Ameren Services

Environmental Services
314.554.2388 (Phone)
314.554.4182 (Facsimile)
ppike@ameren.com

One Ameren Plaza
1901 Chouteau Avenue
PO Box 66149
St. Louis, MO 63166-6149
314.621.3222

December 3, 2008

Mr. Larry Pierce, R.G.
Unit Chief - Geological Survey Program
Division of Geology and Land Survey
Department of Natural Resources
P.O. Box 250
Rolla, MO 65402-0250

RE: Preliminary Site Investigation Request - Proposed Utility Waste Landfill
AmerenUE Labadie Power Plant, Franklin County, Missouri

Dear Mr. Pierce,

As discussed in our November 12 meeting in your office, enclosed is a Preliminary Site Investigation (PSI) request for a proposed Utility Waste Landfill at AmerenUE's Labadie Power Plant in Franklin County, Missouri. This PSI request is being made in accordance with 10 CSR 80-2.015(1)(A). The PSI request encompasses approximately 1,042 acres, however only a portion of the area will be permitted as a solid waste disposal area. Following the Department's PSI findings, AmerenUE will identify and delineate a smaller footprint for the Detailed Site Investigation (DSI), design and permitting of the actual solid waste disposal area.

Ameren either currently owns, or has a verbal agreement to purchase all of the land within the PSI limits by February 27, 2009. The purchase agreement includes the rights to access the site for the purpose of completing the DSI.

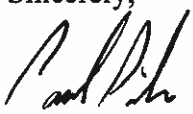
A USGS map at 1" = 2000' scale is attached to the PSI request form. The limits of the PSI area are shown on this map. Generally the PSI area extends from Labadie Bottom Road on the west to a property line approximately 1500 feet east of Davis Road on the east, and from the existing agricultural levee on the south to the existing levee on the north. Additional site information, including site maps, boring logs, piezometer locations, and piezometric water level data were provided to you on November 12th. This additional information is referenced but not submitted with this PSI request. Additional copies of this information can be provided at your request.

We understand that 10 CSR 80-2.015(1)(A) requires review and approval/disapproval of the PSI within sixty (60) days of receipt. It is also our understanding that Department staff will make a site visit during this 60 day time

period to observe site conditions. AmerenUE requests notification of this site visit so that the necessary and appropriate representatives can be present during that visit. Please coordinate the date of your site visit with either myself or Paul H. Reitz, P.E. with Reitz & Jens, Inc. I can be reached at prpike@ameren.com or 314-554-2388. Mr. Reitz can be reached at preitz@reitzjens.com or 314-993-4132, ext. 224. Once contacted, we will subsequently notify other appropriate AmerenUE representatives of the planned date and time of your staff's site visit.

If you have any questions or would like additional information regarding this PSI request, please contact me at 314-554-2388 or prpike@ameren.com.

Sincerely,



Paul R. Pike
Strategic Analyst
Environmental Services

Enclosures

cc: Bill Duley, R.G., Geological Survey Program w/enclosure
Charlene Fitch, Waste Management Program, w/enclosure
Paul Reitz, P.E., Reitz & Jens, Inc., w/enclosure
Mikel Carlson, R.G., GREDELL Engineering Resources, Inc., w/enclosure

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGY AND LAND SURVEY, GEOLOGICAL SURVEY PROGRAM

REQUEST FOR PRELIMINARY INVESTIGATION OF PROPOSED SOLID-WASTE DISPOSAL SITE

FOR OFFICE USE ONLY
PROJECT CODE
DATE RECEIVED

FACILITY OR PROJECT LOCATION

FACILITY OR PROJECT NAME: AmerenUE Labadie Plant Utility Waste Landfill

¼ ¼ ¼ SECTION	¼ ¼ SECTION	¼ SECTION	SECTION	TOWNSHIP	RANGE	QUADRANGLE NAME
			*	44 North	2 ☒ East ☐ West	Labadie

WRITTEN LOCATION IF LEGAL DESCRIPTION IS UNAVAILABLE: *Section 17/20 also includes SUR 354 and 735

COUNTY: Franklin

OWNER INFORMATION

OWNER'S NAME	TELEPHONE		
Ameren	(314) 342-1000		
ADDRESS	**CITY**	**STATE**	**ZIP CODE**
One Ameren Plaza, 1901 Chouteau Ave	St. Louis	MO	63166-1419

EVALUATION REQUESTED BY

NAME AND COMPANY OF REQUESTOR	TELEPHONE		
Paul Pike, Ameren Services	(314) 554-2388		
ADDRESS	**CITY**	**STATE**	**ZIP CODE**
One Ameren Plaza, 1901 Chouteau Ave	St. Louis	MO	63166-1419

FACILITY INFORMATION

TYPE OF DISOPSAL AREA PROPOSED

☐ SANITARY LANDFILL ☐ DEMOLITION LANDFILL

☒ UTILITY WASTE LANDFILL ☐ **SPECIAL WASTE LANDFILL*

* Please specify type of special waste _____.

ESTIMATED SIZE OF DISPOSAL AREA IN ACRES: +/- 1042**

ESTIMATED ELEVATION OF THE SUB-BASE GRADE IN FEET ABOVE MEAN SEA LEVEL: 455 ft.

** A special waste is defined as "solid-waste requiring handling other than normally used for municipal waste."

SKETCH OR MAP MUST BE SUBMITTED WITH REQUEST !

A topographic map must be provided with this request that contains the following information: all known wells, springs, sinkholes, caves, mines, roads, and dwellings within ¼ mile of the facility. Show the estimated boundaries of the disposal facility and any existing borings, test pits, or excavations which expose soil or bedrock. Include a scale and north arrow on the map.

COMMENTS

**A USGS topographic map is attached, which outlines the approximate boundaries of the requested PSI investigation area. The area delineated includew qncillary and support features of the future solid waste disposal area. Following receipt of DGLS's PSI report, AmerenUE intends to delineate a final, smaller disposal area footprint for evaluation during the DSI process.

Additional site information, including site maps, soil borings, and groundwater data, was provided to DGLS at our November 12, 2008 meeting in Rolla.

Please contact Paul Pike at 314-554-2388 or Paul Reitz (Reitz & Jens, Inc.) at 314-993-4132 to coordinate the PSI site visit.

REQUESTOR'S SIGNATURE	DATE
Paul Pike	12/3/2008
OWNER'S SIGNATURE (INDICATES PERMISSION TO ACCESS PROPERTY)	DATE
Paul Pike	12/3/2008

2008 Site Layouts/PSI-Aerial 11/26/2008

Data Source:
United States Geological Survey
7.5 Minute Quadrangle Map
Labadie, Missouri
1972

SHEET 1 OF 1	Labadie UWL PSI Site Layout 2008012455	Ameren UE	Designed g.h.r. Checked g.h.r. Drawn g.h.r. Issued 11/26/2008	REITZ & JENS, INC. CONSULTING ENGINEERS 1055 CORPORATE SQUARE DRIVE ST. LOUIS MISSOURI 63132 (314) 993-4132

SHEET 1 OF 1	Labadie UWL PSI Site Layout 2008012455	Ameren UE	Designed g.h.r. Checked g.h.r. Drawn g.h.r. Issued 11/26/2008	REITZ & JENS, INC. CONSULTING ENGINEERS 1055 CORPORATE SQUARE DRIVE ST. LOUIS MISSOURI 63132 (314) 993-4132

Bcc: J. Thee, w/enclosure
K.D. Stumpe w/enclosure
M. J. Tomasovic w/enclosure
D. V. Fox, w/o enclosure
E. J. Kammerer w/o enclosure
S. B. Knowles, w/o enclosure
T. J. Fox w/o enclosure
B. S. Skitt, w/o enclosure
C. R. Henderson w/o enclosure
W.E. Kahl w/o enclosure
M. L. Menne, w/o enclosure
S. C. Whitworth, w/o enclosure
J. C. Pozzo, w/o enclosure
File WM 3.5.8 w/enclosure

REITZ & JENS, INC.
CONSULTING ENGINEERS

1055 corporate square drive
st. louis, missouri 63132
phone: 314.993.4132
fax: 314.993.4177
www.reitzjens.com

MEMORANDUM

Subject: Preliminary Site Conditions
AmerenUE Labadie Power Plant
Proposed Utility Waste Landfill Site

Date: November 12, 2008

This report presents the results of a preliminary evaluation and field exploration of a proposed Utility Waste Landfill (UWL) site on property adjacent to AmerenUE's Labadie Power Plant. The investigation was completed in the spring of 2007.

Site Description

The proposed UWL site (Site) is on approximately 300 acres of Ameren owned property east of the Labadie Power Plant as shown in Figure 1. The Site is generally bounded on the west by Labadie Bottom Road, on the south by a Laclede Gas pipeline and agricultural levee, on the north by an agricultural levee along the Missouri River, and on the east by the Ameren property line. The entire Site is in the 100-year floodplain of the Missouri River and protected from frequent flooding by the agricultural levee system. Being in the floodplain, the ground surface is relatively flat. Existing ground surface elevations are estimated to range from 465 and 471 NGVD.

Existing improvements that need to be addressed during Site development include AmerenUE transmission lines that run parallel to the north-south portion of Labadie Bottom Road and diagonally cross the Site from northwest to southeast; a 24-inch Explorer natural gas pipeline that diagonally crosses the southern half of the Site from southwest to northeast; and the east-west portion of Labadie Bottom Road that divides the northern third of the Site. There is also a Laclede Gas pipeline running along the southern property line immediately north of the agricultural levee, and the levee itself on the northern and southern edges of the Site.

Floodplain

The Site is shown on panel 105 of the Flood Boundary and Floodway Map (FBFM) and Flood Insurance Rate Map (FIRM) for Franklin County, Missouri, effective dates of October 16, 1982. The FIRM shows the Site to be between Missouri River Mile (RM) 57 and 58 which is immediately north of the Site. The nearest river gage is located in Washington, Missouri at river mile 67.0. According to the FIRM, the regulatory 100-year flood elevation (Base Flood Elevation or BFE) at the Site is approximately 480 NGVD. The FBFM shows the floodway of the Missouri River to generally follow the agricultural levee to the north of the Site, suggesting that the entire UWL Site is in the regulatory 100-year floodplain but outside the regulatory floodway.

With the existing ground surface estimated to be between 465 and 471 NGVD, the 100-year flood will inundate the Site with 10 to 15 feet of water. The height of the agricultural levee and amount of flood protection it provides is unknown, but it appears to be 8 to 10 feet. The Site is immediately downstream of the Labadie Plant and its access roads which are at or above the 500-year flood elevation. These higher upstream elevations at least partially block flow across most of the Site during larger flood events, creating an ineffective flow area, or area of low flow velocity, over most of the Site.

Geology

The site is located on the 100-year floodplain of the Missouri River, approximately 1/2 mile south of the River channel. Alluvium, or sediment deposited by flowing water, covers the entire site. To the south, the site is bordered by loess covered uplands or the River Hills landform.

Geologic structural features closest to the proposed site are the Eureka-House Springs anticline, Moselle normal fault and the Jeffreisburg fault. These features were formed as a result of periods of uplift in the Ozarks. The Eureka-House Springs anticline is approximately 7 miles to the northeast. The Moselle normal fault is approximately 10 miles to the southwest. The Jeffreisburg fault is approximately 14 miles to the southwest. There is no literature indicating that these faults are currently active or have been active during Holocene time. The Dam and Reservoir Safety Council Permit Requirements (10 CSR 22-2.010) classifies all of Franklin County in Zone D with Probable Maximum Acceleration of bedrock of 0.23 g, somewhat greater than the St. Charles County PMA of 0.20 g.

There do not appear to be any geologic conditions such as active Holocene era faults, unstable ground or karst topography that would preclude the development of a UWL on the Site. The primary potential seismic or stability issue at the Site is liquefaction of the natural alluvial deposits. A liquefaction analysis of the UWL Site will be completed during preliminary design. However, experience with similar sites suggests that the general soil stratigraphy on the Site should be able to support a utility waste landfill that is 100 feet high, or higher.

Field Investigation

Our spring 2007 field investigation consisted of 8 borings at the approximate locations shown in Figure 1. Temporary standpipe piezometers were installed in three borings, designated P-1, P-2 and P-3. Borings P-1 and B-7 were drilled to refusal in cobbles or limestone bedrock. The completed depths of these borings were 91.5 feet and 104.5 feet, respectively. The other borings were 20 to 30 feet deep, and were terminated in the underlying medium-dense sand.

Below the surface topsoil and disturbed zone (due to farming), the 8 borings encountered 0 to 8.5 feet of high plastic clay which should have a permeability of $1x10^{-7}$ cm/sec or less when compacted, and thus would be suitable for a composite liner for the UWL. Boring P-1 on the north end and Boring B-8 on the south end had no clay stratum. The thickness of the high plastic clay in the remaining 6 borings ranged from 2.5 feet to 8.5 feet, and averaged about 6 feet. The remainder of the soils in the upper 13.5 feet consisted of sandy silts, silty clay, silt, and silty sand.

Below about 13.5 feet, the borings encountered strata of medium-dense to very dense sand and gravelly sand. Cobbles and boulders were encountered below about 50 feet in the two deep borings.

Since they were installed in March 2007, the water levels in the piezometers have been periodically read and recorded along with the reported Missouri River Stage at the Washington gage. These results are included in Table I. Once the elevation and location of the piezometers have been determined by survey, the piezometer water levels will be compared to the reported river elevations based on the gage data.

p:\amerenue\2008012455\reports\geologic reports\psi geology report - 111208.doc

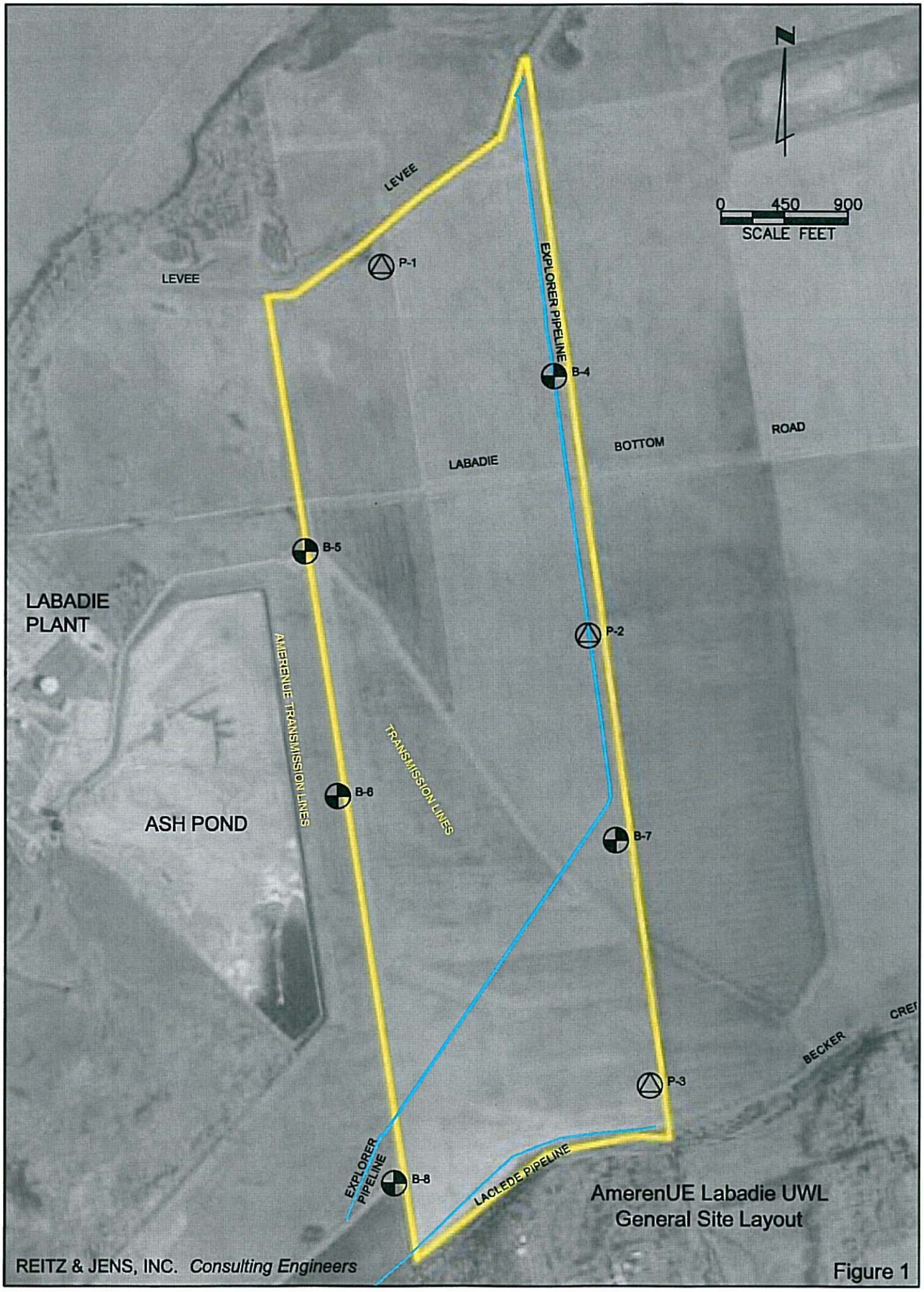

N
0 450 900
SCALE FEET
LEVEE
LEVEE
P-1
EXPLORER PIPELINE
B-4
BOTTOM
ROAD
LABADIE
B-5
LABADIE
PLANT
P-2
AMERENUE TRANSMISSION LINES
TRANSMISSION LINES
B-6
ASH POND
B-7
BECKER
P-3
EXPLORER
PIPELINE
B-8
LACLEDE PIPELINE
AmerenUE Labadie UWL
General Site Layout
REITZ & JENS, INC. Consulting Engineers
Figure 1

TABLE 1

AmerenUE Labadie Plant
Piezometer Readings

Piezometer	Top Elevation (NGVD)
P-1	
P-2	
P-3	

* River Stage data obtained from Washington gage @ RM 67.0
O gage = 457.20 NGVD
** Measured from notch in top of 2"-PVC riser

			P-1				P-2				P-3			
	River Stage (ft)*		Field Measurements**		Elevation (NGVD)		Field Measurements**		Elevation (NGVD)		Field Measurements**		Elevation (NGVD)	
Date	Stage*	Elevation	Bottom Depth (ft)	Water Depth (ft)	Bottom Elevation	Water Elevation	Bottom Depth (ft)	Water Depth (ft)	Bottom Elevation	Water Elevation	Bottom Depth (ft)	Water Depth (ft)	Bottom Elevation	Water Elevation
3/16/2007	6.0	463.2	32.25	21.99	-32.25	-21.99	31.61	17.90	-31.61	-17.90	32.30	17.63	-32.30	-17.63
4/5/2007	11.2	468.4		20.63		-20.63		16.71		-16.71		16.30		-16.30
5/4/2007	14.9	472.1		17.56		-17.56		13.95		13.95		13.56		-13.56
5/10/2007	22.2	479.4		14.45		-14.45		12.62		-12.62		12.58		-12.58
5/13/2007	24.2	481.4		11.18		-11.18		11.22		-11.22		10.68		-10.68
11/19/2007	1.2	458.4		20.71		-20.71		15.37		-15.37		14.92		-14.92
1/11/2008	7.8	465.0		21.52		-21.52		16.53		-16.53		15.90		-15.90
3/12/2008	9.3	466.5		18.07		-18.07		13.92		-13.92		13.30		-13.30
6/13/2008	21.6	478.8		8.06		-8.06		4.92		-4.92		not read		
6/18/2008	23.0	480.2		6.99		-6.99		4.45		-4.45		5.49		-5.49
10/30/2008	10.5	467.7		15.37		-15.37		10.62		-10.62		10.28		-10.28

Observations were taken at dirt road crossing of levee north of P-1
5/10/2007 Flood waters at toe of levee on unprotected side approx. 6" to 12" deep
5/13/2007 Flood waters are approx 2.5' to 3.5' deep on unprotected side

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG P-1

AmerenUE Labadie Power Plant UWL
Franklin County, Missouri
CLIENT: **Ameren Services**

LOCATION: N E
ELEVATION: 471 DATUM: U.S.G.S.
DATE DRILLED: 3-14-2007

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0	470					TOPSOIL (4")		
					83	Sandy SILT (ML), brown, loose, dry	3-4-3	18.4
					78	Becoming grayish brown, less sandy, with clay laminations, moist	2-2-3	28.5
5	465				67	Becoming more sandy, medium-dense, dry	2-3-5	15.7
					72	Becoming tan	3-5-6	15.0
10	460							
					89	Silty SAND (SP-SM), tan, fine, loose	3-3-4	12.4
15	455							
		▽			100	Becoming gray, slightly silty, very loose, with clay balls, free water	1-1-1	
20	450							
					94	SAND (SP), tan, fine, medium-dense	3-5-7	
25	445							
					89	Becoming gray, fine- to medium-grain, with decaying wood, loose	3-2-4	
30	440							

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (PASSING #200 SIEVE)
PL LL
20 40 60

DRILLER: Midwest
METHOD: CFA/Mud Rotary
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. Pruett

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

WATER LEVELS: DURING DRILLING 19 FEET
N BORING DRY AT COMPLETION OF DRILLING
AT ____ FEET AFTER ____ HOURS
AT ____ FEET AFTER ____ HOURS
PIEZOMETER: INSTALLED AT 30 FEET

File: 2007012401

Figure A-1 Sheet 1 of 3

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG P-1

AmerenUE Labadie Power Plant UWL

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
35	435				83	Becoming tan, fine- to coarse, medium- dense	6-8-10	
40	430				72	Becoming gray, fine- to medium-grain, dense, with decaying wood	10-15-10	
45	425				72	Without decaying wood	13-21-15	
50	420				39	SAND and GRAVEL (SP-GP), gray, dense, with clay balls and fragments of dolomite (up to 1.5") Very stiff drilling at 51' (heavy gravels and cobbles)	9-16-7	
55	415							
60	410				78	Becoming medium-dense, without clay and fragments of dolomite Very stiff drilling from 60.5' to 61.5' possible limestone cobbles or boulders	12-10-8	
65	405							
70	400				72		2-8-9	

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (PASSING #200 SIEVE)
PL LL
20 40 60

File: 2007012401

Figure A-1 Sheet 2 of 3

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG P-1

AmerenUE Labadie Power Plant UWL

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES ROD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
75	395					Very stiff drilling at 71', 73', and 77' to 78', possible cobbles or boulders		
					44		7-8-9	
80	390					Very stiff drilling from 80' to 91.5' possible cobbles		
85	385							
					33	Becoming dense	10-11-12	
90	380					Boring terminated at 91'-6" in cobbles.		
95	375					Note: terminated boring due to very difficult drilling; rods were binding during advancement, near breaking point.		
100	370							
105	365							

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (PASSING #200 SIEVE)
PL LL
20 40 60

File: 2007012401

Figure A-1 Sheet 3 of 3

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG P-2

AmerenUE Labadie Power Plant UWL
Franklin County, Missouri
CLIENT: **Ameren Services**

LOCATION: N E
ELEVATION: 467 DATUM: U.S.G.S.
DATE DRILLED: 3-12-2007

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						TOPSOIL (5")		
	465				100	CLAY (CH), dark grayish brown, high plastic, moist, stiff	3-3-6	27.3
5					94	Becoming firm, with seams of grayish brown silt	3-3-3	36.4
	460				100	SILT (ML), tan, medium-dense, with fine sand, dry	3-4-4	14.7
10					89	Becoming loose, with traces of iron stains	2-1-3	25.9
	455							
		▽			100	SAND (SP), grayish tan, fine, medium- dense	4-6-7	
15	450							
					78	Becoming dark gray	1-3-5	
20	445							
					100	Becoming fine- to medium-grain	2-3-5	
25	440							
					100	Becoming fine to coarse	7-7-8	
30	435					Boring terminated at 30'-0"		

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (PASSING #200 SIEVE)
PL LL
20 40 60

DRILLER: Midwest
METHOD: CFA/Mud Rotary
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. Pruett

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

WATER LEVELS: DURING DRILLING 14 FEET
N BORING DRY AT COMPLETION OF DRILLING
AT ____ FEET AFTER ____ HOURS
AT ____ FEET AFTER ____ HOURS
PIEZOMETER: INSTALLED AT 30 FEET

File: 2007012401

Figure A-2 Sheet 1 of 1

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG P-3

AmerenUE Labadie Power Plant UWL
Franklin County, Missouri
CLIENT: **Ameren Services**

LOCATION: N E
ELEVATION: 467 DATUM: U.S.G.S.
DATE DRILLED: 3-12-2007

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						TOPSOIL (5")		
	465				78	CLAY (CH), dark gray, high plastic, with silt seams, moist, stiff	2-3-4	24.5
						SILT (ML), grayish tan, with fine sand		
5					94	Silty SAND (SP-SM), grayish tan, fine, loose	1-3-1	26.6
	460				100	With lenses of gray high plastic clay	1-1-4	29.9
					100	With alternating layers of fine silty sand and high plastic clay	2-3-4	31.4
10	455							
		▽			83	SAND (SP), gray, fine, loose	2-4-3	
15	450							
					100	Becoming medium-dense	2-5-8	
20	445							
					100		5-7-8	
25	440							
					100		6-7-7	
30	435					Boring terminated at 30'-0"		

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (PASSING #200 SIEVE)
PL LL
20 40 60

DRILLER: Midwest
METHOD: CFA/Mud Rotary
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. Pruett

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

WATER LEVELS: DURING DRILLING 13.5 FEET
N BORING DRY AT COMPLETION OF DRILLING
AT ____ FEET AFTER ____ HOURS
AT ____ FEET AFTER ____ HOURS
PIEZOMETER: INSTALLED AT 30 FEET

File: 2007012401

Figure A-3 Sheet 1 of 1

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG B-4

AmerenUE Labadie Power Plant UWL
Franklin County, Missouri
CLIENT: **Ameren Services**

LOCATION: N E
ELEVATION: 468 DATUM: U.S.G.S.
DATE DRILLED: 3-9-2007

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						TOPSOIL (3")		
					78	Sandy SILT (ML-SM), tan, loose, wet	3-3-1	37.4
	465					CLAY (CH), grayish brown, high plastic, moist, soft		
5					100			
					89	Becoming dry and firm	1-2-3	34.0
	460							
					72	Sandy SILT (ML-SM), tan, medium-dense, moist	5-9-7	18.6
10								
	455							
					67	SAND (SP), tan, fine, medium-dense with organic clay balls	4-4-10	
15								
	450	▽						
					89	Becoming tan and gray, fine- to medium-grain, loose	1-2-3	
20								
	445							
					100	Becoming medium-dense	4-7-10	
25						Boring terminated at 25'-0"		
	440							
30								

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (PASSING #200 SIEVE)
PL LL
20 40 60

DRILLER: Midwest
METHOD: CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. Pruett

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

WATER LEVELS: DURING DRILLING 18.5 FEET
N BORING DRY AT COMPLETION OF DRILLING
AT ____ FEET AFTER ____ HOURS
AT ____ FEET AFTER ____ HOURS
PIEZOMETER: INSTALLED AT ____ FEET

File: 2007012401

Figure A-4 Sheet 1 of 1

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG B-5

AmerenUE Labadie Power Plant UWL
Franklin County, Missouri
CLIENT: **Ameren Services**

LOCATION: N E
ELEVATION: 467 DATUM: U.S.G.S.
DATE DRILLED: 3-12-2007

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						TOPSOIL (4")		
	465				100	Silty CLAY (CL-CH), brown, moderately plastic, stiff, dry	2-3-4	20.2
					78	CLAY (CH), grayish brown, high plastic, stiff, moist	2-4-6	33.2
5	460				94	With tan silty fine sand laminations	2-3-4	30.6
					83	SAND (SP), tan, fine, medium-dense with sporatic clay balls	4-5-6	
10	455							
					72	Becoming grayish tan, without clay balls	3-4-4	
15	450	▽						
					89		1-3-4	
20	445							
					100		1-4-4	
25	440					Boring terminated at 25'-0"		
30	435							

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (PASSING #200 SIEVE)
PL LL
20 40 60

DRILLER: Midwest
METHOD: CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. Pruett

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

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

File: 2007012401

Figure A-5 Sheet 1 of 1

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG B-6

AmerenUE Labadie Power Plant UWL
Franklin County, Missouri
CLIENT: **Ameren Services**

LOCATION: N E
ELEVATION: 467 DATUM: U.S.G.S.
DATE DRILLED: 3-12-2007

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0	465				61	TOPSOIL (4") CLAY (CH), grayish brown, high plastic, slightly silty, firm, dry	2-3-3	22.4
5	460				78	Sandy SILT (ML-SM), tan, medium-dense, becoming more sandy with depth	3-4-4	23.0
					94	With seams of dark grayish brown, stiff, high plastic clay	3-5-9	16.6
10	455				100	SAND (SP), tan, fine, medium-dense	6-6-5	
15	450	▽			72	Becoming brown	3-4-5	
20	445				78	Becoming loose	1-2-3	
						Boring terminated at 20'-0"		
25	440							
30	435							

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (PASSING #200 SIEVE)
PL LL
20 40 60

DRILLER: Midwest
METHOD: CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. Pruett

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

WATER LEVELS: DURING DRILLING 16 FEET
N BORING DRY AT COMPLETION OF DRILLING
AT ____ FEET AFTER ____ HOURS
AT ____ FEET AFTER ____ HOURS
PIEZOMETER: INSTALLED AT ___ FEET

File: 2007012401

Figure A-6 Sheet 1 of 1

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG B-7

AmerenUE Labadie Power Plant UWL
Franklin County, Missouri
CLIENT: **Ameren Services**

LOCATION: N E
ELEVATION: 465 DATUM: U.S.G.S.
DATE DRILLED: 3-12-2007

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0	465					TOPSOIL (4")		
					100	CLAY (CH), grayish brown, high plastic, with silty fine sand laminations, firm, moist	2-3-4	30.0
					83			
5	460							
					94	Becoming dry	1-2-4	14.2
					100	Silty CLAY (CL), gray and tan, very soft, becoming more silty with depth, wet	1-1-1	40.1
10	455							
		▽			100	SAND (SP), gray, fine, slightly silty, medium-dense	1-4-4	
15	450							
					100	Becoming grayish tan and gray	2-2-5	
20	445							
					100	SAND and GRAVEL (GP-SP), grayish tan, fine sand to coarse gravel, medium-dense	3-2-5	
25	440							
					28	Becoming very dense, with less coarse gravel	23-30-28	
30	435							

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (PASSING #200 SIEVE)
PL ⊢——⊣ LL
20 40 60

DRILLER: Midwest
METHOD: CFA/Mud Rotary
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. Pruett

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

WATER LEVELS: DURING DRILLING 14 FEET
N BORING DRY AT COMPLETION OF DRILLING
AT ____ FEET AFTER ____ HOURS
AT ____ FEET AFTER ____ HOURS
PIEZOMETER: INSTALLED AT ____ FEET

File: 2007012401

Figure

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG B-7

AmerenUE Labadie Power Plant UWL

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
35	430				78	Becoming dense with coarse gravel (up to 1")	17-15-13	
40	425				100	SAND (SP), gray, fine, very dense	10-17-24	
45	420				100		15-23-30	
50	415				89		14-19-19	
55	410							
60	405				94	SAND & GRAVEL (SP-GP), gray, coarse sand and fine gravel, dense	9-13-12	
65	400							
70	395				100	With medium gravel (to 3/8")	11-11-14	

SHEAR STRENGTH, tsf

△ QU/2 ■ PP □ SV ◇ TV

1 2 3

STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)

● MOISTURE CONTENT, %
○ % FINES (PASSING #200 SIEVE)

PL LL

20 40 60

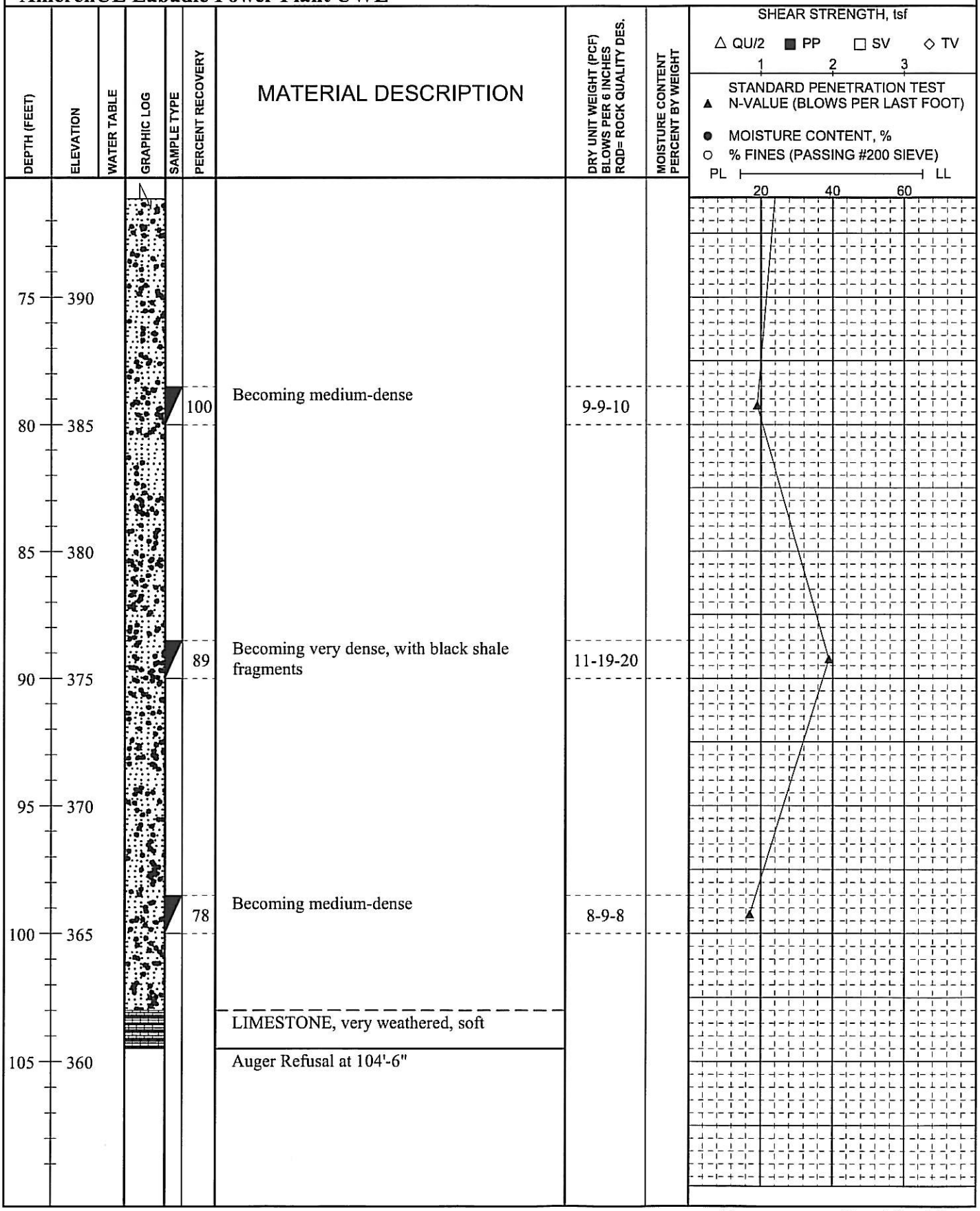
File: 2007012401

Figure

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG B-7

AmerenUE Labadie Power Plant UWL



File: 2007012401

Figure

REITZ & JENS, INC.
CONSULTING ENGINEERS

BORING LOG B-8

AmerenUE Labadie Power Plant UWL
Franklin County, Missouri
CLIENT: **Ameren Services**

LOCATION: N E
ELEVATION: 468 DATUM: U.S.G.S.
DATE DRILLED: 3-9-2007

DEPTH (FEET)	ELEVATION	WATER TABLE	GRAPHIC LOG	SAMPLE TYPE	PERCENT RECOVERY	MATERIAL DESCRIPTION	DRY UNIT WEIGHT (PCF) BLOWS PER 6 INCHES RQD= ROCK QUALITY DES.	MOISTURE CONTENT PERCENT BY WEIGHT
0						TOPSOIL (4")		
					83	Sandy SILT (ML-SM), gray and tan, loose, with seams of grayish brown high plastic clay, dry	2-2-3	17.5
	465							
					67		2-2-3	12.6
5								
					89	Becoming medium-dense, without clay seams, with fine sand laminations	3-5-4	23.0
	460							
					94	SAND (SP), tan, fine, medium-dense, with sporatic clay balls	3-5-4	
10								
	455							
					78	Becoming grayish brown, loose	2-3-3	
15								
	450	▽						
					94	Becoming very loose	1-1-3	
20						Boring terminated at 20'-0"		
	445							
25								
	440							
30								

SHEAR STRENGTH, tsf
△ QU/2 ■ PP □ SV ◇ TV
1 2 3
STANDARD PENETRATION TEST
▲ N-VALUE (BLOWS PER LAST FOOT)
● MOISTURE CONTENT, %
○ % FINES (PASSING #200 SIEVE)
PL ⊢——⊣ LL
20 40 60

DRILLER: Midwest
METHOD: CFA
TYPE OF SPT HAMMER: Automatic
HAMMER EFFICIENCY (%):
LOGGED BY: J. Pruett

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

WATER LEVELS: DURING DRILLING 17.5 FEET
N BORING DRY AT COMPLETION OF DRILLING
AT ____ FEET AFTER ____ HOURS
AT ____ FEET AFTER ____ HOURS
PIEZOMETER: INSTALLED AT ____ FEET

File: 2007012401

Figure A-8 Sheet 1 of 1

KEY TO BORING LOGS

Symbol	Description
KEY TO SOIL SYMBOLS	
	Topsoil
	Silty SAND or Sandy SILT (SM)
	Poorly-graded SAND (SP)
	Poorly-graded SAND & GRAVEL (GP)
	High plastic CLAY (CH)
	Inorganic, non-plastic SILT (ML)
	Medium to high plastic CLAY
	Low plastic Silty CLAY (CL)
	Very Weathered LIMESTONE

Symbol	Description
	Moisture content (%)
	N-value from Standard Penetration Test (blows/ft)
	Shear strength from Pocket Penetrometer (tsf)
SOIL SAMPLERS	
	2-in. O.D. Split-Spoon
	3-in. O.D. Shelby Tube

MISCELLANEOUS SYMBOLS

 Water table during drilling

 Boring continues

Notes:

1. Borings were drilled March 9 - 14, 2007, by Midwest Drilling, Inc. The borings were advanced using continuous flight augers (CFA) to below the water table, and then with mud rotary drilling techniques using Bentonite slurry.

2. Boring locations were selected and located by Reitz and Jens, Inc.

3. Borings were logged in the field by a Reitz & Jens' soils technician based upon the recovered samples, cuttings and drilling characteristics. Samples were transported to Reitz & Jens' lab for testing. Field logs were revised, if needed, based upon laboratory classification and testing.

4. Stratification lines shown on the log represent approximate soil boundaries; actual changes in strata may be gradual or occur between samples.

5. Piezometers were installed in Borings labeled P-1, P-2, and P-3.

Figure A-0