

US EPA ARCHIVE DOCUMENT



August 22, 2011

CERTIFIED MAIL: 7002 3150 0001 2354 9273

Mr. Stephen Hoffman
US Environmental Protection Agency (5304P)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

**Re: Ameren Missouri
Labadie Power Station
Response to O'Brien & Gere Final Dam Safety Assessment of CCW Impoundment**

Dear Mr. Hoffman:

In the USEPA letter to Mr. Michael Menne dated July 28, 2011, the USEPA requested information on how Ameren intended to address recommendations found in final report on the structural stability of the fly ash and bottom ash ponds at Ameren Missouri's Labadie Power Station. This report was prepared by your engineering contractor (O'Brien & Gere) based on a site visit and review of engineering documentation provided by Ameren. Your engineering contractor then provided their evaluation of the structural stability of the fly ash and bottom ash pond and provided recommendations in their final report dated July 2011.

In 2010 and citing investigation authority under CERCLA, USEPA instituted a review of coal ash impoundments at electric generating facilities located throughout the United States. Ameren Corporation and its operating companies cooperated fully with that investigation and provided a variety of engineering documentation and made its facilities available for site inspections performed by USEPA's engineering consultant. That limited review effort has culminated in USEPA's issuance of reports regarding the structural stability of impoundments located at our facilities. While many of the observations are routine, we do have some concerns as to the methodology and process employed in drafting the reports. As a preliminary matter, the language used by your consultant is not tied to a regulatory definition, engineering standard or protocol. As such, condition ratings such as "satisfactory", "fair", "poor", "unsatisfactory" or "unknown" lack regulatory or statutory definition. To the extent USEPA has created its own standard and/or grading system; such a process could create confusion and be misleading to members of the public who are unfamiliar with the regulatory and engineering standards applicable to these facilities.

In fact, USEPA's regulatory basis both its initial investigation, and most recent correspondence regarding structural assessments remains unclear. (As you are aware, USEPA has proposed revisions to RCRA which would allow for the direct regulation including the engineering and design of impoundments and landfills. That regulatory process, however, has not been finalized.) In fact, state regulatory authorities such as Missouri

Department of Natural Resources (MDNR) traditionally have authority over the structural integrity of such facilities through their dam safety programs. Accordingly, in responding to USEPA's reports regarding the structural stability of ash ponds at our facilities, Ameren reserves its right to object to a USEPA's assertion of jurisdiction in an area that appears to be outside of its regulatory purview. To the extent that Ameren has decided to implement a recommendation, such implementation is on a voluntary basis.

Subject to the above comments and objections, below are Ameren Missouri's responses to the conclusions and recommendations provided in the O'Brien & Gere final dam safety assessment of the coal combustion waste (CCW) impoundments at the Labadie Power Station. The conclusions and recommendations from the report are presented in **bold print** and our responses are provided in regular print.

5.0 CONCLUSIONS, Bottom Ash Pond:the overall condition of the Bottom Ash Pond is considered to be FAIR.

Response: Ameren Missouri disagrees with an overall "fair" rating for the bottom ash pond and believes a "**satisfactory**" rating is applicable based on the criteria established by the USEPA for the rating of the ash ponds. The stability analysis provided to the EPA along with Ameren Missouri's response to the "draft" assessment report indicated that the factor of safety for the bottom ash pond exceeds MDNR requirements for both static and seismic cases. In addition, maintenance items noted in the assessment report are considered by Ameren Missouri to be "minor" in nature.

5.0 CONCLUSIONS, Fly Ash Pond:the overall condition of the Fly Ash Pond is considered to be FAIR.

Response: Ameren Missouri disagrees with an overall "fair" rating for the fly ash pond and believes a "**satisfactory**" rating is applicable based on the criteria established by the USEPA for the rating of the ash ponds. The stability analysis provided to the EPA along with Ameren Missouri's response to the "draft" assessment report indicated that the factor of safety for the fly ash pond exceeds MDNR requirements for both static and seismic cases. In addition, maintenance items noted in the assessment report are considered by Ameren Missouri to be "minor" in nature.

6.0 RECOMMENDATIONS, Based on the findings of our visual inspection and *review* of the available records for the Bottom Ash Pond and the Fly Ash Pond, O'Brien & Gere recommends that additional maintenance of the embankments be completed to correct the miscellaneous deficiencies in the final report. The seepage along the toe of the western embankment should continue to be monitored and any changes in the color, rate or location of seepage brought immediately to the attention of the Ameren Dam Safety & Engineering group. Additional measures may be required if changes in the color, rate or location of seepage are observed.

Response: This seepage is monitored with routine weekly inspections and will continue to be monitored weekly to ensure that the integrity of the embankment is not compromised. If changes to the seepage are noted, it will be brought to the attention of the Ameren Dam Safety Group and corrective measures will be implemented.

6.1 URGENT ACTION ITEMS: None of the recommendations are considered to be urgent, since the issues noted in the final report do not appear to threaten the structural integrity of the impoundments in the near term.

Response: Ameren Missouri agrees that none of the recommendations are considered to be urgent.

6.2 LONG TERM IMPROVEMENTS: The deficient conditions observed during the inspection do not require immediate attention, but additional actions should be implemented in the near future as part of a regular maintenance plan. The recommended maintenance/improvement actions are described below:

Bottom Ash Pond

- **Outboard slopes – remove deleterious vegetation and continue regular maintenance of the slopes.**
- **Additional studies – no additional studies may be needed. The input for cross section 5 should be provided.**
- **If the Bottom Ash Pond is not taken out of service and replaced with the dry landfill, a seepage collection and monitoring system installed along the outboard slope of the western embankment if changes in the color, rate or location of seepage are *observed*.**

Response: The individual bullet items are discussed below in order.

- The deleterious vegetation has been removed. Ameren has a routine maintenance program in place for ongoing vegetation control on the embankment slopes.
- The input for cross section 5 has been provided on the enclosed August 2, 2011 letter report from Reitz & Jens.
- The remaining service life of the bottom ash pond is unknown. Ameren Missouri has initiated a project to collect the seepage through the bottom ash pond embankment and pump it back into the pond. Until, during and after the seepage return system is installed, the seepage and embankment slope will be monitored visually for changed conditions. Ameren Missouri plans to have the seepage collection system installed within the next 12 months.

Fly Ash Pond

- **Outboard slopes – repair animal burrows.**
- **Inboard slopes – remove the small tree growing along the northern portion of the embankment.**
- **Interior crest – repair erosion near discharge end of six-inch diameter PVC pipes.**
- **Additional studies – no additional studies may be needed. However, an explanation as to why the water level readings in soundings P-3 and P-4 were not used in the analyses should be provided, and/or the slope stability analyses should be re-run using the data from Sounding P-4 (apparent worst-case scenario).**

Response: The individual bullet items are discussed below in order.

- Animal burrows have been repaired. Repairs of animal burrows are performed on a regular basis as part of the routine mowing of the embankments.
- The small tree has been removed. Tree removal and spraying are part of the routine maintenance of the embankments.
- Agreed. The erosion will be repaired within the next 12 months.

- An explanation as to why the water level readings in soundings P-3 and P-4 in the stability analysis is provided in the enclosed August 2, 2011 letter report from Reitz & Jens.

6.3 MONITORING AND FUTURE INSPECTIONS: Continue weekly inspections by Labadie Power Station personnel and annual inspections by the Ameren Dam Safety & Hydro Engineering group.

Response: Ameren Missouri plans to continue weekly and annual inspections of the ash pond embankments as indicated in our Dam Safety Program for Labadie Power Station.

6.4 TIME FRAME FOR COMPLETION OF REPAIRS/IMPROVEMENTS: It is recommended that minor repairs recommended above be completed within *twelve* (12) months.

Response: All repairs will be completed within the twelve (12) months as recommended.

Business Confidentiality Claim

We request the final Dam Safety Assessment Report for the Labadie Power Station prepared by O'Brien & Gere as well as our responses to this report remain confidential. This request is made in accordance with the procedures described in 40 CFR, Part 2, Subpart B. We also request that engineering documents initially submitted to O'Brien & Gere for preparation of their draft report along with the stability analysis submitted for consideration in Ameren's response to the draft report be designated as Confidential Business Information.

If you need further information, please feel free to contact me at 314-554-2388.

Sincerely,



Paul R. Pike
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August 2, 2011

CONFIDENTIAL

Mr. Matt Frerking, P.E.
Managing Supervisor – Dam Safety
Ameren Missouri
3700 South Lindbergh, MC F-604
Sunset Hills, Missouri 63127

RE: Ash Pond Stability Recommendations
Labadie Power Station

Dear Mr. Frerking:

Reitz & Jens analyzed the stability of the ash pond embankments at the Labadie Plant in 2010. We submitted our report to Ameren Missouri on November 16, 2010. Subsequently the United States Environmental Protection Agency (“EPA”) and its engineering contractors have reviewed this report and request clarification on two items regarding the stability analysis. Responses to their requests, which are highlighted in italics, are presented below.

Bottom Ash Pond

“Additional studies – no additional studies may be needed. The input for cross section 5 should be provided.”

Response – The result of stability analysis of cross section 5 for full pond, steady-state seepage, and long-term (drained) shear strength properties is depicted graphically and attached. Shown on the figure are the long-term shear strength properties used in the analysis. The analysis limited the search for failure surfaces to include “deep” failures surfaces or slope failures that would require significant effort to repair.

Fly Ash Pond

“Additional studies – no additional studies may be needed. However, an explanation as to why the water level readings in Soundings P-3 and P-4 were not used in the analysis should be provided, and/or the slope stability analyses should be re-run using the data from Sounding P-4 (apparent worst-case scenario).”

Response - The water levels shown on soundings P-3 and P-4 are at elevation 476.5 and 487.3, respectively. These soundings were conducted in the crest of the embankment for the Fly Ash Pond which is lined with HDPE. The normal water level in the fly ash pond is estimated between elevations 475 to 480 feet based on weekly inspections. In the slope stability analysis presented in the November 2010 report it was assumed that the normal pool level was at elevation 484 feet,

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which is the level of the impounded ash at cross section 2, and that the seepage through the HDPE liner did not contribute to the level of the phreatic surface.

While analyzing the CPT soundings it was concluded that the elevated pore pressures were the result of induced strains caused by advancing the CPT cone through unsaturated strata or due to thin, wet coarse grained strata bounded by impervious fine grained strata. Our conclusion that the water levels shown on the logs are not a true groundwater level was supported by the following observations:

- The water levels shown on the soundings are generally higher than the normal pool water level, and there is no higher topographic tributary area upstream to support or supply this groundwater elevation
- The measured tip pressure and sleeve friction do not support saturated soil behavior for the type of soil observed, above the assumed water level used in the analysis. The measured tip pressure at a depth of approximately 29 feet was lower in Soundings P-3 and P-4 than what was measured in the overlying strata. This behavior was also observed in Soundings P-2 and P-10
- The HDPE liner is generally assumed in good condition, but even for large punctures or tears in the liner seams, it is doubtful that a potential seepage source entry would have sufficient size to allow the volume of water necessary to elevate the water level to those shown in Soundings P-3 and P-4. In addition, the upstream slope is buttressed with a considerable thickness of relatively impervious fly ash
- Soundings P-2 and P-10 which were advanced approximately 20 feet past the termination depths of P-3 and P-4 and into the underlying foundation strata show the water level much deeper between elevations 464.07 and 464.79. The potential source of seepage is much closer at sounding location P-2 because the upstream slope is not buttressed with relatively impervious fly ash.

The water levels shown on CPT soundings P-3 and P-4 are assumed erroneous and have been removed from the revised logs which are attached.

Please let us know if you have any questions regarding this report, or any other aspects of the stability of the ash ponds. We appreciate this opportunity to continue our working relationship with Ameren Missouri.

Sincerely,
REITZ & JENS, Inc.



Donald S. Eskridge, P.E.
Principal



Jeffrey D. Bertel, P.E.
Project Engineer

The following figures are attached and complete this report:

Cross section 5 Stability Analysis
CPT Sounding Log P-3
CPT Sounding Log P-4

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Material: Fine to Medium SAND (deep)
 Strength Type: Mohr-Coulomb
 Unit Weight: 122 lb/ft³
 Friction Angle: 28 degrees

Material: Coarse SAND
 Strength Type: Mohr-Coulomb
 Unit Weight: 125 lb/ft³
 Friction Angle: 30 degrees

Material: Unconsolidated BA
 Strength Type: Mohr-Coulomb
 Unit Weight: 120 lb/ft³
 Friction Angle: 26 degrees

Material: Fine to Medium SAND
 Strength Type: Mohr-Coulomb
 Unit Weight: 120 lb/ft³
 Friction Angle: 30 degrees

Material: SAND and SILT
 Strength Type: Mohr-Coulomb
 Unit Weight: 131 lb/ft³
 Cohesion: 40 psf
 Friction Angle: 33 degrees

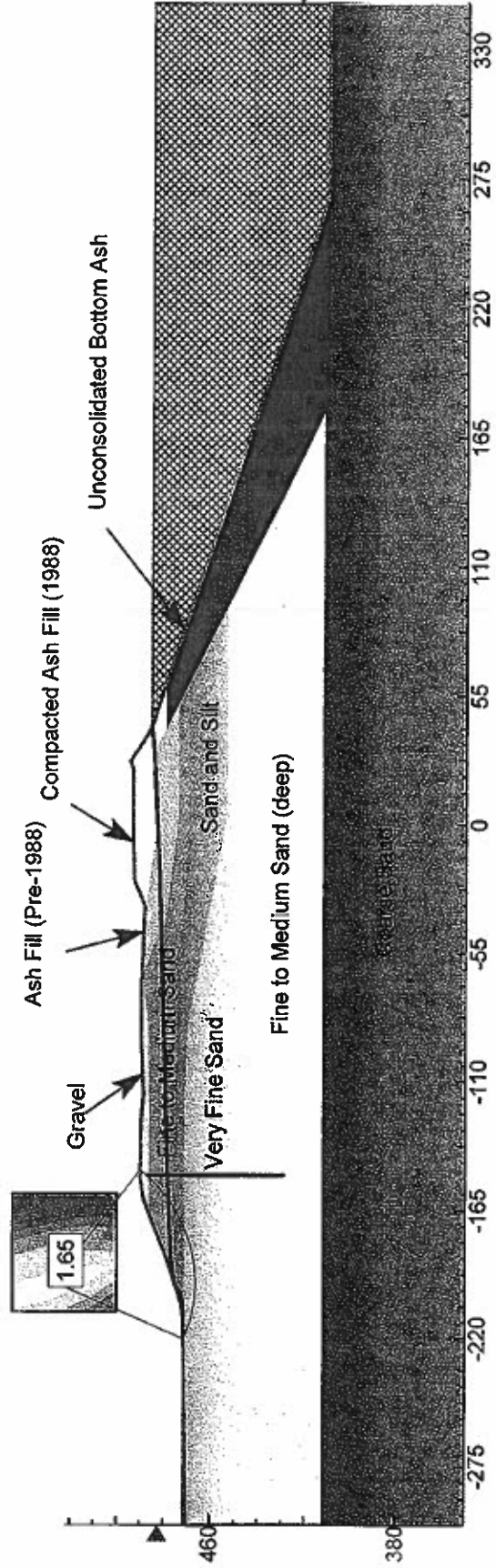
Material: Very Fine SAND
 Strength Type: Mohr-Coulomb
 Unit Weight: 119 lb/ft³
 Friction Angle: 29 degrees

Material: Ash Fill (1988)
 Strength Type: Mohr-Coulomb
 Unit Weight: 96 lb/ft³
 Friction Angle: 30 degrees

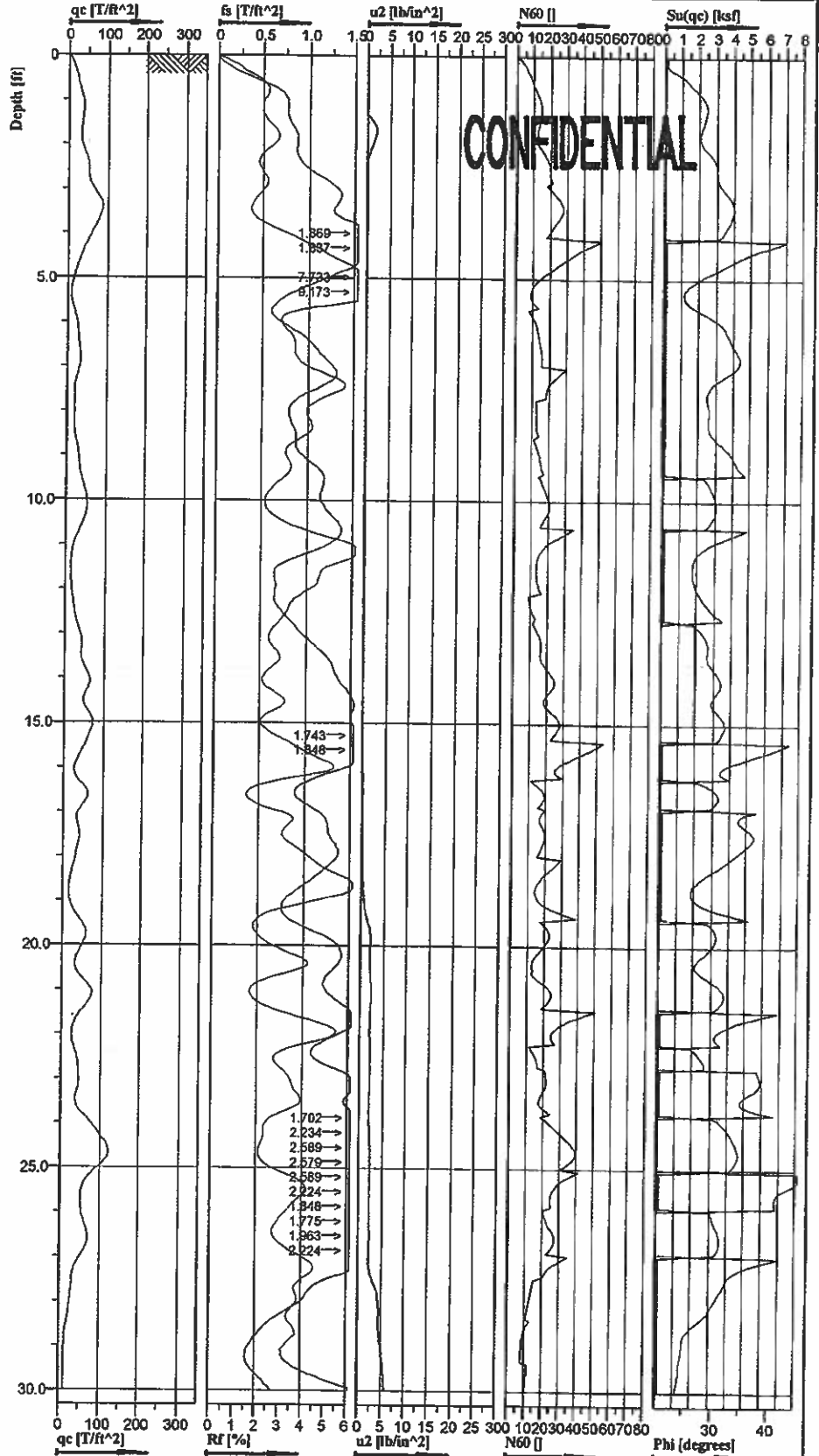
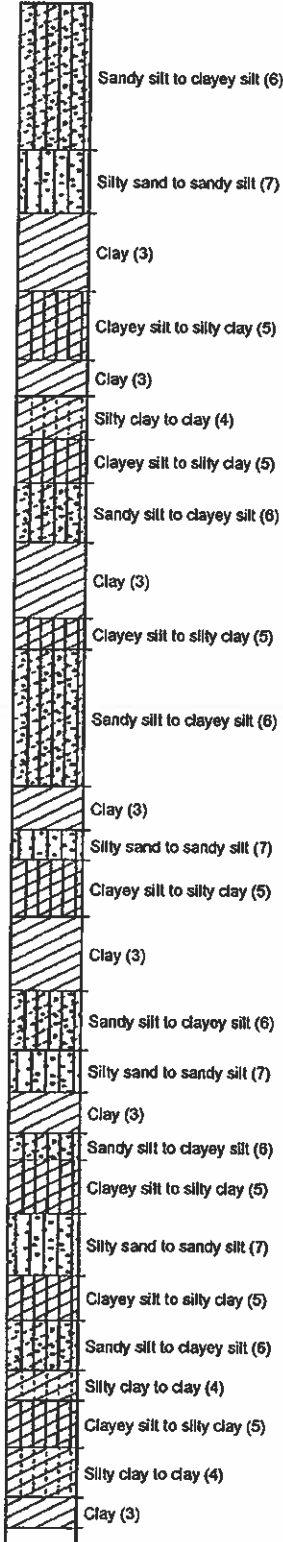
Material: Ash Fill (pre 1988)
 Strength Type: Mohr-Coulomb
 Unit Weight: 100 lb/ft³
 Friction Angle: 30 degrees

Material: Gravel
 Strength Type: Mohr-Coulomb
 Unit Weight: 134 lb/ft³
 Friction Angle: 35 degrees

Labadie Power Station
 Steady Seepage, Full Reservoir
 Cross-section 5



Classification by
Robertson 1986



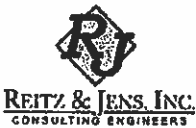
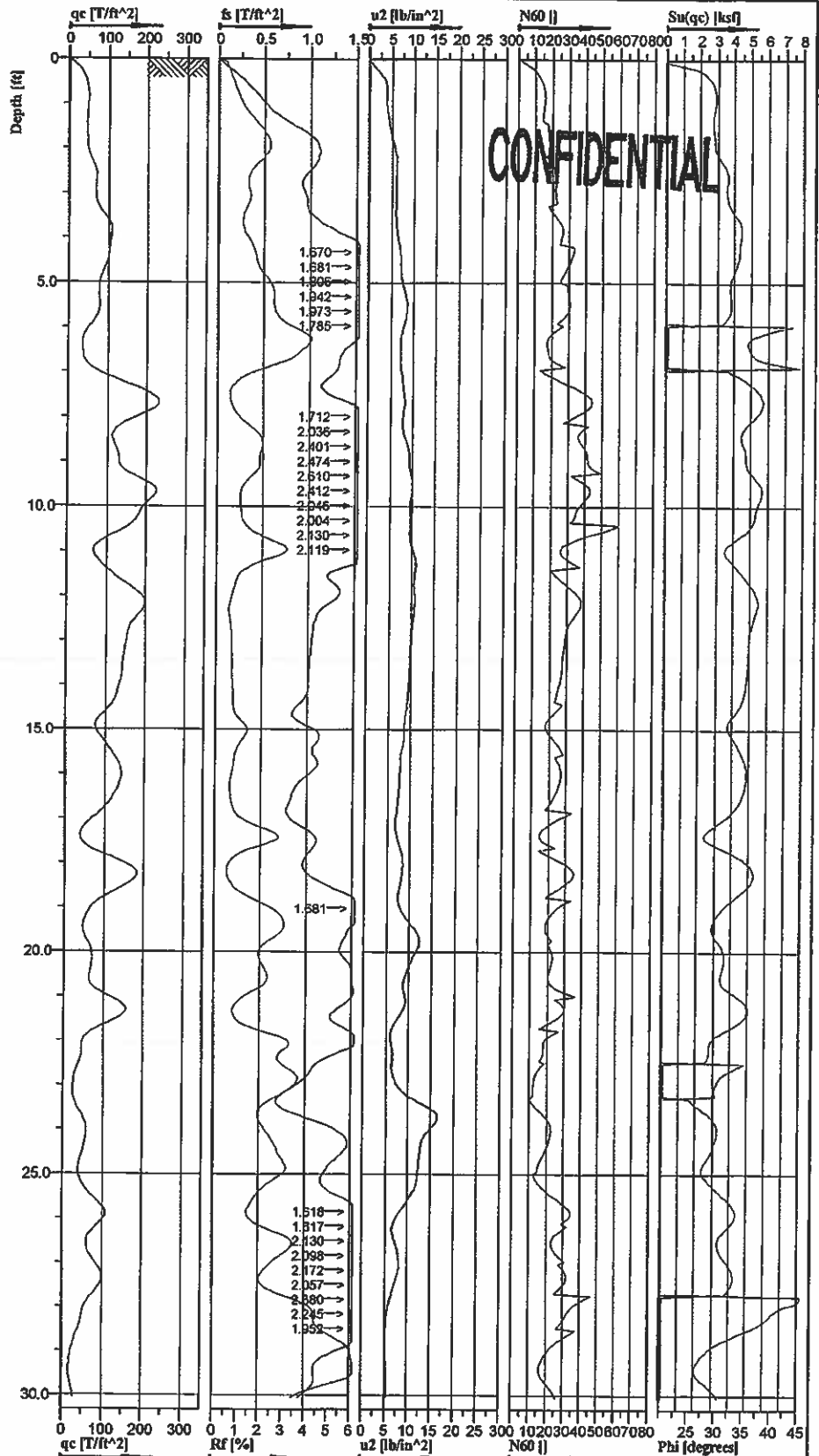
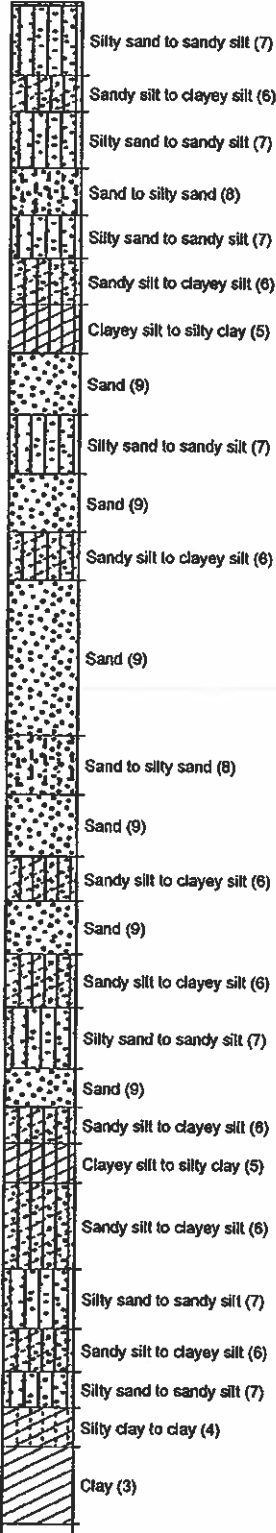
RITZ & JENS, INC.
CONSULTING ENGINEERS



Cone No: 4274
Tip area [cm²]: 10
Sleeve area [cm²]: 150

Location: Labadie Power Plant	Position: X: 726283.89 ft, Y: 992395.37 ft	Ground level: 492.49	Test no: P-3
Project ID: 2010012488	Client: AmerenUE	Date: 6/23/2010	Scale: 1 : 42
Project: Ash Pond Stability Analysis		Page: 1/1	Fig: 3-3
Revised 8/2/2011		File: P-3.cpd	

Classification by
Robertson 1986



Cone No: 4274
Tip area [cm²]: 10
Sleeve area [cm²]: 150

Location: Labadie Power Plant	Position: X: 726302.49 ft, Y: 993187.86 ft	Ground level: 493.64	Test no: P-4
Project ID: 2010012488	Client: AmerenUE	Date: 6/24/2010	Scale: 1 : 42
Project: Ash Pond Stability Analysis		Page: 1/1	Fig: 3-4
Revised 8/2/2011			File: P-4.cpd

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