DRAFT REPORT

Dam Safety Assessment of CCW Impoundments

Labadie Power Station

United States Environmental Protection Agency
Washington, DC

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O'BRIEN & GERE
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Prepared for:
US Environmental Protection Agency
Washington, DC

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1. INTRODUCTION

1.1. GENERAL

In response to the coal combustion waste (CCW) impoundment failure at the TVA/Kingston coal-fired electric generating station in December of 2008, the U. S. Environmental Protection Agency has initiated a nationwide program of structural integrity and safety assessments of coal combustion waste impoundments or "management units". A CCW management unit is defined as a surface impoundment or similar diked or bermed management unit or management units designated as landfills that receive liquid-borne material and are used for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. Management units also include inactive impoundments that have not been formally closed in compliance with applicable federal or state closure/reclamation regulations. This project is being conducted in accordance with the terms of O'Brien & Gere's Order EP-B10S-0013 to Contract BPA# EP10W000673 with the EPA, dated April 8, 2010.

1.2. PROJECT PURPOSE AND SCOPE

The purpose of this work is to provide Dam Safety Assessment of CCW management units, including the following:

- Identify conditions that may adversely affect the structural stability and functionality of a management unit and its appurtenant structures
- Note the extent of deterioration, status of maintenance, and/or need for immediate repair
- Evaluate conformity with current design and construction practices
- Determine the hazard potential classification for units not currently classified by the management unit owner or by state or federal agencies

O'Brien & Gere's scope of services for this project includes performing a site specific dam safety assessment of all CCW management units at the subject facility. Specifically, the scope includes the following tasks:

- Perform a review of pertinent records (prior inspections, engineering reports, drawings, etc.) made available at the time of the site visit to review previously documented conditions and safety issues and gain an understanding of the original design and modifications of the facility.
- Perform a site visit and visual inspection of each CCW management unit and complete the visual inspection checklist to document conditions observed.
- Perform an evaluation of the adequacy of the outlet works, structural stability, quality and adequacy of the management unit's inspection, maintenance, and operations procedures.
- Identify critical infrastructure within 5 miles down gradient of management units.
- Evaluate the risks and effects of potential overtopping and evaluate effects of flood loading on the management units.
- Provide immediate notification of conditions requiring emergency or urgent corrective action.
- Identify environmental permits issued for the management units
- Identify leaks, spills, or releases of any kind from the management units within the last 5 years.
- Prepare a report summarizing the findings of the assessment, conclusions regarding the safety and structural integrity, recommendations for maintenance and corrective action, and other action items as appropriate.

This report addresses the above issues for the Bottom Ash and Fly Ash Ponds at the Labadie Power Station in Labadie, Missouri. The above impoundments are owned and operated by Ameren Missouri, a part of the Ameren Corporation. In previous correspondence between Ameren and the US EPA, the company was referred to as "AmerenUE". The preferred company name was discussed during the site visit and it was agreed that "Ameren" is the most appropriate name to use for the purposes of this report. In the course of this assessment, O'Brien & Gere obtained information through interviews with representatives of Ameren.

2. PROJECT/FACILITY DESCRIPTION

2.1. GENERAL

The Labadie Power Station is located at 226 Labadie Power Plant Road in Labadie, Missouri. A Site Location Map is included as Figure 1. The generating station was commissioned in 1970 and includes a power generating facility with an approximate capacity of 2,400 megawatts (MW) gross generation capacity from its four coal-fired electric generating units. Coal combustion waste that is produced during power generation is managed on-site with two CCW impoundments.

The facility utilizes two impoundments referred to as the Bottom Ash Pond and the Fly Ash Pond, for CCW management. The impoundments are located on the south side of the site. This safety assessment report summarizes the November 17, 2010 inspection of the CCW management units at the Labadie Power Station.

2.2. MANAGEMENT UNIT DESCRIPTION

The two CCW impoundments inspected during this safety assessment are identified on Figure 2 – Facility Layout Plan. Neither impoundment meets the height requirement (35 feet) for regulation as a dam by the Missouri Department of Natural Resources (MoDNR).

CCW consists of bottom ash and fly ash. Bottom ash generated at the Labadie Plant is hydraulically sluiced to the Bottom Ash Pond. Fly ash is collected using electrostatic precipitators, pneumatically sluiced to storage silos, and sold for reuse or hydraulically sluiced into the Fly Ash Pond.

2.2.1. Bottom Ash Pond

The Bottom Ash Pond forms the southwestern portion of the CCW impoundment. The impoundment was completed in 1970 and expanded (raised) in 1988. Bottom ash is sluiced to the impoundment using water pumped from the Missouri River. Water that is routed through the pond is discharged through an outlet structure into an open channel which drains to the Missouri River.

2.2.2. Fly Ash Pond

The Fly Ash Pond forms the northeastern portion of the CCW impoundment. The impoundment was constructed in 1992. The bottom of the impoundment is lined with a 40-mil high-density polyethylene (HDPE) liner and the inboard slopes are lined with a 60-mil HDPE liner. The liner is not covered. This pond is currently used for fly ash disposal only when the fly ash generated is not sold for beneficial reuse. Water that is routed through the Fly Ash Pond is pumped into the Bottom Ash Pond and ultimately discharged to the Missouri River.

2.2.3. Other Impoundments

A Facility Layout Map is provided as Figure 2, which shows the location of the various impoundments on the site. There is one additional impoundment on the north side of the plan known as the Combined Drain Sump. The Combined Drain Sump is a reinforced concrete pit. It receives the stormwater runoff from the Labadie Power Plant site as well as treated sewage from the facility. Waste water is pumped from the Combined Drain Sump into the Bottom Ash Pond.

2.3. HAZARD POTENTIAL CLASSIFICATION

The State of Missouri classifies dams or embankments in accordance with the Missouri Revised Statutes (RSMo) and Missouri Code of State Regulations (CSR). The regulations are administrated by the Missouri Department of Natural Resources (MoDNR), Dam and Reservoir Safety Unit of the Water Resources Center. The DNR defines a dam as any structure that is 35 feet or more in height from the natural bed of the stream or watercourse measured at the downstream toe of the barrier or dam, if it is not across a streambed or watercourse, or has a surface area of fifteen or more acres of water at the water storage elevation (RSMo Chapter 236.400).

In the State of Missouri, dam hazard classifications are established by the owner or owner's engineer in accordance with 10 CSR 22-3.020(2) and (3). Dams are classified as Environmental Class I, II, or III in accordance with 10 CSR 22-2.040(1).

> (2) *"The owner must provide a determination of an environmental class for each dam and reservoir. The method, data and assumptions used by the owner to determine environmental class shall conform to practices reputable and in current use in the engineering, geologic and construction professions or the chief engineer may reject the owner's classification. If an owner chooses not to have this done by an experienced professional engineer or an agency engineer, the chief engineer will assign the dam and reservoir to environmental class I or s/he may assign the dam and reservoir to another environmental class if s/he has justification to do so."*
>
> (3) *The anticipated consequences of a dam failure with respect to public safety, life and property damage are important considerations in establishing acceptable methods for specific investigations and sites. Methods used in exploration design, construction and maintenance must be in accordance with good engineering practices reputable and in current use in the engineering, geologic and construction professions.*

2.3.1. Bottom Ash Pond

The definitions for the four hazard potentials (Less than Low, Low, Significant and High) to be used in this assessment are included in the EPA CCW checklist found in Appendix A. Based on the checklist definitions and as a result of this assessment, the hazard potential rating recommended for the Bottom Ash Pond is **LOW.** This rating would generally be synonymous with the State of Missouri Environmental Class III, if the impoundment met the height requirement for classification as a dam**.** Failure is not likely to cause loss of life because no residences appear to be located in the area immediately downstream of the Bottom Ash Pond and a levee located to the west of the drainage swale should prevent CCW discharge from flowing beyond Ameren property. Ameren owns the land that would likely be inundated with CCW and sluice water should the Bottom Ash Pond embankments fail.

2.3.2. Fly Ash Pond

Based on the checklist definitions and as a result of this assessment, the hazard potential rating recommended for the Fly Ash Pond is also **LOW.** A failure of the Fly Ash Pond embankments is not likely to cause loss of life because no residences appear to be located in the area immediately downstream of the Fly Ash Pond. Additionally, Ameren owns the land that would likely be inundated with CCW and sluice water should the Fly Ash Pond embankments fail.

2.4. IMPOUNDING STRUCTURE DETAILS

The following sections summarize the structural components and basic operations of the Bottom Ash Pond and the Fly Ash Pond. The locations of these impoundments on the Labadie Plant site are shown on Figure 2. A smaller scale plan of the two ponds, and photo location identifiers are provided as Figure 3. Additionally, photos taken during the visual inspection are incorporated in a Photographic Log provided as Appendices B and C.

2.4.1. Embankment Configuration

Bottom Ash Pond

The Bottom Ash Pond is a combined incised/diked earthen embankment structure with a total surface area of approximately 154 acres, according to information provided by Ameren in the EPA Request for Information. The Bottom Ash Pond is diked over the length of its perimeter; the height of the dike is approximately 29.5 feet above the outboard toe of slope and approximately 50 feet in depth is incised below the outboard toe. According to information provided by Ameren, the crest elevation varies from a low of elevation (EL) 491 to EL. 494 feet above mean sea level at the highest point. The survey showed the embankment crest elevation generally fell between EL. 492 and EL. 493. The lowest elevation was measured at the southwestern corner of the Bottom Ash Pond and the highest elevation was measured on the northern embankment of the Fly Ash Pond. The inboard slopes were designed at an inclination of 3H:1V while the outboard dike slopes were designed at an inclination of 2H:1V. The pond was designed without a liner for the bottom of the pond or the inboard slope of the dike.

Fly Ash Pond

The Fly Ash Pond is also a combined incised/diked earthen embankment structure with a total surface area of approximately 79 acres, according to information provided by the Ameren in the EPA Request for Information. The Fly Ash Pond is diked over the length of its perimeter; the height of the dike is approximately 29.5 feet above the outboard toe of slope and approximately 6 feet of storage is incised below the outboard toe. As with the Bottom Ash Pond, the crest is approximately at elevation (EL) 491-494 feet above mean sea level. The inboard slopes were designed at an inclination of 3H:1V and the outboard dike slopes were designed at an inclination of 2H:1V. The bottom of the impoundment is lined with a 40-mil high-density polyethylene (HDPE) liner and the inboard slopes are lined with a 60-mil HDPE liner.

In addition to the impoundments described above, there is one impoundment located to the north of the CCW impoundment known as the Combined Drain Sump. It receives the stormwater runoff from the Labadie Power Plant site as well as treated sewage from the facility, which is subsequently pumped to the Bottom Ash Pond. The Combined Drain sump does not receive or store CCW, therefore it was not assessed as part of this CCW impoundment assessment.

2.4.2. Type of Materials Impounded

Bottom Ash Pond

Influent into the Bottom Ash Pond includes water with solids consisting of primarily bottom ash with lesser quantities of miscellaneous fines composed of coal fines and fly ash.

Fly Ash Pond

Under normal plant operation, the Labadie Plant does not discharge into the Fly Ash Pond; the fly ash is captured pneumatically and stored in silos. Fly ash will be sluiced into the Fly Ash Pond when the amount produced exceeds the amount sold for beneficial reuse.

2.4.3. Outlet Works

Bottom Ash Pond

The Bottom Ash Pond is an incised/diked impoundment that has been designed to receive sluice flows; pumped sluice flow from the Fly Ash Pond; direct precipitation; and treated sanitary wastewater, lube water and site runoff pumped from the Combined Drain Sump. The primary outlet structure is located on the western embankment of the impoundment. It consists of a 36-inch diameter carbon steel pipe with two butterfly valves to regulate flow through the system and to govern the water level in the pond. An eight-foot diameter galvanized skimmer in the pond serves to exclude floating debris from the discharge. This 36-inch gravity-fed discharge pipe was installed in 1988; it replaced a system of twin twelve-inch pump-fed pipes that originally served as the Bottom Ash Pond outlet works. Effluent discharges into an open channel that eventually empties into the Missouri River. The discharge is permitted under MoDNR permit # MO-0004812.

Fly Ash Pond

The Fly Ash Pond is also an incised/diked impoundment designed to receive sluice flows and direct precipitation. The primary outlet structure, located near the southwestern corner of the impoundment, consists of two submersible pumps discharging through twin six-inch diameter PVC pipes into the Bottom Ash Pond.

3. RECORDS REVIEW

A review of the available records related to design, construction, operation and inspection of the Labadie Plant CCW impoundment was performed as part of this assessment. The documents provided by Ameren are listed below:

Table 3.1 *Summary of Documents Reviewed*

Document	Dates	By	Description
Boring Logs	1966	Sverdrup & Parcel	Logs of Borings 10 – 54, original site investigation. Note: No boring plan available
Memorandum	1966	J.A. Larson	Unconfined Compressive Strength Results
Memorandum	1966	Sverdrup & Parcel and Associates, Inc.	Consolidation Test Reports
Drawing 8500-X-49002	1966 - 1969	Bechtel Corporation	Site Plan (Schematic)
Drawing 8500-X51153	1980	Commonwealth Associates, Inc.	Contract Drawings – Labadie Precip., Laydown Area Site Plan
Drawing 8500-X-55001	1966 - 1985	Bechtel Corporation	Contract Drawings - Site Plan
Drawing 8500-X-55008	1969 - 1974	Bechtel Corporation	Contract Drawings – Paving & Utilities Plan
Drawing 8500-Y-85887	1974	Union Electric Company	Contract Drawings – Piping Install – Water Pump Discharge. Ash Pond Pumping Plant
Contract Documents	1977	Bechtel Corporation	Contract for subsurface investigation
Report - Soil Test Boring Results	1983	Smith & Brennan Pile Co., Inc/Wabash Drilling Co.	Boring Logs
Drawing 8500-Y-144599	1985	Burns & McDonnell	Contract Drawings – Discharge Structure Foundation Details. Fly Ash Pond
Drawing 8500-Y-113203	1988	Union Electric Company	Contract Drawings – Equipment Details. Ash Pond Gravity Drain
Drawing 8500-X-113204	1988	Union Electric Company	Contract Drawings – Equipment Arrangement Plan & Elevation. Ash Pond Gravity Drain, South Yard
Drawing 8500-Y-113221	1988	Union Electric Company	Contract Drawings – Equipment Details. Ash Pond Gravity Drain, Discharge Channel
Drawing 8500-X-113222	1988	Union Electric Company	Contract Drawings – Equipment Arrangement Plan & Elevation. Ash Pond Gravity Drain, Discharge Channel
Drawing 8500-Y-113364	1988	Union Electric Company	Contract Drawings – Property-Yard Plan. Ash Pond Gravity Drain. Ash Pond to Discharge Channel, South Yard
Drawing 8500-Y-113365	1988	Union Electric Company	Contract Drawings – Property-Yard Plan. Combined Drain Sump
Drawing 8500-Y-113367	1988	Union Electric Company	Contract Drawings – Property-Yard Plan. Overall Arrangement, Raising Elevation of Ash Pond Dike
Drawing 8500-Y-115875	1988	Union Electric Company	Contract Drawings – Property-Yard Plan. Support & Ash Piping Details. New Ash Pond Dike. Ash Disposal System
Drawing 8500-Y-124532	1992	Burns & McDonnell	Contract Drawings – Structure-Concrete-FDN-Plan. Ash Pond Fly Ash Silo. 1992 Ash Handling Mods.
Drawing 8500-X-124136	1992	Union Electric Company	Contract Drawings – Property Plan. New Roadway & Ash Pond.
Drawing 8500-X-126563	1992	Union Electric Company	Contract Drawings – Property Plan. New Ash Pond.

Table 3.1 *Summary of Documents Reviewed*

Document	Dates	By	Description
Emergency Dam Failure/Loss of Integrity Procedure	1999	Ameren	Emergency Action Plan for Labadie Power Station CCW Impoundments
Report: AmerenUE Dam Inventory and Inspection Program, Phase I. Labadie Plant	2007	Reitz & Jens, Inc.	Report on the results of a visual inspection of the Labadie Power Station CCW Impoundments
Response to EPA RFI	2009	Ameren	Utility's response to EPA questionnaire regarding CCW impoundments
Internal email	February 4, 2009	Ameren	Summary of 2008 Annual Inspection of Labadie Power Plant CCW Impoundments
Report: Dam Safety Program for AmerenUE Non-Hydroelectric Facilities	September 4, 2009	Ameren	Emergency Action Plan for AmerenUE Dams and CCW Impoundments
Internal email	December 2, 2009	Ameren	Summary of 2009 Annual Inspection of Labadie Power Plant CCW Impoundments
Report: Steam Electric Questionnaire	May 20, 2010	Ameren	Ameren database information on pond/impoundment systems and other wastewater treatment operations. Labadie Power Station
Weekly Inspection Checksheet: Labadie Fly Ash Pond	December 8, 2010	Ameren	Sample weekly inspection for the Fly Ash Pond
Weekly Inspection Checksheet: Labadie Bottom Ash Pond	December 8, 2010	Ameren	Sample weekly inspection for the Bottom Ash Pond

3.1. ENGINEERING DOCUMENTS

Review of the available documents revealed information on the design and performance details for the Bottom Ash and Fly Ash Ponds which is summarized below.

- The Bottom Ash Pond was originally constructed in 1969, at the time of the Labadie Power Station construction.
- The Bottom Ash Pond embankments were raised in 1988 from EL. 484 – 490 to a design crest elevation of 494 feet above mean sea level (msl) using CCW material dredged from the pond.
- The Fly Ash Pond was constructed in 1992 to a crest elevation of 494 feet above msl. The crest has not been raised.
- The existing crest elevation of the Bottom Ash and Fly Ash Ponds varies from El. 491 to El. 494 according to survey information presented in the 2007 inspection report by Reitz & Jens.
- The lowest elevation was measured at the southwestern corner of the Bottom Ash Pond and the highest elevation was measured on the northern embankment of the Fly Ash Pond.
- The Ponds were constructed as combined incised/diked structures. The excavated material was used to construct the dikes. The native materials generally consist of clayey silt and sand to sand.
- Neither the Bottom Ash Pond nor the Fly Ash Pond embankments were keyed into the underlying foundation.
- The bottom and inboard dike slopes of the Bottom Ash Pond are unlined; the bottom and inboard dike slopes of the Fly Ash Pond are lined with 40 mil and 60 mil HDPE liners, respectively.
- Slope stability analyses for the design of the embankments were not found. A stability analysis is currently underway, but the results were not yet available at the time of writing this DRAFT report.

3.1.1. Stormwater Inflows

Stormwater inflow to the Bottom Ash Pond consists of direct rainfall on the pond and stormwater runoff from the Labadie Power Station site that is collected in the Combined Drain Sump and subsequently pumped into the Bottom Ash Pond. Stormwater inflow to the Fly Ash Pond is limited to direct rainfall. According to information presented in the 2007 Investigation and Inspection report by Reitz & Jens, Inc., both the Bottom Ash and Fly Ash Ponds have sufficient capacity to store the 100-year, 24-hour rainfall event if the normal pool is kept below EL. 488.0. The water surface elevation in the Bottom Ash Pond was EL. 485.8 during the inspection, this was reported to be approximately equal to the normal pool elevation. It should be noted that according to the Reitz & Jens report, "the elevations shown on the staff gage were not verified by an elevation survey".

3.1.2. Stability Analyses

As stated above, no as-built slope stability analyses were provided in the records made available by Ameren. A subsurface investigation was performed in the spring of 2010 and the results of the investigation are being used to perform slope stability analyses. The results of the analyses, however, were not ready for release by Ameren when this DRAFT report was being prepared.

3.1.3. Instrumentation

A staff gage was installed at the outlet works of the Bottom Ash Pond and electronic readings can be obtained in the outlet valve control building. The piezometers installed during the 2010 subsurface program were abandoned after readings were taken over a period of several months. No instrumentation is present at the Fly Ash Pond.

3.2. PREVIOUS INSPECTIONS

The Bottom Ash Pond and the Fly Ash Pond are not regulated by the MoDNR; therefore, no regular inspections by state personnel are performed. Labadie Power Station personnel perform weekly informal inspections of the ponds during their security detail. An Ameren engineer performs an annual inspection of the ponds.

3.3. OPERATOR INTERVIEWS

Numerous plant and corporate personnel took part in the inspection proceedings. The following is a list of participants for the inspection of the Labadie Power Station CCW impoundments:

Table 3.2 *List of Participants*

Name	Affiliation	Title
Mike Hanneken, PE	Ameren	Plant Engineer, Labadie Power Plant
Matthew Frerking, PE	Ameren	Managing Supervisor, Dam Safety
Paul Pike	Ameren	Environmental Sciences Executive
Mark Litzinger	Ameren	Production Superintendent (Ops)
Michael Tomasovic	Ameren	Environmental Scientist
Johan Anestad, PE	O'Brien & Gere	Technical Associate
Robert Brodowski, PE	O'Brien & Gere	Technical Director

Facility personnel provided good background information, general plant operation and historical documentation for the Bottom Ash Pond and the Fly Ash Pond.

4. VISUAL INSPECTION

The following sections summarize the inspection of the Bottom Ash Pond and the Fly Ash Pond, which occurred on November 17, 2010. Following the inspection, O'Brien & Gere completed EPA inspection checklists that briefly summarize the results of the inspection. The checklists were submitted electronically to the EPA on November 29, 2010. Copies of the completed inspection checklists are included as Appendix A.

4.1. GENERAL

The weather during the inspection was clear and approximately 40 degrees. The visual inspection consisted of a thorough site walk along the crest and perimeter of both ash ponds. O'Brien & Gere team members made observations along the toe, outboard slope, and crest of the embankments, and along exposed portions of the inboard slopes. The team also inspected the inlet/outlet structures. There was discharge of CCW into the Bottom Ash Pond during the inspection.

Photos of relevant features and conditions observed during the inspection were taken by O'Brien & Gere and are provided in Appendices B and C for the Bottom Ash Pond and Fly Ash Pond, respectively. A Site Plan of the Bottom Ash Pond and the Fly Ash Pond is presented as Figure 3, which also provides photograph locations and directions.

4.2. SUMMARY OF FINDINGS

Bottom Ash Pond

The following observations were made during the visual inspection:

- Sluiced CCW by-product discharge enters the pond in the northern corner (Photos B1 - B3) and sluice water exits the pond through an eight-foot diameter galvanized CMP skimmer and 36-inch diameter welded steel pipe located near the northwestern corner of the pond (Photos B11 & B12).
- The CCW has accumulated above the normal pool level over an estimated 60 percent of the pond area (Photos B4, B5 & B16). Water in the pond is isolated to the western third of the pond (Figures 2 & 3).
- A crushed-stone access road was constructed over the length of the crest. The road appears to be in good condition with no rutting, erosion or standing water observed (Photos B6 & B16).
- A portion of the inboard slope was covered with stone riprap (Photo B7), reportedly in response to deficiencies noted during inspections of the structure. The remainder of the inboard slope is either obscured/covered with CCW, or well vegetated.
- The outboard slope is generally covered with well maintained grass (Photo B8), though some taller grasses were observed along the western embankment (Photo B9). According to Ameren personnel, the grass is normally maintained along this embankment, but the mowing contractor missed the fall mowing.
- Several seepage locations were observed along the toe of the western embankment, extending for a distance of approximately 200' starting near the southwestern corner of the pond (typical seep, Photo B10). According to Ameren personnel, the seepage started shortly after the embankment was raised in 1988. The representatives also noted that the rate of seepage has remained relatively steady, although it will fluctuate in response to changes in pool elevation. The seepage was clear.
- A small amount of seepage (approx. 5 gpm) was observed around the outside of the outlet pipe (Photo B15).
- Discharge from the outlet structure pools at the toe of the western embankment before flowing north to the Missouri River.

- The outlet structure appeared to be in good condition and functioning normally (Photo B14). A staff gage is housed on the outside of the galvanized CMP but the numbers near normal-pool level have corroded and are not legible (Photo B11). An accurate reading of the pool water surface elevation is presented on a meter (Photo B13) located inside the outlet valve and CO2 control building. CO2 is used to regulate the pH of the discharge, if it falls outside acceptable levels.

Based on conversations with Ameren personnel, no releases have occurred from the Bottom Ash Pond impoundment. No patchwork repair on the embankment appears to have been performed. As stated above, the seepage observed along the toe of the western embankment was initially observed shortly after the embankment crest was raised in 1988. Ameren personnel reported that the rate, color and location of seepage does not appear to have changed. Additionally, temporary piezometers were reportedly installed in the western embankment during the 2010 subsurface investigation. Water level readings taken in the piezometers reportedly remained steady through the testing period and appeared appropriate based on the pool water surface elevation and the location of the seepage. Since the subsurface and stability analyses report was not yet available at the time of writing of this report, the testing period and results could not be reviewed.

Fly Ash Pond

The following observations were made during the visual inspection:

- Sluiced CCW by-product is not currently discharged into the pond on a regular basis. The fly ash generated is generally sold for beneficial reuse. When CCW by-product discharge does enter the Fly Ash Pond, it is sluiced into the northwestern corner of the pond.
- Water is discharged by submersible pumps through two six-inch diameter PVC pipes from the Fly Ash Pond into the Bottom Ash Pond. The pumps and PVC pipes are housed on a structure similar to the Bottom Ash Pond outlet structure (Photos C4 & C5), located near the southwestern corner of the pond.
- The CCW has accumulated above the normal pool level over an estimated 90 percent of the pond area. Water in the pond is isolated to primarily the southern corner of the pond (Figures 2 & 3, Photos C1 - C4).
- Water is routed from the intake point to the outlet structure through a channel excavated into the CCW (Photo C2). Ameren personnel re-route the channel on a regular basis as it fills with deposited CCW.
- The crest of the dividing dike between the Fly Ash and Bottom Ash Ponds has eroded at the discharge end of the PVC pipes (Photo C6).
- A crushed-stone access road was constructed over the length of the crest. The road appears to be in good condition with no rutting, erosion or standing water observed (Photo C5).
- The 60-mil PVC liner installed on the inboard slope is exposed or covered with CCW (Photos C1 – C5). A small tree was observed growing near the inboard slope of the northern embankment (Photo C-3).
- The outboard slope is generally covered with well-maintained grass (Photos C7 – C9).
- A change in the slope of the outboard face was observed for approximately ¼-mile along the toe of the eastern embankment. The change in slope did not appear to be the result of a slough of the embankment. It is not known if this section of the embankment was constructed with a change from the design slope of 3H:1V.
- Several animal burrows were observed along the northern, eastern and southern embankments (Photo C-10).
- A Redi-mix concrete plant has been erected on reclaimed material placed outboard of the southern embankment (Photos B8 and C11). The plant uses CCW material obtained from the Labadie Power Station as part of the concrete mix. The plant is currently furloughed due to economic conditions, but will return to service when the demand for Redi-mix concrete increases.

Based on conversations with plant personnel, no releases have occurred from the Fly Ash Pond impoundment. Additional material (reclaimed CCW) has been placed along the outboard face of the southern embankment to develop room for the Redi-mix concrete plant and for possible further commercial enterprise.

5. CONCLUSIONS

Bottom Ash Pond

Based on the ratings defined in the RFP (Satisfactory, Fair, Poor and Unsatisfactory), the available information reviewed and the visual inspection, the overall condition of the Bottom Ash Pond is considered to be **POOR**. Because the 2010 subsurface investigation, subsequent piezometer readings and the results of the stability analyses were not available when this draft report was prepared, it is not known if acceptable performance can be expected under all loading conditions. In addition, some deficiencies exist that require repair and/or additional studies or investigations. The deficiencies include the following:

- Raising of the embankment with CCW material of unknown geotechnical properties.
- Seepage along the toe of the western embankment and along the outlet pipe.
- Deleterious vegetation along the outboard slope of the western embankment.

Other than the items cited above, the owner has implemented regular inspections and a maintenance program which enable the impoundment to be kept in acceptable working condition.

Fly Ash Pond

Based on the ratings defined in the RFP (Satisfactory, Fair, Poor and Unsatisfactory), the information reviewed and the visual inspection, the overall condition of the Fly Ash Pond is considered to be **FAIR**. Acceptable performance is expected under all loading conditions; however, some minor deficiencies exist that require repair and/or additional studies or investigations. The deficiencies include the following:

- Animal burrows located along the northern, eastern and southern embankments.
- Erosion of dividing dike crest near discharge end of six-inch PVC pipes from Fly Ash Pond into Bottom Ash Pond.

Other than the conditions cited above, the owner has implemented regular inspections and maintenance which enable the impoundment to be kept in good working order.

It should be noted that Ameren has begun the process of designing and licensing of a dry landfill in the vicinity of the Labadie Power Station. Once completed, the landfill will receive the CCW and the Bottom Ash and Fly Ash Ponds will be taken out of service. Ameren, however, does not have a firm time frame for the change from wet pond storage to dry landfill storage of the CCW.

6. 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 cited above. 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 the results of the stability analyses indicate that the embankment does not meet applicable criteria.

6.1. URGENT ACTION ITEMS

None of the recommendations are considered to be urgent, since the issues noted above do not appear to threaten the structural integrity of the impoundments in the near term.

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. A conclusion will be included in the Final version of this report if the 2010 subsurface investigation and stability analyses is available for review by O'Brien & Gere.
- If the Bottom Ash Pond is not taken out of service and replaced with the dry landfill, a seepage collection and monitoring system should be installed along the outboard slope of the western embankment.

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, final conclusion will be provided after review of the 2010 subsurface investigation and stability analyses.

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.

6.4. TIME FRAME FOR COMPLETION OF REPAIRS/IMPROVEMENTS

It is recommended that the minor repairs recommended above be completed within twelve (12) months.

6.5. CERTIFICATION STATEMENT

I acknowledge that the Bottom Ash Pond CCW management unit referenced herein were personally inspected by me on November 17, 2010 and was found to be in the following condition:

~~SATISFACTORY~~
~~FAIR~~
POOR
~~UNSATISFACTORY~~

I acknowledge that the Fly Ash Pond CCW management units referenced herein were personally inspected by me on November 17, 2010 and was found to be in the following condition:

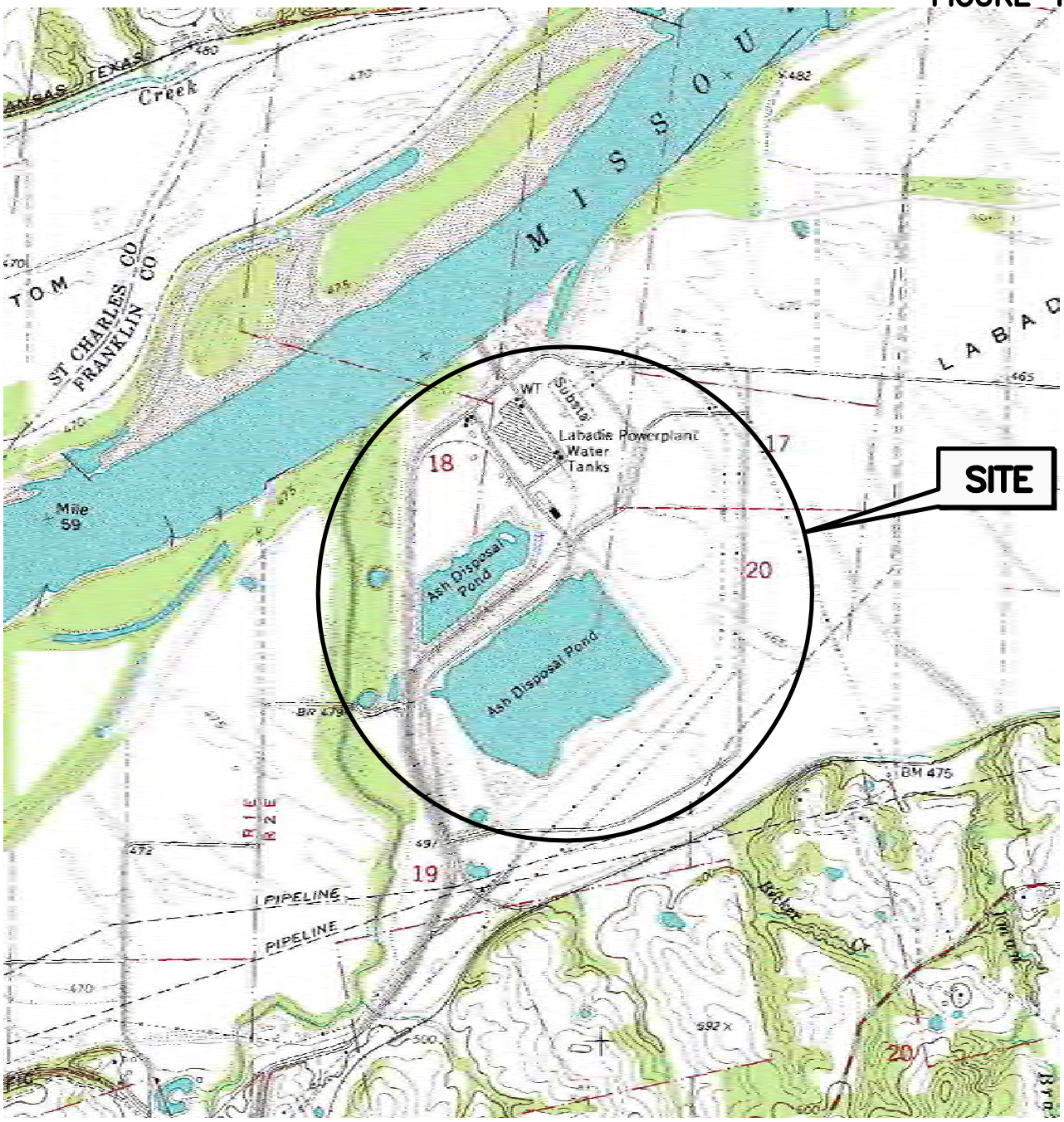
~~SATISFACTORY~~
FAIR
~~POOR~~
~~UNSATISFACTORY~~

Signature: _____DRAFT_____ Date: _____

Robert F. Brodowski, PE
MO PE # 2000172984

FIGURES

FIGURE 1



ADAPTED FROM: LABADIE QUADRANGLE, MISSOURI U.S.G.S. 7.5 MIN. QUAD; 1972, P.I. 1980

QUADRANGLE LOCATION

US EPA
DAM SAFETY ASSESSMENT
OF CCW IMPOUNDMENTS

LABADIE POWER STATION
LABADIE, MISSOURI

SITE LOCATION MAP

1 0 1/2 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

SCALE: 1:24000

46122-LABADIE-F01
JANUARY 2011

O'BRIEN & GERE

I:\US-EPA.13498\46122.ASSESS-OF-DAM-S\DOCS\DWG\SHEETS\46122-LABADIE-F01.DWG, 01/25/2011 3:44PM

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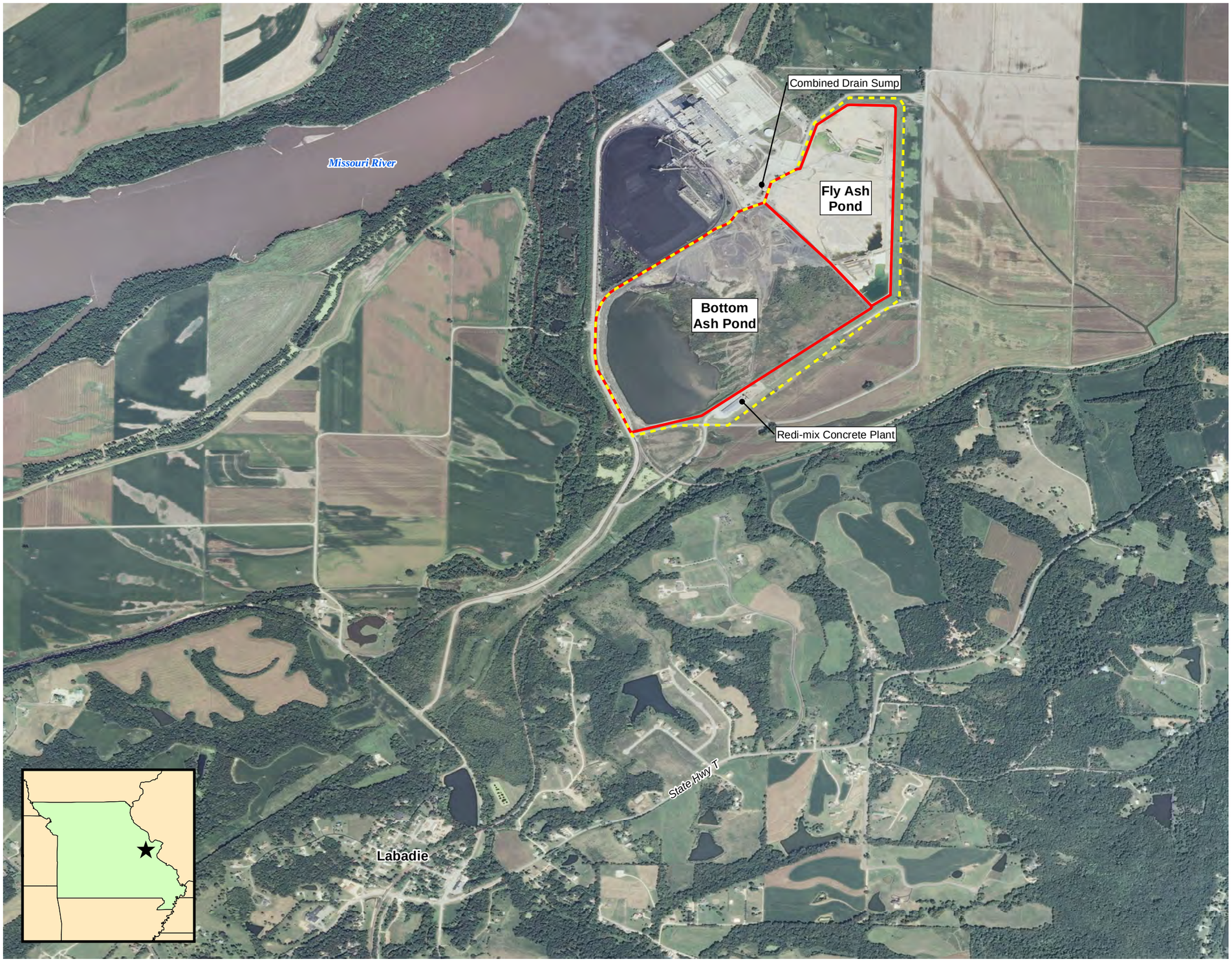
DRAFT FIGURE 2



N

NOTE
2010 Aerial Imagery provided by National Agriculture Imagery Program, USDA.

AMEREN
LABADIE POWER STATION
LABADIE, MISSOURI

SITE LAYOUT

0 800 1,600 3,200
Feet

JANUARY 2011
13498/46122

O'BRIEN & GERE

PLOT DATE: 1/11/2011 KaufmaDR

This document was developed in color. Reproduction in B/W may not represent the data as intended.

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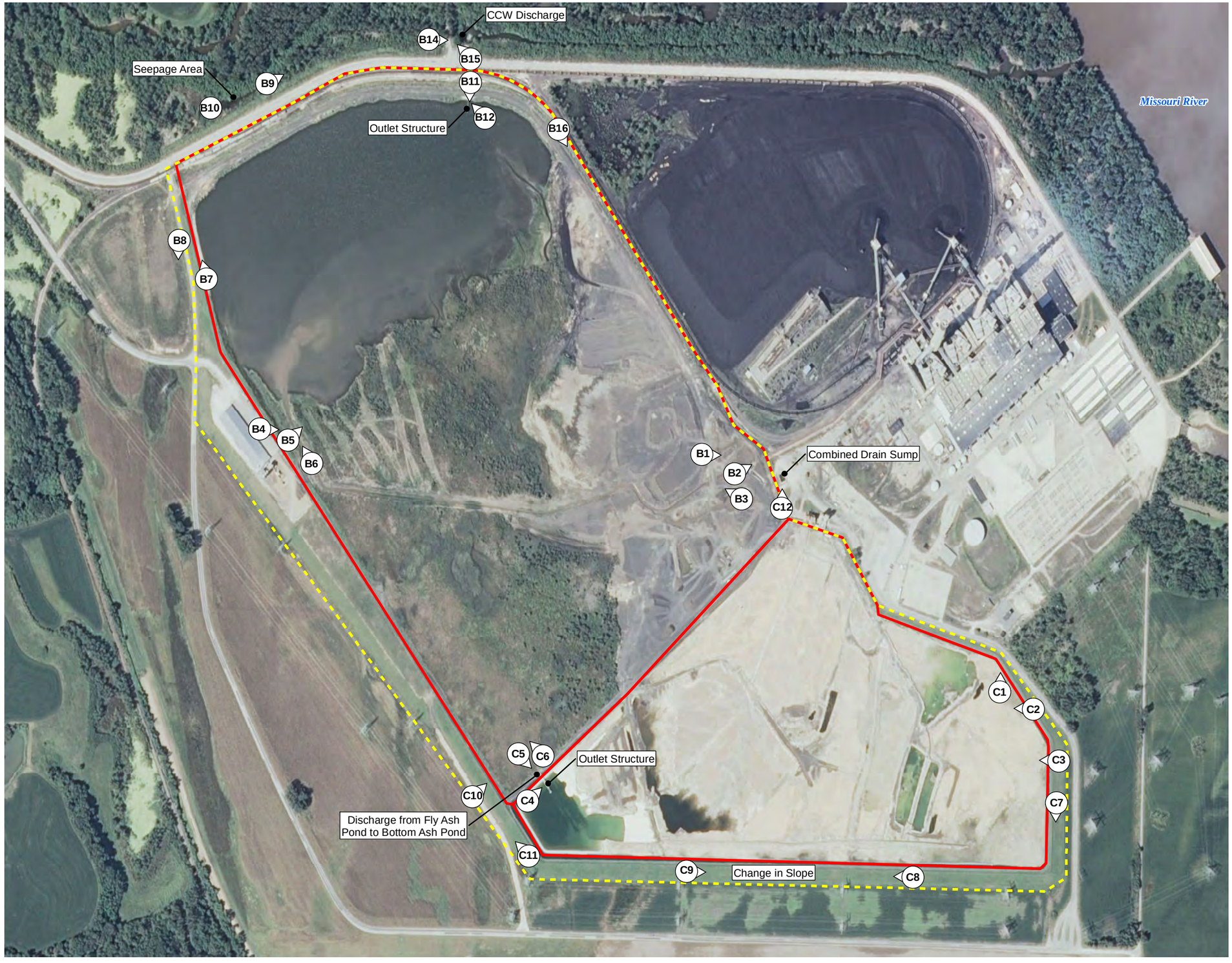
DRAFT FIGURE 3



N

LEGEND

C8 Photograph Direction/Location

NOTE
2010 Aerial Imagery provided by National Agriculture Imagery Program, USDA.

AMEREN
LABADIE POWER STATION
LABADIE, MISSOURI

PHOTO LOCATIONS AND SITE FEATURES

0 300 600 1,200
Feet

JANUARY 2011
13498/46122

O'BRIEN & GERE

PLOT DATE: 1/25/2011 KaufmaDR

This document was developed in color. Reproduction in B/W may not represent the data as intended.

APPENDIX A

Visual Inspection Checklists

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Labadie Power Station	Date:	November 17, 2010
Unit Name:	Bottom Ash Pond	Operator's Name:	AmerenUE
Unit I.D.:		Hazard Potential Classification:	High Significant Low ✓
Inspector's Name:	Robert Brodowski, PE/Johan Anestad, P.E.		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	485.8		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	478.0		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	491.0		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?	✓	
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	N/A		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?	✓	
12. Are decant trashracks clear and in place?	✓		From downstream foundation area?	✓	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?	✓	
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?	✓	
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

21. Several seeps observed along the toe of the western embankment extending for a distance of approximately 200' starting near the SW corner of pond. According to AmerenUE representatives, the flow started shortly after the embankment was raised in 1988. The representatives also reported that the rate of discharge has not increased and the seepage remains clear. Weekly inspections of the seepage locations are made. A small amount of seepage (approx. 5 gpm) was observed around the outside of the decant pipe. This pipe was installed in 1988.

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # MO-000481[illegible] INSPECTOR RF Brodowski, PE, NJ Anestad, P.E.

Date November 17, 2010

Impoundment Name Labadie Bottom Ash Pond

Impoundment Company AmerenUE

EPA Region 7

State Agency (Field Office) Addresss 901 N. 5th Street
Kansas City, KS 66101

Name of Impoundment Labadie Bottom Ash Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	X	_____

IMPOUNDMENT FUNCTION: Storage of fly ash,bottom ash, and site runoff, settling pond

Nearest Downstream Town : Name St. Albans

Distance from the impoundment 3.7 miles

Impoundment Location:
Longitude 90 Degrees 50 Minutes 9 Seconds
Latitude 38 Degrees 33 Minutes 15 Seconds
State MO County Franklin

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency?_____

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

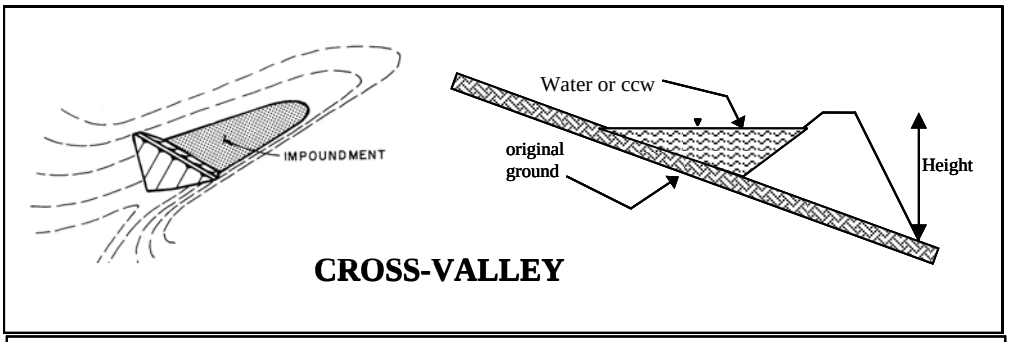
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

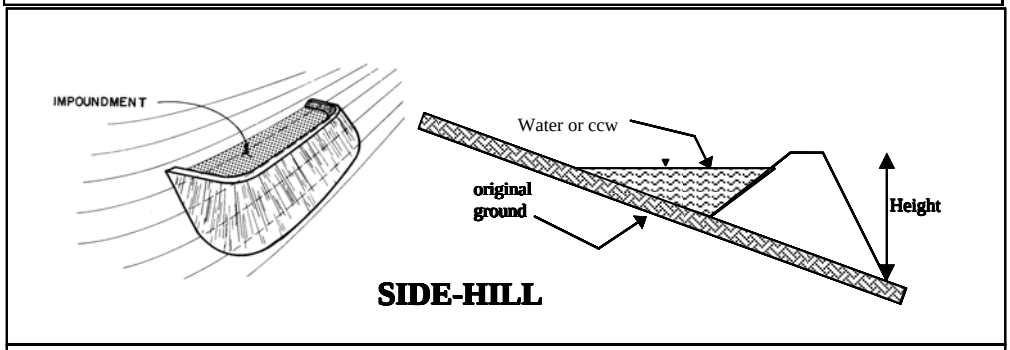
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

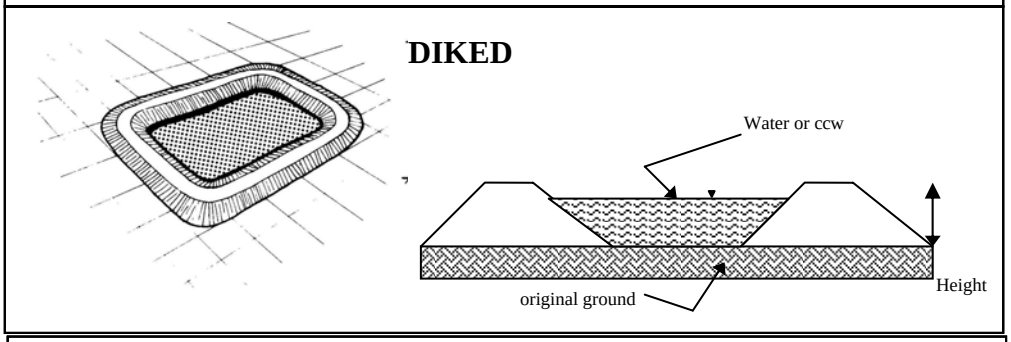
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

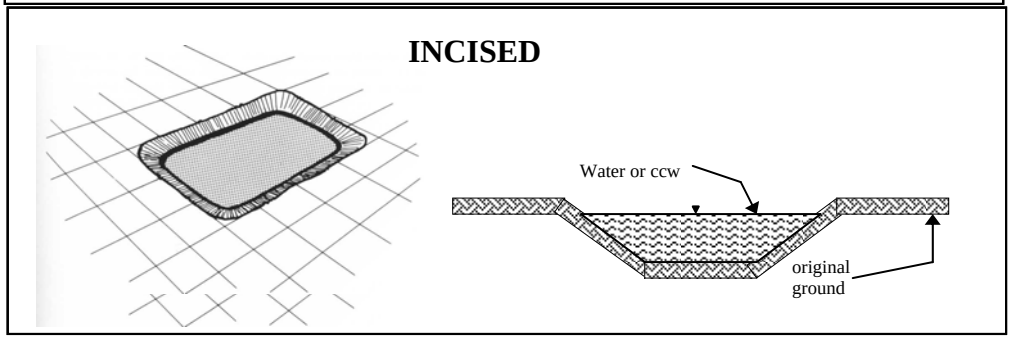
Potential for Environmental Damage is limited due to distance from impoundment to major environmental resource (Missouri River). Property damage limited to AmerenUE.

CONFIGURATION:









_____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
__X__ Combination Incised/Diked

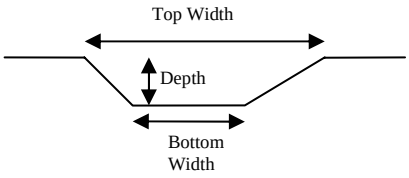
Embankment Height 29.5 feet
Pool Area 154 acres
Current Freeboard 5.2 feet

Embankment Material Native silts, clays and silty sand excavated from incised portion of pond. The embankments were raised with CCW reclaimed from the interior of the pond.
Liner None
Liner Permeability _____

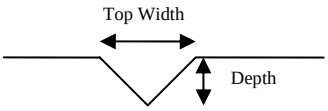
TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

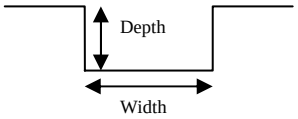


TRIANGULAR

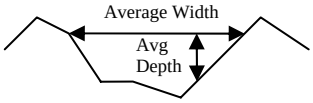


_____ depth
_____ bottom (or average) width
_____ top width

RECTANGULAR

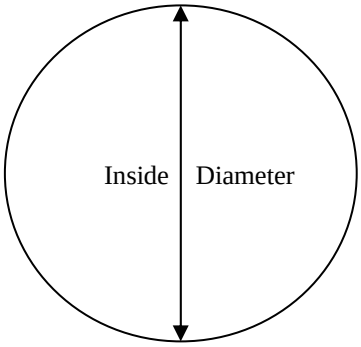


IRREGULAR



__X__ **Outlet**

__36"__ inside diameter



Material
_____ corrugated metal
__X__ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

Is water flowing through the outlet? YES __X__ NO _____

_____ **No Outlet**

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Bechtel

_____

Has there ever been a failure at this site? YES _____ NO ___X___

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES X NO _____

If So When? Ongoing

IF So Please Describe:

Seepage along the south end of the western embankment was initially observed shortly after the embankment was raised in 1988. It is likely that the source of seepage is a plane between the original 1970 embankment and the new fill placed in 1988. Seepage is present in numerous locations extending north for a distance of approximately 200' starting near the southwest corner of the impoundment. The seepage is monitored (visual observations on a weekly basis. According to AmerenUE, the rate of flow appears to have remained steady with no signs of piping (discharge cloudy with embankment fines) observed.

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES X NO _____

If so, which method (e.g., piezometers, gw pumping,...)? Piezometers

If so Please Describe :

Temporary piezometers were installed in the western embankment crest during a subusrface investigation performed in 2010 to gather data for use in stability analyses of the embankment. The water level in the piezometers reportedly remained constant during the monitoring period. The piezometers were removed and the boreholes filled when the monitoring period was over.

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Labadie Power Station	Date:	November 17, 2010
Unit Name:	Fly Ash Pond	Operator's Name:	AmerenUE
Unit I.D.:		Hazard Potential Classification:	High Significant Low ✓
Inspector's Name:	Robert Brodowski, PE/Johan Anestad, P.E.		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	485.0		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes: None		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		
5. Lowest dam crest elevation (operator records)?	491.0		Is water exiting outlet, but not entering inlet?		
6. If instrumentation is present, are readings recorded (operator records)?		✓	Is water exiting outlet flowing clear?		
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	N/A		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?		N/A	From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

3, 4, 12. No decant pipes or open spillways, water is pumped from the Fly Ash Pond into the Bottom Ash Pond for eventual discharge.

9. Approx. 2" diameter tree on inboard face of northern embankment.

17, 18. No cracks, scarps, sloughs or bulging observed, change in slope on outboard face observed for approx. 1/4 mile along toe of eastern embankment.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # None INSPECTOR RF Brodowski, PE, NJ Anestad, P.E.

Date November 17, 2010

Impoundment Name Labadie Fly Ash Pond

Impoundment Company AmerenUE

EPA Region 7

State Agency (Field Office) Address 901 N. 5th Street
Kansas City, KS 66101

Name of Impoundment Labadie Fly Ash Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Storage of fly ash, settling pond

Nearest Downstream Town : Name St. Albans

Distance from the impoundment 3.7 miles

Impoundment Location:
Longitude 90 Degrees 49 Minutes 52 Seconds
Latitude 38 Degrees 33 Minutes 31 Seconds
State MO County Franklin

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency?_____

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

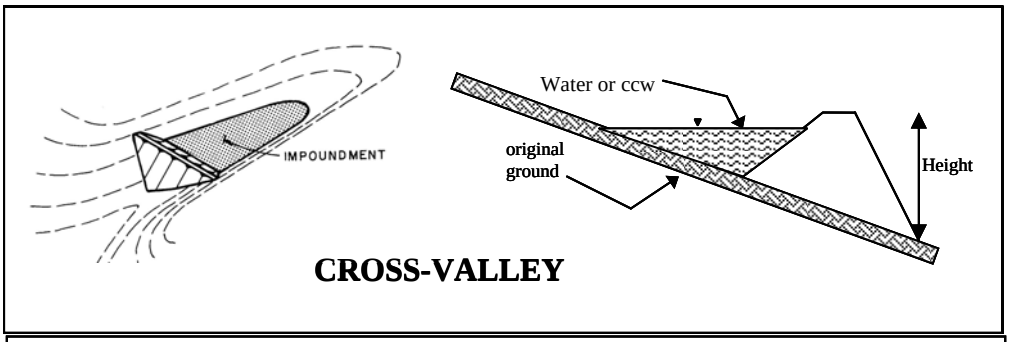
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

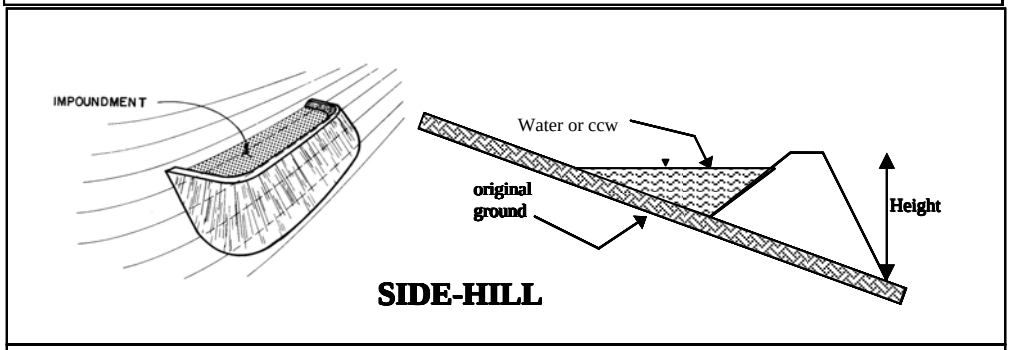
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Potential for Environmental Damage is limited due to distance from impoundment to major environmental resource (Missouri River). Property damage limited to AmerenUE.

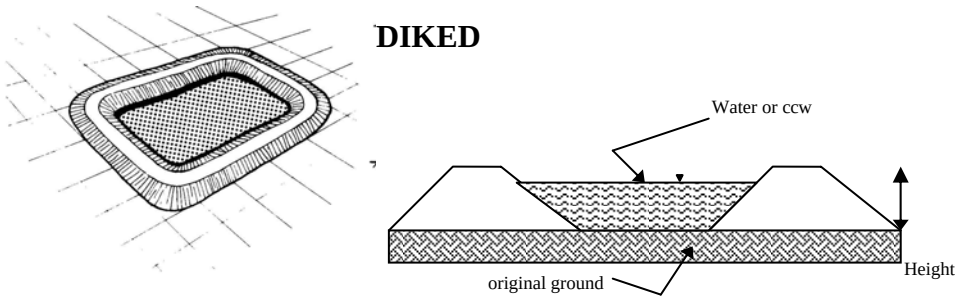
CONFIGURATION:

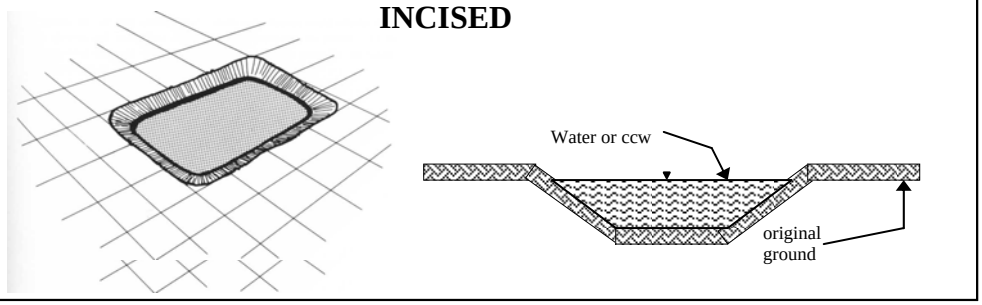


CROSS-VALLEY



SIDE-HILL





_____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
__X__ Combination Incised/Diked

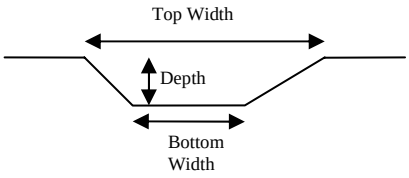
Embankment Height 29.5 feet
Pool Area 79 acres
Current Freeboard 6 feet

Embankment Material Native silts, clays and silty sand excavated from incised portion of pond
Liner 60-mil HDPE
Liner Permeability _____

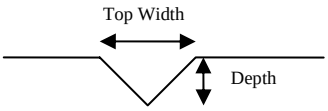
TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

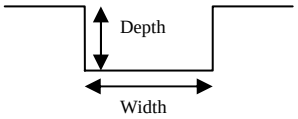


TRIANGULAR

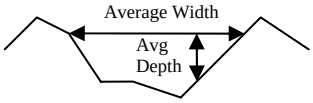


_____ depth
_____ bottom (or average) width
_____ top width
_____

RECTANGULAR

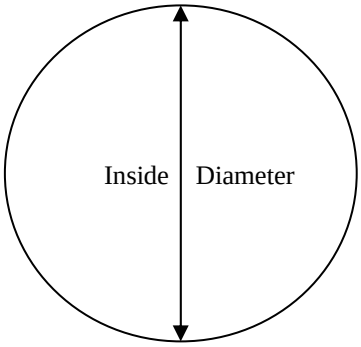


IRREGULAR



_____ **Outlet**

_____ inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES _____ NO _____

_____ **No Outlet**

_____

X **Other Type of Outlet** (specify) 2 submersible pumps. Pumps discharge flows through two 6" diameter pipes into Bottom Ash Pond

The Impoundment was Designed By AmerenUE

Has there ever been a failure at this site? YES _____ NO ___X___

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO ___X___

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO __X__

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

APPENDIX B

Photographs – Bottom Ash Pond

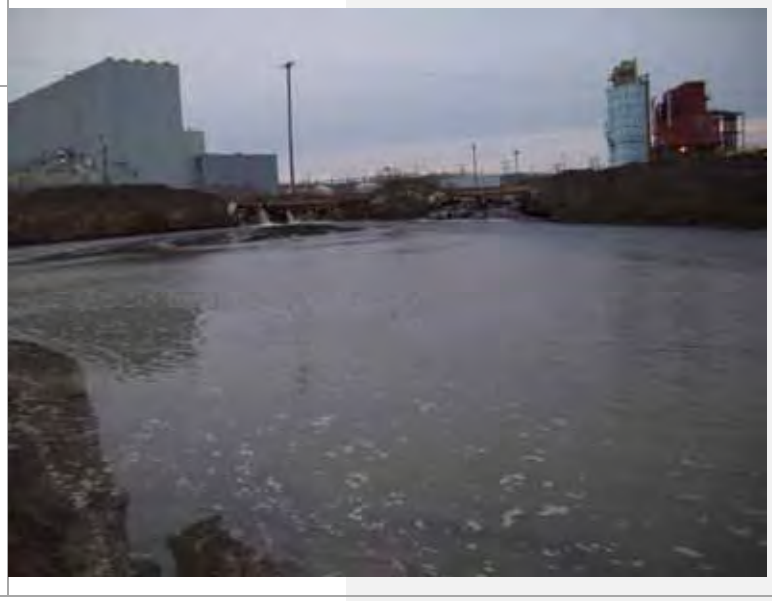
PHOTOGRAPHIC LOG – BOTTOM ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B1	Nov. 17, 2010

DESCRIPTION

Northern corner, note influent of CCW in background.



CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B2	Nov. 17, 2010

DESCRIPTION

Discharge pipes for water pumped from the Combined Drain Sump.

PHOTOGRAPHIC LOG – BOTTOM ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B3	Nov. 17, 2010

DESCRIPTION

CCW discharge into Bottom Ash Pond, northern corner of pond.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B4	Nov. 17, 2010

DESCRIPTION

Interior of Bottom Ash Pond, looking north. Note channel cut through deposited CCW.

PHOTOGRAPHIC LOG – BOTTOM ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B5	Nov. 17, 2010

DESCRIPTION

Interior of Bottom Ash Pond. Note vegetative growth on CCW.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B6	Nov. 17, 2010

DESCRIPTION

Southern embankment, looking west. Note riprap on inboard slope, background.

PHOTOGRAPHIC LOG – BOTTOM ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B7	Nov. 17, 2010

DESCRIPTION

Riprap on portion of inboard slope of southern embankment.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B8	Nov. 17, 2010

DESCRIPTION

Outboard face of southern embankment. Note redi-mix plant.

PHOTOGRAPHIC LOG – BOTTOM ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B9	Nov. 17, 2010

DESCRIPTION

Outboard face and toe of western embankment. Note vegetative growth.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B10	Nov. 17, 2010

DESCRIPTION

Typical seepage at toe of western embankment.

PHOTOGRAPHIC LOG – BOTTOM ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B11	Nov. 17, 2010

DESCRIPTION

Staff gage on outlet structure.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B12	Nov. 17, 2010

DESCRIPTION

Interior of galvanized 8-foot diameter CMP outlet works skimmer.

PHOTOGRAPHIC LOG – BOTTOM ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B13	Nov. 17, 2010

DESCRIPTION

Water level readout in valve and CO2 control building.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B14	Nov. 17, 2010

DESCRIPTION

Discharge from outlet structure.

PHOTOGRAPHIC LOG – BOTTOM ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B15	Nov. 17, 2010

DESCRIPTION

Seepage along outlet pipe.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
B16	Nov. 17, 2010

DESCRIPTION

Crest of northern embankment. Note width and dried CCW.

APPENDIX C

Photographs – Fly Ash Pond

PHOTOGRAPHIC LOG – FLY ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C1	Nov. 17, 2010

DESCRIPTION

Interior of Fly Ash Pond, looking north. Note dried CCW and exposed 60 mil HDPE liner

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C2	Nov. 17, 2010

DESCRIPTION

Interior of Fly Ash Pond, looking south. Note dried CCW and excavated channel.

PHOTOGRAPHIC LOG – FLY ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C3	Nov. 17, 2010

DESCRIPTION

Interior of Fly Ash Pond looking south. Note tree and exposed liner.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C4	Nov. 17, 2010

DESCRIPTION

Fly Ash Pond outlet structure.

PHOTOGRAPHIC LOG – FLY ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C5	Nov. 17, 2010

DESCRIPTION

Access bridge to Fly Ash Pond outlet structure. Note six-inch diameter PVC pipes along the bridge.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C6	Nov. 17, 2010

DESCRIPTION

Discharge end of PVC pipes from Fly Ash Pond into Bottom Ash Pond. Note erosion of dividing dike crest.

PHOTOGRAPHIC LOG – FLY ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C7	Nov. 17, 2010

DESCRIPTION

Northern embankment, looking east.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C8	Nov. 17, 2010

DESCRIPTION

Eastern embankment looking south. Note change in slope near the toe.

PHOTOGRAPHIC LOG – FLY ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C9	Nov. 17, 2010

DESCRIPTION

Eastern embankment looking north. Note change in slope near the toe.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C10	Nov. 17, 2010

DESCRIPTION

Typical animal burrow.

PHOTOGRAPHIC LOG – FLY ASH POND

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C11	Nov. 17, 2010

DESCRIPTION

Southern embankment looking west.

CLIENT NAME:	SITE LOCATION:	PROJECT NO.
US EPA	Labadie Power Station. Labadie, MO	13489|46122

PHOTO NO.	DATE:
C12	Nov. 17, 2010

DESCRIPTION

Combined Drain Sump.