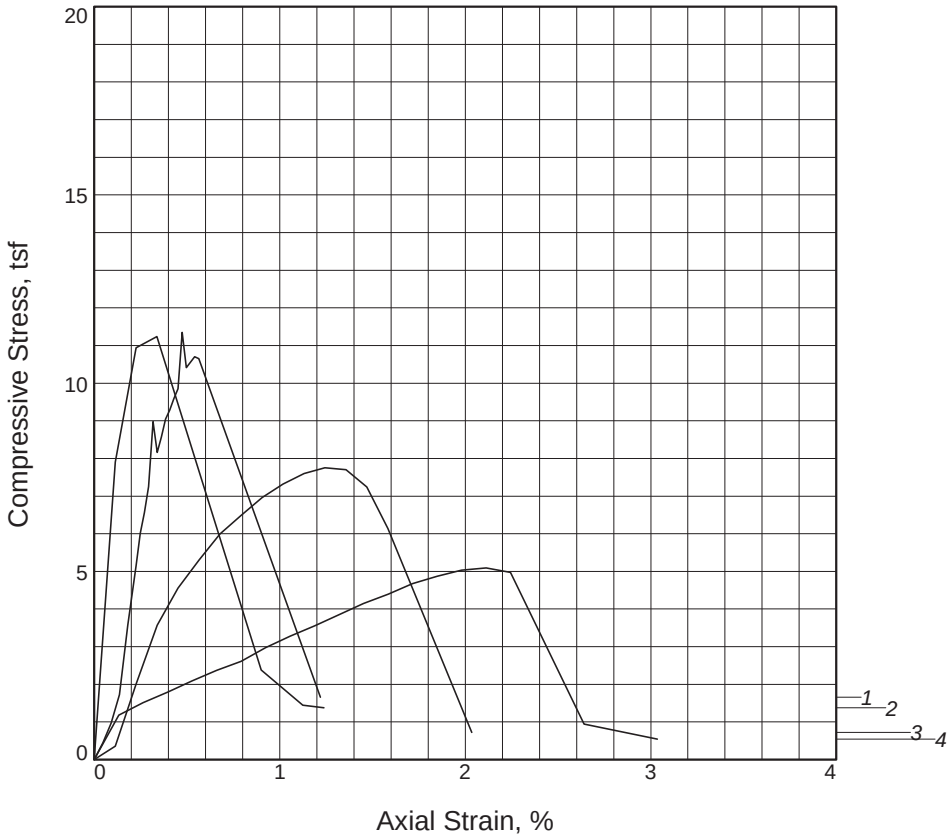
Moisture Content Determination

Tare No.	B-40	B-14	B19	B6		
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

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

KEITZ & JENS, INC.

Unconsolidated Undrained or Unconfined Test

Project: AMERICAN 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 99.0 pcf & 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)	

Load: #14

Rate of Load Application: 0.5 %/min

Confining Pressure: psi

Mass of Top Cap: gms

Failure Sketch

Strain (.001")	Load (lbs)
0	
~~40~~ 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

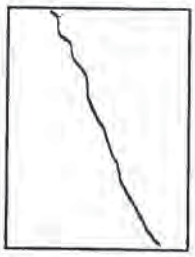
Description of Entire Tube: Spec. #1

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

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

Failure Sketch



Loads: #14

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: Ames - Labadie | Test by: CWC / JJP

Boring No.: Frm Labadie | Entered by: CWC

Sample No.: Ash Testing | Checked by: KEK

Depth: Mix #16% | Testing Date: 1/20/09

Compacted 1/16/09

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

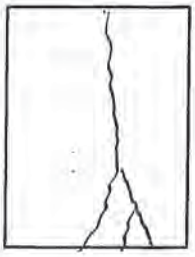
Load #24

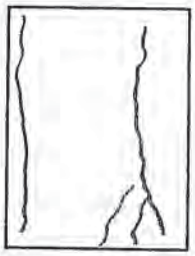
Rate of Load Application: 0.8244 %/min

Confining Pressure: 0 psi

Mass of Top Cap: ____ gms

Failure Sketch





Strain (.001")	Load (lbs)
0	0
~~10~~ 5	330
~~20~~ 10	457
~~30~~ 15	470
~~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	

Notes: Peak

Strain (.001")	Load (lbs)
~~240~~ 85	
~~260~~ 90	
~~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: 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: Mat +199. — Testing Date: 1/20/09

Description of Entire Tube: Spec #3

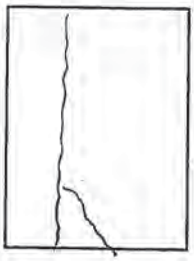
Description of Test Sample: Compaction Ash Sample from Standard Proctor at 107.8 pcf @ 17.8% M

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=		10.3

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

Failure Sketch



Rate of Load Application: 0.92 %/min

Confining Pressure: — psi

Mass of Top Cap: ____ gms

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: AMEREN 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% M — Testing Date: 1/20/09

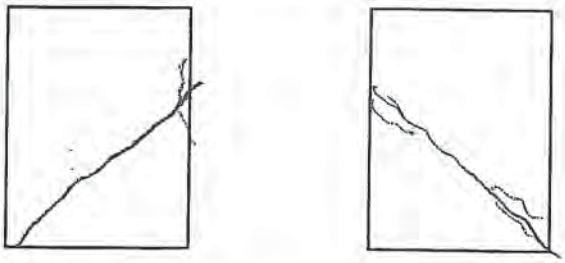
Description of Entire Tube: Spec #4

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

Moisture Contents		
	Trial 1	Trial 2
Tare #	M-8	M-11
Wet Wt.+Tare	104.48	113.44
Dry Wt.+Tare	90.78	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~~ ~~50~~	
~~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~~ ~~90~~	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 3/10/11

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		Moisture added @ 22½%	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 %			

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 Final γ_m = 128.8
$\%_M$ = 22.5 $\%_M$ = 20.1
γ_D = 101.4 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

TRIAXIAL CELL SATURATION & BETA FACTOR

PROJECT American Labrador 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

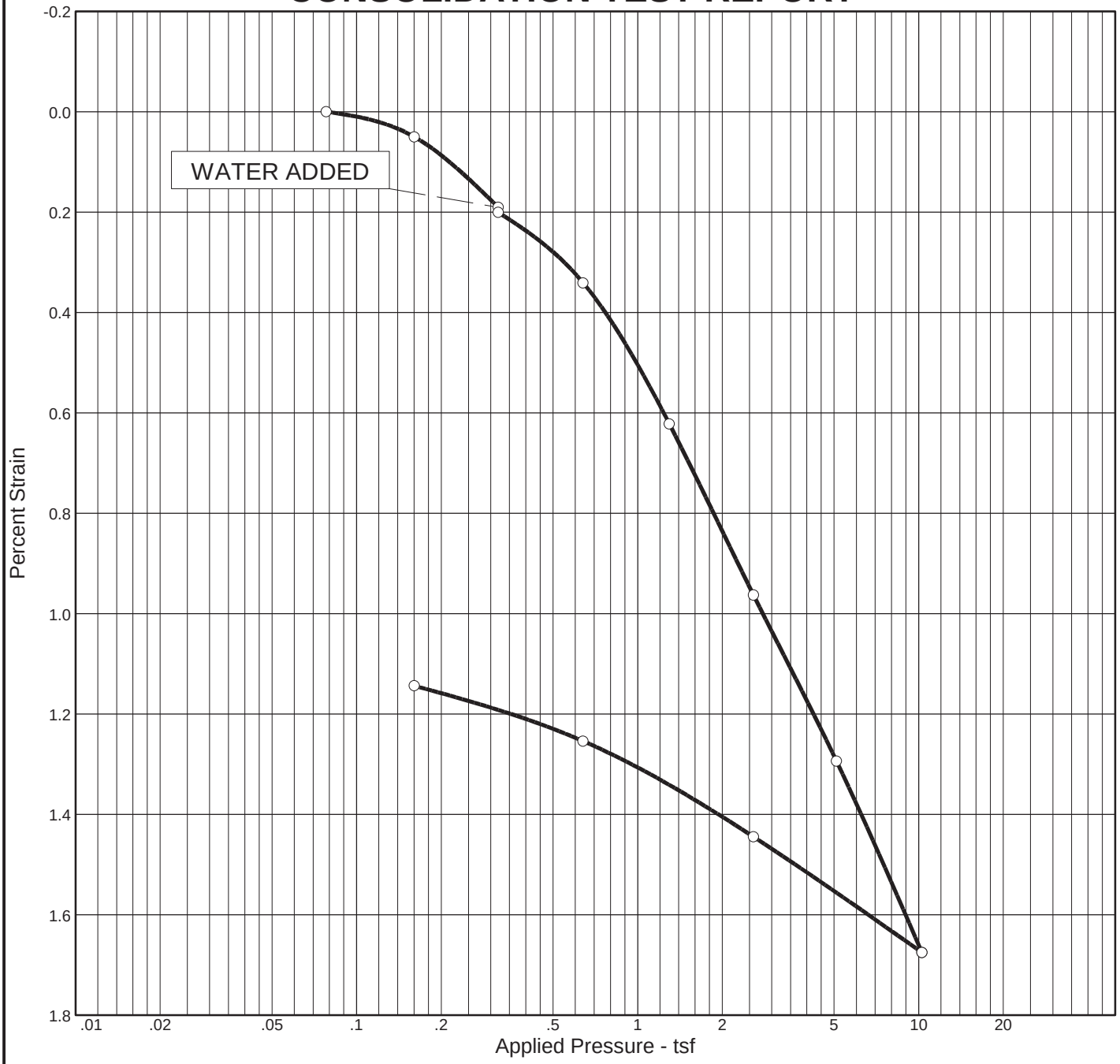
INITIAL PORE PRESSURE 50.0 CELL NUMBER 3

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		46.0	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 KW

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

REITZ & JENS, INC.
CONSULTING ENGINEERS

Remarks:

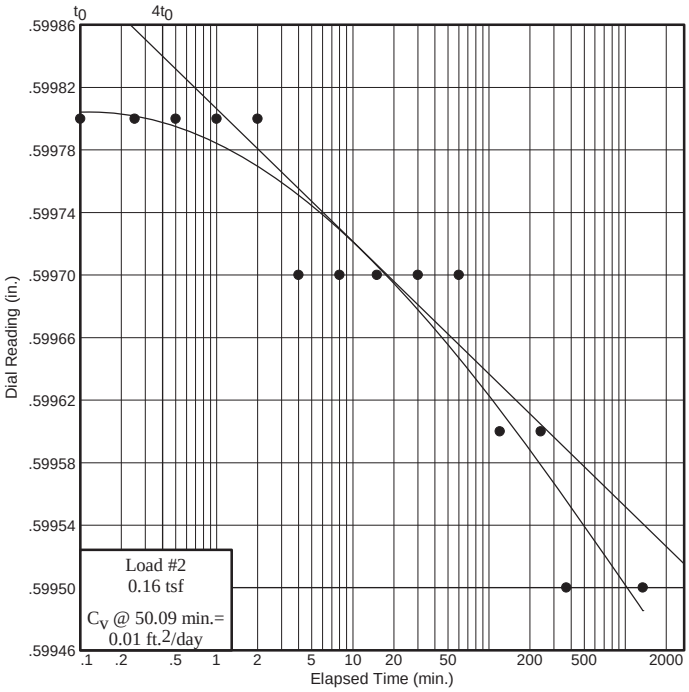
Non-ponded fly ash mixed at 22.5% moisture

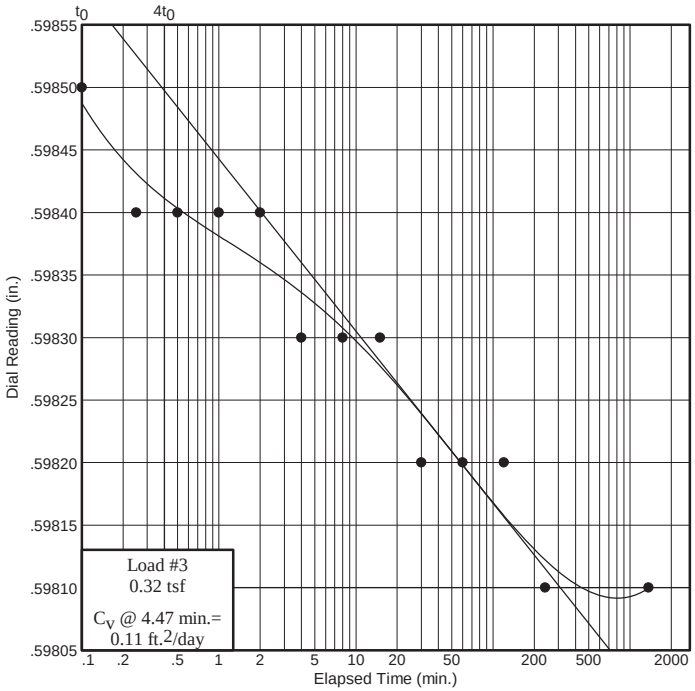
Figure

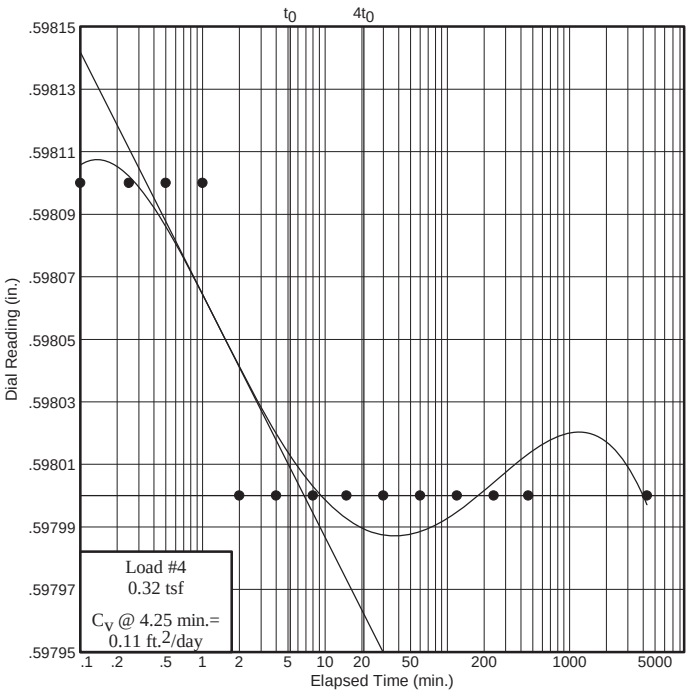
Dial Reading vs. Time

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

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







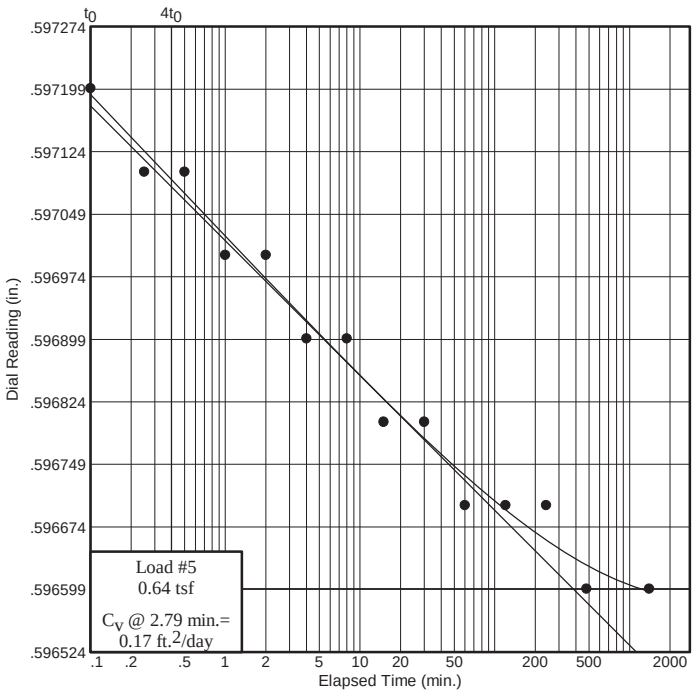


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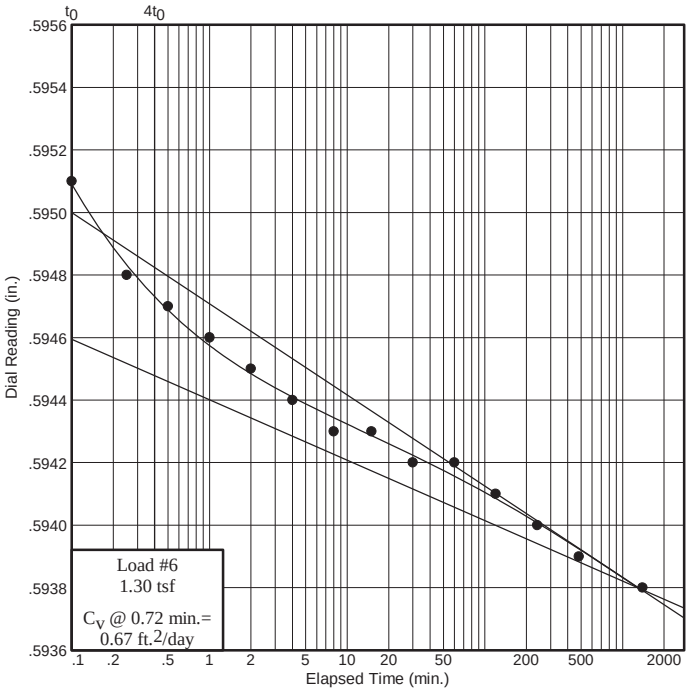
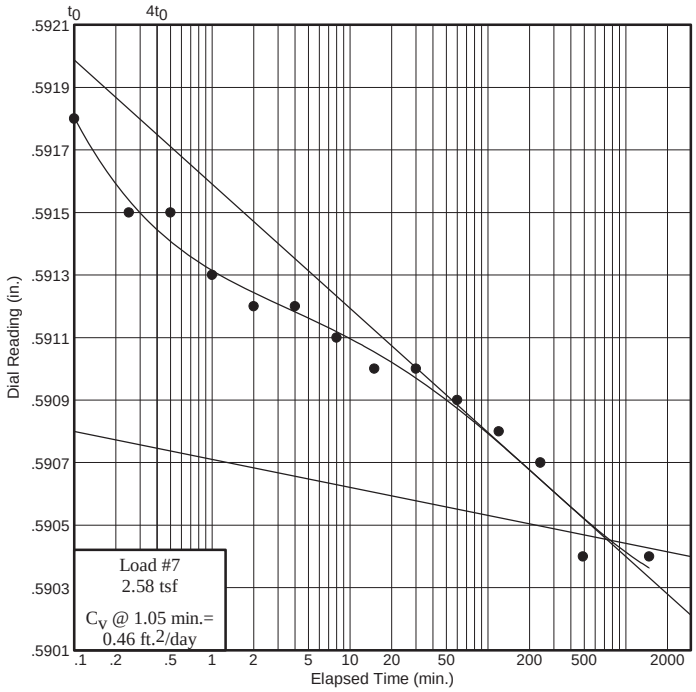
Figure

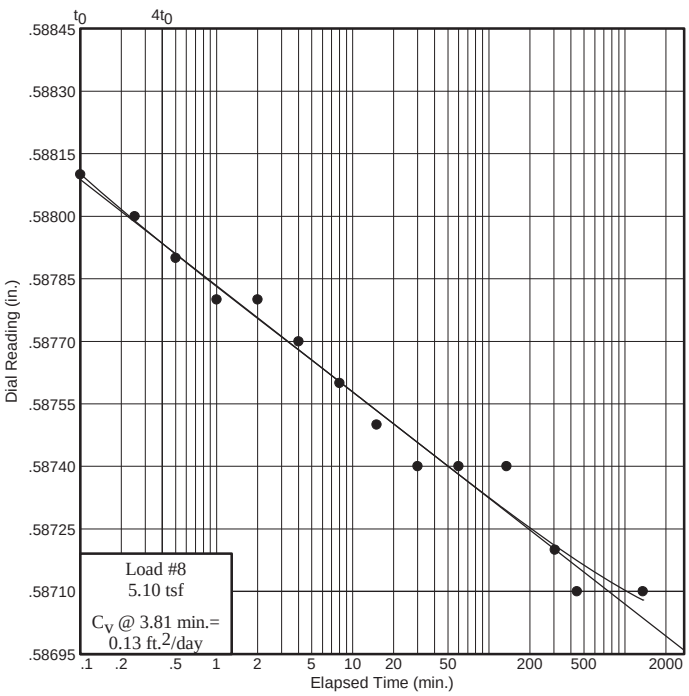
Dial Reading vs. Time

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

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







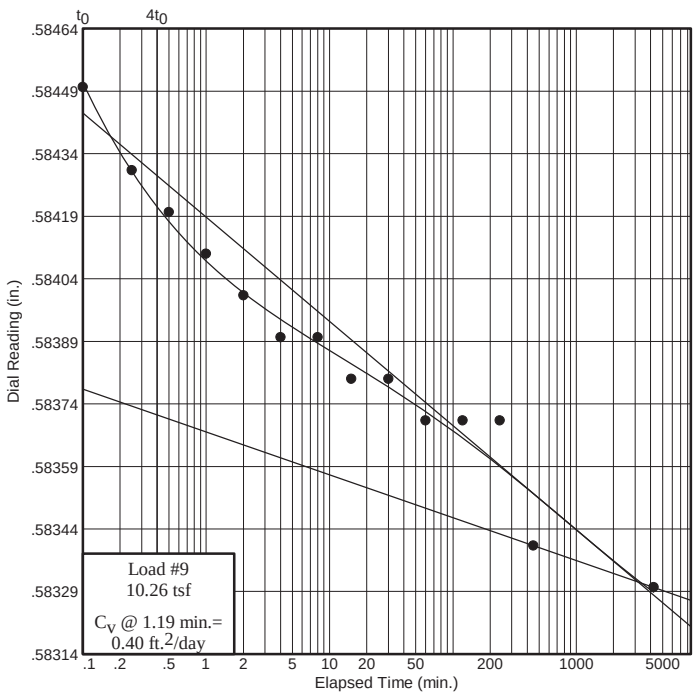


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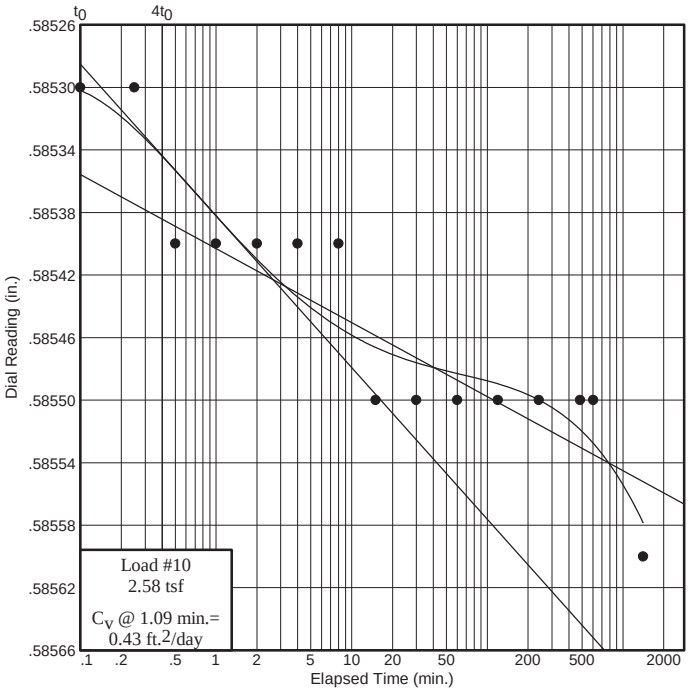
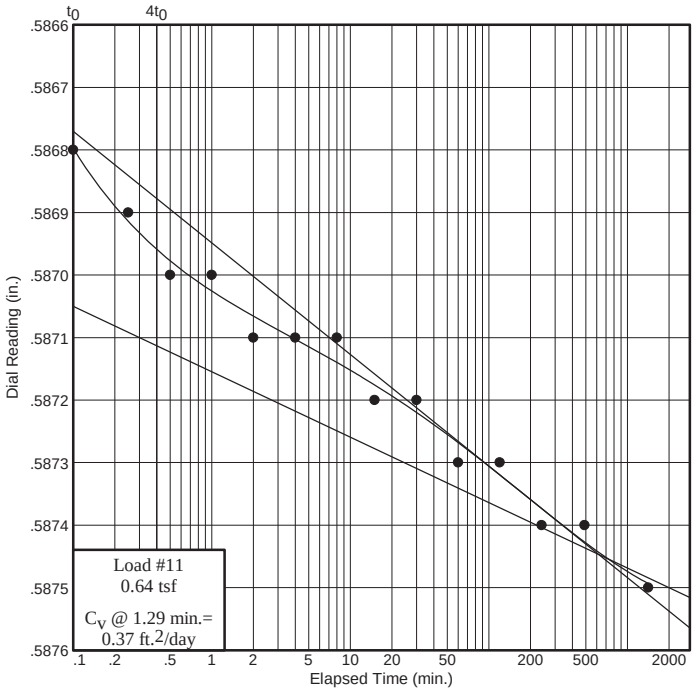
Figure

Dial Reading vs. Time

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

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





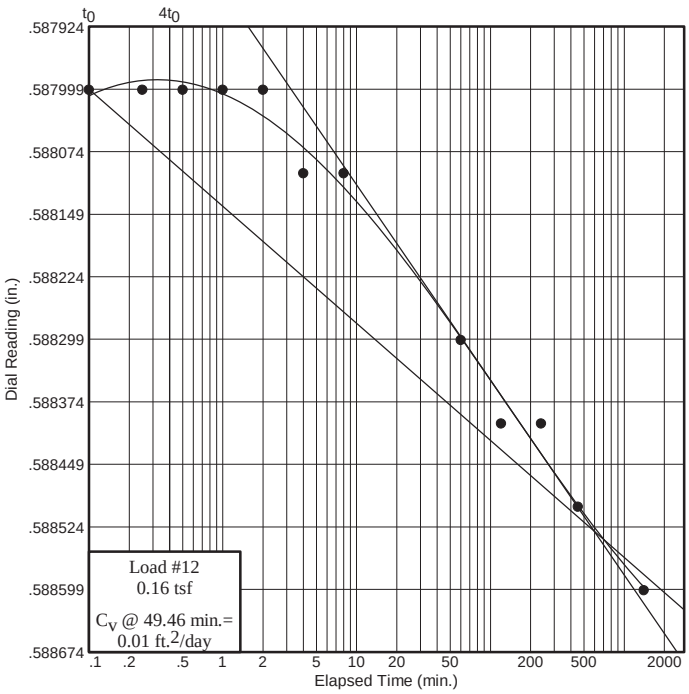


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Figure

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-Bonded Fly Ash @ 22½% m (molded @ 22½% m)

USCS: _____ AASHTO: _____

†Project Number _____

†Job AMEREN UE, LABADIE UNIT

†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

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

.9799

START 0 = .5567

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 = 190.72

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 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 .10000	
				.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		JR2	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 1/2 #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	
			12	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	480	.5939	

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

Consulting Engineers

R&J Project: Am UE Labadieuwl Sheet 3 of 5

Fly Ash 22727#2

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	139.5	.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	
			~~13:35~~	~~245~~		
			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	

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

Consulting Engineers

R&J Project: AM UE Labadie UWL Sheet 4 of 5

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

DATE	LOAD kg	TESTER'S INITIALS	TIME	ELAPSED TIME, min.	DIAL READING	NOTES
3/4/11	32kg	JSP	10:35	120	.5837	
			12:35	240	.5836	
			16:05	450	.5834	
3/7/11			7:15	4240	.5833	
	8kg	JRL	8:35	0	.5833	
				.1	.5853	
				.25	.5853	
				.5	.5854	
			8:36	1	.5854	
			8:37	2	.5854	
			8:39	4	.5854	
			8:43	8	.5854	
			8:50	15	.5855	
			9:05	30	.5855	
			9:35	60	.5855	
			10:35	120	.5855	
			12:35	240	.5855	
			16:40	485	.5855	
			18:40	605	.5855	
3/8/11	"	JRL	8:05	1410	.5856	
	2kg		8:40	0	0.5856	
				.1	.5868	
				.25	.5869	
				.5	.5870	
			8:41	1	.5870	
			8:42	2	.5871	
			8:44	4	.5871	
			8:48	8	.5871	
			8:55	15	.5872	
			9:10	30	.5872	
			9:40	60	.5873	
			10:40	120	.5873	
			12:40	240	.5874	
			16:50	490	.5874	
3/9/11			8:10	1410	.5875	

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

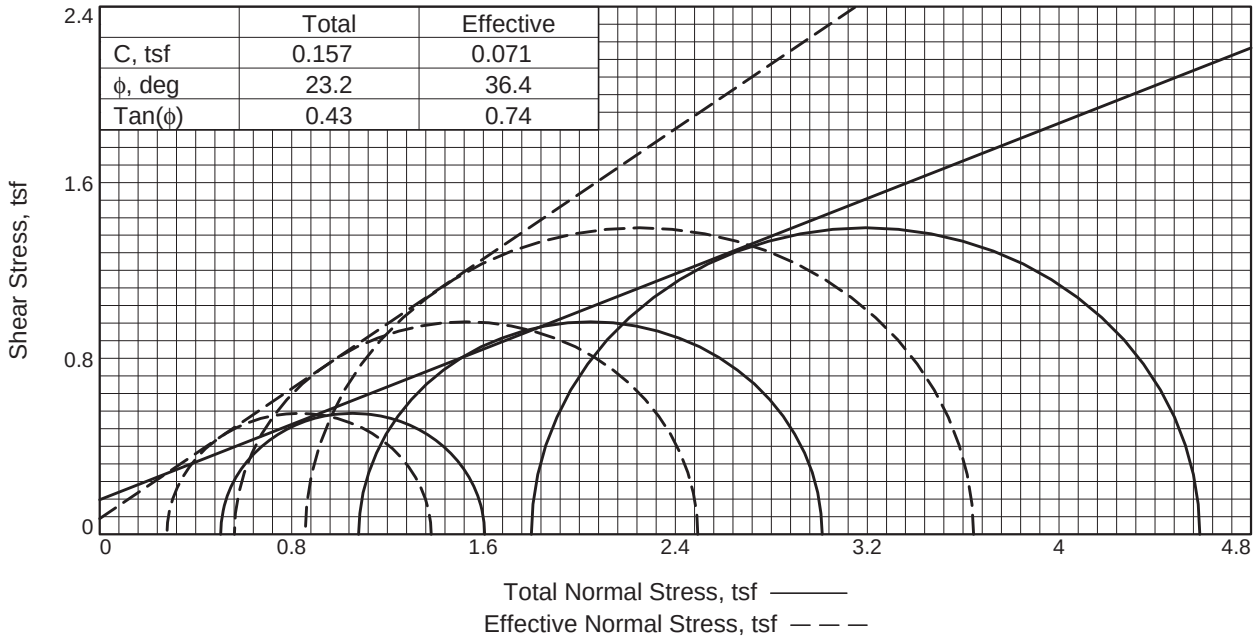
Consulting Engineers

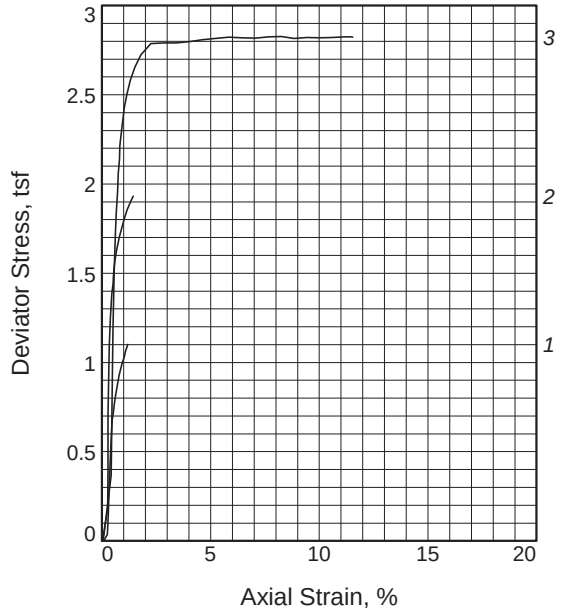
R&J Project: Ameren Labadie UWL Sheet 5 of 5

Boring: Fly Ash C2267 Sample: [redacted] #2 Depth: _____ Rig: 1

DATE	LOAD kg	TESTER'S INITIALS	TIME	ELAPSED TIME, min.	DIAL READING	NOTES
3/9/11	0.5	JR	9:00	0	0.5875	
				.1	5880	
				.25	5880	
				.5	5880	
			9:01	1	5880	
			9:02	2	5880	
			9:04	4	5881	
			9:08	8	5881	
			9:15	15	—	
			9:30	30	—	
			10:00	60	5883	
			11:00	120	5884	
			13:00	240	5884	
			16:30	450	5885	
3/10/11			8:20	1400	5886	

Break Down





Sample No.		1	2	3
Initial	Water Content,	55.3	55.3	55.3
	Dry Density, pcf	58.3	58.3	58.3
	Saturation,	76.5	76.5	76.5
	Void Ratio	2.0726	2.0726	2.0726
	Diameter, in.	1.96	1.96	1.96
	Height, in.	3.65	3.65	3.65
At Test	Water Content,	69.0	68.7	68.7
	Dry Density, pcf	60.1	60.3	60.3
	Saturation,	100.0	100.0	100.0
	Void Ratio	1.9796	1.9721	1.9721
	Diameter, in.	1.94	1.95	1.97
	Height, in.	3.61	3.56	3.51
Strain rate, %/min.		0.20	0.10	0.08
Back Pressure, tsf		3.96	4.25	4.82
Cell Pressure, tsf		4.46	5.33	6.62
Fail. Stress, tsf		1.10	1.93	2.79
Total Pore Pr., tsf		4.18	4.77	5.77
Ult. Stress, tsf				
Total Pore Pr., tsf				
$\bar{\sigma}_1$ Failure, tsf		1.38	2.49	3.64
$\bar{\sigma}_3$ Failure, tsf		0.28	0.56	0.86

Type of Test:
CU with Pore Pressures

Sample Type: Hand Molded

Description: Ponded fly ash, air dried to 8% and molded at 55%

Assumed Specific Gravity= 2.87

Remarks: Staged Test

Client: Ameren Missouri

Project: CCP Properties, Labadie Plant

Source of Sample: Ponded Fly Ash

Sample Number: Bulk

Proj. No.: 2008012455 **Date:** 4/7/2011

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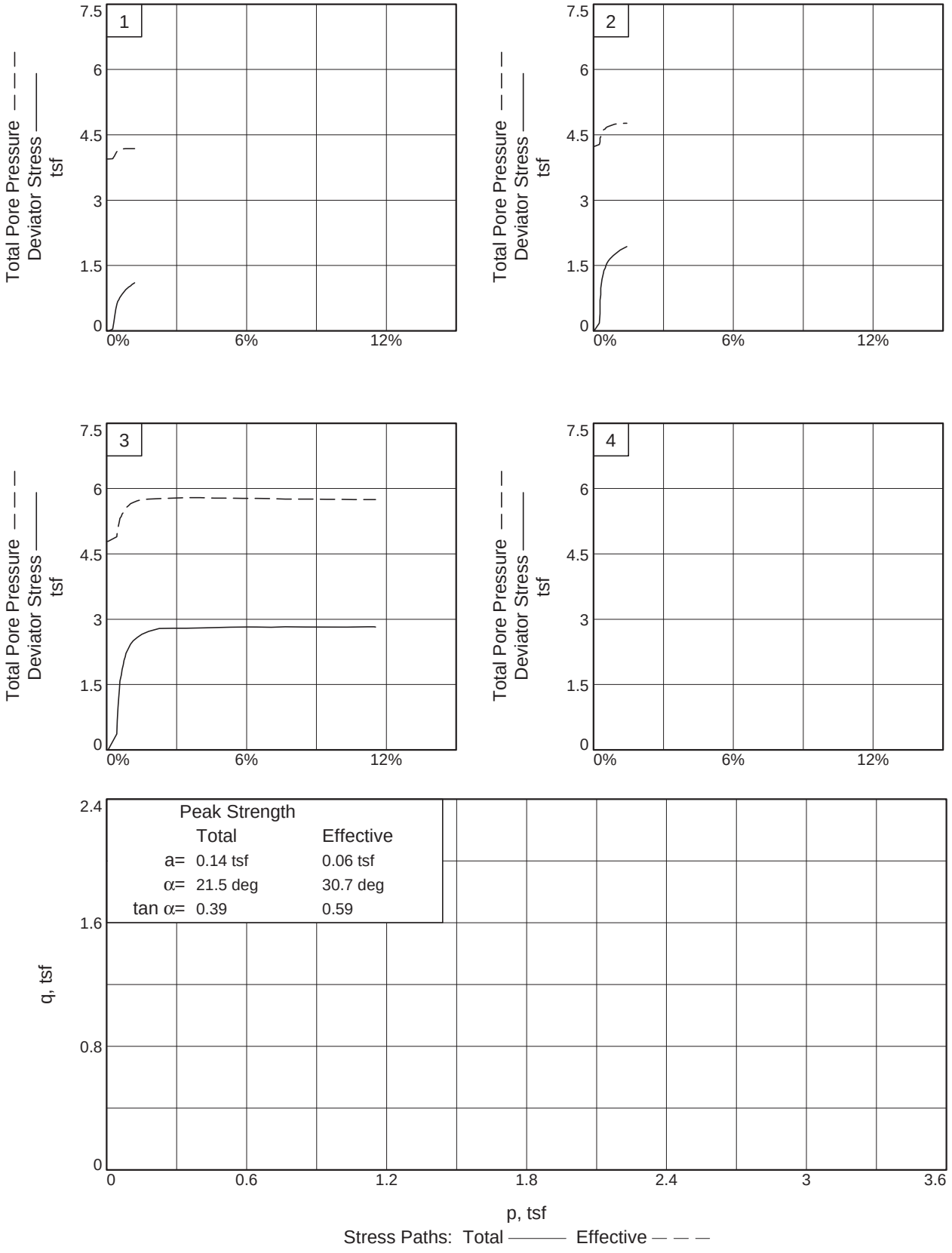
CONSULTING ENGINEERS

Figure _____

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



Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Source of Sample: Ponded Fly Ash **Sample Number:** Bulk
Project No.: 2008012455 **Figure** _____

REITZ & JENS, INC.

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

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

5/23/2011
1:21 PM

Date: 4/7/2011
Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Project No.: 2008012455
Location: Ponded Fly Ash
Sample Number: Bulk
Description: Ponded fly ash, air dried to 8% and molded at 55%
Remarks: Staged Test
Type of Sample: Hand Molded
Assumed Specific Gravity=2.87 **LL=** **PL=** **PI=**
Test Method: COE uniform strain (staged method triaxial test)

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	342.950			487.550
Moisture content: Dry soil+tare, gms.	247.420			376.760
Moisture content: Tare, gms.	74.600			210.870
Moisture, %	55.3	69.7	69.0	66.8
Moist specimen weight, gms.	262.3			
Diameter, in.	1.96	1.95	1.94	
Area, in.²	3.03	2.98	2.97	
Height, in.	3.65	3.62	3.61	
Net decrease in height, in.		0.03	0.01	
Wet Density, pcf	90.5	101.3	101.6	
Dry density, pcf	58.3	59.7	60.1	
Void ratio	2.0726	1.9996	1.9796	
Saturation, %	76.5	100.0	100.0	

Test Readings for Specimen No. 1

Consolidation cell pressure = 62.00 psi (4.464 tsf)
Consolidation back pressure = 55.00 psi (3.960 tsf)
Consolidation effective confining stress = 0.504 tsf
Strain rate, %/min. = 0.20
Fail. Stress = 1.101 tsf **at reading no.** 22

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.0040	16.00	0.0	0.0	0.000	0.518	0.518	1.00	54.80	0.518	0.000
1	0.0060	16.00	0.0	0.1	0.000	0.518	0.518	1.00	54.80	0.518	0.000
2	0.0070	16.00	0.0	0.1	0.000	0.518	0.518	1.00	54.80	0.518	0.000
3	0.0130	17.50	1.5	0.2	0.036	0.511	0.548	1.07	54.90	0.529	0.018
4	0.0140	20.30	4.3	0.3	0.104	0.497	0.601	1.21	55.10	0.549	0.052
5	0.0150	24.50	8.5	0.3	0.206	0.468	0.674	1.44	55.50	0.571	0.103
6	0.0160	28.80	12.8	0.3	0.310	0.446	0.756	1.69	55.80	0.601	0.155
7	0.0170	33.30	17.3	0.4	0.418	0.418	0.836	2.00	56.20	0.627	0.209
8	0.0180	36.40	20.4	0.4	0.493	0.389	0.882	2.27	56.60	0.635	0.247
9	0.0190	39.60	23.6	0.4	0.571	0.360	0.931	2.58	57.00	0.645	0.285
10	0.0200	42.20	26.2	0.4	0.633	0.346	0.979	2.83	57.20	0.662	0.317
11	0.0210	44.00	28.0	0.5	0.677	0.324	1.001	3.09	57.50	0.662	0.338
12	0.0230	45.90	29.9	0.5	0.722	0.310	1.032	3.33	57.70	0.671	0.361
13	0.0240	47.40	31.4	0.6	0.758	0.302	1.060	3.51	57.80	0.681	0.379
14	0.0250	48.70	32.7	0.6	0.789	0.295	1.084	3.67	57.90	0.690	0.395
15	0.0280	51.00	35.0	0.7	0.844	0.288	1.132	3.93	58.00	0.710	0.422
16	0.0300	53.00	37.0	0.7	0.892	0.288	1.180	4.10	58.00	0.734	0.446
17	0.0330	54.70	38.7	0.8	0.932	0.281	1.213	4.32	58.10	0.747	0.466
18	0.0350	56.30	40.3	0.9	0.970	0.281	1.251	4.45	58.10	0.766	0.485
19	0.0380	57.60	41.6	0.9	1.000	0.281	1.281	4.56	58.10	0.781	0.500
20	0.0410	58.90	42.9	1.0	1.031	0.281	1.312	4.67	58.10	0.796	0.515
21	0.0430	60.30	44.3	1.1	1.064	0.281	1.345	4.79	58.10	0.813	0.532
22	0.0470	61.90	45.9	1.2	1.101	0.281	1.382	4.92	58.10	0.831	0.550

Parameters for Specimen No. 2

Specimen Parameter	Initial	Cum. for Test	Consolidated	Final
Moisture content: Moist soil+tare, gms.	342.950			487.550
Moisture content: Dry soil+tare, gms.	247.420			376.760
Moisture content: Tare, gms.	74.600			210.870
Moisture, %	55.3		68.7	66.8
Moist specimen weight, gms.	262.3			
Diameter, in.	1.96		1.95	
Area, in.²	3.03		3.00	
Height, in.	3.65		3.56	
Net decrease in height, in.		0.08	0.00	
Wet Density, pcf	90.5		101.7	
Dry density, pcf	58.3		60.3	
Void ratio	2.0726		1.9721	
Saturation, %	76.5		100.0	

Test Readings for Specimen No. 2

Consolidation cell pressure = 74.00 psi (5.328 tsf)
Consolidation back pressure = 59.00 psi (4.248 tsf)
Consolidation effective confining stress = 1.080 tsf
Strain rate, %/min. = 0.10
Fail. Stress = 1.932 tsf **at reading no.** 22

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.0040	19.10	0.0	0.0	0.000	1.094	1.094	1.00	58.80	1.094	0.000
1	0.0050	19.30	0.2	0.0	0.005	1.094	1.099	1.00	58.80	1.097	0.002
2	0.0130	26.50	7.4	0.3	0.177	1.051	1.229	1.17	59.40	1.140	0.089
3	0.0140	35.40	16.3	0.3	0.391	0.986	1.377	1.40	60.30	1.182	0.195
4	0.0140	42.70	23.6	0.3	0.565	0.943	1.509	1.60	60.90	1.226	0.283
5	0.0140	48.50	29.4	0.3	0.704	0.900	1.604	1.78	61.50	1.252	0.352
6	0.0150	53.60	34.5	0.3	0.826	0.871	1.698	1.95	61.90	1.284	0.413
7	0.0150	60.00	40.9	0.3	0.980	0.828	1.808	2.18	62.50	1.318	0.490
8	0.0160	64.80	45.7	0.3	1.094	0.792	1.886	2.38	63.00	1.339	0.547
9	0.0170	68.40	49.3	0.4	1.180	0.763	1.943	2.55	63.40	1.353	0.590
10	0.0180	71.40	52.3	0.4	1.252	0.742	1.993	2.69	63.70	1.367	0.626
11	0.0190	74.40	55.3	0.4	1.323	0.720	2.043	2.84	64.00	1.382	0.662
12	0.0200	77.00	57.9	0.4	1.385	0.706	2.090	2.96	64.20	1.398	0.692
13	0.0220	79.50	60.4	0.5	1.444	0.691	2.135	3.09	64.40	1.413	0.722
14	0.0230	81.60	62.5	0.5	1.494	0.670	2.163	3.23	64.70	1.416	0.747
15	0.0250	84.70	65.6	0.6	1.567	0.648	2.215	3.42	65.00	1.431	0.783
16	0.0280	87.40	68.3	0.7	1.630	0.626	2.256	3.60	65.30	1.441	0.815
17	0.0320	90.20	71.1	0.8	1.695	0.605	2.300	3.80	65.60	1.452	0.847
18	0.0360	92.80	73.7	0.9	1.755	0.583	2.338	4.01	65.90	1.461	0.877
19	0.0410	95.10	76.0	1.0	1.807	0.576	2.383	4.14	66.00	1.480	0.904
20	0.0450	97.30	78.2	1.2	1.857	0.569	2.426	4.27	66.10	1.497	0.929
21	0.0520	99.70	80.6	1.3	1.910	0.562	2.472	4.40	66.20	1.517	0.955
22	0.0550	100.70	81.6	1.4	1.932	0.562	2.494	4.44	66.20	1.528	0.966

Parameters for Specimen No. 3

Specimen Parameter	Initial	Cum. for Test	Consolidated	Final
Moisture content: Moist soil+tare, gms.	342.950			487.550
Moisture content: Dry soil+tare, gms.	247.420			376.760
Moisture content: Tare, gms.	74.600			210.870
Moisture, %	55.3		68.7	66.8
Moist specimen weight, gms.	262.3			
Diameter, in.	1.96		1.97	
Area, in.²	3.03		3.04	
Height, in.	3.65		3.51	
Net decrease in height, in.		0.13	0.00	
Wet Density, pcf	90.5		101.7	
Dry density, pcf	58.3		60.3	
Void ratio	2.0726		1.9721	
Saturation, %	76.5		100.0	

Test Readings for Specimen No. 3

Consolidation cell pressure = 92.00 psi (6.624 tsf)
Consolidation back pressure = 67.00 psi (4.824 tsf)
Consolidation effective confining stress = 1.800 tsf
Strain rate, %/min. = 0.08
Fail. Stress = 2.787 tsf **at reading no.** 20

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
0	0.0040	23.80	0.0	0.0	0.000	1.836	1.836	1.00	66.50	1.836	0.000
1	0.0060	23.80	0.0	0.1	0.000	1.836	1.836	1.00	66.50	1.836	0.000
2	0.0190	39.40	15.6	0.4	0.368	1.728	2.096	1.21	68.00	1.912	0.184
3	0.0200	52.50	28.7	0.5	0.677	1.620	2.297	1.42	69.50	1.958	0.338
4	0.0210	64.90	41.1	0.5	0.969	1.526	2.495	1.63	70.80	2.011	0.484
5	0.0220	74.70	50.9	0.5	1.199	1.447	2.646	1.83	71.90	2.047	0.600
6	0.0230	83.40	59.6	0.5	1.404	1.368	2.772	2.03	73.00	2.070	0.702
7	0.0240	90.80	67.0	0.6	1.578	1.310	2.888	2.20	73.80	2.099	0.789
8	0.0260	97.10	73.3	0.6	1.725	1.260	2.985	2.37	74.50	2.123	0.863
9	0.0270	102.20	78.4	0.7	1.845	1.210	3.054	2.52	75.20	2.132	0.922
10	0.0290	107.00	83.2	0.7	1.956	1.174	3.130	2.67	75.70	2.152	0.978
11	0.0300	111.30	87.5	0.7	2.057	1.130	3.187	2.82	76.30	2.159	1.028
12	0.0320	114.90	91.1	0.8	2.140	1.102	3.242	2.94	76.70	2.172	1.070
13	0.0330	118.10	94.3	0.8	2.215	1.066	3.280	3.08	77.20	2.173	1.107
14	0.0370	123.50	99.7	0.9	2.339	1.015	3.354	3.30	77.90	2.185	1.169
15	0.0400	127.40	103.6	1.0	2.428	0.972	3.400	3.50	78.50	2.186	1.214
16	0.0440	130.70	106.9	1.1	2.503	0.943	3.446	3.65	78.90	2.195	1.251
17	0.0500	134.30	110.5	1.3	2.583	0.907	3.490	3.85	79.40	2.199	1.291
18	0.0570	137.60	113.8	1.5	2.654	0.878	3.533	4.02	79.80	2.206	1.327
19	0.0670	140.90	117.1	1.8	2.723	0.864	3.587	4.15	80.00	2.226	1.362
20	0.0830	144.20	120.4	2.2	2.787	0.857	3.644	4.25	80.10	2.250	1.394
21	0.1040	145.10	121.3	2.8	2.791	0.842	3.633	4.31	80.30	2.238	1.395
22	0.1240	145.80	122.0	3.4	2.791	0.835	3.626	4.34	80.40	2.230	1.395
23	0.1450	146.90	123.1	4.0	2.798	0.835	3.633	4.35	80.40	2.234	1.399
24	0.1660	148.10	124.3	4.6	2.808	0.842	3.650	4.33	80.30	2.246	1.404
25	0.1870	149.20	125.4	5.2	2.815	0.842	3.657	4.34	80.30	2.250	1.407
26	0.2090	150.40	126.6	5.8	2.823	0.850	3.673	4.32	80.20	2.261	1.412

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Eff. Stress tsf	Major Eff. Stress tsf	1:3 Ratio	Pore Press. psi	P tsf	Q tsf
27	0.2300	151.00	127.2	6.4	2.819	0.850	3.668	4.32	80.20	2.259	1.409
28	0.2520	151.80	128.0	7.1	2.817	0.857	3.674	4.29	80.10	2.265	1.409
29	0.2730	153.00	129.2	7.7	2.825	0.864	3.689	4.27	80.00	2.277	1.413
30	0.2940	153.90	130.1	8.3	2.827	0.864	3.691	4.27	80.00	2.277	1.413
31	0.3140	154.20	130.4	8.8	2.816	0.864	3.680	4.26	80.00	2.272	1.408
32	0.3350	155.30	131.5	9.4	2.821	0.871	3.692	4.24	79.90	2.282	1.410
33	0.3560	156.10	132.3	10.0	2.819	0.871	3.690	4.24	79.90	2.281	1.410
34	0.3760	157.00	133.2	10.6	2.820	0.878	3.699	4.21	79.80	2.289	1.410
35	0.3970	158.10	134.3	11.2	2.825	0.878	3.703	4.22	79.80	2.291	1.412
36	0.4070	158.50	134.7	11.5	2.824	0.878	3.702	4.21	79.80	2.290	1.412
37	0.4090	158.50	134.7	11.5	2.822	0.878	3.700	4.21	79.80	2.289	1.411

TRIAXIAL CELL SETUP & TAKEDOWN

Project Ameren Labadie UWL Date 4-11-11

Sample Labadie Ponded Ash Depth

Description 100% Labadie Ponded Ash Air dried to ≈8%, then molded at 65% M

Type of Test Staged CU Confining Pressure Differential 7, 15, 25 psi

Cell Number 2 Saturate (before) after Consolidation

Number of Membranes 2 Filter Strips (Yes) No

LENGTH CHANGE	
STRAIN GAUGE at setup	500
at saturation start	500
at consolidation start	529
at axial load start	537

MOISTURE CONTENT

	INITIAL		FINAL
Tare No.	R 44	B-3	Bowl 2
Wet Wt. + Tare	155.26	187.69	487.55
Dry Wt. + Tare	111.74	135.66	379.76
Wt. Water			
Tare Wt.	33.97	40.63	210.87
Dry Soil Wt.			*168.89
Moisture %	55.920	54.751	63.823
Avg. w %	55.3		63.8

MASS PROPERTIES

Wt. Tube + Soil		gm.
Wt. Tube		gm.
Wt. Soil	262.29	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.

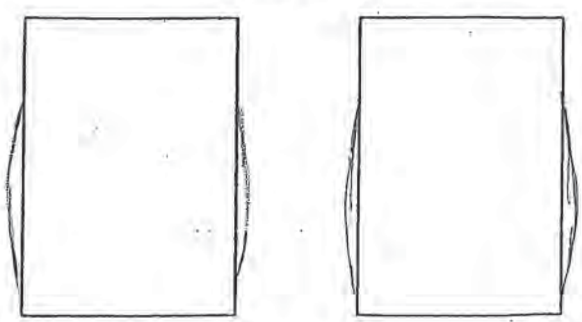
SPECIMEN DIMENSIONS in. / mm.

	HEIGHT		DIAMETER	
	Initial	Final	Initial	Final
1	3.6380		T 1.9630	
2	3.6445		M 1.9620	
3	3.6530		B 1.9650	
Avg.	3.64517		1.96333	

Description After Test Initial γ_m = 90.5
%M = 55.3
γ_D = 58.3

Remarks *Sample is very fragile will use dry wt after test to determine Density

Failure Sketch



Trimmed By KBK
Trimmed Date 4-11-2011

Setup By KBK
Setup Date 4-11-2011

Taken Down By KBK
Take Down Date 4-21-11

Revised 2/12/98

REITZ & JENS, INC. Consulting Engineers Sheet ______ of ______

TRIAXIAL CELL SATURATION & BETA FACTOR

PROJECT Amercoal Labadie Ponded Fly Ash

SAMPLE Ponded Fly Ash DEPTH

INITIAL CELL PRESSURE 51.0 START DATE 4-11-11

INITIAL PORE PRESSURE 50.0 CELL NUMBER 2

INITIAL TRANSDUCER READING 50.3 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)
4-13-11	0	2.95	51.0	50.6				
	1		56.0	55.4	5.0		4.8	0.96
	2		"	55.4	5.0		4.8	0.96
	4		"	55.4	5.0		4.8	0.96
			OK					
			1 LBR					

TRIAXIAL CELL CONSOLIDATION TEST

PROJECT American Labadie Wall Ponded Fly Ash

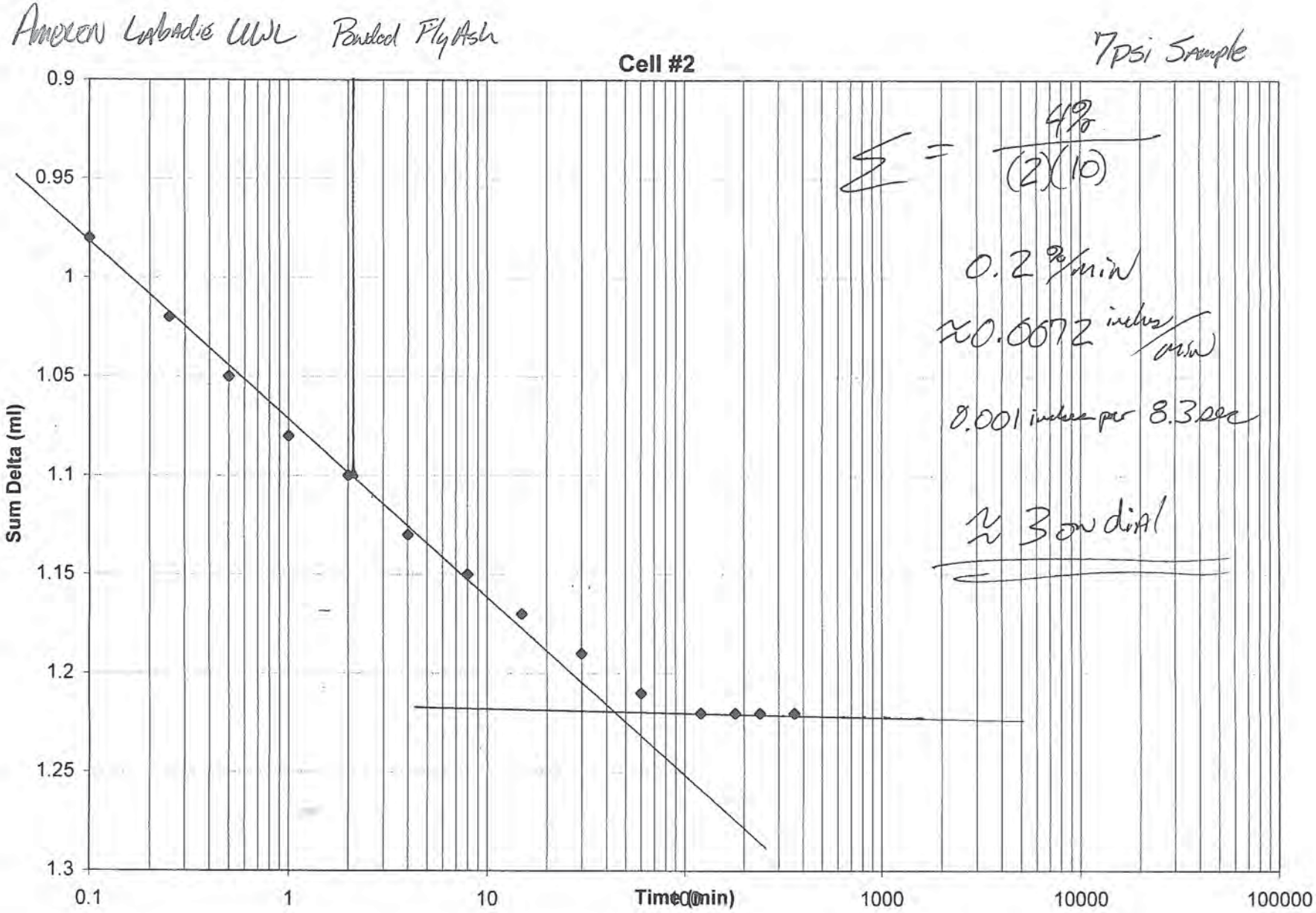
SAMPLE Ponded Fly Ash DEPTH

CONSOLIDATION CELL PRESSURE 62.0 CELL NUMBER 2

CONSOLIDATION PORE PRESSURE 55.0

DATE	TIME	BURETTE READING	DELTA VOLUME	SUM DELTA VOLUME	DELTA TIME	TEMP	REMARKS
4-14-11	7:42	10.00			0		
		9.02			.1		
		8.98			.25		
		8.95			.5		
	7:43	8.92			1		
	7:44	8.90			2		
	7:46	8.87			4		
	7:50	8.85			8		
	7:57	8.83			15		
	8:12	8.81			30		
	8:42	8.79			60		
	9:42	8.78			120		
	10:42	8.78			180		
	11:42	8.78			240		
	13:42	8.78			360		

REITZ & JENS, INC. Consulting Engineers Sheet ____ of


American Labadie UWL Ponded Fly Ash
Cell #2
7 psi Sample
Sum Delta (ml)
0.9
0.95
1
1.05
1.1
1.15
1.2
1.25
1.3
0.1
1
10
100
1000
10000
100000
Time (min)
ε = 4% / (2)(10)
0.2 %/min
≈ 0.0072 inches/min
0.001 inches per 8.3 sec
≈ 3 on dial

TRIAXIAL CELL AXIAL LOADING TEST

DATE 4-15-11

PROVING RING _____

PROJECT American Labrador UWL

SAMPLE Powdered Flyash DEPTH _____

INITIAL CELL PRESSURE 62.0 CELL NUMBER 2

INITIAL PORE PRESSURE 55.0 START DATE 4-15-11

SAMPLE HEIGHT: AT SETUP _____ AT START OF LOADING ≈3.6082

STRAIN RATE 0.2 %/min TYPE OF TEST Staged CU

50 x 5 1/4

TIME	STRAIN DIAL (.001) IN	LOAD DIAL (.0001) IN	PORE PRESSURE READING	TIME	STRAIN DIAL (.001) IN	LOAD DIAL (.0001) IN	PORE PRESSURE READING
Data Collected Electronically							

MASS OF TOP CAP & POROUS STONE: _____ g.

TRIAXIAL CELL CONSOLIDATION TEST

Strain @ Consol Start 500
@ Axial Loading 503

PROJECT American Labrador Mill

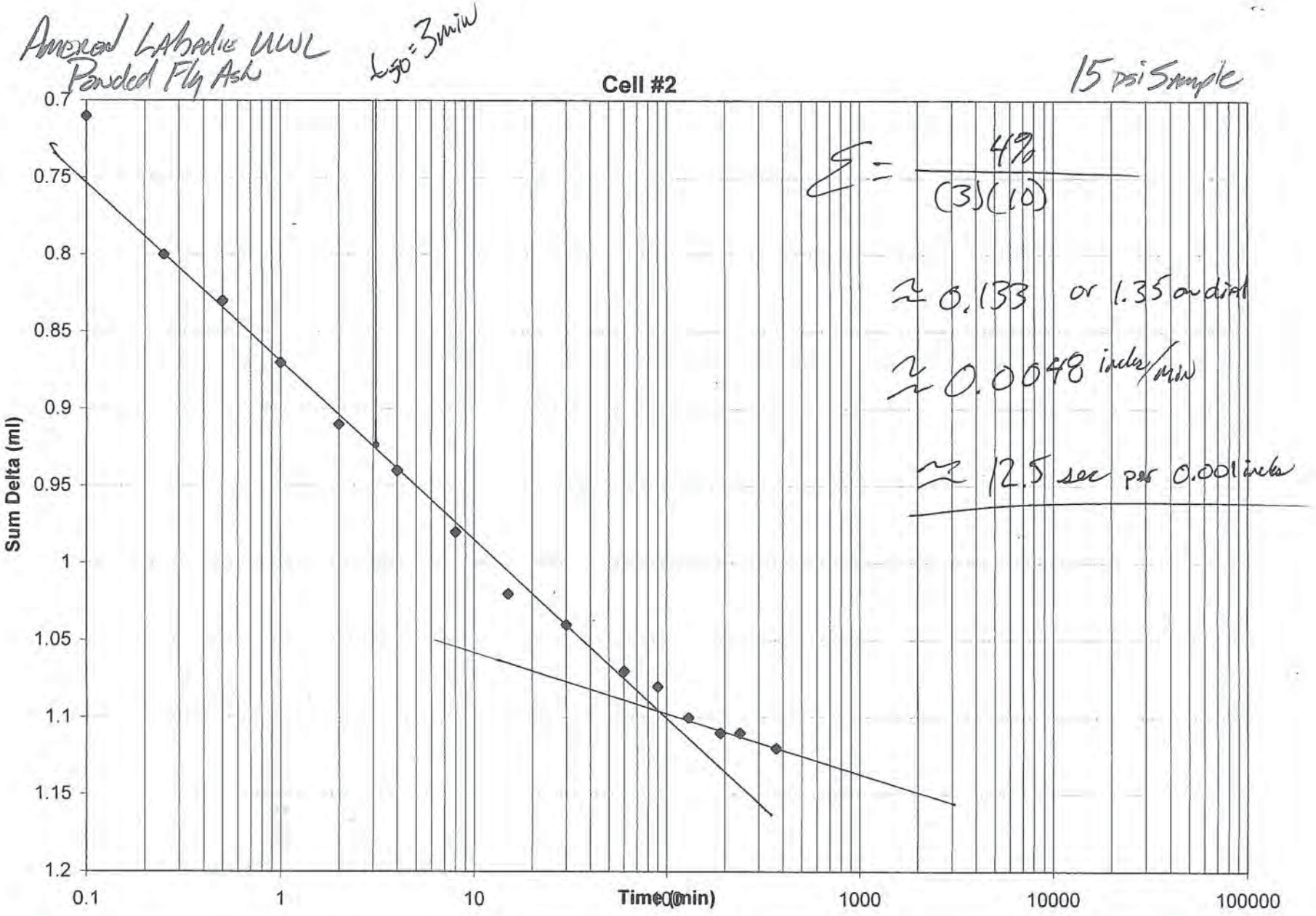
SAMPLE Ponded Fly Ash DEPTH

CONSOLIDATION CELL PRESSURE 74.0 CELL NUMBER 2

CONSOLIDATION PORE PRESSURE 59.0

15 psi Stage

DATE	TIME	BURETTE READING	DELTA VOLUME	SUM DELTA VOLUME	DELTA TIME	TEMP	REMARKS
4-15-11	9:00	10.00			0		
		9.29			.1		
		9.20			.25		
		9.17			.5		
	9:01	9.13			1		
	9:02	9.09			2		
	9:04	9.06			4		
	9:08	9.02			8		
	9:15	8.98			15		
	9:30	8.96			30		
	10:00	8.93			60		
	10:30	8.92			90		
	11:10	8.90			130		
	12:10	8.89			190		
	13:00	8.89			240		
	15:10	8.88			370		
4-18-11	7:10	8.88					


American LaMadre UWL
Ponded Fly Ash
t50 = 3min
Cell #2
15 psi Sample
S = 4% / (3)(10)
≈ 0.133 or 1.35 on dial
≈ 0.0048 inches/min
≈ 12.5 sec per 0.001 inches
Sum Delta (ml)
0.7
0.75
0.8
0.85
0.9
0.95
1
1.05
1.1
1.15
1.2
0.1
1
10
1000
10000
100000

TRIAXIAL CELL AXIAL-LOADING TEST

DATE 4-20-11

PROVING RING _____

PROJECT Ameren Labadie LLNL

SAMPLE Ponded Fly Ash DEPTH _____

INITIAL CELL PRESSURE 74.0 CELL NUMBER 2

INITIAL PORE PRESSURE 59.0 START DATE 4-20-2011

SAMPLE HEIGHT: AT SETUP _____ AT START OF LOADING 3.60

STRAIN RATE 0.13 TYPE OF TEST Staged 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
Data Collected Electronically							

MASS OF TOP CAP & POROUS STONE: _____ g.

REITZ & JENS, INC. Consulting Engineers Sheet _____ of _____

TRIAXIAL CELL CONSOLIDATION TEST

Strain @ Consol Start 500
@ Axial Loading 500

PROJECT Ameren Labadie UWL

SAMPLE Ponded Fly Ash DEPTH

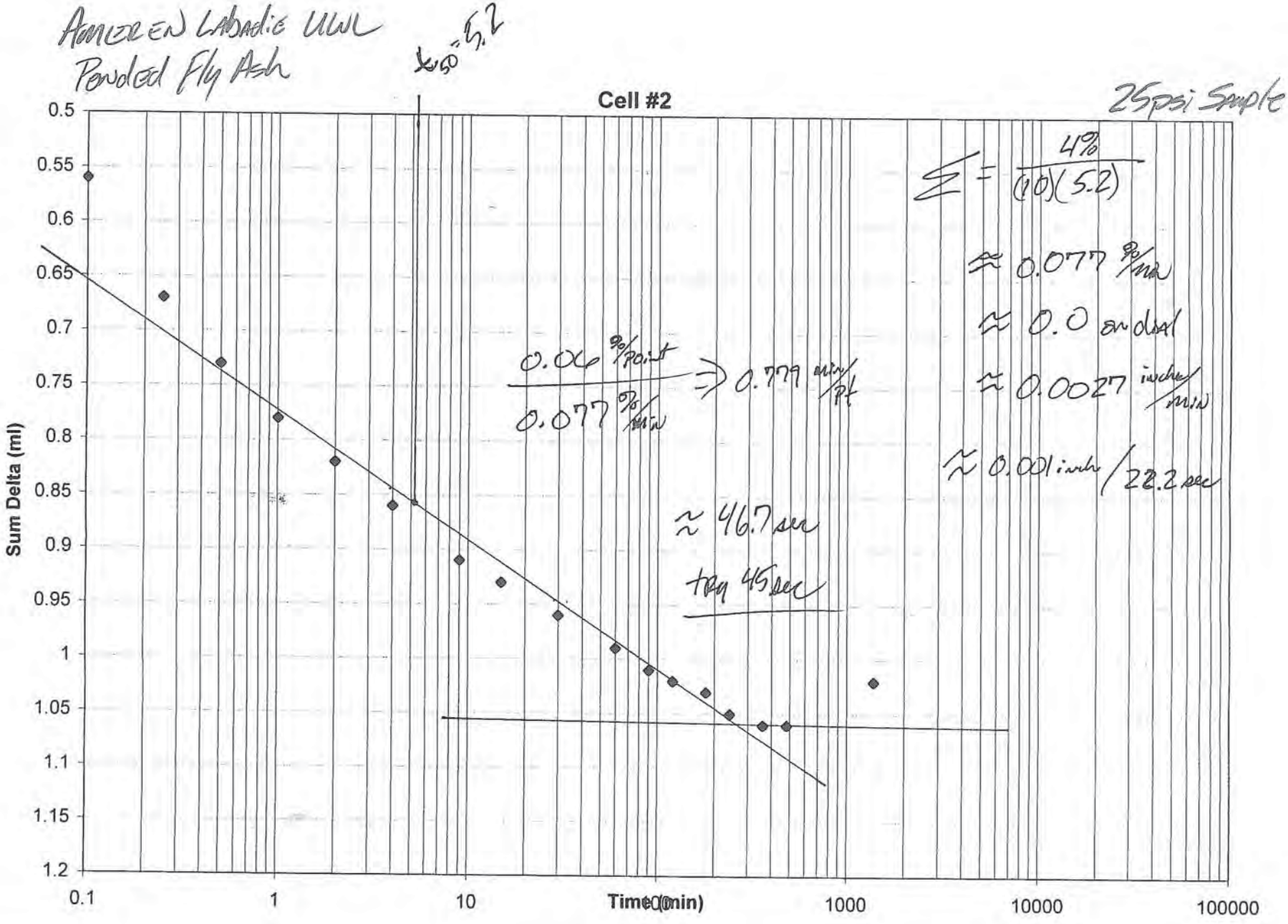
CONSOLIDATION CELL PRESSURE 92.0 CELL NUMBER 2

CONSOLIDATION PORE PRESSURE 67.0

25 psi Stage

DATE	TIME	BURETTE READING	DELTA VOLUME	SUM DELTA VOLUME	DELTA TIME	TEMP	REMARKS
4-20	8:55	10.00		0			
		9.44		.1			
		9.33		.25			
		9.27		.5			
	8:56	9.22		1			
	8:57	9.18		2			
	8:59	9.14		4			
	9:09	9.09		8			
	9:10	9.07		15			
	9:25	9.04		30			
	9:55	9.01		60			
	10:25	8.99		90			
	10:55	8.98		120			
	11:55	8.97		180			
	12:55	8.95		240			
	14:55	8.94		360			
	16:55	8.94		480			
4-21-11	7:50	8.98		1375			

1375 / 60 / 23


Aerated Labadie ULWL
Ponded Fly Ash
t50 = 5.2
Cell #2
25psi Sample
Sum Delta (ml)
Time (min)
0.5
0.55
0.6
0.65
0.7
0.75
0.8
0.85
0.9
0.95
1
1.05
1.1
1.15
1.2
0.1
1
10
1000
10000
100000
0.06 %/Point / 0.077 %/min ⇒ 0.779 min/Pt
≈ 46.7 sec
trg 45 sec
Σ = 4% / (10)(5.2)
≈ 0.077 %/min
≈ 0.0 endset
≈ 0.0027 inches/min
≈ 0.001 inch / 22.2 sec

TRIAXIAL CELL AXIAL-LOADING TEST

DATE 4-21-11

PROVING RING _____

PROJECT AMEREN LABADIE UWL

SAMPLE Bonded Fly Ash DEPTH _____

INITIAL CELL PRESSURE 92.0 CELL NUMBER 2

INITIAL PORE PRESSURE 67.0 START DATE 4-21-11

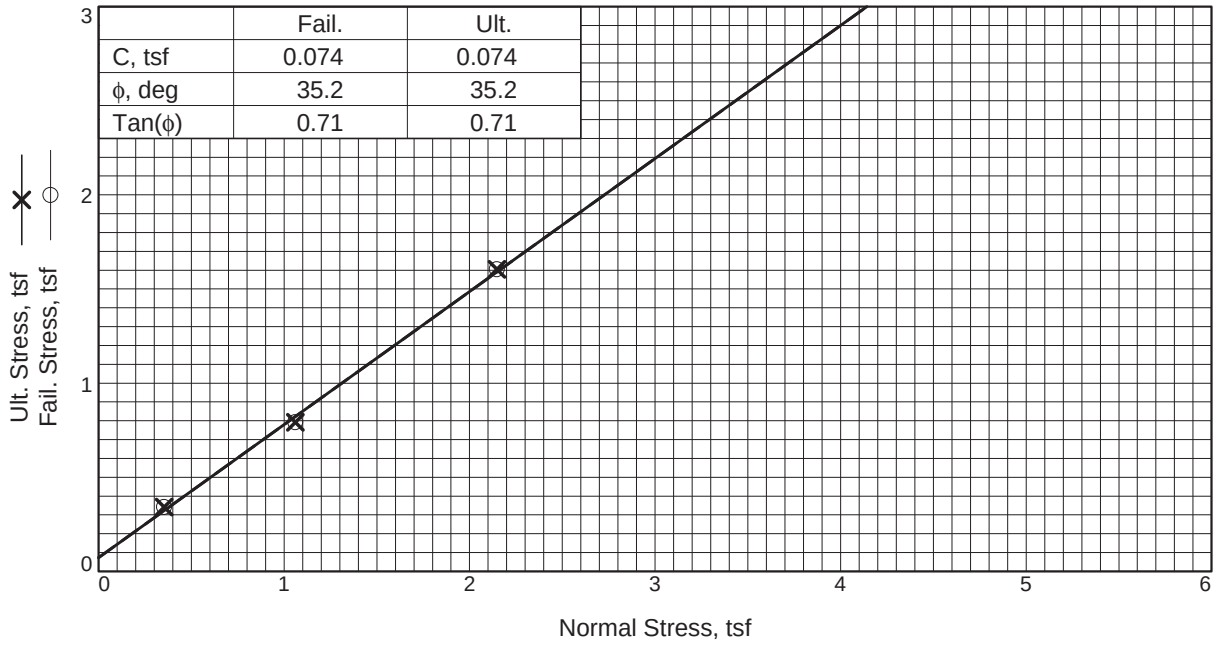
SAMPLE HEIGHT: AT SETUP _____ AT START OF LOADING ≈ 3.58"

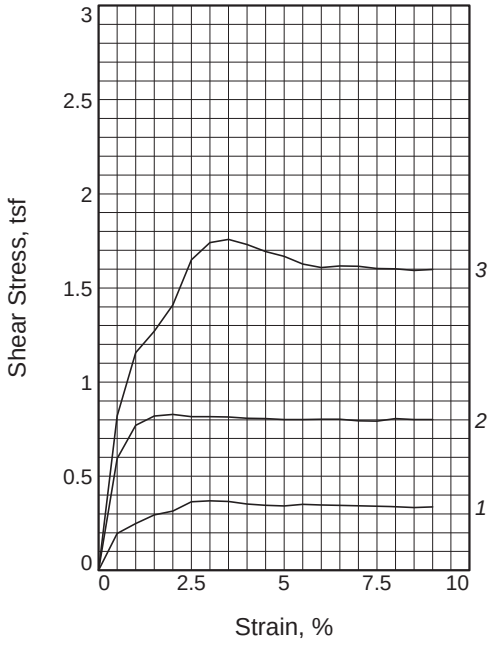
STRAIN RATE 0.077 %/min TYPE OF TEST Staged CU test

TIME	STRAIN DIAL (.001) IN	LOAD DIAL (.0001) IN	PORE PRESSURE READING	TIME	STRAIN DIAL (.001) IN	LOAD DIAL (.0001) IN	PORE PRESSURE READING
Data Collected Electronically							

MASS OF TOP CAP & POROUS STONE: _____ g.

REITZ & JENS, INC. Consulting Engineers Sheet _____ of





Sample No.		1	2	3
Initial	Water Content, %	58.8	58.8	58.8
	Dry Density, pcf	59.8	60.7	62.7
	Saturation, %	84.7	86.6	90.9
	Void Ratio	1.9947	1.9496	1.8577
	Diameter, in.	2.00	2.00	2.00
	Height, in.	1.31	1.31	1.31
At Test	Water Content, %	57.0	56.2	55.2
	Dry Density, pcf	59.8	60.7	62.7
	Saturation, %	82.1	82.8	85.3
	Void Ratio	1.9947	1.9496	1.8577
	Diameter, in.	2.00	2.00	2.00
	Height, in.	1.31	1.31	1.31
Normal Stress, tsf		0.354	1.061	2.148
Fail. Stress, tsf		0.342	0.792	1.604
Strain, %		7.5	7.5	7.5
Ult. Stress, tsf		0.342	0.792	1.604
Strain, %		7.5	7.5	7.5
Strain rate, %/min.		0.80	0.80	0.80

Sample Type: Hand Compacted
Description: Ponded fly-ash, air dried to 8% and molded at 55%

Specific Gravity= 2.87
Remarks: Direct shear with textured liner material

Figure _____

Client: Ameren Missouri

Project: CCP Properties, Labadie Plant

Source of Sample: Ponded Fly Ash
Sample Number: Bulk
Proj. No.: 2008012455 **Date:** 4/26/11

REITZ & JENS, INC.
CONSULTING ENGINEERS

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

DIRECT SHEAR TEST

5/23/2011

Date: 4/26/11
Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Project No.: 2008012455
Location: Ponded Fly Ash
Sample Number: Bulk
Description: Ponded fly-ash, air dried to 8% and molded at 55%
Remarks: Direct shear with textured liner material
Type of Sample: Hand Compacted
Specific Gravity=2.87 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	108.330		123.830
Moisture content: Dry soil+tare, gms.	76.200		86.810
Moisture content: Tare, gms.	21.590		21.900
Moisture, %	58.8	57.0	57.0
Moist specimen weight, gms.	102.7		
Diameter, in.	2.00	2.00	
Area, in.²	3.14	3.14	
Height, in.	1.31	1.31	
Net decrease in height, in.		0.00	
Wet Density, pcf	95.0	94.0	
Dry density, pcf	59.8	59.8	
Void ratio	1.9947	1.9947	
Saturation, %	84.7	82.1	

Test Readings for Specimen No. 1

Primary load ring constant = .1176 lbs. per input unit
Normal stress = 0.3537 tsf
Strain rate, %/min. = 0.80
Fail. Stress = 0.342 tsf **at reading no.** 15
Ult. Stress = 0.342 tsf **at reading no.** 15

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	2.0	0.0	0.0	0.000
1	0.0100	75.0	8.6	0.5	0.197
2	0.0200	94.0	10.8	1.0	0.248
3	0.0300	111.0	12.8	1.5	0.294
4	0.0400	119.0	13.8	2.0	0.315
5	0.0500	137.0	15.9	2.5	0.364
6	0.0600	139.0	16.1	3.0	0.369
7	0.0700	138.0	16.0	3.5	0.367
8	0.0800	133.0	15.4	4.0	0.353
9	0.0900	130.0	15.1	4.5	0.345
10	0.1000	129.0	14.9	5.0	0.342
11	0.1100	132.0	15.3	5.5	0.350
12	0.1200	131.0	15.2	6.0	0.348

Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
13	0.1300	130.0	15.1	6.5	0.345
14	0.1400	129.0	14.9	7.0	0.342
15	0.1500	129.0	14.9	7.5	0.342
16	0.1600	127.0	14.7	8.0	0.337
17	0.1700	126.0	14.6	8.5	0.334
18	0.1800	127.0	14.7	9.0	0.337

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	108.330		124.010
Moisture content: Dry soil+tare, gms.	76.200		87.360
Moisture content: Tare, gms.	21.590		22.180
Moisture, %	58.8	56.2	56.2
Moist specimen weight, gms.	104.2		
Diameter, in.	2.00	2.00	
Area, in.²	3.14	3.14	
Height, in.	1.31	1.31	
Net decrease in height, in.		0.00	
Wet Density, pcf	96.5	94.9	
Dry density, pcf	60.7	60.7	
Void ratio	1.9496	1.9496	
Saturation, %	86.6	82.8	

Test Readings for Specimen No. 2

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

Normal stress = 1.061 tsf

Strain rate, %/min. = 0.80

Fail. Stress = 0.792 tsf **at reading no.** 15

Ult. Stress = 0.792 tsf **at reading no.** 15

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	1.0	0.0	0.0	0.000
1	0.0100	221.0	25.9	0.5	0.593
2	0.0200	287.0	33.6	1.0	0.771
3	0.0300	305.0	35.8	1.5	0.819
4	0.0400	308.0	36.1	2.0	0.827
5	0.0500	304.0	35.6	2.5	0.817
6	0.0600	304.0	35.6	3.0	0.817
7	0.0700	303.0	35.5	3.5	0.814
8	0.0800	301.0	35.3	4.0	0.809
9	0.0900	300.0	35.2	4.5	0.806
10	0.1000	298.0	34.9	5.0	0.800
11	0.1100	298.0	34.9	5.5	0.800
12	0.1200	299.0	35.0	6.0	0.803
13	0.1300	299.0	35.0	6.5	0.803
14	0.1400	296.0	34.7	7.0	0.795
15	0.1500	295.0	34.6	7.5	0.792
16	0.1600	300.0	35.2	8.0	0.806

Test Readings for Specimen No. 2

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
17	0.1700	298.0	34.9	8.5	0.800
18	0.1800	298.0	34.9	9.0	0.800

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	108.330		126.110
Moisture content: Dry soil+tare, gms.	76.200		88.940
Moisture content: Tare, gms.	21.590		21.600
Moisture, %	58.8	55.2	55.2
Moist specimen weight, gms.	107.6		
Diameter, in.	2.00	2.00	
Area, in.²	3.14	3.14	
Height, in.	1.31	1.31	
Net decrease in height, in.		0.00	
Wet Density, pcf	99.6	97.3	
Dry density, pcf	62.7	62.7	
Void ratio	1.8577	1.8577	
Saturation, %	90.9	85.3	

Test Readings for Specimen No. 3

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

Normal stress = 2.148 tsf

Strain rate, %/min. = 0.80

Fail. Stress = 1.604 tsf **at reading no.** 15

Ult. Stress = 1.604 tsf **at reading no.** 15

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	1.0	0.0	0.0	0.000
1	0.0100	305.0	35.8	0.5	0.819
2	0.0200	430.0	50.5	1.0	1.156
3	0.0300	472.0	55.4	1.5	1.269
4	0.0400	524.0	61.5	2.0	1.410
5	0.0500	613.0	72.0	2.5	1.649
6	0.0600	647.0	76.0	3.0	1.741
7	0.0700	653.0	76.7	3.5	1.757
8	0.0800	643.0	75.5	4.0	1.730
9	0.0900	629.0	73.9	4.5	1.693
10	0.1000	620.0	72.8	5.0	1.668
11	0.1100	605.0	71.0	5.5	1.628
12	0.1200	598.0	70.2	6.0	1.609
13	0.1300	601.0	70.6	6.5	1.617
14	0.1400	600.0	70.4	7.0	1.614
15	0.1500	596.0	70.0	7.5	1.604
16	0.1600	595.0	69.9	8.0	1.601
17	0.1700	592.0	69.5	8.5	1.593
18	0.1800	594.0	69.7	9.0	1.598

DIRECT SHEAR

job Ameren Labadie UWL

date 4-26-11

Sample Description Fly Ash lightly compacted "pended"

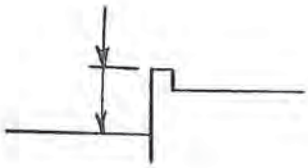
Sample + Tare Start 4183.63 TARE 4080.97

Sample + Tare Finish 4183.63

Sample Used 102.66

Diam = 2.0"
L = 1.31"

BLOCK MEASUREMENT



Projection Start _____

Projection Finish _____

Volume of Sample _____ Dry Density _____

CONFINING (Vertical) LOAD 7.0 Kg

$P = 45 \times \frac{N}{840} + \left[(N-840) \times 0.353\right]$

LOAD DIAL	HZ. STRAIN DIAL	VERT. STRAIN DIAL	
002	0		
085	10		
094	20		
111	30		
119	40		
137	50		
139	60		
138	70		
133	80		
130	90		
129	100		
132	110		
131	120		
130	130		
129	140		
129	150		
127	160		
126	170		
127	180		

DIRECT SHEAR

job American LABADIE UWL

date 4/26/11

Sample Description Lightly compacted "jarred" Fly Ash

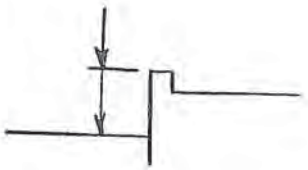
$\phi = 1.31^\circ$ $c = 1.31$

Sample + Tare Start 4185.20 TARE 4080.97

Sample + Tare Finish

Sample Used 104.23

BLOCK MEASUREMENT



Projection Start

Projection Finish

Volume of Sample _____ Dry Density _____

CONFINING (Vertical) LOAD 21 Kg

$P = 45 \times \frac{N}{840} + [(N-840) \times 0.353]$

LOAD DIAL	HZ. STRAIN DIAL	VERT. STRAIN DIAL	
001	0		
221	10		
287	20		
305	30		
308	40		
304	50		
304	60		
303	70		
301	80		
300	90		
298	100		
298	110		
299	120		
299	130		
296	140		
295	150		
300	160		
298	170		
298	180		

JK
KEK

DIRECT SHEAR

job American Ladder WWL

date 4/26/11

Sample Description lightly compacted "poured"
~~fly ash~~

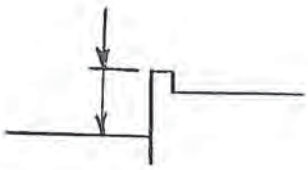
Φ = 2"
= 1.31"

Sample + Tare Start 4188.55 Tare 4080.97

Sample + Tare Finish

Sample Used 107.58

BLOCK MEASUREMENT



Projection Start N/A

Projection Finish N/A

Volume of Sample _____ Dry Density _____

CONFINING (Vertical) LOAD 42.5 Kg

$P = 45 \times \frac{N}{840} + [(N-840) \times 0.353]$

LOAD DIAL	HZ. STRAIN DIAL	VERT. STRAIN DIAL	
001	0		
305	10		
430	20		
472	30		
524	40		
613	50		
647	60		
653	70		
643	80		
629	90		
620	100		
605	110		
598	120		
601	130		
600	140		
596	150		
595	160		
592	170		
594	180		

Reitz & Jens, Inc.

ATTERBERG LIMITS & MOISTURE CONTENT

Job: AMEREN LANDFILL UWL Date: 4/26/11

Location: formed flyash @ +459.2m Test By: JJL

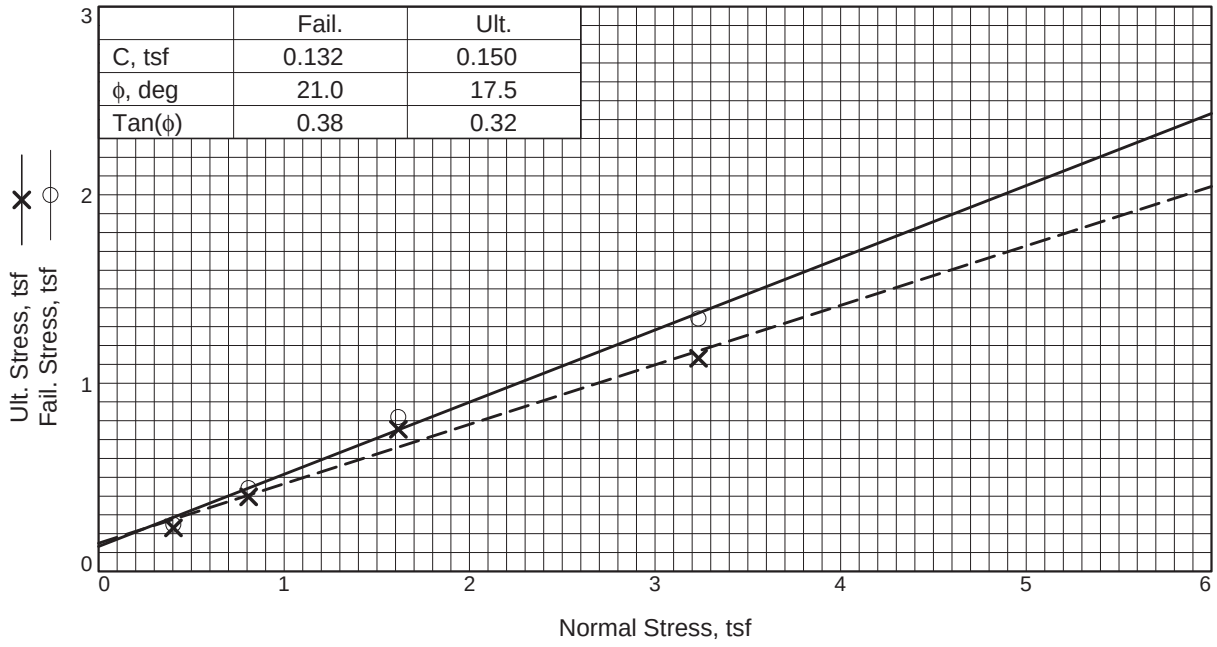
Checked: KEL Date: 4-27-11

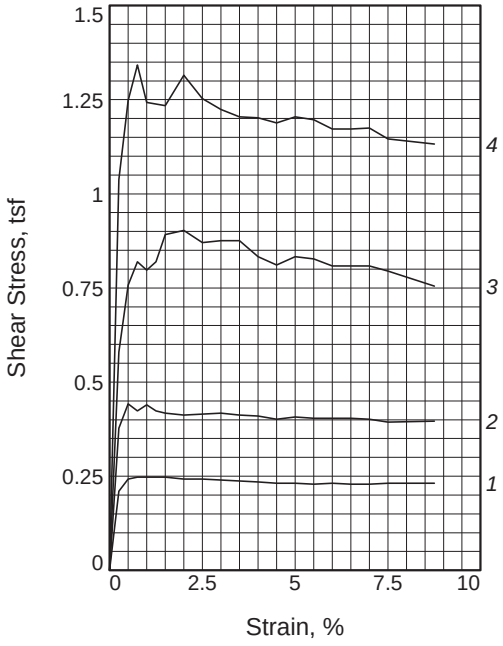
Test Hole		7Kg	21Kg	42.5Kg		
Depth						
Type of Test						
Container No.	75	12	30	79		
No. of Blows						
Wt. Wet + Tare	108.33	123.83	124.01	126.11		
Wt. Dry + Tare	76.20	86.81	87.36	88.94		
Wt. Water						
Tare	21.57	21.90	22.18	21.60		
Wt. Dry Soil						
% Moisture						
Liquid Limit						
Average Limits						

Test Hole						
Depth						
Type of Test						
Container No.						
No. of Blows						
Wt. Wet + Tare						
Wt. Dry + Tare						
Wt. Water						
Tare						
Wt. Dry Soil						
% Moisture						
Liquid Limit						
Average Limits						

Test Hole						
Depth						
Type of Test						
Container No.						
No. of Blows						
Wt. Wet + Tare						
Wt. Dry + Tare						
Wt. Water						
Tare						
Wt. Dry Soil						
% Moisture						
Liquid Limit						
Average Limits						

Remarks:





Sample No.		1	2	3	4
Initial	Water Content, %	56.5	56.6	56.6	55.8
	Dry Density, pcf	59.5	59.6	59.4	60.4
	Saturation, %	80.6	80.9	80.5	81.3
	Void Ratio	2.0116	2.0080	2.0178	1.9675
	Diameter, in.	2.00	2.00	2.00	2.00
	Height, in.	1.31	1.31	1.31	1.31
At Test	Water Content, %	56.5	56.6	58.4	55.8
	Dry Density, pcf	59.5	59.6	59.4	60.4
	Saturation, %	80.6	80.9	83.1	81.3
	Void Ratio	2.0116	2.0080	2.0178	1.9675
	Diameter, in.	2.00	2.00	2.00	2.00
	Height, in.	1.31	1.31	1.31	1.31
Normal Stress, tsf		0.404	0.808	1.617	3.234
Fail. Stress, tsf		0.248	0.442	0.819	1.342
Strain, %		0.8	0.5	0.8	0.8
Ult. Stress, tsf		0.232	0.396	0.755	1.132
Strain, %		8.8	8.8	8.8	8.8
Strain rate, %/min.		0.80	0.80	0.80	0.80

Sample Type: Hand Compacted
Description: Ponded fly-ash, air dried to 8% and molded at 55%

Assumed Specific Gravity= 2.87
Remarks: Direct shear with smooth liner material

Figure _____

Client: Ameren Missouri

Project: CCP Properties, Labadie Plant

Source of Sample: Ponded Fly Ash
Sample Number: Bulk
Proj. No.: 2008012455 **Date:** 5/16/11

REITZ & JENS, INC.
CONSULTING ENGINEERS

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

DIRECT SHEAR TEST

5/23/2011

Date: 5/16/11
Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Project No.: 2008012455
Location: Ponded Fly Ash
Sample Number: Bulk
Description: Ponded fly-ash, air dried to 8% and molded at 55%
Remarks: Direct shear with smooth liner material
Type of Sample: Hand Compacted
Assumed Specific Gravity=2.87 **LL=** **PL=** **PI=**

Parameters for Specimen No. 1

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	137.620		137.620
Moisture content: Dry soil+tare, gms.	101.600		101.600
Moisture content: Tare, gms.	37.810		37.810
Moisture, %	56.5	56.5	56.5
Moist specimen weight, gms.	100.6		
Diameter, in.	2.00	2.00	
Area, in.²	3.14	3.14	
Height, in.	1.31	1.31	
Net decrease in height, in.		0.00	
Wet Density, pcf	93.1	93.1	
Dry density, pcf	59.5	59.5	
Void ratio	2.0116	2.0116	
Saturation, %	80.6	80.6	

Test Readings for Specimen No. 1

Primary load ring constant = .1176 lbs. per input unit
Normal stress = 0.4042 tsf
Strain rate, %/min. = 0.80
Fail. Stress = 0.248 tsf **at reading no.** 3
Ult. Stress = 0.232 tsf **at reading no.** 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.0	0.0	0.0	0.000
1	0.0050	78.0	9.2	0.3	0.210
2	0.0100	90.0	10.6	0.5	0.243
3	0.0150	92.0	10.8	0.8	0.248
4	0.0200	92.0	10.8	1.0	0.248
5	0.0250	92.0	10.8	1.3	0.248
6	0.0300	92.0	10.8	1.5	0.248
7	0.0400	90.0	10.6	2.0	0.243
8	0.0500	90.0	10.6	2.5	0.243
9	0.0600	89.0	10.5	3.0	0.240
10	0.0700	88.0	10.3	3.5	0.237
11	0.0800	87.0	10.2	4.0	0.234
12	0.0900	86.0	10.1	4.5	0.232

Test Readings for Specimen No. 1

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
13	0.1000	86.0	10.1	5.0	0.232
14	0.1100	85.0	10.0	5.5	0.229
15	0.1200	86.0	10.1	6.0	0.232
16	0.1300	85.0	10.0	6.5	0.229
17	0.1400	85.0	10.0	7.0	0.229
18	0.1500	86.0	10.1	7.5	0.232
19	0.1750	86.0	10.1	8.8	0.232

Parameters for Specimen No. 2

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	139.440		139.440
Moisture content: Dry soil+tare, gms.	103.290		103.290
Moisture content: Tare, gms.	39.460		39.460
Moisture, %	56.6	56.6	56.6
Moist specimen weight, gms.	100.8		
Diameter, in.	2.00	2.00	
Area, in.²	3.14	3.14	
Height, in.	1.31	1.31	
Net decrease in height, in.		0.00	
Wet Density, pcf	93.3	93.3	
Dry density, pcf	59.6	59.6	
Void ratio	2.0080	2.0080	
Saturation, %	80.9	80.9	

Test Readings for Specimen No. 2

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

Normal stress = 0.8084 tsf

Strain rate, %/min. = 0.80

Fail. Stress = 0.442 tsf **at reading no.** 2

Ult. Stress = 0.396 tsf **at reading no.** 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.0	0.0	0.0	0.000
1	0.0050	140.0	16.5	0.3	0.377
2	0.0100	164.0	19.3	0.5	0.442
3	0.0150	157.0	18.5	0.8	0.423
4	0.0200	163.0	19.2	1.0	0.439
5	0.0250	157.0	18.5	1.3	0.423
6	0.0300	155.0	18.2	1.5	0.418
7	0.0400	153.0	18.0	2.0	0.412
8	0.0500	154.0	18.1	2.5	0.415
9	0.0600	155.0	18.2	3.0	0.418
10	0.0700	153.0	18.0	3.5	0.412
11	0.0800	152.0	17.9	4.0	0.410
12	0.0900	149.0	17.5	4.5	0.402
13	0.1000	151.0	17.8	5.0	0.407
14	0.1100	150.0	17.6	5.5	0.404
15	0.1200	150.0	17.6	6.0	0.404

Test Readings for Specimen No. 2

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
16	0.1300	150.0	17.6	6.5	0.404
17	0.1400	149.0	17.5	7.0	0.402
18	0.1500	146.0	17.2	7.5	0.393
19	0.1750	147.0	17.3	8.8	0.396

Parameters for Specimen No. 3

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	136.700		136.700
Moisture content: Dry soil+tare, gms.	100.790		100.790
Moisture content: Tare, gms.	37.310		39.310
Moisture, %	56.6	58.4	58.4
Moist specimen weight, gms.	100.4		
Diameter, in.	2.00	2.00	
Area, in.²	3.14	3.14	
Height, in.	1.31	1.31	
Net decrease in height, in.		0.00	
Wet Density, pcf	93.0	94.0	
Dry density, pcf	59.4	59.4	
Void ratio	2.0178	2.0178	
Saturation, %	80.5	83.1	

Test Readings for Specimen No. 3

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

Normal stress = 1.6168 tsf

Strain rate, %/min. = 0.80

Fail. Stress = 0.819 tsf **at reading no.** 3

Ult. Stress = 0.755 tsf **at reading no.** 19

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.0	0.0	0.0	0.000
1	0.0050	215.0	25.3	0.3	0.579
2	0.0100	281.0	33.0	0.5	0.757
3	0.0150	304.0	35.8	0.8	0.819
4	0.0200	296.0	34.8	1.0	0.798
5	0.0250	304.0	35.8	1.3	0.819
6	0.0300	331.0	38.9	1.5	0.892
7	0.0400	335.0	39.4	2.0	0.903
8	0.0500	323.0	38.0	2.5	0.871
9	0.0600	325.0	38.2	3.0	0.876
10	0.0700	325.0	38.2	3.5	0.876
11	0.0800	309.0	36.3	4.0	0.833
12	0.0900	301.0	35.4	4.5	0.811
13	0.1000	309.0	36.3	5.0	0.833
14	0.1100	307.0	36.1	5.5	0.827
15	0.1200	300.0	35.3	6.0	0.809
16	0.1300	300.0	35.3	6.5	0.809
17	0.1400	300.0	35.3	7.0	0.809
18	0.1500	295.0	34.7	7.5	0.795

Test Readings for Specimen No. 3

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
19	0.1750	280.0	32.9	8.8	0.755

Parameters for Specimen No. 4

Specimen Parameter	Initial	Consolidated	Final
Moisture content: Moist soil+tare, gms.	140.880		140.880
Moisture content: Dry soil+tare, gms.	105.060		105.060
Moisture content: Tare, gms.	40.830		40.830
Moisture, %	55.8	55.8	55.8
Moist specimen weight, gms.	101.6		
Diameter, in.	2.00	2.00	
Area, in.²	3.14	3.14	
Height, in.	1.31	1.31	
Net decrease in height, in.		0.00	
Wet Density, pcf	94.0	94.0	
Dry density, pcf	60.4	60.4	
Void ratio	1.9675	1.9675	
Saturation, %	81.3	81.3	

Test Readings for Specimen No. 4

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

Normal stress = 3.2336 tsf

Strain rate, %/min. = 0.80

Fail. Stress = 1.342 tsf **at reading no.** 3

Ult. Stress = 1.132 tsf **at reading no.** 18

No.	Horizontal Def. Dial in.	Load Dial	Load lbs.	Strain %	Shear Stress tsf
0	0.0000	0.0	0.0	0.0	0.000
1	0.0050	385.0	45.3	0.3	1.038
2	0.0100	463.0	54.4	0.5	1.248
3	0.0150	498.0	58.6	0.8	1.342
4	0.0200	461.0	54.2	1.0	1.242
5	0.0300	458.0	53.9	1.5	1.234
6	0.0400	488.0	57.4	2.0	1.315
7	0.0500	465.0	54.7	2.5	1.253
8	0.0600	454.0	53.4	3.0	1.224
9	0.0700	447.0	52.6	3.5	1.205
10	0.0800	446.0	52.4	4.0	1.202
11	0.0900	441.0	51.9	4.5	1.189
12	0.1000	447.0	52.6	5.0	1.205
13	0.1100	444.0	52.2	5.5	1.197
14	0.1200	435.0	51.2	6.0	1.172
15	0.1300	435.0	51.2	6.5	1.172
16	0.1400	436.0	51.3	7.0	1.175
17	0.1500	425.0	50.0	7.5	1.145
18	0.1750	420.0	49.4	8.8	1.132

A1-

DIRECT SHEAR

job AMEREN Laboratories UWL

date 5/14/11

Sample Description AIR DRIED PONDED Fly ASH W/ 45% WATER ADDED, COMPACTED @ 90% REDUCED PROCTOR

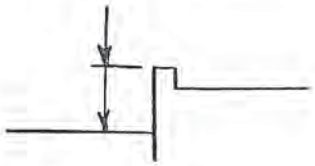
Sample + Tare Start 4182.94

~~Sample + Tare Finish~~ 4082.38

Sample Used 100.56

Diam = 2.0"

Length = 1.31"



BLOCK MEASUREMENT

Projection Start _____

Projection Finish _____

Volume of Sample _____ Dry Density _____

CONFINING (Vertical) LOAD 8 Kg 0.4642 tsf

LOAD DIAL	HZ. STRAIN DIAL	VERT. STRAIN DIAL	
000	0		
	5		
90	10		
92	15		
92	20		
92	25		
92	30		
90	40		
90	50		
89	60		
88	70		
87	80		
86	90		
86	100		
85	110		
86	120		
85	130		
85	140		
86	150		
86	175		

$P = 45 \times \frac{N}{840} + [(N-840) \times 0.353]$

DIRECT SHEAR

job AMEREN Labadie UWL

date 5/16/14

Sample Description Same As 8 Kg Sample

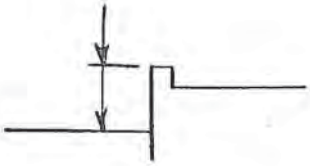
Sample + Tare Start 4183.17

~~Sample~~ + Tare ~~Finish~~ 4082.38

Sample Used 100.79

Dia = 2.0"

L = 1.31"



BLOCK MEASUREMENT

Projection Start _____

Projection Finish _____

Volume of Sample _____ Dry Density _____

CONFINING (Vertical) LOAD 16 Kg 0.8084 tsf

$P = 45 \times \frac{N}{840} + [(N-840) \times 0.353]$

LOAD DIAL	HZ. STRAIN DIAL	VERT. STRAIN DIAL	
000	0		
140	5		
144	10		
157	15		
143	20		
157	25		
155	30		
153	40		
154	50		
155	60		
153	70		
152	80		
149	90		
151	100		
150	110		
150	120		
150	130		
149	140		
146	150		
147	175		

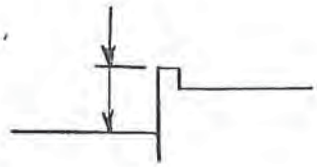
DIRECT SHEAR

job Amoreen Laboratories UWL
date 5/16/11

Sample Description Same As 8Kg Sample

Sample + Tare Start 4182.80
~~Sample~~ + Tare ~~Finish~~ 4082.38
Sample Used 100.42

Diam = 2.0"
L = 1.31"



BLOCK MEASUREMENT

Projection Start _____
Projection Finish _____

Volume of Sample _____ Dry Density _____

CONFINING (Vertical) LOAD 32Kg 1.6168 tsf

$P = 45 \times \frac{N}{840} + [(N-840) \times 0.353]$

LOAD DIAL	HZ. STRAIN DIAL	VERT. STRAIN DIAL	
000	0		
215	5		
281	10		
304	15		
296	20		
304	25		
331	30		
335	40		
323	50		
325	60		
325	70		
309	80		
301	90		
309	100		
307	110		
300	120		
300	130		
300	140		
295	150		
280	175		

4

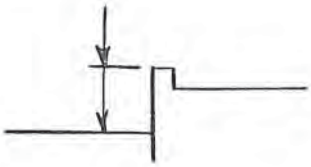
DIRECT SHEAR

job American Laboratories Unlimited
date 5/16/11

Sample Description Same as 8 Kg Sample

Sample + Tare Start 4183.98
~~Sample~~ + Tare ~~Finish~~ 4082.38
Sample Used 101.60

D.A = 2.0"
L = 1.31"



BLOCK MEASUREMENT

Projection Start _____
Projection Finish _____

Volume of Sample _____ Dry Density _____

CONFINING (Vertical) LOAD 64 Kg 3.2336 tsf

$P = 45 \times \frac{N}{840} + [(N-840) \times 0.353]$

LOAD DIAL	HZ. STRAIN DIAL	VERT. STRAIN DIAL	
000	0		
385	5		
463	10		
498	15		
491	20		
	25		
458	30		
488	40		
465	50		
454	60		
447	70		
446	80		
441	90		
447	100		
444	110		
435	120		
435	130		
436	140		
435	150		
420	175		

Reitz & Jens, Inc.

ATTERBERG LIMITS & MOISTURE CONTENT

Job: Direct Shear — Date: 5/16/11

Location: Labadie Ponded Fly Ash — Test By: JRW + JLC

Air Dry @ 45% added on Smooth liner — Checked: KEK Date: 5-17-11

Test Hole	8Kg			16Kg				
Depth								
Type of Test								
Container No.	R55			R111				
No. of Blows								
Wt. Wet + Tare	137.62			139.44				
Wt. Dry + Tare	101.60			103.29				
Wt. Water								
Tare	37.81			39.46				
Wt. Dry Soil								
% Moisture	56.5			56.6				
Liquid Limit								
Average Limits								

Test Hole	32Kg			64Kg				
Depth								
Type of Test								
Container No.	R33			13				
No. of Blows								
Wt. Wet + Tare	136.70			140.88				
Wt. Dry + Tare	100.79			105.06				
Wt. Water								
Tare	37.31			40.83				
Wt. Dry Soil								
% Moisture	56.6			55.8				
Liquid Limit								
Average Limits								

Test Hole								
Depth								
Type of Test								
Container No.								
No. of Blows								
Wt. Wet + Tare								
Wt. Dry + Tare								
Wt. Water								
Tare								
Wt. Dry Soil								
% Moisture								
Liquid Limit								
Average Limits								

Remarks:

Ameren Missouri; Labadie Power Plant UWL

Utility Waste Landfill, CCP Properties

Material: 100% ponded fly ash, material was air dried to 8% moisture then molded at 55% moisture

Hydraulic Conductivity

Soil Conditions	
Pre-test conditions	**Post-test Conditions**
Wet Density = 90.4 (lbs/ft^3)	Wet Density = 99.6 (lbs/ft^3)
% Moisture = 52.6%	% Moisture = 65.9%
Dry Density = 59.2 (lbs/ft^3)	Dry Density = 60.1 (lbs/ft^3)

Test Information	
a (cm^2)=	0.1969
L (cm)=	4.8138
A (cm^2)=	19.3625

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)
3/20/11 10:05	0	9.2	10.00	27.200	0.00	78.000	85.979	21.4					
3/20/11 10:06	60	9.2	9.05	32.026	0.97	73.072	76.225	21.4	21.40	4.91E-05	0.9669876	60	4.75E-05
3/20/11 10:07	120	9.2	8.24	36.141	1.75	69.110	68.148	21.4	21.40	4.74E-05	0.9669876	120	4.58E-05
3/20/11 10:09	240	9.2	6.84	43.253	3.13	62.100	54.026	21.4	21.40	4.74E-05	0.9669876	240	4.58E-05
3/20/11 10:13	480	9.2	4.88	53.210	5.12	51.990	33.960	21.4	21.40	4.74E-05	0.9669876	480	4.58E-05
3/20/11 10:20	900	9.2	3.04	62.557	6.94	42.745	15.367	21.4	21.40	4.68E-05	0.9669876	900	4.53E-05
3/20/11 10:35	1800	9.2	1.85	68.602	8.13	36.700	3.277	21.4	21.40	4.44E-05	0.9669876	1800	4.30E-05
												H.C.=	**4.5E-05**

Hydraulic Conductivity (ASTM-D 5084)
Flow Rate Calculation

Job------- Amazon Labadie UWL
Location-
Sample--- 100% Ponded Ash, Air dried to 8% then Molded at 55% Moisture
Depth-----

a= 0,1969
A= 19.3625
L= 4.8138

Cell No. 3

Cell Pressure (p.s.i.)	Base Pressure (p.s.i.)	Top Pressure (p.s.i.)
66.5	65.0	65.5

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
4-20-11	10:05	0	9.15	10.00	0.00				21.4	
	10:06	1	9.15	9.05	0.97				21.4	
	10:07	2	9.15	8.24	1.75				21.4	
	10:09	4	9.15	6.84	3.13				21.4	
	10:13	8	9.15	4.88	5.12				21.4	
	10:20	15	9.15	3.04	6.94				21.4	
	10:35	30	9.15	1.85	8.13				21.4	
	12:35	150	9.15	1.78	8.21				21.9	
	14:35	270	9.05	1.90	8.09				21.9	

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 Ameren Labadie UWL Date 4-11-2011

Sample Labadie Ponded Fly Ash Depth

Description 100% Labadie Ponded Ash Air dried to ≈ 8%, Then molded at 65% M

Type of Test HC Confining Pressure Differential

Cell Number 3 Saturate (before) after Consolidation

Number of Membranes 2 Filter Strips Yes (No)

MOISTURE CONTENT

	INITIAL		FINAL
Tare No.	36	2	Bowl 1
Wet Wt. + Tare	129.30	107.23	343.78
Dry Wt. + Tare	99.03	84.19	254.71
Wt. Water			
Tare Wt.	41.34	40.52	195.03
Dry Soil Wt.			89.68
Moisture %	52.470	52.759	65.868
Avg. w %	52.6		65.9

LENGTH CHANGE

STRAIN GAUGE at setup N/A

at saturation start

at consolidation start

at axial load start

MASS PROPERTIES

Wt. Tube + Soil		gm.
Wt. Tube		gm.
Wt. Soil	137.09	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.

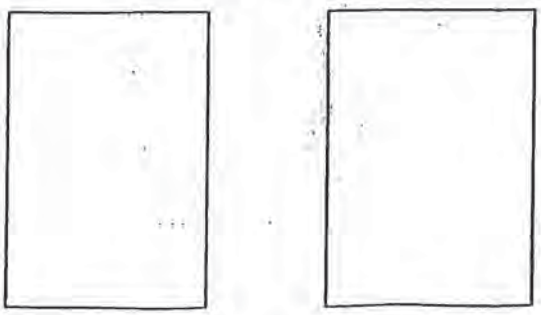
SPECIMEN DIMENSIONS in. / mm.

	HEIGHT		DIAMETER	
	Initial	Final	Initial	Final
1	1.9060	1.8925	T 1.9600	1.9655
2	1.9140	1.8940	M 1.9680	1.9540
3	1.9045	1.8990	B 1.9700	1.9450
Avg.	1.9082	1.8952	1.9660	1.9548

Description After Test Initial γ_M = 90.4, $\%_M$ = 52.6, γ_D = 59.2 Final γ_M = 99.6, $\%_M$ = 65.9, γ_D = 60.1

Remarks

Failure Sketch



Trimmed By KEK
Trimmed Date 4-4-11

Setup By KEK
Setup Date 4-11-11

Taken Down By KEK
Take Down Date 4-21-11

tritSTUP.dwg revised 2/12/98

TRIAXIAL CELL SATURATION & BETA FACTOR

PROJECT American Laboratories LLC

SAMPLE Powded Fly Ash DEPTH

INITIAL CELL PRESSURE 51.0 START DATE 4-11-11

INITIAL PORE PRESSURE 50.0 CELL NUMBER 3

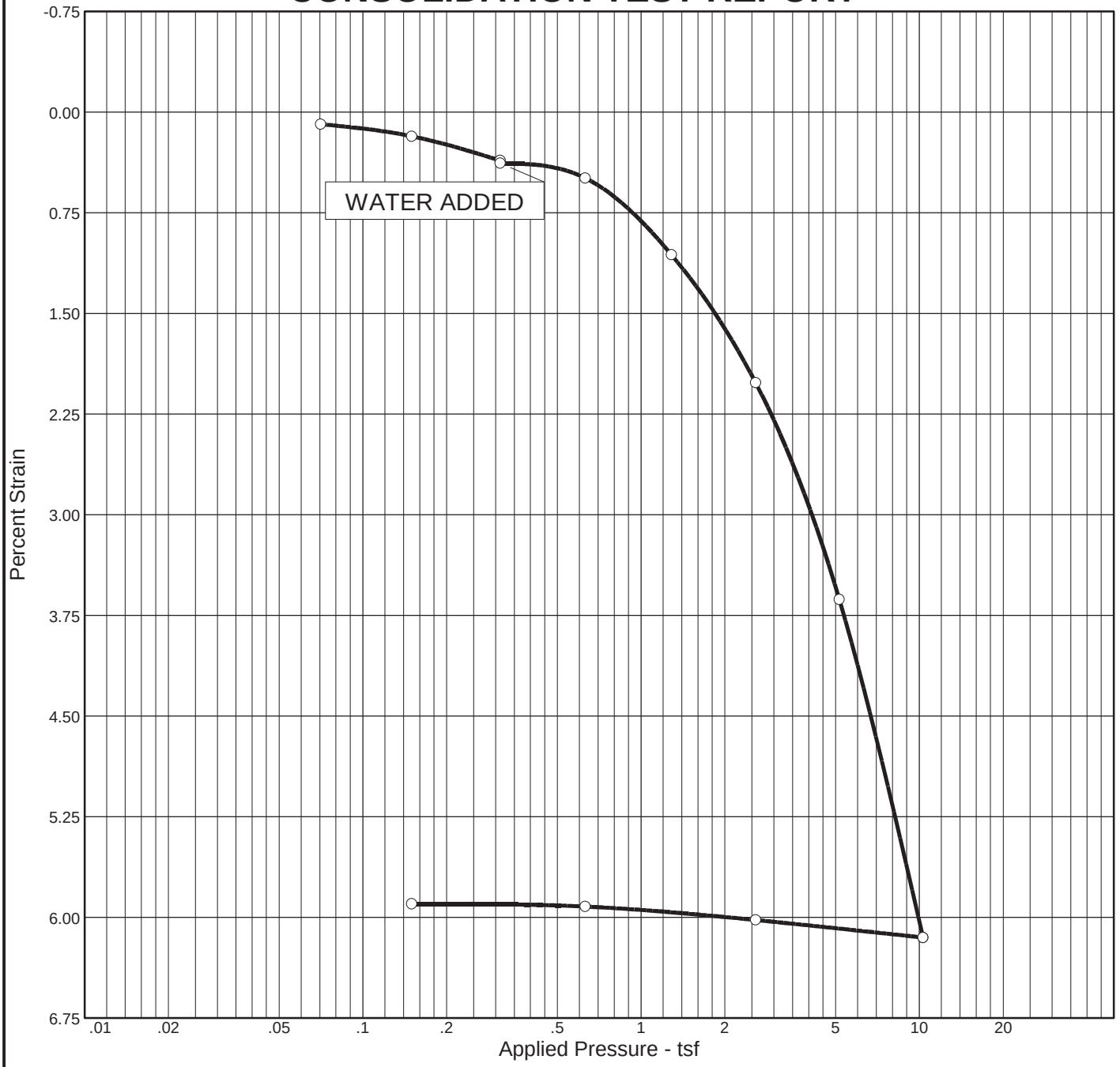
INITIAL TRANSDUCER READING 50.5 TRANSDUCER NUMBER 3

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)
4-13-11	0	2.11	51.0	50.5				
	1		56.0	54.9	5.0		4.4	0.88
	2		"	54.8	5.0		4.3	0.86
	4		"	54.8	5.0		4.3	0.86
4-15-11	0	2.62	56.0	55.5				
	1		61.0	60.2	5.0		4.7	0.94
	2		"	60.2	5.0		4.7	0.94
	4		"	60.2	5.0		4.7	0.94
	8		"	60.2	5.0		4.7	0.94
4-20-11	0	2.97	61.0	60.4				
	1		66.0	65.2	5.0		4.8	0.96
	2		"	65.2	5.0		4.8	0.96
	4		"	65.2	5.0		4.8	0.96
	8		"	65.2	5.0		4.8	0.96
			"		5.0			

OK

OK

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.											
82.7 %	56.1 %	60.8			2.87		2.46	0.25	0.00			1.946

MATERIAL DESCRIPTION	USCS	AASHTO
Ponded fly-ash, air dried to 8% and molded at 55%		

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

Project: CCP Properties, Labadie Plant

Source: Ponded Fly Ash **Sample No.:** Bulk

REITZ & JENS, INC.
CONSULTING ENGINEERS

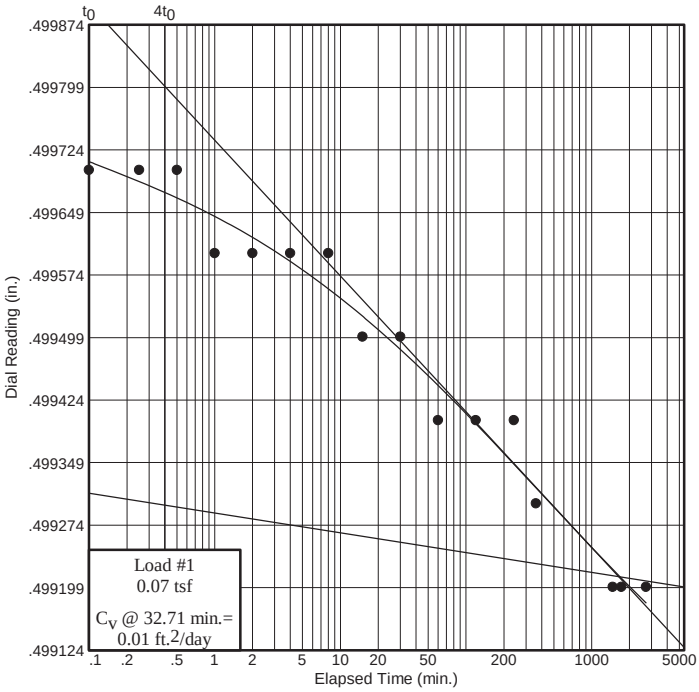
Remarks:

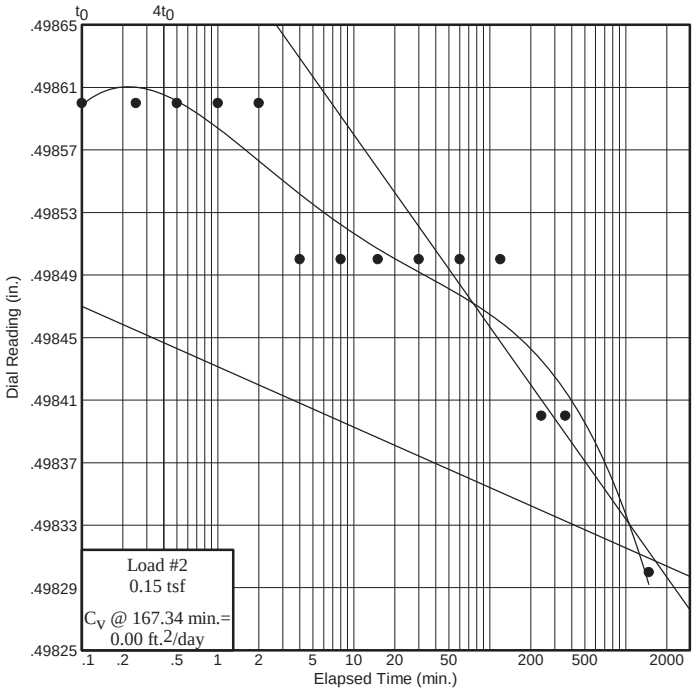
Figure

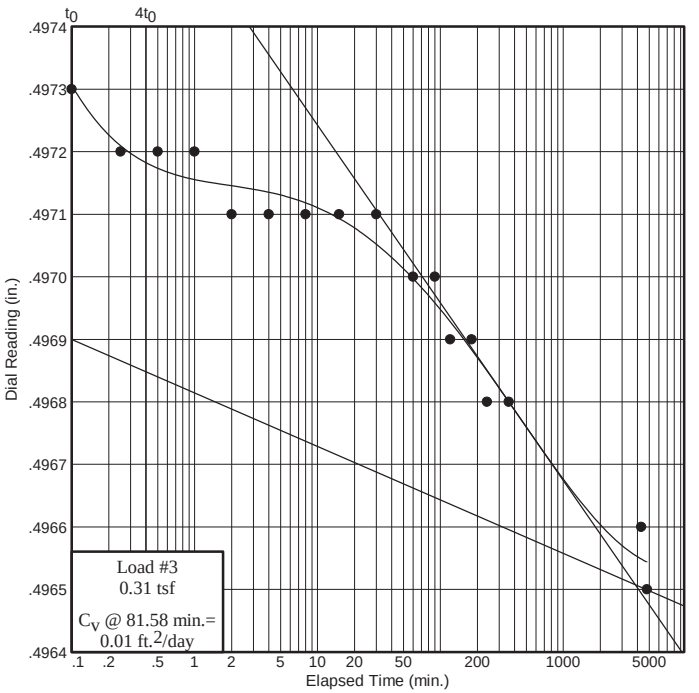
Dial Reading vs. Time

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

Source: Ponded Fly Ash Sample No.: Bulk







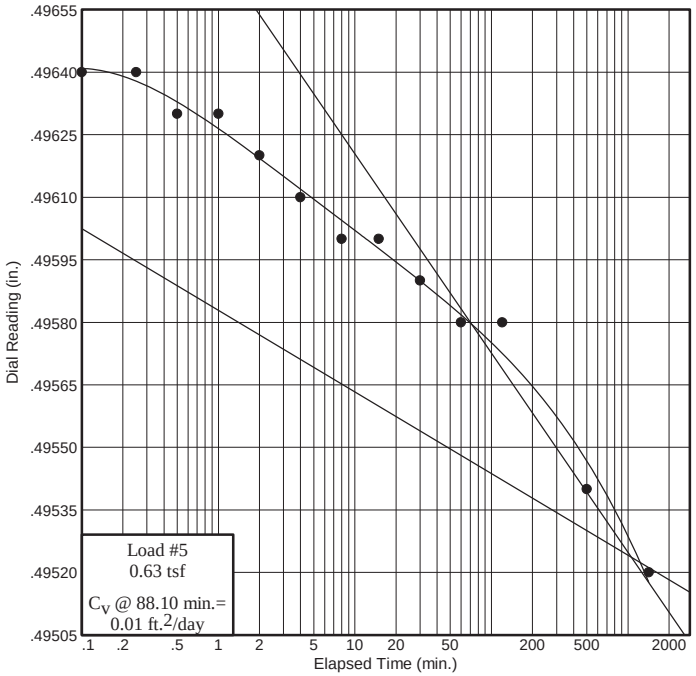


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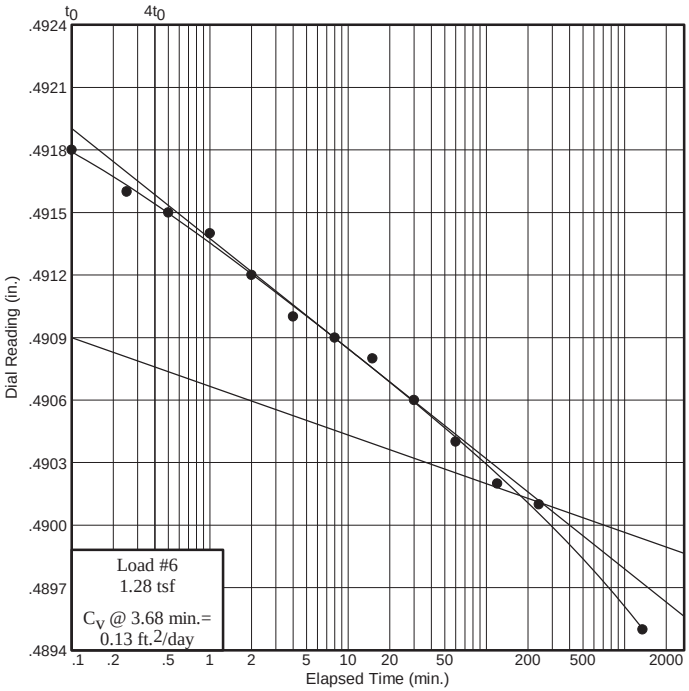
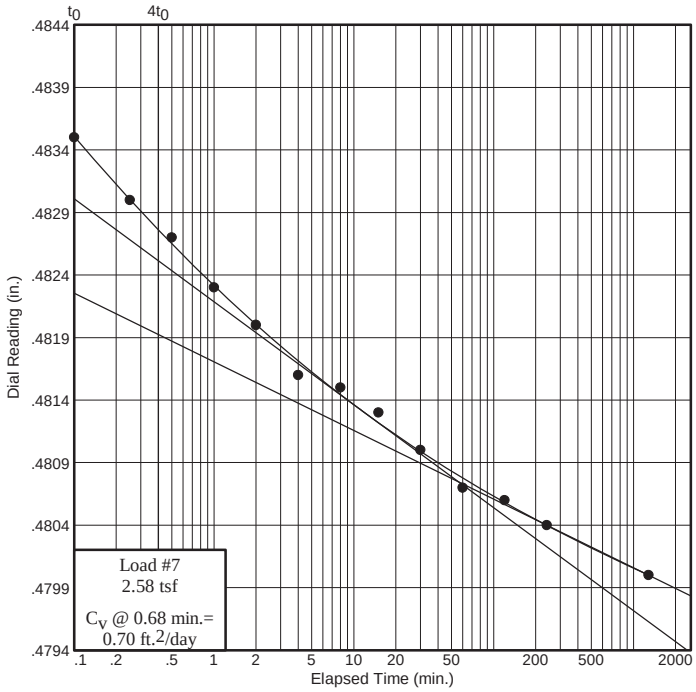
Figure

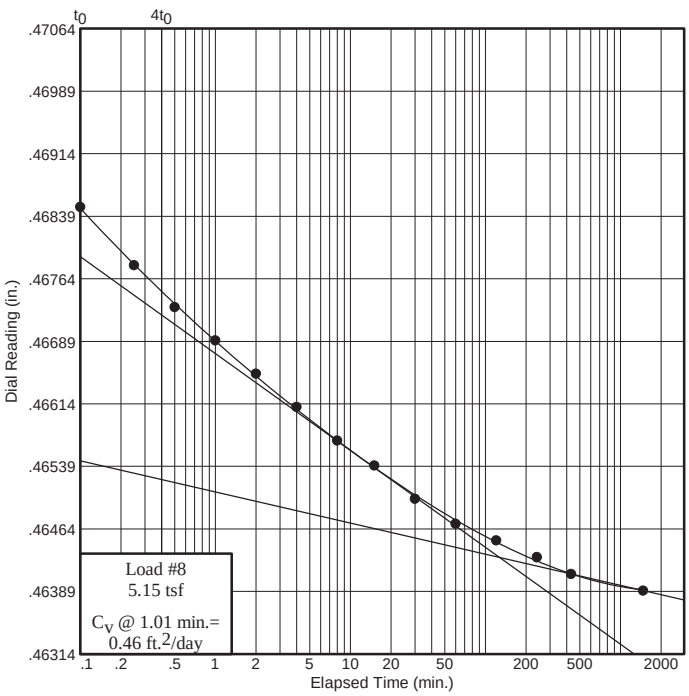
Dial Reading vs. Time

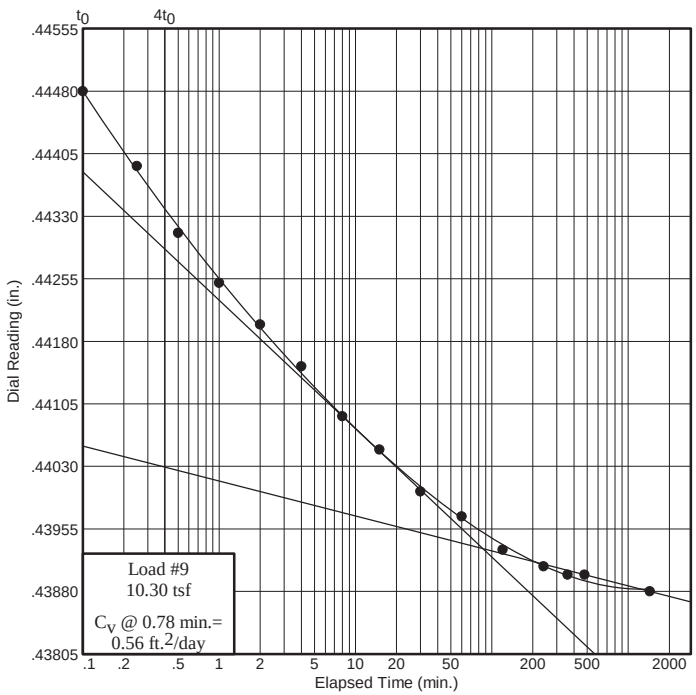
Project No.: 2008012455
Project: CCP Properties, Labadie Plant

Source: Ponded Fly Ash Sample No.: Bulk









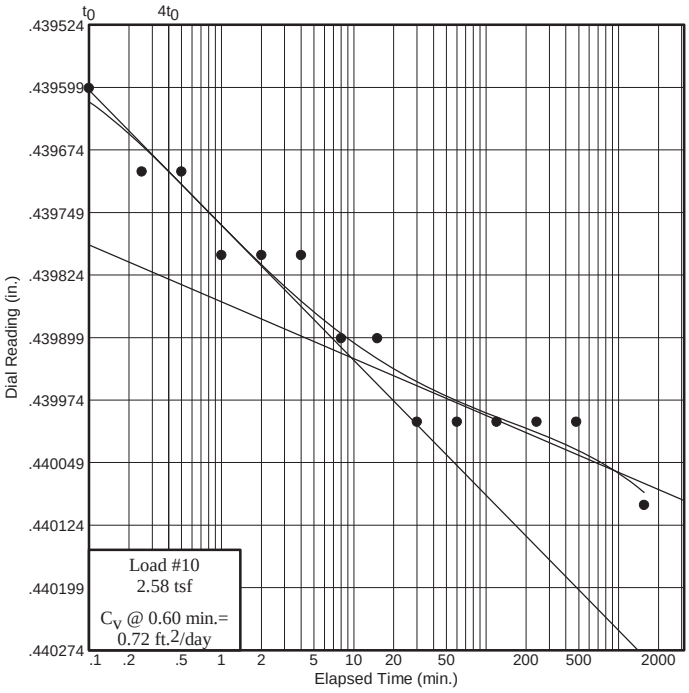
REITZ & JENS, INC.
CONSULTING ENGINEERS

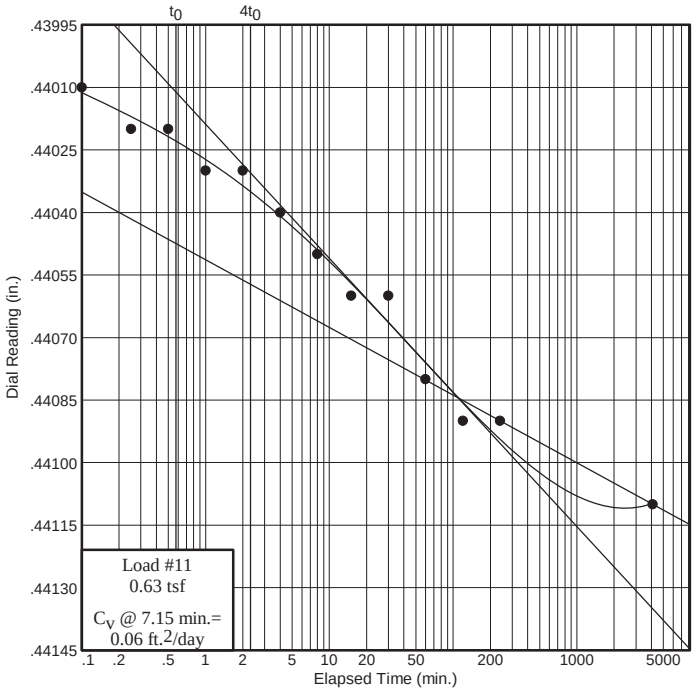
Figure

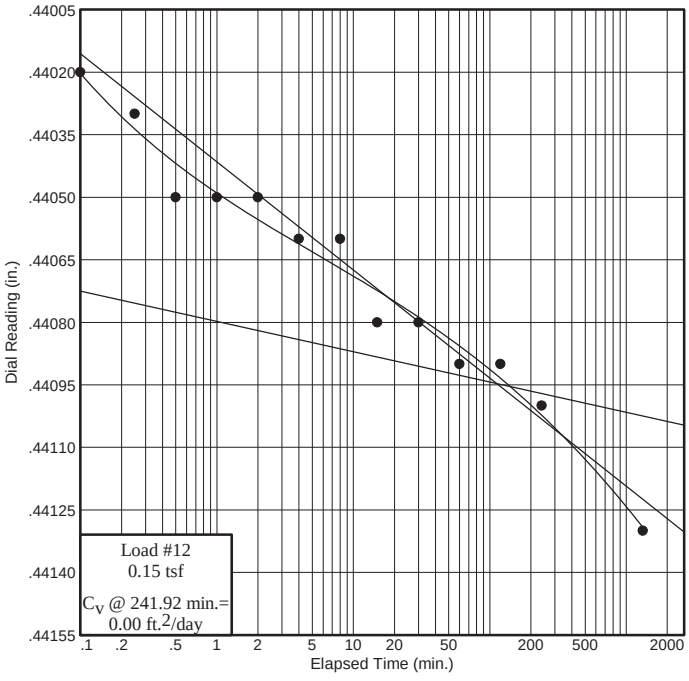
Dial Reading vs. Time

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

Source: Ponded Fly Ash Sample No.: Bulk







REITZ & JENS, INC.
CONSULTING ENGINEERS

Figure

CONSOLIDATION TEST DATA

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

Sample Data

Source: Ponded Fly Ash
Sample No.: Bulk
Elev. or Depth: **Sample Length(in./cm.):**
Location:
Description: Ponded fly-ash, air dried to 8% and molded at 55%
Liquid Limit: **Plasticity Index:**
USCS: **AASHTO:** **Figure No.:**
Testing Remarks:

Test Specimen Data

TOTAL SAMPLE		BEFORE TEST	AFTER TEST
Wet w+t =	259.37 g.	**Consolidometer #** = 1	**Wet w+t** =
Dry w+t =	180.45 g.		**Dry w+t** =
Tare Wt. =	39.71 g.	**Spec. Gravity** = 2.87	**Tare Wt.** =
Height =	1.00 in.	**Height** = 1.00 in.	
Diameter =	2.50 in.	**Diameter** = 2.52 in.	
Weight =	121.70 g.	**Defl. Table** = Labadie 100% Fly Ash at 65%M	
Moisture =	56.1 %	**Ht. Solids** = 0.3383 in.	**Moisture** = %
Wet Den. =	94.9 pcf	**Dry Wt.** = 79.04 g.*	**Dry Wt.** = n/a
Dry Den. =	60.8 pcf	**Void Ratio** = 1.946	**Void Ratio** = 1.772
		Saturation = 82.7 %	

*** Initial 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	0.50010				1.946	
0.07	0.49880	0.00040	0.01	0.000	1.943	0.1 Comprs.
0.15	0.49720	0.00110	0.00	0.000	1.941	0.2 Comprs.
0.31	0.49450	0.00200	0.01	0.000	1.935	0.4 Comprs.
water	0.49430	0.00200			1.935	0.4 Comprs.
0.63	0.49200	0.00320	0.01	0.000	1.931	0.5 Comprs.
1.28	0.48410	0.00540	0.13	0.000	1.915	1.1 Comprs.
2.58	0.47290	0.00710	0.70	0.001	1.887	2.0 Comprs.
5.15	0.45440	0.00950	0.46	0.000	1.839	3.6 Comprs.
10.30	0.42670	0.01210	0.56	0.000	1.765	6.2 Comprs.
2.58	0.43030	0.00980	0.72		1.769	6.0 Comprs.
0.63	0.43350	0.00760	0.06		1.772	5.9 Comprs.
0.15	0.43540	0.00590	0.00		1.772	5.9 Comprs.

C_C = 0.25 P_C = 2.46 tsf C_S = 0.00
Collapse percentage = 0.0

CONSOLIDATION TEST

Rev. 4/2000
† – to be completed by Project Engineer

Date 4-11-11 Set-up by KEK

Sample Description: 100% Labadie Ponded Ash Air dried to ≈8%, then molded At 85% Moisture

USCS: _____ AASHTO: _____

†Project Number _____
†Job Ameren Labadie ULWL
†Test Hole _____
†Sample Labadie Ponded Ash †Depth _____
†Sample Type Molded
†S.G.= 2.87 ☒ Measured ☒ Assumed
L.L.= _____ PP= _____ TSF
P.L.= _____ Torvane= _____ TSF

†Testing Remarks: _____

Test Specific Data

†Deflection Table: _____
Rig No. 1 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

Untrimmed Sample Data

Wgt. Tube+ Soil= _____ g
Wgt. Tube= _____ g
Wgt. Soil= _____ g
Sample Lgth. (L)= _____ in.
Sample Dia. (D)= _____ in.
Tube Constant (k)= _____
k= 4.85/(D²L)
Wet Unit Wgt.= _____ PCF

Initial Moisture Content

Tare No.: 3
Wet Wgt.+Tare= 259.37 g
Dry Wgt.+Tare= 180.45 g
Wgt. Water= 78.92 g
Wgt. Tare= 39.71 g
Wgt. Dry Soil= 140.74 g
Water Content= 56.07 %
Dry Unit Wgt.= 90.18 PCF

Initial Trimmed Sample Data

Trimmed sample in ring without dish.
Wgt. Ring= 499.18 g
Wet Wgt.+Ring= 620.91 g
Wgt. Wet Soil= 121.7 g

Hanger Load Seating Load of 0.125 kg

†Sequence	†Instructions
0.25 kg	0.0705 TSF
0.5 kg	0.1495 TSF
1.0 kg	0.3116 TSF
10 kg	Add Water
2.0 kg	0.6290
4.0 kg	1.2844
8.0 kg	2.5777
16.0 kg	5.1524
32.0 kg	10.3004
8.0 kg	2.5777
2.0 kg	0.6290
0.5 kg	0.1499
____ kg	
____ kg	
____ kg	
____ kg	
____ kg	
____ kg	
____ kg	

†☒ Run Mach. Deflections

Reading	Difference
.5996	0.0004 in.
.5989	0.0011 in.
.5986	0.0020 in.
.5977	0.0023 in.
.5968	0.0032 in.
.5946	0.0054 in.
.5929	0.0071 in.
.5905	0.0095 in.
.5879	0.0121 in.
.5902	0.0098 in.
.5924	0.0076 in.
.5941	0.0059 in.
____	____ in.
____	____ in.
____	____ in.
____	____ in.
____	____ in.
____	____ in.
____	____ in.

Post-Test Sample Data

Dish No.: 3A
Wgt. Dish= 197.03 g
Tare (Ring+Dish)= 696.21 g
Wet Wgt.+Tare= 818.67 g
Dry Wgt.+Tare= 772.56 g
Wgt. Water= _____ g
Wgt. Dry Soil= _____ g
Water Content= _____ %

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. _____

START DEFLEK = .6000

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

Consulting Engineers

R&J Project: Ameren Labadie LWL Sheet 1 of 5

Boring: 100% ADDED ASH Sample: 65% M Depth: N/A Rig: 1

DATE	LOAD kg	TESTER'S INITIALS	TIME	ELAPSED TIME, min.	DIAL READING	NOTES
4/12	0.25	JJL	1015	0	.5001	SEATED 4/11 w/ .125 kg
				.1	.4993	
				.25	.4993	
				.5	.4993	
			16	1	.4992	
			17	2	.4992	
			19	4	.4992	
			23	8	.4992	
			30	15	.4991	
			45	30	.4991	
			1115	60	.4990	
			1215	120	.4990	
			1415	240	.4990	
			1615	360	.4989	
4-13-11		KEK	10:50	1475	.4988	
"		"	15:00	1725	.4988	
4-14-11		"	7:30	2715	.4988	
	0.50 kg	"	7:30	0	.4988	
				.1	.4975	
				.25	.4975	
				.5	.4975	
			7:31	1	.4975	
			7:32	2	.4975	
			7:34	4	.4974	
			7:38	8	.4974	
			7:45	15	.4974	
			8:00	30	.4974	
			8:30	60	.4974	
			9:30	120	.4974	
			11:30	240	.4973	
			15:30	360	.4973	
4-15-11			8:10	1480	.4972	
	1.0 kg	KEK	8:10	0	.4972	
				.1	.4953	
				.25	.4952	
				.5	.4952	
			8:11	1	.4952	
			8:12	2	.4951	
			8:14	4	.4951	
			8:18	8	.4951	
			8:26	15	.4951	

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

Consulting Engineers

R&J Project: American Cabadise UWL Sheet 2 of 5

Boring: 100% Ponded AEH Sample: SS2 M Depth: N/A Rig: 1

DATE	LOAD kg	TESTER'S INITIALS	TIME	ELAPSED TIME, min.	DIAL READING	NOTES
4-15-11	1.0	KEK	8:40	30	.4951	
			9:10	60	.4950	
			9:40	90	.4950	
			10:10	120	.4949	
			11:10	180	.4949	
			12:10	240	.4948	
			14:10	360	.4948	
4-18-11		KEK	8:00	4310	.4946	
			4:10 pm	4800	.4945	
4-19-11	1.0	JFC	10:35	0	.4945	ADD H2O
				.1	43	
				.25	43	
				.5	43	
			36	1	44	
			37	2	43	
			39	4	43	
			43	8	43	
			50	15	43	
			1105	30	43	
			1135	60	43	
4/20	1.0	JFC	0835	0	.4943	
	2.0			.1	.4932	
				.25	32	
				.5	31	
			36	1	31	
			37	2	30	
			39	4	29	
			43	8	28	
			50	15	28	
			0905	30	27	
			0935	60	26	
			1035	120	26	
			~~1135~~	~~240~~		
		KEK	1655	500	.4922	
4-21-11		KEK	8:15	1420	.4920	
4/22/11		JFC	10:30	0	.4919	
	4Kg		10:35	.1	.4864	
				.25	62	
				.5	61	
			36	1	60	
			37	2	58	
			39	4	56	

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

Consulting Engineers

R&J Project: Amercu LABADIE UWL Sheet 3 of 5

Boring: 100% POND ASH Sample: 65% M Depth: N/A Rig: 1

DATE	LOAD kg	TESTER'S INITIALS	TIME	ELAPSED TIME, min.	DIAL READING	NOTES
4/22	4Kg	JSC	1043	0	.4855	
			1050	15	.4854	
			1105	30	.4852	
			1135	60	.4850	
		(CWE)	1235	120	.4848	
			1435	240	.4847	
4-25	4		8:55	1345/10	.4841	
"	8	JSC	1020	.1	.4764	
				.25	.4759	
				.5	.4756	
			21	1	.4752	
			22	2	.4749	
			24	4	.4745	
			28	8	.4744	
			35	15	.4742	
			50	30	.4739	
			1120	60	.4736	
			1220	120	.4735	
			1420	240	.4733	
4/26	8	JSC	0805	1205/10	.4729	
	16		0820	.1	.4590	
				.25	.4583	
				.5	.4578	
			21	1	.4574	
			22	2	.4570	
			24	4	.4566	
			28	8	.4562	
			35	15	.4559	
			50	30	.4555	
			0920	60	.4552	
			1020	120	.4550	
			1220	240	.4548	
			1530	430	.4546	
			1620	480	.4546	
4/27	16	JSC	0840	1445/10	.4544	
	32			.1	.4327	
				.25	.4318	
				.5	.4310	
			41	1	.4304	
			42	2	.4299	
			44	4	.4294	
			48	8	.4288	

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

Consulting Engineers

R&J Project: Ameren LABADIE UWL Sheet 4 of 5

Boring: 100% Load #54 Sample: 55% M Depth: N/A Rig: 1

DATE	LOAD kg	TESTER'S INITIALS	TIME	ELAPSED TIME, min.	DIAL READING	NOTES
4/27	32	JJC	0855	15	.4284	
			0910	30	.4279	
			0940	60	.4276	
			1040	120	.4272	
			1240	240	.4270	
			1440	360	.4269	
			1640	480	.4269	
4/28	32	JJC	0840	1440	.4267	
	8		0850	.1	.4298	
				.25	.4299	
				.5	.4299	
			51	1	.4300	
			52	2	.4300	
			54	4	.4300	
			58	8	.4301	
			0905	15	.4301	
			0920	30	.4302	
			0950	60	.4302	
			1050	120	.4302	
		KEK	1250	240	.4302	
		JJC	1650	480	.4302	
4/29	8		1050	1560.0	.4303	
	2		1100	.1	.4325	
				.25	.4326	
				.5	.4326	
			01	1	.4327	
			02	2	.4327	
			04	4	.4328	
			08	8	.4329	
			15	15	.4330	
			30	30	.4330	
			1200	60	.4332	
			1300	120	.4333	
			1500	240	.4333	
5-2-11	2	KEK	8:30	4090	.4335	
	0.5	JJC	0950	.1	.4343	
				.25	.4344	
				.5	.4346	
			51	1	.4346	
			52	2	.4346	
			54	4	.4347	
			58	8	.4347	

1440 - 115 / 1325

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

Consulting Engineers

R&J Project: Anheuser Landfill UWL Sheet 5 of 5

Boring: 1000 POND ASH Sample: 55% M Depth: N/A Rig: 1

DATE	LOAD kg	TESTER'S INITIALS	TIME	ELAPSED TIME, min.	DIAL READING	NOTES
5/2	0.5	JSL	1005	15	.4349	
			1020	30	.4349	
			1050	60	.4350	
			1150	120	.4350	
			1350	240	.4351	
5-3-11		KEK	07:55	1325	.4354	
		JSL	1435	1725	.4354	
5/9/11		JSL	1330		.4355	TERMINATED TEST

SPECIFIC GRAVITY OF SOLIDS

Pycnometer Method

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

Sample or Specimen No.			1	2	
Flask No.			8	8	
Temperature of water and soil, T, ^{o}C			22.5	22.5	
Dish No.					
Weight in Grams	Dish + Dry Soil				
	Dish				
	Dry soil	W_s	100.11	100.11	
	Flask + water at T, ^{o}C	W_{bw}	678.23	678.21	
	$W_s + W_{bw}$		778.34	778.32	
	Flask + water + immersed soil	W_{bws}	742.64	742.64	
	Displaced water, $W_s + W_{bw} - W_{bws}$		35.70	35.68	
Correction factor		K	.99945	.99945	
$(W_s K) / (W_s + W_{bw} - W_{bws})$		G_s	2.80	2.80	

Sample Description

#1 Bottom ash, tan and grey, fine sand to coarse gravel size particles, pitted

#2 Same

Flask Calibration	Trial				
Weight					
Temp.					

SPECIFIC GRAVITY OF SOLIDS

Pycnometer Method

JOB: AmerenUE CCP Ash Study DATE: 8/13/10

BORING: Labadie TEST BY: JR

SAMPLE: Bottom Ash COMPUTED BY: JRD & KEK

Sample or Specimen No.			—		
Flask No.			8		8
Temperature of water and soil, T, °C			22.5		22.5
Dish No.			—		
Weight in Grams: Dish + Dry Soil					
Weight in Grams: Dish					
Weight in Grams: Dry soil		W_s	100.11		100.11
Weight in Grams: Flask + water at T, °C		W_{bw}	678.23		678.21
Weight in Grams: $W_s + W_{bw}$			778.34		778.32
Weight in Grams: Flask + water + immersed soil		W_{bws}	742.64		742.64
Weight in Grams: Displaced water, $W_s + W_{bw} - W_{bws}$			35.70		35.68
Correction factor		K	.9945		.9945
$(W_s K) / (W_s + W_{bw} - W_{bws})$		G_s	2.802		2.804

100.054 / 35.70 = 2.8027 2010 flask data Av. flask data 2.804

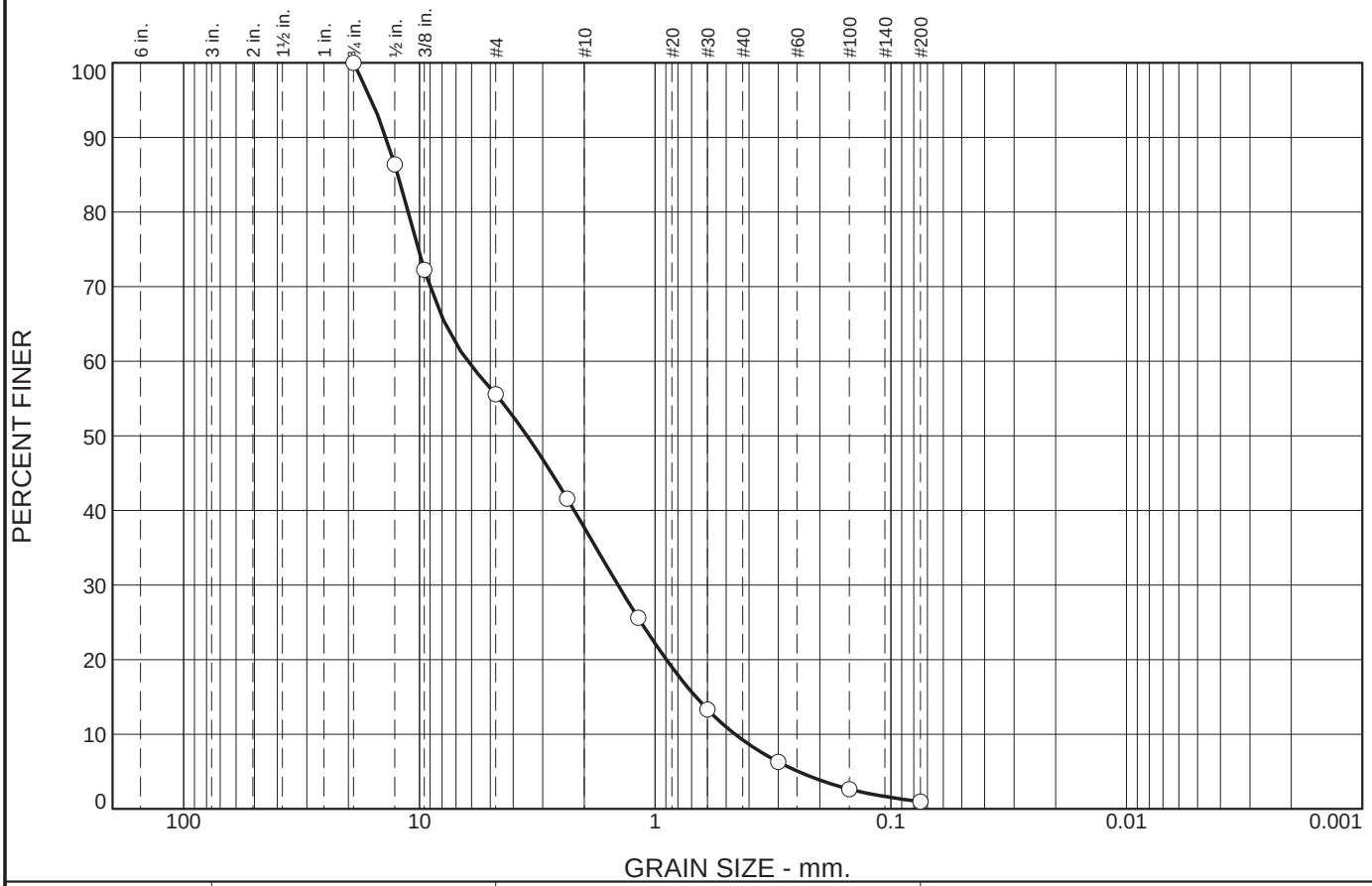
Sample Description

#1 Flask #8 179.98 g. material passing #4 per ASTM

#2 Tan & Grey fine sand to coarse gravel size, pitted

Flask Calibration	Trial				
Weight					
Temp.					

Particle Size Distribution Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	44.4	17.8	28.6	8.2	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	86.4		
3/8	72.3		
#4	55.6		
#8	41.6		
#16	25.6		
#30	13.3		
#50	6.3		
#100	2.6		
#200	1.0		

* (no specification provided)

Material Description

Bottom Ash, grey and tan, fine sand to coarse gravel size particles, pitted, from pond

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 12.3294 D_{60}= 6.2300 D_{50}= 3.4902
D_{30}= 1.4347 D_{15}= 0.6720 D_{10}= 0.4577
C_u= 13.61 C_c= 0.72

Date Tested: 12/17/09 **Tested By:** M. Tierney

Remarks

Sample No.: Bulk **Source of Sample:** Bottom Ash **Date Sampled:** 12/17/09
Location: **Elev./Depth:**
Checked By: K. Kocher **Title:** Engineer

REITZ & JENS, INC.
CONSULTING ENGINEERS

Client: Ameren Missouri
Project: CCP Properties, Labadie Plant

Project No: 2008012455 **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

5/24/2011

Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Project Number: 2008012455
Location: Bottom Ash
Sample Number: Bulk
Material Description: Bottom Ash, grey and tan, fine sand to coarse gravel size particles, pitted, from pond
Sample Date: 12/17/09
Tested By: M. Tierney **Test Date:** 12/17/09
Checked By: K. Kocher **Title:** Engineer

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 1524.36
Tare Wt. = 505.91
Minus #200 from wash = 0.6%

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
1530.79	505.91	0.00	3/4	0.00	100.0
			1/2	139.63	86.4
			3/8	284.25	72.3
			#4	455.21	55.6
			#8	598.54	41.6
			#16	762.30	25.6
			#30	888.37	13.3
			#50	960.17	6.3
			#100	997.77	2.6
			#200	1014.72	1.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	44.4	44.4	17.8	28.6	8.2	54.6			1.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.4577	0.6720	0.8961	1.4347	3.4902	6.2300	11.1539	12.3294	13.8504	16.0171

Fineness Modulus	C_u	C_c
4.83	13.61	0.72

REITZ & JENS, INC.

GRAIN SIZE ANALYSIS

(Sieve or Screen Method)

Project: Labadie CCP Properties
Boring No.: Btm Ash
Sample No.:
Depth:

Test by: MPT
Entered by: KEK
Checked by: KEK
Testing Date: 12-17-09

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				0	
1/2-in.	12.7				139.63	
3/8-in.	9.5				284.25	
#3	6.35					
#4	4.75				455.21	
#6	3.35					
#8	2.36				598.54	
#10	2.00					
#16	1.18				762.30	
#18	1.00					
#20	0.85					
#30	0.60				888.37	
#35	0.50					
#40	0.425					
#50	0.300				960.17	
#60	0.250					
#70	0.212					
#100	0.150				997.77	
#120	0.125					
#140	0.106					
#200	0.075				1014.78	
Pan					1018.66	
Sample Lost in #200 Wash						
Total Weight in Grams						

Pre #200 wash Weights	
Soil + Tare	1530.79
Tare	505.91
Soil	1024.88

Post #200 wash Weights	
Soil + Tare	1524.36
Tare	505.91
Soil	1018.45

Sample Description & Remarks: Bottom Ash, tan & grey, fine Sand to Coarse gravel, pitted

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Relative Density = $\frac{\gamma' max. (\gamma' field - \gamma' min.)}{\gamma' field (\gamma' max. - \gamma' min.)} \times 100$

Job Ameren; Labadie CCP Testing

Boring No. Bottom Ash

Depth

Sample No. Bulk

Mold Vol. 0.09995 (cu. ft.) (Vm)

Mold End Area 0.1961 (sq. ft.) (Am)

Lab Test by MPT Date 12/17/09

Computed by JLC Date 12/17/09

Checked by KEK Date 12/17/09

Mold No. Blue Mold

Mold Diam. 6.0 (in)

Mold Wt. 7.98 (lb.)

MINIMUM DENSITY						
Trial No.			Trial 1			
Weight Lb.	Tare + Soil Dry	W	16.34			
	Tare	W	7.98			
	Soil Dry	W s	8.36			
Min. Dry Density pcf.		γ d				
Min. Dry Density Average pcf			83.64			

MAXIMUM DENSITY						
Method Used			Near Saturation			
Trial No.			Trial 1			
Height Inches	Initial Dial Reading	h o		0.00		
	Left Dial Reading	h l	1.47			
	Right Dial Reading	h r	1.43			
	Sum	h l + h r	2.9			
	Average Dial Reading	h a		1.45		
	Height Change	Δ h		1.45		
Volume cu. ft.	Mold Initial Volume	V m		0.09995		
	Volume Change *	Δ V		0.02369		
	Volume of Soil	V s		0.07626		
Weight Lb.	Tare + Soil Dry	W	16.34			
	Tare	W m	7.98			
	Soil Dry	W s	8.36			
Max. Dry Density pcf.		γ d				
Max. Dry Density Average pcf.			109.62			

* $\Delta V = \frac{\Delta h \times A m}{12}$

Sample Description & Remarks Bottom ash, tan and grey, fine sand to coarse gravel in size, pitted

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job Labadie

Boring No. Btm Ash

Depth

Sample No.

Mold Vol. 0.09995 (cu. ft.) (Vm)

Mold End Area 0.1961 (sq. ft.) (Am)

Lab Test by MPT Date 12/17/09

Computed by JLC Date 12/17/09

Checked by KGC Date 12/18/09

Mold No. Blue

Mold Diam. 6 (in)

Mold Wt. 7.98 (lb.)

Relative Density = $\frac{\gamma' max. (\gamma' field - \gamma' min.)}{\gamma' field (\gamma' max. - \gamma' min.)} \times 100$

MINIMUM DENSITY						
Trial No.						
Weight Lb.	Tare + Soil Dry	W	16.34			
	Tare	W	7.98			
	Soil Dry	Ws	8.36			
Min. Dry Density pcf.		γd				
Min. Dry Density Average pcf			83.64			
MAXIMUM DENSITY						
Method Used						
Trial No.						
Height Inches 0.254345 / 12	Initial Dial Reading	ho				
	Left Dial Reading	hl	1.47			
	Right Dial Reading	hr	1.43			
	Sum	hl + hr				
	Average Dial Reading	ha		1.45		
	Height Change	Δh		1.45		
Volume cu. ft.	Mold Initial Volume	Vm		0.09995		
	Volume Change *	ΔV		0.02369		
	Volume of Soil	Vs		0.08626		
Weight Lb.	Tare + Soil Dry	W	16.34			
	Tare	Wm	7.98			
	Soil Dry	Ws	8.36			
Max. Dry Density pcf.		γd				
Max. Dry Density Average pcf.			109.82			

* $\Delta V = \frac{\Delta h \times A m}{12}$

Sample Description & Remarks Bottom Ash

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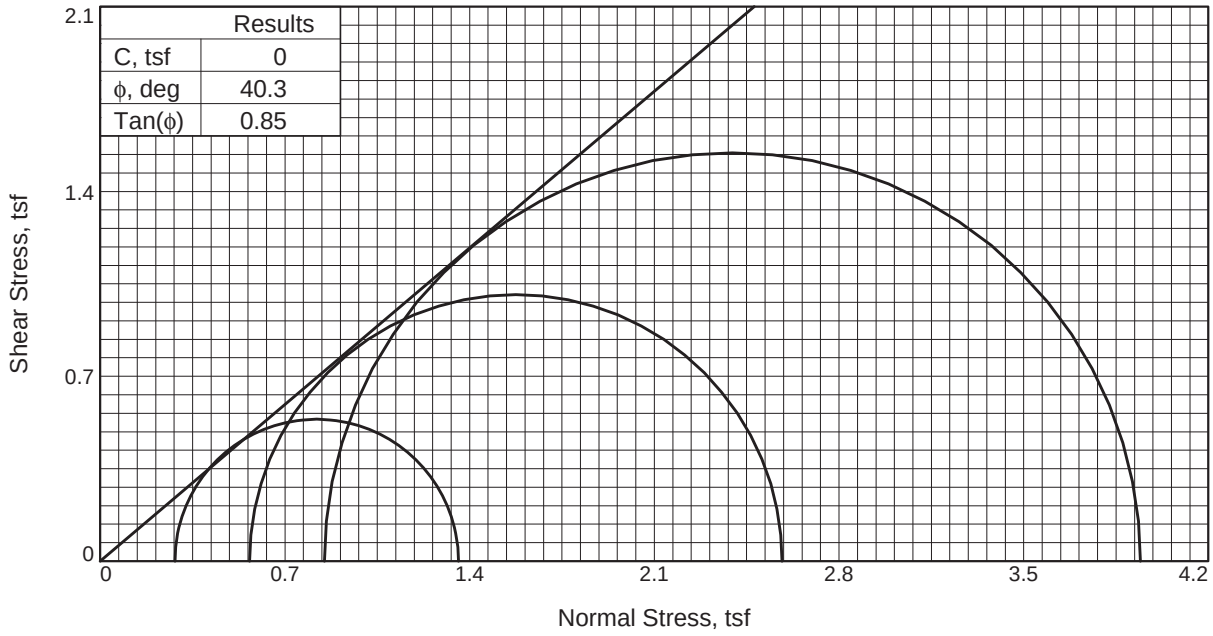
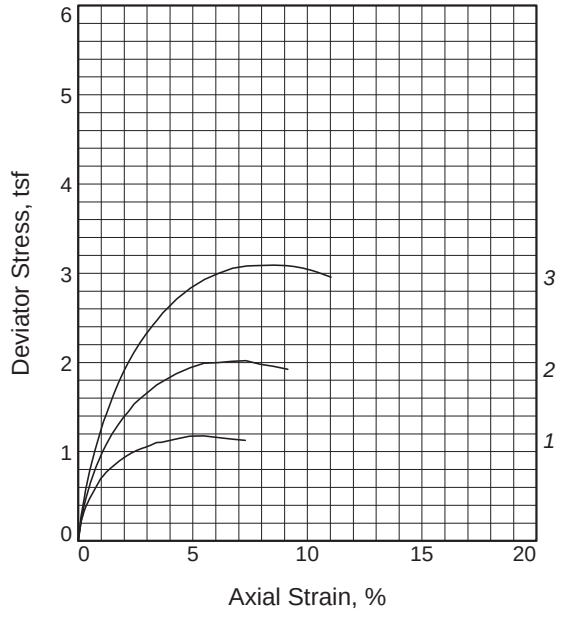




Sample No.		1	2	3
Initial	Water Content,	0.0	0.0	0.0
	Dry Density, pcf	89.2	89.0	90.9
	Saturation,	0.0	0.0	0.0
	Void Ratio	0.9596	0.9631	0.9226
	Diameter, in.	3.79	3.78	3.78
	Height, in.	8.23	8.20	8.16
At Test	Water Content,	0.0	0.0	0.0
	Dry Density, pcf	89.2	89.0	90.9
	Saturation,	0.0	0.0	0.0
	Void Ratio	0.9596	0.9631	0.9226
	Diameter, in.	3.79	3.78	3.78
	Height, in.	8.23	8.20	8.16
Strain rate, %/min.		0.40	0.40	0.40
Back Pressure, tsf		0.00	0.00	0.00
Cell Pressure, tsf		0.28	0.57	0.85
Fail. Stress, tsf		1.07	2.02	3.09
Ult. Stress, tsf		1.18	2.02	3.09
σ_1 Failure, tsf		1.36	2.58	3.94
σ_3 Failure, tsf		0.28	0.57	0.85

Type of Test:
Unconsolidated Undrained

Sample Type: Hand compacted

Description: Bottom Ash, grey and tan, fine sand to coarse gravel size particles, pitted, from pond

Assumed Specific Gravity= 2.80

Remarks: Vacuum Triaxial Test on dry sample

Client: Ameren Missouri

Project: CCP Properties, Labadie Plant

Source of Sample: Bottom Ash

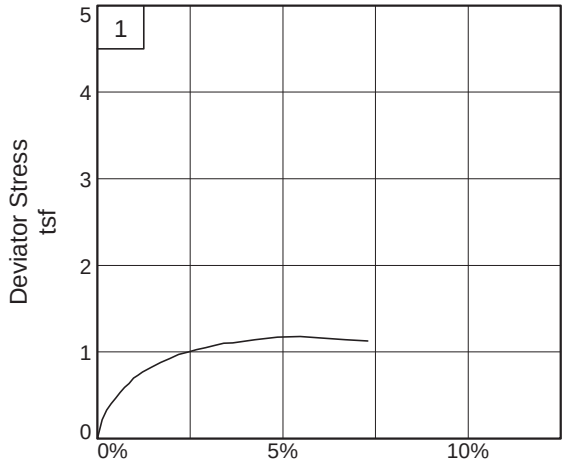
Sample Number: Bulk

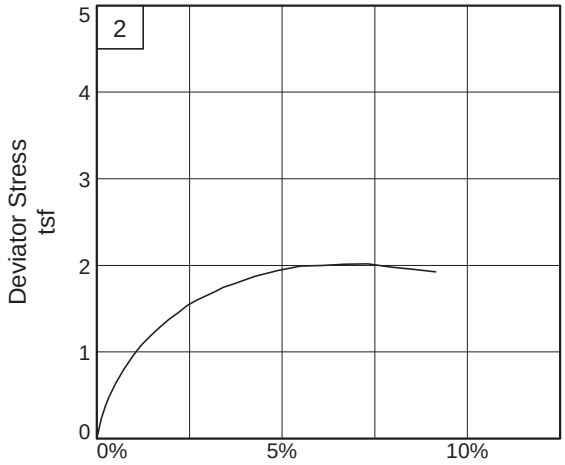
Proj. No.: 2008012455 **Date:** 12/17/09

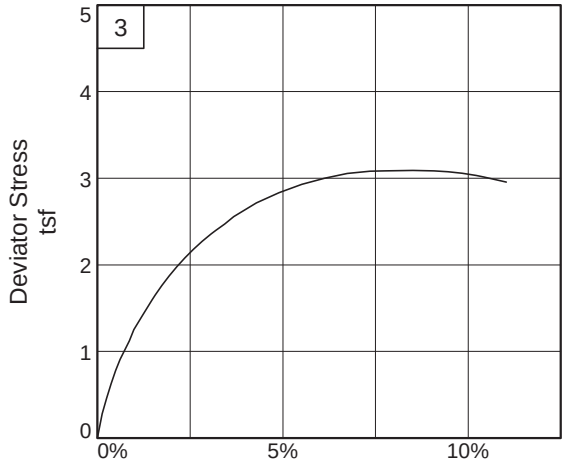
REITZ & JENS, INC.
CONSULTING ENGINEERS

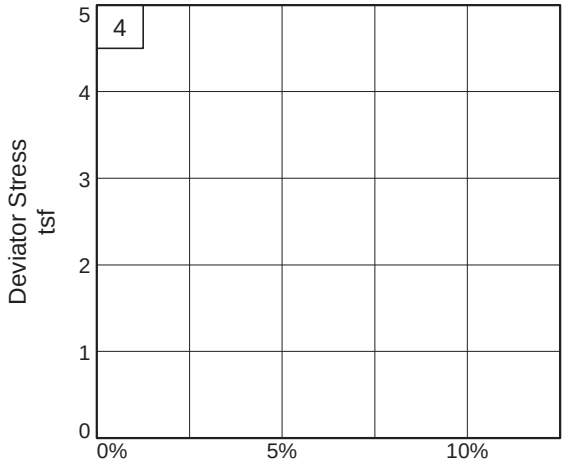
Figure _____

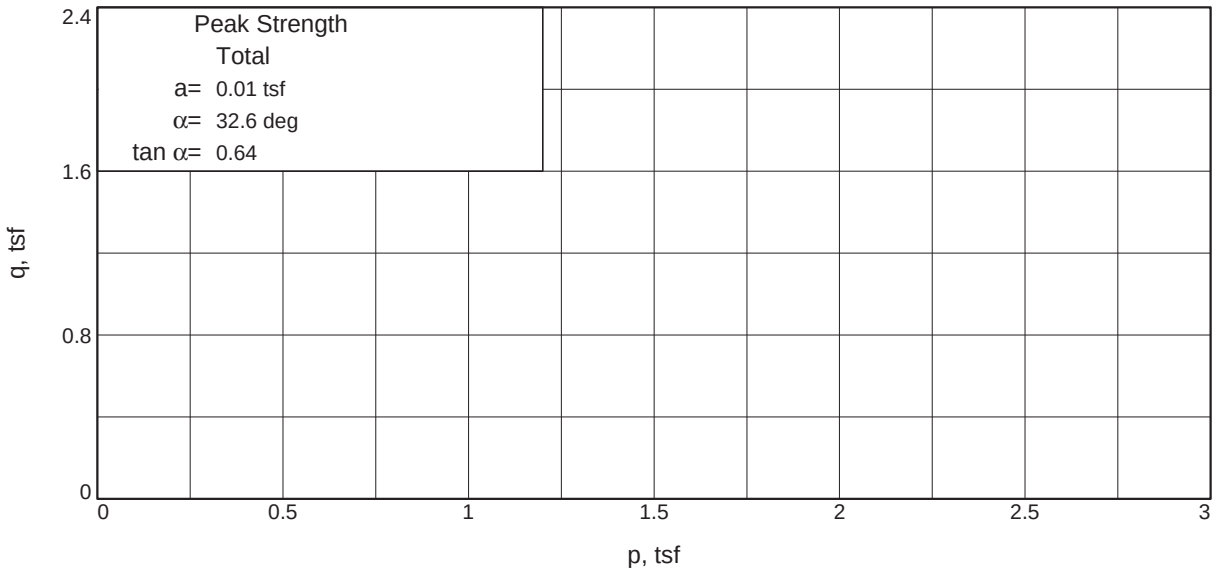
Tested By: K. Kocher **Checked By:** J. Fouse











Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Source of Sample: Bottom Ash **Sample Number:** Bulk
Project No.: 2008012455 **Figure** _____

REITZ & JENS, INC.

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

TRIAXIAL COMPRESSION TEST 5/24/2011
Unconsolidated Undrained 9:40 AM

Date: 12/17/09
Client: Ameren Missouri
Project: CCP Properties, Labadie Plant
Project No.: 2008012455
Location: Bottom Ash
Sample Number: Bulk
Description: Bottom Ash, grey and tan, fine sand to coarse gravel size particles, pitted, from pond
Remarks: Vacuum Triaxial Test on dry sample
Type of Sample: Hand compacted
Assumed Specific Gravity=2.80 **LL=** **PL=** **PI=**
Test Method: ASTM D 2850

Parameters for Specimen No. 1

Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	0.100	0.100
Moisture content: Dry soil+tare, gms.	0.100	0.100
Moisture content: Tare, gms.	0.000	0.000
Moisture, %	0.0	0.0
Moist specimen weight, gms.	2172.8	
Diameter, in.	3.79	
Area, in.²	11.28	
Height, in.	8.23	
Wet Density, pcf	89.2	
Dry density, pcf	89.2	
Void ratio	0.9596	
Saturation, %	0.0	

Test Readings for Specimen No. 1

Cell pressure = 3.93 psi (0.283 tsf)
Back pressure = 0.00 psi (0.000 tsf)
Strain rate, %/min. = 0.40
Fail. Stress = 1.075 tsf **at reading no.** 18
Ult. Stress = 1.178 tsf **at reading no.** 23

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
0	0.0000	1.90	0.0	0.0	0.000	0.283	0.283	1.00	0.283	0.000
1	0.0100	36.00	34.1	0.1	0.217	0.283	0.500	1.77	0.392	0.109
2	0.0200	53.50	51.6	0.2	0.329	0.283	0.612	2.16	0.447	0.164
3	0.0300	65.30	63.4	0.4	0.403	0.283	0.686	2.43	0.484	0.202
4	0.0400	75.20	73.3	0.5	0.466	0.283	0.749	2.65	0.516	0.233
5	0.0500	85.80	83.9	0.6	0.532	0.283	0.815	2.88	0.549	0.266
6	0.0600	94.90	93.0	0.7	0.590	0.283	0.872	3.08	0.578	0.295
7	0.0700	102.40	100.5	0.9	0.636	0.283	0.919	3.25	0.601	0.318
8	0.0800	112.00	110.1	1.0	0.696	0.283	0.979	3.46	0.631	0.348
9	0.0900	117.70	115.8	1.1	0.731	0.283	1.014	3.59	0.648	0.366
10	0.1000	123.90	122.0	1.2	0.770	0.283	1.052	3.72	0.668	0.385
11	0.1200	133.00	131.1	1.5	0.825	0.283	1.108	3.92	0.695	0.412
12	0.1400	141.90	140.0	1.7	0.879	0.283	1.162	4.11	0.722	0.439
13	0.1600	149.10	147.2	1.9	0.922	0.283	1.204	4.26	0.744	0.461
14	0.1800	157.20	155.3	2.2	0.970	0.283	1.253	4.43	0.768	0.485
15	0.2000	162.00	160.1	2.4	0.997	0.283	1.280	4.53	0.782	0.499
16	0.2200	167.10	165.2	2.7	1.027	0.283	1.309	4.63	0.796	0.513
17	0.2400	171.20	169.3	2.9	1.050	0.283	1.332	4.71	0.808	0.525
18	0.2600	175.70	173.8	3.2	1.075	0.283	1.358	4.80	0.820	0.537
19	0.2800	180.50	178.6	3.4	1.102	0.283	1.384	4.90	0.834	0.551
20	0.3000	181.60	179.7	3.6	1.106	0.283	1.388	4.91	0.836	0.553
21	0.3500	188.40	186.5	4.3	1.140	0.283	1.423	5.03	0.853	0.570
22	0.4000	194.90	193.0	4.9	1.172	0.283	1.455	5.15	0.869	0.586
23	0.4500	197.10	195.2	5.5	1.178	0.283	1.461	5.17	0.872	0.589
24	0.5000	195.10	193.2	6.1	1.159	0.283	1.442	5.10	0.862	0.579
25	0.5500	193.30	191.4	6.7	1.141	0.283	1.423	5.03	0.853	0.570
26	0.6000	192.10	190.2	7.3	1.126	0.283	1.409	4.98	0.846	0.563

Parameters for Specimen No. 2

Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	0.100	0.100
Moisture content: Dry soil+tare, gms.	0.100	0.100
Moisture content: Tare, gms.	0.000	0.000
Moisture, %	0.0	0.0
Moist specimen weight, gms.	2154.2	
Diameter, in.	3.78	
Area, in.²	11.24	
Height, in.	8.20	
Wet Density, pcf	89.0	
Dry density, pcf	89.0	
Void ratio	0.9631	
Saturation, %	0.0	

Test Readings for Specimen No. 2

Cell pressure = 7.86 psi (0.566 tsf)
Back pressure = 0.00 psi (0.000 tsf)
Strain rate, %/min. = 0.40
Fail. Stress = 2.019 tsf **at reading no.** 26
Ult. Stress = 2.019 tsf **at reading no.** 26

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
0	0.0000	1.60	0.0	0.0	0.000	0.566	0.566	1.00	0.566	0.000
1	0.0100	37.30	35.7	0.1	0.228	0.566	0.794	1.40	0.680	0.114
2	0.0200	62.50	60.9	0.2	0.389	0.566	0.955	1.69	0.760	0.195
3	0.0300	81.20	79.6	0.4	0.508	0.566	1.074	1.90	0.820	0.254
4	0.0400	99.40	97.8	0.5	0.623	0.566	1.189	2.10	0.878	0.312
5	0.0500	113.90	112.3	0.6	0.715	0.566	1.281	2.26	0.923	0.357
6	0.0600	127.30	125.7	0.7	0.799	0.566	1.365	2.41	0.966	0.400
7	0.0700	140.30	138.7	0.9	0.881	0.566	1.447	2.56	1.006	0.440
8	0.0800	151.90	150.3	1.0	0.953	0.566	1.519	2.68	1.043	0.477
9	0.0900	162.90	161.3	1.1	1.022	0.566	1.588	2.81	1.077	0.511
10	0.1000	173.00	171.4	1.2	1.085	0.566	1.650	2.92	1.108	0.542
11	0.1200	190.70	189.1	1.5	1.194	0.566	1.760	3.11	1.163	0.597
12	0.1400	206.60	205.0	1.7	1.291	0.566	1.857	3.28	1.211	0.645
13	0.1600	220.90	219.3	2.0	1.377	0.566	1.943	3.43	1.255	0.689
14	0.1800	233.60	232.0	2.2	1.454	0.566	2.019	3.57	1.293	0.727
15	0.2000	247.30	245.7	2.4	1.536	0.566	2.101	3.71	1.334	0.768
16	0.2200	257.40	255.8	2.7	1.595	0.566	2.161	3.82	1.363	0.797
17	0.2400	266.20	264.6	2.9	1.645	0.566	2.211	3.91	1.389	0.823
18	0.2600	274.60	273.0	3.2	1.693	0.566	2.259	3.99	1.413	0.847
19	0.2800	283.90	282.3	3.4	1.747	0.566	2.313	4.09	1.439	0.873
20	0.3000	290.30	288.7	3.7	1.782	0.566	2.348	4.15	1.457	0.891
21	0.3500	307.00	305.4	4.3	1.873	0.566	2.439	4.31	1.502	0.936
22	0.4000	320.00	318.4	4.9	1.940	0.566	2.506	4.43	1.536	0.970
23	0.4500	330.60	329.0	5.5	1.992	0.566	2.558	4.52	1.562	0.996
24	0.5000	333.90	332.3	6.1	1.999	0.566	2.565	4.53	1.565	0.999
25	0.5500	338.40	336.8	6.7	2.013	0.566	2.579	4.56	1.572	1.006
26	0.6000	341.60	340.0	7.3	2.019	0.566	2.585	4.57	1.575	1.009
27	0.6500	337.50	335.9	7.9	1.981	0.566	2.547	4.50	1.556	0.991

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
28	0.7000	335.40	333.8	8.5	1.956	0.566	2.522	4.46	1.544	0.978
29	0.7500	332.20	330.6	9.1	1.924	0.566	2.490	4.40	1.528	0.962

Parameters for Specimen No. 3

Specimen Parameter	Initial	Final
Moisture content: Moist soil+tare, gms.	0.100	0.100
Moisture content: Dry soil+tare, gms.	0.100	0.100
Moisture content: Tare, gms.	0.000	0.000
Moisture, %	0.0	0.0
Moist specimen weight, gms.	2183.1	
Diameter, in.	3.78	
Area, in.²	11.21	
Height, in.	8.16	
Wet Density, pcf	90.9	
Dry density, pcf	90.9	
Void ratio	0.9226	
Saturation, %	0.0	

Test Readings for Specimen No. 3

Cell pressure = 11.80 psi (0.850 tsf)
Back pressure = 0.00 psi (0.000 tsf)
Strain rate, %/min. = 0.40
Fail. Stress = 3.093 tsf **at reading no.** 28
Ult. Stress = 3.093 tsf **at reading no.** 28

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
0	0.0000	1.30	0.0	0.0	0.000	0.850	0.850	1.00	0.850	0.000
1	0.0100	44.80	43.5	0.1	0.279	0.850	1.129	1.33	0.989	0.140
2	0.0200	73.20	71.9	0.2	0.461	0.850	1.310	1.54	1.080	0.230
3	0.0300	99.60	98.3	0.4	0.629	0.850	1.479	1.74	1.164	0.315
4	0.0400	123.50	122.2	0.5	0.781	0.850	1.631	1.92	1.240	0.391
5	0.0500	143.90	142.6	0.6	0.910	0.850	1.760	2.07	1.305	0.455
6	0.0600	161.20	159.9	0.7	1.019	0.850	1.869	2.20	1.359	0.510
7	0.0700	177.80	176.5	0.9	1.124	0.850	1.973	2.32	1.412	0.562
8	0.0800	198.10	196.8	1.0	1.252	0.850	2.101	2.47	1.475	0.626
9	0.0900	211.80	210.5	1.1	1.337	0.850	2.187	2.57	1.518	0.669
10	0.1000	225.50	224.2	1.2	1.422	0.850	2.272	2.67	1.561	0.711
11	0.1200	253.60	252.3	1.5	1.597	0.850	2.446	2.88	1.648	0.798
12	0.1400	278.60	277.3	1.7	1.750	0.850	2.600	3.06	1.725	0.875
13	0.1600	300.80	299.5	2.0	1.886	0.850	2.735	3.22	1.793	0.943
14	0.1800	321.70	320.4	2.2	2.012	0.850	2.862	3.37	1.856	1.006
15	0.2000	340.00	338.7	2.5	2.122	0.850	2.972	3.50	1.911	1.061
16	0.2200	356.90	355.6	2.7	2.222	0.850	3.072	3.62	1.961	1.111
17	0.2400	372.70	371.4	2.9	2.315	0.850	3.165	3.73	2.007	1.158
18	0.2600	387.00	385.7	3.2	2.398	0.850	3.248	3.82	2.049	1.199
19	0.2800	399.80	398.5	3.4	2.472	0.850	3.321	3.91	2.085	1.236
20	0.3000	414.40	413.1	3.7	2.556	0.850	3.405	4.01	2.127	1.278
21	0.3500	442.80	441.5	4.3	2.714	0.850	3.564	4.19	2.207	1.357

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress tsf	Minor Princ. Stress tsf	Major Princ. Stress tsf	1:3 Ratio	P tsf	Q tsf
22	0.4000	465.40	464.1	4.9	2.835	0.850	3.684	4.34	2.267	1.417
23	0.4500	484.40	483.1	5.5	2.932	0.850	3.781	4.45	2.315	1.466
24	0.5000	498.80	497.5	6.1	3.000	0.850	3.849	4.53	2.349	1.500
25	0.5500	511.50	510.2	6.7	3.056	0.850	3.906	4.60	2.378	1.528
26	0.6000	519.00	517.7	7.4	3.081	0.850	3.930	4.63	2.390	1.540
27	0.6500	523.40	522.1	8.0	3.086	0.850	3.936	4.63	2.393	1.543
28	0.7000	528.00	526.7	8.6	3.093	0.850	3.942	4.64	2.396	1.546
29	0.7500	529.40	528.1	9.2	3.080	0.850	3.930	4.63	2.390	1.540
30	0.8000	529.10	527.8	9.8	3.058	0.850	3.907	4.60	2.378	1.529
31	0.8500	525.20	523.9	10.4	3.014	0.850	3.864	4.55	2.357	1.507
32	0.9000	518.80	517.5	11.0	2.957	0.850	3.807	4.48	2.328	1.479

REITZ & JENS, INC.

~~Unconsolidated Undrained or Unconfined Test~~ Vacuum Triaxial Test

Project Ameren Labadie UWL

Boring No. —

Sample No. —

Depth —

Test by K. Kaher

Entered by K. Kaher

Checked by J. Fouke

Testing Date 4-26-11

Description of Entire Tube

Description of Test Sample Dry Labadie Bottom Ash, Lightly compacted into mold

Moisture Contents		
	Trial 1	Trial 2
Tare #		
Wet Wt.+Tare		
Dry Wt.+Tare		
Wt. of Water		
Tare Wt.		
Wt. of Soil		
% Moisture		
Average % Moisture=	0.0	

Sample Density	
Wet Wt. of Sample (grams)	2172.81
Diameter of Sample (Inches)	D= 3.789
Length of Sample (Inches)	L= 8.23
Density Constant C = (4.85 / (D^2 * L)	
Wet Density (pcf)	
Dry Density (pcf)	

4472.17
2299.36

Failure Sketch

Rate of Load Application 20 on dial %/min

Confining Pressure 8.0 inches of Hg. Vacuum

Mass of Top Cap gms

Strain (.001")	Load (lbs)
0	1.9
10	36.0
20	53.5
30	65.3
40	95.2
50	85.8
60	94.9
70	102.4
80	112.0
90	117.7
100	123.9
120	133.0
140	141.9
160	149.1
180	157.2
200	162.0
220	167.1

Notes:

Strain (.001")	Load (lbs)
240	171.2
260	175.7
280	180.5
300	181.6
350	188.4
400	194.9
450	197.1
500	195.1
550	193.3
600	192.1
650	
700	
750	
800	
850	
900	
1000	

Notes:

REITZ & JENS, INC.

Unconsolidated Undrained or Unconfined Test

Project: American Labadie UWL
Boring No.: —
Sample No.: —
Depth: —

Test by: K. Kahn
Entered by: K. Kahn
Checked by: J. Fousse
Testing Date: 4-26-11

3.784
.784
.782

Description of Entire Tube: _____

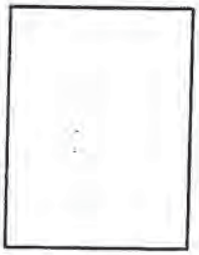
Description of Test Sample: SAME AS 8.0 inches of Mesc.

Moisture Contents		
	Trial 1	Trial 2
Tare #		
Wet Wt.+Tare		
Dry Wt.+Tare		
Wt. of Water		
Tare Wt.		
Wt. of Soil		
% Moisture		
Average % Moisture=	0.0	

Sample Density	
Wet Wt. of Sample (grams)	2154.20
Diameter of Sample (Inches)	D= 3.783
Length of Sample (Inches)	L= 8.20
Density Constant C = (4.85 / (D^2 * L)	
Wet Density (pcf)	
Dry Density (pcf)	

4467.2
2313.0

Failure Sketch



Rate of Load Application: _____ %/min

7.84 Confining Pressure: 16 ~~Psi~~ Vacuum inches of Hg

Mass of Top Cap: _____ gms

Strain (.001")	Load (lbs)
0	1.6
10	37.3
20	62.5
30	81.2
40	99.4
50	113.9
60	127.3
70	140.3
80	151.9
90	162.9
100	173.0
120	190.7
140	206.6
160	220.9
180	233.6
200	247.3
220	257.4

Notes:

Strain (.001")	Load (lbs)
240	266.2
260	274.6
280	283.9
300	290.3
350	307.0
400	320.0
450	330.6
500	333.9
550	338.4
600	341.6
650	337.5
700	335.4
750	332.2
800	
850	
900	
1000	

Notes:

REITZ & JENS, INC.

Unconsolidated Undrained or Unconfined Test

Project Anwen Wabadie UWL
Boring No. —
Sample No. —
Depth —

Test by K. Kacher
Entered by K. Kacher
Checked by J. Fowle
Testing Date 4-26-11

Description of Entire Tube

Description of Test Sample Same AS 8 inches of Misc.

4464.89
2281.78

Moisture Contents		
	Trial 1	Trial 2
Tare #		
Wet Wt.+Tare		
Dry Wt.+Tare		
Wt. of Water		
Tare Wt.		
Wt. of Soil		
% Moisture		
Average % Moisture=		0.0

Sample Density	
Wet Wt. of Sample (grams)	2183.11
Diameter of Sample (Inches)	D= 3.778
Length of Sample (Inches)	L= 8.16
Density Constant C = (4.85 / (D^2 * L)	
Wet Density (pcf)	
Dry Density (pcf)	

Failure Sketch

Rate of Load Application ____ %/min
11.8 Confining Pressure 24.0 psi
Mass of Top Cap ____ gms

Vac inches of sheet.

Strain (.001")	Load (lbs)
0	1.3
10	44.8
20	73.2
30	99.6
40	123.5
50	193.9
60	161.2
70	177.8
80	193.1
90	211.8
100	225.5
120	253.6
140	278.6
160	300.8
180	321.7
200	340.0
220	356.9

Notes:

Strain (.001")	Load (lbs)
240	372.7
260	387.0
280	399.8
300	414.4
350	442.8
400	465.4
450	484.4
500	498.8
550	511.5
600	519.0
650	523.4
700	528.0
750	529.4
800	529.1
850	525.2
900	518.8
1000	

Notes:

CONSTANT HEAD PERMEABILITY TEST

Project Ameren; Labadie CCP Testing

Date 04/15/11

SoilDescription Bottom Ash, loosely placed in the cylinder

Test Cylinder Diameter 3.0" Area 45.6 (sq cm)

Sample Length To Bottom 11.6" To Top 2.9" Length 8.70" (in)_

Weight Dry Material Used
Initial Tare + Sample 4529.89 (gms)_
Final Tare + Sample 3210.41 (gms)
Material Weight 1319.48 (gms)

Sample Density K x Material Weight = 81.7 **(pcf)_**

$K = 4.85/(D^2 \times L)$

D in inches, L in inches

Trial No.	top mano-meter	Bottom Mano-meter	Head Loss	Length between ports	Water Wt + Tare (gms)	Tare (gms)	volume of flow (gms=cc)	time (sec)	Temp (C)
1	-	-	2.79 cm	10.3 cm			1000 cc	89 sec	26.35
2	-	-	9.02 cm	10.3 cm			1000 cc	49 sec	27.97
3	-	-	9.53 cm	10.3 cm			1000 cc	40 sec	29.68
4	-	-	5.51 cm	10.3 cm			1000 cc	64 sec	30.98

Trial	K for test temp K= Flow / ((h/l) x area x time)	K for 20 C. Mu_t / Mu_{20}
1	K = 0.910 cm/sec	K for 20C = 0.785 cm/sec
2	K = 0.511 cm/sec	K for 20C = 0.425 cm/sec
3	K = 0.593 cm/sec	K for 20C = 0.476 cm/sec
4	K = 0.641 cm/sec	K for 20C = 0.500 cm/sec

Mu_{20} = 1.005 centipoises

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rev. Sept. 09, 2002

CONSTANT HEAD PERMEABILITY TEST

Project Ameron Lahaina Wells

Date 4-15-11

SoilDescription Lahaina bottom ash (Minimum density possible)

Test Cylinder Diameter 3.0 inches Area 45.6 cm² (sq cm)

Sample Length To Bottom 11.6" To Top 2.9" Length 8.70" (in)

Weight Dry Material Used
Initial Tare + Sample 4529.89g (gms)
Final Tare + Sample 3210.41g (gms)
Material Weight 1319.48g (gms)

Sample Density K x Material Weight = 81.7 pcf (pcf)
K= 4.85/(D² x L)
D in inches, L in inches

Trial No.	top mano-meter	Bottom Mano-meter	Head Loss (cm)	Length between ports (cm)	Water Wt + Tare (gms)	Tare (gms)	volume of flow (gms=cc)	time (sec)	Temp (C)
1			2.79cm	10.3			1000cm	89sec	26.35
2			9.02	10.3			1000cm	49sec	27.97
3			9.53	10.3			1000cm	40sec	29.68
4			5.51	10.3			1000cm	64sec	30.98

Trial	K for test temp K= Flow / ((h/l) x area x time)	K for 20 C. Mu_t / Mu_{20}
1	$K=\frac{(1000)(10.3)}{(45.6)(89)(2.79)} = 0.910$ cm/sec	$K_{20°C}=\left(\frac{0.8670}{1.005}\right)(0.910) \Rightarrow K_{20°C}=0.785$ cm/sec
2	$K=\frac{(1000)(10.3)}{(45.6)(49)(9.02)} = 0.511$ cm/sec	$K_{20°C}=\left(\frac{0.8360}{1.005}\right)(0.511) \Rightarrow K_{20°C}=0.425$ cm/sec
3	$K=\frac{(1000)(10.3)}{(45.6)(40)(9.53)} = 0.593$ cm/sec	$K_{20°C}=\left(\frac{0.804}{1.005}\right)(0.593) \Rightarrow K_{20°C}=0.476$ cm/sec
4	$K=\frac{(1000)(10.3)}{(45.6)(64)(5.51)} = 0.641$ cm/sec	$K_{20°C}=\left(\frac{0.7840}{1.005}\right)(0.641) \Rightarrow K_{20°C}=0.500$ cm/sec

Mu_{20} = 1.005 centipoises

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rev. Sept. 09, 2002

CONSTANT HEAD PERMEABILITY TEST

Project Ameren; Labadie CCP Testing

Date 04/15/11

SoilDescription Bottom Ash, densified in the cylinder

Test Cylinder Diameter 3.0" Area 45.6 (sq cm)

Sample Length To Bottom 11.5" To Top 3.05" Length 8.45" (in)

Weight Dry Material Used
Initial Tare + Sample 3210.41 (gms)
Final Tare + Sample 1700.86 (gms)
Material Weight 1509.55 (gms)

Sample Density K x Material Weight = 96.3 **(pcf)**

$K = 4.85/(D^2 \times L)$

D in inches, L in inches

Trial No.	top mano-meter	Bottom Mano-meter	Head Loss	Length between ports	Water Wt + Tare (gms)	Tare (gms)	volume of flow (gms=cc)	time (sec)	Temp (C)
1	-	-	6.99 cm	10.3 cm			1000 cc	290 sec	24.25
2	-	-	13.2 cm	10.3 cm			1000 cc	155 sec	24.79
3*	-	-	21.2 cm	10.3 cm			1000 cc	139 sec	22.30

Trial	K for test temp K= Flow / ((h/l) x area x time)	K for 20 C. Mu_t / Mu_{20}
1	K = 0.111 cm/sec	K for 20C = 0.100 cm/sec
2	K = 0.110 cm/sec	K for 20C = 0.098 cm/sec
3*	K = 0.077 cm/sec	K for 20C = 0.073 cm/sec
	* May have had clogging or migration of material during test	

Mu_{20} = 1.005 centipoises

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rev. Sept. 09, 2002

CONSTANT HEAD PERMEABILITY TEST

Project American Labadie UWL

Date 4-15-2011

SoilDescription Labadie Bottom Ash (Densified in cylinder)

Test Cylinder Diameter 3" = 7.62 cm Area 45.6 (sq cm)

Sample Length To Bottom 11.5" To Top 3.05" Length 8.45 (in)

Weight Dry Material Used
Initial Tare + Sample 3210.41 (gms)
Final Tare + Sample 1700.86 (gms)
Material Weight 1509.55 (gms)

Sample Density K x Material Weight = 96.3 pcf (pcf)
$K = 4.85/(D^2 \times L)$
D in inches, L in inches

Trial No.	top mano-meter	Bottom Mano-meter	Head Loss (cm)	Length between ports (cm)	Water Wt + Tare (gms)	Tare (gms)	volume of flow (gms=cc)	time (sec)	Temp (C)	
1			6.99	10.3cm			1000 cc	290 sec	24.25	
2			13.2	10.3cm			1000 cc	155 sec	24.79	
3*			21.2	10.3cm			1000 cc	139 sec	22.30	*Clogging? or Migration?
4										

Trial	K for test temp K= Flow / ((h/l) x area x time)	K for 20 C. Mu_t / Mu_{20}
1	$K = \frac{(1000)(10.3)}{(45.6)(290)(6.99)} = 0.111$ cm/sec	$K_{20} = (0.111)\left(\frac{0.909}{1.005}\right) \Rightarrow K_{20C} = 0.100$ cm/sec
2	$K = \frac{(1000)(10.3)}{(45.6)(155)(13.2)} = 0.110$ cm/sec	$K_{20C} = (0.110)\left(\frac{0.898}{1.005}\right) \Rightarrow K_{20C} = 0.098$ cm/sec
3*	$K = \frac{(1000)(10.3)}{(45.6)(139)(21.2)} = 0.077$ cm/sec	$K_{20C} = (0.077)\left(\frac{0.951}{1.005}\right) \Rightarrow K_{20C} = 0.073$ cm/sec

$Mu_{20} = 1.005$ centipoises

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rev. Sept. 09, 2002

REITZ & JENS, INC.
Consulting Engineers

PAINT FILTER LIQUIDS TEST

R&J Project: AmerenUE - CCP Ash Study Sheet _____

Boring: Labadie Fly Ash Sample: _____ Depth: _____

Date: 8/16/10

Test By: JR

100% Fly Ash

Sample Wt:	Added % Moisture	5 minutes Static	2 minutes Vibratory
100g	30%	FAIL	N/A
100g	27 1/2 %	PASS	Pass (cemented)

EPA Method 9095B Paint Filter Liquids Test
Equip: Conical paint filter (mesh #60 +/-5% fine meshed size)
Fluted Glass Funnel
Rings and Ring Stand
Glass Beaker

Procedure: Add water to sample, mix thoroughly and place in paper paint funnel. Allow to sit statically for 5 minutes. If it drips then it has free liquids, if not run immediately run 2 minutes on vibratory table on desired frequency. Document after each process of passing or failing the test time limit at the given moistures.

REITZ & JENS, INC.
Consulting Engineers

PAINT FILTER LIQUIDS TEST

R&J Project: Ameren UE - CCP Ash Study Sheet _____

Boring: Labadie Blend Sample: _____ Depth: _____

Date: 8/18/10 46% FA, 20% Btm, 34% Gyp.

Test By: JRL

Sample Wt:	Added % Moisture	5 minutes Static	2 minutes Vibratory
100g	30%	FAIL	N/A
100g	27.5%	PASS	Pass (cemented)
100g	25.0%	PASS	Pass (cemented)
100g			

EPA Method 9095B Paint Filter Liquids Test

Equip: Conical paint filter (mesh #60 +/-5% fine meshed size)
- Fluted Glass Funnel
- Rings and Ring Stand
- Glass Beaker

Procedure: Add water to sample, mix thoroughly and place in paper paint funnel. Allow to sit statically for 5 minutes. If it drips then it has free liquids, if not run immediately run 2 minutes on vibratory table on desired frequency. Document after each process of passing or failing the test time limit at the given moistures.

Figure B-18

REITZ & JENS, INC.
Consulting Engineers

PAINT FILTER LIQUIDS TEST

R&J Project: Ameren UE - CCP Ash Study Sheet _____

Boring: Labadie Blend Sample: _____ Depth: _____

Date: 8/18/10 30% Fly
25% Btm
45% Gyp

Test By: JR1

Sample Wt:	Added % Moisture	5 minutes Static	2 minutes Vibratory
100g	30%	FAIL	N/A
100g	27.5%	Pass	Pass (cemented)
100g	25.0%	Pass	Pass (cemented)
100g			

EPA Method 9095B Paint Filter Liquids Test
Equip: Conical paint filter (mesh #60 +/-5% fine meshed size)
Fluted Glass Funnel
Rings and Ring Stand
Glass Beaker

Procedure: Add water to sample, mix thoroughly and place in paper paint funnel. Allow to sit statically for 5 minutes. If it drips then it has free liquids, if not run immediately run 2 minutes on vibratory table on desired frequency. Document after each process of passing or failing the test time limit at the given moistures.

Figure B-19

REITZ & JENS, INC.
Consulting Engineers

PAINT FILTER LIQUIDS TEST

R&J Project: AmerenUE - CCP Ash Study Sheet _____

Boring: Labadie Bend Sample: _____ Depth: _____

Date: 8/18/10 30% Fly 64% Gyp.

Test By: JR

Sample Wt:	Added % Moisture	5 minutes Static	2 minutes Vibratory
100g	30%	PASS	Pass (cemented)
100g	40%	PASS	Pass (cemented)
100g	45%	FAIL	N/A
100g	42.5%	FAIL	N/A

EPA Method 9095B Paint Filter Liquids Test

Equip: Conical paint filter (mesh #60 +/-5% fine meshed size)
- Fluted Glass Funnel
- Rings and Ring Stand
- Glass Beaker

Procedure: Add water to sample, mix thoroughly and place in paper paint funnel. Allow to sit statically for 5 minutes. If it drips then it has free liquids, if not run immediately run 2 minutes on vibratory table on desired frequency. Document after each process of passing or failing the test time limit at the given moistures.

Figure B-20

Labadie 46% Fly Ash 20% Bottom Ash 34% Pre-Pump Duck Creek Gypsum

Trial #	1	2	3	4	5	6	
			Minimum Density				
Tare + Material (g)	933.56	943.03	931.54	929.15	927.91	944.08	
Tare (g)	67.76	68.09	67.24	68.39	67.26	67.18	
Material (g)	865.8	874.94	864.3	860.76	860.65	876.9	
Diameter (in)	3.057	3.0595	3.0678	3.056	3.0588	3.0618	
Length (in)	5.9404	5.9383	5.9375	5.9466	5.9411	5.9436	
X-Section Area (in^2)	7.339741	7.351751	7.391694	7.33494	7.348387	7.362809	
Volume (in^3)	43.601	43.6569	43.88818	43.61796	43.6575	43.76159	
Density (g/in^3)	19.85734	20.04127	19.69323	19.73407	19.71368	20.03812	
Density (pcf)	75.64829	76.349	75.02309	75.17869	75.10099	76.33698	Average= 75.60617 Stand. Dev.= 0.610833
			Density After 8 Minutes of Vibration				
Change in Length	1.502	1.165	1.3625	1.101	1.2955	1.063	
Change in Length	1.449	1.379	1.1685	1.421	1.472	1.3405	
Change in Length	1.406	1.597	1.2955	1.5865	1.437	1.644	
Change in Length	1.2335	1.51	1.5305	1.453	1.3085	1.5755	
Average Change in Length	1.397625	1.41275	1.33925	1.390375	1.37825	1.40575	
Change in Volume	10.25821	10.38619	9.899326	10.19832	10.12791	10.35027	
New Volume	33.34279	33.27072	33.98886	33.41964	33.52959	33.41132	
Density (g/in^3)	25.96663	26.2976	25.42892	25.75611	25.66837	26.24559	
Density (pcf)	98.92216	100.183	96.87372	98.12018	97.78592	99.9849	Average= 98.64498 Stand. Dev.= 1.295264

Figure B-21

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Relative Density = $\frac{\gamma' max. (\gamma' field - \gamma' min.)}{\gamma' field (\gamma' max. - \gamma' min.)} \times 100$

Job: Ameren UE - CCP Ash Study

Boring No.: Labadie Fly Ash 40%

Depth: + Bottom Ash 20%

Sample No.: + D.C. Repump "Dry" Cap 34%

Mold Vol.: .0252 / .0253 (cu. ft.) (Vm)

Mold End Area: .05097 / .05105 (sq. ft.) (Am)

Lab Test by: [illegible] Date: 8/17/10

Computed by: _____ Date: ___

Checked by: _____ Date: ___

Mold No.: _____

Mold Diam.: _____ (in)

Mold Wt.: _____ (lb.)

			MINIMUM DENSITY			
Trial No.			1		2	
Weight	Tare + Soil Dry	W	933.56		943.03	
	Tare	W	67.76		68.09	
Lb.	Soil Dry	W s	865.80	1.9088	874.94	1.9289
Min. Dry Density pcf.		γ d				
Min. Dry Density Average pcf			75.75		76.24	
	(8 min) Vibrated ~~MAXIMUM DENSITY~~					
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	h o	1.5020		1.1650	
	~~Left Dial Reading~~	h l	1.4490		1.3790	
	~~Right Dial Reading~~	h r	1.4060		1.5970	
	~~Sum~~	h l + h r	1.2335		1.5100	
	~~Average Dial Reading~~	h a				
	Height Change	Δ h		1.3976		1.41275
Volume cu. ft.	Mold Initial Volume	V m		.0252		.0253
	Volume Change *	Δ V		0.005936		0.001601
	Volume of Soil	V s		0.01926		0.01929
Weight Lb.	Tare + Soil Dry	W				
	Tare	W m				
	Soil Dry	W s		1.9088		1.9289
Max. Dry Density pcf.		γ d				
Max. Dry Density Average pcf.			99.11		99.99	

* $\Delta V = \frac{\Delta h \times A m}{12}$

Sample Description & Remarks: Ave. Minimum = 75.573 pcf

Ave. Vibrated Density after 8 min = 98.587 pcf

Figure B-21

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Relative Density = $\frac{\gamma' \text{max.} \ (\gamma' \text{field} - \gamma' \text{min.})}{\gamma' \text{field} \ (\gamma' \text{max.} - \gamma' \text{min.})} \times 100$

Job _____

Boring No. Lakeside Blend

Depth 46% Fly + 20% Btm + 34% P.C. "Dry" prepump gypsum

Sample No. _____

Mold Vol. .0254 / .0253 (cu. ft.) (Vm)

Mold End Area .05133 / .0507 (sq. ft.) (Am)

Lab Test by _____ Date ___

Computed by _____ Date ___

Checked by _____ Date ___

Mold No. _____

Mold Diam. _____ (in)

Mold Wt. _____ (lb.)

MINIMUM DENSITY						
Trial No.			3		4	
Weight Lb.	Tare + Soil Dry	W	931.94		929.15	
	Tare	W	67.24		68.39	
	Soil Dry	W s	864.30	1.9055	860.76	1.8977
Min. Dry Density pcf.		γ d				
Min. Dry Density Average pcf			75.02		75.01	
MAXIMUM DENSITY						
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	h o	1.3625		1.1010	
	~~Left Dial Reading~~	h l	1.1085		1.4210	
	~~Right Dial Reading~~	h r	1.2955		1.5865	
	~~Sum~~	h l + h r	1.5305		1.4930	
	~~Average Dial Reading~~	h a				
	Height Change	Δ h		1.33925		1.3904
Volume cu. ft.	Mold Initial Volume	V m		.0254		.0253
	Volume Change *	Δ V		0.005729		0.00590
	Volume of Soil	V s		0.01967		0.0194
Weight Lb.	Tare + Soil Dry	W				
	Tare	W m				
	Soil Dry	W s		1.9055		1.8977
Max. Dry Density pcf.		γ d				
Max. Dry Density Average pcf.			96.87		97.82	

* $\Delta V = \frac{\Delta h \times A m}{12}$

Sample Description & Remarks _____

Figure B-21

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job _____

Boring No. Labadie Blend

Depth 46% Fly + 20% Btm

Sample No. + 34% P.C. Prepump "Dry" Gyp

Mold Vol. .0253/.0253 (cu. ft.) (Vm)

Mold End Area .0510/.0511 (sq. ft.) (Am)

Lab Test by _____ Date ___

Computed by _____ Date ___

Checked by _____ Date ___

Mold No. _____

Mold Diam. _____ (in)

Mold Wt. _____ (lb.)

Relative Density $= \frac{\gamma' \text{max.}\ (\gamma' \text{field} - \gamma' \text{min.})}{\gamma' \text{field}\ (\gamma' \text{max.} - \gamma' \text{min.})} \times 100$

MINIMUM DENSITY							
Trial No.				5		6	
Weight	Tare + Soil Dry		W	927.91		944.08	
	Tare		W	67.26		67.18	
Lb.	Soil Dry		W s	860.65	1.8978	876.90	1.9332
Min. Dry Density pcf.			γ d				
Min. Dry Density Average pcf				75.01		76.41	
	MAXIMUM DENSITY						
Method Used							
Trial No.							
Height Inches	~~Initial Dial Reading~~		h o	1.2955		1.0630	
	~~Left Dial Reading~~		h l	1.4720		1.3405	
	~~Right Dial Reading~~		h r	1.4370		1.6440	
	~~Sum~~	h l + h r		1.3085		1.5755	
	~~Average Dial Reading~~		h a				
	Height Change		Δ h		1.37825		1.40575
Volume cu. ft.	Mold Initial Volume		V m		.0253		.0253
	Volume Change *		Δ V		0.005858		0.005986
	Volume of Soil		V s		0.01944		0.01931
Weight Lb.	Tare + Soil Dry		W				
	Tare		W m				
	Soil Dry		W s		1.8978		1.9332
Max. Dry Density pcf.			γ d				
Max. Dry Density Average pcf.				97.62		100.11	

$$* \Delta V = \frac{\Delta h \times A m}{12}$$

Sample Description & Remarks _____

Figure B-21

Labadie 30% Fly Ash 25% Bottom Ash 45% Pre-Pump Duck Creek Gypsum

Trial #	1	2	3	4	5	6	
			Minimum Density				
Tare + Material (g)	938.32	968.87	944.79	970.5	954.38	970.48	
Tare (g)	67.76	68.09	67.24	68.39	67.26	67.18	
Material (g)	870.56	900.78	877.55	902.11	887.12	903.3	
Diameter (in)	3.057	3.0595	3.0678	3.056	3.0588	3.0618	
Length (in)	5.9404	5.9383	5.9375	5.9466	5.9411	5.9436	
X-Section Area (in^2)	7.339741	7.351751	7.391694	7.33494	7.348387	7.362809	
Volume (in^3)	43.601	43.6569	43.88818	43.61796	43.6575	43.76159	
Density (g/in^3)	19.96651	20.63316	19.99513	20.68208	20.31999	20.64139	
Density (pcf)	76.06419	78.60385	76.17321	78.7902	77.41078	78.63519	Average= 77.6129 Stand. Dev.= 1.258977
			Density After 8 Minutes of Vibration				
Change in Length	1.0455	0.9965	1.3665	1.03	1.2495	1.4315	
Change in Length	1.2555	1.359	0.995	1.195	1.112	1.334	
Change in Length	1.5755	1.601	1.238	1.404	1.336	1.187	
Change in Length	1.4545	1.397	1.6575	1.311	1.427	1.218	
Average Change in Length	1.33275	1.338375	1.31425	1.235	1.281125	1.292625	
Change in Volume	9.78204	9.8394	9.714534	9.058651	9.414203	9.517351	
New Volume	33.81896	33.8175	34.17365	34.5593	34.2433	34.24424	
Density (g/in^3)	25.74177	26.6365	25.67914	26.10325	25.90638	26.37816	
Density (pcf)	98.06555	101.4741	97.82695	99.44261	98.69263	100.4899	Average= 99.33196 Stand. Dev.= 1.429645

Figure B-22

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job Ameren UE - CCP Ash Study

Boring No. Labadie Fly Ash 30%

Depth + Bim Ash 25%

Sample No. + Duck Creek Prepump "Dry" Gyp @ 45%

Mold Vol. .0252 | .0253 (cu. ft.) (Vm)

Mold End Area .05027 | .05105 (sq. ft.) (Am)

Lab Test by _____ Date ___

Computed by _____ Date ___

Checked by _____ Date ___

Mold No. _____

Mold Diam. _____ (in)

Mold Wt. _____ (lb.)

Relative Density = $\frac{\gamma' \text{max.} \ (\gamma' \text{field} - \gamma' \text{min.})}{\gamma' \text{field} \ (\gamma' \text{max.} - \gamma' \text{min.})} \times 100$

MINIMUM DENSITY							
Trial No.				1		2	
Weight	Tare + Soil Dry	W		938.32		968.87	
	Tare	W		67.76		68.09	
Lb.	Soil Dry	W s		870.56	1.9193	900.78	1.9859
Min. Dry Density pcf.		γ d					
Min. Dry Density Average pcf				76.16		78.49	
	Vibrated (8 min.) ~~MAXIMUM~~ DENSITY						
Method Used							
Trial No.							
Height Inches	~~Initial Dial Reading~~	h o		1.0455		0.9765	
	~~Left Dial Reading~~	h l		1.2555		1.3590	
	~~Right Dial Reading~~	h r		1.5755		1.6010	
	~~Sum~~	h l + h r		1.4545		1.3970	
	~~Average Dial Reading~~	h a					
	Height Change	Δ h			1.33275		1.33838
Volume cu. ft.	Mold Initial Volume	V m			.0252		.0253
	Volume Change *	Δ V			0.005261		0.005694
	Volume of Soil	V s			0.01954		0.01961
Weight Lb.	Tare + Soil Dry	W					
	Tare	W m					
	Soil Dry	W s			1.9193		1.9859
Max. Dry Density pcf.		γ d					
Max. Dry Density Average pcf.				98.22		101.27	

* $\Delta V = \frac{\Delta h \times A m}{12}$

Sample Description & Remarks Ave. Minimum Density = 77.573 pcf

Average Density after 8 min. Vibration = 99.257 pcf

Figure B-22

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job Labadie Blend

Boring No. 30% Fly

Depth 25% Btm

Sample No. +45% D.C. "A4" Gyp.

Mold Vol. .0254 / .0253 (cu. ft.) (Vm)

Mold End Area .05135 / .0509 (sq. ft.) (Am)

Lab Test by _____ Date ____

Computed by _____ Date ____

Checked by _____ Date ____

Mold No. _____

Mold Diam. _____ (in)

Mold Wt. _____ (lb.)

Relative Density = $\frac{\gamma_{max.}\ (\gamma_{field} - \gamma_{min.})}{\gamma_{field}\ (\gamma_{max.} - \gamma_{min.})} \times 100$

MINIMUM DENSITY						
Trial No.			3		4	
Weight Lb.	Tare + Soil Dry	W	944.79		970.50	
	Tare	W	67.24		68.39	
	Soil Dry	W s	877.55	1.9347	902.11	1.9888
Min. Dry Density pcf.		γ d				
Min. Dry Density Average pcf			76.17		78.61	
MAXIMUM DENSITY						
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	h o	1.3065		1.0300	
	Left Dial Reading	h l	0.9950		1.1950	
	~~Right Dial Reading~~	h r	1.2380		1.4040	
	~~Sum~~	h l + h r	1.6575		1.3110	
	~~Average Dial Reading~~	h a				
	Height Change	Δ h		1.3140		1.2350
Volume cu. ft.	Mold Initial Volume	V m		.0254		.0253
	Volume Change *	Δ V		0.005021		0.005238
	Volume of Soil	V s		0.01978		0.02006
Weight Lb.	Tare + Soil Dry	W				
	Tare	W m				
	Soil Dry	W s		1.9347		1.9888
Max. Dry Density pcf.		γ d				
Max. Dry Density Average pcf.			97.81		99.14	

* $\Delta V = \frac{\Delta h \times A m}{12}$

Sample Description & Remarks _____

Figure B-22

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job Lakeside Blend

Boring No. 30% Fly

Depth 25% Btm

Sample No. + 45% O.C. "Dry" Prepump GHP

Mold Vol. .0253 / .0253 (cu. ft.) (Vm)

Mold End Area .0510 / .0511 (sq. ft.) (Am)

Lab Test by _____ Date ____

Computed by _____ Date ____

Checked by _____ Date ____

Mold No. _____

Mold Diam. _____ (in)

Mold Wt. _____ (lb.)

Relative Density = $\frac{\gamma' max. \ (\gamma' field - \gamma' min.)}{\gamma' field \ (\gamma' max. - \gamma' min.)} \times 100$

			MINIMUM DENSITY			
Trial No.			5		6	
Weight	Tare + Soil Dry	W	954.38		970.48	
	Tare	W	67.26		67.18	
Lb.	Soil Dry	W s	887.12	1.95576	903.30	1.9914
Min. Dry Density pcf.		γ d				
Min. Dry Density Average pcf			77.30		78.71	
			MAXIMUM DENSITY			
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	h o	1.2495		1.4315	
	~~Left Dial Reading~~	h l	1.1120		1.3340	
	~~Right Dial Reading~~	h r	1.3360		1.1870	
	~~Sum~~	h l + h r	1.4270		1.2180	
	~~Average Dial Reading~~	h a				
	Height Change	Δ h		1.2811		1.2926
Volume cu. ft.	Mold Initial Volume	V m		.0253		.0253
	Volume Change *	Δ V		0.009445		0.009504
	Volume of Soil	V s		0.019855		0.019796
Weight Lb.	Tare + Soil Dry	W				
	Tare	W m				
	Soil Dry	W s		1.95576		1.9914
Max. Dry Density pcf.		γ d				
Max. Dry Density Average pcf.			98.50		100.60	

* $\Delta V = \frac{\Delta h \times A m}{12}$

Sample Description & Remarks _____

Figure B-22

Labadie 36% Fly Ash 64% Pre-Pump Duck Creek Gypsum (Trail 2)

Trial #	1	2	3	4	5	6	
			Minimum Density				
Tare + Material (g)	835.58	838.48	832.77	844.1	819.26	826.22	
Tare (g)	67.76	68.09	67.24	68.39	67.26	67.18	
Material (g)	767.82	770.39	765.53	775.71	752	759.04	
Diameter (in)	3.057	3.0595	3.0678	3.056	3.0588	3.0618	
Length (in)	5.9404	5.9383	5.9375	5.9466	5.9411	5.9436	
X-Section Area (in^2)	7.339741	7.351751	7.391694	7.33494	7.348387	7.362809	
Volume (in^3)	43.601	43.6569	43.88818	43.61796	43.6575	43.76159	
Density (g/in^3)	17.61015	17.64646	17.44274	17.78419	17.22499	17.34489	
Density (pcf)	67.0874	67.22576	66.44964	67.75043	65.62011	66.07689	Average= 66.7017 Stand. Dev.= 0.793349
			Density After 8 Minutes of Vibration				
Change in Length	1.2545	1.2705	1.2145	1.3575	1.723	1.823	
Change in Length	1.461	1.516	1.3225	1.779	1.3845	1.498	
Change in Length	1.724	1.82	1.9	1.4168	1.385	1.3025	
Change in Length	1.419	1.584	1.6525	1.207	1.6145	1.438	
Average Change in Length	1.464625	1.547625	1.522375	1.440075	1.52675	1.515375	
Change in Volume	10.74997	11.37775	11.25293	10.56286	11.21915	11.15742	
New Volume	32.85103	32.27915	32.63525	33.05509	32.43835	32.60417	
Density (g/in^3)	23.37278	23.86649	23.45715	23.46719	23.18243	23.28046	
Density (pcf)	89.04067	90.92149	89.36207	89.40031	88.31552	88.68894	Average= 89.28817 Stand. Dev.= 0.900239

Figure B-23

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job AM UE LCR Studies

Boring No. LAB Fly Ash 36%

Depth D.C. Pre Pump 64%

Sample No. _____

Mold Vol. .0252/.0253 (cu. ft.) (Vm)

Mold End Area .05097/.05105 (sq. ft.) (Am)

new material

Retrial

Trial #2

Lab Test by SSP Date 8/23/10

Computed by _____ Date _____

Checked by _____ Date _____

Mold No. _____

Mold Diam. _____ (in)

Mold Wt. _____ (lb.)

Relative Density $= \frac{\gamma' \text{max.} \; (\gamma' \text{field} - \gamma' \text{min.})}{\gamma' \text{field} \; (\gamma' \text{max.} - \gamma' \text{min.})} \times 100$

MINIMUM DENSITY							
Trial No.				1		2	
Weight Lb.	Tare + Soil Dry	W	835.58			838.48	
	Tare	W	67.76			68.09	
	Soil Dry	W s	767.82			770.39	
Min. Dry Density pcf.		γ d					
Min. Dry Density Average pcf							
MAXIMUM DENSITY							
Method Used							
Trial No.							
Height Inches	~~Initial Dial Reading~~	h o	1.2545			1.2705	
	~~Left Dial Reading~~	h l	1.4610			1.5160	
	~~Right Dial Reading~~	h r	1.7240			1.8200	
	~~Sum~~	h l + h r	1.4190			1.5840	
	~~Average Dial Reading~~	h a					
	Height Change	Δ h					
Volume cu. ft.	Mold Initial Volume	V m					
	Volume Change *	Δ V					
	Volume of Soil	V s					
Weight Lb.	Tare + Soil Dry	W					
	Tare	W m					
	Soil Dry	W s					
Max. Dry Density pcf.		γ d					
Max. Dry Density Average pcf.							

* $\Delta V = \frac{\Delta h \times A m}{12}$

Sample Description & Remarks _____

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Figure B-23

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Relative Density = $\frac{\gamma' \text{max.} \quad (\gamma' \text{field} - \gamma' \text{min.})}{\gamma' \text{field} \ (\gamma' \text{max.} - \gamma' \text{min.})} \times 100$

Job _____

Boring No. LAB Fly Ash 36%

Depth D.C. Pre Pump 64%

Sample No. _____

Mold Vol. .0254/.0253 (cu. ft.) (Vm)

Mold End Area .05133/.0509 (sq. ft.) (Am)

Lab Test by _____ Date ___

Computed by _____ Date ___

Checked by _____ Date ___

Mold No. _____

Mold Diam. _____ (in)

Mold Wt. _____ (lb.)

			MINIMUM DENSITY			
Trial No.			3		4	
Weight Lb.	Tare + Soil Dry	W	832.77		844.10	
	Tare	W	67.24		68.39	
	Soil Dry	Ws	765.53		775.71	
Min. Dry Density pcf.		γd				
Min. Dry Density Average pcf						

			MAXIMUM DENSITY			
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	ho	1.2145		1.3575	
	~~Left Dial Reading~~	hl	1.3225		1.7790	
	~~Right Dial Reading~~	hr	1.9000		1.41168	
	~~Sum~~	hl + hr	1.6525		1.2070	
	~~Average Dial Reading~~	ha				
	Height Change	Δh				
Volume cu. ft.	Mold Initial Volume	Vm				
	Volume Change *	ΔV				
	Volume of Soil	Vs				
Weight Lb.	Tare + Soil Dry	W				
	Tare	Wm				
	Soil Dry	Ws				
Max. Dry Density pcf.		γd				
Max. Dry Density Average pcf.						

* $\Delta V = \frac{\Delta h \times A m}{12}$

Sample Description & Remarks _____

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Figure B-23

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Relative Density $= \frac{\gamma' max. \ (\gamma' field - \gamma' min.)}{\gamma' field \ (\gamma' max. - \gamma' min.)} \times 100$

Job _____

Boring No. LAB Fly Ash 36%

Depth D. C. Prepump 64%

Sample No. _____

Mold Vol. .0253/.0253 (cu. ft.) (Vm)

Mold End Area .0510/.0511 (sq. ft.) (Am)

Lab Test by _____ Date ___

Computed by _____ Date ___

Checked by _____ Date ___

Mold No. _____

Mold Diam. _____ (in)

Mold Wt. _____ (lb.)

MINIMUM DENSITY						
Trial No.			5		6	
Weight Lb.	Tare + Soil Dry	W	819.26		826.22	
	Tare	W	67.26		67.18	
	Soil Dry	Ws	752.00		759.04	
Min. Dry Density pcf.		γd				
Min. Dry Density Average pcf						
MAXIMUM DENSITY						
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	ho	1.7230		1.8230	
	~~Left Dial Reading~~	hl	1.3845		1.4980	
	~~Right Dial Reading~~	hr	1.3850		1.3025	
	~~Sum~~	hl + hr	1.6145		1.4380	
	~~Average Dial Reading~~	ha				
	Height Change	Δh				
Volume cu. ft.	Mold Initial Volume	Vm				
	Volume Change *	ΔV				
	Volume of Soil	Vs				
Weight Lb.	Tare + Soil Dry	W				
	Tare	Wm				
	Soil Dry	Ws				
Max. Dry Density pcf.		γd				
Max. Dry Density Average pcf.						

* $\Delta V = \frac{\Delta h \times A m}{12}$

Sample Description & Remarks _____

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Figure B-23

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Project: Ameren UE – CCP Ash Study Date: 08/25/2010
R&J Personnel: James R. David / Jason J. Pruett R&J No.: 2008012455

Ameren UE – CCP Ash Study Set-up Time and Dry Unit Weight

Dry Sample Components: **Testing Date:** 8/20/2010
46% Labadie Fly Ash + 20% Labadie Bottom Ash
+ 34% Duck Creek "Pre-pumped" Gypsum

Dry Components: 500 grams **Water Added to Dry Components:** 137.5 grams
Percent Moisture (by weight): 27.5%

After thoroughly mixing at 0 min: wet, shiny, slurry, soft

5 min set time: dull appearance, becoming warm, imprintable with finger, water on surface during imprint, "silt like", starting to cement

10 min set time: dull, hard, very slightly imprintable, slightly warm

Dry Unit Weight: 95 pcf

Dry Components: 500 grams **Water Added to Dry Components:** 112.5 grams
Percent Moisture (by weight): 22.5%

After thoroughly mixing at 0 min: wet, shiny appearance, slurry to pudding texture

5 min set time: dull, hard, very slightly imprintable, slightly warm

10 min set time: not imprintable, dull, hard, slightly warm

Dry Unit Weight: 100 pcf

Ameren UE – CCP Ash Study Set-up Time and Dry Unit Weight

Dry Sample Components: **Testing Date:** 8/20/2010
46% Labadie Fly Ash + 20% Labadie Bottom Ash
+ 34% Duck Creek "Pre-pumped" Gypsum

Dry Components: 500 grams **Water Added to Dry Components:** 87.5 grams
Percent Moisture (by weight): 17.5%

After thoroughly mixing at 0 min: wetted powder, dull, wet clumps or balls, soft "bread like" texture, imprintable, trace dry material

5 min set time: slightly imprintable, slightly warm, cementing

10 min set time: not imprintable, hard, slightly warm, cemented

Dry Unit Weight: 79 pcf

Figure B-24

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job Ameren UE - CCP Ash Study

Boring No. Labadie Blend

Depth 40% Fly + 20% Bim + 3+2 D.C. "dry" JJP.

Sample No. _____

Mold Vol. .0253 (cu. ft.) (Vm)

Mold End Area .05106 (sq. ft.) (Am)

Lab Test by JR Date 8/25/10

Computed by _____ Date ___

Checked by _____ Date ___

Mold No. _____

Mold Diam. _____ (in)

Mold Wt. _____ (lb.)

$$\text{Relative Density} = \frac{\gamma' \text{max.} \ (\gamma' \text{field} - \gamma' \text{min.})}{\gamma' \text{field} \ (\gamma' \text{max.} - \gamma' \text{min.})} \times 100$$

MINIMUM DENSITY						
Trial No.			27½		22½	
Weight	Tare + Soil Dry	W				
	Tare	W				
Lb.	Soil Dry	W s	500.0g	1.1023 *	500.0g	1.1023 *
Min. Dry Density pcf.		γ d				
Min. Dry Density Average pcf						
MAXIMUM DENSITY						
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	h o	3.2265		3.5065	
	~~Left Dial Reading~~	h l	3.2270		3.2435	
	~~Right Dial Reading~~	h r	3.2165		3.1735	
	~~Sum~~	h l + h r	3.2130		3.5010	
	~~Average Dial Reading~~	h a		3.2208		3.3611
	Height Change	Δ h				
Volume cu. ft.	Mold Initial Volume	V m		.0253		.0253
	Volume Change *	Δ V		.01370		.01430
	Volume of Soil	V s		.01160		.0110
Weight Lb.	Tare + Soil Dry	W				
	Tare	W m				
	Soil Dry	W s				
Max. Dry Density pcf.		γ d				
Max. Dry Density Average pcf.				95.03		100.21

$$* \Delta V = \frac{\Delta h \times A m}{12}$$

Sample Description & Remarks _____

Figure B-24

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job _____ Lab Test by _____ Date ___

Boring No. _____ Computed by _____ Date ___

Depth _____ Checked by _____ Date ___

Sample No. _____ Mold No. _____

Mold Vol. _____ (cu. ft.) (Vm) Mold Diam. _____ (in)

Mold End Area _____ (sq. ft.) (Am) Mold Wt. _____ (lb.)

$$\text{Relative Density} = \frac{\gamma' \text{max.} \ (\gamma' \text{field} - \gamma' \text{min.})}{\gamma' \text{field} \ (\gamma' \text{max.} - \gamma' \text{min.})} \times 100$$

MINIMUM DENSITY						
Trial No.			17½%			
Weight Lb.	Tare + Soil Dry	W				
	Tare	W				
	Soil Dry	W s	500.0	1.10231 #		
Min. Dry Density pcf.		γ' d				
Min. Dry Density Average pcf						
	MAXIMUM DENSITY					
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	h o	2.6010			
	~~Left Dial Reading~~	h l	2.6770			
	~~Right Dial Reading~~	h r	2.7265			
	~~Sum~~	h l + h r	2.6930			
	~~Average Dial Reading~~	h a		2.66044		
	Height Change	Δ h				
Volume cu. ft.	Mold Initial Volume	V m		.10253		
	Volume Change *	Δ V		.01134		
	Volume of Soil	V s		.01396		
Weight Lb.	Tare + Soil Dry	W				
	Tare	W m				
	Soil Dry	W s				
Max. Dry Density pcf.		γ' d				
Max. Dry Density Average pcf.				78.96		

$$* \Delta V = \frac{\Delta h \times A m}{12}$$

Sample Description & Remarks _____

Figure B-24

Set-up / Unit Wt.

JR / JTP
8/20/10

Ameren UE - CCP Fly Ash Study
Lakadie Blend

5000 gal

46% Fly 2/2/09 collect
20% Btm 2/2/09 "
34% D.C. "Dry" Gypsum 6/10-7/10 collect

27½% ⇒ 9:33 = 0 min ⇒ Wet, Shiney, Slurry, Soft,
137.5 9:38 = 5 min ⇒ dull appearance, becoming warm imprintable w/ finger, water surface during imprint, (Silt like), cementing
9:43 = 10 min ⇒ hard, very slightly imprintable dull, slightly warm

22½% ⇒ 9:46 = 0 min ⇒ Wet, Shiney surface, pudding texture
112.5 9:51 5 min ⇒ dull, hard, very slight imprint, Slightly warm
9:56 10 min ⇒ Same, non-imprintable

17½% ⇒ 10:12 0 min ⇒ Wetted powder, dull, wet clumps or balls, ~~soft powder~~ soft bread like texture, imprintable, trace dry particles
87.5 10:17 5 min ⇒ Slightly imprintable, rest Same Slightly warm

10:22 10 min ⇒ non-imprintable, rest Same

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Project: Ameren UE – CCP Ash Study Date: 08/25/2010
R&J Personnel: James R. David / Jason J. Pruett R&J No.: 2008012455

Ameren UE – CCP Ash Study Set-up Time and Dry Unit Weight

Dry Sample Components: **Testing Date:** 8/19/2010
30% Labadie Fly Ash + 25% Labadie Bottom Ash
+ 45% Duck Creek "Pre-pumped" Gypsum

Dry Components: 500 grams **Water Added to Dry Components:** 137.5 grams
Percent Moisture (by weight): 27.5%

After thoroughly mixing at 0 min: wet, shiny, slurry, soft

5 min set time: dull, tacky surface, imprintable, moisture to surface during imprint, "silt like"

10 min set time: dull, cemented, not imprintable,

Dry Unit Weight: 95 pcf

Dry Components: 500 grams **Water Added to Dry Components:** 112.5 grams
Percent Moisture (by weight): 22.5%

After thoroughly mixing at 0 min: wet, satin appearance, paste

5 min set time: slightly warm, slightly imprintable, dull, stiff to firm

10 min set time: dull, hard, not imprintable, cemented, slightly warm

Dry Unit Weight: 94 pcf

Ameren UE – CCP Ash Study Set-up Time and Dry Unit Weight

Dry Sample Components: **Testing Date:** 8/19/2010
30% Labadie Fly Ash + 25% Labadie Bottom Ash
+ 45% Duck Creek "Pre-pumped" Gypsum

Dry Components: 500 grams **Water Added to Dry Components:** 87.5 grams
Percent Moisture (by weight): 17.5%

After thoroughly mixing at 0 min: wet powder, small clumps, dull, imprintable, slightly warm, lightly tamped flat

5 min set time: firm, slightly imprintable, slightly warm, dull in appearance

10 min set time: not imprintable, dull, cemented, slightly warm

Dry Unit Weight: 93 pcf

Figure B-25

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job Ameren UE - CCP Ash Study

Boring No. Labadie Blend

Depth 30% Fly + 25% Btm + 45% D.C. "dry" Cyp.

Sample No. _____

Mold Vol. .0253 (cu. ft.) (Vm)

Mold End Area .05106 (sq. ft.) (Am)

Lab Test by JR2 Date 8/25/10

Computed by _____ Date ___

Checked by _____ Date ___

Mold No. _____

Mold Diam. _____ (in)

Mold Wt. _____ (lb.)

$$\text{Relative Density} = \frac{\gamma' \text{max.} \; (\gamma' \text{field} - \gamma' \text{min.})}{\gamma' \text{field} \; (\gamma' \text{max.} - \gamma' \text{min.})} \times 100$$

MINIMUM DENSITY						
Trial No.			27½ %		22½%	
Weight	Tare + Soil Dry	W				
	Tare	W				
Lb.	Soil Dry	W s	500.0g	1.10231#	500.0g	1.10231
Min. Dry Density pcf.		γ d				
Min. Dry Density Average pcf						
	MAXIMUM DENSITY					
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	h o	3.2495		3.1945	
	~~Left Dial Reading~~	h l	3.2130		3.1405	
	~~Right Dial Reading~~	h r	3.1620		3.1460	
	~~Sum~~	h l + h r	3.2165		3.2775	
	~~Average Dial Reading~~	h a		3.21025		3.17962
	Height Change	Δ h				
Volume cu. ft.	Mold Initial Volume	V m		.0253		.0253
	Volume Change *	Δ V		.01366		.01353
	Volume of Soil	V s		.011164		.01177
Weight Lb.	Tare + Soil Dry	W				
	Tare	W m				
	Soil Dry	W s				
Max. Dry Density pcf.		γ d				
Max. Dry Density Average pcf.				94.70		93.65

$$*\Delta V = \frac{\Delta h \times A m}{12}$$

Sample Description & Remarks _____

Figure B-25

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job _____ Lab Test by _____ Date ___

Boring No. _____ Computed by _____ Date ___

Depth _____ Checked by _____ Date ___

Sample No. _____ Mold No. _____

Mold Vol. _____ (cu. ft.) (Vm) Mold Diam. _____ (in)

Mold End Area _____ (sq. ft.) (Am) Mold Wt. _____ (lb.)

$$\text{Relative Density} = \frac{\gamma' \text{max.} \ (\gamma' \text{field} - \gamma' \text{min.})}{\gamma' \text{field} \ (\gamma' \text{max.} - \gamma' \text{min.})} \times 100$$

MINIMUM DENSITY						
Trial No.			17	2%		
Weight Lb.	Tare + Soil Dry	W				
	Tare	W	g			
	Soil Dry	W s	500.0g	1.1023 lb		
Min. Dry Density pcf.		γ d				
Min. Dry Density Average pcf						
	MAXIMUM DENSITY					
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	h o	3.0850			
	~~Left Dial Reading~~	h l	3.1735			
	~~Right Dial Reading~~	h r	3.1980			
	~~Sum~~	h l + h r	3.1370			
	~~Average Dial Reading~~	h a		3.14838		
	Height Change	Δ h				
Volume cu. ft.	Mold Initial Volume	V m		.0253		
	Volume Change *	Δ V		.013396		
	Volume of Soil	V s		.01190		
Weight Lb.	Tare + Soil Dry	W				
	Tare	W m				
	Soil Dry	W s				
Max. Dry Density pcf.		γ d				
Max. Dry Density Average pcf.				92.63		

$$* \Delta V = \frac{\Delta h \times A m}{12}$$

Sample Description & Remarks _____

Figure B-25

Set-Time / Unit #1

JRC + JJP
8/19/10

Ameren UE - CCP Ash Study

500g

Labadie Blend

30% Fly ash collect 8/2/09
25% Btm " "
45% D.C. "Dry" Gyp. collect 6/10-7/10

27½% ⇒ 137.9g H2O
3:35 0 min = wet, shiney, slurry,
3:40 5 min = dull, tacky surface, imprintable moisture to surface during imprint
3:45 10 min = cemented, non-imprint, dull

22½% ⇒ 112.5g H2O
3:50 0 min = wet, satin appearance, paste,
3:55 5 min = slightly warm, slight imprint, dull, firm to stiff
4:00 10 min = non-imprint, dull, hard cemented, slightly warm

17½% ⇒ 87.5g H2O
4:05 0 min = wet powder, small clumps, dull imprintable, slightly warm
4:10 5 min = same, firm, slightly imprint
4:15 10 min = non-imprint, dull, cemented, slightly warm

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Project: Ameren UE – CCP Ash Study Date: 08/25/2010
R&J Personnel: James R. David / Jason J. Pruett R&J No.: 2008012455

Ameren UE – CCP Ash Study Set-up Time and Dry Unit Weight

Dry Sample Components:
36% Labadie Fly Ash
+ 64% Duck Creek "Pre-pumped" Gypsum

Testing Date: 8/19/2010

Dry Components: 500 grams
Water Added to Dry Components: 200 grams
Percent Moisture (by weight): 40%

After thoroughly mixing at 0 min: wet, shiny, liquid to thin slurry, warm

5 min set time: dull appearance, warm, very slightly imprintable

10 min set time: same as above

18 min set time: no longer imprintable, hard, warm

Dry Unit Weight: 82 pcf

Dry Components: 500 grams
Water Added to Dry Components: 175 grams
Percent Moisture (by weight): 35%

After thoroughly mixing at 0 min: wet, shiny appearance, slurry, warm

5 min set time: dull, very slightly imprintable, warm

10 min set time: dull, not imprintable, hard, cemented, warm

Dry Unit Weight: 89 pcf

Ameren UE – CCP Ash Study Set-up Time and Dry Unit Weight

Dry Sample Components:
36% Labadie Fly Ash
+ 64% Duck Creek "Pre-pumped" Gypsum

Testing Date: 8/19/2010

Dry Components: 500 grams
Water Added to Dry Components: 150 grams
Percent Moisture (by weight): 30%

After thoroughly mixing at 0 min: moist powder, large clumps, warm, easily imprinted, trace dry material

5 min set time: slightly imprintable, dull, warm, clumpy appearance

10 min set time: not imprintable, dull, warm, hard

Dry Unit Weight: 72 pcf

Figure B-26

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job Ameren UE - CCP Ash Study

Boring No. Labadie Blend

Depth 30% Fly + 64% O.C. "Dry" Gyp

Sample No. _____

Mold Vol. .0253 (cu. ft.) (Vm)

Mold End Area .05106 (sq. ft.) (Am)

Lab Test by JRL Date 8/25/10

Computed by _____ Date ____

Checked by _____ Date ____

Mold No. _____

Mold Diam. _____ (in)

Mold Wt. _____ (lb.)

$$\text{Relative Density} = \frac{\gamma' \text{max.} \ (\gamma' \text{field} - \gamma' \text{min.})}{\gamma' \text{field} \ (\gamma' \text{max.} - \gamma' \text{min.})} \times 100$$

MINIMUM DENSITY						
Trial No.			40%		35%	
Weight	Tare + Soil Dry	W				
	Tare	W				
Lb.	Soil Dry	W s	500.0g	1.10231#	500.0g	1.10231#
Min. Dry Density pcf.		γ d				
Min. Dry Density Average pcf						
MAXIMUM DENSITY						
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	h o	2.7410		3.0420	
	~~Left Dial Reading~~	h l	2.7410		3.0010	
	~~Right Dial Reading~~	h r	2.8010		3.0085	
	~~Sum~~	h l + h r	2.8290		3.0000	
	~~Average Dial Reading~~	h a		2.7780		3.0279
	Height Change	Δ h				
Volume cu. ft.	Mold Initial Volume	V m		.0253		.0253
	Volume Change *	Δ V		.01182		.01288
	Volume of Soil	V s		.01348		.01242
Weight Lb.	Tare + Soil Dry	W				
	Tare	W m				
	Soil Dry	W s				
Max. Dry Density pcf.		γ d				
Max. Dry Density Average pcf.			81.77		88.75	

$$^{*}\Delta V = \frac{\Delta h \times A m}{12}$$

Sample Description & Remarks _____

Figure B-26

Reitz & Jens, Inc.

RELATIVE DENSITY TEST

(Minimum & Maximum Density Determinations)

Job _____

Boring No. _____

Depth _____

Sample No. _____

Mold Vol. _____(cu. ft.) (Vm)

Mold End Area _____(sq. ft.) (Am)

Lab Test by _____Date ___

Computed by _____Date ___

Checked by _____Date ___

Mold No. _____

Mold Diam. _____(in)

Mold Wt. _____(lb.)

$$\text{Relative Density} = \frac{\gamma' \text{max.} \quad (\gamma' \text{field} - \gamma' \text{min.})}{\gamma' \text{field} \ (\gamma' \text{max.} - \gamma' \text{min.})} \times 100$$

MINIMUM DENSITY						
Trial No.				30%		
Weight	Tare + Soil Dry	W				
	Tare	W				
Lb.	Soil Dry	W s	900.0g	1.1023 *		
Min. Dry Density pcf.		γ d				
Min. Dry Density Average pcf						
	MAXIMUM DENSITY					
Method Used						
Trial No.						
Height Inches	~~Initial Dial Reading~~	h o	2.2980			
	~~Left Dial Reading~~	h l	2.3470			
	~~Right Dial Reading~~	h r	2.5120			
	~~Sum~~	h l + h r	2.3530			
	~~Average Dial Reading~~	h a		2.3675		
	Height Change	Δ h				
Volume cu. ft.	Mold Initial Volume	V m		.0253		
	Volume Change *	Δ V		.01007		
	Volume of Soil	V s		.01523		
Weight Lb.	Tare + Soil Dry	W				
	Tare	W m				
	Soil Dry	W s				
Max. Dry Density pcf.		γ d				
Max. Dry Density Average pcf.				72.38		

$$* \Delta V = \frac{\Delta h \times A m}{12}$$

Sample Description & Remarks _____

Figure B-26

Set time / unit wt.

500g sample

Labadie Plant

JRe / JJP
8/19/10

36% Fly ash collect 9/2/10

+ 64% D.C. "dry" gypsum collect 6/10-7/10

2:52 40% M ⇒ 0_{min} = wet, shiney, liquid, warm
200g H_2O

2:57 5_{min} = dull, warm, very slightly imprintable

3:02 10 min = same

3:10 no longer imprintable, warm

3:08 35% M ⇒ 0 = wet, shiney, slurry, warm
175g H_2O

3:13 5 min = dull, V. Slight imprint, warm

3:18 10 min = dull, cemented, non-imprint, warm

3:20 30% ⇒ 0 = mixture has large clumps, warm, easily
150g H_2O imprinted by hand, not evenly mixed,
dry pockets (speed to high for a while)

3:25 5 min = Slightly imprintable, dull, warm,
clumpy appearance

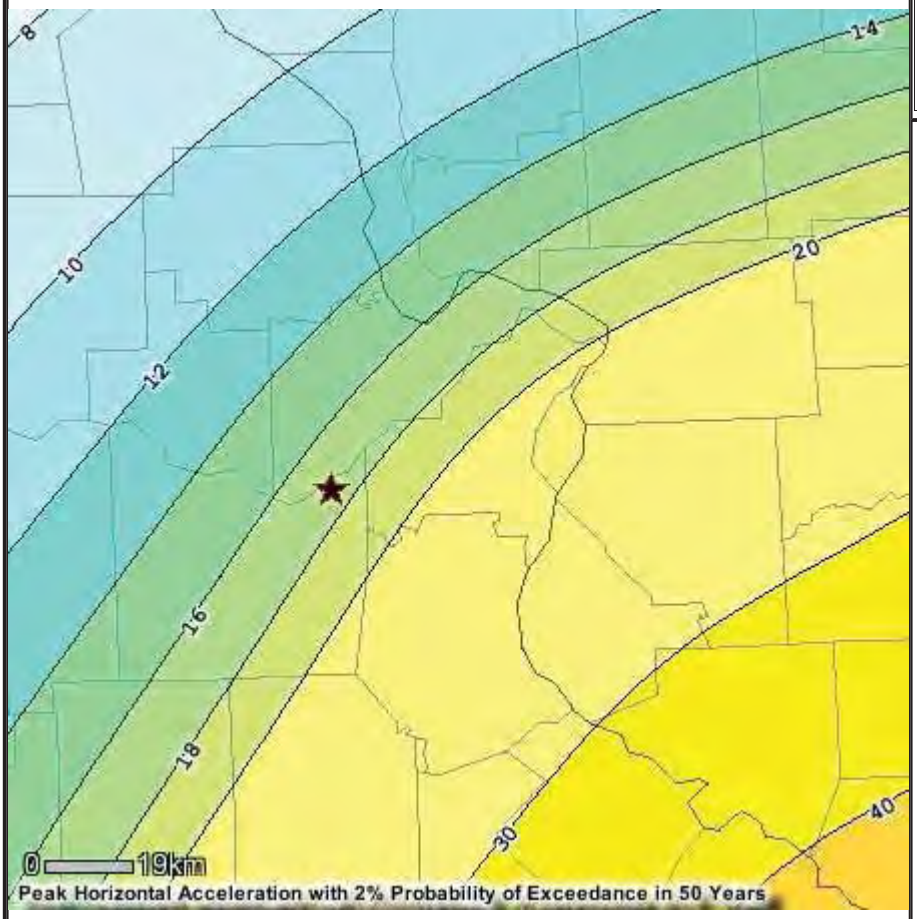
3:30 10 min = no longer imprintable, same

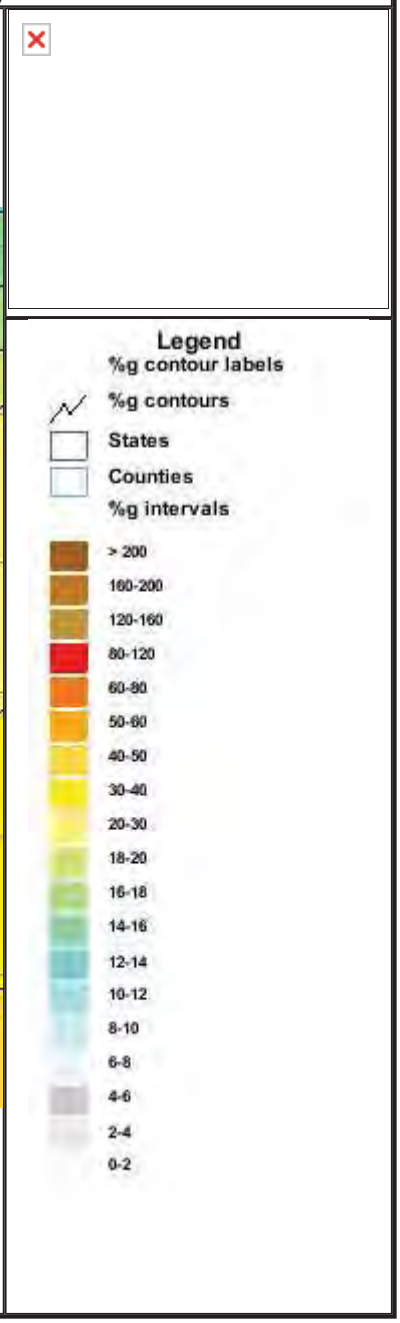
Appendix C

RESULTS OF SEISMIC RISK ANALYSES

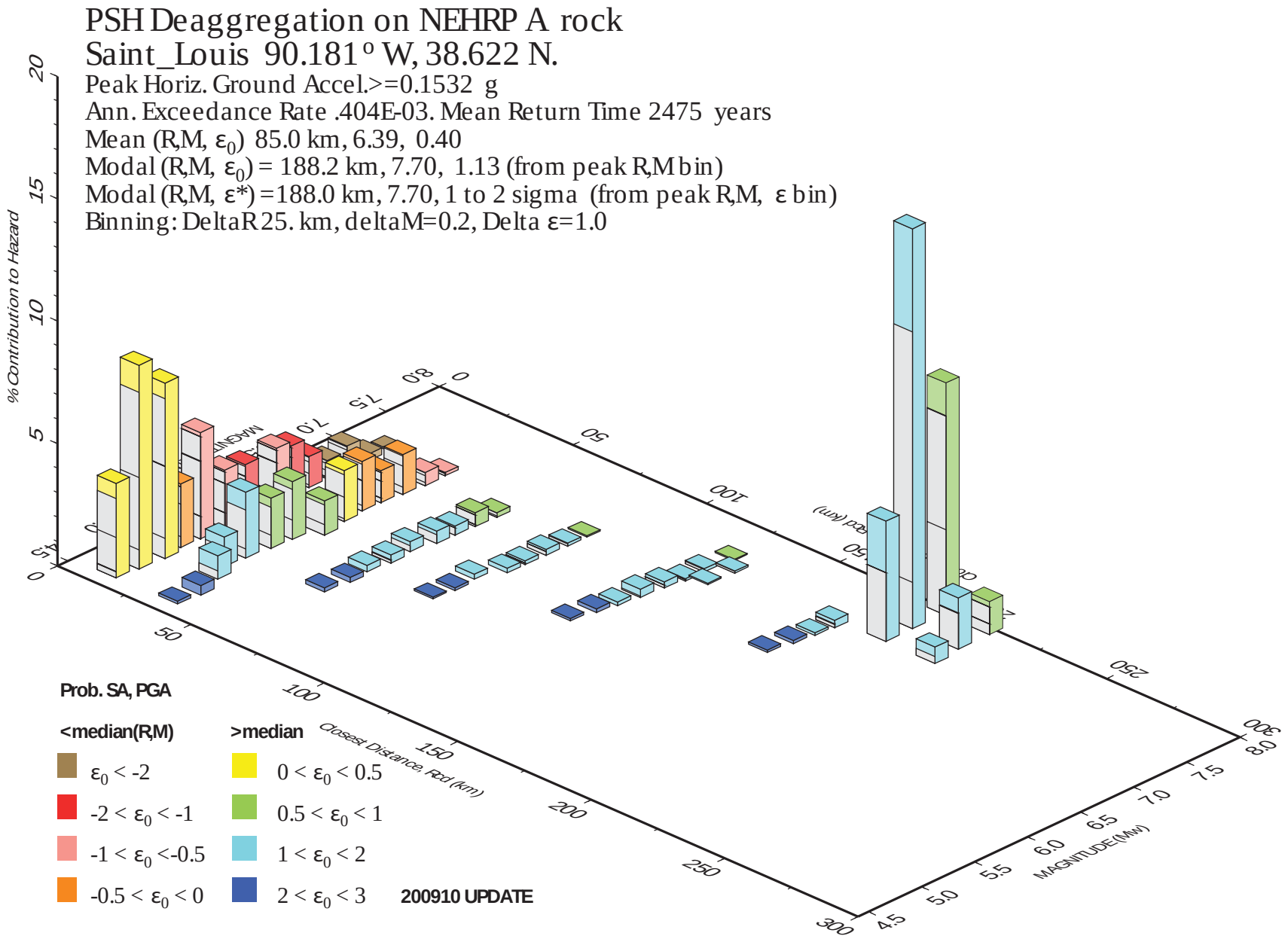
APPENDIX C
SEISMIC ANALYSES
TABLE OF CONTENTS

USGS Seismic Hazard Maps: Labadie, MO

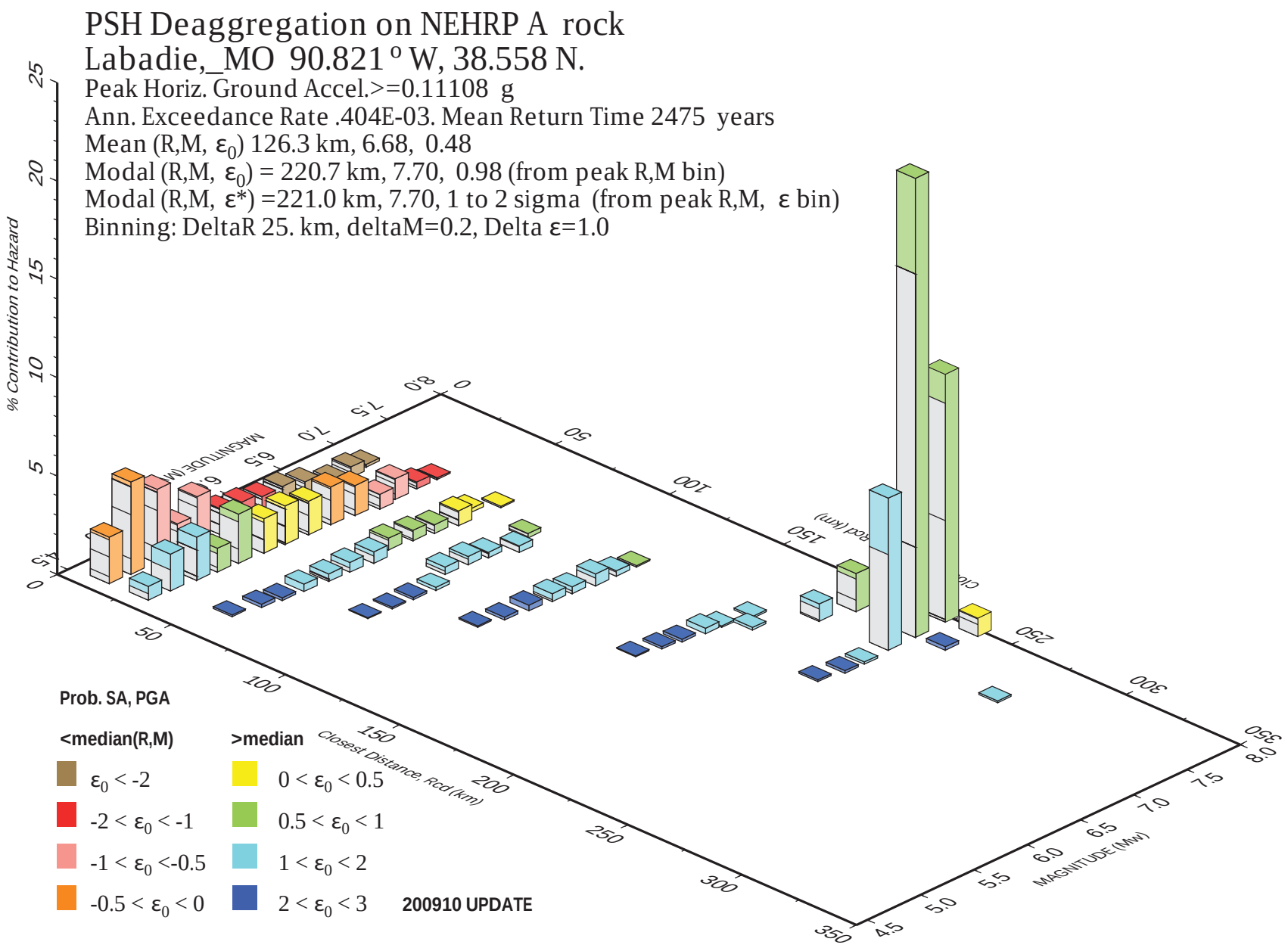




http://gldims.cr.usgs.gov/servlet/com.esri.esrimap.Esrimap?ServiceName=redirect&Form=Tr... 4/15/2011



GMT 2011 Apr 26 17:21:12 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on rock with average vs=2000. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted



GMT 2011 Apr 26 19:04:54 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on rock with average vs=2000. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

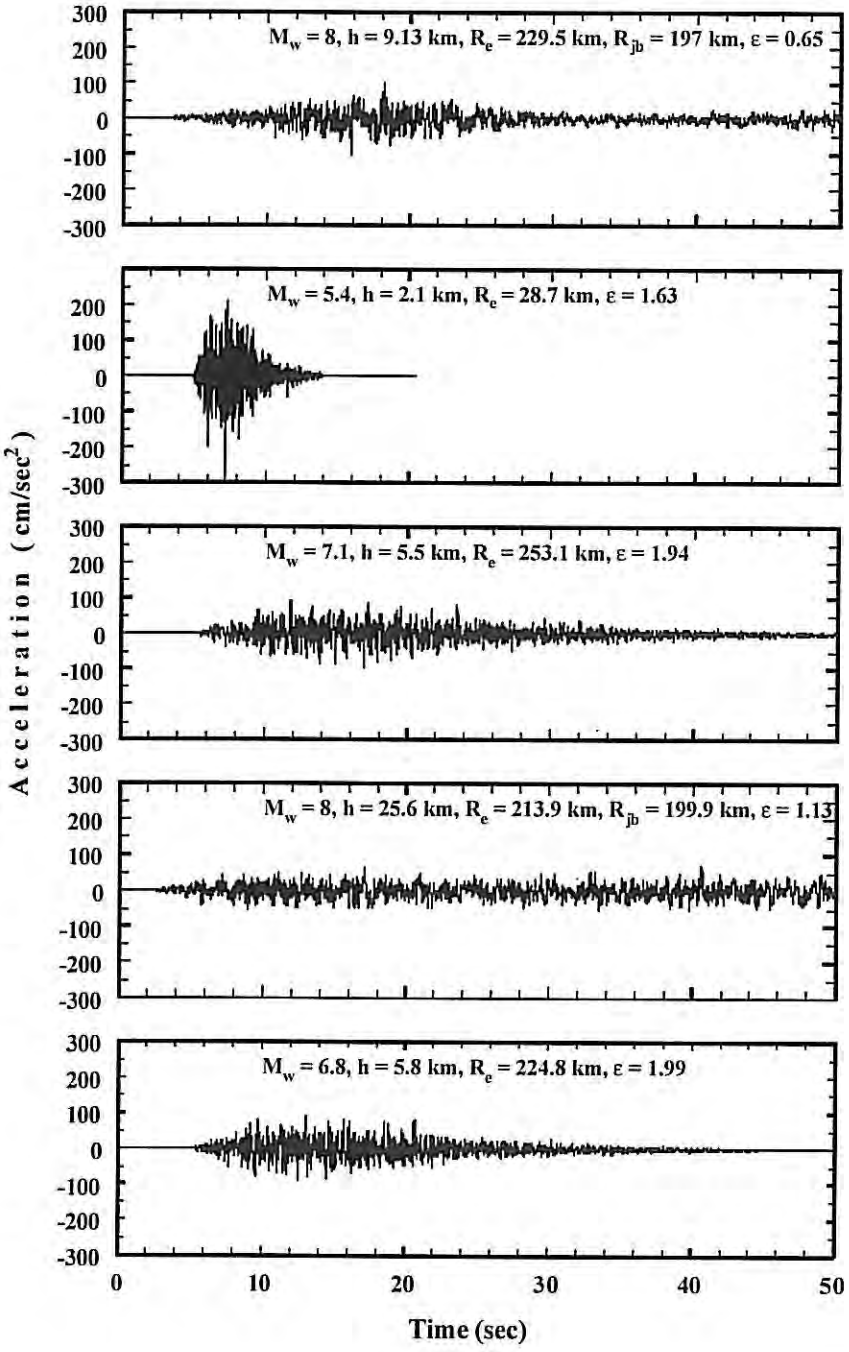


Figure 30. Suite of 2% in 50 years Ground Motions for Bedrock (Hard Rock), St. Louis, MO.

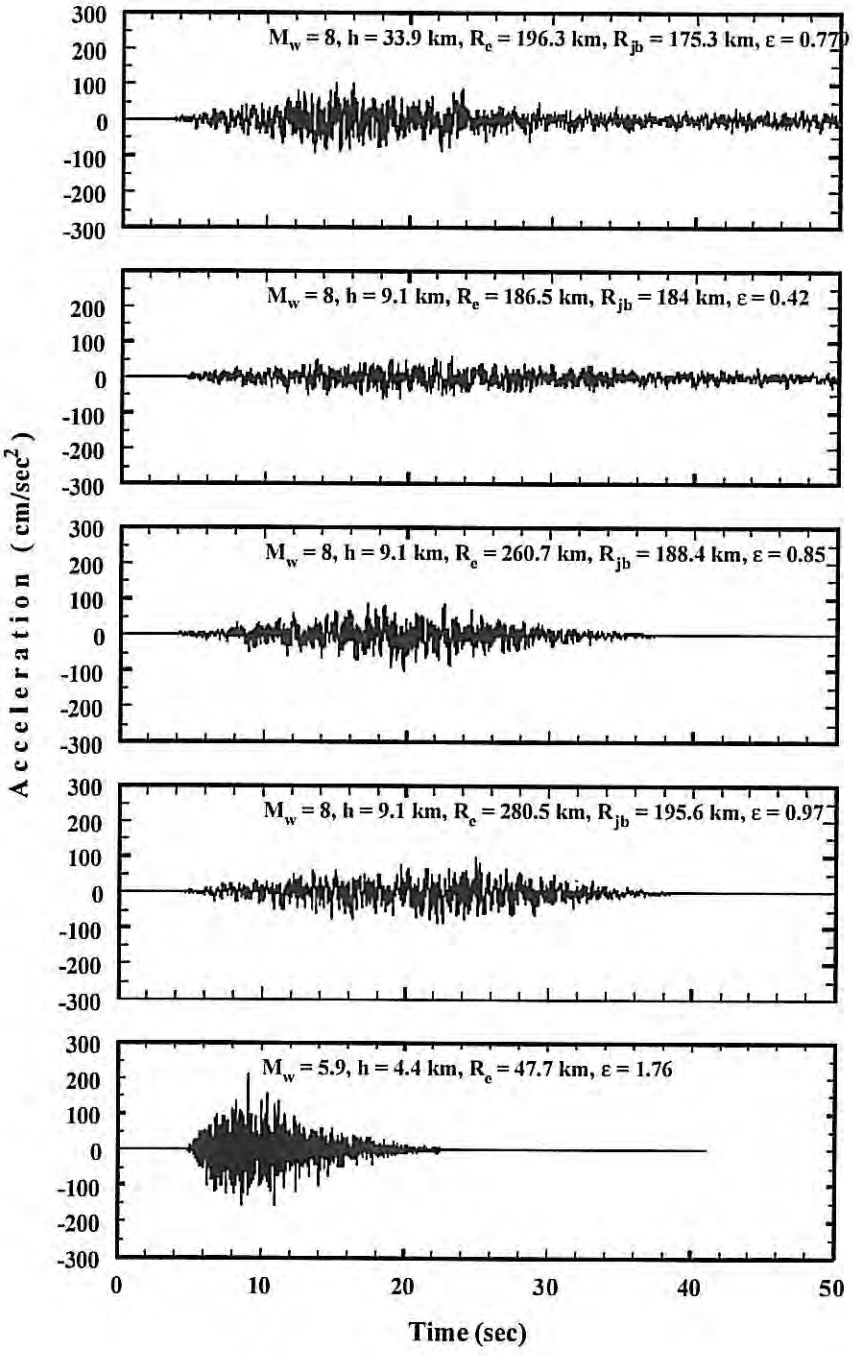


Figure 30 (continued).

Option 1 - Set No. 1 - Material No.: 1
G/Gmax - C3 (CLAY PI =20-40, Sun et al. 198)
Damping - Soil with PI=30, OCR=1-8 (Vucetic & Dobry, JGE 1/91)

Point No.	Shear Strain (%)	G/Gmax	Point No.	Shear Strain (%)	Dampin g Ratio (%)
1	.0001	1	1	.002	1.7
2	.001	.999	2	.003	2.1
3	.00316	.98	3	.004	2.5
4	.01	.92	4	.005	2.6
5	.0316	.78	5	.006	2.9
6	.1	.532	6	.008	3.3
7	.316	.293	7	.01	3.7
8	1	.137	8	.02	5.05
9	3.16	.075	9	.03	5.7
10	10	.025	10	.04	6.4
			11	.05	6.9
			12	.06	7.3
			13	.08	8.1
			14	.1	8.7
			15	.2	10.8
			16	.3	12.3
			17	.4	13.3
			18	.5	14.1
			19	.7	15.6
			20	1	16.9

Option 1 - Set No. 1 - Material No.: 2
G/Gmax - SAND, Average (Seed & Idriss 1970)
Damping for SAND, February 1971

Point No.	Shear Strain (%)	G/Gmax	Point No.	Shear Strain (%)	Dampin g Ratio (%)
1	.0001	1	1	.0001	1
2	.0003	.98	2	.001	1.6
3	.001	.95	3	.003	3.12
4	.003	.89	4	.01	5.8
5	.01	.73	5	.03	9.5
6	.03	.52	6	.1	15.4
7	.1	.29	7	.3	20.9
8	.3	.14	8	1	25
9	1	.06	9	10	30

Option 1 - Set No. 1 - Material No.: 3
G/Gmax - ROCK (Schnabel 1973)
Damping for ROCK (Schnabel 1973)

Point No.	Shear Strain (%)	G/Gmax	Point No.	Shear Strain (%)	Dampin g Ratio (%)
1	.0001	1	1	.0001	.4
2	.0003	1	2	.001	.8
3	.001	.99	3	.01	1.5
4	.003	.95	4	.1	3
5	.01	.9	5	1	4.6
6	.03	.81			
7	.1	.725			
8	1	.55			

Option 2 - Set No. 1
Option 2 -Soil Profile B/C-100
Soil Deposit No.: 1 - Soil Profile No. 2

Layer	Soil Type	Thickness (ft)	Shear Modulus (ksf)	Damping	Unit Weight (kcf)	Shear Wave Velocity (fps)
Layer	Soil Type	Thickness	Shear Modulus	Damping	Unit Weight	Shear Wave Velocity
		(ft)	(ksf)		(kcf)	(fps)
1	1	2.5	257	.05	.118	
2	2	2.5	715	.05	.108	
3	2	5	896	.05	.122	
4	2	5	1044	.05	.122	
5	2	5	1150	.05	.122	
6	2	5	1331	.05	.122	
7	2	5	1786	.05	.122	
8	2	5	1711	.05	.122	
9	2	5	1659	.05	.122	
10	2	5	1805	.05	.122	
11	2	5	2198	.05	.122	
12	2	5	2576	.05	.122	
13	2	10	2477	.05	.122	
14	2	10	2414	.05	.122	
15	2	10	2804	.05	.122	
16	2	10	3085	.05	.122	
17	2	10	3439	.05	.122	
18	2	6	3378	.05	.122	
19	3			.02	.145	2500

Option 3 - Set No. 1
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 229.5
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_01r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 2
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 5.4, h: 2.1 km, Re: 28.7
No. of acceleration values to be read for input motion: 2048
No. of values for use in Fourier Transform: 4096
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_02r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 3
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 7.1, h: 5.5 km, Re: 253.
No. of acceleration values to be read for input motion: 8192
No. of values for use in Fourier Transform: 16384
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_03r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25

Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 4
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 25.6 km, Re: 213.9
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_04r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 5
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 6.8, h: 5.8 km, Re: 224.
No. of acceleration values to be read for input motion: 8192
No. of values for use in Fourier Transform: 16384
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_05r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 6
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 33.9 km, Re: 196.3
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_06r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 7
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 186.5
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_07r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 8
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 260.7
No. of acceleration values to be read for input motion: 15000

No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_08r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 9
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 280.5
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_09r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 10
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 5.9, h: 4.4 km, Re: 47.7
No. of acceleration values to be read for input motion: 4096
No. of values for use in Fourier Transform: 8192
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_10r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 4 - Set No. 1
Option 4 - Input Motion at Layer 19 - Outcrop
No. of sublayer at the top of which the object motion is assigned: 19
Object motion is assigned as outcrop motion.

Option 5 - Set No. 1
Option 5 - Number of Iterations & Strain Ratio Set No. 2
Strain-compatible soil properties are not saved after the final iteration.
Number of Iterations: 10
Ratio of equivalent uniform strain divided by maximum strain: .65

Option 6 - Set No. 1
Option 6 - Soil Profile No. 2 - Layers 1 to 15

Layer	Type	Maximum Acceleration	Time History of Acceleration
1	Outcrop	x	x
2	Within	x	
3	Within	x	
4	Within	x	
5	Within	x	
6	Within	x	

Layer	Type	Maximum Acceleration	Time History of Acceleration
7	Within	x	
8	Within	x	
9	Within	x	
10	Within	x	
11	Within	x	
12	Within	x	
13	Within	x	
14	Within	x	
15	Within	x	

Option 6 - Set No. 2
Option 6 - Soil Profile No. 2 - Layers 16 to 19

Layer	Type	Maximum Acceleration	Time History of Acceleration
16	Within	x	
17	Within	x	
18	Within	x	
19	Within	x	x

Option 1 - Set No. 1 - Material No.: 1
G/Gmax - C3 (CLAY PI =20-40, Sun et al. 198)
Damping - Soil with PI=30, OCR=1-8 (Vucetic & Dobry, JGE 1/91)

Point No.	Shear Strain (%)	G/Gmax	Point No.	Shear Strain (%)	Damping Ratio (%)
1	.0001	1	1	.002	1.7
2	.001	.999	2	.003	2.1
3	.00316	.98	3	.004	2.5
4	.01	.92	4	.005	2.6
5	.0316	.78	5	.006	2.9
6	.1	.532	6	.008	3.3
7	.316	.293	7	.01	3.7
8	1	.137	8	.02	5.05
9	3.16	.075	9	.03	5.7
10	10	.025	10	.04	6.4
			11	.05	6.9
			12	.06	7.3
			13	.08	8.1
			14	.1	8.7
			15	.2	10.8
			16	.3	12.3
			17	.4	13.3
			18	.5	14.1
			19	.7	15.6
			20	1	16.9

Option 1 - Set No. 1 - Material No.: 2
G/Gmax - SAND, Average (Seed & Idriss 1970)
Damping for SAND, February 1971

Point No.	Shear Strain (%)	G/Gmax	Point No.	Shear Strain (%)	Damping Ratio (%)
1	.0001	1	1	.0001	1
2	.0003	.98	2	.001	1.6
3	.001	.95	3	.003	3.12
4	.003	.89	4	.01	5.8
5	.01	.73	5	.03	9.5
6	.03	.52	6	.1	15.4
7	.1	.29	7	.3	20.9
8	.3	.14	8	1	25
9	1	.06	9	10	30

Option 1 - Set No. 1 - Material No.: 3
G/Gmax - ROCK (Schnabel 1973)
Damping for ROCK (Schnabel 1973)

Point No.	Shear Strain (%)	G/Gmax	Point No.	Shear Strain (%)	Damping Ratio (%)
1	.0001	1	1	.0001	.4
2	.0003	1	2	.001	.8
3	.001	.99	3	.01	1.5
4	.003	.95	4	.1	3
5	.01	.9	5	1	4.6
6	.03	.81			
7	.1	.725			
8	1	.55			

Option 2 - Set No. 1
Option 2 -Soil Profile B/C-100 w Ash
Soil Deposit No.: 1 - Soil Profile No. 2

Layer	Soil Type	Thickness (ft)	Shear Modulus (ksf)	Damping	Unit Weight (kcf)	Shear Wave Velocity (fps)
Layer	Soil Type	Thickness	Shear Modulus	Damping	Unit Weight	Shear Wave Velocity
		(ft)	(ksf)		(kcf)	(fps)
1	2	10	827	.05	.09	
2	2	10	1170	.05	.09	
3	2	10	1433	.05	.09	
4	2	10	1655	.05	.09	
5	2	10	1850	.05	.09	
6	2	10	2027	.05	.09	
7	2	10	2189	.05	.09	
8	2	10	2341	.05	.09	
9	2	10	2483	.05	.09	
10	2	10	2617	.05	.09	
11	1	2.5	257	.05	.118	
12	2	2.5	715	.05	.108	
13	2	5	896	.05	.122	
14	2	5	1044	.05	.122	
15	2	5	1150	.05	.122	
16	2	5	1331	.05	.122	
17	2	5	1786	.05	.122	
18	2	5	1711	.05	.122	
19	2	5	1659	.05	.122	
20	2	5	1805	.05	.122	
21	2	5	2198	.05	.122	
22	2	5	2576	.05	.122	
23	2	10	2477	.05	.122	
24	2	10	2414	.05	.122	
25	2	10	2804	.05	.122	
26	2	10	3085	.05	.122	
27	2	10	3439	.05	.122	
28	2	6	3378	.05	.122	
29	3			.02	.145	2500

Option 3 - Set No. 1
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 229.5
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_01r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 2
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 5.4, h: 2.1 km, Re: 28.7
No. of acceleration values to be read for input motion: 2048
No. of values for use in Fourier Transform: 4096
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_02r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 3
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 7.1, h: 5.5 km, Re: 253.
No. of acceleration values to be read for input motion: 8192
No. of values for use in Fourier Transform: 16384
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_03r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 4
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 25.6 km, Re: 213.9
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_04r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 5
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 6.8, h: 5.8 km, Re: 224.
No. of acceleration values to be read for input motion: 8192
No. of values for use in Fourier Transform: 16384
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_05r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 6
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 33.9 km, Re: 196.3
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_06r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 7
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 186.5
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_07r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1

Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 8
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 260.7
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_08r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 9
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 280.5
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_09r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 10
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 5.9, h: 4.4 km, Re: 47.7
No. of acceleration values to be read for input motion: 4096
No. of values for use in Fourier Transform: 8192
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_10r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 4 - Set No. 1
Option 4 - Input Motion at Layer 29 - Outcrop
No. of sublayer at the top of which the object motion is assigned: 29
Object motion is assigned as outcrop motion.

Option 5 - Set No. 1
Option 5 - Number of Iterations & Strain Ratio Set No. 2
Strain-compatible soil properties are not saved after the final iteration.
Number of Iterations: 10
Ratio of equivalent uniform strain divided by maximum strain: .65

Option 6 - Set No. 1

Option 6 - Soil Profile No. 2 - Layers 1 to 15

Layer	Type	Maximum Acceleration	Time History of Acceleration
1	Outcrop	x	x
2	Within	x	
3	Within	x	
4	Within	x	
5	Within	x	
6	Within	x	
7	Within	x	
8	Within	x	
9	Within	x	
10	Within	x	
11	Within	x	x
12	Within	x	
13	Within	x	
14	Within	x	
15	Within	x	

Option 6 - Set No. 2
Option 6 - Soil Profile No. 2 - Layers 16 to 29

Layer	Type	Maximum Acceleration	Time History of Acceleration
16	Within	x	
17	Within	x	
18	Within	x	
19	Within	x	
20	Within	x	
21	Within	x	
22	Within	x	
23	Within	x	
24	Within	x	
25	Within	x	
26	Within	x	
27	Within	x	
28	Within	x	
29	Within	x	

Option 1 - Set No. 1 - Material No.: 1
G/Gmax - C3 (CLAY PI =20-40, Sun et al. 198)
Damping - Soil with PI=30, OCR=1-8 (Vucetic & Dobry, JGE 1/91)

Point No.	Shear Strain (%)	G/Gmax	Point No.	Shear Strain (%)	Damping Ratio (%)
1	.0001	1	1	.002	1.7
2	.001	.999	2	.003	2.1
3	.00316	.98	3	.004	2.5
4	.01	.92	4	.005	2.6
5	.0316	.78	5	.006	2.9
6	.1	.532	6	.008	3.3
7	.316	.293	7	.01	3.7
8	1	.137	8	.02	5.05
9	3.16	.075	9	.03	5.7
10	10	.025	10	.04	6.4
			11	.05	6.9
			12	.06	7.3
			13	.08	8.1
			14	.1	8.7
			15	.2	10.8
			16	.3	12.3
			17	.4	13.3
			18	.5	14.1
			19	.7	15.6
			20	1	16.9

Option 1 - Set No. 1 - Material No.: 2
G/Gmax - SAND, Average (Seed & Idriss 1970)
Damping for SAND, February 1971

Point No.	Shear Strain (%)	G/Gmax	Point No.	Shear Strain (%)	Damping Ratio (%)
1	.0001	1	1	.0001	1
2	.0003	.98	2	.001	1.6
3	.001	.95	3	.003	3.12
4	.003	.89	4	.01	5.8
5	.01	.73	5	.03	9.5
6	.03	.52	6	.1	15.4
7	.1	.29	7	.3	20.9
8	.3	.14	8	1	25
9	1	.06	9	10	30

Option 1 - Set No. 1 - Material No.: 3
G/Gmax - ROCK (Schnabel 1973)
Damping for ROCK (Schnabel 1973)

Point No.	Shear Strain (%)	G/Gmax	Point No.	Shear Strain (%)	Damping Ratio (%)
1	.0001	1	1	.0001	.4
2	.0003	1	2	.001	.8
3	.001	.99	3	.01	1.5
4	.003	.95	4	.1	3
5	.01	.9	5	1	4.6
6	.03	.81			
7	.1	.725			
8	1	.55			

Option 1 - Set No. 1 - Material No.: 4
G/Gmax - C2 (CLAY PI =10-20, Sun et al. 198)
Damping - Soil with PI=15, OCR=1-8 (Vucetic & Dobry, JGE 1/91)

Point No.	Shear Strain (%)	G/Gmax	Point No.	Shear Strain (%)	Damping Ratio (%)
Point No.	Shear Strain (%)	G/Gmax	Point No.	Shear Strain (%)	Damping Ratio (%)
1	.0001	1	1	.003	2.5
2	.001	.997	2	.004	2.8
3	.00316	.974	3	.005	3.2
4	.01	.881	4	.006	3.5
5	.0316	.674	5	.008	4.1
6	.1	.425	6	.01	4.5
7	.316	.22	7	.02	6.4
8	1	.076	8	.03	7.6
9	3.16	.03	9	.04	8.4
10	10	.01	10	.05	9.2
			11	.07	10.3
			12	.1	11.5
			13	.2	14.3
			14	.3	15.9
			15	.4	17
			16	.5	17.6
			17	.6	18.3
			18	.7	18.8
			19	.8	19.3
			20	1	19.9

Option 2 - Set No. 1
Option 2 -Soil Profile B/C-100 w 24ft berm
Soil Deposit No.: 1 - Soil Profile No. 2

Layer	Soil Type	Thickness (ft)	Shear Modulus (ksf)	Damping	Unit Weight (kcf)	Shear Wave Velocity (fps)
1	4	1.5	2000	.05	.12	
2	4	2.5	2000	.05	.12	
3	4	2.5	2000	.05	.12	
4	4	2.5	2000	.05	.12	
5	4	2.5	2000	.05	.12	
6	4	2.5	2000	.05	.12	
7	4	2.5	2000	.05	.12	
8	4	2.5	2000	.05	.12	
9	4	2.5	2000	.05	.12	
10	4	2.5	2000	.05	.12	
11	1	2.5	257	.05	.118	
12	2	2.5	715	.05	.108	
13	2	5	896	.05	.122	
14	2	5	1044	.05	.122	
15	2	5	1150	.05	.122	
16	2	5	1331	.05	.122	
17	2	5	1786	.05	.122	
18	2	5	1711	.05	.122	
19	2	5	1659	.05	.122	
20	2	5	1805	.05	.122	
21	2	5	2198	.05	.122	
22	2	5	2576	.05	.122	
23	2	10	2477	.05	.122	
24	2	10	2414	.05	.122	
25	2	10	2804	.05	.122	
26	2	10	3085	.05	.122	
27	2	10	3439	.05	.122	
28	2	6	3378	.05	.122	
29	3			.02	.145	2500

Option 3 - Set No. 1

Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 229.5
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_01r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 2
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 5.4, h: 2.1 km, Re: 28.7
No. of acceleration values to be read for input motion: 2048
No. of values for use in Fourier Transform: 4096
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_02r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 3
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 7.1, h: 5.5 km, Re: 253.
No. of acceleration values to be read for input motion: 8192
No. of values for use in Fourier Transform: 16384
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_03r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 4
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 25.6 km, Re: 213.9
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_04r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 5
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 6.8, h: 5.8 km, Re: 224.
No. of acceleration values to be read for input motion: 8192
No. of values for use in Fourier Transform: 16384
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_05r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----

Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 6
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 33.9 km, Re: 196.3
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_06r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 7
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 186.5
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_07r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 8
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 260.7
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_08r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 9
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 8, h: 9.1 km, Re: 280.5
No. of acceleration values to be read for input motion: 15000
No. of values for use in Fourier Transform: 32768
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_09r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 3 - Set No. 10
Option 3 - St. Louis, MO; 2% in 50 years, Bedrock (Hard Rock); Mw: 5.9, h: 4.4 km, Re: 47.7

No. of acceleration values to be read for input motion: 4096
No. of values for use in Fourier Transform: 8192
Time interval between acceleration values (sec): .01
Name of file for input motion: c:\Program Files\GeoMotions\Quakes\SHAKE\Simulated\l02_10r.eq
Format for reading acceleration values: (8F9.6)
Multiplication factor for adjusting acceleration values: 1
Maximum acceleration to be used (g's): -----
Maximum frequency to be used in the analysis: 25
Number of header lines in object motion file: 4
Number of acceleration values per line in object motion file: 8

Option 4 - Set No. 1
Option 4 - Input Motion at Layer 29 - Outcrop
No. of sublayer at the top of which the object motion is assigned: 29
Object motion is assigned as outcrop motion.

Option 5 - Set No. 1
Option 5 - Number of Iterations & Strain Ratio Set No. 2
Strain-compatible soil properties are not saved after the final iteration.
Number of Iterations: 10
Ratio of equivalent uniform strain divided by maximum strain: .65

Option 6 - Set No. 1
Option 6 - Soil Profile No. 2 - Layers 1 to 15

Layer	Type	Maximum Acceleration	Time History of Acceleration
1	Outcrop	x	
2	Within	x	
3	Within	x	
4	Within	x	
5	Within	x	
6	Within	x	
7	Within	x	
8	Within	x	
9	Within	x	
10	Within	x	
11	Within	x	
12	Within	x	
13	Within	x	
14	Within	x	
15	Within	x	

Option 6 - Set No. 2
Option 6 - Soil Profile No. 2 - Layers 16 to 29

Layer	Type	Maximum Acceleration	Time History of Acceleration
16	Within	x	
17	Within	x	
18	Within	x	
19	Within	x	
20	Within	x	
21	Within	x	
22	Within	x	
23	Within	x	
24	Within	x	
25	Within	x	
26	Within	x	
27	Within	x	

Layer	Type	Maximum Acceleration	Time History of Acceleration
28	Within	x	
29	Within	x	

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_01R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	1.25	.118	2.9	243.5	.00906	22.06	257.7724	0	.14737	Clay PI=20	Soil PI=30	Outcrop
2	3.75	.108	5.2	547.4	.01177	64.42	403.988	2.5	.14498	Sand Avg.	Sand	Within
3	7.5	.122	6.9	596.4	.02154	128.48	396.7499	5	.14138	Sand Avg.	Sand	Within
4	12.5	.122	8.6	598.3	.03497	209.2	397.3814	10	.12519	Sand Avg.	Sand	Within
5	17.5	.122	9.4	601.6	.04541	273.19	398.4758	15	.10383	Sand Avg.	Sand	Within
6	22.5	.122	9.4	696.7	.04533	315.83	428.8159	20	.11127	Sand Avg.	Sand	Within
7	27.5	.122	8.4	1038.2	.03349	347.73	523.4661	25	.12279	Sand Avg.	Sand	Within
8	32.5	.122	9.2	915.6	.04264	390.44	491.5876	30	.12384	Sand Avg.	Sand	Within
9	37.5	.122	10.4	805	.05537	445.74	460.9417	35	.1215	Sand Avg.	Sand	Within
10	42.5	.122	10.7	854.1	.05898	503.74	474.7909	40	.11608	Sand Avg.	Sand	Within
11	47.5	.122	9.9	1106.6	.05033	556.97	540.4349	45	.10903	Sand Avg.	Sand	Within
12	52.5	.122	9.4	1357.4	.04451	604.14	598.5521	50	.109	Sand Avg.	Sand	Within
13	60	.122	10.4	1202.3	.05532	665.13	563.3191	55	.11236	Sand Avg.	Sand	Within
14	70	.122	11.4	1072.1	.06868	736.28	531.9437	65	.11131	Sand Avg.	Sand	Within
15	80	.122	11	1298.1	.06222	807.69	585.3318	75	.1056	Sand Avg.	Sand	Within
16	90	.122	10.7	1459.7	.05897	860.8	620.6973	85	.0944	Sand Avg.	Sand	Within
17	100	.122	10.1	1708.6	.0521	890.18	671.5344	95	.08462	Sand Avg.	Sand	Within
18	108	.122	10.3	1652.5	.05423	896.08	660.4178	105	.08484	Sand Avg.	Sand	Within
19	Base							111	.08729			Within

Notes:
Period for Soil Column: .84 sec
Average Shear Wave Velocity for Soil Column: 531 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_10R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	1.25	.118	3.2	240.4	.01145	27.53	256.1263	0	.18732	Clay PI=20	Soil PI=30	Outcrop
2	3.75	.108	5.5	534.9	.01342	71.81	399.3488	2.5	.14461	Sand Avg.	Sand	Within
3	7.5	.122	6.5	619.7	.0188	116.53	404.4257	5	.11592	Sand Avg.	Sand	Within
4	12.5	.122	7.1	686.5	.02247	154.27	425.6653	10	.11421	Sand Avg.	Sand	Within
5	17.5	.122	7.7	714.9	.02712	193.87	434.3809	15	.1151	Sand Avg.	Sand	Within
6	22.5	.122	7.8	819.8	.02794	229.06	465.1596	20	.10994	Sand Avg.	Sand	Within
7	27.5	.122	6.9	1188.1	.02159	256.5	559.9826	25	.11351	Sand Avg.	Sand	Within
8	32.5	.122	7.7	1068.4	.02672	285.52	531.025	30	.1199	Sand Avg.	Sand	Within
9	37.5	.122	8.299999	971	.0328	318.5	506.2414	35	.11349	Sand Avg.	Sand	Within
10	42.5	.122	8.299999	1064.9	.032	340.82	530.1545	40	.11594	Sand Avg.	Sand	Within
11	47.5	.122	7.6	1382.7	.02609	360.69	604.1044	45	.12018	Sand Avg.	Sand	Within
12	52.5	.122	7.1	1684.5	.02291	385.84	666.7815	50	.12776	Sand Avg.	Sand	Within
13	60	.122	7.8	1527.4	.02784	425.24	634.9279	55	.12436	Sand Avg.	Sand	Within
14	70	.122	8.1	1441.7	.03081	444.24	616.8584	65	.11424	Sand Avg.	Sand	Within
15	80	.122	7.900001	1717.6	.02844	488.48	673.3007	75	.1481	Sand Avg.	Sand	Within
16	90	.122	7.8	1897.8	.02806	532.42	707.7392	85	.16744	Sand Avg.	Sand	Within
17	100	.122	7.6	2153.3	.02649	570.36	753.8766	95	.17134	Sand Avg.	Sand	Within
18	108	.122	7.900001	2062.1	.02876	592.96	737.7393	105	.14743	Sand Avg.	Sand	Within
19	Base							111	.17222			Within

Notes:
Period for Soil Column: .75 sec
Average Shear Wave Velocity for Soil Column: 591 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_02R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	1.25	.118	3.6	237.1	.01468	34.8	254.3623	0	.23831	Clay PI=20	Soil PI=30	Outcrop
2	3.75	.108	6.2	504.7	.01745	88.06	387.9116	2.5	.18558	Sand Avg.	Sand	Within
3	7.5	.122	7.3	579.7	.02375	137.7	391.1557	5	.14486	Sand Avg.	Sand	Within
4	12.5	.122	7.7	649.2	.02709	175.88	413.9399	10	.12216	Sand Avg.	Sand	Within
5	17.5	.122	8.4	670.8	.03314	222.3	420.7698	15	.10335	Sand Avg.	Sand	Within
6	22.5	.122	8.4	777.2	.03303	256.72	452.9126	20	.13607	Sand Avg.	Sand	Within
7	27.5	.122	7.6	1117.2	.02657	296.83	543.0171	25	.12979	Sand Avg.	Sand	Within
8	32.5	.122	8.7	967.7	.03636	351.85	505.3804	30	.12849	Sand Avg.	Sand	Within
9	37.5	.122	9.3	881.6	.04348	383.33	482.3739	35	.11804	Sand Avg.	Sand	Within
10	42.5	.122	9.5	938.4	.04618	433.4	497.6707	40	.13242	Sand Avg.	Sand	Within
11	47.5	.122	8.900001	1217.1	.03869	470.88	566.7756	45	.16872	Sand Avg.	Sand	Within
12	52.5	.122	8.4	1506.1	.03291	495.6	630.4852	50	.18004	Sand Avg.	Sand	Within
13	60	.122	8.6	1421.3	.03483	495.03	612.4786	55	.16736	Sand Avg.	Sand	Within
14	70	.122	8.299999	1418	.03244	459.96	611.7672	65	.14145	Sand Avg.	Sand	Within
15	80	.122	7.3	1801.9	.0243	437.84	689.6256	75	.18078	Sand Avg.	Sand	Within
16	90	.122	7.2	2014	.02303	463.92	729.0843	85	.20159	Sand Avg.	Sand	Within
17	100	.122	7.6	2164.1	.02606	563.9	755.7648	95	.21307	Sand Avg.	Sand	Within
18	108	.122	8.1	2016.8	.03085	622.12	729.5909	105	.21864	Sand Avg.	Sand	Within
19	Base							111	.25238			Within

Notes:
Period for Soil Column: .76 sec
Average Shear Wave Velocity for Soil Column: 581 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_03R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	1.25	.118	3	242.4	.00983	23.82	257.1895	0	.16146	Clay PI=20	Soil PI=30	Outcrop
2	3.75	.108	5.3	541.5	.01252	67.8	401.805	2.5	.15403	Sand Avg.	Sand	Within
3	7.5	.122	7	592.9	.02199	130.36	395.584	5	.14471	Sand Avg.	Sand	Within
4	12.5	.122	8.4	610.9	.03282	200.5	401.5439	10	.11477	Sand Avg.	Sand	Within
5	17.5	.122	8.900001	634.1	.03917	248.37	409.0976	15	.09705	Sand Avg.	Sand	Within
6	22.5	.122	8.8	747.7	.0371	277.36	444.2339	20	.08879	Sand Avg.	Sand	Within
7	27.5	.122	7.7	1114.7	.02677	298.4	542.4092	25	.08965	Sand Avg.	Sand	Within
8	32.5	.122	8.1	1024.7	.03055	313.02	520.0515	30	.09197	Sand Avg.	Sand	Within
9	37.5	.122	8.4	963.2	.03362	323.81	504.204	35	.08884	Sand Avg.	Sand	Within
10	42.5	.122	8.1	1078.1	.0308	332.09	533.4301	40	.08065	Sand Avg.	Sand	Within
11	47.5	.122	7.3	1416.1	.02409	341.16	611.3571	45	.0739	Sand Avg.	Sand	Within
12	52.5	.122	7	1709.5	.02177	372.19	671.7112	50	.0713	Sand Avg.	Sand	Within
13	60	.122	7.5	1563.5	.0258	403.31	642.3873	55	.07548	Sand Avg.	Sand	Within
14	70	.122	8	1457.8	.02976	433.82	620.2932	65	.07601	Sand Avg.	Sand	Within
15	80	.122	7.7	1743.3	.02711	472.61	678.3192	75	.0827	Sand Avg.	Sand	Within
16	90	.122	7.5	1946.7	.02582	502.66	716.7993	85	.0873	Sand Avg.	Sand	Within
17	100	.122	7.3	2211.8	.02423	535.99	764.0485	95	.0826	Sand Avg.	Sand	Within
18	108	.122	7.6	2129.4	.02591	551.68	749.6812	105	.08033	Sand Avg.	Sand	Within
19	Base							111	.07957			Within

Notes:
Period for Soil Column: .75 sec
Average Shear Wave Velocity for Soil Column: 590 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_04R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	1.25	.118	2.4	250.1	.00555	13.89	261.2425	0	.09404	Clay PI=20	Soil PI=30	Outcrop
2	3.75	.108	3.9	602.8	.00657	39.59	423.9383	2.5	.09084	Sand Avg.	Sand	Within
3	7.5	.122	5.1	689.5	.01142	78.77	426.5944	5	.09099	Sand Avg.	Sand	Within
4	12.5	.122	6.4	729	.01816	132.38	438.6436	10	.0893	Sand Avg.	Sand	Within
5	17.5	.122	7.4	737.2	.0245	180.61	441.1037	15	.08199	Sand Avg.	Sand	Within
6	22.5	.122	7.7	830.5	.02678	222.46	468.1854	20	.07482	Sand Avg.	Sand	Within
7	27.5	.122	7	1182.3	.02196	259.62	558.6141	25	.07027	Sand Avg.	Sand	Within
8	32.5	.122	7.8	1059.6	.02745	290.89	528.8336	30	.07062	Sand Avg.	Sand	Within
9	37.5	.122	8.4	970.5	.03285	318.81	506.111	35	.07159	Sand Avg.	Sand	Within
10	42.5	.122	8.299999	1058.1	.03264	345.37	528.4591	40	.07045	Sand Avg.	Sand	Within
11	47.5	.122	7.7	1363.1	.02733	372.54	599.8075	45	.06761	Sand Avg.	Sand	Within
12	52.5	.122	7.3	1658.8	.02413	400.27	661.6755	50	.06728	Sand Avg.	Sand	Within
13	60	.122	7.900001	1510.6	.02885	435.73	631.4265	55	.066	Sand Avg.	Sand	Within
14	70	.122	8.6	1384.1	.03491	483.2	604.4102	65	.06073	Sand Avg.	Sand	Within
15	80	.122	8.299999	1647.6	.03241	534.01	659.4379	75	.06526	Sand Avg.	Sand	Within
16	90	.122	8.299999	1807.7	.03269	590.87	690.7346	85	.06249	Sand Avg.	Sand	Within
17	100	.122	8.2	2038.2	.03156	643.28	733.4515	95	.06023	Sand Avg.	Sand	Within
18	108	.122	8.6	1929.4	.03532	681.4	713.6071	105	.05591	Sand Avg.	Sand	Within
19	Base							111	.05741			Within

Notes:
Period for Soil Column: .76 sec
Average Shear Wave Velocity for Soil Column: 585 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_05R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	1.25	.118	2.6	246.7	.00717	17.69	259.4607	0	.12156	Clay PI=20	Soil PI=30	Outcrop
2	3.75	.108	4.5	576.9	.00863	49.77	414.7308	2.5	.11449	Sand Avg.	Sand	Within
3	7.5	.122	5.6	663.1	.01427	94.6	418.3478	5	.10652	Sand Avg.	Sand	Within
4	12.5	.122	6.7	709.6	.02001	142.01	432.7677	10	.09428	Sand Avg.	Sand	Within
5	17.5	.122	7.3	743.5	.02381	177.03	442.9845	15	.08422	Sand Avg.	Sand	Within
6	22.5	.122	7.3	861	.02376	204.6	476.7049	20	.08382	Sand Avg.	Sand	Within
7	27.5	.122	6.6	1218.6	.01974	240.6	567.1248	25	.09074	Sand Avg.	Sand	Within
8	32.5	.122	7.7	1062.8	.02719	288.96	529.6315	30	.07979	Sand Avg.	Sand	Within
9	37.5	.122	8.4	966.5	.03326	321.51	505.067	35	.08079	Sand Avg.	Sand	Within
10	42.5	.122	8.2	1073.5	.03122	335.15	532.2909	40	.08361	Sand Avg.	Sand	Within
11	47.5	.122	7.3	1415.1	.02415	341.72	611.1412	45	.0809	Sand Avg.	Sand	Within
12	52.5	.122	6.9	1722.7	.0212	365.16	674.2995	50	.07956	Sand Avg.	Sand	Within
13	60	.122	7.6	1550.4	.02652	411.18	639.6905	55	.08153	Sand Avg.	Sand	Within
14	70	.122	8.2	1431.5	.0315	450.97	614.6724	65	.08391	Sand Avg.	Sand	Within
15	80	.122	7.6	1755.8	.02648	465.01	680.7467	75	.08576	Sand Avg.	Sand	Within
16	90	.122	7.5	1960.2	.02524	494.69	719.2804	85	.0787	Sand Avg.	Sand	Within
17	100	.122	7.1	2255.4	.02268	511.48	771.5424	95	.06712	Sand Avg.	Sand	Within
18	108	.122	7.6	2127	.026	553.1	749.2587	105	.07488	Sand Avg.	Sand	Within
19	Base							111	.0772			Within

Notes:
Period for Soil Column: .74 sec
Average Shear Wave Velocity for Soil Column: 598 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_06R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	1.25	.118	2.7	245	.00813	19.91	258.5652	0	.13612	Clay PI=20	Soil PI=30	Outcrop
2	3.75	.108	4.8	563.1	.00998	56.19	409.7404	2.5	.12969	Sand Avg.	Sand	Within
3	7.5	.122	6.2	634.3	.01727	109.54	409.1621	5	.12381	Sand Avg.	Sand	Within
4	12.5	.122	7.900001	639.3	.02847	182.02	410.7716	10	.11906	Sand Avg.	Sand	Within
5	17.5	.122	8.900001	635.8	.03887	247.11	409.6456	15	.11376	Sand Avg.	Sand	Within
6	22.5	.122	9.3	708.9	.0432	306.3	432.5542	20	.10436	Sand Avg.	Sand	Within
7	27.5	.122	8.6	1023	.03501	358.22	519.62	25	.10418	Sand Avg.	Sand	Within
8	32.5	.122	9.5	894	.04556	407.29	485.7545	30	.1004	Sand Avg.	Sand	Within
9	37.5	.122	10.5	799.2	.0564	450.75	459.2781	35	.09388	Sand Avg.	Sand	Within
10	42.5	.122	10.5	870.4	.05625	489.61	479.3	40	.08252	Sand Avg.	Sand	Within
11	47.5	.122	9.4	1149.3	.04546	522.5	550.763	45	.07888	Sand Avg.	Sand	Within
12	52.5	.122	8.900001	1434.2	.03808	546.12	615.2518	50	.08356	Sand Avg.	Sand	Within
13	60	.122	9.6	1274.3	.04752	605.48	579.9411	55	.08791	Sand Avg.	Sand	Within
14	70	.122	10.8	1135.4	.05986	679.6	547.4223	65	.0815	Sand Avg.	Sand	Within
15	80	.122	10.1	1394.3	.05199	724.86	606.6332	75	.07876	Sand Avg.	Sand	Within
16	90	.122	9.6	1591	.0472	750.89	648.0121	85	.08153	Sand Avg.	Sand	Within
17	100	.122	9.2	1849.1	.04208	778.03	698.5994	95	.07636	Sand Avg.	Sand	Within
18	108	.122	9.6	1746	.04691	819.15	678.8442	105	.08382	Sand Avg.	Sand	Within
19	Base							111	.09626			Within

Notes:
Period for Soil Column: .82 sec
Average Shear Wave Velocity for Soil Column: 544 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_07R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	1.25	.118	2.4	249.8	.00567	14.16	261.0858	0	.09489	Clay PI=20	Soil PI=30	Outcrop
2	3.75	.108	4	599.3	.00682	40.85	422.7058	2.5	.09147	Sand Avg.	Sand	Within
3	7.5	.122	5.2	685.8	.01179	80.84	425.4483	5	.08833	Sand Avg.	Sand	Within
4	12.5	.122	6.4	725	.01853	134.32	437.4385	10	.08246	Sand Avg.	Sand	Within
5	17.5	.122	7.5	730.9	.02522	184.31	439.2148	15	.07831	Sand Avg.	Sand	Within
6	22.5	.122	7.8	819.2	.02801	229.46	464.9893	20	.07265	Sand Avg.	Sand	Within
7	27.5	.122	7.2	1164.3	.02315	269.51	554.3455	25	.06542	Sand Avg.	Sand	Within
8	32.5	.122	8	1031.8	.02989	308.41	521.8502	30	.06672	Sand Avg.	Sand	Within
9	37.5	.122	8.7	937.2	.03649	341.98	497.3523	35	.07045	Sand Avg.	Sand	Within
10	42.5	.122	8.6	1031.3	.03528	363.82	521.7237	40	.07841	Sand Avg.	Sand	Within
11	47.5	.122	7.8	1355.1	.02785	377.45	598.0447	45	.0794	Sand Avg.	Sand	Within
12	52.5	.122	7.2	1678	.02321	389.45	665.4938	50	.07628	Sand Avg.	Sand	Within
13	60	.122	7.8	1522.7	.02812	428.14	633.9503	55	.07453	Sand Avg.	Sand	Within
14	70	.122	8.8	1352	.03743	506.05	597.3603	65	.06605	Sand Avg.	Sand	Within
15	80	.122	8.6	1595.9	.03569	569.57	649.0092	75	.05944	Sand Avg.	Sand	Within
16	90	.122	8.6	1769.3	.03488	617.21	683.3588	85	.05412	Sand Avg.	Sand	Within
17	100	.122	8.299999	2026.5	.03213	651	731.3434	95	.05515	Sand Avg.	Sand	Within
18	108	.122	8.5	1953.7	.03401	664.45	718.0868	105	.05402	Sand Avg.	Sand	Within
19	Base							111	.05358			Within

Notes:
Period for Soil Column: .76 sec
Average Shear Wave Velocity for Soil Column: 582 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_08R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	1.25	.118	2.6	245.5	.00782	19.19	258.8289	0	.12957	Clay PI=20	Soil PI=30	Outcrop
2	3.75	.108	4.8	566.1	.00967	54.72	410.8304	2.5	.12276	Sand Avg.	Sand	Within
3	7.5	.122	6	642.3	.01648	105.86	411.7342	5	.12091	Sand Avg.	Sand	Within
4	12.5	.122	7.7	648.9	.02714	176.09	413.8442	10	.11751	Sand Avg.	Sand	Within
5	17.5	.122	8.8	642.4	.03771	242.26	411.7663	15	.10941	Sand Avg.	Sand	Within
6	22.5	.122	9.2	714.1	.04234	302.33	434.1377	20	.09774	Sand Avg.	Sand	Within
7	27.5	.122	8.5	1027.9	.03451	354.79	520.8629	25	.09419	Sand Avg.	Sand	Within
8	32.5	.122	9.3	905.6	.04396	398.13	488.8957	30	.09496	Sand Avg.	Sand	Within
9	37.5	.122	10.1	823.7	.05219	429.92	466.2647	35	.09464	Sand Avg.	Sand	Within
10	42.5	.122	9.8	917.7	.04904	450.01	492.151	40	.09214	Sand Avg.	Sand	Within
11	47.5	.122	8.8	1227.6	.03773	463.16	569.2151	45	.08941	Sand Avg.	Sand	Within
12	52.5	.122	8.2	1527.4	.03151	481.29	634.9279	50	.08797	Sand Avg.	Sand	Within
13	60	.122	8.8	1384.6	.03764	521.14	604.5193	55	.08687	Sand Avg.	Sand	Within
14	70	.122	9.5	1251.1	.04657	582.64	574.6376	65	.08707	Sand Avg.	Sand	Within
15	80	.122	9.3	1487.2	.04371	650.05	626.5168	75	.086	Sand Avg.	Sand	Within
16	90	.122	9.2	1655.1	.04234	700.72	660.9371	85	.08896	Sand Avg.	Sand	Within
17	100	.122	9.099999	1868.5	.04085	763.36	702.2546	95	.08907	Sand Avg.	Sand	Within
18	108	.122	9.5	1758.5	.04602	809.22	681.2699	105	.09174	Sand Avg.	Sand	Within
19	Base							111	.09083			Within

Notes:
Period for Soil Column: .8 sec
Average Shear Wave Velocity for Soil Column: 556 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_09R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	1.25	.118	2.6	246.9	.00706	17.43	259.5658	0	.12078	Clay PI=20	Soil PI=30	Outcrop
2	3.75	.108	4.5	578.8	.00846	48.97	415.4132	2.5	.11495	Sand Avg.	Sand	Within
3	7.5	.122	5.5	667.8	.01371	91.55	419.8278	5	.10767	Sand Avg.	Sand	Within
4	12.5	.122	6.7	706	.02038	143.87	431.6685	10	.08815	Sand Avg.	Sand	Within
5	17.5	.122	7.6	721.2	.02635	190.06	436.2906	15	.0832	Sand Avg.	Sand	Within
6	22.5	.122	7.900001	812.3	.02878	233.75	463.0269	20	.08748	Sand Avg.	Sand	Within
7	27.5	.122	7.3	1156.1	.02371	274.15	552.3899	25	.0891	Sand Avg.	Sand	Within
8	32.5	.122	8.1	1029.8	.03008	309.75	521.3441	30	.08987	Sand Avg.	Sand	Within
9	37.5	.122	8.6	943.8	.03574	337.32	499.1005	35	.08703	Sand Avg.	Sand	Within
10	42.5	.122	8.8	1006.3	.03793	381.68	515.3613	40	.09109	Sand Avg.	Sand	Within
11	47.5	.122	8.5	1273.4	.03384	430.89	579.7363	45	.09441	Sand Avg.	Sand	Within
12	52.5	.122	8.2	1536.5	.03094	475.33	636.8165	50	.09365	Sand Avg.	Sand	Within
13	60	.122	9	1364	.03931	536.25	600.0055	55	.09207	Sand Avg.	Sand	Within
14	70	.122	9.700001	1235.7	.04816	595.12	571.09	65	.08688	Sand Avg.	Sand	Within
15	80	.122	9.3	1496.3	.04298	643.05	628.4307	75	.09275	Sand Avg.	Sand	Within
16	90	.122	9.2	1663.9	.04171	693.98	662.6918	85	.0911	Sand Avg.	Sand	Within
17	100	.122	8.900001	1910.6	.03832	732.06	710.1219	95	.08734	Sand Avg.	Sand	Within
18	108	.122	9.099999	1837.1	.04074	748.4	696.3289	105	.0823	Sand Avg.	Sand	Within
19	Base							111	.08248			Within

Notes:
Period for Soil Column: .78 sec
Average Shear Wave Velocity for Soil Column: 566 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_10R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	5	.09	3.8	704.4	.00616	43.37	502.0146	0	.09658	Sand Avg.	Sand	Outcrop
2	15	.09	5.3	889.5	.01225	109	564.1306	10	.07779	Sand Avg.	Sand	Within
3	25	.09	5.6	1060	.0143	151.56	615.8282	20	.06757	Sand Avg.	Sand	Within
4	35	.09	5.8	1209.8	.01527	184.69	657.9055	30	.06464	Sand Avg.	Sand	Within
5	45	.09	5.9	1340.8	.01581	211.99	692.6099	40	.06682	Sand Avg.	Sand	Within
6	55	.09	6	1458.6	.01625	236.97	722.3951	50	.05828	Sand Avg.	Sand	Within
7	65	.09	5.9	1579.8	.01607	253.83	751.8094	60	.06301	Sand Avg.	Sand	Within
8	75	.09	5.9	1690.9	.01601	270.8	777.7959	70	.05968	Sand Avg.	Sand	Within
9	85	.09	5.8	1808.1	.01553	280.81	804.2997	80	.04794	Sand Avg.	Sand	Within
10	95	.09	5.6	1937.9	.01422	275.51	832.6689	90	.05804	Sand Avg.	Sand	Within
11	101.25	.118	9.9	115.9	.22709	263.29	177.8397	100	.06842	Clay PI=20	Soil PI=30	Within
12	103.75	.108	12.5	287.7	.08545	245.85	292.8775	102.5	.11404	Sand Avg.	Sand	Within
13	107.5	.122	10.5	431.8	.05633	243.23	337.5898	105	.1167	Sand Avg.	Sand	Within
14	112.5	.122	9.700001	535.7	.04786	256.35	376.0182	110	.11177	Sand Avg.	Sand	Within
15	117.5	.122	9.3	609.8	.04373	266.7	401.1823	115	.1191	Sand Avg.	Sand	Within
16	122.5	.122	8.900001	734.9	.03901	286.7	440.415	120	.12687	Sand Avg.	Sand	Within
17	127.5	.122	7.900001	1091.5	.02865	312.72	536.735	125	.11852	Sand Avg.	Sand	Within
18	132.5	.122	8.4	996.2	.03333	332	512.7684	130	.11558	Sand Avg.	Sand	Within
19	137.5	.122	8.7	941.3	.03602	339.06	498.439	135	.11652	Sand Avg.	Sand	Within
20	142.5	.122	8.2	1066.8	.03183	339.53	530.6273	140	.11977	Sand Avg.	Sand	Within
21	147.5	.122	7.3	1412.8	.02428	343.07	610.6444	145	.12428	Sand Avg.	Sand	Within
22	152.5	.122	6.7	1746.3	.0202	352.81	678.9026	150	.12527	Sand Avg.	Sand	Within
23	160	.122	7.1	1625.5	.02263	367.86	655.0003	155	.12143	Sand Avg.	Sand	Within
24	170	.122	7.1	1579.5	.02286	361.05	645.6659	165	.12993	Sand Avg.	Sand	Within
25	180	.122	6.8	1882.1	.02092	393.81	704.8057	175	.13285	Sand Avg.	Sand	Within
26	190	.122	6.8	2076.7	.02071	430.14	740.3463	185	.16175	Sand Avg.	Sand	Within
27	200	.122	6.5	2368.7	.01909	452.11	790.6842	195	.17664	Sand Avg.	Sand	Within
28	208	.122	6.8	2273.5	.02073	471.21	774.6321	205	.15768	Sand Avg.	Sand	Within
29	Base							211	.17013			Within

Notes:
Period for Soil Column: 1.32 sec
Average Shear Wave Velocity for Soil Column: 640 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
C:\PROGRAM FILES\GEOMOTIONS\QUAKES\SHAKE\SIMULATED\L02_03R.EQ

Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	5	.09	3	741	.00413	30.64	514.8915	0	.06945	Sand Avg.	Sand	Outcrop
2	15	.09	4.5	945.9	.00852	80.57	581.7405	10	.05618	Sand Avg.	Sand	Within
3	25	.09	5.1	1109.3	.01103	122.41	629.9865	20	.05123	Sand Avg.	Sand	Within
4	35	.09	5.4	1243.3	.01311	162.95	666.9521	30	.04656	Sand Avg.	Sand	Within
5	45	.09	5.6	1372	.01409	193.35	700.6219	40	.04084	Sand Avg.	Sand	Within
6	55	.09	5.6	1501.3	.0142	213.19	732.8928	50	.04328	Sand Avg.	Sand	Within
7	65	.09	5.6	1619.6	.01428	231.34	761.2206	60	.04639	Sand Avg.	Sand	Within
8	75	.09	5.6	1730.1	.01437	248.64	786.76	70	.05034	Sand Avg.	Sand	Within
9	85	.09	5.7	1826.4	.01476	269.48	808.3597	80	.05241	Sand Avg.	Sand	Within
10	95	.09	5.8	1914.5	.0152	291.05	827.6265	90	.0554	Sand Avg.	Sand	Within
11	101.25	.118	10.9	98.1	.31769	311.52	163.6144	100	.05468	Clay PI=20	Soil PI=30	Within
12	103.75	.108	15.2	212.6	.14858	315.94	251.7664	102.5	.07969	Sand Avg.	Sand	Within
13	107.5	.122	12.9	346.5	.09268	321.18	302.4124	105	.08735	Sand Avg.	Sand	Within
14	112.5	.122	11.9	445.5	.07515	334.84	342.9035	110	.08438	Sand Avg.	Sand	Within
15	117.5	.122	11.2	520.4	.06565	341.65	370.6096	115	.08067	Sand Avg.	Sand	Within
16	122.5	.122	9.9	669.8	.05036	337.26	420.456	120	.09029	Sand Avg.	Sand	Within
17	127.5	.122	8.1	1067.4	.03073	327.99	530.7764	125	.09424	Sand Avg.	Sand	Within
18	132.5	.122	8.5	982.4	.03477	341.61	509.2045	130	.09449	Sand Avg.	Sand	Within
19	137.5	.122	9	913.3	.03935	359.36	490.9698	135	.09319	Sand Avg.	Sand	Within
20	142.5	.122	8.7	1016	.03688	374.71	517.8392	140	.09439	Sand Avg.	Sand	Within
21	147.5	.122	7.900001	1339.8	.02889	387.09	594.6591	145	.09516	Sand Avg.	Sand	Within
22	152.5	.122	7.4	1651.6	.02449	404.46	660.2379	150	.09124	Sand Avg.	Sand	Within
23	160	.122	7.900001	1509.4	.02891	436.45	631.1756	155	.08791	Sand Avg.	Sand	Within
24	170	.122	8.4	1400.1	.03372	472.05	607.8936	165	.07892	Sand Avg.	Sand	Within
25	180	.122	8	1690.2	.02992	505.75	667.9086	175	.08424	Sand Avg.	Sand	Within
26	190	.122	7.8	1910.1	.02746	524.56	710.029	185	.08702	Sand Avg.	Sand	Within
27	200	.122	7.2	2228.5	.02361	526.21	766.9276	195	.07981	Sand Avg.	Sand	Within
28	208	.122	7.3	2178.4	.02401	522.94	758.2577	205	.07571	Sand Avg.	Sand	Within
29	Base							211	.07564			Within

Notes:
Period for Soil Column: 1.34 sec
Average Shear Wave Velocity for Soil Column: 631 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
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Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	.75	.12	.2	1996.8	.00053	10.58	731.9891	0	.11749	Clay PI=10	Soil PI=15	Outcrop
2	2.75	.12	1.6	1984.4	.00196	38.84	729.7128	1.5	.11681	Clay PI=10	Soil PI=15	Within
3	5.25	.12	2.3	1958.5	.00374	73.16	724.9351	4	.11276	Clay PI=10	Soil PI=15	Within
4	7.75	.12	2.7	1929.3	.00546	105.33	719.5106	6.5	.10531	Clay PI=10	Soil PI=15	Within
5	10.25	.12	3.1	1886.1	.00714	134.57	711.4095	9	.09505	Clay PI=10	Soil PI=15	Within
6	12.75	.12	3.4	1855.2	.00864	160.23	705.5579	11.5	.08651	Clay PI=10	Soil PI=15	Within
7	15.25	.12	3.7	1832.7	.00993	181.99	701.2664	14	.0816	Clay PI=10	Soil PI=15	Within
8	17.75	.12	3.9	1816.1	.01101	199.89	698.0832	16.5	.08035	Clay PI=10	Soil PI=15	Within
9	20.25	.12	4	1803.7	.01188	214.28	695.6959	19	.08349	Clay PI=10	Soil PI=15	Within
10	22.75	.12	4.2	1791.8	.01279	229.22	693.3972	21.5	.08503	Clay PI=10	Soil PI=15	Within
11	25.25	.118	9.4	124.3	.19409	241.29	184.1715	24	.08407	Clay PI=20	Soil PI=30	Within
12	27.75	.108	12.1	299.6	.07829	234.61	298.8732	26.5	.10852	Sand Avg.	Sand	Within
13	31.5	.122	10.2	442.5	.05293	234.19	341.7469	29	.1062	Sand Avg.	Sand	Within
14	36.5	.122	9.700001	533.1	.04848	258.43	375.1046	34	.11496	Sand Avg.	Sand	Within
15	41.5	.122	9.4	604.7	.04477	270.73	399.5011	39	.11573	Sand Avg.	Sand	Within
16	46.5	.122	9.099999	724.8	.04059	294.19	437.3782	44	.117	Sand Avg.	Sand	Within
17	51.5	.122	8	1076.1	.02998	322.56	532.9351	49	.12256	Sand Avg.	Sand	Within
18	56.5	.122	8.7	967.2	.03641	352.22	505.2498	54	.11973	Sand Avg.	Sand	Within
19	61.5	.122	9.099999	897.3	.04139	371.34	486.6501	59	.11834	Sand Avg.	Sand	Within
20	66.5	.122	8.900001	1000.4	.03859	386.02	513.8483	64	.12849	Sand Avg.	Sand	Within
21	71.5	.122	8.2	1306.5	.03127	408.58	587.2225	69	.13454	Sand Avg.	Sand	Within
22	76.5	.122	7.7	1598.5	.02728	436.04	649.5377	74	.14187	Sand Avg.	Sand	Within
23	84	.122	8.4	1446.4	.03303	477.81	617.863	79	.14217	Sand Avg.	Sand	Within
24	94	.122	8.7	1365	.03639	496.68	600.2253	89	.12803	Sand Avg.	Sand	Within
25	104	.122	7.8	1723.1	.02815	485.06	674.3778	99	.14241	Sand Avg.	Sand	Within
26	114	.122	7.5	1958.9	.02529	495.47	719.0418	109	.16544	Sand Avg.	Sand	Within
27	124	.122	7.3	2212.3	.02421	535.67	764.1349	119	.168	Sand Avg.	Sand	Within
28	132	.122	7.4	2151.7	.02503	538.53	753.5965	129	.14751	Sand Avg.	Sand	Within
29	Base							135	.1656			Within

Notes:
Period for Soil Column: .9 sec
Average Shear Wave Velocity for Soil Column: 598 ft/sec

Soil Profile No. 2
Analysis No. 1 - Profile No. 1 - Soil Pro-TUJ352
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Layer	Depth to Middle of Layer (ft)	Total Unit Weight (kcf)	Damping Used (%)	Shear Modulus (ksf)	Maximum Shear Strain (%)	Maximum Shear Stress (psf)	Shear Wave Velocity (fps)	Depth to Top of Layer (ft)	Peak Acceleration (g)	G/Gmax Curve	Damping Curve	Type of Motion
1	.75	.12	------	1997.6	.00039	7.77	732.1357	0	.0863	Clay PI=10	Soil PI=15	Outcrop
2	2.75	.12	1.3	1994.2	.00142	28.25	731.5124	1.5	.08615	Clay PI=10	Soil PI=15	Within
3	5.25	.12	1.9	1971.3	.00271	53.47	727.3002	4	.08526	Clay PI=10	Soil PI=15	Within
4	7.75	.12	2.3	1955.9	.00399	78.1	724.4537	6.5	.08358	Clay PI=10	Soil PI=15	Within
5	10.25	.12	2.6	1935	.00527	101.97	720.5727	9	.08119	Clay PI=10	Soil PI=15	Within
6	12.75	.12	2.9	1898.6	.0066	125.34	713.7631	11.5	.07883	Clay PI=10	Soil PI=15	Within
7	15.25	.12	3.3	1868.9	.00793	148.26	708.1583	14	.07766	Clay PI=10	Soil PI=15	Within
8	17.75	.12	3.5	1843.7	.00927	170.99	703.3677	16.5	.07681	Clay PI=10	Soil PI=15	Within
9	20.25	.12	3.8	1821.6	.01064	193.74	699.1395	19	.07577	Clay PI=10	Soil PI=15	Within
10	22.75	.12	4	1802.4	.01198	215.92	695.4452	21.5	.07415	Clay PI=10	Soil PI=15	Within
11	25.25	.118	9.4	125	.19169	239.59	184.6894	24	.07196	Clay PI=20	Soil PI=30	Within
12	27.75	.108	12.8	279.3	.09088	253.87	288.5702	26.5	.07825	Sand Avg.	Sand	Within
13	31.5	.122	11.2	406.2	.06542	265.75	327.4296	29	.08417	Sand Avg.	Sand	Within
14	36.5	.122	10.2	512.5	.05373	275.4	367.7858	34	.08524	Sand Avg.	Sand	Within
15	41.5	.122	10	575.1	.05123	294.6	389.6007	39	.0768	Sand Avg.	Sand	Within
16	46.5	.122	9.6	686.9	.04712	323.64	425.7893	44	.07675	Sand Avg.	Sand	Within
17	51.5	.122	8.4	1035.4	.03376	349.61	522.7597	49	.08324	Sand Avg.	Sand	Within
18	56.5	.122	8.900001	945.7	.03889	367.82	499.6026	54	.08268	Sand Avg.	Sand	Within
19	61.5	.122	9.2	887.5	.04268	378.75	483.9854	59	.07797	Sand Avg.	Sand	Within
20	66.5	.122	8.900001	1000.8	.03854	385.68	513.9509	64	.07772	Sand Avg.	Sand	Within
21	71.5	.122	8	1326.8	.02979	395.33	591.767	69	.07634	Sand Avg.	Sand	Within
22	76.5	.122	7.4	1642.4	.02495	409.76	658.3965	74	.07616	Sand Avg.	Sand	Within
23	84	.122	7.900001	1517.7	.02841	431.24	632.9086	79	.0733	Sand Avg.	Sand	Within
24	94	.122	8.2	1434.5	.0313	448.96	615.3161	89	.07755	Sand Avg.	Sand	Within
25	104	.122	7.7	1750.2	.02676	468.35	679.6602	99	.07438	Sand Avg.	Sand	Within
26	114	.122	7.4	1979.3	.02443	483.53	722.7762	109	.08411	Sand Avg.	Sand	Within
27	124	.122	7.1	2265.3	.02234	506.03	773.2339	119	.08319	Sand Avg.	Sand	Within
28	132	.122	7.3	2171.5	.02427	527.06	757.0559	129	.08225	Sand Avg.	Sand	Within
29	Base							135	.08006			Within

Notes:
Period for Soil Column: .9 sec
Average Shear Wave Velocity for Soil Column: 600 ft/sec

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Appendix D

RESULTS OF LIQUEFACTION ANALYSES
Revised August 2013

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Ameren Missouri: Labadie UWL
Liquefaction Factor of Safety vs. Height of Ash

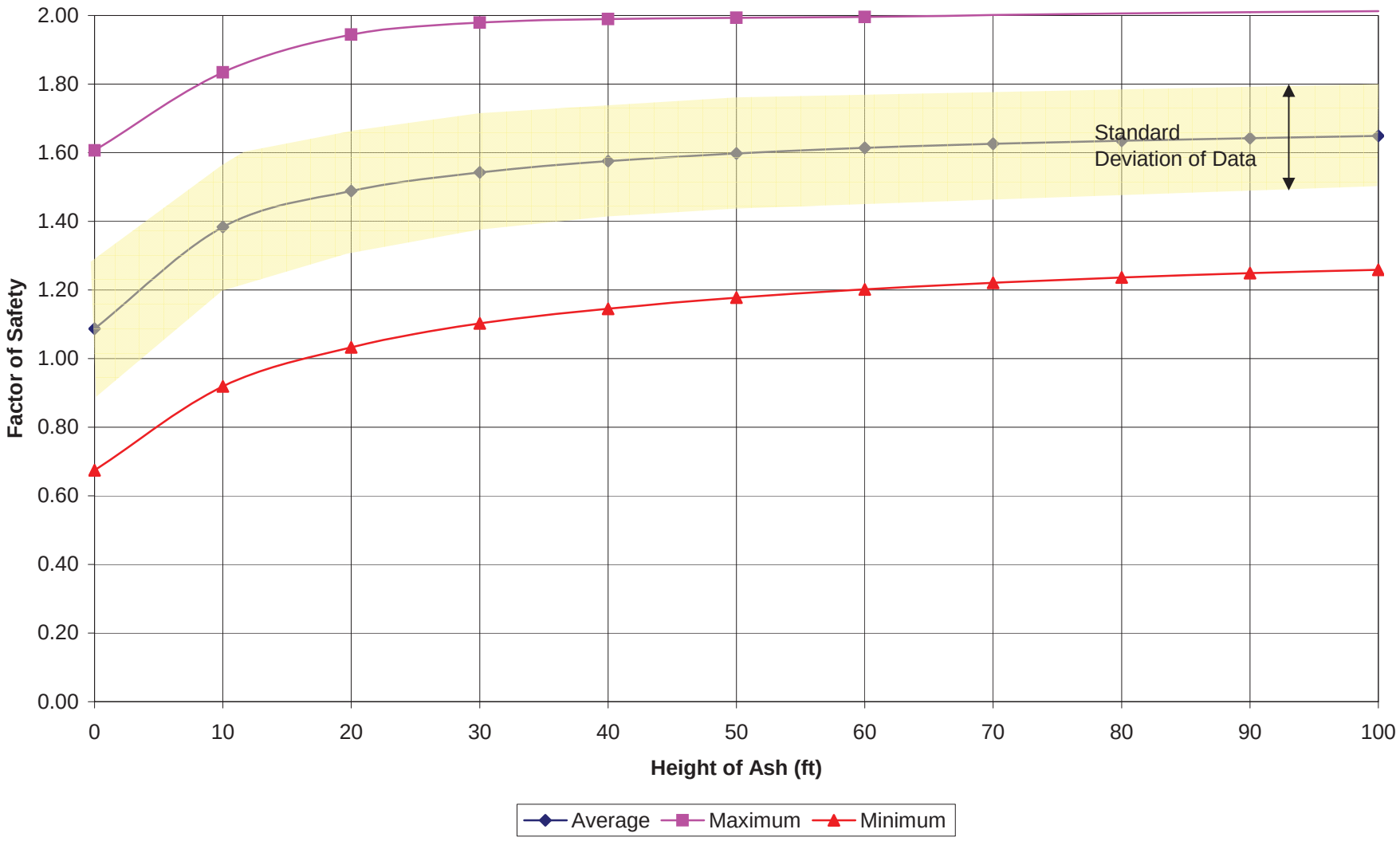


Figure D-1

Ameren Missouri: Labadie UWL
Liquefaction Settlement vs Height of Ash

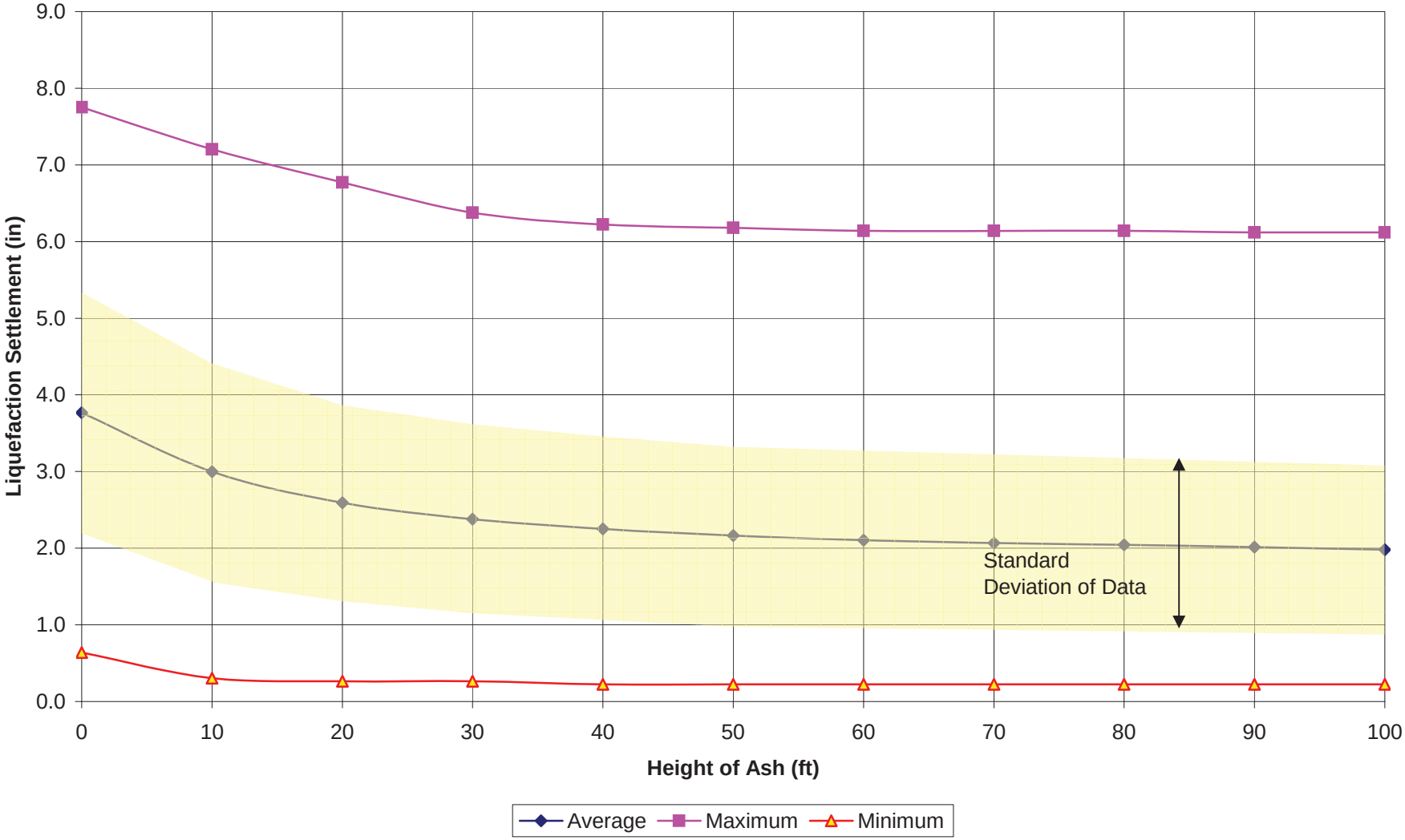
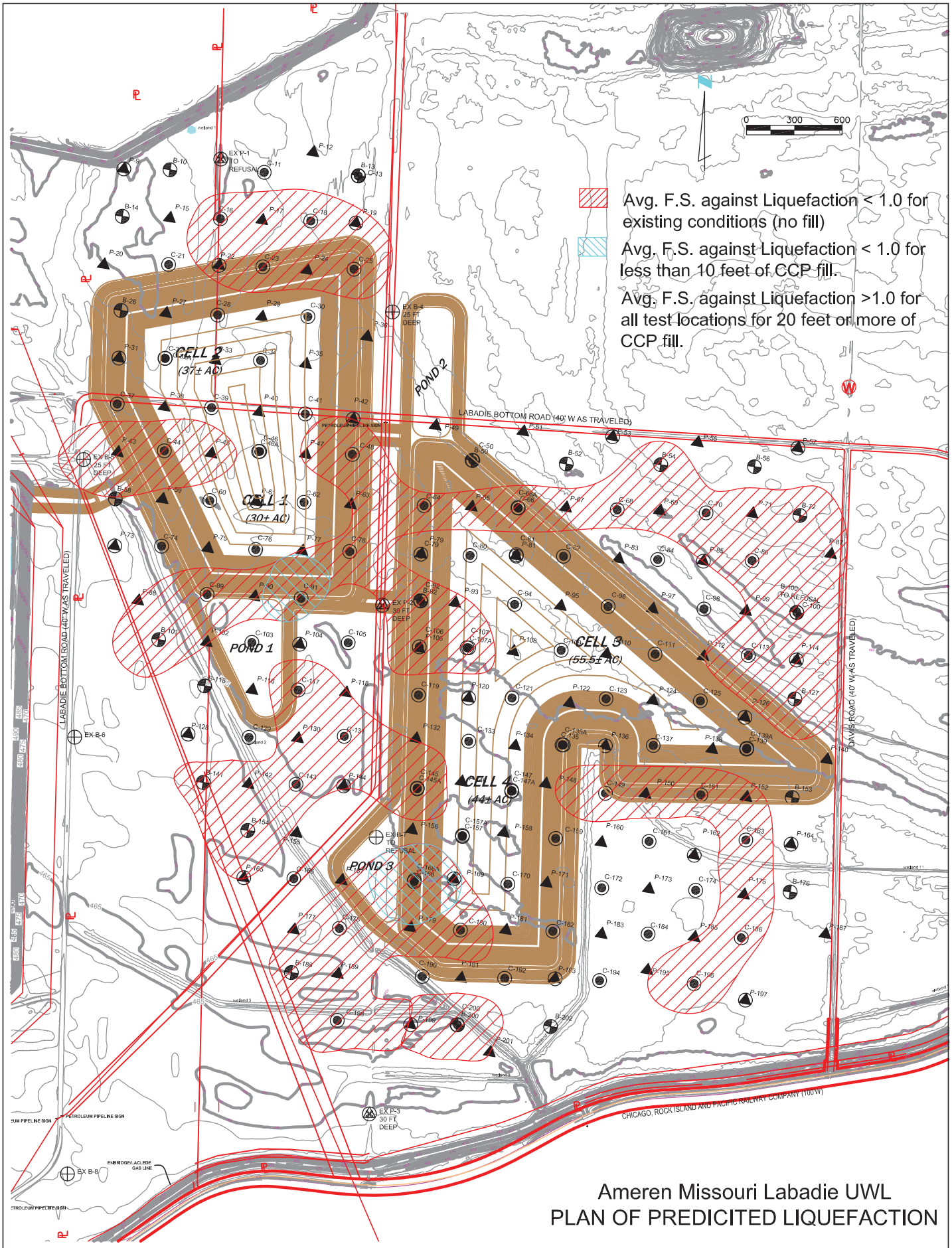


Figure D-2



Ameren Missouri Labadie UWL
PLAN OF PREDICITED LIQUEFACTION

REITZ & JENS, INC.

Figure D-3

Ameren Missouri: Labadie UWL
Liquefaction Analysis
0' of ASH M: 7.5
PGA: 2% probability of exceedence in 50 yrs: 0.1792 GW: 0.0'

C-11		C-13		C-16		C-18		C-21		C-23		C-25		C-28		C-30		C-32		C-34		C-37		C-39	
S (ft)	0.32	S (ft)	0.19	S (ft)	0.40	S (ft)	0.51	S (ft)	0.28	S (ft)	0.45	S (ft)	0.42	S (ft)	0.35	S (ft)	0.33	S (ft)	0.26	S (ft)	0.27	S (ft)	0.31	S (ft)	0.18
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.39	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.45	6.25	0.26	6.25	n.a	6.25	0.53	6.25	0.59	6.25	n.a	6.25	0.31	6.25	n.a	6.25	0.37	6.25	n.a	6.25	n.a
8.75	n.a	8.75	0.66	8.75	0.55	8.75	n.a	8.75	n.a	8.75	0.48	8.75	0.42	8.75	0.32	8.75	0.81	8.75	0.51	8.75	n.a	8.75	0.40	8.75	n.a
11.25	0.26	11.25	2.00	11.25	0.34	11.25	0.47	11.25	0.54	11.25	0.63	11.25	1.97	11.25	n.a	11.25	1.82	11.25	1.39	11.25	n.a	11.25	1.47	11.25	0.60
13.75	n.a	13.75	2.00	13.75	0.53	13.75	0.92	13.75	2.00	13.75	1.03	13.75	0.47	13.75	n.a	13.75	2.00	13.75	1.12	13.75	0.46	13.75	0.97	13.75	1.08
16.25	0.28	16.25	2.00	16.25	0.79	16.25	0.98	16.25	2.00	16.25	1.00	16.25	1.23	16.25	0.76	16.25	0.86	16.25	0.55	16.25	2.11	16.25	2.00	16.25	1.56
18.75	2.00	18.75	2.00	18.75	0.84	18.75	0.61	18.75	1.92	18.75	0.44	18.75	0.69	18.75	0.79	18.75	1.06	18.75	1.27	18.75	1.20	18.75	2.00	18.75	0.82
21.25	1.64	21.25	1.28	21.25	1.42	21.25	0.48	21.25	0.75	21.25	1.08	21.25	1.24	21.25	0.89	21.25	0.93	21.25	1.22	21.25	2.00	21.25	1.07	21.25	2.00
23.75	1.29	23.75	2.00	23.75	2.00	23.75	0.84	23.75	0.96	23.75	2.00	23.75	0.63	23.75	1.34	23.75	1.05	23.75	0.76	23.75	2.00	23.75	0.58	23.75	0.82
26.25	2.00	26.25	0.83	26.25	1.32	26.25	2.00	26.25	0.98	26.25	2.00	26.25	0.67	26.25	1.27	26.25	2.00	26.25	0.74	26.25	2.00	26.25	0.71	26.25	1.40
28.75	2.00	28.75	1.96	28.75	2.00	28.75	2.00	28.75	0.94	28.75	0.84	28.75	0.95	28.75	1.18	28.75	2.00	28.75	2.00	28.75	0.99	28.75	2.00	28.75	2.00
31.25	2.12	31.25	0.84	31.25	2.00	31.25	0.87	31.25	1.43	31.25	2.00	31.25	1.52	31.25	0.86	31.25	1.52	31.25	2.00	31.25	1.78	31.25	0.73	31.25	2.00
33.75	2.00	33.75	0.92	33.75	2.00	33.75	2.00	33.75	0.96	33.75	2.00	33.75	1.71	33.75	2.00	33.75	0.63	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.07
		36.25	2.00	36.25	2.00	36.25	1.12	36.25	0.87	36.25	2.00	36.25	2.00	36.25	0.74	36.25	2.00	36.25	2.00	36.25	0.60	36.25	2.00	36.25	1.92
		38.75	2.00																			38.75	2.00		
		41.25	2.00																			41.25	2.00		
Inv Avg	1.02	Inv Avg	1.44	Inv Avg	0.92	Inv Avg	0.83	Inv Avg	1.18	Inv Avg	0.86	Inv Avg	0.90	Inv Avg	1.02	Inv Avg	1.04	Inv Avg	1.14	Inv Avg	1.11	Inv Avg	1.16	Inv Avg	1.38
Risk	Moderate	Risk	Low	Risk	High	Risk	High	Risk	Moderate	Risk	High	Risk	High	Risk	Moderate	Risk	Moderate	Risk	Moderate	Risk	Moderate	Risk	Moderate	Risk	Low

Figure D-4

C-41		C-44		C-46		C-46A		C-48		C-50		C-60		C-62		C-64		C-66		C-66A		C-68		C-70	
S (ft)	0.24	S (ft)	0.44	S (ft)	0.30	S (ft)	0.34	S (ft)	0.45	S (ft)	0.31	S (ft)	0.21	S (ft)	0.18	S (ft)	0.50	S (ft)	0.05	S (ft)	0.32	S (ft)	0.38	S (ft)	0.41
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	0.38	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.47	6.25	n.a	6.25	n.a	6.25	0.38	6.25	0.28	6.25	n.a	6.25	0.39	6.25	n.a	6.25	n.a	6.25	0.39	6.25	0.33	6.25	0.73
8.75	n.a	8.75	0.47	8.75	n.a	8.75	n.a	8.75	0.47	8.75	1.13	8.75	0.35	8.75	n.a	8.75	0.29	8.75	n.a	8.75	0.41	8.75	0.67	8.75	0.78
11.25	0.36	11.25	0.83	11.25	0.93	11.25	0.75	11.25	0.71	11.25	0.48	11.25	0.72	11.25	n.a	11.25	0.62	11.25	2.00	11.25	2.05	11.25	0.56	11.25	0.81
13.75	0.58	13.75	0.70	13.75	0.53	13.75	0.54	13.75	0.58	13.75	1.91	13.75	0.83	13.75	0.72	13.75	0.59	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.57
16.25	0.58	16.25	0.74	16.25	1.09	16.25	1.00	16.25	0.37	16.25	2.00	16.25	1.43	16.25	2.00	16.25	0.31	16.25	0.93	16.25	0.78	16.25	2.00	16.25	n.a
18.75	1.50	18.75	0.78	18.75	1.16	18.75	1.83	18.75	2.00	18.75	2.00	18.75	1.26	18.75	2.00	18.75	0.98	18.75	1.25	18.75	1.00	18.75	2.14	18.75	0.55
21.25	1.51	21.25	0.58	21.25	0.60	21.25	0.78	21.25	0.67	21.25	2.00	21.25	1.88	21.25	2.00	21.25	1.14	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.39
23.75	1.12	23.75	0.72	23.75	0.84	23.75	0.88	23.75	1.88	23.75	1.17	23.75	2.00	23.75	1.05	23.75	2.00	23.75	1.18	23.75	2.00	23.75	0.65	23.75	1.12
26.25	1.40	26.25	2.00	26.25	0.75	26.25	0.90	26.25	2.00	26.25	2.00	26.25	2.14	26.25	1.18	26.25	2.00			26.25	2.00	26.25	0.67	26.25	1.23
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.14	28.75	2.00	28.75	2.00	28.75	2.00			28.75	1.67	28.75	2.00	28.75	0.74
31.25	1.74	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.91	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.15			31.25	0.98	31.25	2.00	31.25	2.00
33.75	2.00	33.75	n.a	33.75	1.73	33.75	2.00	33.75	2.12	33.75	2.00			33.75	1.83	33.75	0.78			33.75	n.a	33.75	1.37	33.75	1.63
36.25	2.00	36.25	n.a	36.25	1.02	36.25	0.55	36.25	0.95	36.25	0.75			36.25	2.00	36.25	0.60					36.25	0.85	36.25	0.47
				38.75	1.22	38.75	1.73			38.75	2.00														
				41.25	2.13	41.25	1.64			41.25	2.00														
				43.75	2.00	43.75	2.00																		
Inv Avg	1.14	Inv Avg	0.93	Inv Avg	1.18	Inv Avg	1.18	Inv Avg	0.87	Inv Avg	1.13	Inv Avg	1.19	Inv Avg	1.33	Inv Avg	0.82	Inv Avg	1.61	Inv Avg	0.93	Inv Avg	0.99	Inv Avg	0.94
Risk	Moderate	Risk	High	Risk	Moderate	Risk	Moderate	Risk	High	Risk	Moderate	Risk	Moderate	Risk	Low	Risk	High	Risk	Low	Risk	High	Risk	High	Risk	High

Figure D-4

C-74		C-76		C-78		C-79		C-80		C-81		C-82		C-84		C-86		C-89		C-91		C-92		C-94	
S (ft)	0.32	S (ft)	0.16	S (ft)	0.42	S (ft)	0.27	S (ft)	0.28	S (ft)	0.27	S (ft)	0.10	S (ft)	0.26	S (ft)	0.39	S (ft)	0.46	S (ft)	0.65	S (ft)	0.22	S (ft)	0.23
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.41	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.40	6.25	0.47	6.25	0.34	6.25	n.a	6.25	n.a	6.25	n.a	6.25	0.85	6.25	n.a	6.25	n.a	6.25	0.41	6.25	0.41
8.75	n.a	8.75	n.a	8.75	n.a	8.75	0.62	8.75	n.a	8.75	0.46	8.75	n.a	8.75	0.58	8.75	0.43	8.75	0.50	8.75	0.32	8.75	0.61	8.75	0.70
11.25	n.a	11.25	n.a	11.25	0.30	11.25	n.a	11.25	n.a	11.25	0.32	11.25	n.a	11.25	0.82	11.25	0.59	11.25	0.59	11.25	0.43	11.25	0.43	11.25	n.a
13.75	0.29	13.75	0.40	13.75	0.38	13.75	0.56	13.75	0.39	13.75	1.21	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.62	13.75	0.34	13.75	1.74	13.75	n.a
16.25	0.55	16.25	0.75	16.25	2.00	16.25	1.03	16.25	0.59	16.25	1.92	16.25	2.00	16.25	1.15	16.25	1.29	16.25	0.55	16.25	0.62	16.25	2.00	16.25	0.74
18.75	1.13	18.75	1.13	18.75	1.70	18.75	2.00	18.75	2.00	18.75	0.68	18.75	1.23	18.75	1.37	18.75	1.96	18.75	0.44	18.75	0.78	18.75	2.00	18.75	1.03
21.25	0.68	21.25	2.00	21.25	0.73	21.25	1.43	21.25	1.03	21.25	1.15	21.25	2.00	21.25	1.16	21.25	2.00	21.25	0.85	21.25	1.69	21.25	2.00	21.25	2.00
23.75	1.75	23.75	2.00	23.75	2.00	23.75	0.67	23.75	2.00	23.75	1.88	23.75	2.00	23.75	0.91	23.75	0.66	23.75	0.84	23.75	1.26	23.75	2.00	23.75	1.37
26.25	1.29	26.25	2.00	26.25	0.92	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.08	26.25	0.43			26.25	2.00
28.75	1.11	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.95	28.75	1.23	28.75	1.06	28.75	0.57			28.75	2.00
31.25	0.78	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.16	31.25	2.00	31.25	2.11	31.25	2.00	31.25	0.97	31.25	0.78	31.25	0.51			31.25	1.28
33.75	n.a	33.75	2.00	33.75	0.87	33.75	2.00	33.75	1.78	33.75	1.20	33.75	1.43	33.75	2.00	33.75	1.09	33.75	2.00	33.75	1.07			33.75	1.13
36.25	n.a	36.25	2.00	36.25	1.75	36.25	2.00	36.25	2.00	36.25	2.00	36.25	0.48	36.25	0.38	36.25	1.05	36.25	1.96	36.25	0.88			36.25	2.00
Inv Avg	1.03	Inv Avg	1.40	Inv Avg	0.90	Inv Avg	1.14	Inv Avg	1.06	Inv Avg	1.09	Inv Avg	1.57	Inv Avg	1.14	Inv Avg	0.93	Inv Avg	0.88	Inv Avg	0.67	Inv Avg	1.00	Inv Avg	1.19
Risk	Moderate	Risk	Low	Risk	High	Risk	Moderate	Risk	Moderate	Risk	Moderate	Risk	Low	Risk	Moderate	Risk	High	Risk	High	Risk	High	Risk	Moderate	Risk	Moderate

Figure D-4

C-96		C-98		C-100		C-103		C-105		C-106		C-107		C-107A		C-109		C-111		C-113		C-117		C-119	
S (ft)	0.23	S (ft)	0.30	S (ft)	0.28	S (ft)	0.28	S (ft)	0.15	S (ft)	0.48	S (ft)	0.28	S (ft)	0.25	S (ft)	0.30	S (ft)	0.24	S (ft)	0.42	S (ft)	0.44	S (ft)	0.17
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.37	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	1.31	6.25	n.a	6.25	n.a	6.25	0.47	6.25	0.36	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a
8.75	n.a	8.75	0.27	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.38	8.75	0.38	8.75	0.57	8.75	n.a	8.75	n.a	8.75	0.38	8.75	0.24	8.75	0.37
11.25	n.a	11.25	0.59	11.25	1.25	11.25	0.47	11.25	n.a	11.25	0.61	11.25	0.45	11.25	0.64	11.25	0.25	11.25	0.34	11.25	1.08	11.25	1.36	11.25	0.74
13.75	0.36	13.75	1.27	13.75	0.91	13.75	1.72	13.75	n.a	13.75	1.29	13.75	1.02	13.75	0.91	13.75	1.08	13.75	0.43	13.75	0.39	13.75	0.62	13.75	1.14
16.25	0.59	16.25	1.97	16.25	1.04	16.25	1.35	16.25	1.49	16.25	0.89	16.25	1.81	16.25	2.00	16.25	2.00	16.25	0.78	16.25	1.03	16.25	0.55	16.25	1.74
18.75	0.63	18.75	1.83	18.75	2.00	18.75	0.49	18.75	2.00	18.75	0.47	18.75	1.78	18.75	2.00	18.75	0.87	18.75	2.00	18.75	0.64	18.75	0.56	18.75	2.00
21.25	1.70	21.25	2.00	21.25	1.70	21.25	0.54	21.25	2.05	21.25	0.51	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.10	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	1.31	23.75	1.08	23.75	0.89	23.75	1.35	23.75	1.12	23.75	2.00	23.75	0.84	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00
26.25	1.34	26.25	2.00	26.25	1.64	26.25	0.88	26.25	2.00	26.25	0.93			26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.83	26.25	2.00	26.25	2.00
28.75	2.00	28.75	0.78	28.75	0.50	28.75	n.a	28.75	0.49	28.75	2.00			28.75	0.78	28.75	1.14	28.75	2.00	28.75	0.77	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.05	31.25	0.83	31.25	n.a	31.25	1.70	31.25	2.00			31.25	2.00	31.25	1.65	31.25	2.00	31.25	1.42	31.25	2.00	31.25	2.00
33.75	1.63	33.75	2.00			33.75	n.a	33.75	2.00	33.75	0.80			33.75	2.00	33.75	1.29	33.75	2.00	33.75	0.81	33.75	1.47	33.75	2.00
		36.25	2.00			36.25	n.a	36.25	0.74	36.25	1.21			36.25	2.00	36.25	0.92			36.25	0.93	36.25	1.16		
Inv Avg	1.16	Inv Avg	1.09	Inv Avg	0.99	Inv Avg	1.10	Inv Avg	1.44	Inv Avg	0.81	Inv Avg	0.85	Inv Avg	1.26	Inv Avg	1.12	Inv Avg	1.16	Inv Avg	0.90	Inv Avg	0.96	Inv Avg	1.33
Risk	Moderate	Risk	Moderate	Risk	High	Risk	Moderate	Risk	Low	Risk	High	Risk	High	Risk	Low	Risk	Moderate	Risk	Moderate	Risk	High	Risk	High	Risk	Low

Figure D-4

C-121		C-123		C-125		C-129		C-131		C-133		C-135		C-135A		C-137		C-139		C-139A		C-143		C-145	
S (ft)	0.22	S (ft)	0.24	S (ft)	0.30	S (ft)	0.38	S (ft)	0.48	S (ft)	0.18	S (ft)	0.07	S (ft)	0.14	S (ft)	0.08	S (ft)	0.13	S (ft)	0.15	S (ft)	0.40	S (ft)	0.28
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.29	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.37	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	0.27	6.25	0.32
8.75	n.a	8.75	1.99	8.75	n.a	8.75	n.a	8.75	0.32	8.75	0.57	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	0.80	8.75	0.83
11.25	0.58	11.25	1.13	11.25	n.a	11.25	n.a	11.25	0.28	11.25	1.12	11.25	0.54	11.25	0.54	11.25	n.a	11.25	n.a	11.25	n.a	11.25	0.96	11.25	0.51
13.75	2.00	13.75	2.00	13.75	0.47	13.75	n.a	13.75	0.59	13.75	1.30	13.75	2.00	13.75	2.00	13.75	1.19	13.75	0.30	13.75	0.38	13.75	1.44	13.75	2.00
16.25	2.00	16.25	1.79	16.25	0.93	16.25	0.26	16.25	0.72	16.25	2.00	16.25	2.00	16.25	2.00	16.25	0.95	16.25	2.00	16.25	1.31	16.25	1.64	16.25	2.00
18.75	2.00	18.75	1.00	18.75	2.00	18.75	2.00	18.75	0.94	18.75	0.99	18.75	2.00	18.75	2.00	18.75	1.30	18.75	2.00	18.75	2.00	18.75	0.69	18.75	0.66
21.25	2.00	21.25	0.97	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.11			21.25	2.00	21.25	1.08	21.25	2.00	21.25	2.00	21.25	1.05	21.25	2.00
23.75	1.65	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.54	23.75	0.75			23.75	2.00	23.75	2.00			23.75	2.00	23.75	0.76	23.75	2.00
26.25	0.64	26.25	2.00	26.25	2.00	26.25	0.62	26.25	1.08	26.25	1.34			26.25	1.91	26.25	1.26			26.25	2.00	26.25	1.41	26.25	2.00
28.75	0.95	28.75	1.62	28.75	2.00	28.75	0.70	28.75	0.66	28.75	1.30			28.75	0.57	28.75	1.40			28.75	2.00	28.75	1.10		
31.25	0.58	31.25	0.60	31.25	0.71	31.25	2.00	31.25	1.57	31.25	2.00			31.25	1.52	31.25	2.00			31.25	0.76	31.25	0.86		
33.75	2.00	33.75	1.39	33.75	1.38	33.75	0.73	33.75	2.00	33.75	2.00					32.25	2.00					33.75	2.00		
		36.25	1.51	36.25	1.69	36.25	0.68	36.25	1.33	36.25	2.00											36.25	2.00		
Inv Avg	1.25	Inv Avg	1.17	Inv Avg	1.08	Inv Avg	1.02	Inv Avg	0.84	Inv Avg	1.29	Inv Avg	1.50	Inv Avg	1.40	Inv Avg	1.54	Inv Avg	1.23	Inv Avg	1.34	Inv Avg	0.95	Inv Avg	0.97
Risk	Low	Risk	Moderate	Risk	Moderate	Risk	Moderate	Risk	High	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	High	Risk	High

Figure D-4

C-145A		C-147		C-149		C-151		C-157		C-157A		C-159		C-161		C-163		C-166		C-168		C-168A		C-170	
S (ft)	0.36	S (ft)	0.17	S (ft)	0.45	S (ft)	0.50	S (ft)	0.23	S (ft)	0.26	S (ft)	0.37	S (ft)	0.20	S (ft)	0.65	S (ft)	0.28	S (ft)	0.41	S (ft)	0.62	S (ft)	0.32
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.31	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.40	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	1.15	6.25	n.a	6.25	n.a	6.25	0.26	6.25	0.26	6.25	2.00	6.25	0.39	6.25	n.a	6.25	0.63	6.25	0.39	6.25	0.32	6.25	n.a
8.75	0.54	8.75	2.00	8.75	0.40	8.75	n.a	8.75	1.70	8.75	1.56	8.75	0.80	8.75	0.51	8.75	n.a	8.75	2.00	8.75	0.61	8.75	0.60	8.75	0.28
11.25	0.56	11.25	0.60	11.25	0.64	11.25	0.23	11.25	0.84	11.25	0.57	11.25	0.74	11.25	1.46	11.25	n.a	11.25	2.00	11.25	0.66	11.25	0.46	11.25	0.86
13.75	2.00	13.75	1.48	13.75	1.04	13.75	0.56	13.75	2.00	13.75	2.00	13.75	1.16	13.75	1.29	13.75	0.22	13.75	0.93	13.75	0.75	13.75	0.50	13.75	0.81
16.25	2.00	16.25	0.84	16.25	1.64	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.89	16.25	1.13	16.25	1.07	16.25	1.47	16.25	0.48	16.25	0.59	16.25	2.00
18.75	0.55	18.75	2.00	18.75	2.00	18.75	0.65	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.30	18.75	0.91	18.75	2.00	18.75	0.61	18.75	0.70	18.75	2.00
21.25	2.00	21.25	0.75	21.25	1.82	21.25	0.96	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.13	21.25	0.63	21.25	2.00	21.25	0.86	21.25	0.71	21.25	0.67
23.75	2.00	23.75	2.00	23.75	2.12	23.75	0.87	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.58	23.75	0.66	23.75	2.00	23.75	1.93	23.75	1.64	23.75	1.02
26.25	2.00			26.25	0.67	26.25	1.78			26.25	2.00	26.25	0.66	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00
28.75	1.70			28.75	0.57	28.75	1.46			28.75	1.18	28.75	0.68	28.75	2.00	28.75	1.27	28.75	2.00	28.75	2.00	28.75	n.a	28.75	1.50
31.25	0.78			31.25	0.59	31.25	2.00			31.25	1.97	31.25	0.87	31.25	2.00	31.25	1.91	31.25	0.45	31.25	2.00	31.25	0.37	31.25	1.58
33.75	0.57			33.75	2.00	33.75	2.00					33.75	0.79					32.25	0.71	32.25	2.00	33.75	0.55	33.75	2.00
36.25	0.63			36.25	2.00							36.25	0.59					33.25	1.46					36.25	1.05
Inv Avg	1.03	Inv Avg	1.21	Inv Avg	0.87	Inv Avg	0.96	Inv Avg	1.09	Inv Avg	1.12	Inv Avg	1.06	Inv Avg	1.11	Inv Avg	0.93	Inv Avg	1.06	Inv Avg	0.91	Inv Avg	0.68	Inv Avg	1.06
Risk	Moderate	Risk	Low	Risk	High	Risk	High	Risk	Moderate	Risk	Moderate	Risk	Moderate	Risk	Moderate	Risk	High	Risk	Moderate	Risk	High	Risk	High	Risk	Moderate

Figure D-4

C-172		C-174		C-178		C-180		C-182		C-184		C-186		C-190		C-192		C-194		C-196		C-198		C-200	
S (ft)	0.33	S (ft)	0.14	S (ft)	0.35	S (ft)	0.55	S (ft)	0.17	S (ft)	0.37	S (ft)	0.44	S (ft)	0.18	S (ft)	0.23	S (ft)	0.34	S (ft)	0.36	S (ft)	0.46	S (ft)	0.60
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	0.28	6.25	0.62	6.25	n.a	6.25	0.34	6.25	n.a	6.25	n.a	6.25	0.30	6.25	n.a	6.25	0.32	6.25	0.35	6.25	n.a	6.25	0.37	6.25	0.44
8.75	0.70	8.75	1.20	8.75	0.37	8.75	0.90	8.75	0.59	8.75	0.30	8.75	1.70	8.75	n.a	8.75	2.00	8.75	n.a	8.75	0.45	8.75	0.41	8.75	n.a
11.25	1.07	11.25	2.00	11.25	0.84	11.25	0.54	11.25	0.74	11.25	0.71	11.25	1.78	11.25	n.a	11.25	1.25	11.25	0.70	11.25	0.75	11.25	0.67	11.25	n.a
13.75	2.00	13.75	2.00	13.75	0.83	13.75	0.45	13.75	1.15	13.75	1.85	13.75	1.98	13.75	n.a	13.75	2.06	13.75	0.51	13.75	1.65	13.75	2.00	13.75	0.56
16.25	1.73	16.25	1.03	16.25	0.46	16.25	0.42	16.25	1.30	16.25	0.80	16.25	2.00	16.25	0.31	16.25	2.00	16.25	1.02	16.25	0.67	16.25	2.00	16.25	0.62
18.75	2.00	18.75	0.88	18.75	1.32	18.75	0.65	18.75	1.36	18.75	0.82	18.75	0.72	18.75	1.39	18.75	0.45	18.75	0.59	18.75	0.99	18.75	0.93	18.75	1.67
21.25	0.81	21.25	2.05	21.25	0.86	21.25	0.59	21.25	1.08	21.25	2.00	21.25	0.57	21.25	0.81	21.25	2.00	21.25	2.00	21.25	1.04	21.25	n.a	21.25	0.79
23.75	0.84	23.75	1.48	23.75	0.64	23.75	0.62	23.75	2.00	23.75	2.00	23.75	0.67	23.75	1.84	23.75	2.00	23.75	2.00	23.75	1.12	23.75	0.43	23.75	1.06
26.25	1.09	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.49	26.25	2.00	26.25	1.45	26.25	2.00	26.25	2.00	26.25	0.98	26.25	0.84
28.75	1.52	28.75	1.91	28.75	1.21	28.75	2.00	28.75	2.00	28.75	1.21	28.75	0.50	28.75	2.16	28.75	1.55	28.75	2.00	28.75	2.00	28.75	0.72	28.75	2.00
31.25	1.11	31.25	2.14	31.25	2.00	31.25	1.02	31.25	1.68	31.25	0.99	31.25	2.00	31.25	2.00	31.25	1.80	31.25	1.10	31.25	n.a	31.25	0.77	31.25	2.00
33.75	1.64	33.75	2.00	33.75	2.00	33.75	1.03	33.75	1.16	33.75	1.06	33.75	1.33	33.75	2.00	33.75	1.33	33.75	0.97	33.75	0.30	33.75	1.87	33.75	0.80
36.25	2.00			36.25	2.00	36.25	2.00			36.25	0.73			36.25	2.00	36.25	2.00	36.25	2.00			36.25	2.00	36.25	2.00
																								38.75	2.00
																								41.25	2.00
																								43.75	1.52
																								46.25	0.92
																								48.75	0.70
																								51.25	0.84
																								53.75	0.76
																								56.25	2.00
																								58.75	2.00
																								61.25	2.00
																								63.75	2.00
																								66.25	0.83
Inv Avg	1.03	Inv Avg	1.44	Inv Avg	0.99	Inv Avg	0.76	Inv Avg	1.30	Inv Avg	1.01	Inv Avg	0.85	Inv Avg	1.34	Inv Avg	1.17	Inv Avg	1.01	Inv Avg	0.95	Inv Avg	0.87	Inv Avg	1.11
Risk	Moderate	Risk	Low	Risk	High	Risk	High	Risk	Low	Risk	Moderate	Risk	High	Risk	Low	Risk	Moderate	Risk	Moderate	Risk	High	Risk	High	Risk	Moderate

Figure D-4

Ameren Missouri: Labadie UWL
Liquefaction Analysis
10' of ASH M: 7.5
PGA: 2% probability of exceedence in 50 yrs: 0.1792 GW: 0.0'

C-11		C-13		C-16		C-18		C-21		C-23		C-25		C-28		C-30		C-32		C-34		C-37		C-39	
S (ft)	0.32	S (ft)	0.09	S (ft)	0.33	S (ft)	0.40	S (ft)	0.14	S (ft)	0.37	S (ft)	0.34	S (ft)	0.22	S (ft)	0.22	S (ft)	0.21	S (ft)	0.25	S (ft)	0.24	S (ft)	0.10
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.75	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.79	6.25	0.46	6.25	n.a	6.25	0.93	6.25	1.04	6.25	n.a	6.25	0.54	6.25	n.a	6.25	0.64	6.25	n.a	6.25	n.a
8.75	n.a	8.75	1.08	8.75	0.89	8.75	n.a	8.75	n.a	8.75	0.78	8.75	0.69	8.75	0.53	8.75	1.32	8.75	0.84	8.75	n.a	8.75	0.66	8.75	n.a
11.25	0.41	11.25	2.00	11.25	0.53	11.25	0.73	11.25	0.84	11.25	0.97	11.25	2.00	11.25	n.a	11.25	2.00	11.25	2.16	11.25	n.a	11.25	2.00	11.25	0.94
13.75	n.a	13.75	2.00	13.75	0.80	13.75	1.37	13.75	2.00	13.75	1.53	13.75	0.71	13.75	n.a	13.75	2.00	13.75	1.67	13.75	0.68	13.75	1.45	13.75	1.61
16.25	0.40	16.25	2.00	16.25	1.14	16.25	1.42	16.25	2.00	16.25	1.44	16.25	1.78	16.25	1.09	16.25	1.23	16.25	0.80	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	2.00	18.75	1.18	18.75	0.85	18.75	2.00	18.75	0.61	18.75	0.97	18.75	1.10	18.75	1.48	18.75	1.78	18.75	1.67	18.75	2.00	18.75	1.14
21.25	2.00	21.25	1.75	21.25	1.93	21.25	0.66	21.25	1.02	21.25	1.47	21.25	1.69	21.25	1.22	21.25	1.27	21.25	1.66	21.25	2.00	21.25	1.46	21.25	2.00
23.75	1.72	23.75	2.00	23.75	2.00	23.75	1.12	23.75	1.29	23.75	2.00	23.75	0.84	23.75	1.79	23.75	1.41	23.75	1.02	23.75	2.00	23.75	0.78	23.75	1.10
26.25	2.00	26.25	1.09	26.25	1.74	26.25	2.00	26.25	1.29	26.25	2.00	26.25	0.88	26.25	1.67	26.25	2.00	26.25	0.97	26.25	2.00	26.25	0.93	26.25	1.84
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.22	28.75	1.09	28.75	1.23	28.75	1.52	28.75	2.00	28.75	2.00	28.75	1.28	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.07	31.25	2.00	31.25	1.11	31.25	1.83	31.25	2.00	31.25	1.93	31.25	1.10	31.25	1.94	31.25	2.00	31.25	2.00	31.25	0.93	31.25	2.00
33.75	2.00	33.75	1.15	33.75	2.00	33.75	2.00	33.75	1.21	33.75	2.00	33.75	2.15	33.75	2.00	33.75	0.79	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00
		36.25	2.00	36.25	2.00	36.25	1.39	36.25	1.08	36.25	2.00	36.25	2.00	36.25	0.92	36.25	2.00	36.25	2.00	36.25	0.75	36.25	2.00	36.25	2.00
		38.75	2.00																			38.75	2.00		
		41.25	2.00																			41.25	2.00		
Inv Avg	1.27	Inv Avg	1.66	Inv Avg	1.27	Inv Avg	1.14	Inv Avg	1.45	Inv Avg	1.22	Inv Avg	1.24	Inv Avg	1.32	Inv Avg	1.38	Inv Avg	1.47	Inv Avg	1.40	Inv Avg	1.44	Inv Avg	1.66
Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-5

C-41		C-44		C-46		C-46A		C-48		C-50		C-60		C-62		C-64		C-66		C-66A		C-68		C-70	
S (ft)	0.22	S (ft)	0.31	S (ft)	0.21	S (ft)	0.20	S (ft)	0.38	S (ft)	0.28	S (ft)	0.13	S (ft)	0.13	S (ft)	0.45	S (ft)	0.03	S (ft)	0.24	S (ft)	0.32	S (ft)	0.27
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	0.82	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.82	6.25	n.a	6.25	n.a	6.25	0.66	6.25	0.50	6.25	n.a	6.25	0.68	6.25	n.a	6.25	n.a	6.25	0.69	6.25	0.57	6.25	1.27
8.75	n.a	8.75	0.77	8.75	n.a	8.75	n.a	8.75	0.77	8.75	1.85	8.75	0.57	8.75	n.a	8.75	0.48	8.75	n.a	8.75	0.67	8.75	1.10	8.75	1.27
11.25	0.56	11.25	1.29	11.25	1.44	11.25	1.17	11.25	1.10	11.25	0.75	11.25	1.13	11.25	n.a	11.25	0.97	11.25	2.00	11.25	2.00	11.25	0.88	11.25	1.26
13.75	0.87	13.75	1.04	13.75	0.78	13.75	0.80	13.75	0.87	13.75	2.00	13.75	1.23	13.75	1.07	13.75	0.87	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.85
16.25	0.84	16.25	1.07	16.25	1.57	16.25	1.44	16.25	0.53	16.25	2.00	16.25	2.06	16.25	2.00	16.25	0.44	16.25	1.33	16.25	1.13	16.25	2.00	16.25	n.a
18.75	2.10	18.75	1.10	18.75	1.62	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.76	18.75	2.00	18.75	1.37	18.75	1.75	18.75	1.40	18.75	2.00	18.75	0.76
21.25	2.06	21.25	0.79	21.25	0.82	21.25	1.07	21.25	0.92	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.55	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.90
23.75	1.50	23.75	0.96	23.75	1.12	23.75	1.18	23.75	2.00	23.75	1.56	23.75	2.00	23.75	1.40	23.75	2.00	23.75	1.58	23.75	2.00	23.75	0.87	23.75	1.50
26.25	1.83	26.25	2.00	26.25	0.99	26.25	1.18	26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.55	26.25	2.00			26.25	2.00	26.25	0.88	26.25	1.61
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.47	28.75	2.00	28.75	2.00	28.75	2.00			28.75	2.15	28.75	2.00	28.75	0.96
31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00			31.25	1.25	31.25	2.00	31.25	2.00
33.75	2.00	33.75	n.a	33.75	2.17	33.75	2.00	33.75	2.00	33.75	2.00			33.75	2.00	33.75	0.98			33.75	n.a	33.75	1.72	33.75	2.05
36.25	2.00	36.25	n.a	36.25	1.27	36.25	0.68	36.25	1.18	36.25	0.93			36.25	2.00	36.25	0.74					36.25	1.05	36.25	0.58
				38.75	1.50	38.75	2.13			38.75	2.00														
				41.25	2.00	41.25	1.99			41.25	2.00														
				43.75	2.00	43.75	2.00																		
Inv Avg	1.46	Inv Avg	1.26	Inv Avg	1.47	Inv Avg	1.45	Inv Avg	1.18	Inv Avg	1.44	Inv Avg	1.53	Inv Avg	1.62	Inv Avg	1.09	Inv Avg	1.83	Inv Avg	1.33	Inv Avg	1.29	Inv Avg	1.26
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-5

C-74		C-76		C-78		C-79		C-80		C-81		C-82		C-84		C-86		C-89		C-91		C-92		C-94	
S (ft)	0.28	S (ft)	0.12	S (ft)	0.36	S (ft)	0.22	S (ft)	0.26	S (ft)	0.25	S (ft)	0.10	S (ft)	0.18	S (ft)	0.30	S (ft)	0.36	S (ft)	0.58	S (ft)	0.19	S (ft)	0.14
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.77	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.70	6.25	0.83	6.25	0.59	6.25	n.a	6.25	n.a	6.25	n.a	6.25	1.49	6.25	n.a	6.25	n.a	6.25	0.72	6.25	0.71
8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.02	8.75	n.a	8.75	0.75	8.75	n.a	8.75	0.95	8.75	0.70	8.75	0.82	8.75	0.53	8.75	1.00	8.75	1.15
11.25	n.a	11.25	n.a	11.25	0.47	11.25	n.a	11.25	n.a	11.25	0.50	11.25	n.a	11.25	1.27	11.25	0.92	11.25	0.92	11.25	0.67	11.25	0.66	11.25	n.a
13.75	0.44	13.75	0.60	13.75	0.57	13.75	0.84	13.75	0.58	13.75	1.80	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.93	13.75	0.50	13.75	2.00	13.75	n.a
16.25	0.79	16.25	1.07	16.25	2.00	16.25	1.48	16.25	0.85	16.25	2.00	16.25	2.00	16.25	1.65	16.25	1.85	16.25	0.79	16.25	0.89	16.25	2.00	16.25	1.07
18.75	1.59	18.75	1.59	18.75	2.00	18.75	2.00	18.75	2.00	18.75	0.95	18.75	1.73	18.75	1.92	18.75	2.00	18.75	0.62	18.75	1.09	18.75	2.00	18.75	1.43
21.25	0.93	21.25	2.00	21.25	1.00	21.25	1.95	21.25	1.41	21.25	1.57	21.25	2.00	21.25	1.59	21.25	2.00	21.25	1.16	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	0.89	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.22	23.75	0.88	23.75	1.12	23.75	1.68	23.75	2.00	23.75	1.83
26.25	1.70	26.25	2.00	26.25	1.21	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.57			26.25	2.00
28.75	1.44	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.59	28.75	1.37	28.75	0.73			28.75	2.00
31.25	0.99	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.48	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.23	31.25	0.99	31.25	0.65			31.25	1.63
33.75	n.a	33.75	2.00	33.75	1.09	33.75	2.00	33.75	2.00	33.75	1.51	33.75	1.79	33.75	2.00	33.75	1.37	33.75	2.00	33.75	1.34			33.75	1.42
36.25	n.a	36.25	2.00	36.25	2.17	36.25	2.00	36.25	2.00	36.25	2.00	36.25	0.60	36.25	0.47	36.25	1.31	36.25	2.00	36.25	1.09			36.25	2.00
Inv Avg	1.30	Inv Avg	1.63	Inv Avg	1.20	Inv Avg	1.47	Inv Avg	1.37	Inv Avg	1.40	Inv Avg	1.70	Inv Avg	1.42	Inv Avg	1.29	Inv Avg	1.18	Inv Avg	0.92	Inv Avg	1.35	Inv Avg	1.54
Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	High	Risk	Low	Risk	Low

Figure D-5

C-96		C-98		C-100		C-103		C-105		C-106		C-107		C-107A		C-109		C-111		C-113		C-117		C-119	
S (ft)	0.21	S (ft)	0.24	S (ft)	0.21	S (ft)	0.23	S (ft)	0.13	S (ft)	0.39	S (ft)	0.27	S (ft)	0.14	S (ft)	0.24	S (ft)	0.20	S (ft)	0.32	S (ft)	0.42	S (ft)	0.13
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.71	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	0.81	6.25	0.62	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a
8.75	n.a	8.75	0.45	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.62	8.75	0.62	8.75	0.92	8.75	n.a	8.75	n.a	8.75	0.62	8.75	0.39	8.75	0.60
11.25	n.a	11.25	0.92	11.25	1.95	11.25	0.73	11.25	n.a	11.25	0.95	11.25	0.70	11.25	0.99	11.25	0.39	11.25	0.52	11.25	1.68	11.25	2.12	11.25	1.16
13.75	0.53	13.75	1.89	13.75	1.36	13.75	2.00	13.75	n.a	13.75	1.93	13.75	1.51	13.75	1.36	13.75	1.61	13.75	0.63	13.75	0.58	13.75	0.92	13.75	1.70
16.25	0.85	16.25	2.00	16.25	1.50	16.25	1.95	16.25	2.14	16.25	1.28	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.12	16.25	1.48	16.25	0.79	16.25	2.00
18.75	0.88	18.75	2.00	18.75	2.00	18.75	0.69	18.75	2.00	18.75	0.66	18.75	2.00	18.75	2.00	18.75	1.22	18.75	2.00	18.75	0.89	18.75	0.79	18.75	2.00
21.25	2.00	21.25	2.00	21.25	2.00	21.25	0.74	21.25	2.00	21.25	0.69	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	1.74	23.75	1.45	23.75	1.19	23.75	1.80	23.75	1.50	23.75	2.00	23.75	1.13	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00
26.25	1.75	26.25	2.00	26.25	2.15	26.25	1.16	26.25	2.00	26.25	1.22			26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.09	26.25	2.00	26.25	2.00
28.75	2.00	28.75	1.00	28.75	0.65	28.75	n.a	28.75	0.63	28.75	2.00			28.75	1.00	28.75	1.47	28.75	2.00	28.75	0.99	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.33	31.25	1.06	31.25	n.a	31.25	2.16	31.25	2.00			31.25	2.00	31.25	2.11	31.25	2.00	31.25	1.81	31.25	2.00	31.25	2.00
33.75	2.04	33.75	2.00			33.75	n.a	33.75	2.00	33.75	1.01			33.75	2.00	33.75	1.62	33.75	2.00	33.75	1.02	33.75	1.85	33.75	2.00
		36.25	2.00			36.25	n.a	36.25	0.91	36.25	1.51			36.25	2.00	36.25	1.15			36.25	1.16	36.25	1.45		
Inv Avg	1.43	Inv Avg	1.40	Inv Avg	1.37	Inv Avg	1.38	Inv Avg	1.64	Inv Avg	1.13	Inv Avg	1.20	Inv Avg	1.54	Inv Avg	1.41	Inv Avg	1.42	Inv Avg	1.20	Inv Avg	1.26	Inv Avg	1.62
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low

Figure D-5

C-121		C-123		C-125		C-129		C-131		C-133		C-135		C-135A		C-137		C-139		C-139A		C-143		C-145	
S (ft)	0.19	S (ft)	0.19	S (ft)	0.26	S (ft)	0.34	S (ft)	0.40	S (ft)	0.11	S (ft)	0.07	S (ft)	0.14	S (ft)	0.04	S (ft)	0.13	S (ft)	0.14	S (ft)	0.26	S (ft)	0.23
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.55	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.64	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	0.48	6.25	0.56
8.75	n.a	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.52	8.75	0.93	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.31	8.75	1.36
11.25	0.90	11.25	1.76	11.25	n.a	11.25	n.a	11.25	0.43	11.25	1.74	11.25	0.84	11.25	0.84	11.25	n.a	11.25	n.a	11.25	n.a	11.25	1.49	11.25	0.79
13.75	2.00	13.75	2.00	13.75	0.70	13.75	n.a	13.75	0.88	13.75	1.94	13.75	2.00	13.75	2.00	13.75	1.78	13.75	0.45	13.75	0.57	13.75	2.15	13.75	2.00
16.25	2.00	16.25	2.00	16.25	1.34	16.25	0.38	16.25	1.04	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.37	16.25	2.00	16.25	1.89	16.25	2.00	16.25	2.00
18.75	2.00	18.75	1.40	18.75	2.00	18.75	2.00	18.75	1.32	18.75	1.39	18.75	2.00	18.75	2.00	18.75	1.82	18.75	2.00	18.75	2.00	18.75	0.97	18.75	0.93
21.25	2.00	21.25	1.32	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.52			21.25	2.00	21.25	1.47	21.25	2.00	21.25	2.00	21.25	1.43	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.05	23.75	1.01			23.75	2.00	23.75	2.00			23.75	2.00	23.75	1.01	23.75	2.00
26.25	0.84	26.25	2.00	26.25	2.00	26.25	0.81	26.25	1.42	26.25	1.76			26.25	2.00	26.25	1.66			26.25	2.00	26.25	1.85	26.25	2.00
28.75	1.22	28.75	2.09	28.75	2.00	28.75	0.91	28.75	0.85	28.75	1.67			28.75	0.73	28.75	1.81			28.75	2.00	28.75	1.42		
31.25	0.73	31.25	0.76	31.25	0.91	31.25	2.00	31.25	2.00	31.25	2.00			31.25	1.94	31.25	2.00			31.25	0.97	31.25	1.09		
33.75	2.00	33.75	1.75	33.75	1.73	33.75	0.92	33.75	2.00	33.75	2.00					32.25	2.00					33.75	2.00		
		36.25	1.88	36.25	2.10	36.25	0.85	36.25	1.65	36.25	2.00											36.25	2.00		
Inv Avg	1.47	Inv Avg	1.50	Inv Avg	1.41	Inv Avg	1.23	Inv Avg	1.15	Inv Avg	1.63	Inv Avg	1.71	Inv Avg	1.61	Inv Avg	1.82	Inv Avg	1.44	Inv Avg	1.56	Inv Avg	1.32	Inv Avg	1.31
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-5

C-145A		C-147		C-149		C-151		C-157		C-157A		C-159		C-161		C-163		C-166		C-168		C-168A		C-170	
S (ft)	0.34	S (ft)	0.08	S (ft)	0.42	S (ft)	0.43	S (ft)	0.20	S (ft)	0.25	S (ft)	0.24	S (ft)	0.18	S (ft)	0.60	S (ft)	0.22	S (ft)	0.28	S (ft)	0.57	S (ft)	0.22
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.59	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.76	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	2.01	6.25	n.a	6.25	n.a	6.25	0.45	6.25	0.46	6.25	2.00	6.25	0.67	6.25	n.a	6.25	1.09	6.25	0.69	6.25	0.56	6.25	n.a
8.75	0.89	8.75	2.00	8.75	0.65	8.75	n.a	8.75	2.00	8.75	2.00	8.75	1.31	8.75	0.84	8.75	n.a	8.75	2.00	8.75	1.00	8.75	0.99	8.75	0.46
11.25	0.87	11.25	0.94	11.25	0.99	11.25	0.36	11.25	1.30	11.25	0.88	11.25	1.15	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.03	11.25	0.72	11.25	1.34
13.75	2.00	13.75	2.00	13.75	1.56	13.75	0.83	13.75	2.00	13.75	2.00	13.75	1.73	13.75	1.92	13.75	0.33	13.75	1.38	13.75	1.11	13.75	0.74	13.75	1.21
16.25	2.00	16.25	1.20	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.63	16.25	1.54	16.25	2.12	16.25	0.70	16.25	0.84	16.25	2.00
18.75	0.78	18.75	2.00	18.75	2.00	18.75	0.91	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.81	18.75	1.28	18.75	2.00	18.75	0.86	18.75	0.98	18.75	2.00
21.25	2.00	21.25	1.02	21.25	2.00	21.25	1.32	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.55	21.25	0.86	21.25	2.00	21.25	1.17	21.25	0.97	21.25	0.91
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.16	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.12	23.75	0.88	23.75	2.00	23.75	2.00	23.75	2.20	23.75	1.36
26.25	2.00			26.25	0.88	26.25	2.00			26.25	2.00	26.25	0.86	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00
28.75	2.19			28.75	0.73	28.75	1.89			28.75	1.53	28.75	0.87	28.75	2.00	28.75	1.64	28.75	2.00	28.75	2.00	28.75	n.a	28.75	1.93
31.25	1.00			31.25	0.76	31.25	2.00			31.25	2.00	31.25	1.11	31.25	2.00	31.25	2.00	31.25	0.57	31.25	2.00	31.25	0.47	31.25	2.01
33.75	0.71			33.75	2.00	33.75	2.00					33.75	0.99					32.25	0.90	32.25	2.00	33.75	0.69	33.75	2.00
36.25	0.79			36.25	2.00							36.25	0.73					33.25	1.84					36.25	1.30
Inv Avg	1.28	Inv Avg	1.57	Inv Avg	1.18	Inv Avg	1.24	Inv Avg	1.43	Inv Avg	1.45	Inv Avg	1.33	Inv Avg	1.53	Inv Avg	1.19	Inv Avg	1.38	Inv Avg	1.24	Inv Avg	0.95	Inv Avg	1.38
Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low	Risk	High	Risk	Low

Figure D-5

C-172		C-174		C-178		C-180		C-182		C-184		C-186		C-190		C-192		C-194		C-196		C-198		C-200	
S (ft)	0.21	S (ft)	0.07	S (ft)	0.26	S (ft)	0.48	S (ft)	0.10	S (ft)	0.23	S (ft)	0.40	S (ft)	0.15	S (ft)	0.22	S (ft)	0.26	S (ft)	0.27	S (ft)	0.36	S (ft)	0.45
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	0.49	6.25	1.08	6.25	n.a	6.25	0.60	6.25	n.a	6.25	n.a	6.25	0.52	6.25	n.a	6.25	0.55	6.25	0.61	6.25	n.a	6.25	0.64	6.25	0.76
8.75	1.15	8.75	1.96	8.75	0.60	8.75	1.47	8.75	0.97	8.75	0.50	8.75	2.00	8.75	n.a	8.75	2.00	8.75	n.a	8.75	0.74	8.75	0.67	8.75	n.a
11.25	1.67	11.25	2.00	11.25	1.30	11.25	0.84	11.25	1.14	11.25	1.10	11.25	2.00	11.25	n.a	11.25	1.93	11.25	1.09	11.25	1.17	11.25	1.04	11.25	n.a
13.75	2.00	13.75	2.00	13.75	1.24	13.75	0.67	13.75	1.71	13.75	2.00	13.75	2.00	13.75	n.a	13.75	2.00	13.75	0.75	13.75	2.00	13.75	2.00	13.75	0.83
16.25	2.00	16.25	1.49	16.25	0.66	16.25	0.60	16.25	1.87	16.25	1.15	16.25	2.00	16.25	0.44	16.25	2.00	16.25	1.47	16.25	0.96	16.25	2.00	16.25	0.89
18.75	2.00	18.75	1.23	18.75	1.85	18.75	0.92	18.75	1.90	18.75	1.14	18.75	1.00	18.75	1.95	18.75	0.62	18.75	0.82	18.75	1.38	18.75	1.30	18.75	2.00
21.25	1.11	21.25	2.00	21.25	1.18	21.25	0.80	21.25	1.47	21.25	2.00	21.25	0.77	21.25	1.11	21.25	2.00	21.25	2.00	21.25	1.42	21.25	n.a	21.25	1.08
23.75	1.12	23.75	1.98	23.75	0.85	23.75	0.82	23.75	2.00	23.75	2.00	23.75	0.90	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.50	23.75	0.57	23.75	1.42
26.25	1.43	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.65	26.25	2.00	26.25	1.90	26.25	2.00	26.25	2.00	26.25	1.29	26.25	1.10
28.75	1.96	28.75	2.00	28.75	1.56	28.75	2.00	28.75	2.00	28.75	1.56	28.75	0.65	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	0.93	28.75	2.00
31.25	1.41	31.25	2.00	31.25	2.00	31.25	1.30	31.25	2.14	31.25	1.25	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.40	31.25	n.a	31.25	0.97	31.25	2.00
33.75	2.07	33.75	2.00	33.75	2.00	33.75	1.30	33.75	1.46	33.75	1.33	33.75	1.67	33.75	2.00	33.75	1.67	33.75	1.22	33.75	0.38	33.75	2.00	33.75	1.00
36.25	2.00			36.25	2.00	36.25	2.00			36.25	0.90			36.25	2.00	36.25	2.00	36.25	2.00			36.25	2.00	36.25	2.00
																								38.75	2.00
																								41.25	2.00
																								43.75	1.83
																								46.25	1.11
																								48.75	0.83
																								51.25	0.99
																								53.75	0.89
																								56.25	2.00
																								58.75	2.00
																								61.25	2.00
																								63.75	2.00
																								66.25	0.95
Inv Avg	1.40	Inv Avg	1.77	Inv Avg	1.31	Inv Avg	1.05	Inv Avg	1.67	Inv Avg	1.31	Inv Avg	1.12	Inv Avg	1.55	Inv Avg	1.49	Inv Avg	1.33	Inv Avg	1.22	Inv Avg	1.16	Inv Avg	1.35
Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low

Figure D-5

Ameren Missouri: Labadie UWL
Liquefaction Analysis
20' of ASH M: 7.5
PGA: 2% probability of exceedence in 50 yrs: 0.1792 GW: 0.0'

C-11		C-13		C-16		C-18		C-21		C-23		C-25		C-28		C-30		C-32		C-34		C-37		C-39	
S (ft)	0.32	S (ft)	0.06	S (ft)	0.28	S (ft)	0.39	S (ft)	0.10	S (ft)	0.30	S (ft)	0.26	S (ft)	0.17	S (ft)	0.21	S (ft)	0.15	S (ft)	0.24	S (ft)	0.21	S (ft)	0.06
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.82	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.88	6.25	0.51	6.25	n.a	6.25	1.04	6.25	1.16	6.25	n.a	6.25	0.60	6.25	n.a	6.25	0.71	6.25	n.a	6.25	n.a
8.75	n.a	8.75	1.23	8.75	1.01	8.75	n.a	8.75	n.a	8.75	0.89	8.75	0.79	8.75	0.60	8.75	1.50	8.75	0.95	8.75	n.a	8.75	0.75	8.75	n.a
11.25	0.47	11.25	2.00	11.25	0.61	11.25	0.83	11.25	0.97	11.25	1.11	11.25	2.00	11.25	n.a	11.25	2.00	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.08
13.75	n.a	13.75	2.00	13.75	0.91	13.75	1.58	13.75	2.00	13.75	1.76	13.75	0.81	13.75	n.a	13.75	2.00	13.75	1.92	13.75	0.79	13.75	1.66	13.75	1.85
16.25	0.46	16.25	2.00	16.25	1.31	16.25	1.63	16.25	2.00	16.25	1.66	16.25	2.05	16.25	1.26	16.25	1.42	16.25	0.92	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	2.00	18.75	1.36	18.75	0.98	18.75	2.00	18.75	0.71	18.75	1.11	18.75	1.27	18.75	1.71	18.75	2.05	18.75	1.93	18.75	2.00	18.75	1.32
21.25	2.00	21.25	2.02	21.25	2.00	21.25	0.76	21.25	1.18	21.25	1.69	21.25	1.95	21.25	1.40	21.25	1.47	21.25	1.91	21.25	2.00	21.25	1.68	21.25	2.00
23.75	1.98	23.75	2.00	23.75	2.00	23.75	1.29	23.75	1.48	23.75	2.00	23.75	0.96	23.75	2.05	23.75	1.62	23.75	1.17	23.75	2.00	23.75	0.90	23.75	1.26
26.25	2.00	26.25	1.25	26.25	1.99	26.25	2.00	26.25	1.48	26.25	2.00	26.25	1.01	26.25	1.91	26.25	2.00	26.25	1.11	26.25	2.00	26.25	1.06	26.25	2.11
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.39	28.75	1.24	28.75	1.40	28.75	1.74	28.75	2.00	28.75	2.00	28.75	1.46	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.22	31.25	2.00	31.25	1.26	31.25	2.08	31.25	2.00	31.25	2.00	31.25	1.25	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.06	31.25	2.00
33.75	2.00	33.75	1.31	33.75	2.00	33.75	2.00	33.75	1.38	33.75	2.00	33.75	2.00	33.75	2.00	33.75	0.90	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00
		36.25	2.00	36.25	2.00	36.25	1.57	36.25	1.23	36.25	2.00	36.25	2.00	36.25	1.04	36.25	2.00	36.25	2.00	36.25	0.85	36.25	2.00	36.25	2.00
		38.75	2.00																			38.75	2.00		
		41.25	2.00																			41.25	2.00		
Inv Avg	1.36	Inv Avg	1.75	Inv Avg	1.38	Inv Avg	1.25	Inv Avg	1.58	Inv Avg	1.34	Inv Avg	1.36	Inv Avg	1.46	Inv Avg	1.50	Inv Avg	1.59	Inv Avg	1.49	Inv Avg	1.54	Inv Avg	1.77
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-6

C-41		C-44		C-46		C-46A		C-48		C-50		C-60		C-62		C-64		C-66		C-66A		C-68		C-70	
S (ft)	0.21	S (ft)	0.23	S (ft)	0.16	S (ft)	0.16	S (ft)	0.34	S (ft)	0.26	S (ft)	0.13	S (ft)	0.12	S (ft)	0.36	S (ft)	0.02	S (ft)	0.24	S (ft)	0.23	S (ft)	0.24
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	0.85	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.91	6.25	n.a	6.25	n.a	6.25	0.74	6.25	0.55	6.25	n.a	6.25	0.76	6.25	n.a	6.25	n.a	6.25	0.77	6.25	0.64	6.25	1.42
8.75	n.a	8.75	0.88	8.75	n.a	8.75	n.a	8.75	0.88	8.75	2.10	8.75	0.65	8.75	n.a	8.75	0.55	8.75	n.a	8.75	0.76	8.75	1.24	8.75	1.45
11.25	0.65	11.25	1.48	11.25	1.65	11.25	1.34	11.25	1.26	11.25	0.86	11.25	1.29	11.25	n.a	11.25	1.11	11.25	2.00	11.25	2.00	11.25	1.00	11.25	1.44
13.75	1.00	13.75	1.20	13.75	0.90	13.75	0.92	13.75	1.00	13.75	2.00	13.75	1.42	13.75	1.23	13.75	1.01	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.98
16.25	0.97	16.25	1.23	16.25	1.81	16.25	1.66	16.25	0.61	16.25	2.00	16.25	2.00	16.25	2.00	16.25	0.51	16.25	1.54	16.25	1.30	16.25	2.00	16.25	n.a
18.75	2.00	18.75	1.26	18.75	1.86	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.03	18.75	2.00	18.75	1.57	18.75	2.02	18.75	1.61	18.75	2.00	18.75	0.88
21.25	2.00	21.25	0.91	21.25	0.94	21.25	1.23	21.25	1.05	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.79	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.19
23.75	1.72	23.75	1.11	23.75	1.29	23.75	1.36	23.75	2.00	23.75	1.79	23.75	2.00	23.75	1.61	23.75	2.00	23.75	1.82	23.75	2.00	23.75	1.00	23.75	1.72
26.25	2.10	26.25	2.00	26.25	1.13	26.25	1.35	26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.78	26.25	2.00			26.25	2.00	26.25	1.01	26.25	1.85
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.68	28.75	2.00	28.75	2.00	28.75	2.00			28.75	2.00	28.75	2.00	28.75	1.10
31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00			31.25	1.42	31.25	2.00	31.25	2.00
33.75	2.00	33.75	n.a	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00			33.75	2.00	33.75	1.12			33.75	n.a	33.75	1.95	33.75	2.00
36.25	2.00	36.25	n.a	36.25	1.44	36.25	0.77	36.25	1.34	36.25	1.06			36.25	2.00	36.25	0.84					36.25	1.20	36.25	0.66
				38.75	1.70	38.75	2.00			38.75	2.00														
				41.25	2.00	41.25	2.00			41.25	2.00														
				43.75	2.00	43.75	2.00																		
Inv Avg	1.56	Inv Avg	1.38	Inv Avg	1.59	Inv Avg	1.56	Inv Avg	1.29	Inv Avg	1.54	Inv Avg	1.62	Inv Avg	1.70	Inv Avg	1.20	Inv Avg	1.92	Inv Avg	1.41	Inv Avg	1.40	Inv Avg	1.39
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-6

C-74		C-76		C-78		C-79		C-80		C-81		C-82		C-84		C-86		C-89		C-91		C-92		C-94	
S (ft)	0.22	S (ft)	0.11	S (ft)	0.32	S (ft)	0.17	S (ft)	0.25	S (ft)	0.22	S (ft)	0.10	S (ft)	0.15	S (ft)	0.24	S (ft)	0.26	S (ft)	0.53	S (ft)	0.18	S (ft)	0.12
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.84	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.79	6.25	0.92	6.25	0.66	6.25	n.a	6.25	n.a	6.25	n.a	6.25	1.66	6.25	n.a	6.25	n.a	6.25	0.80	6.25	0.80
8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.16	8.75	n.a	8.75	0.85	8.75	n.a	8.75	1.08	8.75	0.79	8.75	0.93	8.75	0.60	8.75	1.14	8.75	1.31
11.25	n.a	11.25	n.a	11.25	0.53	11.25	n.a	11.25	n.a	11.25	0.58	11.25	n.a	11.25	1.45	11.25	1.05	11.25	1.05	11.25	0.77	11.25	0.76	11.25	n.a
13.75	0.50	13.75	0.69	13.75	0.65	13.75	0.96	13.75	0.67	13.75	2.07	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.06	13.75	0.58	13.75	2.00	13.75	n.a
16.25	0.91	16.25	1.24	16.25	2.00	16.25	1.70	16.25	0.98	16.25	2.00	16.25	2.00	16.25	1.90	16.25	2.13	16.25	0.91	16.25	1.03	16.25	2.00	16.25	1.24
18.75	1.83	18.75	1.83	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.10	18.75	1.99	18.75	2.00	18.75	2.00	18.75	0.72	18.75	1.25	18.75	2.00	18.75	1.65
21.25	1.07	21.25	2.00	21.25	1.15	21.25	2.00	21.25	1.62	21.25	1.81	21.25	2.00	21.25	1.83	21.25	2.00	21.25	1.33	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.02	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.40	23.75	1.02	23.75	1.29	23.75	1.93	23.75	2.00	23.75	2.11
26.25	1.94	26.25	2.00	26.25	1.38	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.65			26.25	2.00
28.75	1.64	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.82	28.75	1.56	28.75	0.84			28.75	2.00
31.25	1.13	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.68	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.40	31.25	1.13	31.25	0.75			31.25	1.86
33.75	n.a	33.75	2.00	33.75	1.24	33.75	2.00	33.75	2.00	33.75	1.72	33.75	2.04	33.75	2.00	33.75	1.55	33.75	2.00	33.75	1.52			33.75	1.61
36.25	n.a	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	0.68	36.25	0.54	36.25	1.48	36.25	2.00	36.25	1.24			36.25	2.00
Inv Avg	1.42	Inv Avg	1.70	Inv Avg	1.30	Inv Avg	1.57	Inv Avg	1.46	Inv Avg	1.51	Inv Avg	1.77	Inv Avg	1.54	Inv Avg	1.42	Inv Avg	1.30	Inv Avg	1.03	Inv Avg	1.44	Inv Avg	1.65
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low

Figure D-6

C-96		C-98		C-100		C-103		C-105		C-106		C-107		C-107A		C-109		C-111		C-113		C-117		C-119	
S (ft)	0.17	S (ft)	0.21	S (ft)	0.19	S (ft)	0.21	S (ft)	0.10	S (ft)	0.35	S (ft)	0.27	S (ft)	0.08	S (ft)	0.23	S (ft)	0.20	S (ft)	0.25	S (ft)	0.37	S (ft)	0.12
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.77	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	0.91	6.25	0.69	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a
8.75	n.a	8.75	0.51	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.70	8.75	0.70	8.75	1.05	8.75	n.a	8.75	n.a	8.75	0.71	8.75	0.45	8.75	0.68
11.25	n.a	11.25	1.05	11.25	2.00	11.25	0.84	11.25	n.a	11.25	1.09	11.25	0.80	11.25	1.13	11.25	0.45	11.25	0.60	11.25	1.93	11.25	2.00	11.25	1.32
13.75	0.61	13.75	2.18	13.75	1.56	13.75	2.00	13.75	n.a	13.75	2.00	13.75	1.74	13.75	1.57	13.75	1.86	13.75	0.73	13.75	0.66	13.75	1.06	13.75	1.96
16.25	0.98	16.25	2.00	16.25	1.72	16.25	2.00	16.25	2.00	16.25	1.48	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.29	16.25	1.71	16.25	0.91	16.25	2.00
18.75	1.01	18.75	2.00	18.75	2.00	18.75	0.79	18.75	2.00	18.75	0.76	18.75	2.00	18.75	2.00	18.75	1.40	18.75	2.00	18.75	1.03	18.75	0.91	18.75	2.00
21.25	2.00	21.25	2.00	21.25	2.00	21.25	0.85	21.25	2.00	21.25	0.80	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	1.66	23.75	1.36	23.75	2.07	23.75	1.73	23.75	2.00	23.75	1.29	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.01	26.25	2.00	26.25	2.00	26.25	1.33	26.25	2.00	26.25	1.40			26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.25	26.25	2.00	26.25	2.00
28.75	2.00	28.75	1.14	28.75	0.74	28.75	n.a	28.75	0.72	28.75	2.00			28.75	1.14	28.75	1.68	28.75	2.00	28.75	1.14	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.52	31.25	1.21	31.25	n.a	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.06	31.25	2.00	31.25	2.00
33.75	2.00	33.75	2.00			33.75	n.a	33.75	2.00	33.75	1.15			33.75	2.00	33.75	1.84	33.75	2.00	33.75	1.16	33.75	2.10	33.75	2.00
		36.25	2.00			36.25	n.a	36.25	1.04	36.25	1.71			36.25	2.00	36.25	1.30			36.25	1.32	36.25	1.64		
Inv Avg	1.53	Inv Avg	1.51	Inv Avg	1.48	Inv Avg	1.48	Inv Avg	1.70	Inv Avg	1.26	Inv Avg	1.30	Inv Avg	1.64	Inv Avg	1.51	Inv Avg	1.50	Inv Avg	1.33	Inv Avg	1.37	Inv Avg	1.70
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-6

C-121		C-123		C-125		C-129		C-131		C-133		C-135		C-135A		C-137		C-139		C-139A		C-143		C-145	
S (ft)	0.14	S (ft)	0.18	S (ft)	0.24	S (ft)	0.29	S (ft)	0.35	S (ft)	0.07	S (ft)	0.06	S (ft)	0.13	S (ft)	0.03	S (ft)	0.13	S (ft)	0.11	S (ft)	0.21	S (ft)	0.20
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.60	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.72	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	0.54	6.25	0.62
8.75	n.a	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.59	8.75	1.06	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.49	8.75	1.55
11.25	1.03	11.25	2.01	11.25	n.a	11.25	n.a	11.25	0.49	11.25	1.99	11.25	0.96	11.25	0.96	11.25	n.a	11.25	n.a	11.25	n.a	11.25	1.71	11.25	0.90
13.75	2.00	13.75	2.00	13.75	0.81	13.75	n.a	13.75	1.02	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.05	13.75	0.51	13.75	0.65	13.75	2.00	13.75	2.00
16.25	2.00	16.25	2.00	16.25	1.54	16.25	0.44	16.25	1.20	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.58	16.25	2.00	16.25	2.18	16.25	2.00	16.25	2.00
18.75	2.00	18.75	1.62	18.75	2.00	18.75	2.00	18.75	1.52	18.75	1.60	18.75	2.00	18.75	2.00	18.75	2.09	18.75	2.00	18.75	2.00	18.75	1.11	18.75	1.07
21.25	2.00	21.25	1.52	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.75			21.25	2.00	21.25	1.69	21.25	2.00	21.25	2.00	21.25	1.65	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.16			23.75	2.00	23.75	2.00			23.75	2.00	23.75	1.16	23.75	2.00
26.25	0.96	26.25	2.00	26.25	2.00	26.25	0.93	26.25	1.62	26.25	2.02			26.25	2.00	26.25	1.90			26.25	2.00	26.25	2.12	26.25	2.00
28.75	1.40	28.75	2.00	28.75	2.00	28.75	1.04	28.75	0.98	28.75	1.92			28.75	0.84	28.75	2.07			28.75	2.00	28.75	1.63		
31.25	0.84	31.25	0.86	31.25	1.03	31.25	2.00	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00			31.25	1.11	31.25	1.24		
33.75	2.00	33.75	1.99	33.75	1.97	33.75	1.04	33.75	2.00	33.75	2.00					32.25	2.00					33.75	2.00		
		36.25	2.13	36.25	2.00	36.25	0.96	36.25	1.87	36.25	2.00											36.25	2.00		
Inv Avg	1.57	Inv Avg	1.61	Inv Avg	1.50	Inv Avg	1.32	Inv Avg	1.26	Inv Avg	1.76	Inv Avg	1.76	Inv Avg	1.68	Inv Avg	1.94	Inv Avg	1.51	Inv Avg	1.65	Inv Avg	1.44	Inv Avg	1.41
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-6

C-145A		C-147		C-149		C-151		C-157		C-157A		C-159		C-161		C-163		C-166		C-168		C-168A		C-170	
S (ft)	0.27	S (ft)	0.05	S (ft)	0.36	S (ft)	0.40	S (ft)	0.20	S (ft)	0.22	S (ft)	0.19	S (ft)	0.17	S (ft)	0.56	S (ft)	0.20	S (ft)	0.24	S (ft)	0.48	S (ft)	0.20
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.65	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.82	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	0.50	6.25	0.51	6.25	2.00	6.25	0.75	6.25	n.a	6.25	1.22	6.25	0.77	6.25	0.63	6.25	n.a
8.75	1.01	8.75	2.00	8.75	0.74	8.75	n.a	8.75	2.00	8.75	2.00	8.75	1.48	8.75	0.95	8.75	n.a	8.75	2.00	8.75	1.14	8.75	1.12	8.75	0.52
11.25	1.00	11.25	1.07	11.25	1.13	11.25	0.41	11.25	1.49	11.25	1.01	11.25	1.32	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.18	11.25	0.82	11.25	1.53
13.75	2.00	13.75	2.00	13.75	1.79	13.75	0.96	13.75	2.00	13.75	2.00	13.75	1.99	13.75	2.00	13.75	0.38	13.75	1.59	13.75	1.28	13.75	0.85	13.75	1.39
16.25	2.00	16.25	1.39	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.88	16.25	1.78	16.25	2.00	16.25	0.80	16.25	0.97	16.25	2.00
18.75	0.89	18.75	2.00	18.75	2.00	18.75	1.05	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.09	18.75	1.47	18.75	2.00	18.75	0.99	18.75	1.13	18.75	2.00
21.25	2.00	21.25	1.17	21.25	2.00	21.25	1.51	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.78	21.25	0.99	21.25	2.00	21.25	1.34	21.25	1.12	21.25	1.05
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.33	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.01	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.57
26.25	2.00			26.25	1.01	26.25	2.00			26.25	2.00	26.25	0.99	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00
28.75	2.00			28.75	0.84	28.75	2.16			28.75	1.75	28.75	1.00	28.75	2.00	28.75	1.88	28.75	2.00	28.75	2.00	28.75	n.a	28.75	2.00
31.25	1.14			31.25	0.86	31.25	2.00			31.25	2.00	31.25	1.27	31.25	2.00	31.25	2.00	31.25	0.65	31.25	2.00	31.25	0.54	31.25	2.00
33.75	0.81			33.75	2.00	33.75	2.00					33.75	1.13					32.25	1.02	32.25	2.00	33.75	0.78	33.75	2.00
36.25	0.89			36.25	2.00							36.25	0.82					33.25	2.09					36.25	1.47
Inv Avg	1.38	Inv Avg	1.66	Inv Avg	1.28	Inv Avg	1.36	Inv Avg	1.50	Inv Avg	1.52	Inv Avg	1.45	Inv Avg	1.64	Inv Avg	1.31	Inv Avg	1.48	Inv Avg	1.36	Inv Avg	1.05	Inv Avg	1.49
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low

Figure D-6

C-172		C-174		C-178		C-180		C-182		C-184		C-186		C-190		C-192		C-194		C-196		C-198		C-200	
S (ft)	0.19	S (ft)	0.04	S (ft)	0.24	S (ft)	0.43	S (ft)	0.06	S (ft)	0.19	S (ft)	0.36	S (ft)	0.14	S (ft)	0.21	S (ft)	0.24	S (ft)	0.24	S (ft)	0.31	S (ft)	0.33
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	0.55	6.25	1.21	6.25	n.a	6.25	0.67	6.25	n.a	6.25	n.a	6.25	0.59	6.25	n.a	6.25	0.62	6.25	0.69	6.25	n.a	6.25	0.72	6.25	0.85
8.75	1.31	8.75	2.00	8.75	0.68	8.75	1.67	8.75	1.10	8.75	0.56	8.75	2.00	8.75	n.a	8.75	2.00	8.75	n.a	8.75	0.84	8.75	0.76	8.75	n.a
11.25	1.91	11.25	2.00	11.25	1.49	11.25	0.96	11.25	1.31	11.25	1.26	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.24	11.25	1.34	11.25	1.19	11.25	n.a
13.75	2.00	13.75	2.00	13.75	1.42	13.75	0.77	13.75	1.97	13.75	2.00	13.75	2.00	13.75	n.a	13.75	2.00	13.75	0.87	13.75	2.00	13.75	2.00	13.75	0.95
16.25	2.00	16.25	1.72	16.25	0.75	16.25	0.69	16.25	2.16	16.25	1.33	16.25	2.00	16.25	0.51	16.25	2.00	16.25	1.69	16.25	1.11	16.25	2.00	16.25	1.03
18.75	2.00	18.75	1.41	18.75	2.13	18.75	1.05	18.75	2.19	18.75	1.32	18.75	1.15	18.75	2.00	18.75	0.72	18.75	0.94	18.75	1.59	18.75	1.49	18.75	2.00
21.25	1.27	21.25	2.00	21.25	1.36	21.25	0.92	21.25	1.70	21.25	2.00	21.25	0.89	21.25	1.28	21.25	2.00	21.25	2.00	21.25	1.64	21.25	n.a	21.25	1.24
23.75	1.28	23.75	2.00	23.75	0.98	23.75	0.95	23.75	2.00	23.75	2.00	23.75	1.03	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.72	23.75	0.66	23.75	1.63
26.25	1.63	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.74	26.25	2.00	26.25	2.18	26.25	2.00	26.25	2.00	26.25	1.48	26.25	1.26
28.75	2.00	28.75	2.00	28.75	1.79	28.75	2.00	28.75	2.00	28.75	1.79	28.75	0.74	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.07	28.75	2.00
31.25	1.61	31.25	2.00	31.25	2.00	31.25	1.48	31.25	2.00	31.25	1.43	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.60	31.25	n.a	31.25	1.11	31.25	2.00
33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.48	33.75	1.66	33.75	1.51	33.75	1.90	33.75	2.00	33.75	1.90	33.75	1.39	33.75	0.43	33.75	2.00	33.75	1.14
36.25	2.00			36.25	2.00	36.25	2.00			36.25	1.02			36.25	2.00	36.25	2.00	36.25	2.00			36.25	2.00	36.25	2.00
																								38.75	2.00
																								41.25	2.00
																								43.75	2.06
																								46.25	1.24
																								48.75	0.93
																								51.25	1.10
																								53.75	0.99
																								56.25	2.00
																								58.75	2.00
																								61.25	2.00
																								63.75	2.00
																								66.25	1.05
Inv Avg	1.51	Inv Avg	1.84	Inv Avg	1.44	Inv Avg	1.17	Inv Avg	1.80	Inv Avg	1.43	Inv Avg	1.23	Inv Avg	1.62	Inv Avg	1.58	Inv Avg	1.44	Inv Avg	1.34	Inv Avg	1.28	Inv Avg	1.46
Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-6

Ameren Missouri: Labadie UWL
Liquefaction Analysis
30' of ASH M: 7.5
PGA: 2% probability of exceedence in 50 yrs: 0.1792 GW: 0.0'

C-11		C-13		C-16		C-18		C-21		C-23		C-25		C-28		C-30		C-32		C-34		C-37		C-39	
S (ft)	0.31	S (ft)	0.05	S (ft)	0.27	S (ft)	0.36	S (ft)	0.07	S (ft)	0.29	S (ft)	0.23	S (ft)	0.16	S (ft)	0.20	S (ft)	0.11	S (ft)	0.23	S (ft)	0.18	S (ft)	0.05
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.84	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.93	6.25	0.54	6.25	n.a	6.25	1.09	6.25	1.22	6.25	n.a	6.25	0.63	6.25	n.a	6.25	0.75	6.25	n.a	6.25	n.a
8.75	n.a	8.75	1.30	8.75	1.08	8.75	n.a	8.75	n.a	8.75	0.94	8.75	0.83	8.75	0.64	8.75	1.59	8.75	1.01	8.75	n.a	8.75	0.79	8.75	n.a
11.25	0.50	11.25	2.00	11.25	0.65	11.25	0.89	11.25	1.03	11.25	1.19	11.25	2.00	11.25	n.a	11.25	2.00	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.15
13.75	n.a	13.75	2.00	13.75	0.98	13.75	1.70	13.75	2.00	13.75	1.89	13.75	0.87	13.75	n.a	13.75	2.00	13.75	2.06	13.75	0.85	13.75	1.79	13.75	1.99
16.25	0.50	16.25	2.00	16.25	1.41	16.25	1.76	16.25	2.00	16.25	1.79	16.25	2.00	16.25	1.36	16.25	1.53	16.25	0.99	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	2.00	18.75	1.47	18.75	1.06	18.75	2.00	18.75	0.77	18.75	1.21	18.75	1.38	18.75	1.85	18.75	2.00	18.75	2.09	18.75	2.00	18.75	1.43
21.25	2.00	21.25	2.19	21.25	2.00	21.25	0.82	21.25	1.27	21.25	1.83	21.25	2.11	21.25	1.52	21.25	1.59	21.25	2.08	21.25	2.00	21.25	1.82	21.25	2.00
23.75	2.15	23.75	2.00	23.75	2.00	23.75	1.40	23.75	1.60	23.75	2.00	23.75	1.04	23.75	2.00	23.75	1.75	23.75	1.27	23.75	2.00	23.75	0.98	23.75	1.37
26.25	2.00	26.25	1.36	26.25	2.17	26.25	2.00	26.25	1.61	26.25	2.00	26.25	1.10	26.25	2.08	26.25	2.00	26.25	1.21	26.25	2.00	26.25	1.15	26.25	2.00
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.51	28.75	1.35	28.75	1.53	28.75	1.89	28.75	2.00	28.75	2.00	28.75	1.59	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.32	31.25	2.00	31.25	1.37	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.36	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.15	31.25	2.00
33.75	2.00	33.75	1.43	33.75	2.00	33.75	2.00	33.75	1.50	33.75	2.00	33.75	2.00	33.75	2.00	33.75	0.98	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00
		36.25	2.00	36.25	2.00	36.25	1.71	36.25	1.34	36.25	2.00	36.25	2.00	36.25	1.13	36.25	2.00	36.25	2.00	36.25	0.92	36.25	2.00	36.25	2.00
		38.75	2.00																			38.75	2.00		
		41.25	2.00																			41.25	2.00		
Inv Avg	1.40	Inv Avg	1.80	Inv Avg	1.44	Inv Avg	1.32	Inv Avg	1.65	Inv Avg	1.40	Inv Avg	1.43	Inv Avg	1.53	Inv Avg	1.56	Inv Avg	1.65	Inv Avg	1.54	Inv Avg	1.60	Inv Avg	1.81
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-7

C-41		C-44		C-46		C-46A		C-48		C-50		C-60		C-62		C-64		C-66		C-66A		C-68		C-70	
S (ft)	0.16	S (ft)	0.21	S (ft)	0.13	S (ft)	0.16	S (ft)	0.30	S (ft)	0.24	S (ft)	0.13	S (ft)	0.12	S (ft)	0.35	S (ft)	0.02	S (ft)	0.24	S (ft)	0.20	S (ft)	0.19
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	0.86	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.96	6.25	n.a	6.25	n.a	6.25	0.78	6.25	0.58	6.25	n.a	6.25	0.80	6.25	n.a	6.25	n.a	6.25	0.81	6.25	0.67	6.25	1.49
8.75	n.a	8.75	0.93	8.75	n.a	8.75	n.a	8.75	0.93	8.75	2.00	8.75	0.69	8.75	n.a	8.75	0.58	8.75	n.a	8.75	0.80	8.75	1.32	8.75	1.53
11.25	0.69	11.25	1.58	11.25	1.76	11.25	1.43	11.25	1.34	11.25	0.92	11.25	1.38	11.25	n.a	11.25	1.18	11.25	2.00	11.25	2.00	11.25	1.07	11.25	1.54
13.75	1.07	13.75	1.29	13.75	0.97	13.75	0.99	13.75	1.07	13.75	2.00	13.75	1.52	13.75	1.32	13.75	1.08	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.05
16.25	1.04	16.25	1.33	16.25	1.95	16.25	1.80	16.25	0.66	16.25	2.00	16.25	2.00	16.25	2.00	16.25	0.55	16.25	1.66	16.25	1.40	16.25	2.00	16.25	n.a
18.75	2.00	18.75	1.37	18.75	2.02	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.20	18.75	2.00	18.75	1.70	18.75	2.18	18.75	1.74	18.75	2.00	18.75	0.95
21.25	2.00	21.25	0.99	21.25	1.02	21.25	1.34	21.25	1.14	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.94	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	1.87	23.75	1.20	23.75	1.40	23.75	1.47	23.75	2.00	23.75	1.94	23.75	2.00	23.75	1.75	23.75	2.00	23.75	1.97	23.75	2.00	23.75	1.08	23.75	1.87
26.25	2.00	26.25	2.00	26.25	1.23	26.25	1.47	26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.93	26.25	2.00			26.25	2.00	26.25	1.09	26.25	2.01
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.82	28.75	2.00	28.75	2.00	28.75	2.00			28.75	2.00	28.75	2.00	28.75	1.19
31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00			31.25	1.55	31.25	2.00	31.25	2.00
33.75	2.00	33.75	n.a	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00			33.75	2.00	33.75	1.21			33.75	n.a	33.75	2.12	33.75	2.00
36.25	2.00	36.25	n.a	36.25	1.56	36.25	0.84	36.25	1.46	36.25	1.15			36.25	2.00	36.25	0.91					36.25	1.30	36.25	0.72
				38.75	1.84	38.75	2.00			38.75	2.00														
				41.25	2.00	41.25	2.00			41.25	2.00														
				43.75	2.00	43.75	2.00																		
Inv Avg	1.60	Inv Avg	1.45	Inv Avg	1.67	Inv Avg	1.63	Inv Avg	1.35	Inv Avg	1.58	Inv Avg	1.67	Inv Avg	1.75	Inv Avg	1.27	Inv Avg	1.97	Inv Avg	1.46	Inv Avg	1.46	Inv Avg	1.46
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-7

C-74		C-76		C-78		C-79		C-80		C-81		C-82		C-84		C-86		C-89		C-91		C-92		C-94	
S (ft)	0.21	S (ft)	0.11	S (ft)	0.32	S (ft)	0.13	S (ft)	0.23	S (ft)	0.21	S (ft)	0.09	S (ft)	0.14	S (ft)	0.22	S (ft)	0.24	S (ft)	0.50	S (ft)	0.18	S (ft)	0.12
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.87	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.82	6.25	0.97	6.25	0.70	6.25	n.a	6.25	n.a	6.25	n.a	6.25	1.75	6.25	n.a	6.25	n.a	6.25	0.84	6.25	0.84
8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.23	8.75	n.a	8.75	0.90	8.75	n.a	8.75	1.14	8.75	0.84	8.75	0.99	8.75	0.63	8.75	1.21	8.75	1.39
11.25	n.a	11.25	n.a	11.25	0.57	11.25	n.a	11.25	n.a	11.25	0.62	11.25	n.a	11.25	1.55	11.25	1.13	11.25	1.12	11.25	0.82	11.25	0.81	11.25	n.a
13.75	0.54	13.75	0.74	13.75	0.70	13.75	1.03	13.75	0.72	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.14	13.75	0.62	13.75	2.00	13.75	n.a
16.25	0.99	16.25	1.33	16.25	2.00	16.25	1.84	16.25	1.06	16.25	2.00	16.25	2.00	16.25	2.05	16.25	2.00	16.25	0.98	16.25	1.11	16.25	2.00	16.25	1.33
18.75	1.98	18.75	1.98	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.19	18.75	2.15	18.75	2.00	18.75	2.00	18.75	0.78	18.75	1.36	18.75	2.00	18.75	1.79
21.25	1.16	21.25	2.00	21.25	1.24	21.25	2.00	21.25	1.76	21.25	1.96	21.25	2.00	21.25	1.98	21.25	2.00	21.25	1.44	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.11	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.52	23.75	1.10	23.75	1.40	23.75	2.10	23.75	2.00	23.75	2.00
26.25	2.11	26.25	2.00	26.25	1.50	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.71			26.25	2.00
28.75	1.78	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.98	28.75	1.70	28.75	0.91			28.75	2.00
31.25	1.23	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.83	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.53	31.25	1.23	31.25	0.81			31.25	2.02
33.75	n.a	33.75	2.00	33.75	1.34	33.75	2.00	33.75	2.00	33.75	1.87	33.75	2.00	33.75	2.00	33.75	1.69	33.75	2.00	33.75	1.65			33.75	1.75
36.25	n.a	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	0.73	36.25	0.58	36.25	1.61	36.25	2.00	36.25	1.35			36.25	2.00
Inv Avg	1.49	Inv Avg	1.74	Inv Avg	1.35	Inv Avg	1.62	Inv Avg	1.52	Inv Avg	1.56	Inv Avg	1.80	Inv Avg	1.60	Inv Avg	1.49	Inv Avg	1.38	Inv Avg	1.10	Inv Avg	1.48	Inv Avg	1.71
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low

Figure D-7

C-96		C-98		C-100		C-103		C-105		C-106		C-107		C-107A		C-109		C-111		C-113		C-117		C-119	
S (ft)	0.15	S (ft)	0.19	S (ft)	0.19	S (ft)	0.20	S (ft)	0.10	S (ft)	0.33	S (ft)	0.27	S (ft)	0.06	S (ft)	0.23	S (ft)	0.20	S (ft)	0.22	S (ft)	0.36	S (ft)	0.12
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.79	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	0.96	6.25	0.73	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a
8.75	n.a	8.75	0.54	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.74	8.75	0.74	8.75	1.11	8.75	n.a	8.75	n.a	8.75	0.75	8.75	0.47	8.75	0.72
11.25	n.a	11.25	1.12	11.25	2.00	11.25	0.89	11.25	n.a	11.25	1.16	11.25	0.85	11.25	1.21	11.25	0.48	11.25	0.64	11.25	2.06	11.25	2.00	11.25	1.42
13.75	0.65	13.75	2.00	13.75	1.68	13.75	2.00	13.75	n.a	13.75	2.00	13.75	1.87	13.75	1.68	13.75	1.99	13.75	0.78	13.75	0.71	13.75	1.13	13.75	2.10
16.25	1.06	16.25	2.00	16.25	1.86	16.25	2.00	16.25	2.00	16.25	1.59	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.39	16.25	1.84	16.25	0.98	16.25	2.00
18.75	1.09	18.75	2.00	18.75	2.00	18.75	0.86	18.75	2.00	18.75	0.82	18.75	2.00	18.75	2.00	18.75	1.52	18.75	2.00	18.75	1.11	18.75	0.98	18.75	2.00
21.25	2.00	21.25	2.00	21.25	2.00	21.25	0.92	21.25	2.00	21.25	0.87	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.18	23.75	1.81	23.75	1.48	23.75	2.00	23.75	1.88	23.75	2.00	23.75	1.40	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.19	26.25	2.00	26.25	2.00	26.25	1.44	26.25	2.00	26.25	1.52			26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.36	26.25	2.00	26.25	2.00
28.75	2.00	28.75	1.24	28.75	0.81	28.75	n.a	28.75	0.78	28.75	2.00			28.75	1.24	28.75	1.83	28.75	2.00	28.75	1.24	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.65	31.25	1.32	31.25	n.a	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00
33.75	2.00	33.75	2.00			33.75	n.a	33.75	2.00	33.75	1.24			33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.26	33.75	2.00	33.75	2.00
		36.25	2.00			36.25	n.a	36.25	1.13	36.25	1.85			36.25	2.00	36.25	1.41			36.25	1.43	36.25	1.78		
Inv Avg	1.58	Inv Avg	1.56	Inv Avg	1.54	Inv Avg	1.54	Inv Avg	1.73	Inv Avg	1.33	Inv Avg	1.35	Inv Avg	1.70	Inv Avg	1.58	Inv Avg	1.55	Inv Avg	1.40	Inv Avg	1.42	Inv Avg	1.74
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-7

C-121		C-123		C-125		C-129		C-131		C-133		C-135		C-135A		C-137		C-139		C-139A		C-143		C-145	
S (ft)	0.11	S (ft)	0.17	S (ft)	0.23	S (ft)	0.24	S (ft)	0.33	S (ft)	0.05	S (ft)	0.03	S (ft)	0.09	S (ft)	0.03	S (ft)	0.13	S (ft)	0.11	S (ft)	0.21	S (ft)	0.19
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.62	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.76	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	0.56	6.25	0.65
8.75	n.a	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.62	8.75	1.12	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.58	8.75	1.64
11.25	1.10	11.25	2.15	11.25	n.a	11.25	n.a	11.25	0.52	11.25	2.12	11.25	1.03	11.25	1.03	11.25	n.a	11.25	n.a	11.25	n.a	11.25	1.82	11.25	0.97
13.75	2.00	13.75	2.00	13.75	0.87	13.75	n.a	13.75	1.09	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.20	13.75	0.55	13.75	0.70	13.75	2.00	13.75	2.00
16.25	2.00	16.25	2.00	16.25	1.67	16.25	0.47	16.25	1.29	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.70	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	1.75	18.75	2.00	18.75	2.00	18.75	1.65	18.75	1.73	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.21	18.75	1.16
21.25	2.00	21.25	1.65	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.90			21.25	2.00	21.25	1.83	21.25	2.00	21.25	2.00	21.25	1.79	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.26			23.75	2.00	23.75	2.00			23.75	2.00	23.75	1.26	23.75	2.00
26.25	1.04	26.25	2.00	26.25	2.00	26.25	1.01	26.25	1.76	26.25	2.20			26.25	2.00	26.25	2.06			26.25	2.00	26.25	2.00	26.25	2.00
28.75	1.52	28.75	2.00	28.75	2.00	28.75	1.13	28.75	1.06	28.75	2.08			28.75	0.91	28.75	2.00			28.75	2.00	28.75	1.77		
31.25	0.91	31.25	0.94	31.25	1.12	31.25	2.00	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00			31.25	1.20	31.25	1.35		
33.75	2.00	33.75	2.16	33.75	2.14	33.75	1.13	33.75	2.00	33.75	2.00					32.25	2.00					33.75	2.00		
		36.25	2.00	36.25	2.00	36.25	1.05	36.25	2.03	36.25	2.00											36.25	2.00		
Inv Avg	1.62	Inv Avg	1.67	Inv Avg	1.54	Inv Avg	1.38	Inv Avg	1.33	Inv Avg	1.83	Inv Avg	1.79	Inv Avg	1.72	Inv Avg	1.98	Inv Avg	1.55	Inv Avg	1.68	Inv Avg	1.51	Inv Avg	1.46
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-7

C-145A		C-147		C-149		C-151		C-157		C-157A		C-159		C-161		C-163		C-166		C-168		C-168A		C-170	
S (ft)	0.22	S (ft)	0.04	S (ft)	0.34	S (ft)	0.36	S (ft)	0.20	S (ft)	0.22	S (ft)	0.14	S (ft)	0.14	S (ft)	0.53	S (ft)	0.19	S (ft)	0.21	S (ft)	0.44	S (ft)	0.19
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.67	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.85	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	0.52	6.25	0.54	6.25	2.00	6.25	0.79	6.25	n.a	6.25	1.28	6.25	0.81	6.25	0.66	6.25	n.a
8.75	1.07	8.75	2.00	8.75	0.79	8.75	n.a	8.75	2.00	8.75	2.00	8.75	1.57	8.75	1.01	8.75	n.a	8.75	2.00	8.75	1.21	8.75	1.19	8.75	0.55
11.25	1.07	11.25	1.15	11.25	1.21	11.25	0.44	11.25	1.60	11.25	1.08	11.25	1.41	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.26	11.25	0.88	11.25	1.64
13.75	2.00	13.75	2.00	13.75	1.92	13.75	1.03	13.75	2.00	13.75	2.00	13.75	2.14	13.75	2.00	13.75	0.40	13.75	1.71	13.75	1.37	13.75	0.92	13.75	1.50
16.25	2.00	16.25	1.50	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.03	16.25	1.92	16.25	2.00	16.25	0.87	16.25	1.05	16.25	2.00
18.75	0.97	18.75	2.00	18.75	2.00	18.75	1.14	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.59	18.75	2.00	18.75	1.07	18.75	1.22	18.75	2.00
21.25	2.00	21.25	1.27	21.25	2.00	21.25	1.64	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.93	21.25	1.07	21.25	2.00	21.25	1.46	21.25	1.21	21.25	1.14
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.44	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.10	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.70
26.25	2.00			26.25	1.09	26.25	2.00			26.25	2.00	26.25	1.07	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00
28.75	2.00			28.75	0.91	28.75	2.00			28.75	1.90	28.75	1.08	28.75	2.00	28.75	2.04	28.75	2.00	28.75	2.00	28.75	n.a	28.75	2.00
31.25	1.24			31.25	0.94	31.25	2.00			31.25	2.00	31.25	1.38	31.25	2.00	31.25	2.00	31.25	0.71	31.25	2.00	31.25	0.59	31.25	2.00
33.75	0.88			33.75	2.00	33.75	2.00					33.75	1.23					32.25	1.11	32.25	2.00	33.75	0.85	33.75	2.00
36.25	0.97			36.25	2.00							36.25	0.90					33.25	2.00					36.25	1.60
Inv Avg	1.45	Inv Avg	1.72	Inv Avg	1.34	Inv Avg	1.41	Inv Avg	1.53	Inv Avg	1.56	Inv Avg	1.53	Inv Avg	1.67	Inv Avg	1.37	Inv Avg	1.52	Inv Avg	1.42	Inv Avg	1.11	Inv Avg	1.55
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low

Figure D-7

C-172		C-174		C-178		C-180		C-182		C-184		C-186		C-190		C-192		C-194		C-196		C-198		C-200	
S (ft)	0.19	S (ft)	0.04	S (ft)	0.22	S (ft)	0.35	S (ft)	0.05	S (ft)	0.18	S (ft)	0.34	S (ft)	0.14	S (ft)	0.21	S (ft)	0.21	S (ft)	0.24	S (ft)	0.29	S (ft)	0.24
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	0.58	6.25	1.27	6.25	n.a	6.25	0.70	6.25	n.a	6.25	n.a	6.25	0.61	6.25	n.a	6.25	0.65	6.25	0.72	6.25	n.a	6.25	0.76	6.25	0.89
8.75	1.39	8.75	2.00	8.75	0.72	8.75	1.77	8.75	1.16	8.75	0.60	8.75	2.00	8.75	n.a	8.75	2.00	8.75	n.a	8.75	0.89	8.75	0.81	8.75	n.a
11.25	2.04	11.25	2.00	11.25	1.59	11.25	1.03	11.25	1.40	11.25	1.34	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.33	11.25	1.43	11.25	1.28	11.25	n.a
13.75	2.00	13.75	2.00	13.75	1.53	13.75	0.83	13.75	2.12	13.75	2.00	13.75	2.00	13.75	n.a	13.75	2.00	13.75	0.93	13.75	2.00	13.75	2.00	13.75	1.02
16.25	2.00	16.25	1.85	16.25	0.81	16.25	0.75	16.25	2.00	16.25	1.43	16.25	2.00	16.25	0.55	16.25	2.00	16.25	1.82	16.25	1.19	16.25	2.00	16.25	1.11
18.75	2.00	18.75	1.53	18.75	2.00	18.75	1.14	18.75	2.00	18.75	1.43	18.75	1.25	18.75	2.00	18.75	0.78	18.75	1.02	18.75	1.73	18.75	1.62	18.75	2.00
21.25	1.38	21.25	2.00	21.25	1.47	21.25	1.00	21.25	1.84	21.25	2.00	21.25	0.96	21.25	1.39	21.25	2.00	21.25	2.00	21.25	1.77	21.25	n.a	21.25	1.35
23.75	1.39	23.75	2.00	23.75	1.06	23.75	1.03	23.75	2.00	23.75	2.00	23.75	1.12	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.87	23.75	0.71	23.75	1.77
26.25	1.78	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.81	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.60	26.25	1.37
28.75	2.00	28.75	2.00	28.75	1.95	28.75	2.00	28.75	2.00	28.75	1.94	28.75	0.81	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.16	28.75	2.00
31.25	1.75	31.25	2.00	31.25	2.00	31.25	1.61	31.25	2.00	31.25	1.56	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.73	31.25	n.a	31.25	1.21	31.25	2.00
33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.61	33.75	1.80	33.75	1.64	33.75	2.07	33.75	2.00	33.75	2.06	33.75	1.51	33.75	0.47	33.75	2.00	33.75	1.24
36.25	2.00			36.25	2.00	36.25	2.00			36.25	1.11			36.25	2.00	36.25	2.00	36.25	2.00			36.25	2.00	36.25	2.00
																								38.75	2.00
																								41.25	2.00
																								43.75	2.00
																								46.25	1.35
																								48.75	1.00
																								51.25	1.19
																								53.75	1.07
																								56.25	2.00
																								58.75	2.00
																								61.25	2.00
																								63.75	2.00
																								66.25	1.12
Inv Avg	1.57	Inv Avg	1.87	Inv Avg	1.50	Inv Avg	1.24	Inv Avg	1.83	Inv Avg	1.50	Inv Avg	1.29	Inv Avg	1.66	Inv Avg	1.61	Inv Avg	1.50	Inv Avg	1.41	Inv Avg	1.34	Inv Avg	1.52
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-7

Ameren Missouri: Labadie UWL
Liquefaction Analysis
40' of ASH M: 7.5
PGA: 2% probability of exceedence in 50 yrs: 0.1792 GW: 0.0'

C-11		C-13		C-16		C-18		C-21		C-23		C-25		C-28		C-30		C-32		C-34		C-37		C-39	
S (ft)	0.31	S (ft)	0.05	S (ft)	0.23	S (ft)	0.35	S (ft)	0.07	S (ft)	0.27	S (ft)	0.20	S (ft)	0.15	S (ft)	0.18	S (ft)	0.09	S (ft)	0.23	S (ft)	0.15	S (ft)	0.05
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.86	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.95	6.25	0.55	6.25	n.a	6.25	1.12	6.25	1.25	6.25	n.a	6.25	0.65	6.25	n.a	6.25	0.77	6.25	n.a	6.25	n.a
8.75	n.a	8.75	1.35	8.75	1.11	8.75	n.a	8.75	n.a	8.75	0.98	8.75	0.86	8.75	0.66	8.75	1.65	8.75	1.05	8.75	n.a	8.75	0.82	8.75	n.a
11.25	0.52	11.25	2.00	11.25	0.67	11.25	0.92	11.25	1.08	11.25	1.24	11.25	2.00	11.25	n.a	11.25	2.00	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.20
13.75	n.a	13.75	2.00	13.75	1.03	13.75	1.78	13.75	2.00	13.75	1.98	13.75	0.91	13.75	n.a	13.75	2.00	13.75	2.16	13.75	0.88	13.75	1.87	13.75	2.08
16.25	0.52	16.25	2.00	16.25	1.48	16.25	1.85	16.25	2.00	16.25	1.88	16.25	2.00	16.25	1.43	16.25	1.61	16.25	1.04	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	2.00	18.75	1.54	18.75	1.11	18.75	2.00	18.75	0.81	18.75	1.27	18.75	1.45	18.75	1.95	18.75	2.00	18.75	2.20	18.75	2.00	18.75	1.50
21.25	2.00	21.25	2.00	21.25	2.00	21.25	0.86	21.25	1.34	21.25	1.93	21.25	2.00	21.25	1.60	21.25	1.68	21.25	2.19	21.25	2.00	21.25	1.92	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.48	23.75	1.69	23.75	2.00	23.75	1.10	23.75	2.00	23.75	1.85	23.75	1.34	23.75	2.00	23.75	1.03	23.75	1.45
26.25	2.00	26.25	1.43	26.25	2.00	26.25	2.00	26.25	1.70	26.25	2.00	26.25	1.16	26.25	2.20	26.25	2.00	26.25	1.28	26.25	2.00	26.25	1.22	26.25	2.00
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.60	28.75	1.43	28.75	1.62	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.68	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.40	31.25	2.00	31.25	1.46	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.44	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.22	31.25	2.00
33.75	2.00	33.75	1.51	33.75	2.00	33.75	2.00	33.75	1.59	33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.04	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00
		36.25	2.00	36.25	2.00	36.25	1.81	36.25	1.42	36.25	2.00	36.25	2.00	36.25	1.20	36.25	2.00	36.25	2.00	36.25	0.98	36.25	2.00	36.25	2.00
		38.75	2.00																			38.75	2.00		
		41.25	2.00																			41.25	2.00		
Inv Avg	1.42	Inv Avg	1.83	Inv Avg	1.47	Inv Avg	1.37	Inv Avg	1.70	Inv Avg	1.44	Inv Avg	1.47	Inv Avg	1.58	Inv Avg	1.60	Inv Avg	1.69	Inv Avg	1.58	Inv Avg	1.64	Inv Avg	1.84
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-8

C-41		C-44		C-46		C-46A		C-48		C-50		C-60		C-62		C-64		C-66		C-66A		C-68		C-70	
S (ft)	0.15	S (ft)	0.19	S (ft)	0.10	S (ft)	0.14	S (ft)	0.28	S (ft)	0.23	S (ft)	0.13	S (ft)	0.12	S (ft)	0.33	S (ft)	0.02	S (ft)	0.24	S (ft)	0.17	S (ft)	0.16
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	0.86	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.99	6.25	n.a	6.25	n.a	6.25	0.80	6.25	0.60	6.25	n.a	6.25	0.82	6.25	n.a	6.25	n.a	6.25	0.83	6.25	0.69	6.25	1.53
8.75	n.a	8.75	0.96	8.75	n.a	8.75	n.a	8.75	0.96	8.75	2.00	8.75	0.71	8.75	n.a	8.75	0.60	8.75	n.a	8.75	0.83	8.75	1.37	8.75	1.59
11.25	0.72	11.25	1.65	11.25	1.83	11.25	1.49	11.25	1.40	11.25	0.96	11.25	1.43	11.25	n.a	11.25	1.23	11.25	2.00	11.25	2.00	11.25	1.11	11.25	1.60
13.75	1.12	13.75	1.34	13.75	1.01	13.75	1.03	13.75	1.12	13.75	2.00	13.75	1.59	13.75	1.38	13.75	1.13	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.10
16.25	1.10	16.25	1.40	16.25	2.05	16.25	1.88	16.25	0.69	16.25	2.00	16.25	2.00	16.25	2.00	16.25	0.58	16.25	1.74	16.25	1.47	16.25	2.00	16.25	n.a
18.75	2.00	18.75	1.44	18.75	2.12	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.79	18.75	2.00	18.75	1.83	18.75	2.00	18.75	1.00
21.25	2.00	21.25	1.04	21.25	1.08	21.25	1.41	21.25	1.21	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.04	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	1.98	23.75	1.27	23.75	1.48	23.75	1.56	23.75	2.00	23.75	2.05	23.75	2.00	23.75	1.85	23.75	2.00	23.75	2.08	23.75	2.00	23.75	1.14	23.75	1.97
26.25	2.00	26.25	2.00	26.25	1.30	26.25	1.55	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.05	26.25	2.00			26.25	2.00	26.25	1.16	26.25	2.13
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.93	28.75	2.00	28.75	2.00	28.75	2.00			28.75	2.00	28.75	2.00	28.75	1.26
31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00			31.25	1.64	31.25	2.00	31.25	2.00
33.75	2.00	33.75	n.a	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00			33.75	2.00	33.75	1.29			33.75	n.a	33.75	2.00	33.75	2.00
36.25	2.00	36.25	n.a	36.25	1.66	36.25	0.89	36.25	1.54	36.25	1.22			36.25	2.00	36.25	0.97					36.25	1.38	36.25	0.76
				38.75	1.96	38.75	2.00			38.75	2.00														
				41.25	2.00	41.25	2.00			41.25	2.00														
				43.75	2.00	43.75	2.00																		
Inv Avg	1.63	Inv Avg	1.49	Inv Avg	1.72	Inv Avg	1.67	Inv Avg	1.39	Inv Avg	1.61	Inv Avg	1.68	Inv Avg	1.77	Inv Avg	1.31	Inv Avg	1.98	Inv Avg	1.49	Inv Avg	1.49	Inv Avg	1.52
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-8

C-74		C-76		C-78		C-79		C-80		C-81		C-82		C-84		C-86		C-89		C-91		C-92		C-94	
S (ft)	0.18	S (ft)	0.11	S (ft)	0.32	S (ft)	0.13	S (ft)	0.22	S (ft)	0.20	S (ft)	0.09	S (ft)	0.13	S (ft)	0.22	S (ft)	0.18	S (ft)	0.50	S (ft)	0.18	S (ft)	0.12
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.89	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.85	6.25	1.00	6.25	0.72	6.25	n.a	6.25	n.a	6.25	n.a	6.25	1.79	6.25	n.a	6.25	n.a	6.25	0.86	6.25	0.86
8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.27	8.75	n.a	8.75	0.93	8.75	n.a	8.75	1.18	8.75	0.87	8.75	1.02	8.75	0.66	8.75	1.25	8.75	1.44
11.25	n.a	11.25	n.a	11.25	0.59	11.25	n.a	11.25	n.a	11.25	0.64	11.25	n.a	11.25	1.62	11.25	1.17	11.25	1.17	11.25	0.86	11.25	0.84	11.25	n.a
13.75	0.57	13.75	0.78	13.75	0.74	13.75	1.08	13.75	0.75	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.20	13.75	0.65	13.75	2.00	13.75	n.a
16.25	1.03	16.25	1.40	16.25	2.00	16.25	1.93	16.25	1.11	16.25	2.00	16.25	2.00	16.25	2.15	16.25	2.00	16.25	1.03	16.25	1.16	16.25	2.00	16.25	1.40
18.75	2.08	18.75	2.08	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.25	18.75	2.00	18.75	2.00	18.75	2.00	18.75	0.82	18.75	1.43	18.75	2.00	18.75	1.88
21.25	1.23	21.25	2.00	21.25	1.31	21.25	2.00	21.25	1.85	21.25	2.07	21.25	2.00	21.25	2.09	21.25	2.00	21.25	1.52	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.17	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.61	23.75	1.17	23.75	1.48	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.00	26.25	2.00	26.25	1.59	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.75			26.25	2.00
28.75	1.89	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.09	28.75	1.80	28.75	0.96			28.75	2.00
31.25	1.30	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.94	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.62	31.25	1.30	31.25	0.86			31.25	2.14
33.75	n.a	33.75	2.00	33.75	1.42	33.75	2.00	33.75	2.00	33.75	1.98	33.75	2.00	33.75	2.00	33.75	1.79	33.75	2.00	33.75	1.75			33.75	1.86
36.25	n.a	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	0.78	36.25	0.62	36.25	1.71	36.25	2.00	36.25	1.43			36.25	2.00
Inv Avg	1.53	Inv Avg	1.77	Inv Avg	1.39	Inv Avg	1.65	Inv Avg	1.55	Inv Avg	1.59	Inv Avg	1.81	Inv Avg	1.64	Inv Avg	1.53	Inv Avg	1.43	Inv Avg	1.15	Inv Avg	1.51	Inv Avg	1.74
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low

Figure D-8

C-96		C-98		C-100		C-103		C-105		C-106		C-107		C-107A		C-109		C-111		C-113		C-117		C-119	
S (ft)	0.13	S (ft)	0.19	S (ft)	0.19	S (ft)	0.19	S (ft)	0.10	S (ft)	0.32	S (ft)	0.27	S (ft)	0.06	S (ft)	0.22	S (ft)	0.20	S (ft)	0.22	S (ft)	0.31	S (ft)	0.12
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.81	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	0.98	6.25	0.75	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a
8.75	n.a	8.75	0.56	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.77	8.75	0.77	8.75	1.15	8.75	n.a	8.75	n.a	8.75	0.78	8.75	0.49	8.75	0.75
11.25	n.a	11.25	1.17	11.25	2.00	11.25	0.93	11.25	n.a	11.25	1.21	11.25	0.89	11.25	1.26	11.25	0.50	11.25	0.67	11.25	2.14	11.25	2.00	11.25	1.47
13.75	0.68	13.75	2.00	13.75	1.75	13.75	2.00	13.75	n.a	13.75	2.00	13.75	1.96	13.75	1.76	13.75	2.08	13.75	0.82	13.75	0.74	13.75	1.19	13.75	2.20
16.25	1.11	16.25	2.00	16.25	1.95	16.25	2.00	16.25	2.00	16.25	1.67	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.46	16.25	1.93	16.25	1.03	16.25	2.00
18.75	1.15	18.75	2.00	18.75	2.00	18.75	0.90	18.75	2.00	18.75	0.86	18.75	2.00	18.75	2.00	18.75	1.60	18.75	2.00	18.75	1.17	18.75	1.03	18.75	2.00
21.25	2.00	21.25	2.00	21.25	2.00	21.25	0.97	21.25	2.00	21.25	0.91	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	1.91	23.75	1.56	23.75	2.00	23.75	1.98	23.75	2.00	23.75	1.48	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.53	26.25	2.00	26.25	1.61			26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.44	26.25	2.00	26.25	2.00
28.75	2.00	28.75	1.32	28.75	0.86	28.75	n.a	28.75	0.83	28.75	2.00			28.75	1.32	28.75	1.93	28.75	2.00	28.75	1.31	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.75	31.25	1.40	31.25	n.a	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00
33.75	2.00	33.75	2.00			33.75	n.a	33.75	2.00	33.75	1.32			33.75	2.00	33.75	2.12	33.75	2.00	33.75	1.34	33.75	2.00	33.75	2.00
		36.25	2.00			36.25	n.a	36.25	1.20	36.25	1.97			36.25	2.00	36.25	1.50			36.25	1.52	36.25	1.89		
Inv Avg	1.60	Inv Avg	1.58	Inv Avg	1.58	Inv Avg	1.58	Inv Avg	1.76	Inv Avg	1.38	Inv Avg	1.37	Inv Avg	1.73	Inv Avg	1.62	Inv Avg	1.57	Inv Avg	1.45	Inv Avg	1.45	Inv Avg	1.76
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-8

C-121		C-123		C-125		C-129		C-131		C-133		C-135		C-135A		C-137		C-139		C-139A		C-143		C-145	
S (ft)	0.10	S (ft)	0.17	S (ft)	0.22	S (ft)	0.22	S (ft)	0.31	S (ft)	0.05	S (ft)	0.03	S (ft)	0.09	S (ft)	0.03	S (ft)	0.13	S (ft)	0.11	S (ft)	0.21	S (ft)	0.16
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.63	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.78	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	0.58	6.25	0.67
8.75	n.a	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.64	8.75	1.16	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.63	8.75	1.70
11.25	1.14	11.25	2.00	11.25	n.a	11.25	n.a	11.25	0.54	11.25	2.00	11.25	1.07	11.25	1.07	11.25	n.a	11.25	n.a	11.25	n.a	11.25	1.90	11.25	1.01
13.75	2.00	13.75	2.00	13.75	0.91	13.75	n.a	13.75	1.14	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.58	13.75	0.73	13.75	2.00	13.75	2.00
16.25	2.00	16.25	2.00	16.25	1.75	16.25	0.49	16.25	1.36	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.78	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	1.84	18.75	2.00	18.75	2.00	18.75	1.73	18.75	1.82	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.27	18.75	1.22
21.25	2.00	21.25	1.74	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00			21.25	2.00	21.25	1.93	21.25	2.00	21.25	2.00	21.25	1.89	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.33			23.75	2.00	23.75	2.00			23.75	2.00	23.75	1.33	23.75	2.00
26.25	1.10	26.25	2.00	26.25	2.00	26.25	1.07	26.25	1.87	26.25	2.00			26.25	2.00	26.25	2.18			26.25	2.00	26.25	2.00	26.25	2.00
28.75	1.61	28.75	2.00	28.75	2.00	28.75	1.20	28.75	1.12	28.75	2.00			28.75	0.96	28.75	2.00			28.75	2.00	28.75	1.87		
31.25	0.96	31.25	1.00	31.25	1.19	31.25	2.00	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00			31.25	1.28	31.25	1.43		
33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.20	33.75	2.00	33.75	2.00					32.25	2.00					33.75	2.00		
		36.25	2.00	36.25	2.00	36.25	1.11	36.25	2.16	36.25	2.00											36.25	2.00		
Inv Avg	1.66	Inv Avg	1.68	Inv Avg	1.56	Inv Avg	1.42	Inv Avg	1.37	Inv Avg	1.84	Inv Avg	1.80	Inv Avg	1.74	Inv Avg	1.99	Inv Avg	1.57	Inv Avg	1.70	Inv Avg	1.55	Inv Avg	1.49
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-8

C-145A		C-147		C-149		C-151		C-157		C-157A		C-159		C-161		C-163		C-166		C-168		C-168A		C-170	
S (ft)	0.14	S (ft)	0.04	S (ft)	0.33	S (ft)	0.36	S (ft)	0.20	S (ft)	0.20	S (ft)	0.11	S (ft)	0.13	S (ft)	0.52	S (ft)	0.19	S (ft)	0.19	S (ft)	0.42	S (ft)	0.19
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.68	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.87	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	0.54	6.25	0.55	6.25	2.00	6.25	0.81	6.25	n.a	6.25	1.32	6.25	0.83	6.25	0.68	6.25	n.a
8.75	1.11	8.75	2.00	8.75	0.81	8.75	n.a	8.75	2.00	8.75	2.00	8.75	1.63	8.75	1.05	8.75	n.a	8.75	2.00	8.75	1.25	8.75	1.23	8.75	0.57
11.25	1.11	11.25	1.19	11.25	1.26	11.25	0.45	11.25	1.66	11.25	1.12	11.25	1.46	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.31	11.25	0.91	11.25	1.71
13.75	2.00	13.75	2.00	13.75	2.01	13.75	1.08	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.42	13.75	1.79	13.75	1.43	13.75	0.96	13.75	1.57
16.25	2.00	16.25	1.57	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.13	16.25	2.01	16.25	2.00	16.25	0.91	16.25	1.10	16.25	2.00
18.75	1.02	18.75	2.00	18.75	2.00	18.75	1.20	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.68	18.75	2.00	18.75	1.13	18.75	1.28	18.75	2.00
21.25	2.00	21.25	1.34	21.25	2.00	21.25	1.73	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.04	21.25	1.13	21.25	2.00	21.25	1.54	21.25	1.28	21.25	1.20
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.52	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.16	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.79
26.25	2.00			26.25	1.16	26.25	2.00			26.25	2.00	26.25	1.13	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00
28.75	2.00			28.75	0.97	28.75	2.00			28.75	2.01	28.75	1.15	28.75	2.00	28.75	2.16	28.75	2.00	28.75	2.00	28.75	n.a	28.75	2.00
31.25	1.31			31.25	0.99	31.25	2.00			31.25	2.00	31.25	1.46	31.25	2.00	31.25	2.00	31.25	0.75	31.25	2.00	31.25	0.62	31.25	2.00
33.75	0.93			33.75	2.00	33.75	2.00					33.75	1.30					32.25	1.18	32.25	2.00	33.75	0.90	33.75	2.00
36.25	1.03			36.25	2.00							36.25	0.95					33.25	2.00					36.25	1.70
Inv Avg	1.49	Inv Avg	1.75	Inv Avg	1.38	Inv Avg	1.44	Inv Avg	1.55	Inv Avg	1.58	Inv Avg	1.57	Inv Avg	1.70	Inv Avg	1.42	Inv Avg	1.55	Inv Avg	1.46	Inv Avg	1.16	Inv Avg	1.59
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low

Figure D-8

C-172		C-174		C-178		C-180		C-182		C-184		C-186		C-190		C-192		C-194		C-196		C-198		C-200	
S (ft)	0.19	S (ft)	0.04	S (ft)	0.21	S (ft)	0.35	S (ft)	0.05	S (ft)	0.17	S (ft)	0.31	S (ft)	0.14	S (ft)	0.21	S (ft)	0.21	S (ft)	0.23	S (ft)	0.29	S (ft)	0.22
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	0.59	6.25	1.31	6.25	n.a	6.25	0.72	6.25	n.a	6.25	n.a	6.25	0.63	6.25	n.a	6.25	0.66	6.25	0.74	6.25	n.a	6.25	0.78	6.25	0.92
8.75	1.44	8.75	2.00	8.75	0.75	8.75	1.83	8.75	1.21	8.75	0.62	8.75	2.00	8.75	n.a	8.75	2.00	8.75	n.a	8.75	0.92	8.75	0.83	8.75	n.a
11.25	2.12	11.25	2.00	11.25	1.66	11.25	1.07	11.25	1.46	11.25	1.40	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.38	11.25	1.49	11.25	1.33	11.25	n.a
13.75	2.00	13.75	2.00	13.75	1.60	13.75	0.87	13.75	2.00	13.75	2.00	13.75	2.00	13.75	n.a	13.75	2.00	13.75	0.97	13.75	2.00	13.75	2.00	13.75	1.07
16.25	2.00	16.25	1.94	16.25	0.85	16.25	0.79	16.25	2.00	16.25	1.50	16.25	2.00	16.25	0.57	16.25	2.00	16.25	1.91	16.25	1.25	16.25	2.00	16.25	1.16
18.75	2.00	18.75	1.61	18.75	2.00	18.75	1.20	18.75	2.00	18.75	1.50	18.75	1.31	18.75	2.00	18.75	0.82	18.75	1.07	18.75	1.82	18.75	1.70	18.75	2.00
21.25	1.46	21.25	2.00	21.25	1.55	21.25	1.06	21.25	1.94	21.25	2.00	21.25	1.02	21.25	1.46	21.25	2.00	21.25	2.00	21.25	1.87	21.25	n.a	21.25	1.42
23.75	1.47	23.75	2.00	23.75	1.12	23.75	1.08	23.75	2.00	23.75	2.00	23.75	1.18	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.97	23.75	0.75	23.75	1.86
26.25	1.88	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.85	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.70	26.25	1.45
28.75	2.00	28.75	2.00	28.75	2.06	28.75	2.00	28.75	2.00	28.75	2.06	28.75	0.85	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.23	28.75	2.00
31.25	1.86	31.25	2.00	31.25	2.00	31.25	1.70	31.25	2.00	31.25	1.65	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.84	31.25	n.a	31.25	1.28	31.25	2.00
33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.70	33.75	1.91	33.75	1.74	33.75	2.19	33.75	2.00	33.75	2.19	33.75	1.60	33.75	0.50	33.75	2.00	33.75	1.31
36.25	2.00			36.25	2.00	36.25	2.00			36.25	1.18			36.25	2.00	36.25	2.00	36.25	2.00			36.25	2.00	36.25	2.00
																								38.75	2.00
																								41.25	2.00
																								43.75	2.00
																								46.25	1.43
																								48.75	1.06
																								51.25	1.27
																								53.75	1.13
																								56.25	2.00
																								58.75	2.00
																								61.25	2.00
																								63.75	2.00
																								66.25	1.19
Inv Avg	1.61	Inv Avg	1.89	Inv Avg	1.54	Inv Avg	1.28	Inv Avg	1.85	Inv Avg	1.55	Inv Avg	1.34	Inv Avg	1.68	Inv Avg	1.63	Inv Avg	1.54	Inv Avg	1.45	Inv Avg	1.38	Inv Avg	1.57
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-8

Ameren Missouri: Labadie UWL
Liquefaction Analysis
50' of ASH M: 7.5
PGA: 2% probability of exceedence in 50 yrs: 0.1792 GW: 0.0'

C-11		C-13		C-16		C-18		C-21		C-23		C-25		C-28		C-30		C-32		C-34		C-37		C-39	
S (ft)	0.31	S (ft)	0.05	S (ft)	0.23	S (ft)	0.35	S (ft)	0.06	S (ft)	0.27	S (ft)	0.19	S (ft)	0.15	S (ft)	0.18	S (ft)	0.08	S (ft)	0.20	S (ft)	0.15	S (ft)	0.04
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.87	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.97	6.25	0.56	6.25	n.a	6.25	1.14	6.25	1.27	6.25	n.a	6.25	0.66	6.25	n.a	6.25	0.78	6.25	n.a	6.25	n.a
8.75	n.a	8.75	1.38	8.75	1.14	8.75	n.a	8.75	n.a	8.75	1.00	8.75	0.88	8.75	0.68	8.75	1.68	8.75	1.07	8.75	n.a	8.75	0.84	8.75	n.a
11.25	0.53	11.25	2.00	11.25	0.69	11.25	0.95	11.25	1.10	11.25	1.27	11.25	2.00	11.25	n.a	11.25	2.00	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.23
13.75	n.a	13.75	2.00	13.75	1.06	13.75	1.83	13.75	2.00	13.75	2.04	13.75	0.94	13.75	n.a	13.75	2.00	13.75	2.00	13.75	0.91	13.75	1.92	13.75	2.14
16.25	0.54	16.25	2.00	16.25	1.53	16.25	1.91	16.25	2.00	16.25	1.94	16.25	2.00	16.25	1.48	16.25	1.66	16.25	1.07	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	2.00	18.75	1.60	18.75	1.15	18.75	2.00	18.75	0.83	18.75	1.31	18.75	1.50	18.75	2.02	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.56
21.25	2.00	21.25	2.00	21.25	2.00	21.25	0.90	21.25	1.39	21.25	2.01	21.25	2.00	21.25	1.66	21.25	1.74	21.25	2.00	21.25	2.00	21.25	1.99	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.54	23.75	1.76	23.75	2.00	23.75	1.15	23.75	2.00	23.75	1.93	23.75	1.39	23.75	2.00	23.75	1.07	23.75	1.51
26.25	2.00	26.25	1.49	26.25	2.00	26.25	2.00	26.25	1.77	26.25	2.00	26.25	1.21	26.25	2.00	26.25	2.00	26.25	1.33	26.25	2.00	26.25	1.27	26.25	2.00
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.67	28.75	1.49	28.75	1.69	28.75	2.09	28.75	2.00	28.75	2.00	28.75	1.75	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.46	31.25	2.00	31.25	1.52	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.50	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.27	31.25	2.00
33.75	2.00	33.75	1.58	33.75	2.00	33.75	2.00	33.75	1.66	33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.08	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00
		36.25	2.00	36.25	2.00	36.25	1.89	36.25	1.48	36.25	2.00	36.25	2.00	36.25	1.25	36.25	2.00	36.25	2.00	36.25	1.02	36.25	2.00	36.25	2.00
		38.75	2.00																			38.75	2.00		
		41.25	2.00																			41.25	2.00		
Inv Avg	1.44	Inv Avg	1.85	Inv Avg	1.49	Inv Avg	1.40	Inv Avg	1.74	Inv Avg	1.47	Inv Avg	1.49	Inv Avg	1.60	Inv Avg	1.63	Inv Avg	1.70	Inv Avg	1.59	Inv Avg	1.66	Inv Avg	1.85
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-9

C-41		C-44		C-46		C-46A		C-48		C-50		C-60		C-62		C-64		C-66		C-66A		C-68		C-70	
S (ft)	0.13	S (ft)	0.15	S (ft)	0.08	S (ft)	0.13	S (ft)	0.28	S (ft)	0.23	S (ft)	0.13	S (ft)	0.12	S (ft)	0.31	S (ft)	0.02	S (ft)	0.24	S (ft)	0.17	S (ft)	0.15
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	0.87	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	1.00	6.25	n.a	6.25	n.a	6.25	0.81	6.25	0.61	6.25	n.a	6.25	0.84	6.25	n.a	6.25	n.a	6.25	0.84	6.25	0.70	6.25	1.55
8.75	n.a	8.75	0.98	8.75	n.a	8.75	n.a	8.75	0.99	8.75	2.00	8.75	0.73	8.75	n.a	8.75	0.61	8.75	n.a	8.75	0.85	8.75	1.40	8.75	1.62
11.25	0.74	11.25	1.69	11.25	1.88	11.25	1.53	11.25	1.44	11.25	0.98	11.25	1.47	11.25	n.a	11.25	1.26	11.25	2.00	11.25	2.00	11.25	1.14	11.25	1.64
13.75	1.15	13.75	1.38	13.75	1.04	13.75	1.06	13.75	1.16	13.75	2.00	13.75	1.64	13.75	1.42	13.75	1.16	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.13
16.25	1.13	16.25	1.44	16.25	2.12	16.25	1.95	16.25	0.71	16.25	2.00	16.25	2.00	16.25	2.00	16.25	0.60	16.25	1.80	16.25	1.52	16.25	2.00	16.25	n.a
18.75	2.00	18.75	1.49	18.75	2.20	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.85	18.75	2.00	18.75	1.90	18.75	2.00	18.75	1.04
21.25	2.00	21.25	1.08	21.25	1.12	21.25	1.46	21.25	1.25	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.12	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.05	23.75	1.32	23.75	1.54	23.75	1.62	23.75	2.00	23.75	2.13	23.75	2.00	23.75	1.92	23.75	2.00	23.75	2.17	23.75	2.00	23.75	1.19	23.75	2.05
26.25	2.00	26.25	2.00	26.25	1.36	26.25	1.61	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.13	26.25	2.00			26.25	2.00	26.25	1.20	26.25	2.00
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.01	28.75	2.00	28.75	2.00	28.75	2.00			28.75	2.00	28.75	2.00	28.75	1.31
31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00			31.25	1.71	31.25	2.00	31.25	2.00
33.75	2.00	33.75	n.a	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00			33.75	2.00	33.75	1.34			33.75	n.a	33.75	2.00	33.75	2.00
36.25	2.00	36.25	n.a	36.25	1.73	36.25	0.93	36.25	1.61	36.25	1.28			36.25	2.00	36.25	1.01					36.25	1.44	36.25	0.80
				38.75	2.05	38.75	2.00			38.75	2.00														
				41.25	2.00	41.25	2.00			41.25	2.00														
				43.75	2.00	43.75	2.00																		
Inv Avg	1.65	Inv Avg	1.52	Inv Avg	1.75	Inv Avg	1.70	Inv Avg	1.41	Inv Avg	1.63	Inv Avg	1.70	Inv Avg	1.79	Inv Avg	1.34	Inv Avg	1.99	Inv Avg	1.51	Inv Avg	1.52	Inv Avg	1.54
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-9

C-74		C-76		C-78		C-79		C-80		C-81		C-82		C-84		C-86		C-89		C-91		C-92		C-94	
S (ft)	0.18	S (ft)	0.11	S (ft)	0.32	S (ft)	0.08	S (ft)	0.22	S (ft)	0.20	S (ft)	0.09	S (ft)	0.13	S (ft)	0.21	S (ft)	0.18	S (ft)	0.47	S (ft)	0.18	S (ft)	0.12
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.90	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.86	6.25	1.01	6.25	0.73	6.25	n.a	6.25	n.a	6.25	n.a	6.25	1.83	6.25	n.a	6.25	n.a	6.25	0.88	6.25	0.87
8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.30	8.75	n.a	8.75	0.95	8.75	n.a	8.75	1.21	8.75	0.89	8.75	1.05	8.75	0.67	8.75	1.28	8.75	1.47
11.25	n.a	11.25	n.a	11.25	0.61	11.25	n.a	11.25	n.a	11.25	0.66	11.25	n.a	11.25	1.66	11.25	1.20	11.25	1.20	11.25	0.88	11.25	0.86	11.25	n.a
13.75	0.58	13.75	0.80	13.75	0.76	13.75	1.11	13.75	0.77	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.23	13.75	0.67	13.75	2.00	13.75	n.a
16.25	1.07	16.25	1.45	16.25	2.00	16.25	1.99	16.25	1.15	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.06	16.25	1.20	16.25	2.00	16.25	1.44
18.75	2.15	18.75	2.16	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.30	18.75	2.00	18.75	2.00	18.75	2.00	18.75	0.85	18.75	1.48	18.75	2.00	18.75	1.95
21.25	1.27	21.25	2.00	21.25	1.36	21.25	2.00	21.25	1.92	21.25	2.15	21.25	2.00	21.25	2.17	21.25	2.00	21.25	1.58	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.22	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.67	23.75	1.21	23.75	1.54	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.00	26.25	2.00	26.25	1.66	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.78			26.25	2.00
28.75	1.97	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.18	28.75	1.87	28.75	1.00			28.75	2.00
31.25	1.36	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.02	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.69	31.25	1.36	31.25	0.90			31.25	2.00
33.75	n.a	33.75	2.00	33.75	1.49	33.75	2.00	33.75	2.00	33.75	2.07	33.75	2.00	33.75	2.00	33.75	1.87	33.75	2.00	33.75	1.83			33.75	1.94
36.25	n.a	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	0.81	36.25	0.65	36.25	1.79	36.25	2.00	36.25	1.49			36.25	2.00
Inv Avg	1.56	Inv Avg	1.79	Inv Avg	1.41	Inv Avg	1.67	Inv Avg	1.57	Inv Avg	1.61	Inv Avg	1.82	Inv Avg	1.66	Inv Avg	1.56	Inv Avg	1.46	Inv Avg	1.18	Inv Avg	1.52	Inv Avg	1.75
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low	Risk	Low

Figure D-9

C-96		C-98		C-100		C-103		C-105		C-106		C-107		C-107A		C-109		C-111		C-113		C-117		C-119	
S (ft)	0.13	S (ft)	0.19	S (ft)	0.19	S (ft)	0.16	S (ft)	0.09	S (ft)	0.31	S (ft)	0.26	S (ft)	0.06	S (ft)	0.22	S (ft)	0.20	S (ft)	0.22	S (ft)	0.31	S (ft)	0.12
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.82	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	1.00	6.25	0.76	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a
8.75	n.a	8.75	0.57	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.79	8.75	0.79	8.75	1.18	8.75	n.a	8.75	n.a	8.75	0.79	8.75	0.50	8.75	0.76
11.25	n.a	11.25	1.20	11.25	2.00	11.25	0.96	11.25	n.a	11.25	1.24	11.25	0.91	11.25	1.29	11.25	0.51	11.25	0.69	11.25	2.00	11.25	2.00	11.25	1.51
13.75	0.70	13.75	2.00	13.75	1.81	13.75	2.00	13.75	n.a	13.75	2.00	13.75	2.02	13.75	1.81	13.75	2.15	13.75	0.84	13.75	0.77	13.75	1.22	13.75	2.00
16.25	1.14	16.25	2.00	16.25	2.02	16.25	2.00	16.25	2.00	16.25	1.72	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.50	16.25	2.00	16.25	1.06	16.25	2.00
18.75	1.19	18.75	2.00	18.75	2.00	18.75	0.94	18.75	2.00	18.75	0.89	18.75	2.00	18.75	2.00	18.75	1.65	18.75	2.00	18.75	1.21	18.75	1.07	18.75	2.00
21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.00	21.25	2.00	21.25	0.95	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	1.98	23.75	1.63	23.75	2.00	23.75	2.06	23.75	2.00	23.75	1.54	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.59	26.25	2.00	26.25	1.68			26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.50	26.25	2.00	26.25	2.00
28.75	2.00	28.75	1.37	28.75	0.89	28.75	n.a	28.75	0.86	28.75	2.00			28.75	1.37	28.75	2.02	28.75	2.00	28.75	1.36	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.83	31.25	1.46	31.25	n.a	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00
33.75	2.00	33.75	2.00			33.75	n.a	33.75	2.00	33.75	1.38			33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.40	33.75	2.00	33.75	2.00
		36.25	2.00			36.25	n.a	36.25	1.25	36.25	2.06			36.25	2.00	36.25	1.57			36.25	1.58	36.25	1.98		
Inv Avg	1.62	Inv Avg	1.60	Inv Avg	1.61	Inv Avg	1.60	Inv Avg	1.77	Inv Avg	1.41	Inv Avg	1.39	Inv Avg	1.75	Inv Avg	1.64	Inv Avg	1.59	Inv Avg	1.48	Inv Avg	1.47	Inv Avg	1.76
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

C-121		C-123		C-125		C-129		C-131		C-133		C-135		C-135A		C-137		C-139		C-139A		C-143		C-145	
S (ft)	0.07	S (ft)	0.15	S (ft)	0.22	S (ft)	0.21	S (ft)	0.31	S (ft)	0.05	S (ft)	0.02	S (ft)	0.07	S (ft)	0.02	S (ft)	0.13	S (ft)	0.11	S (ft)	0.20	S (ft)	0.16
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.64	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.79	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	0.59	6.25	0.68
8.75	n.a	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.66	8.75	1.19	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.67	8.75	1.74
11.25	1.17	11.25	2.00	11.25	n.a	11.25	n.a	11.25	0.56	11.25	2.00	11.25	1.10	11.25	1.10	11.25	n.a	11.25	n.a	11.25	n.a	11.25	1.95	11.25	1.03
13.75	2.00	13.75	2.00	13.75	0.93	13.75	n.a	13.75	1.18	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.59	13.75	0.76	13.75	2.00	13.75	2.00
16.25	2.00	16.25	2.00	16.25	1.80	16.25	0.51	16.25	1.40	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.84	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	1.90	18.75	2.00	18.75	2.00	18.75	1.79	18.75	1.88	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.31	18.75	1.26
21.25	2.00	21.25	1.80	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.08			21.25	2.00	21.25	2.01	21.25	2.00	21.25	2.00	21.25	1.96	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.38			23.75	2.00	23.75	2.00			23.75	2.00	23.75	1.38	23.75	2.00
26.25	1.15	26.25	2.00	26.25	2.00	26.25	1.12	26.25	1.94	26.25	2.00			26.25	2.00	26.25	2.00			26.25	2.00	26.25	2.00	26.25	2.00
28.75	1.67	28.75	2.00	28.75	2.00	28.75	1.25	28.75	1.17	28.75	2.00			28.75	1.01	28.75	2.00			28.75	2.00	28.75	1.95		
31.25	1.00	31.25	1.04	31.25	1.24	31.25	2.00	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00			31.25	1.33	31.25	1.50		
33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.26	33.75	2.00	33.75	2.00					32.25	2.00					33.75	2.00		
		36.25	2.00	36.25	2.00	36.25	1.16	36.25	2.00	36.25	2.00											36.25	2.00		
Inv Avg	1.68	Inv Avg	1.70	Inv Avg	1.58	Inv Avg	1.45	Inv Avg	1.39	Inv Avg	1.86	Inv Avg	1.81	Inv Avg	1.76	Inv Avg	1.99	Inv Avg	1.58	Inv Avg	1.72	Inv Avg	1.58	Inv Avg	1.51
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-9

C-145A		C-147		C-149		C-151		C-157		C-157A		C-159		C-161		C-163		C-166		C-168		C-168A		C-170	
S (ft)	0.14	S (ft)	0.03	S (ft)	0.27	S (ft)	0.35	S (ft)	0.20	S (ft)	0.20	S (ft)	0.11	S (ft)	0.13	S (ft)	0.52	S (ft)	0.19	S (ft)	0.19	S (ft)	0.41	S (ft)	0.18
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.69	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.88	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	0.55	6.25	0.56	6.25	2.00	6.25	0.83	6.25	n.a	6.25	1.34	6.25	0.84	6.25	0.69	6.25	n.a
8.75	1.13	8.75	2.00	8.75	0.83	8.75	n.a	8.75	2.00	8.75	2.00	8.75	1.66	8.75	1.07	8.75	n.a	8.75	2.00	8.75	1.27	8.75	1.26	8.75	0.58
11.25	1.14	11.25	1.22	11.25	1.30	11.25	0.46	11.25	1.70	11.25	1.15	11.25	1.50	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.35	11.25	0.94	11.25	1.75
13.75	2.00	13.75	2.00	13.75	2.07	13.75	1.11	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.43	13.75	1.84	13.75	1.48	13.75	0.99	13.75	1.61
16.25	2.00	16.25	1.62	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.20	16.25	2.08	16.25	2.00	16.25	0.94	16.25	1.14	16.25	2.00
18.75	1.05	18.75	2.00	18.75	2.00	18.75	1.24	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.74	18.75	2.00	18.75	1.17	18.75	1.33	18.75	2.00
21.25	2.00	21.25	1.39	21.25	2.00	21.25	1.80	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.12	21.25	1.17	21.25	2.00	21.25	1.59	21.25	1.33	21.25	1.24
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.58	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.21	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.87
26.25	2.00			26.25	1.20	26.25	2.00			26.25	2.00	26.25	1.18	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00
28.75	2.00			28.75	1.01	28.75	2.00			28.75	2.09	28.75	1.20	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	n.a	28.75	2.00
31.25	1.37			31.25	1.04	31.25	2.00			31.25	2.00	31.25	1.53	31.25	2.00	31.25	2.00	31.25	0.79	31.25	2.00	31.25	0.65	31.25	2.00
33.75	0.98			33.75	2.00	33.75	2.00					33.75	1.36					32.25	1.23	32.25	2.00	33.75	0.94	33.75	2.00
36.25	1.08			36.25	2.00							36.25	0.99					33.25	2.00					36.25	1.77
Inv Avg	1.52	Inv Avg	1.77	Inv Avg	1.40	Inv Avg	1.47	Inv Avg	1.56	Inv Avg	1.60	Inv Avg	1.60	Inv Avg	1.72	Inv Avg	1.44	Inv Avg	1.58	Inv Avg	1.48	Inv Avg	1.18	Inv Avg	1.61
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Moderate	Risk	Low

Figure D-9

C-172		C-174		C-178		C-180		C-182		C-184		C-186		C-190		C-192		C-194		C-196		C-198		C-200	
S (ft)	0.19	S (ft)	0.04	S (ft)	0.21	S (ft)	0.34	S (ft)	0.04	S (ft)	0.17	S (ft)	0.31	S (ft)	0.21	S (ft)	0.14	S (ft)	0.17	S (ft)	0.23	S (ft)	0.29	S (ft)	0.19
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	0.60	6.25	1.33	6.25	n.a	6.25	0.73	6.25	n.a	6.25	n.a	6.25	0.64	6.25	n.a	6.25	0.67	6.25	0.75	6.25	n.a	6.25	0.79	6.25	0.93
8.75	1.47	8.75	2.00	8.75	0.77	8.75	1.87	8.75	1.23	8.75	0.63	8.75	2.00	8.75	n.a	8.75	2.00	8.75	n.a	8.75	0.94	8.75	0.85	8.75	n.a
11.25	2.18	11.25	2.00	11.25	1.70	11.25	1.10	11.25	1.50	11.25	1.43	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.42	11.25	1.53	11.25	1.36	11.25	n.a
13.75	2.00	13.75	2.00	13.75	1.65	13.75	0.89	13.75	2.00	13.75	2.00	13.75	2.00	13.75	n.a	13.75	2.00	13.75	1.00	13.75	2.00	13.75	2.00	13.75	1.10
16.25	2.00	16.25	2.01	16.25	0.88	16.25	0.81	16.25	2.00	16.25	1.55	16.25	2.00	16.25	0.59	16.25	2.00	16.25	1.97	16.25	1.29	16.25	2.00	16.25	1.20
18.75	2.00	18.75	1.67	18.75	2.00	18.75	1.24	18.75	2.00	18.75	1.55	18.75	1.36	18.75	2.00	18.75	0.85	18.75	1.11	18.75	1.88	18.75	1.76	18.75	2.00
21.25	1.51	21.25	2.00	21.25	1.61	21.25	1.10	21.25	2.01	21.25	2.00	21.25	1.06	21.25	1.52	21.25	2.00	21.25	2.00	21.25	1.94	21.25	n.a	21.25	1.47
23.75	1.53	23.75	2.00	23.75	1.17	23.75	1.13	23.75	2.00	23.75	2.00	23.75	1.23	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.05	23.75	0.78	23.75	1.94
26.25	1.96	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.89	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.77	26.25	1.51
28.75	2.00	28.75	2.00	28.75	2.15	28.75	2.00	28.75	2.00	28.75	2.14	28.75	0.89	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.28	28.75	2.00
31.25	1.94	31.25	2.00	31.25	2.00	31.25	1.78	31.25	2.00	31.25	1.72	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.92	31.25	n.a	31.25	1.34	31.25	2.00
33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.78	33.75	1.99	33.75	1.82	33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.67	33.75	0.52	33.75	2.00	33.75	1.37
36.25	2.00			36.25	2.00	36.25	2.00			36.25	1.23			36.25	2.00	36.25	2.00	36.25	2.00			36.25	2.00	36.25	2.00
																								38.75	2.00
																								41.25	2.00
																								43.75	2.00
																								46.25	1.49
																								48.75	1.11
																								51.25	1.32
																								53.75	1.19
																								56.25	2.00
																								58.75	2.00
																								61.25	2.00
																								63.75	2.00
																								66.25	1.25
Inv Avg	1.64	Inv Avg	1.90	Inv Avg	1.57	Inv Avg	1.32	Inv Avg	1.87	Inv Avg	1.58	Inv Avg	1.36	Inv Avg	1.70	Inv Avg	1.64	Inv Avg	1.57	Inv Avg	1.48	Inv Avg	1.41	Inv Avg	1.60
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-9

Ameren Missouri: Labadie UWL
Liquefaction Analysis
60' of ASH M: 7.5
PGA: 2% probability of exceedence in 50 yrs: 0.1792 GW: 0.0'

C-11		C-13		C-16		C-18		C-21		C-23		C-25		C-28		C-30		C-32		C-34		C-37		C-39	
S (ft)	0.31	S (ft)	0.05	S (ft)	0.23	S (ft)	0.34	S (ft)	0.06	S (ft)	0.24	S (ft)	0.19	S (ft)	0.15	S (ft)	0.17	S (ft)	0.07	S (ft)	0.20	S (ft)	0.14	S (ft)	0.04
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.88	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.98	6.25	0.57	6.25	n.a	6.25	1.15	6.25	1.29	6.25	n.a	6.25	0.67	6.25	n.a	6.25	0.79	6.25	n.a	6.25	n.a
8.75	n.a	8.75	1.40	8.75	1.16	8.75	n.a	8.75	n.a	8.75	1.01	8.75	0.90	8.75	0.69	8.75	1.71	8.75	1.09	8.75	n.a	8.75	0.85	8.75	n.a
11.25	0.54	11.25	2.00	11.25	0.71	11.25	0.97	11.25	1.13	11.25	1.30	11.25	2.00	11.25	n.a	11.25	2.00	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.25
13.75	n.a	13.75	2.00	13.75	1.08	13.75	1.87	13.75	2.00	13.75	2.08	13.75	0.96	13.75	n.a	13.75	2.00	13.75	2.00	13.75	0.93	13.75	1.97	13.75	2.18
16.25	0.55	16.25	2.00	16.25	1.57	16.25	1.95	16.25	2.00	16.25	1.98	16.25	2.00	16.25	1.51	16.25	1.70	16.25	1.10	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	2.00	18.75	1.64	18.75	1.18	18.75	2.00	18.75	0.86	18.75	1.35	18.75	1.54	18.75	2.07	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.60
21.25	2.00	21.25	2.00	21.25	2.00	21.25	0.92	21.25	1.43	21.25	2.06	21.25	2.00	21.25	1.71	21.25	1.79	21.25	2.00	21.25	2.00	21.25	2.05	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.59	23.75	1.81	23.75	2.00	23.75	1.18	23.75	2.00	23.75	1.98	23.75	1.43	23.75	2.00	23.75	1.10	23.75	1.55
26.25	2.00	26.25	1.54	26.25	2.00	26.25	2.00	26.25	1.83	26.25	2.00	26.25	1.25	26.25	2.00	26.25	2.00	26.25	1.37	26.25	2.00	26.25	1.31	26.25	2.00
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.72	28.75	1.54	28.75	1.74	28.75	2.16	28.75	2.00	28.75	2.00	28.75	1.81	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.51	31.25	2.00	31.25	1.57	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.55	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.32	31.25	2.00
33.75	2.00	33.75	1.63	33.75	2.00	33.75	2.00	33.75	1.71	33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.12	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00
		36.25	2.00	36.25	2.00	36.25	1.96	36.25	1.53	36.25	2.00	36.25	2.00	36.25	1.29	36.25	2.00	36.25	2.00	36.25	1.06	36.25	2.00	36.25	2.00
		38.75	2.00																			38.75	2.00		
		41.25	2.00																			41.25	2.00		
Inv Avg	1.45	Inv Avg	1.86	Inv Avg	1.50	Inv Avg	1.42	Inv Avg	1.76	Inv Avg	1.49	Inv Avg	1.52	Inv Avg	1.62	Inv Avg	1.65	Inv Avg	1.71	Inv Avg	1.61	Inv Avg	1.68	Inv Avg	1.87
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-10

C-41		C-44		C-46		C-46A		C-48		C-50		C-60		C-62		C-64		C-66		C-66A		C-68		C-70	
S (ft)	0.13	S (ft)	0.14	S (ft)	0.08	S (ft)	0.13	S (ft)	0.25	S (ft)	0.20	S (ft)	0.13	S (ft)	0.12	S (ft)	0.31	S (ft)	0.02	S (ft)	0.24	S (ft)	0.17	S (ft)	0.15
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	0.87	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	1.01	6.25	n.a	6.25	n.a	6.25	0.82	6.25	0.61	6.25	n.a	6.25	0.85	6.25	n.a	6.25	n.a	6.25	0.85	6.25	0.71	6.25	1.57
8.75	n.a	8.75	1.00	8.75	n.a	8.75	n.a	8.75	1.00	8.75	2.00	8.75	0.74	8.75	n.a	8.75	0.62	8.75	n.a	8.75	0.86	8.75	1.42	8.75	1.65
11.25	0.75	11.25	1.72	11.25	1.92	11.25	1.56	11.25	1.46	11.25	1.00	11.25	1.50	11.25	n.a	11.25	1.29	11.25	2.00	11.25	2.00	11.25	1.17	11.25	1.68
13.75	1.18	13.75	1.41	13.75	1.07	13.75	1.09	13.75	1.18	13.75	2.00	13.75	1.67	13.75	1.45	13.75	1.19	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.16
16.25	1.16	16.25	1.48	16.25	2.17	16.25	1.99	16.25	0.73	16.25	2.00	16.25	2.00	16.25	2.00	16.25	0.61	16.25	1.84	16.25	1.56	16.25	2.00	16.25	n.a
18.75	2.00	18.75	1.53	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.90	18.75	2.00	18.75	1.95	18.75	2.00	18.75	1.06
21.25	2.00	21.25	1.11	21.25	1.15	21.25	1.50	21.25	1.29	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.18	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.11	23.75	1.36	23.75	1.58	23.75	1.66	23.75	2.00	23.75	2.20	23.75	2.00	23.75	1.98	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.22	23.75	2.11
26.25	2.00	26.25	2.00	26.25	1.40	26.25	1.66	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.20	26.25	2.00			26.25	2.00	26.25	1.24	26.25	2.00
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.08	28.75	2.00	28.75	2.00	28.75	2.00			28.75	2.00	28.75	2.00	28.75	1.36
31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00			31.25	1.77	31.25	2.00	31.25	2.00
33.75	2.00	33.75	n.a	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00			33.75	2.00	33.75	1.39			33.75	n.a	33.75	2.00	33.75	2.00
36.25	2.00	36.25	n.a	36.25	1.79	36.25	0.96	36.25	1.67	36.25	1.32			36.25	2.00	36.25	1.04					36.25	1.49	36.25	0.82
				38.75	2.12	38.75	2.00			38.75	2.00														
				41.25	2.00	41.25	2.00			41.25	2.00														
				43.75	2.00	43.75	2.00																		
Inv Avg	1.66	Inv Avg	1.54	Inv Avg	1.77	Inv Avg	1.72	Inv Avg	1.43	Inv Avg	1.65	Inv Avg	1.71	Inv Avg	1.80	Inv Avg	1.36	Inv Avg	1.98	Inv Avg	1.52	Inv Avg	1.54	Inv Avg	1.57
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-10

C-74		C-76		C-78		C-79		C-80		C-81		C-82		C-84		C-86		C-89		C-91		C-92		C-94	
S (ft)	0.17	S (ft)	0.11	S (ft)	0.32	S (ft)	0.08	S (ft)	0.22	S (ft)	0.20	S (ft)	0.09	S (ft)	0.13	S (ft)	0.20	S (ft)	0.17	S (ft)	0.47	S (ft)	0.18	S (ft)	0.11
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.90	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.87	6.25	1.02	6.25	0.74	6.25	n.a	6.25	n.a	6.25	n.a	6.25	1.85	6.25	n.a	6.25	n.a	6.25	0.89	6.25	0.88
8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.32	8.75	n.a	8.75	0.97	8.75	n.a	8.75	1.23	8.75	0.90	8.75	1.06	8.75	0.68	8.75	1.30	8.75	1.49
11.25	n.a	11.25	n.a	11.25	0.62	11.25	n.a	11.25	n.a	11.25	0.67	11.25	n.a	11.25	1.69	11.25	1.23	11.25	1.22	11.25	0.90	11.25	0.88	11.25	n.a
13.75	0.60	13.75	0.82	13.75	0.77	13.75	1.14	13.75	0.79	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.26	13.75	0.68	13.75	2.00	13.75	n.a
16.25	1.09	16.25	1.48	16.25	2.00	16.25	2.04	16.25	1.17	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.09	16.25	1.23	16.25	2.00	16.25	1.48
18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.33	18.75	2.00	18.75	2.00	18.75	2.00	18.75	0.87	18.75	1.52	18.75	2.00	18.75	2.00
21.25	1.31	21.25	2.00	21.25	1.40	21.25	2.00	21.25	1.97	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.62	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.26	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.72	23.75	1.25	23.75	1.58	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.00	26.25	2.00	26.25	1.71	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.81			26.25	2.00
28.75	2.03	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.93	28.75	1.03			28.75	2.00
31.25	1.41	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.09	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.74	31.25	1.41	31.25	0.93			31.25	2.00
33.75	n.a	33.75	2.00	33.75	1.54	33.75	2.00	33.75	2.00	33.75	2.14	33.75	2.00	33.75	2.00	33.75	1.93	33.75	2.00	33.75	1.89			33.75	2.00
36.25	n.a	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	0.84	36.25	0.67	36.25	1.85	36.25	2.00	36.25	1.54			36.25	2.00
Inv Avg	1.57	Inv Avg	1.79	Inv Avg	1.43	Inv Avg	1.69	Inv Avg	1.59	Inv Avg	1.62	Inv Avg	1.83	Inv Avg	1.67	Inv Avg	1.58	Inv Avg	1.48	Inv Avg	1.20	Inv Avg	1.53	Inv Avg	1.77
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-10

C-96		C-98		C-100		C-103		C-105		C-106		C-107		C-107A		C-109		C-111		C-113		C-117		C-119	
S (ft)	0.13	S (ft)	0.19	S (ft)	0.18	S (ft)	0.16	S (ft)	0.09	S (ft)	0.27	S (ft)	0.26	S (ft)	0.06	S (ft)	0.22	S (ft)	0.20	S (ft)	0.21	S (ft)	0.31	S (ft)	0.12
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.82	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	1.01	6.25	0.77	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a
8.75	n.a	8.75	0.58	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.80	8.75	0.80	8.75	1.20	8.75	n.a	8.75	n.a	8.75	0.81	8.75	0.51	8.75	0.78
11.25	n.a	11.25	1.22	11.25	2.00	11.25	0.97	11.25	n.a	11.25	1.27	11.25	0.93	11.25	1.32	11.25	0.52	11.25	0.70	11.25	2.00	11.25	2.00	11.25	1.54
13.75	0.72	13.75	2.00	13.75	1.84	13.75	2.00	13.75	n.a	13.75	2.00	13.75	2.06	13.75	1.85	13.75	2.19	13.75	0.86	13.75	0.78	13.75	1.25	13.75	2.00
16.25	1.17	16.25	2.00	16.25	2.07	16.25	2.00	16.25	2.00	16.25	1.77	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.54	16.25	2.04	16.25	1.09	16.25	2.00
18.75	1.22	18.75	2.00	18.75	2.00	18.75	0.96	18.75	2.00	18.75	0.91	18.75	2.00	18.75	2.00	18.75	1.70	18.75	2.00	18.75	1.24	18.75	1.10	18.75	2.00
21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.03	21.25	2.00	21.25	0.97	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.04	23.75	1.67	23.75	2.00	23.75	2.12	23.75	2.00	23.75	1.59	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.64	26.25	2.00	26.25	1.73			26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.54	26.25	2.00	26.25	2.00
28.75	2.00	28.75	1.42	28.75	0.92	28.75	n.a	28.75	0.89	28.75	2.00			28.75	1.42	28.75	2.08	28.75	2.00	28.75	1.41	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.89	31.25	1.50	31.25	n.a	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00
33.75	2.00	33.75	2.00			33.75	n.a	33.75	2.00	33.75	1.43			33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.44	33.75	2.00	33.75	2.00
		36.25	2.00			36.25	n.a	36.25	1.29	36.25	2.13			36.25	2.00	36.25	1.62			36.25	1.64	36.25	2.04		
Inv Avg	1.64	Inv Avg	1.62	Inv Avg	1.63	Inv Avg	1.62	Inv Avg	1.79	Inv Avg	1.44	Inv Avg	1.41	Inv Avg	1.77	Inv Avg	1.65	Inv Avg	1.60	Inv Avg	1.50	Inv Avg	1.49	Inv Avg	1.76
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-10

C-121		C-123		C-125		C-129		C-131		C-133		C-135		C-135A		C-137		C-139		C-139A		C-143		C-145	
S (ft)	0.07	S (ft)	0.15	S (ft)	0.22	S (ft)	0.21	S (ft)	0.30	S (ft)	0.04	S (ft)	0.02	S (ft)	0.06	S (ft)	0.02	S (ft)	0.13	S (ft)	0.11	S (ft)	0.20	S (ft)	0.16
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.64	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.80	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	0.59	6.25	0.69
8.75	n.a	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.67	8.75	1.21	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.69	8.75	1.76
11.25	1.19	11.25	2.00	11.25	n.a	11.25	n.a	11.25	0.57	11.25	2.00	11.25	1.12	11.25	1.12	11.25	n.a	11.25	n.a	11.25	n.a	11.25	1.99	11.25	1.05
13.75	2.00	13.75	2.00	13.75	0.95	13.75	n.a	13.75	1.20	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.61	13.75	0.77	13.75	2.00	13.75	2.00
16.25	2.00	16.25	2.00	16.25	1.85	16.25	0.52	16.25	1.44	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.89	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	1.95	18.75	2.00	18.75	2.00	18.75	1.84	18.75	1.93	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.35	18.75	1.29
21.25	2.00	21.25	1.85	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.14			21.25	2.00	21.25	2.06	21.25	2.00	21.25	2.00	21.25	2.01	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.42			23.75	2.00	23.75	2.00			23.75	2.00	23.75	1.43	23.75	2.00
26.25	1.18	26.25	2.00	26.25	2.00	26.25	1.15	26.25	2.00	26.25	2.00			26.25	2.00	26.25	2.00			26.25	2.00	26.25	2.00	26.25	2.00
28.75	1.73	28.75	2.00	28.75	2.00	28.75	1.29	28.75	1.21	28.75	2.00			28.75	1.04	28.75	2.00			28.75	2.00	28.75	2.02		
31.25	1.04	31.25	1.07	31.25	1.29	31.25	2.00	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00			31.25	1.38	31.25	1.55		
33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.30	33.75	2.00	33.75	2.00					32.25	2.00					33.75	2.00		
		36.25	2.00	36.25	2.00	36.25	1.20	36.25	2.00	36.25	2.00											36.25	2.00		
Inv Avg	1.70	Inv Avg	1.72	Inv Avg	1.59	Inv Avg	1.48	Inv Avg	1.41	Inv Avg	1.87	Inv Avg	1.82	Inv Avg	1.77	Inv Avg	2.00	Inv Avg	1.59	Inv Avg	1.73	Inv Avg	1.60	Inv Avg	1.52
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-10

C-145A		C-147		C-149		C-151		C-157		C-157A		C-159		C-161		C-163		C-166		C-168		C-168A		C-170	
S (ft)	0.11	S (ft)	0.03	S (ft)	0.27	S (ft)	0.35	S (ft)	0.20	S (ft)	0.20	S (ft)	0.08	S (ft)	0.13	S (ft)	0.51	S (ft)	0.19	S (ft)	0.19	S (ft)	0.38	S (ft)	0.18
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.69	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.88	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	0.56	6.25	0.57	6.25	2.00	6.25	0.84	6.25	n.a	6.25	1.35	6.25	0.85	6.25	0.70	6.25	n.a
8.75	1.15	8.75	2.00	8.75	0.85	8.75	n.a	8.75	2.00	8.75	2.00	8.75	1.69	8.75	1.09	8.75	n.a	8.75	2.00	8.75	1.29	8.75	1.28	8.75	0.59
11.25	1.16	11.25	1.25	11.25	1.32	11.25	0.47	11.25	1.74	11.25	1.17	11.25	1.53	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.37	11.25	0.95	11.25	1.78
13.75	2.00	13.75	2.00	13.75	2.12	13.75	1.13	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.44	13.75	1.88	13.75	1.51	13.75	1.01	13.75	1.65
16.25	2.00	16.25	1.66	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.13	16.25	2.00	16.25	0.96	16.25	1.16	16.25	2.00
18.75	1.08	18.75	2.00	18.75	2.00	18.75	1.27	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.78	18.75	2.00	18.75	1.20	18.75	1.36	18.75	2.00
21.25	2.00	21.25	1.43	21.25	2.00	21.25	1.85	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.17	21.25	1.20	21.25	2.00	21.25	1.64	21.25	1.37	21.25	1.28
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.63	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.24	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.92
26.25	2.00			26.25	1.24	26.25	2.00			26.25	2.00	26.25	1.22	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00
28.75	2.00			28.75	1.04	28.75	2.00			28.75	2.16	28.75	1.24	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	n.a	28.75	2.00
31.25	1.41			31.25	1.07	31.25	2.00			31.25	2.00	31.25	1.58	31.25	2.00	31.25	2.00	31.25	0.81	31.25	2.00	31.25	0.67	31.25	2.00
33.75	1.01			33.75	2.00	33.75	2.00					33.75	1.41					32.25	1.27	32.25	2.00	33.75	0.97	33.75	2.00
36.25	1.11			36.25	2.00							36.25	1.03					33.25	2.00					36.25	1.84
Inv Avg	1.54	Inv Avg	1.78	Inv Avg	1.42	Inv Avg	1.48	Inv Avg	1.57	Inv Avg	1.61	Inv Avg	1.63	Inv Avg	1.72	Inv Avg	1.46	Inv Avg	1.59	Inv Avg	1.50	Inv Avg	1.21	Inv Avg	1.63
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-10

C-172		C-174		C-178		C-180		C-182		C-184		C-186		C-190		C-192		C-194		C-196		C-198		C-200	
S (ft)	0.18	S (ft)	0.04	S (ft)	0.19	S (ft)	0.31	S (ft)	0.04	S (ft)	0.17	S (ft)	0.29	S (ft)	0.14	S (ft)	0.21	S (ft)	0.17	S (ft)	0.22	S (ft)	0.29	S (ft)	0.19
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	0.61	6.25	1.35	6.25	n.a	6.25	0.74	6.25	n.a	6.25	n.a	6.25	0.65	6.25	n.a	6.25	0.68	6.25	0.76	6.25	n.a	6.25	0.80	6.25	0.94
8.75	1.49	8.75	2.00	8.75	0.78	8.75	1.90	8.75	1.25	8.75	0.64	8.75	2.00	8.75	n.a	8.75	2.00	8.75	n.a	8.75	0.96	8.75	0.87	8.75	n.a
11.25	2.00	11.25	2.00	11.25	1.73	11.25	1.12	11.25	1.52	11.25	1.46	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.45	11.25	1.56	11.25	1.39	11.25	n.a
13.75	2.00	13.75	2.00	13.75	1.68	13.75	0.91	13.75	2.00	13.75	2.00	13.75	2.00	13.75	n.a	13.75	2.00	13.75	1.02	13.75	2.00	13.75	2.00	13.75	1.12
16.25	2.00	16.25	2.05	16.25	0.90	16.25	0.83	16.25	2.00	16.25	1.59	16.25	2.00	16.25	0.61	16.25	2.00	16.25	2.02	16.25	1.32	16.25	2.00	16.25	1.23
18.75	2.00	18.75	1.71	18.75	2.00	18.75	1.28	18.75	2.00	18.75	1.59	18.75	1.40	18.75	2.00	18.75	0.87	18.75	1.14	18.75	1.93	18.75	1.81	18.75	2.00
21.25	1.55	21.25	2.00	21.25	1.66	21.25	1.13	21.25	2.07	21.25	2.00	21.25	1.09	21.25	1.56	21.25	2.00	21.25	2.00	21.25	2.00	21.25	n.a	21.25	1.52
23.75	1.58	23.75	2.00	23.75	1.20	23.75	1.16	23.75	2.00	23.75	2.00	23.75	1.27	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.11	23.75	0.81	23.75	2.00
26.25	2.02	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.92	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.82	26.25	1.56
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	0.92	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.32	28.75	2.00
31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.84	31.25	2.00	31.25	1.78	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.98	31.25	n.a	31.25	1.38	31.25	2.00
33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.84	33.75	2.06	33.75	1.88	33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.73	33.75	0.54	33.75	2.00	33.75	1.42
36.25	2.00			36.25	2.00	36.25	2.00			36.25	1.28			36.25	2.00	36.25	2.00	36.25	2.00			36.25	2.00	36.25	2.00
																								38.75	2.00
																								41.25	2.00
																								43.75	2.00
																								46.25	1.55
																								48.75	1.16
																								51.25	1.37
																								53.75	1.23
																								56.25	2.00
																								58.75	2.00
																								61.25	2.00
																								63.75	2.00
																								66.25	1.29
Inv Avg	1.65	Inv Avg	1.91	Inv Avg	1.58	Inv Avg	1.34	Inv Avg	1.89	Inv Avg	1.60	Inv Avg	1.38	Inv Avg	1.71	Inv Avg	1.65	Inv Avg	1.59	Inv Avg	1.51	Inv Avg	1.44	Inv Avg	1.63
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-10

Ameren Missouri: Labadie UWL
Liquefaction Analysis
70' of ASH M: 7.5
PGA: 2% probability of exceedence in 50 yrs: 0.1792 GW: 0.0'

C-11		C-13		C-16		C-18		C-21		C-23		C-25		C-28		C-30		C-32		C-34		C-37		C-39	
S (ft)	0.31	S (ft)	0.05	S (ft)	0.23	S (ft)	0.33	S (ft)	0.06	S (ft)	0.23	S (ft)	0.18	S (ft)	0.15	S (ft)	0.17	S (ft)	0.06	S (ft)	0.20	S (ft)	0.14	S (ft)	0.04
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.88	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.99	6.25	0.57	6.25	n.a	6.25	1.16	6.25	1.30	6.25	n.a	6.25	0.68	6.25	n.a	6.25	0.80	6.25	n.a	6.25	n.a
8.75	n.a	8.75	1.41	8.75	1.17	8.75	n.a	8.75	n.a	8.75	1.03	8.75	0.91	8.75	0.69	8.75	1.73	8.75	1.10	8.75	n.a	8.75	0.86	8.75	n.a
11.25	0.55	11.25	2.00	11.25	0.72	11.25	0.98	11.25	1.14	11.25	1.31	11.25	2.00	11.25	n.a	11.25	2.00	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.27
13.75	n.a	13.75	2.00	13.75	1.10	13.75	1.90	13.75	2.00	13.75	2.12	13.75	0.98	13.75	n.a	13.75	2.00	13.75	2.00	13.75	0.95	13.75	2.00	13.75	2.00
16.25	0.57	16.25	2.00	16.25	1.60	16.25	1.99	16.25	2.00	16.25	2.02	16.25	2.00	16.25	1.54	16.25	1.73	16.25	1.12	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	2.00	18.75	1.67	18.75	1.21	18.75	2.00	18.75	0.87	18.75	1.37	18.75	1.57	18.75	2.11	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.63
21.25	2.00	21.25	2.00	21.25	2.00	21.25	0.94	21.25	1.46	21.25	2.11	21.25	2.00	21.25	1.74	21.25	1.83	21.25	2.00	21.25	2.00	21.25	2.09	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.62	23.75	1.86	23.75	2.00	23.75	1.21	23.75	2.00	23.75	2.03	23.75	1.47	23.75	2.00	23.75	1.13	23.75	1.59
26.25	2.00	26.25	1.58	26.25	2.00	26.25	2.00	26.25	1.87	26.25	2.00	26.25	1.28	26.25	2.00	26.25	2.00	26.25	1.41	26.25	2.00	26.25	1.34	26.25	2.00
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.77	28.75	1.58	28.75	1.78	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.85	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.55	31.25	2.00	31.25	1.61	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.59	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.35	31.25	2.00
33.75	2.00	33.75	1.68	33.75	2.00	33.75	2.00	33.75	1.76	33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.15	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00
		36.25	2.00	36.25	2.00	36.25	2.01	36.25	1.58	36.25	2.00	36.25	2.00	36.25	1.33	36.25	2.00	36.25	2.00	36.25	1.08	36.25	2.00	36.25	2.00
		38.75	2.00																			38.75	2.00		
		41.25	2.00																			41.25	2.00		
Inv Avg	1.46	Inv Avg	1.87	Inv Avg	1.52	Inv Avg	1.44	Inv Avg	1.79	Inv Avg	1.51	Inv Avg	1.53	Inv Avg	1.63	Inv Avg	1.66	Inv Avg	1.73	Inv Avg	1.62	Inv Avg	1.70	Inv Avg	1.87
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-11

C-41		C-44		C-46		C-46A		C-48		C-50		C-60		C-62		C-64		C-66		C-66A		C-68		C-70	
S (ft)	0.13	S (ft)	0.11	S (ft)	0.08	S (ft)	0.11	S (ft)	0.25	S (ft)	0.20	S (ft)	0.13	S (ft)	0.11	S (ft)	0.30	S (ft)	0.02	S (ft)	0.24	S (ft)	0.17	S (ft)	0.15
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	0.87	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	1.02	6.25	n.a	6.25	n.a	6.25	0.83	6.25	0.62	6.25	n.a	6.25	0.86	6.25	n.a	6.25	n.a	6.25	0.86	6.25	0.72	6.25	1.59
8.75	n.a	8.75	1.01	8.75	n.a	8.75	n.a	8.75	1.01	8.75	2.00	8.75	0.75	8.75	n.a	8.75	0.63	8.75	n.a	8.75	0.87	8.75	1.43	8.75	1.67
11.25	0.76	11.25	1.75	11.25	1.94	11.25	1.58	11.25	1.48	11.25	1.02	11.25	1.52	11.25	n.a	11.25	1.31	11.25	2.00	11.25	2.00	11.25	1.18	11.25	1.70
13.75	1.20	13.75	1.44	13.75	1.08	13.75	1.10	13.75	1.20	13.75	2.00	13.75	1.70	13.75	1.48	13.75	1.21	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.18
16.25	1.18	16.25	1.50	16.25	2.00	16.25	2.03	16.25	0.74	16.25	2.00	16.25	2.00	16.25	2.00	16.25	0.63	16.25	1.87	16.25	1.58	16.25	2.00	16.25	n.a
18.75	2.00	18.75	1.56	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.94	18.75	2.00	18.75	1.99	18.75	2.00	18.75	1.09
21.25	2.00	21.25	1.14	21.25	1.17	21.25	1.54	21.25	1.31	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.16	23.75	1.39	23.75	1.62	23.75	1.70	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.02	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.25	23.75	2.16
26.25	2.00	26.25	2.00	26.25	1.43	26.25	1.70	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00			26.25	2.00	26.25	1.27	26.25	2.00
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.13	28.75	2.00	28.75	2.00	28.75	2.00			28.75	2.00	28.75	2.00	28.75	1.39
31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00			31.25	1.81	31.25	2.00	31.25	2.00
33.75	2.00	33.75	n.a	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00			33.75	2.00	33.75	1.43			33.75	n.a	33.75	2.00	33.75	2.00
36.25	2.00	36.25	n.a	36.25	1.84	36.25	0.99	36.25	1.72	36.25	1.36			36.25	2.00	36.25	1.07					36.25	1.53	36.25	0.85
				38.75	2.18	38.75	2.00			38.75	2.00														
				41.25	2.00	41.25	2.00			41.25	2.00														
				43.75	2.00	43.75	2.00																		
Inv Avg	1.67	Inv Avg	1.56	Inv Avg	1.78	Inv Avg	1.74	Inv Avg	1.44	Inv Avg	1.65	Inv Avg	1.71	Inv Avg	1.80	Inv Avg	1.37	Inv Avg	1.99	Inv Avg	1.53	Inv Avg	1.55	Inv Avg	1.59
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-11

C-74		C-76		C-78		C-79		C-80		C-81		C-82		C-84		C-86		C-89		C-91		C-92		C-94	
S (ft)	0.16	S (ft)	0.11	S (ft)	0.32	S (ft)	0.08	S (ft)	0.21	S (ft)	0.20	S (ft)	0.09	S (ft)	0.13	S (ft)	0.20	S (ft)	0.16	S (ft)	0.46	S (ft)	0.17	S (ft)	0.11
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.91	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.88	6.25	1.03	6.25	0.74	6.25	n.a	6.25	n.a	6.25	n.a	6.25	1.86	6.25	n.a	6.25	n.a	6.25	0.90	6.25	0.89
8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.34	8.75	n.a	8.75	0.98	8.75	n.a	8.75	1.24	8.75	0.91	8.75	1.08	8.75	0.69	8.75	1.31	8.75	1.51
11.25	n.a	11.25	n.a	11.25	0.63	11.25	n.a	11.25	n.a	11.25	0.68	11.25	n.a	11.25	1.72	11.25	1.24	11.25	1.24	11.25	0.91	11.25	0.89	11.25	n.a
13.75	0.61	13.75	0.83	13.75	0.79	13.75	1.15	13.75	0.80	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.28	13.75	0.69	13.75	2.00	13.75	n.a
16.25	1.11	16.25	1.51	16.25	2.00	16.25	2.07	16.25	1.19	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.11	16.25	1.25	16.25	2.00	16.25	1.51
18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.36	18.75	2.00	18.75	2.00	18.75	2.00	18.75	0.88	18.75	1.55	18.75	2.00	18.75	2.04
21.25	1.34	21.25	2.00	21.25	1.43	21.25	2.00	21.25	2.02	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.66	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.29	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.76	23.75	1.28	23.75	1.62	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.00	26.25	2.00	26.25	1.75	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.82			26.25	2.00
28.75	2.08	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.98	28.75	1.06			28.75	2.00
31.25	1.44	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.15	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.79	31.25	1.44	31.25	0.95			31.25	2.00
33.75	n.a	33.75	2.00	33.75	1.58	33.75	2.00	33.75	2.00	33.75	2.19	33.75	2.00	33.75	2.00	33.75	1.98	33.75	2.00	33.75	1.95			33.75	2.06
36.25	n.a	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	0.86	36.25	0.69	36.25	1.90	36.25	2.00	36.25	1.59			36.25	2.00
Inv Avg	1.58	Inv Avg	1.79	Inv Avg	1.44	Inv Avg	1.70	Inv Avg	1.60	Inv Avg	1.63	Inv Avg	1.84	Inv Avg	1.68	Inv Avg	1.59	Inv Avg	1.50	Inv Avg	1.22	Inv Avg	1.54	Inv Avg	1.78
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-11

C-96		C-98		C-100		C-103		C-105		C-106		C-107		C-107A		C-109		C-111		C-113		C-117		C-119	
S (ft)	0.13	S (ft)	0.19	S (ft)	0.18	S (ft)	0.16	S (ft)	0.08	S (ft)	0.27	S (ft)	0.26	S (ft)	0.05	S (ft)	0.22	S (ft)	0.20	S (ft)	0.21	S (ft)	0.28	S (ft)	0.12
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.83	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	1.02	6.25	0.78	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a
8.75	n.a	8.75	0.58	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.81	8.75	0.81	8.75	1.21	8.75	n.a	8.75	n.a	8.75	0.82	8.75	0.52	8.75	0.79
11.25	n.a	11.25	1.24	11.25	2.00	11.25	0.99	11.25	n.a	11.25	1.29	11.25	0.94	11.25	1.34	11.25	0.53	11.25	0.71	11.25	2.00	11.25	2.00	11.25	1.56
13.75	0.73	13.75	2.00	13.75	1.87	13.75	2.00	13.75	n.a	13.75	2.00	13.75	2.09	13.75	1.88	13.75	2.00	13.75	0.88	13.75	0.80	13.75	1.27	13.75	2.00
16.25	1.19	16.25	2.00	16.25	2.10	16.25	2.00	16.25	2.00	16.25	1.80	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.57	16.25	2.08	16.25	1.11	16.25	2.00
18.75	1.25	18.75	2.00	18.75	2.00	18.75	0.98	18.75	2.00	18.75	0.93	18.75	2.00	18.75	2.00	18.75	1.73	18.75	2.00	18.75	1.27	18.75	1.12	18.75	2.00
21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.05	21.25	2.00	21.25	0.99	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.09	23.75	1.71	23.75	2.00	23.75	2.17	23.75	2.00	23.75	1.62	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.68	26.25	2.00	26.25	1.77			26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.58	26.25	2.00	26.25	2.00
28.75	2.00	28.75	1.45	28.75	0.94	28.75	n.a	28.75	0.91	28.75	2.00			28.75	1.45	28.75	2.13	28.75	2.00	28.75	1.44	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.94	31.25	1.54	31.25	n.a	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00
33.75	2.00	33.75	2.00			33.75	n.a	33.75	2.00	33.75	1.46			33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.48	33.75	2.00	33.75	2.00
		36.25	2.00			36.25	n.a	36.25	1.33	36.25	2.19			36.25	2.00	36.25	1.67			36.25	1.68	36.25	2.10		
Inv Avg	1.65	Inv Avg	1.63	Inv Avg	1.65	Inv Avg	1.64	Inv Avg	1.80	Inv Avg	1.46	Inv Avg	1.42	Inv Avg	1.78	Inv Avg	1.66	Inv Avg	1.61	Inv Avg	1.52	Inv Avg	1.50	Inv Avg	1.77
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-11

C-121		C-123		C-125		C-129		C-131		C-133		C-135		C-135A		C-137		C-139		C-139A		C-143		C-145	
S (ft)	0.06	S (ft)	0.14	S (ft)	0.22	S (ft)	0.20	S (ft)	0.30	S (ft)	0.04	S (ft)	0.02	S (ft)	0.06	S (ft)	0.02	S (ft)	0.13	S (ft)	0.11	S (ft)	0.19	S (ft)	0.16
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.65	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.81	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	0.60	6.25	0.70
8.75	n.a	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.68	8.75	1.22	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.71	8.75	1.78
11.25	1.21	11.25	2.00	11.25	n.a	11.25	n.a	11.25	0.58	11.25	2.00	11.25	1.14	11.25	1.14	11.25	n.a	11.25	n.a	11.25	n.a	11.25	2.01	11.25	1.07
13.75	2.00	13.75	2.00	13.75	0.97	13.75	n.a	13.75	1.22	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.62	13.75	0.79	13.75	2.00	13.75	2.00
16.25	2.00	16.25	2.00	16.25	1.88	16.25	0.53	16.25	1.46	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.92	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	1.99	18.75	2.00	18.75	2.00	18.75	1.88	18.75	1.97	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.37	18.75	1.32
21.25	2.00	21.25	1.89	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.18			21.25	2.00	21.25	2.11	21.25	2.00	21.25	2.00	21.25	2.06	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.45			23.75	2.00	23.75	2.00			23.75	2.00	23.75	1.46	23.75	2.00
26.25	1.21	26.25	2.00	26.25	2.00	26.25	1.18	26.25	2.05	26.25	2.00			26.25	2.00	26.25	2.00			26.25	2.00	26.25	2.00	26.25	2.00
28.75	1.77	28.75	2.00	28.75	2.00	28.75	1.32	28.75	1.24	28.75	2.00			28.75	1.06	28.75	2.00			28.75	2.00	28.75	2.07		
31.25	1.07	31.25	1.10	31.25	1.32	31.25	2.00	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00			31.25	1.41	31.25	1.59		
33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.33	33.75	2.00	33.75	2.00					32.25	2.00					33.75	2.00		
		36.25	2.00	36.25	2.00	36.25	1.23	36.25	2.00	36.25	2.00											36.25	2.00		
Inv Avg	1.72	Inv Avg	1.73	Inv Avg	1.60	Inv Avg	1.49	Inv Avg	1.42	Inv Avg	1.88	Inv Avg	1.83	Inv Avg	1.78	Inv Avg	2.00	Inv Avg	1.60	Inv Avg	1.74	Inv Avg	1.62	Inv Avg	1.53
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-11

C-145A		C-147		C-149		C-151		C-157		C-157A		C-159		C-161		C-163		C-166		C-168		C-168A		C-170	
S (ft)	0.10	S (ft)	0.03	S (ft)	0.27	S (ft)	0.35	S (ft)	0.20	S (ft)	0.20	S (ft)	0.08	S (ft)	0.13	S (ft)	0.51	S (ft)	0.19	S (ft)	0.19	S (ft)	0.35	S (ft)	0.18
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.70	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.89	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	0.56	6.25	0.57	6.25	2.00	6.25	0.84	6.25	n.a	6.25	1.37	6.25	0.86	6.25	0.71	6.25	n.a
8.75	1.16	8.75	2.00	8.75	0.86	8.75	n.a	8.75	2.00	8.75	2.00	8.75	1.71	8.75	1.10	8.75	n.a	8.75	2.00	8.75	1.31	8.75	1.29	8.75	0.60
11.25	1.18	11.25	1.27	11.25	1.34	11.25	0.48	11.25	1.76	11.25	1.19	11.25	1.55	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.39	11.25	0.97	11.25	1.81
13.75	2.00	13.75	2.00	13.75	2.15	13.75	1.15	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.45	13.75	1.91	13.75	1.53	13.75	1.02	13.75	1.68
16.25	2.00	16.25	1.69	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.17	16.25	2.00	16.25	0.98	16.25	1.18	16.25	2.00
18.75	1.10	18.75	2.00	18.75	2.00	18.75	1.30	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.82	18.75	2.00	18.75	1.22	18.75	1.39	18.75	2.00
21.25	2.00	21.25	1.46	21.25	2.00	21.25	1.89	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.23	21.25	2.00	21.25	1.67	21.25	1.39	21.25	1.31
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.67	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.27	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.97
26.25	2.00			26.25	1.27	26.25	2.00			26.25	2.00	26.25	1.25	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00
28.75	2.00			28.75	1.07	28.75	2.00			28.75	2.00	28.75	1.27	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	n.a	28.75	2.00
31.25	1.45			31.25	1.10	31.25	2.00			31.25	2.00	31.25	1.62	31.25	2.00	31.25	2.00	31.25	0.83	31.25	2.00	31.25	0.69	31.25	2.00
33.75	1.04			33.75	2.00	33.75	2.00					33.75	1.45					32.25	1.30	32.25	2.00	33.75	1.00	33.75	2.00
36.25	1.15			36.25	2.00							36.25	1.06					33.25	2.00					36.25	1.89
Inv Avg	1.56	Inv Avg	1.80	Inv Avg	1.44	Inv Avg	1.50	Inv Avg	1.57	Inv Avg	1.61	Inv Avg	1.65	Inv Avg	1.71	Inv Avg	1.47	Inv Avg	1.60	Inv Avg	1.52	Inv Avg	1.22	Inv Avg	1.65
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-11

C-172		C-174		C-178		C-180		C-182		C-184		C-186		C-190		C-192		C-194		C-196		C-198		C-200	
S (ft)	0.18	S (ft)	0.04	S (ft)	0.19	S (ft)	0.31	S (ft)	0.04	S (ft)	0.17	S (ft)	0.28	S (ft)	0.14	S (ft)	0.21	S (ft)	0.16	S (ft)	0.22	S (ft)	0.29	S (ft)	0.18
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	0.61	6.25	1.36	6.25	n.a	6.25	0.75	6.25	n.a	6.25	n.a	6.25	0.66	6.25	n.a	6.25	0.69	6.25	0.77	6.25	n.a	6.25	0.81	6.25	0.95
8.75	1.51	8.75	2.00	8.75	0.79	8.75	1.92	8.75	1.27	8.75	0.65	8.75	2.00	8.75	n.a	8.75	2.00	8.75	n.a	8.75	0.97	8.75	0.88	8.75	n.a
11.25	2.00	11.25	2.00	11.25	1.76	11.25	1.13	11.25	1.55	11.25	1.48	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.47	11.25	1.58	11.25	1.41	11.25	n.a
13.75	2.00	13.75	2.00	13.75	1.71	13.75	0.93	13.75	2.00	13.75	2.00	13.75	2.00	13.75	n.a	13.75	2.00	13.75	1.04	13.75	2.00	13.75	2.00	13.75	1.14
16.25	2.00	16.25	2.09	16.25	0.92	16.25	0.85	16.25	2.00	16.25	1.62	16.25	2.00	16.25	0.62	16.25	2.00	16.25	2.06	16.25	1.35	16.25	2.00	16.25	1.25
18.75	2.00	18.75	1.75	18.75	2.00	18.75	1.30	18.75	2.00	18.75	1.63	18.75	1.42	18.75	2.00	18.75	0.89	18.75	1.16	18.75	1.97	18.75	1.84	18.75	2.00
21.25	1.59	21.25	2.00	21.25	1.69	21.25	1.15	21.25	2.11	21.25	2.00	21.25	1.11	21.25	1.59	21.25	2.00	21.25	2.00	21.25	2.04	21.25	n.a	21.25	1.55
23.75	1.61	23.75	2.00	23.75	1.23	23.75	1.19	23.75	2.00	23.75	2.00	23.75	1.30	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.16	23.75	0.82	23.75	2.04
26.25	2.07	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.94	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.86	26.25	1.59
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	0.94	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.35	28.75	2.00
31.25	2.06	31.25	2.00	31.25	2.00	31.25	1.88	31.25	2.00	31.25	1.82	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.03	31.25	n.a	31.25	1.42	31.25	2.00
33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.89	33.75	2.12	33.75	1.93	33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.78	33.75	0.55	33.75	2.00	33.75	1.46
36.25	2.00			36.25	2.00	36.25	2.00			36.25	1.31			36.25	2.00	36.25	2.00	36.25	2.00			36.25	2.00	36.25	2.00
																								38.75	2.00
																								41.25	2.00
																								43.75	2.00
																								46.25	1.60
																								48.75	1.19
																								51.25	1.42
																								53.75	1.27
																								56.25	2.00
																								58.75	2.00
																								61.25	2.00
																								63.75	2.00
																								66.25	1.33
Inv Avg	1.66	Inv Avg	1.92	Inv Avg	1.59	Inv Avg	1.36	Inv Avg	1.90	Inv Avg	1.62	Inv Avg	1.40	Inv Avg	1.72	Inv Avg	1.65	Inv Avg	1.61	Inv Avg	1.53	Inv Avg	1.45	Inv Avg	1.65
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-11

Ameren Missouri: Labadie UWL
Liquefaction Analysis
80' of ASH M: 7.5
PGA: 2% probability of exceedence in 50 yrs: 0.1792 GW: 0.0'

C-11		C-13		C-16		C-18		C-21		C-23		C-25		C-28		C-30		C-32		C-34		C-37		C-39	
S (ft)	0.31	S (ft)	0.05	S (ft)	0.22	S (ft)	0.33	S (ft)	0.06	S (ft)	0.23	S (ft)	0.18	S (ft)	0.15	S (ft)	0.17	S (ft)	0.06	S (ft)	0.19	S (ft)	0.13	S (ft)	0.04
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.89	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.99	6.25	0.58	6.25	n.a	6.25	1.17	6.25	1.31	6.25	n.a	6.25	0.68	6.25	n.a	6.25	0.80	6.25	n.a	6.25	n.a
8.75	n.a	8.75	1.43	8.75	1.18	8.75	n.a	8.75	n.a	8.75	1.04	8.75	0.92	8.75	0.70	8.75	1.74	8.75	1.11	8.75	n.a	8.75	0.87	8.75	n.a
11.25	0.56	11.25	2.00	11.25	0.72	11.25	0.99	11.25	1.15	11.25	1.33	11.25	2.00	11.25	n.a	11.25	2.00	11.25	2.00	11.25	n.a	11.25	2.00	11.25	1.28
13.75	n.a	13.75	2.00	13.75	1.11	13.75	1.92	13.75	2.00	13.75	2.14	13.75	0.99	13.75	n.a	13.75	2.00	13.75	2.00	13.75	0.96	13.75	2.02	13.75	2.00
16.25	0.57	16.25	2.00	16.25	1.62	16.25	2.02	16.25	2.00	16.25	2.05	16.25	2.00	16.25	1.56	16.25	1.76	16.25	1.14	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	2.00	18.75	1.70	18.75	1.23	18.75	2.00	18.75	0.89	18.75	1.40	18.75	1.59	18.75	2.14	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.65
21.25	2.00	21.25	2.00	21.25	2.00	21.25	0.96	21.25	1.49	21.25	2.14	21.25	2.00	21.25	1.77	21.25	1.86	21.25	2.00	21.25	2.00	21.25	2.13	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.65	23.75	1.89	23.75	2.00	23.75	1.23	23.75	2.00	23.75	2.07	23.75	1.49	23.75	2.00	23.75	1.15	23.75	1.62
26.25	2.00	26.25	1.61	26.25	2.00	26.25	2.00	26.25	1.91	26.25	2.00	26.25	1.30	26.25	2.00	26.25	2.00	26.25	1.43	26.25	2.00	26.25	1.37	26.25	2.00
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.80	28.75	1.61	28.75	1.82	28.75	2.00	28.75	2.00	28.75	2.00	28.75	1.89	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.58	31.25	2.00	31.25	1.65	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.63	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.38	31.25	2.00
33.75	2.00	33.75	1.72	33.75	2.00	33.75	2.00	33.75	1.80	33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.18	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00
		36.25	2.00	36.25	2.00	36.25	2.06	36.25	1.61	36.25	2.00	36.25	2.00	36.25	1.36	36.25	2.00	36.25	2.00	36.25	1.11	36.25	2.00	36.25	2.00
		38.75	2.00																			38.75	2.00		
		41.25	2.00																			41.25	2.00		
Inv Avg	1.47	Inv Avg	1.88	Inv Avg	1.52	Inv Avg	1.45	Inv Avg	1.80	Inv Avg	1.52	Inv Avg	1.54	Inv Avg	1.65	Inv Avg	1.68	Inv Avg	1.73	Inv Avg	1.63	Inv Avg	1.71	Inv Avg	1.87
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-12

C-41		C-44		C-46		C-46A		C-48		C-50		C-60		C-62		C-64		C-66		C-66A		C-68		C-70	
S (ft)	0.13	S (ft)	0.11	S (ft)	0.08	S (ft)	0.09	S (ft)	0.25	S (ft)	0.20	S (ft)	0.13	S (ft)	0.11	S (ft)	0.30	S (ft)	0.02	S (ft)	0.23	S (ft)	0.17	S (ft)	0.14
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	0.87	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	1.03	6.25	n.a	6.25	n.a	6.25	0.83	6.25	0.62	6.25	n.a	6.25	0.86	6.25	n.a	6.25	n.a	6.25	0.87	6.25	0.72	6.25	1.60
8.75	n.a	8.75	1.02	8.75	n.a	8.75	n.a	8.75	1.02	8.75	2.00	8.75	0.75	8.75	n.a	8.75	0.64	8.75	n.a	8.75	0.88	8.75	1.45	8.75	1.68
11.25	0.77	11.25	1.77	11.25	1.96	11.25	1.60	11.25	1.50	11.25	1.03	11.25	1.54	11.25	n.a	11.25	1.32	11.25	2.00	11.25	2.00	11.25	1.20	11.25	1.72
13.75	1.21	13.75	1.46	13.75	1.10	13.75	1.12	13.75	1.22	13.75	2.00	13.75	1.72	13.75	1.50	13.75	1.22	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.19
16.25	1.20	16.25	1.53	16.25	2.00	16.25	2.06	16.25	0.75	16.25	2.00	16.25	2.00	16.25	2.00	16.25	0.63	16.25	1.90	16.25	1.61	16.25	2.00	16.25	n.a
18.75	2.00	18.75	1.58	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.97	18.75	2.00	18.75	2.02	18.75	2.00	18.75	1.10
21.25	2.00	21.25	1.15	21.25	1.19	21.25	1.56	21.25	1.34	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	1.41	23.75	1.65	23.75	1.73	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.06	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.28	23.75	2.20
26.25	2.00	26.25	2.00	26.25	1.46	26.25	1.74	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00			26.25	2.00	26.25	1.30	26.25	2.00
28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.17	28.75	2.00	28.75	2.00	28.75	2.00			28.75	2.00	28.75	2.00	28.75	1.42
31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00			31.25	1.85	31.25	2.00	31.25	2.00
33.75	2.00	33.75	n.a	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00			33.75	2.00	33.75	1.46			33.75	n.a	33.75	2.00	33.75	2.00
36.25	2.00	36.25	n.a	36.25	1.88	36.25	1.01	36.25	1.76	36.25	1.39			36.25	2.00	36.25	1.10					36.25	1.57	36.25	0.87
				38.75	2.00	38.75	2.00			38.75	2.00														
				41.25	2.00	41.25	2.00			41.25	2.00														
				43.75	2.00	43.75	2.00																		
Inv Avg	1.67	Inv Avg	1.57	Inv Avg	1.79	Inv Avg	1.75	Inv Avg	1.45	Inv Avg	1.66	Inv Avg	1.72	Inv Avg	1.80	Inv Avg	1.39	Inv Avg	1.99	Inv Avg	1.54	Inv Avg	1.56	Inv Avg	1.60
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-12

C-74		C-76		C-78		C-79		C-80		C-81		C-82		C-84		C-86		C-89		C-91		C-92		C-94	
S (ft)	0.16	S (ft)	0.11	S (ft)	0.32	S (ft)	0.08	S (ft)	0.21	S (ft)	0.20	S (ft)	0.09	S (ft)	0.13	S (ft)	0.20	S (ft)	0.16	S (ft)	0.46	S (ft)	0.16	S (ft)	0.11
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	0.91	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	0.89	6.25	1.04	6.25	0.75	6.25	n.a	6.25	n.a	6.25	n.a	6.25	1.88	6.25	n.a	6.25	n.a	6.25	0.90	6.25	0.90
8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.35	8.75	n.a	8.75	0.99	8.75	n.a	8.75	1.25	8.75	0.92	8.75	1.09	8.75	0.70	8.75	1.33	8.75	1.52
11.25	n.a	11.25	n.a	11.25	0.64	11.25	n.a	11.25	n.a	11.25	0.69	11.25	n.a	11.25	1.73	11.25	1.26	11.25	1.25	11.25	0.92	11.25	0.90	11.25	n.a
13.75	0.61	13.75	0.84	13.75	0.80	13.75	1.17	13.75	0.81	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	1.29	13.75	0.70	13.75	2.00	13.75	n.a
16.25	1.13	16.25	1.53	16.25	2.00	16.25	2.10	16.25	1.21	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.12	16.25	1.27	16.25	2.00	16.25	1.53
18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.38	18.75	2.00	18.75	2.00	18.75	2.00	18.75	0.90	18.75	1.57	18.75	2.00	18.75	2.07
21.25	1.36	21.25	2.00	21.25	1.45	21.25	2.00	21.25	2.05	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.69	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.31	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.79	23.75	1.30	23.75	1.65	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.00	26.25	2.00	26.25	1.78	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	2.00	26.25	0.84			26.25	2.00
28.75	2.13	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.00	28.75	2.02	28.75	1.08			28.75	2.00
31.25	1.47	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.19	31.25	2.00	31.25	2.00	31.25	2.00	31.25	1.83	31.25	1.47	31.25	0.97			31.25	2.00
33.75	n.a	33.75	2.00	33.75	1.62	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.00	33.75	2.03	33.75	2.00	33.75	1.99			33.75	2.10
36.25	n.a	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	2.00	36.25	0.88	36.25	0.70	36.25	1.94	36.25	2.00	36.25	1.62			36.25	2.00
Inv Avg	1.60	Inv Avg	1.80	Inv Avg	1.45	Inv Avg	1.70	Inv Avg	1.61	Inv Avg	1.63	Inv Avg	1.84	Inv Avg	1.69	Inv Avg	1.61	Inv Avg	1.52	Inv Avg	1.24	Inv Avg	1.55	Inv Avg	1.79
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-12

C-96		C-98		C-100		C-103		C-105		C-106		C-107		C-107A		C-109		C-111		C-113		C-117		C-119	
S (ft)	0.12	S (ft)	0.19	S (ft)	0.18	S (ft)	0.16	S (ft)	0.08	S (ft)	0.24	S (ft)	0.26	S (ft)	0.05	S (ft)	0.22	S (ft)	0.20	S (ft)	0.21	S (ft)	0.28	S (ft)	0.12
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.83	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	n.a	6.25	2.00	6.25	n.a	6.25	n.a	6.25	1.03	6.25	0.78	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a
8.75	n.a	8.75	0.59	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.82	8.75	0.82	8.75	1.22	8.75	n.a	8.75	n.a	8.75	0.82	8.75	0.52	8.75	0.79
11.25	n.a	11.25	1.25	11.25	2.00	11.25	1.00	11.25	n.a	11.25	1.30	11.25	0.95	11.25	1.35	11.25	0.53	11.25	0.72	11.25	2.00	11.25	2.00	11.25	1.58
13.75	0.74	13.75	2.00	13.75	1.90	13.75	2.00	13.75	n.a	13.75	2.00	13.75	2.12	13.75	1.91	13.75	2.00	13.75	0.89	13.75	0.81	13.75	1.28	13.75	2.00
16.25	1.21	16.25	2.00	16.25	2.13	16.25	2.00	16.25	2.00	16.25	1.82	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.59	16.25	2.11	16.25	1.12	16.25	2.00
18.75	1.27	18.75	2.00	18.75	2.00	18.75	1.00	18.75	2.00	18.75	0.95	18.75	2.00	18.75	2.00	18.75	1.76	18.75	2.00	18.75	1.29	18.75	1.14	18.75	2.00
21.25	2.00	21.25	2.00	21.25	2.00	21.25	1.07	21.25	2.00	21.25	1.01	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.13	23.75	1.74	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.65	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00
26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.71	26.25	2.00	26.25	1.81			26.25	2.00	26.25	2.00	26.25	2.00	26.25	1.61	26.25	2.00	26.25	2.00
28.75	2.00	28.75	1.48	28.75	0.96	28.75	n.a	28.75	0.93	28.75	2.00			28.75	1.48	28.75	2.18	28.75	2.00	28.75	1.47	28.75	2.00	28.75	2.00
31.25	2.00	31.25	1.98	31.25	1.58	31.25	n.a	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00	31.25	2.00
33.75	2.00	33.75	2.00			33.75	n.a	33.75	2.00	33.75	1.50			33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.51	33.75	2.00	33.75	2.00
		36.25	2.00			36.25	n.a	36.25	1.36	36.25	2.00			36.25	2.00	36.25	1.70			36.25	1.72	36.25	2.15		
Inv Avg	1.65	Inv Avg	1.64	Inv Avg	1.66	Inv Avg	1.65	Inv Avg	1.80	Inv Avg	1.46	Inv Avg	1.42	Inv Avg	1.79	Inv Avg	1.67	Inv Avg	1.62	Inv Avg	1.54	Inv Avg	1.51	Inv Avg	1.77
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-12

C-121		C-123		C-125		C-129		C-131		C-133		C-135		C-135A		C-137		C-139		C-139A		C-143		C-145	
S (ft)	0.06	S (ft)	0.13	S (ft)	0.22	S (ft)	0.20	S (ft)	0.30	S (ft)	0.04	S (ft)	0.02	S (ft)	0.06	S (ft)	0.02	S (ft)	0.13	S (ft)	0.11	S (ft)	0.19	S (ft)	0.16
Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.	Depth	F.S.
1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a	1.25	n.a
3.75	n.a	3.75	n.a	3.75	0.65	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a	3.75	n.a
6.25	n.a	6.25	0.81	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	n.a	6.25	0.60	6.25	0.70
8.75	n.a	8.75	2.00	8.75	n.a	8.75	n.a	8.75	0.68	8.75	1.23	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	n.a	8.75	1.73	8.75	1.80
11.25	1.22	11.25	2.00	11.25	n.a	11.25	n.a	11.25	0.58	11.25	2.00	11.25	1.15	11.25	1.15	11.25	n.a	11.25	n.a	11.25	n.a	11.25	2.04	11.25	1.08
13.75	2.00	13.75	2.00	13.75	0.98	13.75	n.a	13.75	1.24	13.75	2.00	13.75	2.00	13.75	2.00	13.75	2.00	13.75	0.62	13.75	0.80	13.75	2.00	13.75	2.00
16.25	2.00	16.25	2.00	16.25	1.91	16.25	0.54	16.25	1.48	16.25	2.00	16.25	2.00	16.25	2.00	16.25	1.95	16.25	2.00	16.25	2.00	16.25	2.00	16.25	2.00
18.75	2.00	18.75	2.03	18.75	2.00	18.75	2.00	18.75	1.91	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	2.00	18.75	1.40	18.75	1.34
21.25	2.00	21.25	1.93	21.25	2.00	21.25	2.00	21.25	2.00	21.25	2.00			21.25	2.00	21.25	2.14	21.25	2.00	21.25	2.00	21.25	2.09	21.25	2.00
23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	2.00	23.75	1.48			23.75	2.00	23.75	2.00			23.75	2.00	23.75	1.49	23.75	2.00
26.25	1.24	26.25	2.00	26.25	2.00	26.25	1.20	26.25	2.09	26.25	2.00			26.25	2.00	26.25	2.00			26.25	2.00	26.25	2.00	26.25	2.00
28.75	1.81	28.75	2.00	28.75	2.00	28.75	1.35	28.75	1.26	28.75	2.00			28.75	1.09	28.75	2.00			28.75	2.00	28.75	2.11		
31.25	1.09	31.25	1.13	31.25	1.35	31.25	2.00	31.25	2.00	31.25	2.00			31.25	2.00	31.25	2.00			31.25	1.44	31.25	1.62		
33.75	2.00	33.75	2.00	33.75	2.00	33.75	1.36	33.75	2.00	33.75	2.00					32.25	2.00					33.75	2.00		
		36.25	2.00	36.25	2.00	36.25	1.26	36.25	2.00	36.25	2.00											36.25	2.00		
Inv Avg	1.73	Inv Avg	1.74	Inv Avg	1.61	Inv Avg	1.51	Inv Avg	1.43	Inv Avg	1.88	Inv Avg	1.83	Inv Avg	1.78	Inv Avg	2.01	Inv Avg	1.61	Inv Avg	1.75	Inv Avg	1.63	Inv Avg	1.54
Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low	Risk	Low

Figure D-12