DRAFT

Coal Combustion Waste Impoundment
Round 7 - Dam Assessment Report

Sioux Power Station (Site #001)

AmerenUE
St. Charles County, Missouri

Prepared for:

United States Environmental Protection Agency
Office of Resource Conservation and Recovery

Prepared by:

Dewberry & Davis, LLC
Fairfax, Virginia

Under Contract Number: EP-09W001727
November 2010

DRAFT

INTRODUCTION, SUMMARY CONCLUSIONS AND RECOMMENDATIONS

The release of over five million cubic yards from the Tennessee Valley Authority's Kingston, Tennessee facility in December 2008, which flooded more than 300 acres of land, damaging homes and property, is a wake-up call for diligence on coal combustion waste disposal units. We must marshal our best efforts to prevent such catastrophic failure and damage. A first step toward this goal is to assess the stability and functionality of the ash impoundments and other units, then quickly take any needed corrective measures.

This assessment of the stability and functionality of the AmerenUE Sioux Power Station Plant Fly Ash Dam management unit and the Bottom Ash Dam management unit is based on a review of available documents and on the site assessment conducted by Dewberry personnel on Thursday, September 30, 2010. We found the supporting technical documentation inadequate (Section 1.1.3). As detailed in Section 1.2.5, there are recommendations based on field observations that may help to maintain a safe and trouble-free operation.

In summary, the AmerenUE Sioux Fly Ash Dam is **FAIR** for continued safe and reliable operation, with acceptable performance expected under all required loading conditions, however minor deficiencies may exist that require remedial action or additional studies/investigations.. The AmerenUE Sioux Bottom Ash Dam is **FAIR** for continued safe and reliable operation, with acceptable performance expected under all required loading conditions, however minor deficiencies may exist that require remedial action or additional studies/investigations. Results of a pending Embankment Stability Analysis currently being conducted for both embankments may affect the safety ratings assigned in this report.

PURPOSE AND SCOPE

The U.S. Environmental Protection Agency (EPA) is embarking on an initiative to investigate the potential for catastrophic failure of Coal Combustion Surface Impoundments (i.e., management unit) from occurring at electric utilities in an effort to protect lives and property from the consequences of a dam failure or the improper release of impounded slurry. The EPA initiative is intended to identify conditions that may adversely affect the structural stability and functionality of a management unit and its appurtenant structures (if present); to note the extent of deterioration (if present), status of maintenance and/or a need for immediate repair; to evaluate conformity with current design and construction practices; and to determine the hazard potential classification for units not currently classified by the management unit owner or by a state or federal agency. The initiative will address management units that are classified as having a Less-than-Low, Low, Significant or High Hazard Potential ranking. (For Classification, see pp. 3-8 of the 2004 Federal Guidelines for Dam Safety)

DRAFT

In February 2009, the EPA sent letters to coal-fired electric utilities seeking information on the safety of surface impoundments and similar facilities that receive liquid-borne material that store or dispose of coal combustion waste. This letter was issued under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104(e), to assist the Agency in assessing the structural stability and functionality of such management units, including which facilities should be visited to perform a safety assessment of the berms, dikes, and dams used in the construction of these impoundments.

EPA requested that utility companies identify all management units including surface impoundments or similar diked or bermed management units or management units designated as landfills that receive liquid-borne material 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. Utility companies provided information on the size, design, age and the amount of material placed in the units. The EPA used the information received from the utilities to make preliminary determinations which management units had or potentially could have High Hazard Potential ranking.

The purpose of this report is to evaluate the condition and potential of waste release from management units that have not been rated for hazard potential classification. This evaluation included a site visit. Prior to conducting the site visit, a two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal agencies regarding the unit hazard potential classification (if any) and accepted information provided via telephone communication with the management unit owner. During the inspection it was noted that an Embankment Stability Analysis was currently under way and the results would be available by the end of the year. USEPA requested a copy of the analysis to determine the stability of the embankments for both the fly ash and bottom ash ponds. The additional information could potentially change the ratings in the Final report.

Factors considered in determining the hazard potential classification of the management units(s) included the age and size of the impoundment, the quantity of coal combustion residuals or by-products that were stored or disposed of in these impoundments, its past operating history, and its geographic location relative to down gradient population centers and/or sensitive environmental systems.

This report presents the opinion of the assessment team as to the potential of catastrophic failure and reports on the condition of the management unit(s).

DRAFT

LIMITATIONS

The assessment of dam safety reported herein is based on field observations and review of readily available information provided by the owner/operator of the subject coal combustion waste management unit(s). Qualified Dewberry engineering personnel performed the field observations and review and made the assessment in conformance with the required scope of work and in accordance with reasonable and acceptable engineering practices. No other warranty, either written or implied, is made with regard to our assessment of dam safety.

DRAFT

TABLE OF CONTENTS

1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from a one-day site visit, September 30, 2010, and review of technical documentation provided by AmerenUE Power Company.

1.1.1 Conclusions Regarding the Structural Soundness of the Management Unit(s)

The structural soundness of both units is rated **FAIR**. The fly ash and bottom ash pond embankments did not appear to have significant structural concerns during the site visit. Furthermore, AmerenUE weekly, annual and special inspections reports show no record of any serious structural instability. However, results from a pending structural analysis of the embankments may affect these ratings.

Table 1.1: Structural Stability Rating

Category	Description
Satisfactory	No existing or potential management unit safety deficiencies are recognized. Acceptable performance is expected under all applicable loading conditions (static, hydrologic, seismic) in accordance with the applicable criteria. Minor maintenance items may be required.
Fair	Acceptable performance is expected under all applicable loading conditions (static, hydrologic, seismic) in accordance with the applicable safety regulatory criteria. Minor deficiencies may exist that require remedial action and/or secondary studies or investigations.
Poor	A management unit safety deficiency is recognized for any required loading condition (static, hydrologic, seismic) in accordance with the applicable dam safety regulatory criteria. Remedial action is necessary. POOR also applies when further critical studies or investigations are needed to identify any potential dam safety deficiencies.
Unsatisfactory	Considered unsafe. A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution. Reservoir restrictions may be necessary.

Modified from the New Jersey Department of Environmental Protection Dam Safety Guidelines for the Inspection of Existing Dams, January 2008.

1.1.2 Conclusions Regarding the Hydrologic/Hydraulic Safety of the Management Unit(s)

A hydrologic/hydraulic evaluation of the ponds was conducted by Reitz & Jens, Inc. in August 2007. According to their study, there is sufficient storage capacity for the 100-year, 24-hour rain event when the pool elevation is maintained below an elevation of 440.5 feet for the Bottom Ash Pond and 440 feet for the Fly Ash Pond. No hydrologic/hydraulic safety information was provided relative to the Mississippi River and floodplain however. As a result, the supporting technical documentation for hydrologic/hydraulic safety is adequate for the scenario evaluated, but could be improved by conducting a hydrologic/hydraulic safety analysis related to flooding from the Mississippi River.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

Supporting technical documents are limited. No other technical documentation about the design of the existing facility is available. Technical documents to verify the adequacy of the pond storage, outlet structures, and structural stability of the embankments are not available. The pending embankment stability analysis is unavailable until the report is finalized by the end of 2010. A copy has been requested.

1.1.4 Conclusions Regarding the Description of the Management Unit(s)

The description of the management units (fly ash and bottom ash) provided by AmerenUE were an accurate representation of what Dewberry observed in the field. Descriptions were obtained from documentation provided by AmerenUE in their response letters, which are attached to this report. Some items that were provided by AmerenUE were stamped "Confidential" and are not included as attachments. These confidential items were however used to prepare for the field investigation and as source materials for this report.

1.1.5 Conclusions Regarding the Field Observations

Dewberry staff was provided access to all areas in the vicinity of the management units required to conduct a thorough field observation. The visible parts of the embankment dikes and outlet structures were observed

for signs of overstress, significant settlement, shear failure, or other signs of instability. Visual observations were hampered by a wet low area south of the Fly Ash Pond dam that prevented an inspection of the toe area of that unit. Some erosion areas were observed with the Fly Ash management unit, rip-rap has been added to those areas to enhance stability and they are monitored weekly by AmerenUE. A small seep in the northeast corner of the Bottom Ash Pond dam was observed 75' from the toe of the embankment with clear water exiting the area. AmerenUE is monitoring the situation on a weekly basis. There is a channel that flows along the west side of the Bottom Ash Pond embankment. That bank is monitored weekly by AmerenUE from the other side of the stream to see if erosion or wave actions are affecting the integrity of the embankment.

1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation

The current maintenance and methods of operations appear to be adequate for both the Fly Ash and Bottom Ash units. There was no evidence of significant repairs or prior releases observed during the field inspection. Vegetation on the embankments, and at the toe of the embankments, should be maintained on a regular basis to ensure easy visual observation of the integrity of the embankment structures.

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

The surveillance program appears to be adequate. According to AmerenUE's Dam Safety Program for Non-Hydroelectric Facilities and information learned during the site visit, the Sioux Station embankments receive weekly routine inspections and an annual inspection.

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation

The facility classification is **FAIR** for continued safe and reliable operation. The classification is due to the lack of critical technical documentation or engineering analyses verifying structural integrity of the embankments. A structural analysis is expected to be completed by the end of 2010 and its results may affect this classification.

1.2 RECOMMENDATIONS

1.2.1 Recommendations Regarding the Structural Stability

None appear warranted at this time to satisfy a critical need. An embankment stability analysis was conducted and will be available at the end of year of 2010. A copy of this analysis has been requested.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety

It is recommended that AmerenUE conduct an updated hydrologic/hydraulic safety study to reflect current conditions.

1.2.3 Recommendations Regarding the Supporting Technical Documentation

No recommendations appear warranted at this time.

1.2.4 Recommendations Regarding the Description of the Management Unit(s)

No recommendations appear warranted at this time.

1.2.5 Recommendations Regarding the Field Observations

Continue weekly monitoring of western portion of Bottom Ash Pond embankment for signs of erosion or wave action by adjacent channel as well as monitoring the clear water seep observed in the northeastern corner of the embankment. It is also recommended that removal of the woody vegetation along the bottom ash pond, southeast side, should continue if the filled area is planned to be removed and used as an embankment in the future.

1.2.6 Recommendations Regarding the Maintenance and Methods of Operation

Maintain existing embankment slopes to keep vegetation controlled and to allow for easy visual inspection of the dams.

1.2.7 Recommendations Regarding the Surveillance and Monitoring Program

No recommendations appear warranted at this time.

1.2.8 Recommendations Regarding Continued Safe and Reliable Operation

No recommendations appear warranted at this time.

1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

James Filson, P.E., Dewberry & Davis, LLC
Jeffrey Crabtree, P.E., Dewberry & Davis, LLC
Paul Pike, AmerenUE
Matthew Frerking, P.E., AmerenUE
Michael Tomasovic, AmerenUE

1.3.2 Acknowledgement and Signature

We acknowledge that the management unit referenced herein has been assessed on September 30, 2010.

Jeffrey Crabtree, P.E.
Registered, MO E-2001000889

James Filson, P.E.

2.0 DESCRIPTION OF THE COAL COMBUSTION WASTE MANAGEMENT UNIT(S)

2.1 LOCATION AND GENERAL DESCRIPTION

The Plant is located along the south bank of a large bend of the Mississippi River in Saint Charles County near West Alton, Missouri, approximately 20 miles upstream of downtown Saint Louis. The Plant is operated by AmerenUE. The Fly Ash pond is located in the southern portion of the property and outfalls west to Poeling Lake, which is located in the southwest corner of the site. Under normal Mississippi River levels, water from the lake drains north to Brick House slough, which is adjacent to the Mississippi River. The Bottom Ash Pond is located in the northwestern portion of the AmerenUE Sioux site and drains west to Poeling Lake as well. The Bottom Ash Pond outfall is located approximately 1,400 feet northwest of the Fly Ash Pond outfall.

Table 2.1: Summary of Dam Dimensions and Size

	Fly Ash Pond
Dam Height (ft)	22
Crest Width (ft)	Varies (30-75)
Length (ft)	7,675
Side Slopes (upstream) H:V	3:1
Side Slopes (downstream) H:V	2:1
Hazard Classification (per MDNR guidelines)	III
	Bottom Ash Pond
Dam Height (ft)	27
Crest Width (ft)	Varies (50-150)
Length (ft)	6,600
Side Slopes (upstream) H:V	2:1
Side Slopes (downstream) H:V	2:1
Hazard Classification (per MDNR guidelines)	III

2.2 SIZE AND HAZARD CLASSIFICATION

The impoundment area for the Fly Ash Pond is approximately 60 acres. The Fly Ash Pond was constructed in the 1990's and is lined with a 60-millimeter high-density polyethylene (HDPE) liner. The impoundment area for the Bottom Ash

Pond is approximately 47 acres. It was constructed in the 1960's and is comprised of compacted earth fill. The Bottom Ash pound is not lined.

The classification for size, based on the height of the embankment and the impoundment storage capacity is "Small" for both the Fly Ash Pond and the Bottom Ash Pond utilizing the size classifications below.

Table 2.2a: USACE ER 1110-2-106 Size Classification

Category	Impoundment	
	Storage (Ac-ft)	Height (ft)
Small	50 and < 1,000	25 and < 40
Intermediate	1,000 and < 50,000	40 and < 100
Large	> 50,000	> 100

The Environmental Zone Classification, per MDNR Division 22 Reservoir Safety Council Rules and Regulations, is Class III for both the Fly Ash Pond and Bottom Ash Pond. There are no residences, public buildings, campgrounds, industrial buildings, or water/sewer/electrical services for several miles downstream along the Mississippi River.

Table 2.2b: Environmental Zone Classification (per MDNR Division 22 Reservoir Safety Council Rules and Regulations)

Class I	10 or more permanent dwellings or any public building downstream.
Class II	1-9 permanent dwellings, 1 or more campgrounds with permanent water, sewer and electrical services or 1 or more industrial buildings downstream.
Class III	Everything else.

Dewberry conducted a qualitative hazard classification based on the Federal Guidelines for Dam Safety, dated April 2004, and determined that the hazard potential for catastrophic failure of both dam embankments would be Significant for both ponds.

Table 2.2c: FEMA Federal Guidelines for Dam Safety Hazard Classification

	Loss of Human Life	Economic, Environmental, Lifeline Losses

Low	None Expected	Low and generally limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected	Yes (but not necessary for classification)

There are no residences for several miles downstream along the Mississippi River, therefore the loss of human life is not probable in the event of a catastrophic dam failure. However, a catastrophic failure is likely to result in a release of bottom ash and fly ash untreated slurry water into the Mississippi River, resulting in economic and environmental losses. As a result, Dewberry rates the Fly Ash Pond and Bottom Ash Pond as "Significant" for hazard potential.

2.3 AMOUNT AND TYPE OF RESIDUALS CURRENTLY CONTAINED IN THE UNIT(S) AND MAXIMUM CAPACITY

Information on the amount of residuals or the volume of the ash ponds are provided in Table 2.3:

Table 2.3: Maximum Capacity of Unit	
Fly Ash Pond	
Surface Area (acre)[1]	60
Current Storage Capacity (cubic yards)	1,090,613
Current Storage Capacity (acre-feet)[1]	676
Total Storage Capacity (cubic yards)	1,548,800
Total Storage Capacity (acre-feet)[1]	960
Crest Elevation (feet)[2]	441.5 to 446.4
Normal Pond Level (feet)[2]	440
Bottom Ash Pond	
Surface Area (acre)[1]	47
Current Storage Capacity (cubic yards)	2,999,187
Current Storage Capacity (acre-feet)[1]	1,859
Total Storage Capacity (cubic yards)	3,388,000
Total Storage Capacity (acre-feet)[1]	2,100
Crest Elevation (feet)[2]	443 to 445
Normal Pond Level (feet)[2]	434

[1] *Information provided in May 4, 2009 AmerenUE response letter to request for more information.*

[2] *Information found in Reitz & Jens, Inc. Phase I Report 2007012405 for Sioux Plant, dated August 27, 2007, provided by AmerenUE.*

2.4 PRINCIPAL PROJECT STRUCTURES

2.4.1 Earth Embankment

According to the Reitz & Jens, Inc. 2007 Phase I Sioux Plant Report provided by AmerenUE, the Fly Ash Pond dam was constructed in the 1990's. The upstream slopes of the Fly Ash dam are constructed of compacted earth fill at 3:1 Horizontal:Vertical (H:V) slopes and are lined with a 60-mm HDPE liner. The upstream slopes were constructed from the top and over the slopes of an existing railroad and roadway embankment. The existing slopes of the railroad and roadway embankments are typically 2:1 H:V slopes and form the downstream slopes. A short section at the northwest corner of the dam was constructed with new downstream slopes at 3:1 H:V. The dam embankment is 7,675 feet long and approximately 22 feet high. A structural analysis was recently conducted and the results should be available in late 2010.

The Bottom Ash Pond dam was constructed in the 1960's and consists of compacted earth fill at 2:1 H:V slopes. The pond is unlined. The dam embankment is 6,600 feet long and approximately 27 feet high. A structural analysis was recently conducted and the results should be available in late 2010. Rip-rap has been added to the interior and exterior slopes of the Bottom Ash Pond dam to enhance stability and prevent erosion. For the interior, rip-rap has been placed along the northern and northeastern slopes. On the exterior, rip-rap has been placed along the entire southwestern slope and along the northern slope.

No data was provided regarding the initial geotechnical design assumptions or construction criteria used for either dam.

2.4.2 Outlet Structures

According to the Reitz & Jens, Inc. 2007 Phase I Sioux Plant Report provided by AmerenUE, the Fly Ash Pond has one 18-inch HDPE pipe that discharges to Poeling Lake with an invert of 434.5 feet on the upstream end. The invert elevation at the downstream end is 430 feet. These invert elevations were obtained from the plans provided.

The Bottom Ash Pond had an original outfall structure that was comprised of a large diameter galvanized corrugated steel skimmer that is perforated or overlaps to allow water to flow into a concrete pit. Within the pit, stop logs can be used to control flow. A 30-inch concrete pipe discharges water from the concrete pit to Poeling Lake. Downstream invert elevation of the pipe is 422 feet.

2.5 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

A critical infrastructure inventory survey was not provided to Dewberry for review.

Based on available aerial images, however, Clark Bridge, which conveys 4 lanes of traffic on Route 67 over the Mississippi River, is located approximately 7 miles downstream of the Sioux Power Station. Please see Appendix A - Doc 2 for more information.

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS, AND INCIDENTS

AmerenUE provided copies of five internal reports, three weekly (routine) reports for the Fly Ash Pond and two annual reports.

Three weekly reports:

- Sioux Fly Ash Pond Weekly Inspection Check Sheet, dated 08/27/10.
- Sioux Fly Ash Pond Weekly Inspection Check Sheet, dated 09/03/10.
- Sioux Fly Ash Pond Weekly Inspection Check Sheet, dated 09/10/10.

Two annual reports:

- 2009 Annual Inspection Checklist - Email from Matthew K. Frerking, AmerenUE, with attached Fly Ash Pond Inspection Checklist, dated 1/15/2009.
- 2008 Annual Inspection Checklist - Email from Gene A. Campbell, AmerenUE, with attached Fly Ash Pond Inspection Checklist, dated 12/15/2009.

Both annual reports concluded that the ash ponds are in satisfactory conditions and identified several ongoing or short-term maintenance items, including:

- Clearing woody vegetation
- Placing rip-rap on eroded areas
- Removing rocks that are blocking outfall pipe
- Conducting video inspections
- Installing new staff gauges in the Fly Ash and Bottom Ash ponds.

3.1 SUMMARY OF LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS.

Both the Fly Ash Pond Dam and Bottom Ash Pond Dam have dam heights less than 35 feet, therefore neither dam is regulated by the State of Missouri Department of Natural Resources.

Discharges from the impoundments are regulated by the State of Missouri Department of Natural Resources and they were issued a National Pollutant Discharge Elimination System Permit, Permit No. MO-0000353, on April 16, 2004. That permit expired on April 15, 2009.

3.2 SUMMARY OF SPILL/RELEASE INCIDENTS

Data reviewed by Dewberry did not indicate any spills, unpermitted releases, or other performance problems with the embankment over the last 10 years.

4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

4.1.1 Original Construction

According to the Reitz & Jens, Inc. 2007 Phase I Sioux Plant Report provided by AmerenUE, the Fly Ash Pond was constructed in the 1990's and the Bottom Ash Pond was constructed in the 1960's.

4.1.2 Significant Changes/Modifications in Design since Original Construction

No information was provided indicating that any significant changes/modifications in design were made since original construction. Dewberry's visual assessment during the field visit did not include any observations of prior releases, failures, or patchwork on either dam.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

No information was provided indicating that any significant changes/modifications in design were made since original construction. Dewberry's visual assessment during the field visit did not include any observations of prior releases, failures, or patchwork on either dam.

4.2 SUMMARY OF OPERATIONAL PROCEDURES

4.2.1 Original Operational Procedures

According to the Reitz & Jens, Inc. 2007 Phase I Sioux Plant Report provided by AmerenUE, the Fly Ash Pond receives precipitation and fly ash slurry water. The Fly Ash Pond is regulated by one 18-inch HDPE pipe that outfalls to Poeling Lake. Flow through this pipe and the pool elevation of the pond are regulated by two motor operated butterfly valves. These valves are remotely operated. A staff gage is installed in the Fly Ash Pond to provide normal pool elevation levels to an observer.

According to the Reitz & Jens, Inc. 2007 Phase I Sioux Plant Report provided by AmerenUE, the Bottom Ash Pond receives collected stormwater from the combined drain sump (CDS) via four pumps. There are two pumps driven by 200-horsepower pump motors and two pumps driven by 60-horsepower pump motors. These pumps have the combined total capacity to pump an estimated 46-cubic-feet-per-second. The

Bottom Ash Pond also receives flow from sluice water which is used to transport coal combustion ash. In addition, it receives treated wastewater via the CDS, but this volume is minimal. Water is discharged by a 30-inch concrete pipe to Poeling Lake.

4.2.2 Significant Changes in Operational Procedures and Original Startup

No documents were provided to indicate any operational procedures have changed for the Fly Ash Pond. To address sedimentation and lack of positive drainage in the Bottom Ash Pond, AmerenUE installed a 24-inch pipe that collects and distributes surface water of the pond directly to the concrete pit outfall area, bypassing a large diameter galvanized corrugated steel skimmer. The 24-inch pipe is buoyed to keep it near the surface and anchored to maintain its alignment.

4.2.3 Current Operational Procedures

Current operational procedures, including maintenance and emergency action response actions, are outlined in the "AmerenUE Program DSP 003, Dam Safety Program for AmerenUE Non-Hydroelectric Facilities", dated September 4, 2009.

4.2.4 Other Notable Events since Original Startup

No additional information was provided to Dewberry of other notable events impacting the operation of the two ponds or their embankments.

5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel Jeffrey Crabtree, P.E., and James Filson, P.E., performed a site visit on Thursday, September 30, 2010 in company with the participants.

The site visit began at 9:00 AM. According to National Weather Service data, the weather was sunny with ambient air temperatures measuring 70° F. Photographs were taken of conditions observed. Refer to photographs in Appendix B and the Dam Inspection Checklist in Appendix C for additional visual information. Selected photographs are included here for ease of visual reference. All pictures were taken by Dewberry personnel during the site visit.

The overall assessment of the dam was that it was in satisfactory condition and no significant problems were noted.

5.2 FLY ASH POND

5.2.1 Embankment Crest

The crest of the embankment had no signs of significant depressions, tension cracks, or other indications of settlement or shear failure. Figure 5.2.1-1 shows the crest along its western boundary. The railroad and access road to the plant form the embankment. In this area the embankment is quite wide, approximately 75 feet in width.

Figure 5.2.1-1: Photograph of Fly Ash Embankment, View to the South

The southern embankment crest is much narrower in width, approximately 30 feet, than the western crest, and also contains a railroad bed that is used by the plant operators two to three times during the week (Fig. 5.2.1-2).

Figure 5.2.1-2: Photograph of Fly Ash Embankment, View to the East

5.2.2 Upstream/Inside Slope

According to the Reitz & Jens, Inc. 2007 Phase I Sioux Plant Report provided by AmerenUE, the Fly Ash Pond was lined with a 60-mm thick HDPE liner in 1993. There were no observed scarps, sloughs, bulging, cracks, depressions or other indications of slope stability problems. Figure 5.2.2-1 shows a representative section of the upstream/inside slope of the embankment.

Figure 5.2.2-1: Photograph of Upstream/Inside Slope of Fly Ash Pond, View Looking East

5.2.3 Downstream/Outside Slope and Toe

Areas of surface runoff erosion were observed on the downstream/outside slope of the Fly Ash embankment in parts. Rip-rap has been added to those areas to minimize future erosion and they are monitored for stability on a weekly basis. Figure 5.2.3-1 shows one of the eroded areas near the northwest corner of the embankment.

Figure 5.2.3-1: Photograph of Fly Ash Dam Downstream/Outside Slope, View to the South

5.2.4 Abutments and Groin Areas

The Fly Ash Pond embankment has no abutments or groin areas.

5.3 BOTTOM ASH POND

5.3.1 Embankment Crest

The crest of the embankment had no signs of significant depressions, tension cracks, or other indications of settlement or failure. There were some areas of erosion which have been overlain with rip-rap to enhance stability. One area of the embankment had obvious signs of ash along the inside slope and crest (Fig. 5.3.1-1).

Figure 5.3.1-1: Photograph of Bottom Ash Pond with ash on crest, View Looking West

5.3.2 Upstream/Inside Slope

The upstream/inside slope is vegetated with various scrub/shrub species and tall grasses and wildflowers. There were no observed scarps, sloughs, bulging, cracks, depressions, or other signs of slope instability. Rip-rap had been placed along the interior slopes of the northern and northwestern portions of the embankment to enhance stability.

Figure 5.3.2-1: Photograph of Bottom Ash Pond Upstream/Inside Slope, View Looking West

Figure 5.3.2-2: Photograph of Bottom Ash Pond Upstream/Inside Slope, View looking North

5.3.3 Downstream/Outside Slope and Toe

The downstream/outside slope and toe of the Bottom Ash Pond embankment are covered in various plant species; along the slope are various scrub/shrub plant species and tall grasses and wildflowers, while some larger trees are located at the toe of the slope.

Figure 5.3.3-1: Photograph of Bottom Ash Pond Downstream/Outside Embankment, View Looking North

A small seep was observed (Fig. 5.3.3-2) in the northwestern corner of the pond embankment, approximately 75' from the toe of the embankment. The situation is monitored weekly by AmerenUE personnel.

Figure 5.3.3-2: Photograph of clearwater seep emerging 75' from toe of embankment.

5.3.4 Abutments and Groin Areas

The Bottom Ash Pond embankment has no abutments or groin areas.

5.4 OUTLET STRUCTURES

5.4.1 Overflow Structure

The Bottom Ash Pond has a concrete pit where pond water drains before discharging via a 30-inch concrete pipe. The outfall structure comprises a large diameter galvanized corrugated steel skimmer which is perforated to allow water to flow into the concrete pit (Fig 5.4.1-1).

Figure 5.4.1-1: Inlet control structure and emergency gate to the skimmer for the Bottom Ash Pond.

The Fly Ash Pond outfall is comprised of one 18-inch HDPE pipe which is upturned to an elevation of 434.5 feet on the upstream end.

5.4.2 Outlet Conduit

The Fly Ash Pond outfalls to Poeling Lake via an 18" HDPE pipe. The outlet conduit appeared to be in good shape and operating normally with no signs of clogging. Water discharging from the pipe appeared to be clear.

Figure 5.4.2-1: Photograph of Fly Ash Pond outfall (18" HDPE pipe) and stilling basin, Looking West

The 30-inch concrete pipe outlet conduit for the Bottom Ash Pond appeared to be in good shape and operating normally with no signs of clogging. Water discharging from the pipe appeared to be clear.

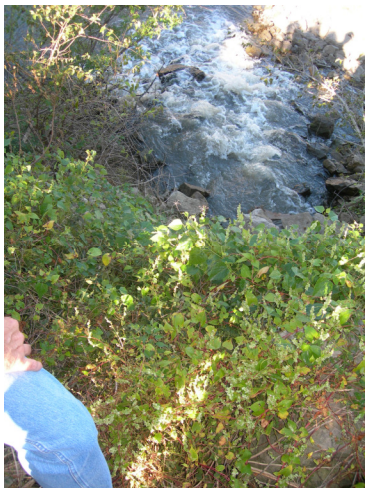


Figure 5.4.2-2: Photograph of Bottom Ash Pond outfall, Looking West

5.4.3 Emergency Spillway

No emergency spillway is present for either the Fly Ash Pond or Bottom Ash Pond.

5.4.4 Low Level Outlet

No low level outlet is present for either the Fly Ash Pond or Bottom Ash Pond.

6.0 HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCUMENTATION

6.1.1 Flood of Record

No documentation on Flood of Record was provided. Consulting the FEMA Flood Insurance Rate Map for St. Charles County, Missouri and Incorporated Areas (Panel 150 of 525), Map Number 29183C0150 E, Revised August 2, 1996, the flood elevation for the 100-year event is approximately 438.5 feet. Both ponds, according to the FIRM, are located above the 100-year floodplain. The crest elevation for the Fly Ash Pond ranges between 441.5 and 446.4 feet, giving a minimum of 3 feet of clearance outside the pond during the 100-year flood event. The crest elevation for the Bottom Ash Pond ranges between 443 and 445 feet, giving a minimum of 4.5 feet of clearance outside the pond during the 100-year flood event.

6.1.2 Inflow Design Flood

AmerenUE contracted Reitz & Jens, Inc. to conduct a hydrologic/ hydraulic study for the ponds, which was issued on August 27, 2007, to analyze the capacity of the Fly Ash Pond and Bottom Ash Pond to store water from the design storm event. The design storm was a 100-year (1 percent annual exceedance probability), 24 hour event with an estimated depth of 7.0 inches. The report concluded that there is sufficient capacity to store water from this event if normal pool elevations of 440 feet in the Fly Ash Pond and 440.5 feet in the Bottom Ash Pond are maintained. The Bottom Ash Pond receives the site's stormwater runoff as well bottom ash slurry water. The Fly Ash Pond does not receive site stormwater.

6.1.3 Spillway Rating

Neither the Fly Ash nor the Bottom Ash Pond have emergency spillways.

6.1.4 Downstream Flood Analysis

No downstream flood analysis was provided to Dewberry.

6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Overall, the supporting technical documentation is inadequate. No dam break study or inundation map was provided and we cannot determine the impact of embankment breach downstream of the site.

6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

Based on the information provided, both the Fly Ash Pond and Bottom Ash Pond are designed to handle the 100-year flood event.

7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed

No stability analysis was available at the time this report was written. However, a stability analysis is being conducted for the Fly Ash Pond and Bottom Ash Pond dams; results of the studies will be available in late 2010.

7.1.2 Design Parameters and Dam Materials

Soil design properties and parameters were not provided for review.

7.1.3 Uplift and/or Phreatic Surface Assumptions

No documentation of uplift calculations or phreatic surface assumptions was provided to Dewberry for review.

7.1.4 Factors of Safety and Base Stresses

No stability analysis was provided in time for the writing of this report, therefore Dewberry has no documentation on the factors of safety or base stresses for the dams.

7.1.5 Liquefaction Potential

No analysis of liquefaction potential from slope stability analyses on the perimeter levee were available for review.

7.1.6 Critical Geological Conditions

No structural analysis was provided to Dewberry in time for inclusion in this report, therefore, we are not able to assess critical geological conditions.

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Structural stability documentation is absent. However, given 1) the low height and generally low consequences of failure of the perimeter dike, and 2) the fair condition of the basins and embankments based on visual observation, there is not an immediate need for physical remedial action. Nevertheless, the lack of

supporting structural stability documentation is a concern until the completed stability analysis of the perimeter levee is available.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

Overall, the structural stability under static loading conditions of the perimeter levee embankment probably is satisfactory based on available recent dam inspection reports, the 2008 to 2009 inspection reports, the August 2007 Reitz & Jens, Inc. Sioux Plant Phase I Ameren UE Dam Inventory and Inspection Program Phase I Presentation of Field Observation, Analysis and Recommendations, and the following observations during the September 30, 2010 field visit by Dewberry.

- There were no indications of scarps, sloughs, depressions or bulging anywhere along the dam;
- Boils or sinks were not observed along the slopes, groins or toe;
- A small seepage located 75' from the toe of the embankment in the northeast corner of the Bottom Ash Pond embankment was observed, AmerenUE is monitoring the area on a weekly basis, and
- The crest appeared free of major depressions and no significant vertical or horizontal alignment variations were observed.

Seismic stability of the embankment dams cannot be similarly assessed, because the dams were not experiencing seismic loading at the time of observations. However, the apparent absence of poor foundation soils (based on the limited available subsurface information), low height of the dikes, and satisfactory performance under static loading are favorable indications that the dikes are expected to perform satisfactorily under seismic loading; although it cannot be known without detailed study whether the dikes could withstand the strong shaking that can be expected when an earthquake occurs in this area. Seismic stability analyses performed in 2010 will be provided when it becomes available.

The outlet structures appear to be in sound and stable condition with no visual evidence of significant deterioration; they should be satisfactory for continued service

8.0 ADEQUACY OF MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATING PROCEDURES

The Fly Ash pond is operated for storage of fly ash deposits. The Bottom Ash Pond is operated for the storage of bottom ash deposits as well receiving and treating the Sioux Plant's site stormwater. Both ponds have gravity discharges of clarified water to Poeling Lake.

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

AmerenUE developed and currently maintains both a dam safety program and an emergency procedure protocol. Guidelines and regulations for each can be found in the Dam Safety Program for AmerenUE Non-Hydroelectric Cailities, dated September 4, 2009, and the Emergency Plant Dam Failure/Loss of Integrity Procedures, dated December 5, 2002. AmerenUE's dam safety program includes, but is not limited to:

- Defining the policies and expectations of the dam safety program,
- Duties and responsibilities of dam operating personnel,
- Details regarding dam safety training requirements for operating personnel, and
- Weekly, annual and special event inspection requirements specific to the Sioux Station's Fly Ash and Bottom Ash pond dams.

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATIONS

8.3.1 Adequacy of Operating Procedures

Based on the assessments of this report, operating procedures appear to be adequate.

8.3.2 Adequacy of Maintenance

Based on the example inspection documents provided by AmerenUE, as well as the field inspection performed by Dewberry staff, there are no significant maintenance issues that jeopardize the integrity of the Fly Ash Pond dam or the Bottom Ash Pond dam. Although maintenance procedures appear to be adequate, several maintenance recommendations are offered:

- Areas where erosion has occurred on the dam should be rehabilitated.
- Tree encroachment along inside or outside slopes of either pond embankment should be minimized. Periodic maintenance of vegetation and tree growth is necessary, including at the toe of the embankment.
- Minor seepage in any areas along the embankment should be closely monitored.

Based on the assessments of this report, maintenance procedures appear to be adequate.

9.0 ADEQUACY OF SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

According to AmerenUE's Dam Safety Program for Non-Hydroelectric Dams, four types of dam safety inspections are performed at the Sioux Station. These consist of routine inspections, annual inspections, special inspections, and unannounced inspections. For the Sioux Plant, routine inspections are performed weekly, annual inspections are performed annually, and special inspections are performed as needed. All inspections are documented on standardized AmerenUE inspection forms and checklists.

9.2 INSTRUMENTATION MONITORING

9.2.1 Instrumentation Plan

There is no dam performance monitoring instrumentation in place in the impounding levee embankment. Staff gauges have been installed to measure the water surface elevation.

9.2.2 Instrumentation Monitoring Results

There are no dam performance monitoring results.

9.2.3 Dam Performance Data Evaluation

This is not applicable since there are no dam performance data to evaluate.

9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

9.3.1 Adequacy of Inspection Program

The inspection program is generally adequate based on field observations and the data reviewed by Dewberry. However, internal inspections of the outlet structures with a remote camera or by personnel using confined-space procedures should be conducted on a frequency of at least once every 5 years.

9.3.2 Adequacy of Instrumentation Monitoring Program

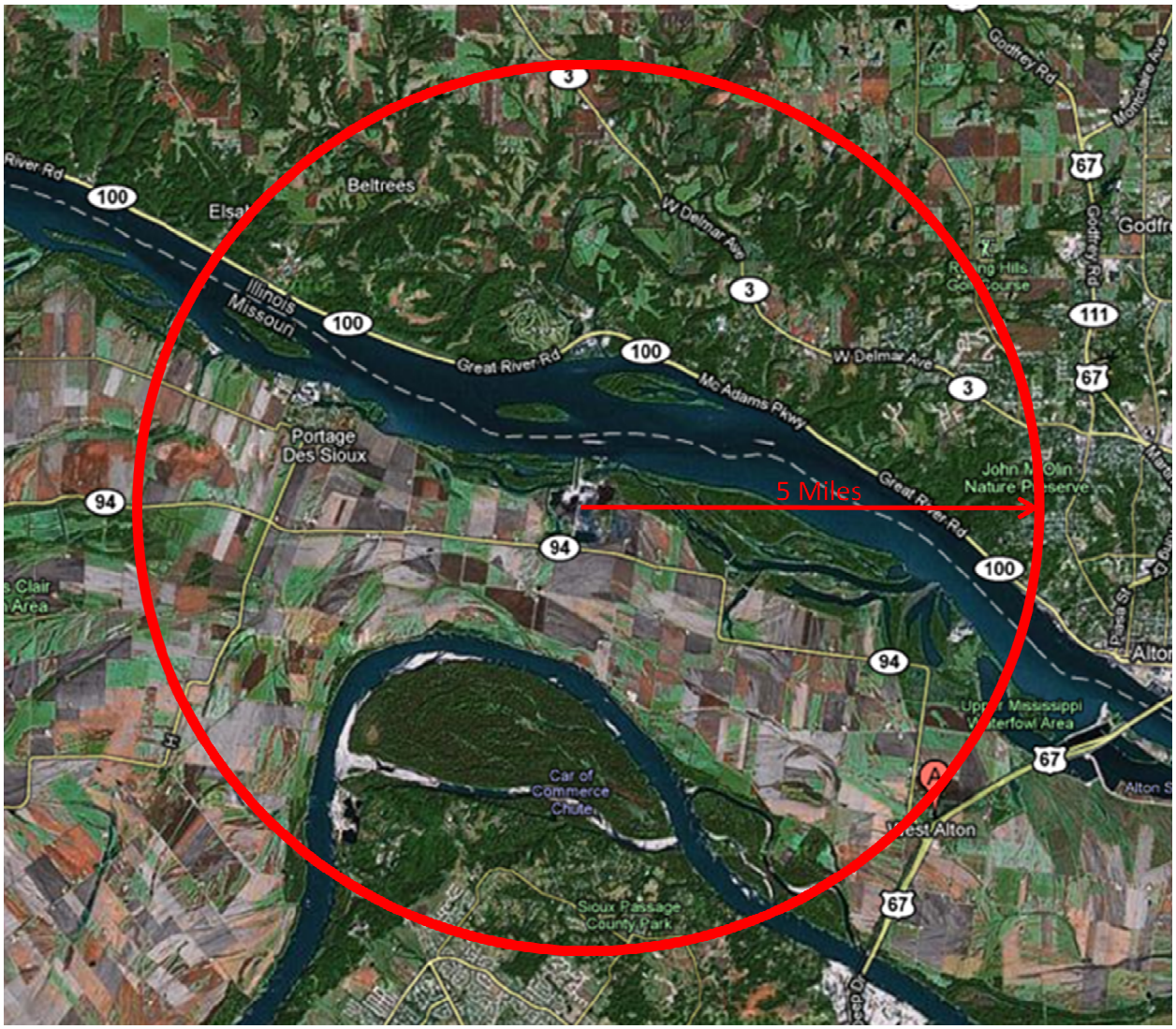
There is no dam performance monitoring instrumentation in place. No problem or suspect condition, such as excessive settlement, seepage, shear

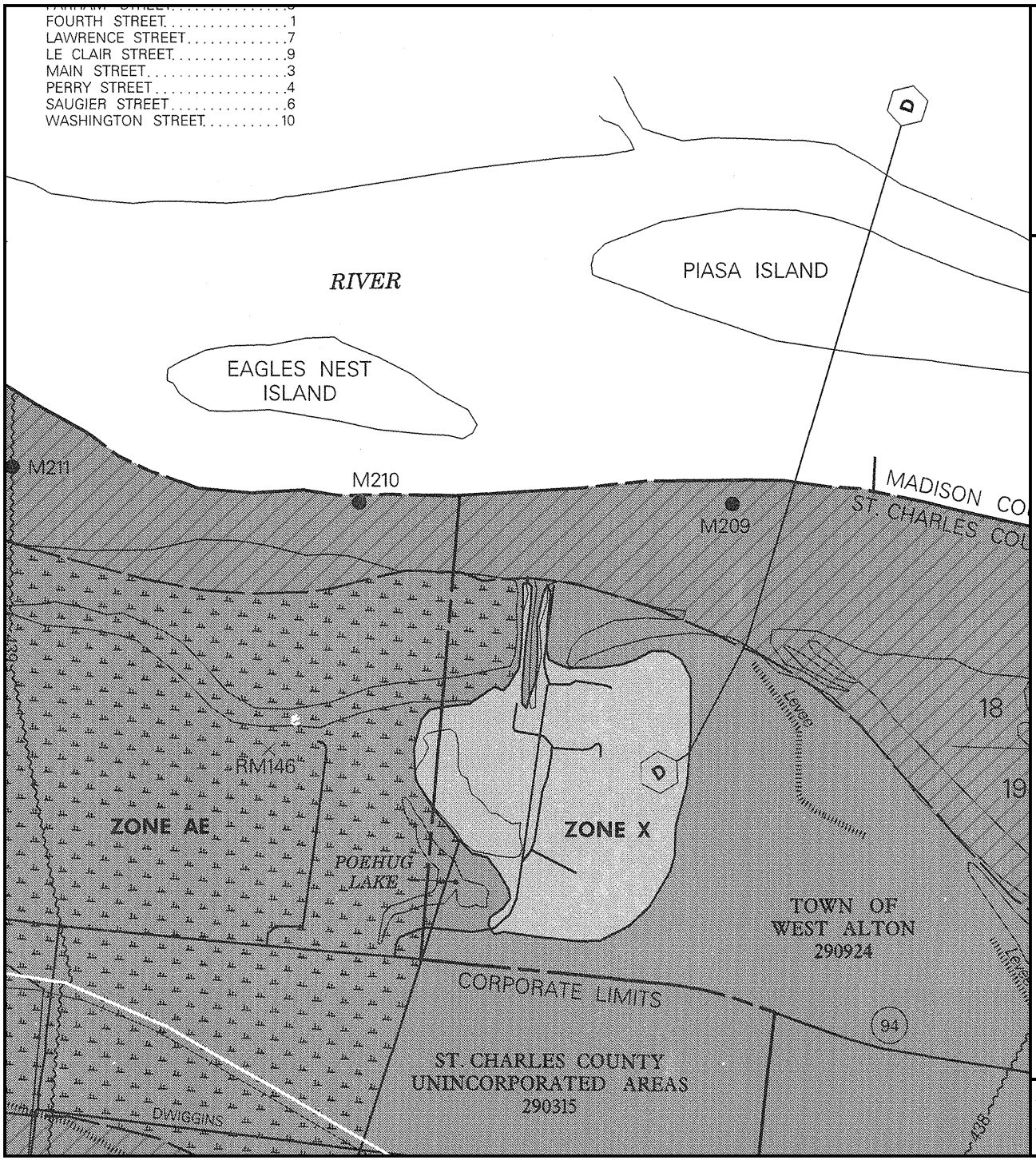
failure, or displacement was observed in the field that might be reason for installation of instrumentation. In the absence of stability problems or seepage issues, there is no need for performance monitoring instrumentation at this time.

APPENDIX A

Document 1: AmerenUE Sioux Power Station Site Map (Scale: 1”=2 mi)

Document 2: AmerenUE Sioux Power Station Aerial Photograph (Scale: 1”=2 miles)





APPROXIMATE SCALE IN FEET

2000 0 2000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

ST. CHARLES COUNTY, MISSOURI AND INCORPORATED AREAS

PANEL 150 OF 525

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
PORTAGE DES SIOUX, CITY OF	290317	0150	E
ST. CHARLES COUNTY, UNINCORPORATED AREAS	290315	0150	E
WEST ALTON, TOWN OF	290924	0150	E

MAP NUMBER 29183C0150 E

MAP REVISED: AUGUST 2, 1996

Federal Emergency Management Agency

REVISIONS		
NO.	BY	DATE
0		

FIRST ISSUE

NOTE: PLAN DETAIL (AUTO PLOT) FROM PHOTOGRAMMETRIC DIGITAL DATA. CONTOURS WERE COMPILED AS DIGITAL STRING DATA DIRECTLY FROM THE STEREO PLOTTER (STRING FORMED BY X, Y, Z COORDINATES).

LEGEND

RAILROAD		MANHOLE	
PAVED ROAD		CATCH BASIN	
UNPAVED ROAD		LOCATED OBJECT	
TRAIL		SINGLE TREE	
SIDEWALK		TREE LINE	
BUILDING		STREAM	
FOUNDATION		INDEX CONTOUR	430
FENCE		DEPRESSION CONTOUR	
WALL		APPROXIMATE CONTOUR	
SIGN		SPOT ELEVATION	434
POLE			

TOPOGRAPHIC MAP

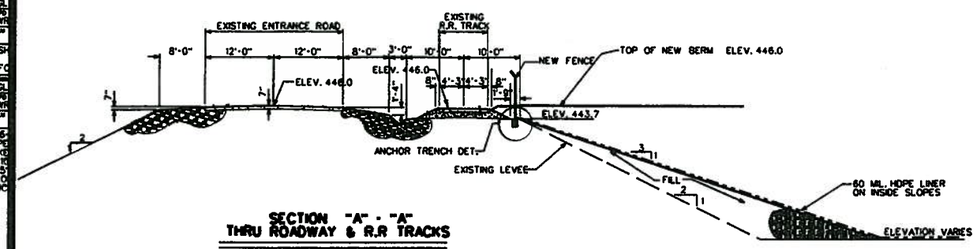
PREPARED FOR: UNION ELECTRIC

PREPARED BY: WALKER & ASSOCIATES, 1650 HEADLAND DR., FENTON, MO. 63026

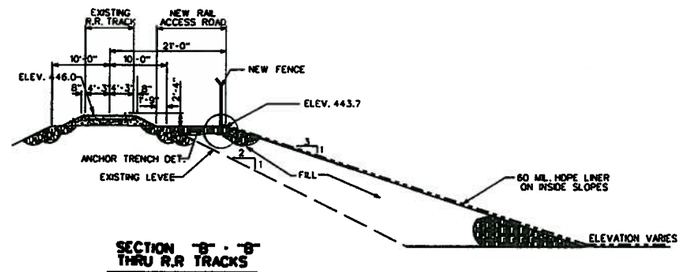
SCALE: 1"=100' CONTOUR INT. 1' PHOTOS FLOWN 12-1-
CONTROL DATUM: HOR. ASSUMED VER. MSL
DASHED CONTOURS MAYBE UNRELIABLE

DRAWN		PROPERTY - TOPOGRAPHIC MAP ASH POND AREA FROM AERIAL SURVEY 12-1-1992
CHKD		
APPD		
APPD		
LOCATION 001005	SIOUX PLANT	CLASS 02010
UNION ELECTRIC COMPANY ST. LOUIS, MO.	8430-X-128771	REV. 0

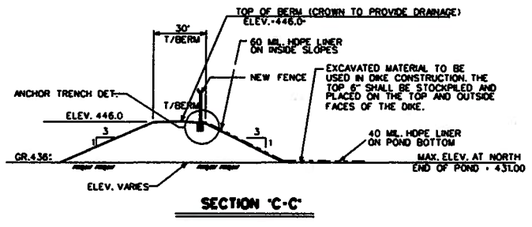
P:\SIOUX\STP\128771.dgn 09/10/2010 9:28:26 AM



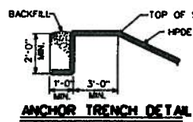
SECTION "A" - "A"
THRU ROADWAY & R.R TRACKS



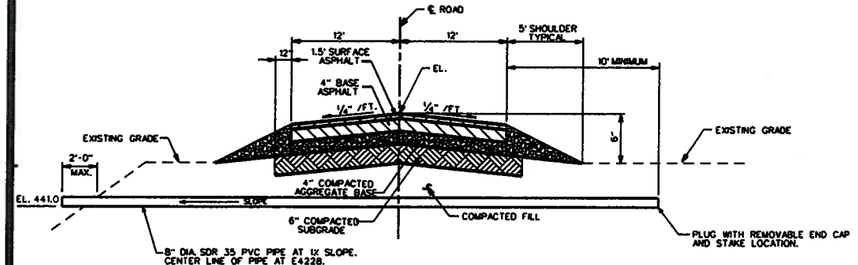
SECTION "B" - "B"
THRU R.R TRACKS



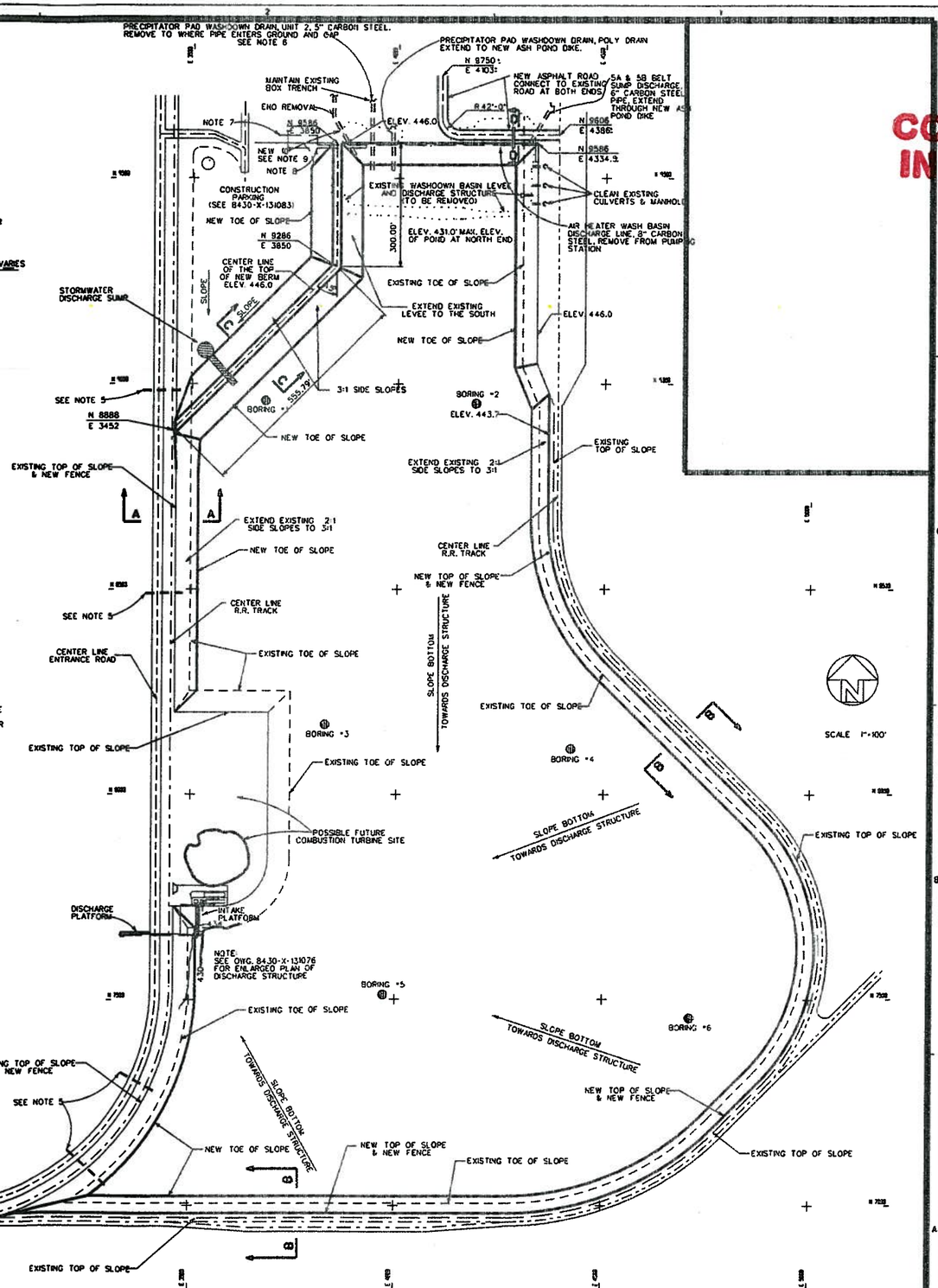
SECTION "C-C"



ANCHOR TRENCH DETAIL



SECTION "D-D"
NOT TO SCALE



PLAN

NOTES:

1. MATERIAL WITHIN THE POND BASIN SHALL BE EXCAVATED TO PROVIDE THE FILL REQUIRED FOR THE NEW BERM SECTION AND SLOPE EXTENSIONS.
2. THE ELEVATION OF THE POND BOTTOM AT THE NORTH END OF THE POND SHALL NOT BE GREATER THAN 431.0'.
3. THE ELEVATION OF THE POND BOTTOM AT THE SOUTH END OF THE POND SHALL NOT BE LESS THAN 422.0'.
4. THE POND BOTTOM SHALL BE GRADED TO A CONSTANT UNIFORM SLOPE STARTING FROM THE NORTH END AND EXTENDING SOUTH TO THE DISCHARGE STRUCTURE WITH NO MOUNDS OR DEPRESSED AREAS.
5. APPROXIMATE LOCATION OF EXISTING CULVERTS. THEY ARE TO BE PLUGGED WITH CONCRETE AND ABANDONED IN PLACE. ANY EXISTING CULVERTS NOT SHOWN ON DRAWING SHALL ALSO BE PLUGGED WITH CONCRETE AND ABANDONED IN PLACE (IN THE AREA OF THE NEW ASH POND).
6. PRECIPITATOR PAD WASHDOWN DRAIN, UNIT 1, 5" CARBON STEEL. EXTEND PIPE THROUGH NEW ASH POND DIKE. (EXTEND UNIT 1 LINE INTO POND).
7. END REMOVAL OF AIR HEATER WASH BASIN DISCHARGE LINE AND CAP LINE.
8. CAUSTIC INJECTION LINE, ¾" CARBON STEEL, REMOVE FROM AIR HEATER WASH BASIN DISCHARGE LINE TO POINT INDICATED BY NOTE 7 AND CAP LINE.
9. REMOVE EXISTING 10" SHOT PIT DISCHARGE LINE FROM WHERE THE LINE GOES UNDERGROUND AT THE AIR HEATER TO THE NEW ASH POND. INSTALL NEW 10" NASPIPE FROM END OF REMOVALS AND EXTEND INTO NEW ASH POND. INSTALL 30° NASPIPE ELBOW AND OLO PIPE CONNECTION TO REDIRECT FLOW. NEW PIPING SHALL BE BURIED. BURIED PIPING SHALL BE SLEEVED BY A 16" CARBON STEEL SCH 40 PIPE BENEATH ASPHALT PAVING.

FOR EXISTING GROUND CONDITIONS SEE DRAWING 8430-X-128

REV.	DATE	DRAWN
0	E956	

FIRST ISSUE

REV	DATE	DRAWN
1	E9561	MGN
CHKD	SUPV	APPR
NOT	SKO	CWR
E.O.		PLT
E956		

ADD NEW ASH POND PLAT- FORMS & INFO

REV	DATE	DRAWN
2	E9961	MGN
CHKD	SUPV	APPR
NOT	SKO	CWR
E.O.		PLT
E956		

ADD NOTES 6 & 9 & MISC. INFO MOVED INTAKE STRUCTURE TO WEST, ADD 15' TO LENGTH OF INTAKE STRUC

REV. 0 SCALED BY

DRAWN

DATE 10-02-2009

CHECKED

E.O.D.

SUPV.

E.O.D.

APPR.

S. 10-01-09

W.REZONTY 001009

STATE OF MISSOURI

NOTICE OF LIABILITY RESPONSIBILITY

PROPERTY - PLAN
NEW ASH POND

SIOUX PLANT

UNION ELECTRIC COMPANY

8430-X-128772

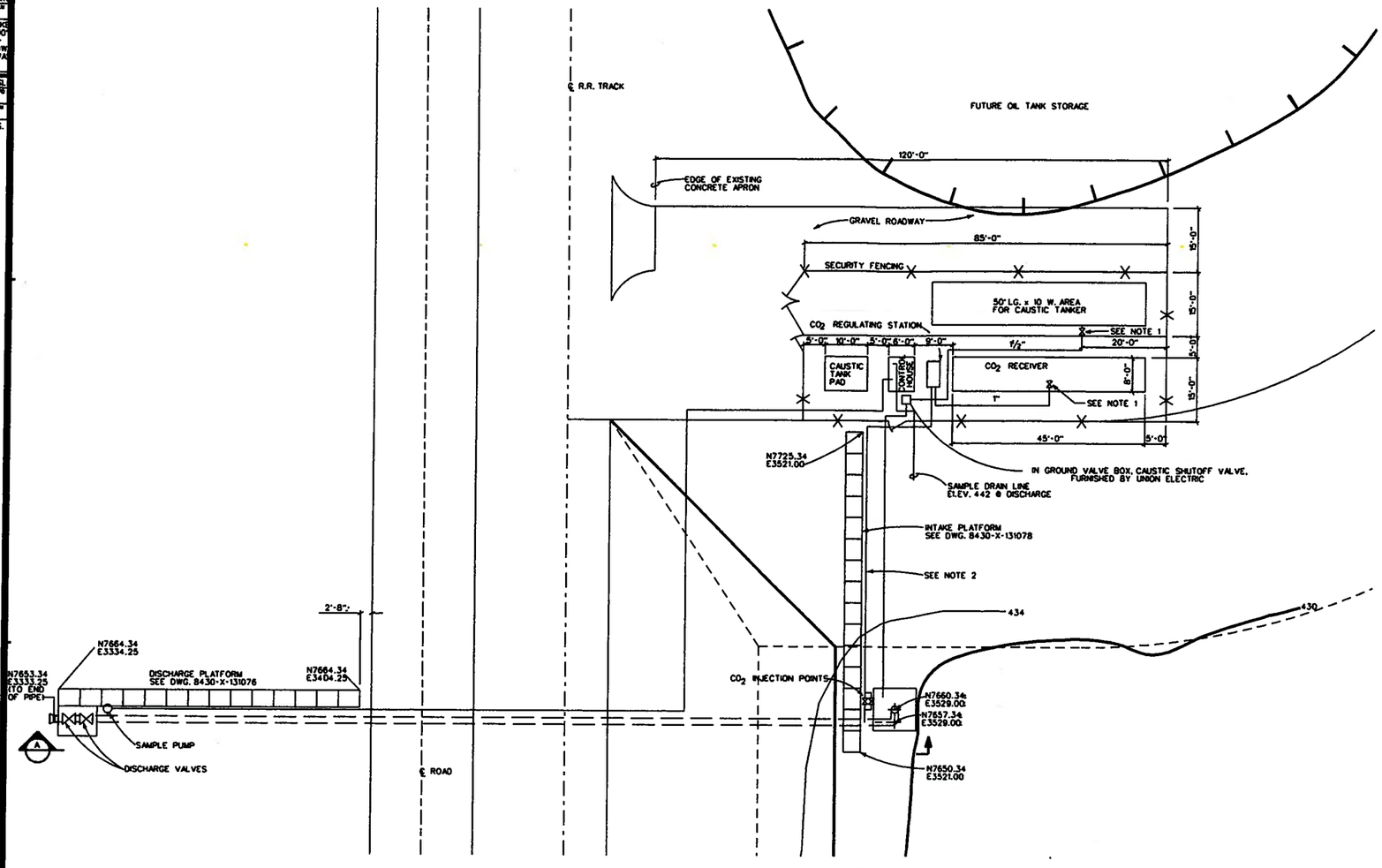
02010

REV. 2

P:\SIOUX\STR\128772.dgn 09/10/2010 9:41:32 AM

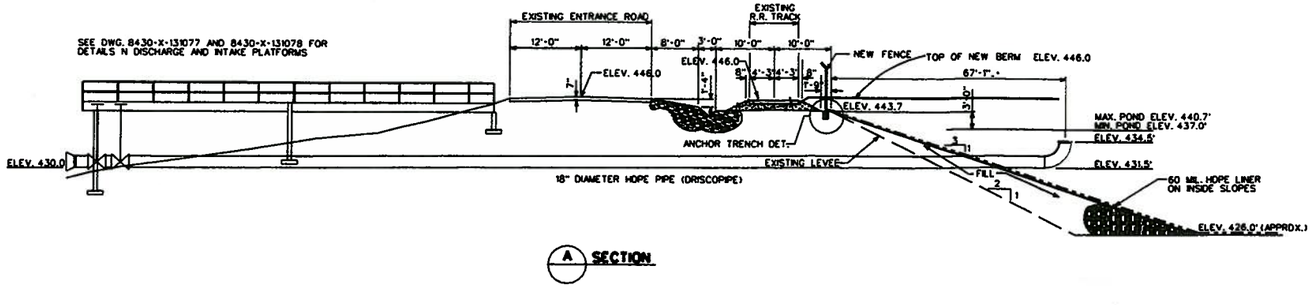
REVISIONS			
REV.	REQ.		
0	E954		
FIRST ISSUE			
REV. 1	DATE 05/28	BY MGL	
CHKD NOT	APP'D SKO	APP'D CWN	
W.O. J639		PLN	
MOVED INTAKE PLATFORM 10' WEST. PLATFORM IS NOW 75' LONG (WAS 60' LONG)			
REV. 2	DATE 09/28	BY MGL	
CHKD TG	APP'D SKO	APP'D	
W.O. 6672		PLN	
ADD. COORDS. & SLP ON BCK. WTR. VLV.			

CONFIDENTIAL INFORMATION



ENLARGED PLAN

1" = 10'



A SECTION

NOTES:

1. PIPING IS BURIED 1'-0" BELOW GRADE. EXTEND PIPING ABOVE GRADE AND LOCATE BALL VALVE 1'-0" ABOVE GRADE. INSTALL PIPE NIPPLE AND CAP ON UPPER VALVE THREADED CONNECTION.
2. RUN CO2 AND CAUSTIC PIPING ON INTAKE PLATFORM AT GRATING ELEVATION. LOCATE BOTH CO2 ISOLATION VALVES FOR EASY ACCESS FROM PLATFORM. EXTEND CAUSTIC LINE TO EXTEND 1'-0" INTO 18" DISCHARGE PIPE INLET.

REFERENCE DRAWINGS:

8430-X-128771-----PROPERTY-TOPOGRAPHIC MAP (EXISTING GROUND CONDITIONS)
8430-X-128772-----PROPERTY-PLAN

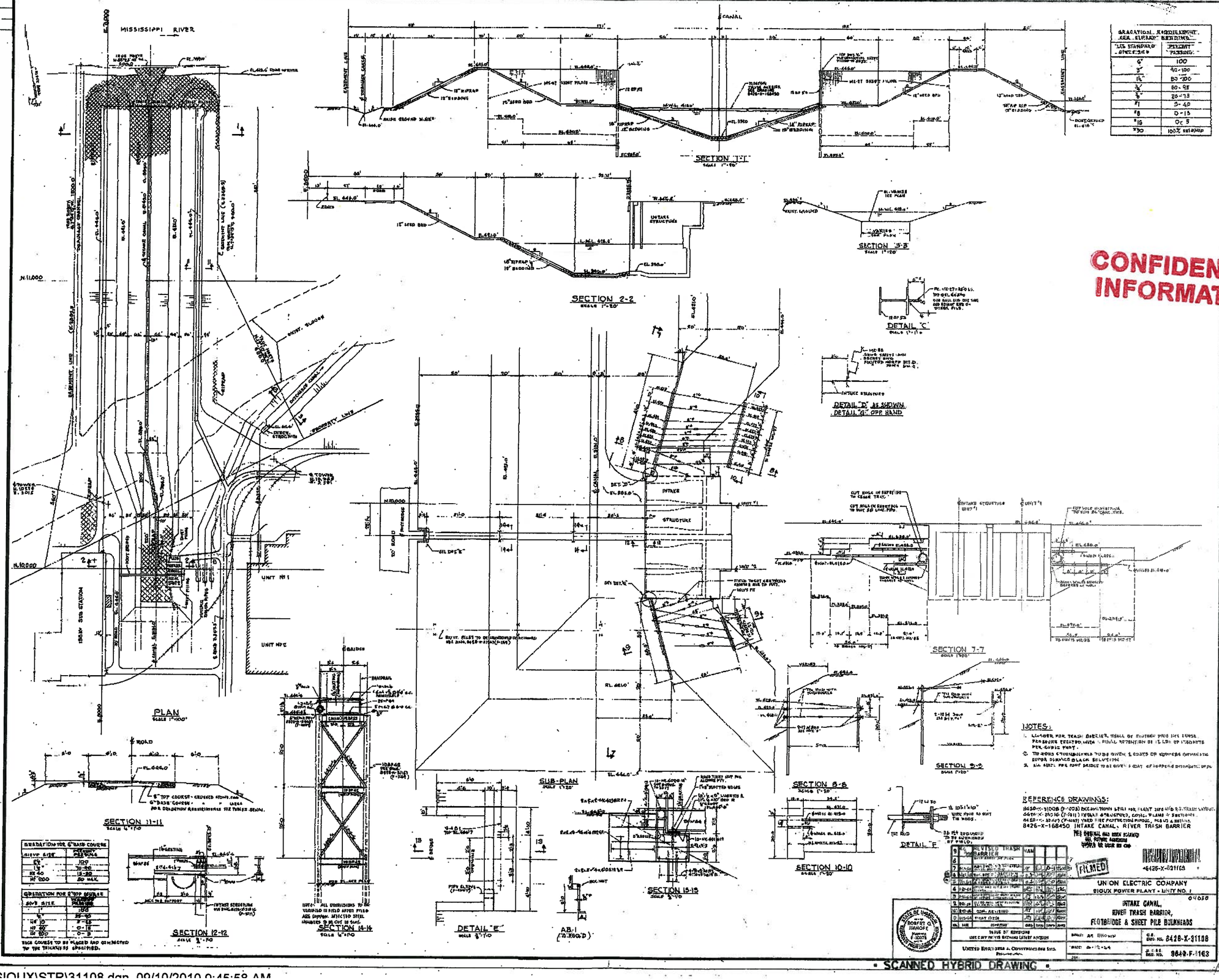
DO NOT SCALE DRAWING!

[redacted] -8430-X-131076-

REV. 0 SEALED BY [redacted]

DRAWN LOMIT	PROPERTY - ENLARGED PLAN
CHKD.	NEW ASH POND DISCHARGE STRUCTURE
APP'D STEVE OTT	
DWG.	
ASSIGNMENT 001009	SIOUX PLANT CLASS 02010
UNION ELECTRIC COMPANY ST. LOUIS, MO.	8430-X-131076 REV. 2

R:\SIOUX\STR\131076.dgn 09/10/2010 1:36:13 PM



P:\SIOUX\STR\31108.dgn 09/10/2010 9:45:58 AM

8430-X-131078

REVISIONS

PRINT ISSUE

1 6275 MAT.

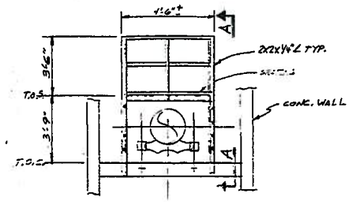
NOT SHO

E356

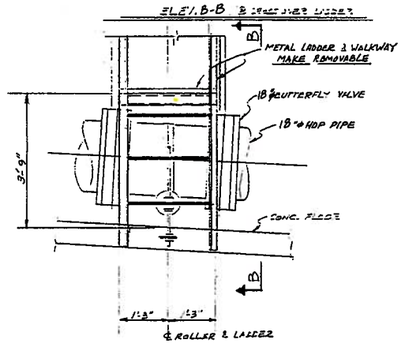
INTAKE PLATFORM WAS 60'LG, CHGD EL. OF PTFD. (PTFM. LOCATION) CHGD. ADD NOTE 2

2 1-2549 MGL TO WAS SHE

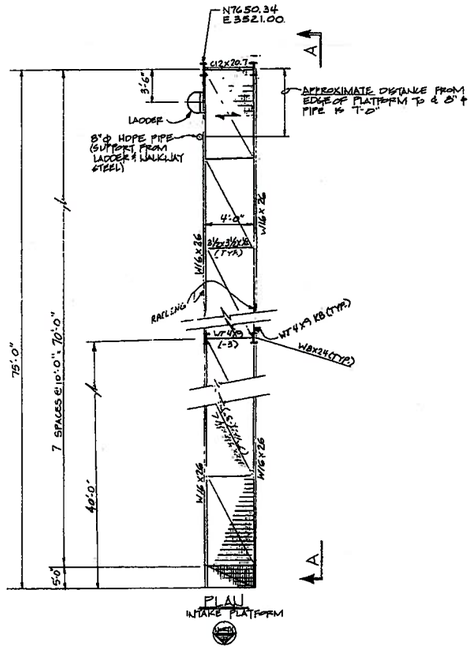
9672. ADD. GOODING & PLATH GETG.



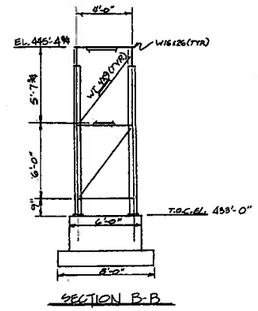
ELEV. B-B



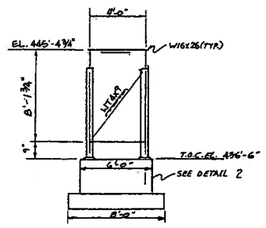
ELEVATION A-A



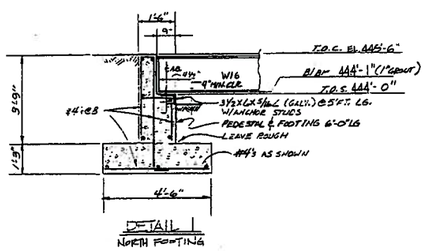
PLAN
INTAKE PLATFORM



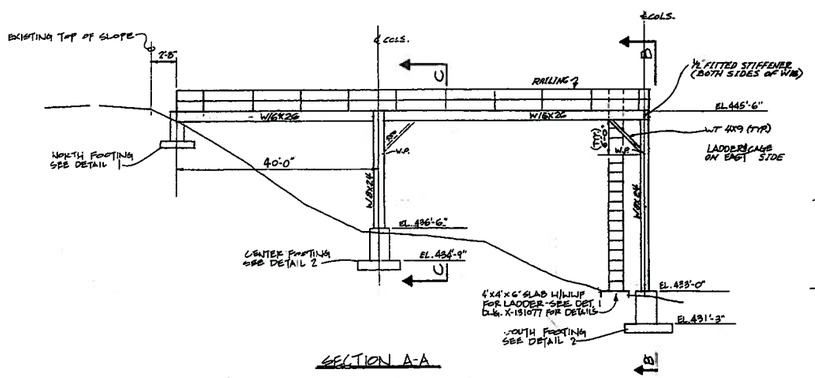
SECTION B-B



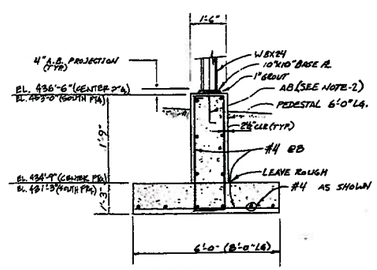
SECTION C-C



DETAIL
NORTH FOOTING



SECTION A-A



DETAIL 2
CENTER & SOUTH FOOTING

NOTES:
1. THIS WORK TO BE DONE IN ACCORDANCE WITH U.E. SPEC. NO EC-2111.
2. ELEVATIONS GIVEN FOR CONCRETE FOOTINGS ARE ESTIMATED AND SHOULD BE VERIFIED IN THE FIELD BEFORE ANY WORK BEGINS.

REFERENCE DRAWINGS:
8430-X-131772 ---- PROPERTY PLAN

THIS DRAWING HAS NO SCALE

8430-X-131078

STATE OF MISSOURI — CARL W. REZNOVA — NUMBER E-18287 — REGISTERED PROFESSIONAL ENGINEER

DRAWN BY MGL
TRACED BY MIKE LACEY
CHKD. NOT CHK'D.
SUPV.
APP'D ECH-43
DATE 8-11-43
CARL REZNOVA

STRUCTURE-ASSEMBLY & DETAILS
NEW ASH POND
INTAKE STRUCTURE

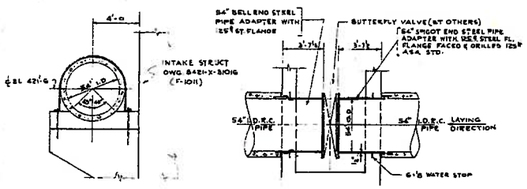
LOCATION OF SIOUX PLANT

UNION ELECTRIC COMPANY
ST. LOUIS, MO.

8430-X-131078

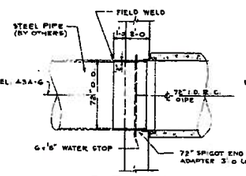
REV. 2

PRINT DIST.

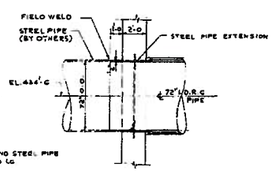


DETAIL "E"
SCALE 1/2"=1'-0

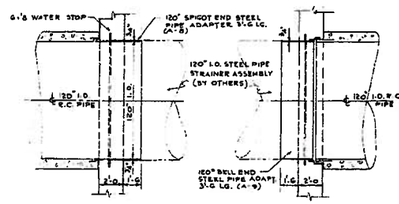
DETAIL "F"
SCALE 1/2"=1'-0



DETAIL "A"
SCALE 1/2"=1'-0

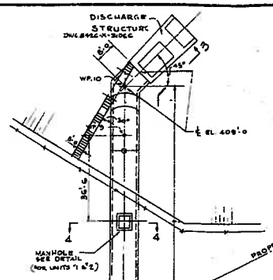


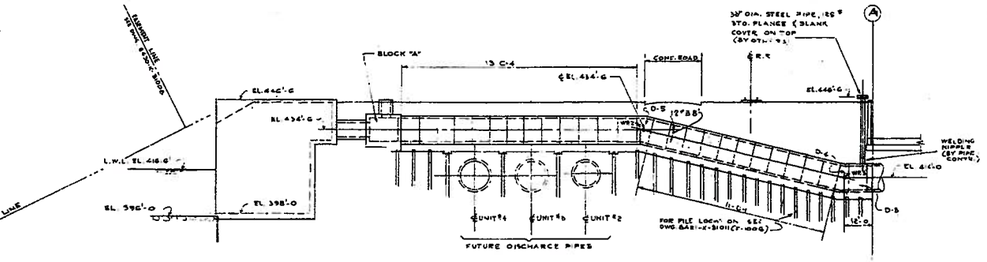
DETAIL "B"
SCALE 1/2"=1'-0



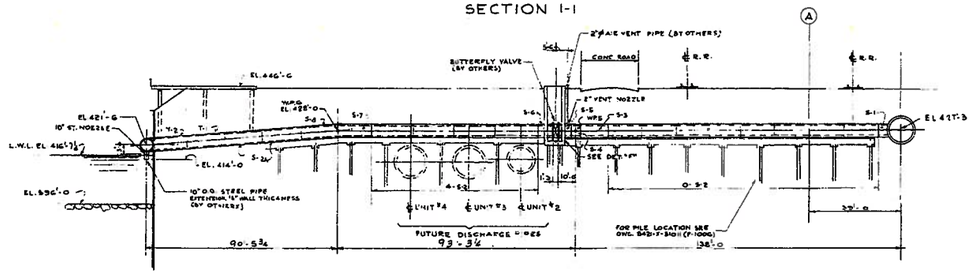
DETAIL "C"

DETAIL "D"

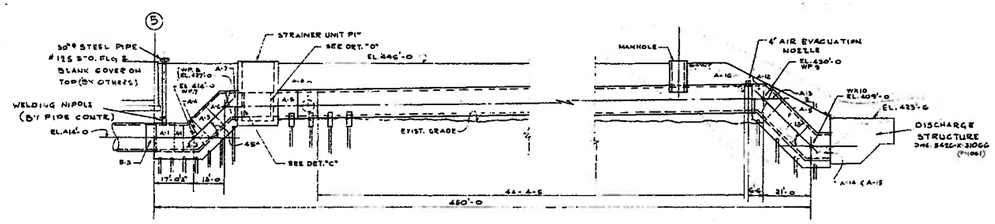


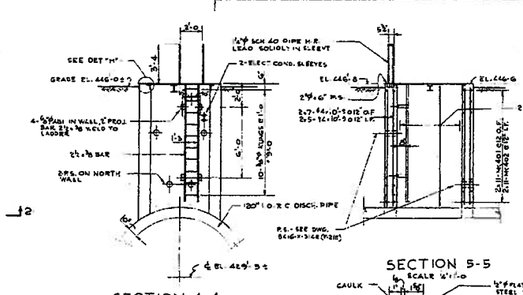


SECTION 1-1

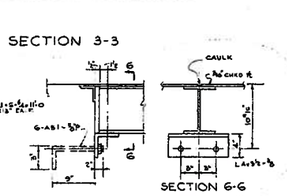


SECTION 2-2



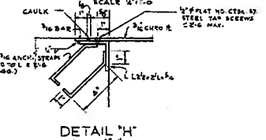


SECTION 3-3

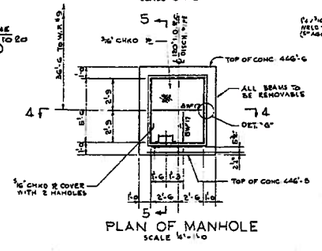


SECTION 6-6

DETAIL "G"
SCALE 1½"=1'-0



DETAIL "H"
SCALE 3"=1'-0



PLAN OF MANHOLE
SCALE ½"=1'-0

REFERENCE DRAWINGS

EXCAVATION & FILL FOR PLANT SITE & R.R. TRACK - 8420-X-31008 (F-1004)
EXCAVATION & PILE PLAN FOR C.W. COND. 8421-F-31011 (F-1006)
INTAKE STRUCTURE - PLAN, SECT. 8426-X-31016 (F-1011)
C.W. COND. & SUPP. INTURBINE AREA 8426-X-31020 (F-1015)
" " " (TRANSITIONS - BLOCKS B & C 8426-X-31021 (F-1016)
" " " " " " A & VALVE PIT - 8426-X-31022 (F-1017)
C.W. CONDUITS - STRAINER UNIT PIT 8426-X-31065 (F-1080)
120" I.D. DISCH. SUPPORTS & DISCH STRUC. 8420-X-31066 (F-100)
C.W. COND. - SUPPORTS INTARO - REINF. 8426-X-3165 (F-1140)
C.W. CONDENSATE & JACKET COOLERS 8425-F-31866 (F-2064)
120" C.W. DISCH. PIPE & 84" WARMING LINE P.P. 9049-1027
120" C.W. INTAKE PIPE P.P. 9049-1030

NOTES

1. FOR GENERAL CONC. NOTES SEE DWG. 8421-X-31026 (F-1023)
2. FOR GENERAL NOTES ON MISC. STEEL SEE DWG. 8421-X-31076 (F-1171)
3. FOR P.S. LOCATION SEE DWG. 8416-X-31411 (P-2111)

CONFIDENTIAL INFORMATION

FILMED

8426-X-93819

NO.	DATE	DESCRIPTION	CHKD	DESIGN	QUANT	APPROVED
6	9/16/03	ADD "A" VALVE PIT, REVISE 84" WARMING LINE & MISC. DETAILS	JMM	MFC	JMM	DMM
5	7/1/03	ADD REFERENCE DWGS	JMM	MFC	JMM	DMM
4	5/21/03	REVISE DIM. VALVE & ADD DIM.	JMM	MFC	JMM	DMM
3	3/24/03	REVISE DIM. VALVE & ADD DIM.	JMM	MFC	JMM	DMM
2	10/4/02	REVISE DIM. SEE DWG. 8426-X-31020 (F-1015)	JMM	MFC	JMM	DMM
1	4/24/02	ADD DIM. & CONC. ROAD	RK	MFC	JMM	DMM
0	2/14/02	FIRST ISSUE	RV	MFC	JMM	DMM

TABLE OF REVISIONS
USE ONLY PRINTS SHOWING LATEST REVISION

UNITED ENGINEERS & CONSTRUCTORS INC. PHILADELPHIA

UNION ELECTRIC COMPANY
SIOUX POWER PLANT - UNIT NO. 1
05020

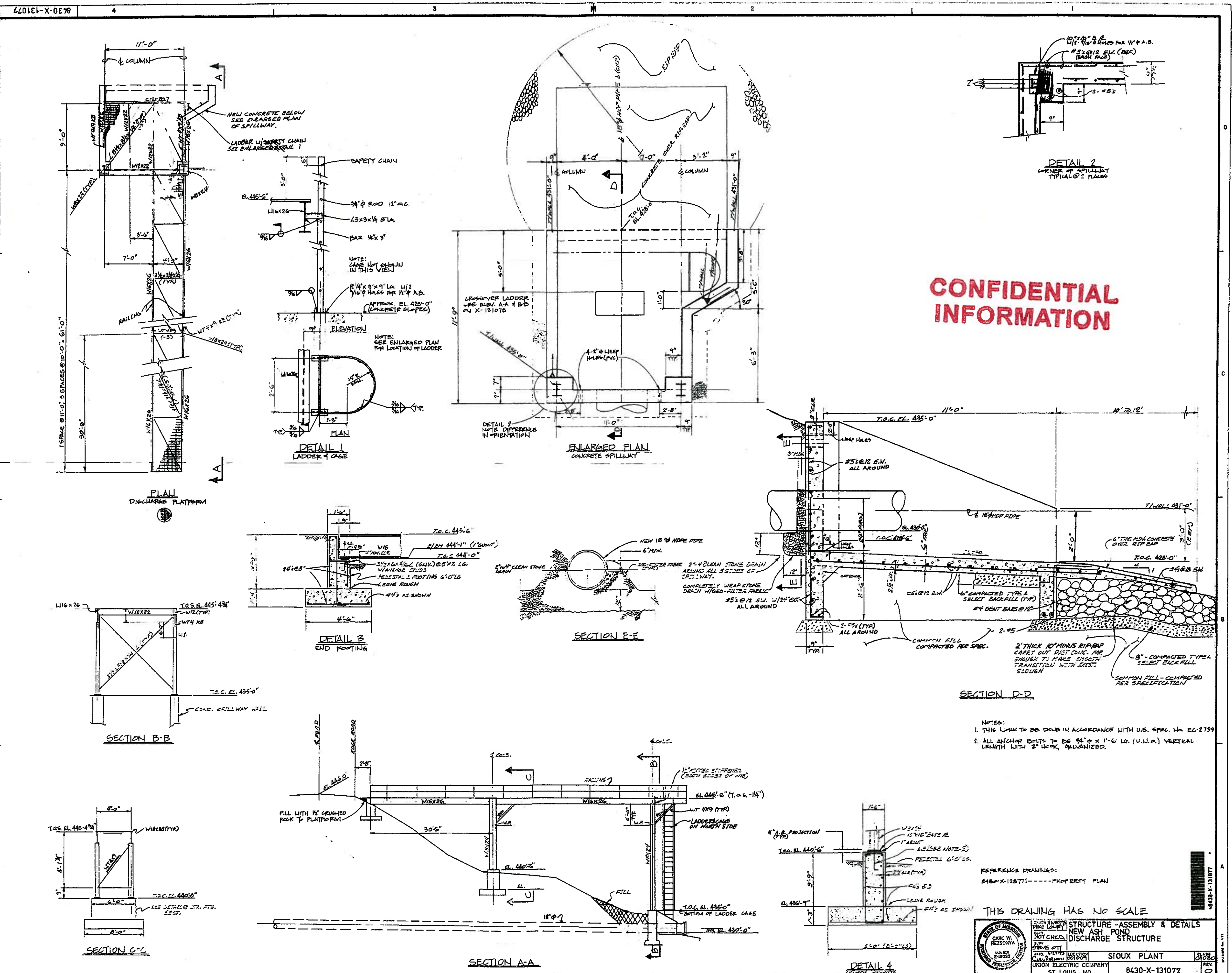
CIRCULATING WATER CONDUITS AND SUPPORTS IN YARD

SCALE: 1"=20'
DATE: 9/26/03
JOB:

U.E. DWG. NO. 8426-X-31819
U.E.&C. DWG. NO. 9049-F-1814

STATE OF MISSOURI — ROBERT C. IMHOFF — NUMBER E-19078 — REGISTERED PROFESSIONAL ENGINEER

8430-X-131077



CONFIDENTIAL INFORMATION

NOTES:
1. THIS WORK TO BE DONE IN ACCORDANCE WITH U.E. SPEC. No. EC-2799
2. ALL ANCHOR BOLTS TO BE 3/4"φ x 1'-6" LG. (U.N.O.) VERTICAL LENGTH WITH 3" HOOK, GALVANIZED.

REFERENCE DRAWINGS:
8430-X-128771-----PROPERTY PLAN

THIS DRAWING HAS NO SCALE

CARL W. REZSONYA
NUMBER E-18282

DRAWN 11 MAY 93 MIKE LOWRY	STRUCTURE - ASSEMBLY & DETAILS NEW ASH POND DISCHARGE STRUCTURE
CHKD NOT CHKD.	
SUPV STEVE OTT	
APPD. 5-27-93 Carl Rezsonya	LOCATION 001009 · SIOUX PLANT · CLASS 04030
UNION ELECTRIC COMPANY ST. LOUIS, MO.	8430-X-131077 · REV. 0

8430-X-131077

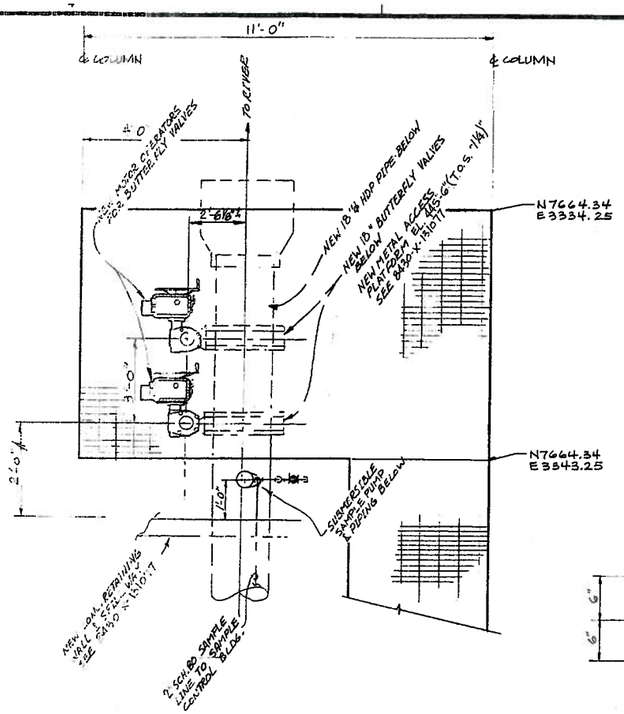
REVISIONS

REV.	D.O.
2	97-50

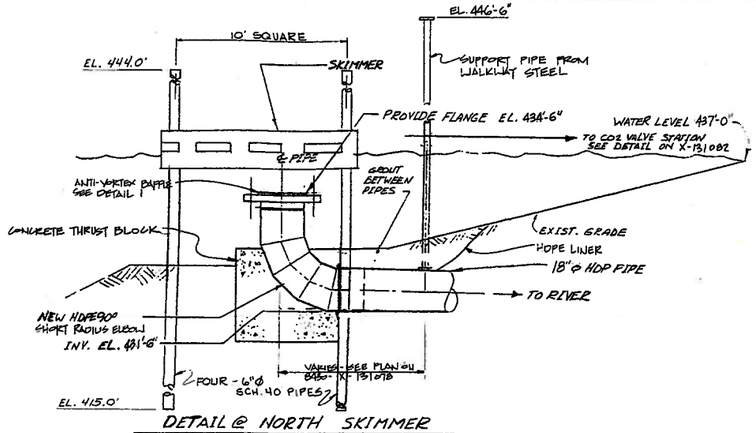
PHOTOSTATS

1 6/3/13 WGL
NOT CHKD 6/27
5956
ADD NOTE TO SUPPORT PIPE FROM STL ON DET. @ N SLOPE

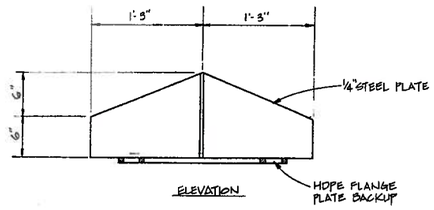
2 12-5-91 WGL
TCR 12/20 CWR
4672 (F)
ADD. COORDS & 5'-0" DIM.

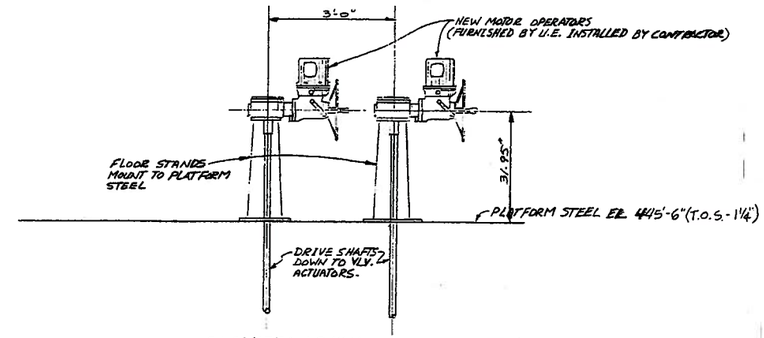


PLAN @ VALVE MOTOR OPERATORS
(DISCHARGE EXIT)



DETAIL @ NORTH SKIMMER

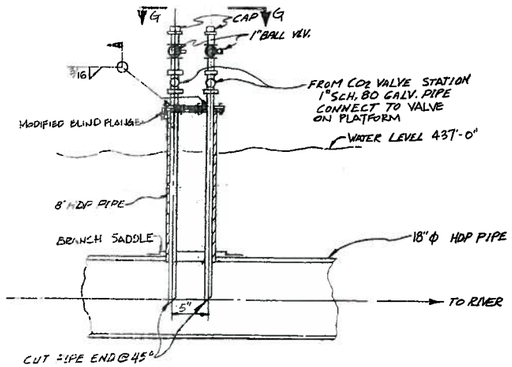




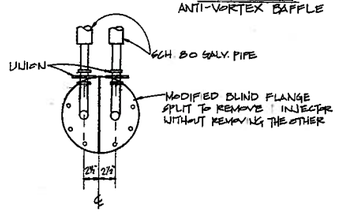
ELEVATION @ VLV. MOTOR OPERATORS

PLAN

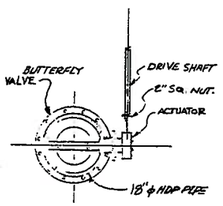
DETAIL I
ANTI-VORTEX BAFFLE



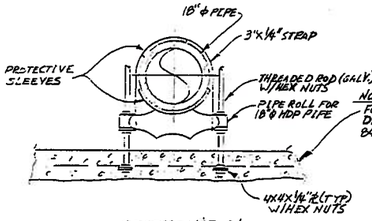
DETAIL @ CO2 INJECTION



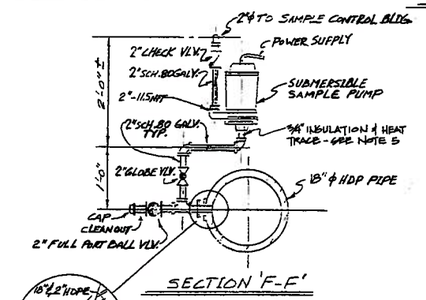
SECTION G-G



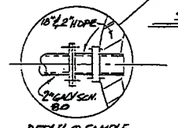
SECTION 'E-E'



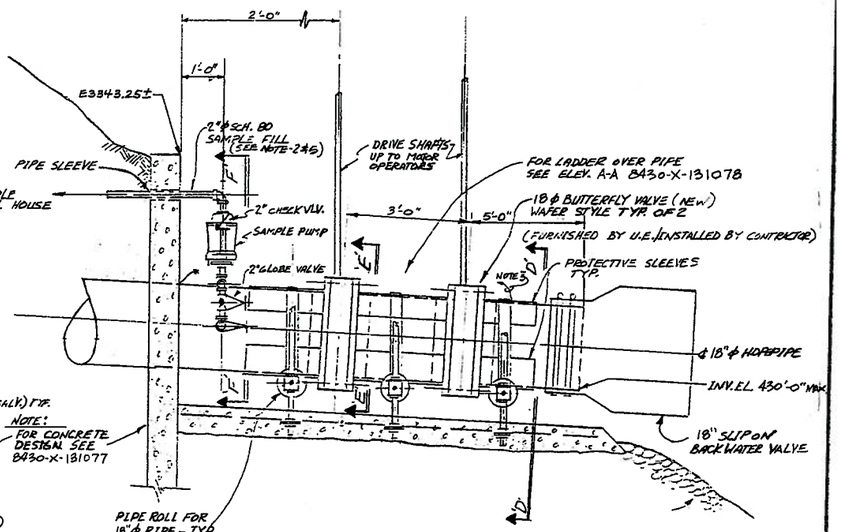
SECTION 'D-D'



SECTION 'F-F'



DETAIL @ SAMPLE PIPE ATTACHMENT



DETAIL @ ASH POND DRAIN EXIT TO RIVER
(AT WEST DISCHARGE - EXIT)

NOTES:
1. THIS WORK TO BE DONE IN ACCORDANCE WITH U.E. SPEC. NO. EC-2779.
2. ALL 2" ϕ SCH. 80 PIPING ABOVE GROUND TO BE GALVANIZED. ALL 2" ϕ SCH. 80 PIPING BELOW GROUND TO BE COMMON CARBON STEEL.
3. ALL PIPING 2" ϕ & SMALLER TO BE SCHEDULE 80.
4. CONTRACTOR TO REAM PIPE FLANGES TO PERMIT FREE OPERATION OF 18" ϕ BUTTERFLY VALVES.
5. INSTALL 3/4" INSULATION AND HEAT TRACE ON 18" ϕ PIPE FROM CONCRETE WALL TO LAST PIPE ROLL AND ON 2" ϕ PIPE FROM CONCRETE WALL TO 18" ϕ PIPE.
6. ALL HDP PIPE CONNECTIONS SHALL BE FUSION WELDED.

REFERENCE DRAWINGS:
B430-X-128772 ----PROPERTY PLAN

THIS DRAWING HAS NO SCALE

8430-X-131080

CONFIDENTIAL INFORMATION

STATE OF MISSOURI
KARL D. GAUS
NUMBER E-21805
REGISTERED PROFESSIONAL ENGINEER

DRAWN 12/4/91 MIKE LOHEY	PIPING-INSTALLATION & DETAILS ASH POND DISCHARGE NEW ASH POND
CHKD NOT CHK'D.	
SUPV. STEVE OTT	
APP'D 12/20/91	LOCATION SIOUX PLANT — CLASS E-5050
UNION ELECTRIC COMPANY ST. LOUIS, MO.	8430-X-131080 — REV. 2

PRINT DIST.

REVISIONS

REV.	W.O.	
0	NONE	F

FIRST ISSUE

5-7-79 M.P.

ADDED P-K NAIL

2 8-22-79 H.P.

Added I. Pipes

3 8-29-79 H.P.

Chan... C 3

4 8-31-79 H.P.

7. Hc chgd Added Pond #291

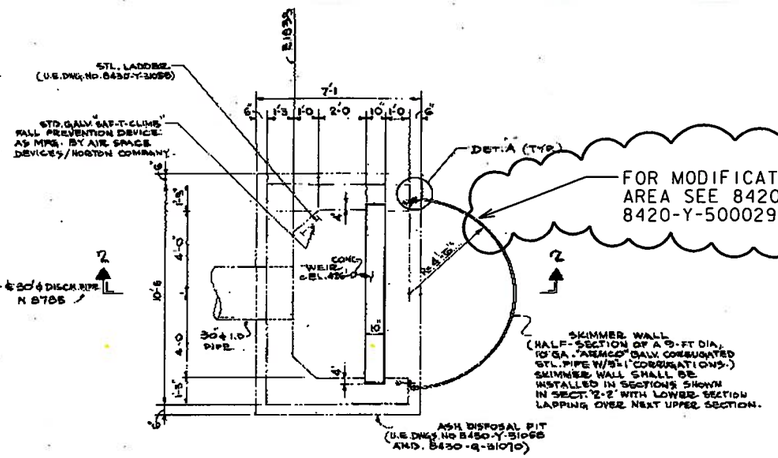
N

Scale 1" = 120'

CONFIDENTIAL INFORMATION

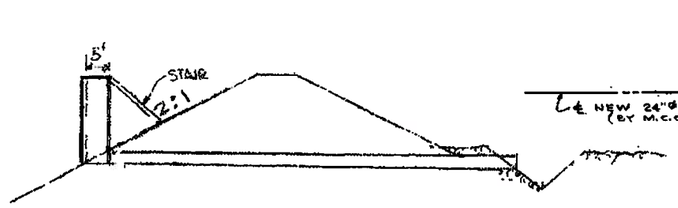
DRAWN 5-5-77 E. Hodges	PROPERTY PLAN SURVEY ASH POND #291 INSTRUMENT PT. LOC.	
CHKD.		
SUPV.		
APPD.	LOCATION 001003 SIOUX PLANT	DWG. 02010
UNION ELECTRIC COMPANY ST. LOUIS, MO.	8400-Y-92817	REV. 4

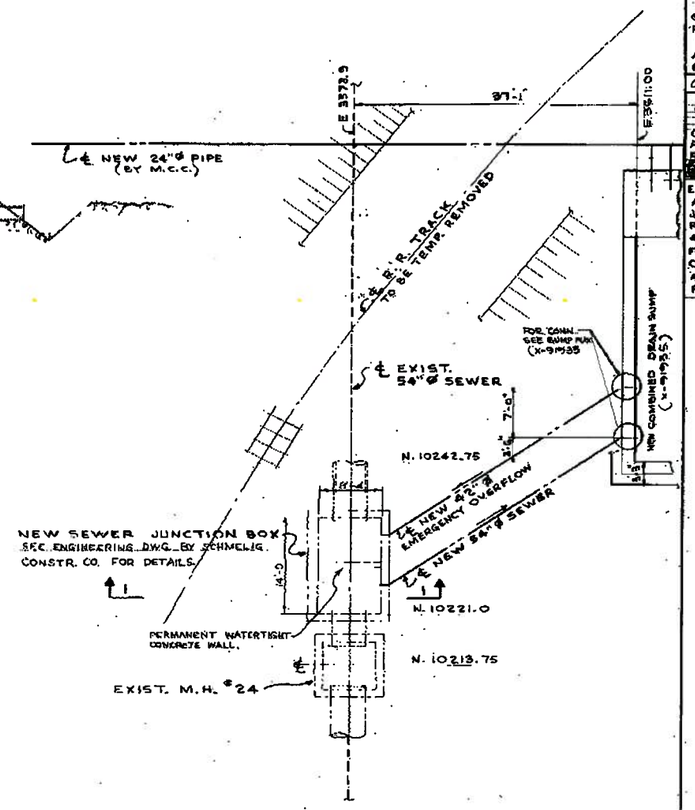
3715118 Rev. 4-73



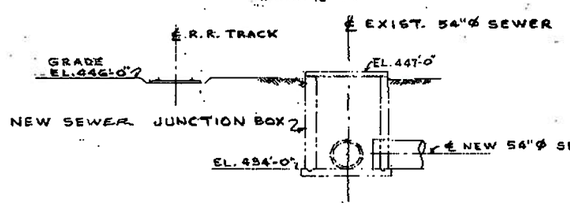
PLAN — MODIFIED ASH POND OVERFLOW (X-91934)
SCALE 1/8"=1'-0"

FOR MODIFICATIONS IN THIS AREA SEE 8420-Y-500022 & 8420-Y-500029

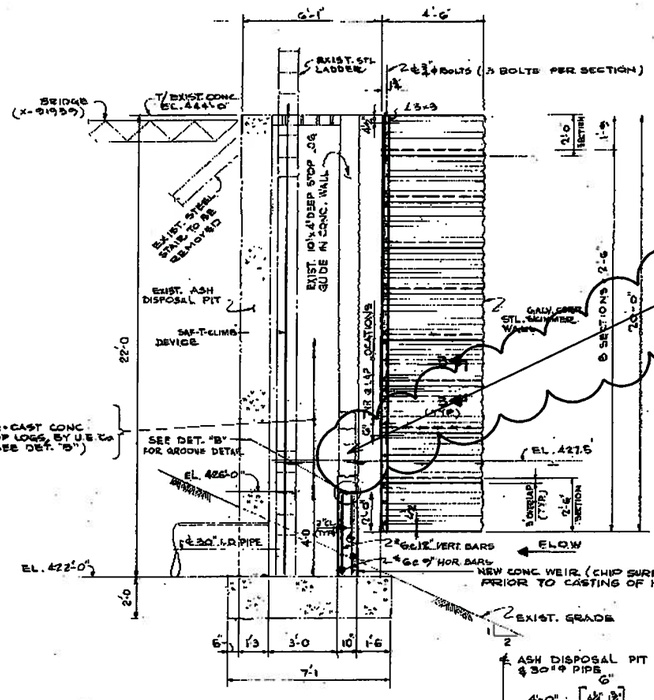




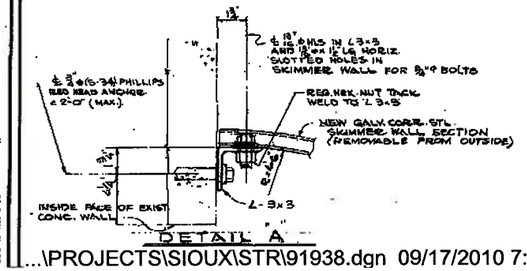
ENLARGED PLAN "C" (X-91934)
SCALE: 1/8"=1'-0"



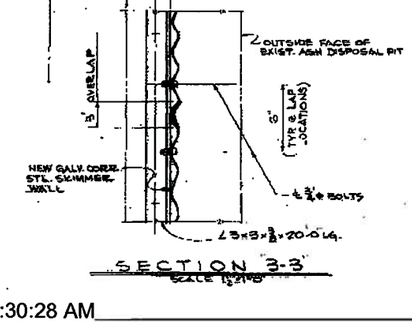
SECTION 1-1
SCALE: 1/8"=1'-0"



SECTION 2-2
SCALE ⅜"=1'-0"

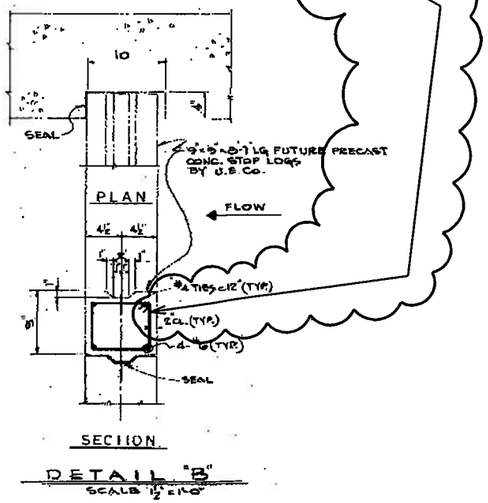


DETAIL A



SECTION 3-3
SCALE 1½"=1'-0"

REMOVE EXISTING CONCRETE STOP LOGS. REPLACE WITH STRUCTURAL STEEL FRAME AND SLUICE GATE SHOWN ON DRAWING 8420-Y-500022 AND 8420-Y-500029



SECTION

DETAIL "B"
SCALE 1½"=1'-0"

NOTES:

1. FOR GENERAL NOTES AND REF. DRAWINGS SEE DWG 8430-X-91934
2. DESIGN H.W. LEVEL FOR WEIR & STOP LOG DESIGN IS @ EL. 444.0'
3. ALL WORK BY STRUCTURAL/CIVIL CONSTRUCTION CONTRACTOR UNLESS OTHERWISE NOTED.

CONFIDENTIAL INFORMATION

REVISIONS

C: DWG. REVISED FOR BID QUOTATION. @A-7 THRU 12 RELOCATED NEW 24"ϕ PIPE. APP'D: [illegible] FILMED: 6-26-97

D: 3926 CHECKED, SIGNED, STAMPED & RELEASED FOR CONSTRUCTION. CHK'D: E.C. APP'D: [illegible] 7-8-97 FILMED: 7-8-97

E-11: REVISED ENLARGED PLAN "C" ADDED NEW SEWER JUNCTION BOX, REROUTED NEW 42"ϕ & 54"ϕ PIPE F-11: REV. SECT. 1-1 CHK'D: S.A.K. APP'D: [illegible] 9-2-97 FILMED: 9-2-97

AMEREN REVISIONS

REV	DATE	DRAWN
2	05/20/09	MSB
CHKD	SUPV	APPD
NOT		
W.O.		FILM

ADDED NOTE PER SLUICE GATE ADDITION

B RELEASED FOR CONSTRUCTION BIDS ONLY. APP'D: [illegible] 7-18-97 FILMED: 7-18-97

A RELEASED WITH STRUCTURAL SPECS FOR CLIENTS COMMENTS ONLY APP'D: [illegible] 6-13-97 FILMED: 6-13-97

ROBERT A. MARKS NUMBER E-6305 REGISTERED PROFESSIONAL ENGINEER STATE OF ILLINOIS

UNION ELECTRIC COMPANY
ST. LOUIS, MISSOURI
001009 SIOUX PLANT 0850

ASH POND OVERFLOW AND MISC. MODIFICATION

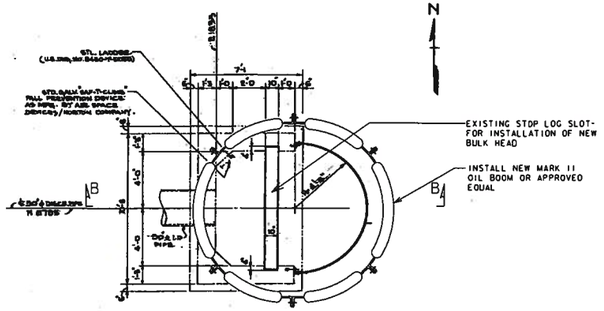
Designed by FLUOR PIONEER INC.
CHICAGO, ILLINOIS

DRAWN	DATE	DESIGNED	DATE	SUPERVD	DATE	SCALE
S.Z.S.		D.R.		[illegible]	6-4-97	AS NOTED
PIONEER DRAWING NUMBER		DATE		PIONEER PROJECT NO.		
[illegible]		7-7-97				UE-SP-99-PD-8005
APPROVED [illegible]				PROJECT NO. 104193		SHT.
				8430-X-91938		REVISION 2

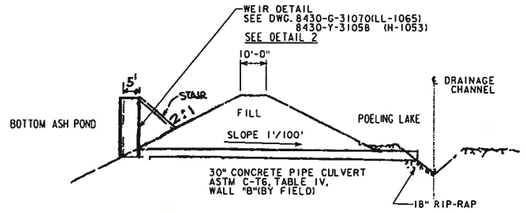
8430-X-91938-01

...\PROJECTS\SIOUX\STR\91938.dgn 09/17/2010 7:30:28 AM

PRINT DIST.	8420-Y-500029
REVISIONS	
REV. 0 / W.O.	
FIRST ISSUE	

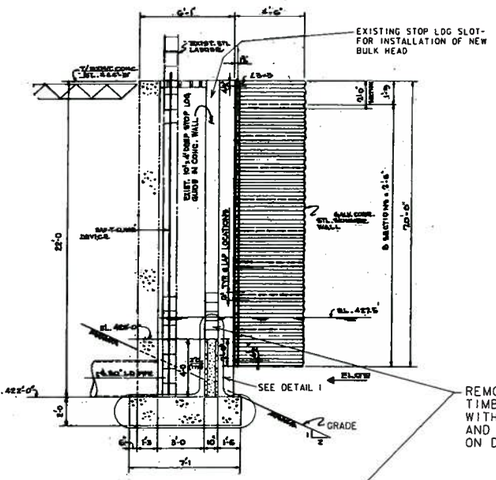


DETAIL I
PLAN-EXISTING BOTTOM ASH WATER CONTROL STRUCTURE

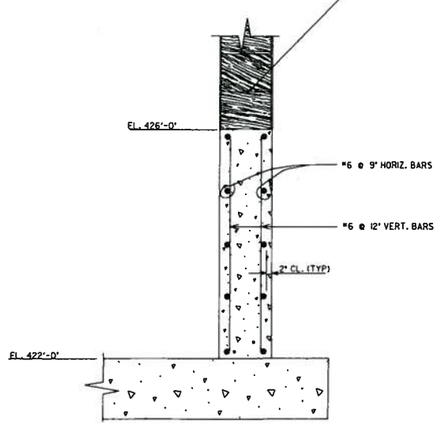


SECTION "A-A"

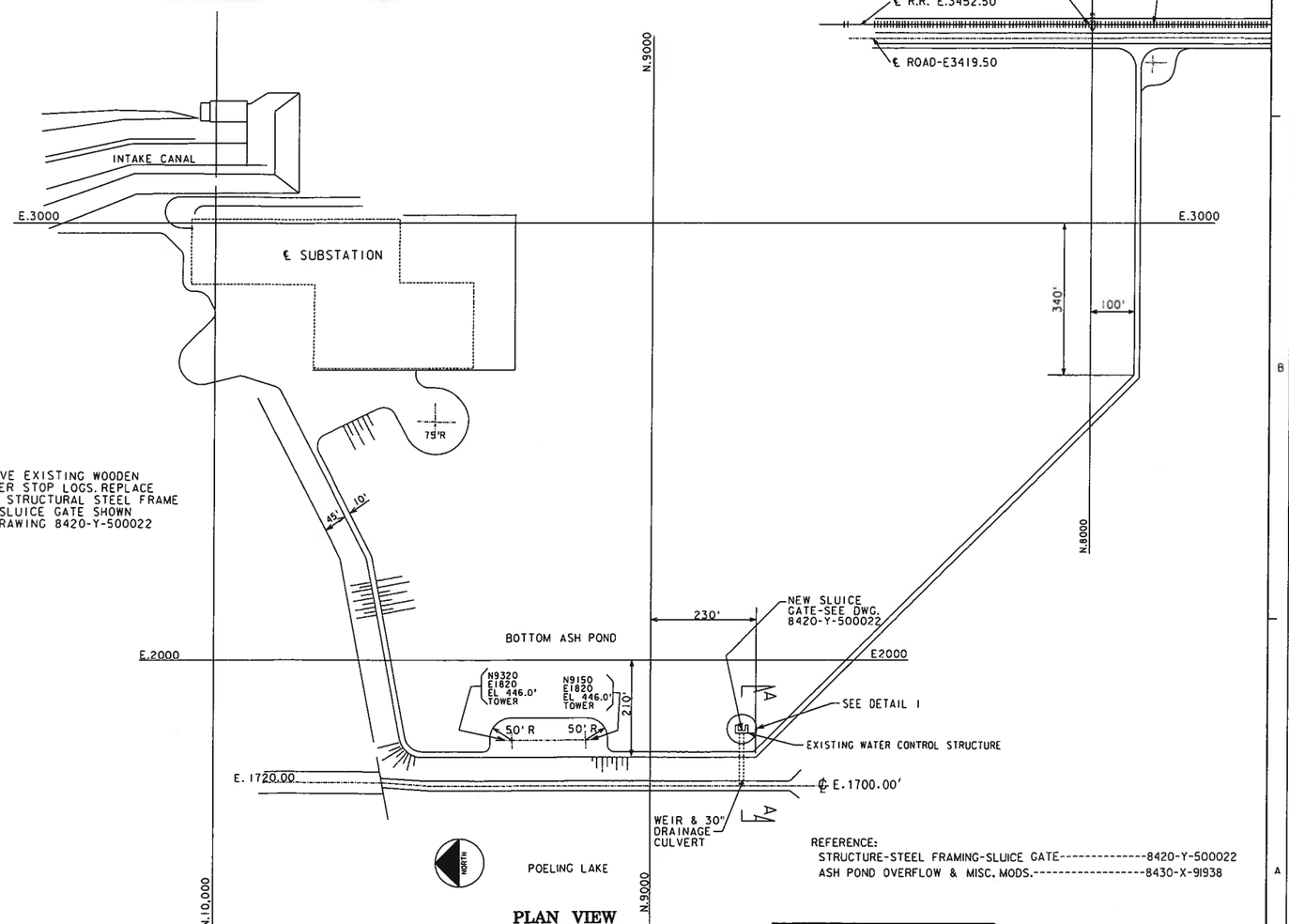
CONFIDENTIAL INFORMATION



DETAIL-2
SECTION "B-B"



DETAIL 3



PLAN VIEW

REFERENCE:
STRUCTURE-STEEL FRAMING-SLUICE GATE----------8420-Y-500022
ASH POND OVERFLOW & MISC. MODS.----------8430-X-91938

NOTICE OF LIMITED RESPONSIBILITY
THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE DESIGN WORK SHOWN ON PROJECT DRAWINGS AND DOCUMENTS BEARING HIS/HER SEAL, SIGNATURE OR INITIALS. HE/SHE DOES NOT HAVE AUTHORIZATION OR CONTROL OVER THE PROJECT AND ASSUMES NO RESPONSIBILITY FOR WORK DONE UNDER UNAUTHORIZED CONDITIONS. HE/SHE ALSO ASSUMES NO RESPONSIBILITY FOR SUBSEQUENT REVISIONS AND ANY OTHER DOCUMENTS ASSOCIATED WITH THE PROJECT WHICH DO NOT BEAR HIS/HER SEAL, SIGNATURE OR INITIALS.

PREPARED FOR Ameren UE

DRAWN 5-29-09 MSB	STRUCTURE-STEEL-INSTALLATION BULKHEAD/SLUICE GATE & OIL SKIMMER FOR BOTTOM ASH POND WATER CONTROL STRUCTURE	
CHKD. NOT CHK'D.		
SUPV. S.K. OTT		
APPD.	LOCATION 001009 SIOUX PLANT	CLASS 04060
Ameren ST. LOUIS, MISSOURI	8420-Y-500029	REV. 0

3 2 1

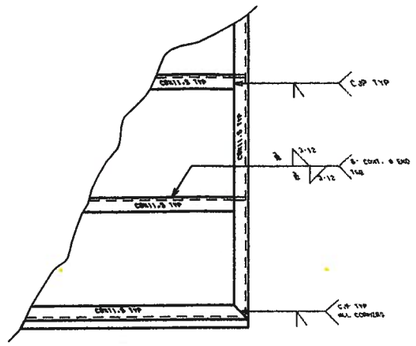
J1-0-88 Rev. 9-85

PRINT DIST.

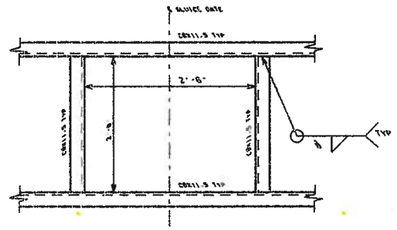
REVISIONS

REV.	W.O.
9	283419

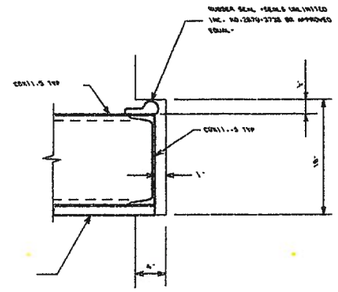
9 1997 1998



DETAIL 1

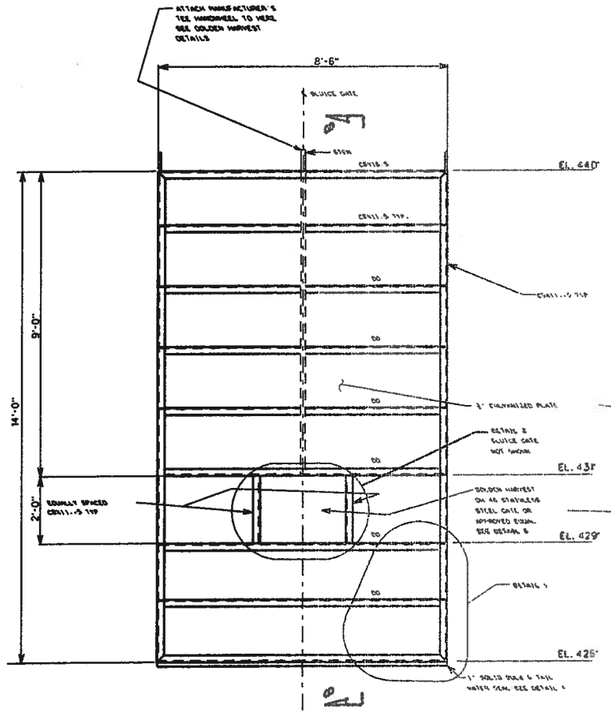


DETAIL 2

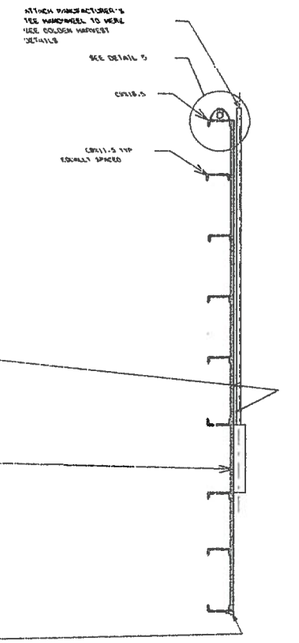


DETAIL 3

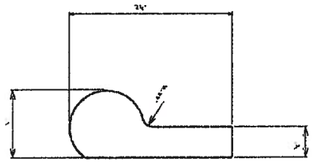
4



SECTION "A-A"



SECTION "B-B"

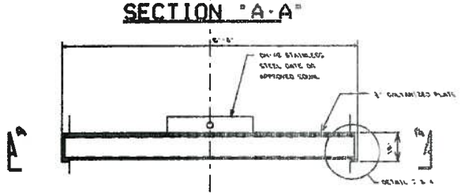


DETAIL 4

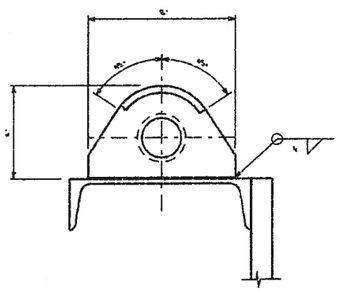
AT WATER SEAL

RUBBER SEAL, "SEALS UNLIMITED INC. NO.2570-3738 OR APPROVED EQUAL"

NOTE: USE MANUFACTURER RECOMMENDED MOUNTING KIT



PLAN



DETAIL 5

NOTE:
USE WINDLASS CORP 5 TON LIFTING LUG OR APPROVED EQUAL

DETAIL 6

GOLDEN HARVEST ON 48 STAINLESS STEEL GATE OR APPROVED EQUAL

SECTION "C-C"

FOR SLUICE GATE

NOTES:

1. ALL STRUCTURAL STEEL WORK SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STEEL CONSTRUCTION OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION" "AISC".
2. ALL STEEL SHALL CONFORM TO ASTM A36 AND SHALL BE GRADE 50 "ASTM A572 OR A992".
3. SUBMIT SHOP DRAWINGS TO ENGINEER. SHOP DRAWINGS SHALL INCLUDE COMPLETE DETAILS AND SCHEDULES FOR FABRICATION AND ASSEMBLY OF ALL COMPONENTS INCLUDING ALL SHOP AND AND FIELD CONNECTIONS. INDICATE WELDS BY STANDARD AWS A2.1 AND A2.4 SYMBOLS AND SHOW SIZE, LENGTH, AND TYPE OF WELD.
4. WELD CONSTRUCTION SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND METHODS USED IN CORRECTING WELDING WORK.
5. ELECTRODES FOR WELD SHALL BE E70 FOR MANUAL ARC WELDING.
6. ALL STRUCTURAL MEMBERS TO BE HOT DIPPED GALVANIZED EXCEPT GATE.

PREPARED FOR Ameren UE

DESIGNED	STRUCTURE STEEL FRAMING
DRAWN	SALVAGED SLUICE GATE
CHECKED	GRIFFITH MEM POND
SUPV.	
APPD. D. CAMPBELL	LOCATION GRIFFITH

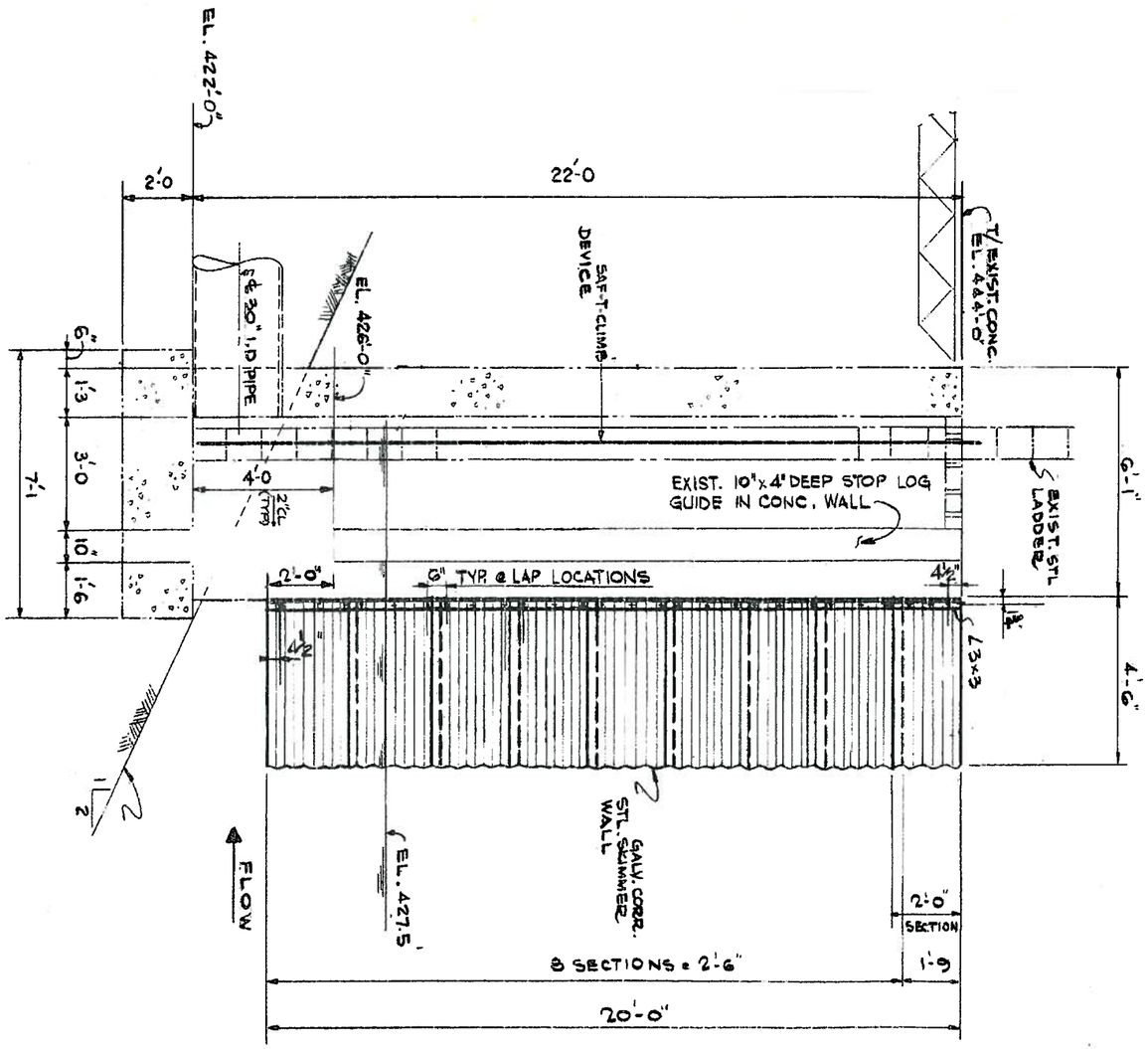
CLASS 94040

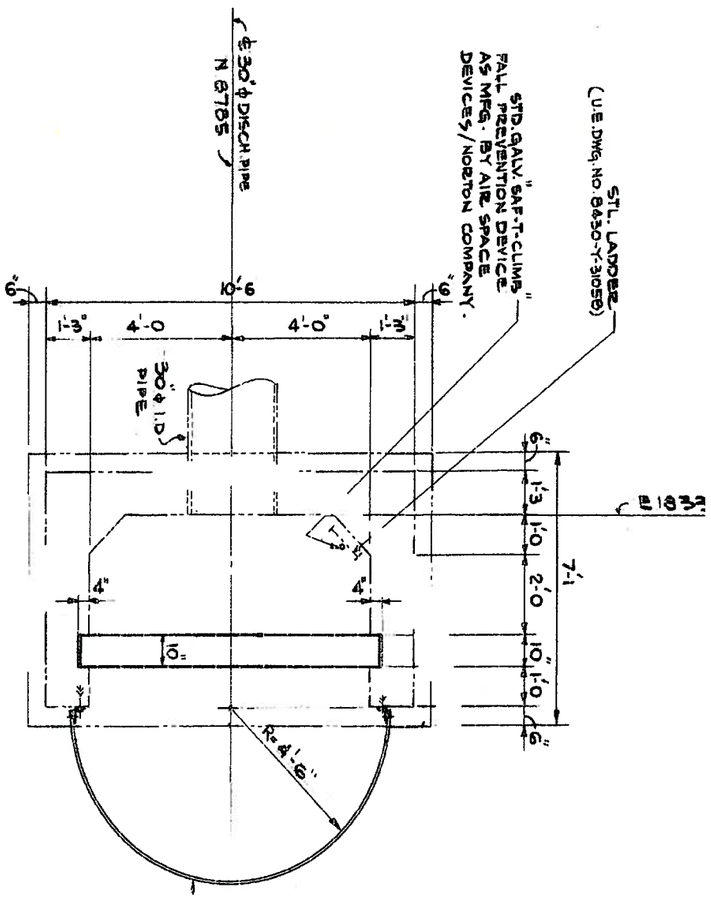
Ameren ST. LOUIS, MISSOURI

94GR-9-508822

REV. 9

37-13-148 Rev. 9-85





CONFIDENTIAL INFORMATION

PRINT DIST.

REVISIONS

REV.	W.O.	
A	6163	

ISSUED FOR APPROVAL

REV.	DATE	DRAWN
	8 5 93	SDS
CHKD. SJI	SUPV. JMH	APPD. SDH
W.O. 6163		FILM

ISSUED FOR BID

REV.	DATE	DRAWN
	11 4 93	SDS
CHKD. SJI	SUPV. JMH	APPD. SDH
W.O. 6163		FILM

ISSUED FOR CONSTRUCTION

REV.	DATE	DRAWN
1	2 8 94	SJI
CHKD. CBJ	SUPV. JMH	APPD. SDH
W.O. 6163		FILM

GENERAL REVISIONS ISSUED WITH C.O. #2 TO CONTRACT C-1

REV.	DATE	DRAWN
2	5 10 95	SJI
CHKD. CBJ	SUPV. JMH	APPD. SDH
W.O. 6163		FILM

CONFORMING TO CONSTRUCTION RECORDS

U.E. REVISIONS

REV.	DATE	DESIGN
3	120596	MSE
CHKD. NO T	SUPV. -	APPD. -
W.O. 6163		FILM

REVISED TITLE ADDED SEAL AND BAR CODE

R421-Y-130438

FOR CONTINUATION SEE DWG. NO. 8422-Y-130439

SEE DRAWING 8421-Y-130443 FOR LADDER ACCESS LANDING

EXIST. W8x24

EXIST. W24x130

W12x22

EXISTING PLATFORMS

EXIST. CONVEYOR TOWER STEEL FRAMING (SEE REF. DWG. 8421-X-71122)

REMOVE W6x8.5 CROSS MEMBERS (6 LOCATIONS)

C10x15.3

T.O.S. EL. 472'-1"

REMOVE EXISTING C10x15.3

PIPE RACK PLAN

SCALE IN FEET

NORTH

TOP OF EXIST. STEEL EL. 482'-4"

EXIST. 2L 4x3x5/16

2L 3½x3x1/4 LLV

EXIST. C15

EXIST. 2L4X3X5/16

EXIST. L4x3x5/16 BRACING TO BE REMOVED

TOP OF EXIST. STEEL EL. 472'-1"

EL. 469'-2"

EL. 456'-1"

TOP OF CONC. EL. 446'-10"

TOP OF STEEL EL. 470'-0"

TOP OF GRADE EL. 446'-0"

TOP OF CONCRETE EL. 447'-0"

SECTION A

SECTION B

SECTION C

SECTION D

SECTION E

CONFIDENTIAL INFORMATION

NOTICE OF LIMITED RESPONSIBILITY

THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE DESIGN WORK OR PLANS SHOWN ON THIS DOCUMENT. BY AFFIXING HIS SEAL, THE ENGINEER DOES NOT ASSUME RESPONSIBILITY FOR ANY CONSTRUCTION WORK PERFORMED FROM THIS DOCUMENT UNLESS HE IS EMPLOYED TO PROVIDE CONSTRUCTION SUPERVISION AND THEN ONLY TO THE EXTENT OF SUCH SUPERVISION. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR ANY CONSTRUCTION WORK PERFORMED FROM THIS DOCUMENT WITHOUT HIS KNOWLEDGE, SUPERVISION OR APPROVAL.

[redacted]

REV. 2 SEALED BY

NAME S2011 D. RICHART

NUMBER E-19037

STATE OF MISSOURI

BURNS/MCDONNELL

DRAWN BY MARTINDALE	
CHKD. 11 1 93	THO
SUPV. 9 1 93	ASHTON
APPD. 11 5 93	RICHART

STRUCTURE-STEEL FRAMING-UNIT-PLAN & ELEVATIONS PIPE RACKS FOR FLYASH PIPING TO ASH POND 1993 ASH HANDLING MODIFICATIONS

LOCATION	SIOUX PLANT	CODE
001009		04090

UNION ELECTRIC COMPANY ST. LOUIS, MO.

8421-Y-130438 REV. 3

37-13-758 Rev. 9-85

·8421-Y-130438·

PRINT DIST.

REVISIONS

REV.	W.O.	
A	684	10 8 93

ISSUED FOR APPROVAL

REV.	DATE	DRAWN
	11 5 93	JLR
CHKD. S.T	SUPV. SMA	APPD. SDR
W.O. 684		FILM

ISSUED FOR BID

REV.	DATE	DRAWN
	1 4 94	JLR
CHKD. S.T	SUPV. SMA	APPD. SDR
W.O. 684		FILM

ISSUED FOR CONSTRUCTION

REV.	DATE	DRAWN
1	8 8 94	JLR
CHKD. S.T	SUPV. SMA	APPD. SDR
W.O. 684		FILM

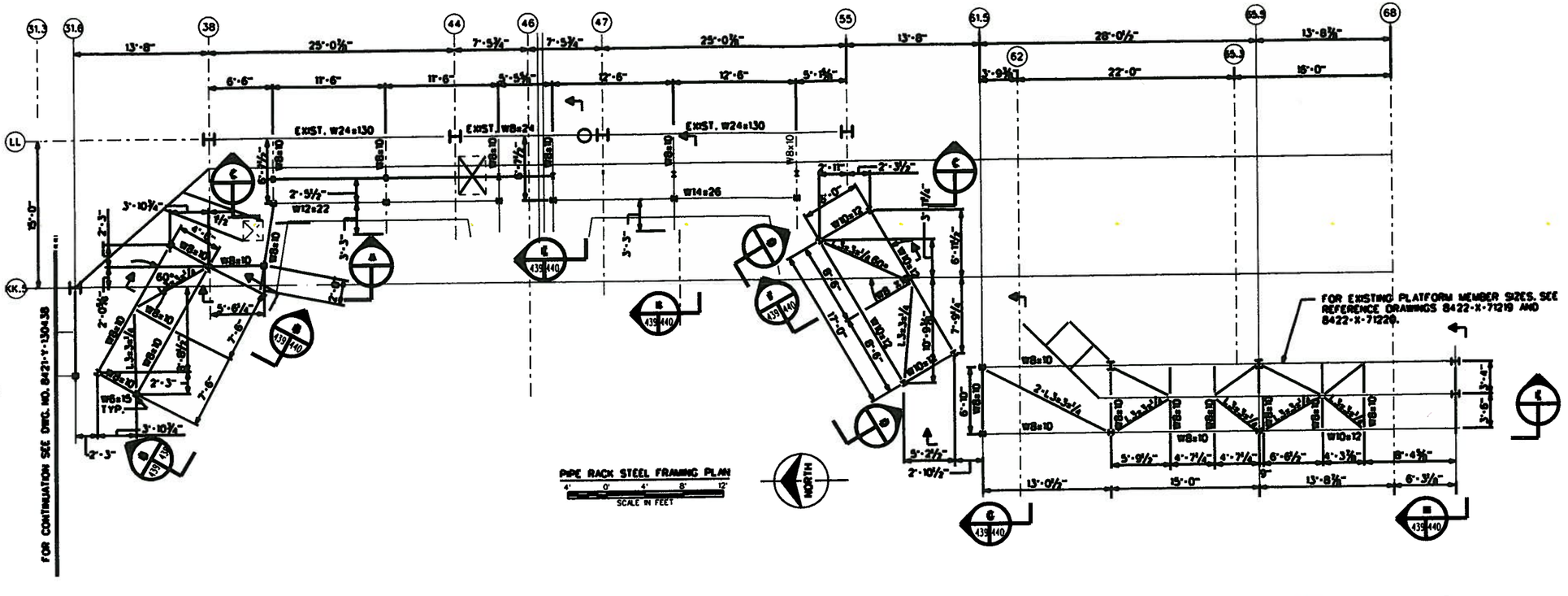
CONFORMING TO CONSTRUCTION RECORDS

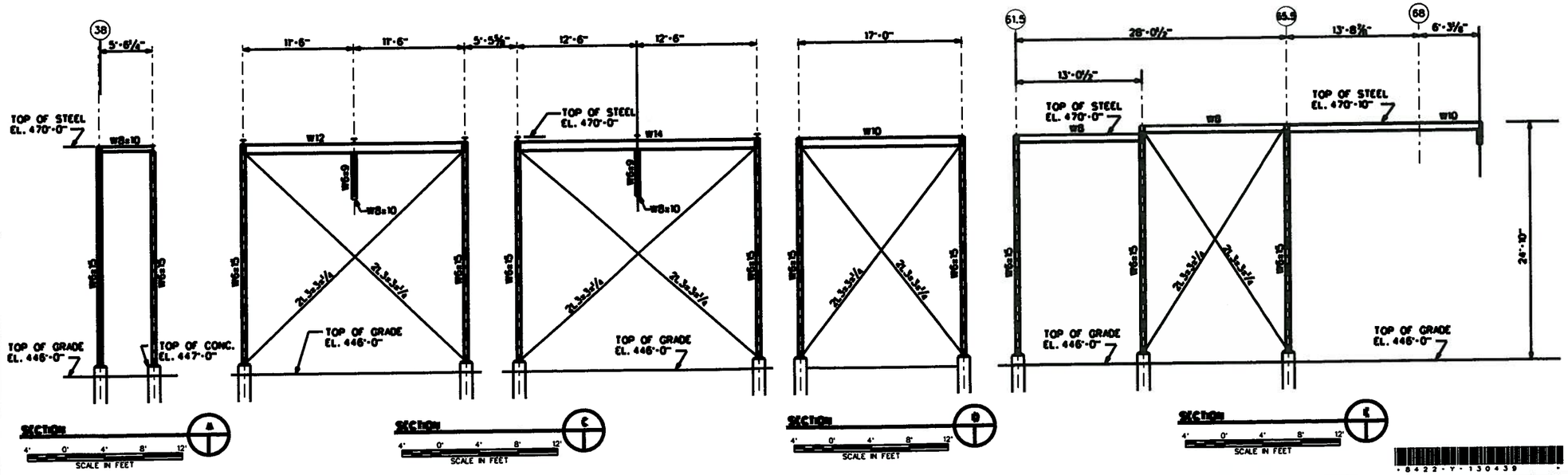
U.E. REVISIONS

REV	DATE	DRAWN
2	020596	MSB
CHKD NOT	SUPV -	APPD -
W.O. 6163		FILM

REVISED TITLE ADDED SEAL AND BAR CODE

8422-Y-130439





CONFIDENTIAL INFORMATION

NOTICE OF LIMITED RESPONSIBILITY

REV. 1 SEALED BY
SCOTT D. RICHART
NUMBER E-10037
STATE OF MISSOURI
BURNS/MCDONNELL

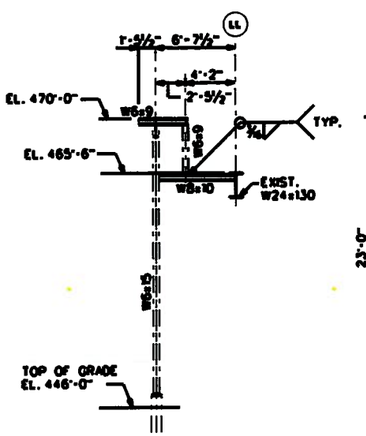
DESIGN	S 28 93 ROUTON	STRUCTURE-STEEL FRAMING UNIT PLAN & ELEVATIONS PIPE RACKS FOR FLYASH PIPING TO ASH POND 1993 ASH HANDLING MODIFICATIONS
DRAWN/CHKD	T 1 93 THO	
SUPV.	9 2 93 ASHTON	
APPD.	11 5 93 RICHART	LOCATION 001009
		CLASS 04060
Ameren	ST. LOUIS, MISSOURI	8422-Y-130439 REV. 2

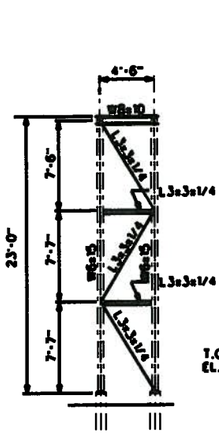
8422-Y-130439

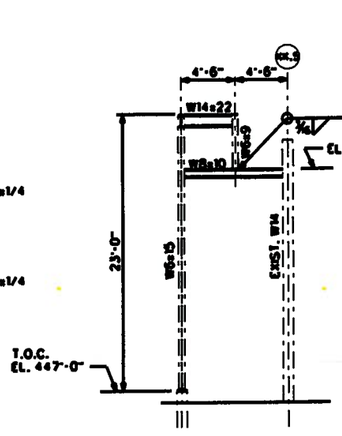
PRINT DIST.

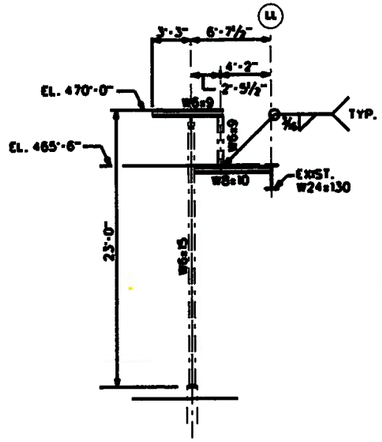
REVISIONS		
REV. A	W.O. 6163	10 8 93
ISSUED FOR APPROVAL		
REV.	DATE 11 5 93	DRAWN JLR
CHKD. SLT	SUPV. SMA	APPD. SDR
W.O. 6163		FILM
ISSUED FOR BID		
REV.	DATE 11 4 94	DRAWN JLR
CHKD. SLT	SUPV. SMA	APPD. SDR
W.O. 6163		FILM
ISSUED FOR CONSTRUCTION		
REV. 1	DATE 7 6 94	DRAWN JLR
CHKD. CDJ	SUPV. SMA	APPD. SDR
W.O. 6163		FILM
GENERAL REVISIONS ISSUED WITH C.O. #2 TO CONTRACT C-1		
REV. 2	DATE 5 8 95	DRAWN DP
CHKD. CDJ	SUPV. SMA	APPD. SDR
W.O. 6163		FILM
CONFORMING TO CONSTRUCTION RECORDS		
U.E. REVISIONS		
REV. 3	DATE 020596	DRAWN MSE
CHKD. NOT	SUPV. -	APPD. -
W.O. 6163		FILM
REVISED TITLE, ADDED SEAL AND BAR CODE		

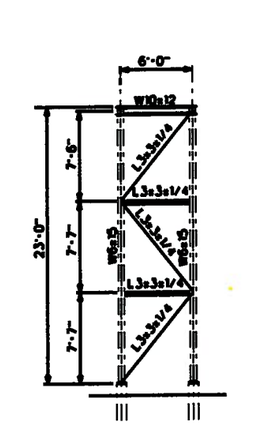
8421-Y-130440



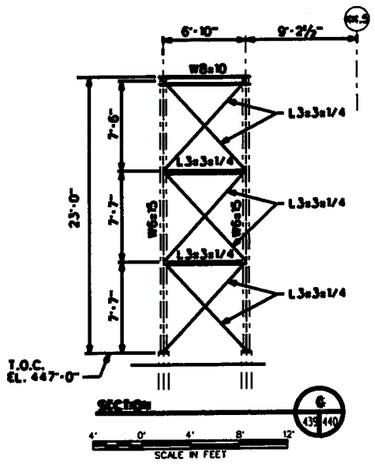


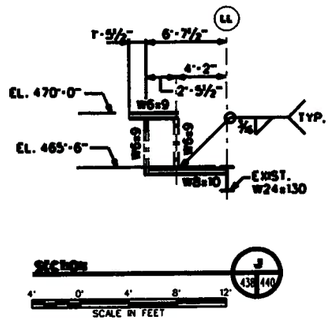


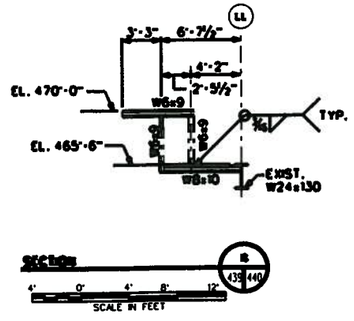


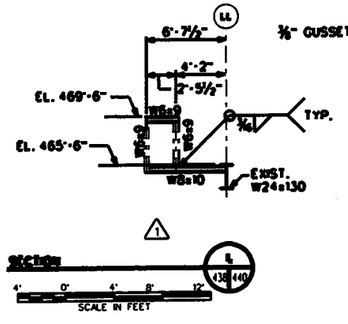


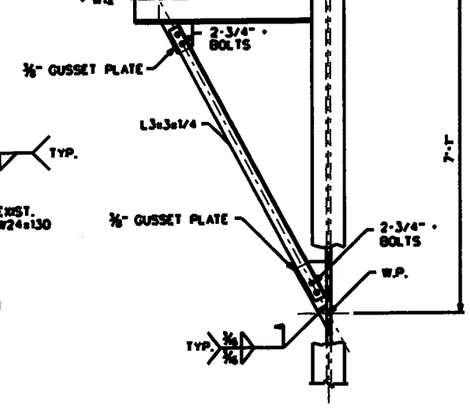
CONFIDENTIAL INFORMATION

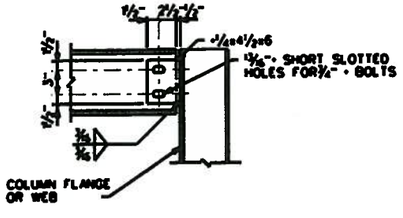


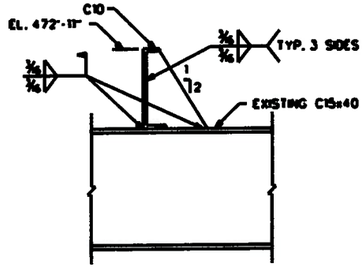


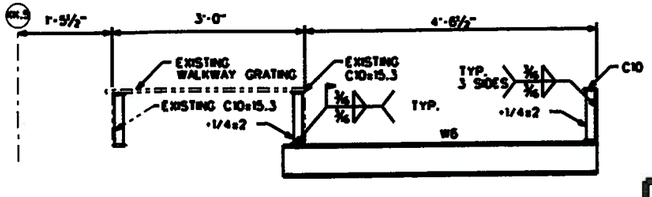












NOTICE OF LIMITED RESPONSIBILITY

THE RESPONSIBILITY OF THE UNDERSIGNED ENGINEER IS LIMITED TO THE DESIGN SHOWN HEREON AS PREPARED IN THE ENGINEER'S OFFICE AND DOES NOT INCLUDE ANY RESPONSIBILITY FOR THE ACCURACY OF DIMENSIONS OR DETAILS OF EXISTING FACILITIES NOT SHOWN AUTHORITY OVER THE PROJECT IS TO BE EXERCISED BY OTHERS. THE ENGINEER'S RESPONSIBILITY FOR THE PROJECT IS TO BE LIMITED TO THE CONTRACT DOCUMENTS PREPARED BY THE ENGINEER'S OFFICE AND DOES NOT INCLUDE ANY RESPONSIBILITY FOR THE ACCURACY OF DIMENSIONS OR DETAILS OF EXISTING FACILITIES NOT SHOWN ON THE DRAWINGS PREPARED BY THE ENGINEER'S OFFICE.

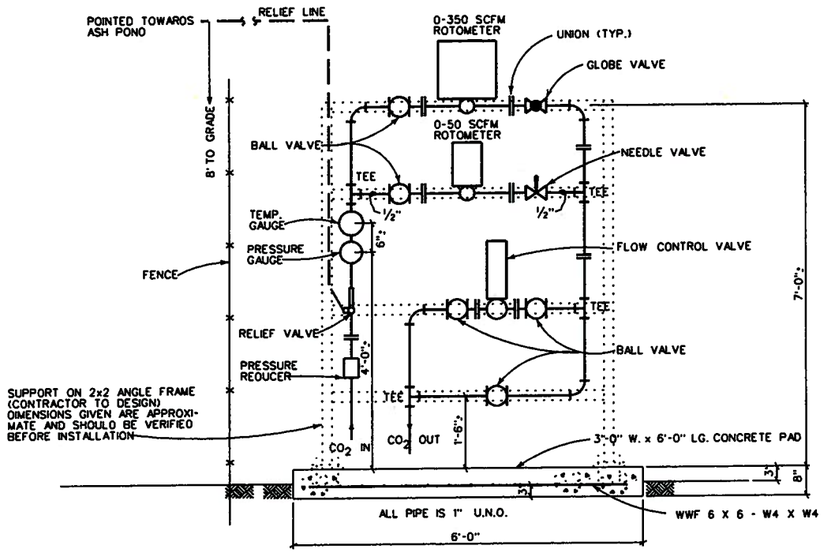
REV. 2 SEALED BY

NAME SCOTT D. RICHART
NUMBER E-10037
STATE OF MISSOURI
BURNS/MCDONNELL

DES.	6 28 93 HAWTHORNE	STRUCTURE-STEEL FRAMING UNIT-SECTIONS & DETAILS PIPE RACKS FOR FLYASH PIPING TO ASH POND 1993 ASH HANDLING MODIFICATIONS
CHK'D/WII	1 93 THO	
SUPV.	9 3 93 ASHTON	
APPD.	11 5 93 RICHART	
LOCATION	001009	SCALE 04060
Ameren	ST. LOUIS, MISSOURI	8421-Y-130440 REV. 3

8421-Y-130440

37-13-3 Rev. 9-85



DETAIL 1
CO_2 REGULATING STATION
LOOKING WEST

EQUIPMENT LIST	
PRESSURE GAUGE	ASHCROFT "DURAGAUGE" #1349SS 4½" BACK ½" NPT 0-100 psig, AISI 316SS BOURDON SYSTEM, 4½" FACE, BACK STEM, ½" NPT, ALUMINUM CASE, COLOR BLACK.
TEMPERATURE GAUGE	ASHCROFT INDUSTRIAL BIMETAL THERMOMETER, CODE 50C160R025, -20/120 F 5" DIA DIAL, ½" NPT REAR CONNECTION, 2½" STEM.
ROTOMETER	DIRECT READING CO_2 FLOWMETER, 0-350 SCFM, 1" NPT CONNECTIONS.
ROTOMETER	DIRECT READING CO_2 FLOWMETER, 0-40 SCFM, ½" NPT CONNECTIONS.
CONTROL VALVE	1" NPT CONNECTIONS, FURNISHED BY UNION ELECTRIC CO.
PRESSURE REDUCING VALVE CO_2	CASHCO PRESSURE REDUCING REGULATOR, TYPE 1000 HP, 1" NPT CONNECTIONS, BRASS BODY, OPTION 1000-5 FOR CRYOGENIC SERVICE, 40-80 psig SPRING RANGE, 300#/hr MAX FLOW, 300 psig INLET PRESSURE, 50 psig OUTLET PRESSURE.
RELIEF VALVE CO_2	CASHCO RELIEF VALVE, MODEL 1164, 1" NPT CONNECTIONS, BRONZE BODY, OPTION 5 FOR CRYOGENIC SERVICE, 300#/hr MAX FLOW, 70-150 psig SPRING RANGE, RELIEVE AT 90 psig.

NOTES:

1. THIS WORK TO BE DONE IN ACCORDANCE WITH U.E. SPEC. NO. EC-2799.

REFERENCE DRAWINGS:

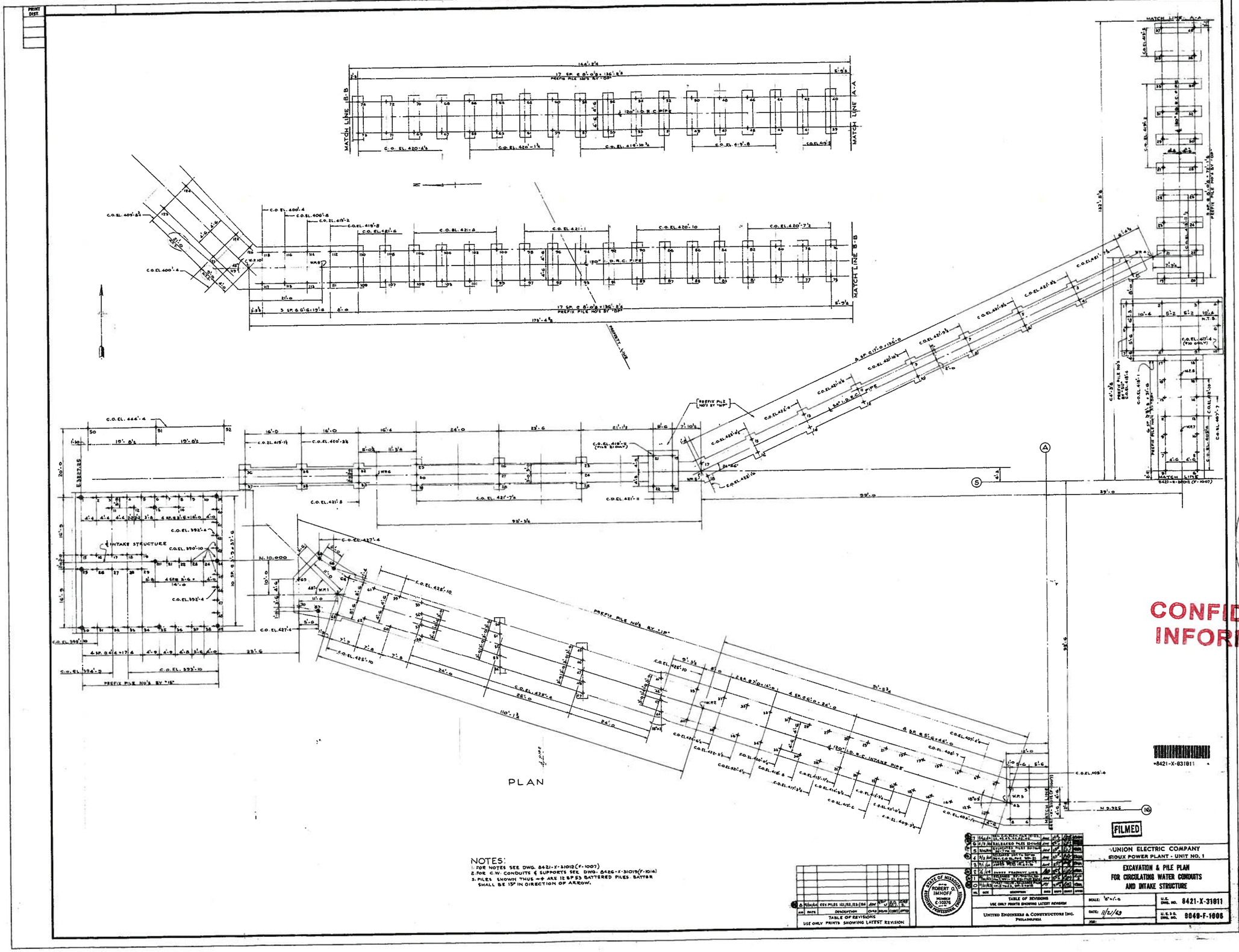
THIS DRAWING HAS NO SCAL

DRAWN	MIKE LOWRY
CHKD.	NOT CHKD.
DES.	STEVE OTT
APPD.	
LOCATION	001009
	SIOUX PLANT
UNION ELECTRIC COMPANY	ST. LOUIS, MO.

PIPING-INSTALLATION AND DETAIL
CO_2 REGULATING STATION
NEW ASH POND

8430-X-131082

PRINT DIST.



NOTES:
1. FOR NOTES SEE DWG. 8421-X-31012(F-1007)
2. FOR C.W. CONDUITS & SUPPORTS SEE DWG. 8426-X-31015(F-1016)
3. PILES SHOWN THUS ⊕ ARE 12 BP 53 BATTERED PILES BATTER SHALL BE 15" IN DIRECTION OF ARROW.

NO.	DATE	DESCRIPTION	CHKD	DRAWN	CHKD	APPD
7	10/24/13	CCW PILES 132,133,134	JMH	W	AA	JMH
6	9/3/13	RELOCATED PILES 13-14				
5	8/16/13	REVISED PILES 50 THRU 92				
4	7/31/13	REVISED PILES 1 THRU 49				
3	7/2/13	ADDED STRUCTURE NO. 10				
2	6/14/13	ADDED STRUCTURE NO. 9				
1	5/31/13	ADDED STRUCTURE NO. 8				
NO.	DATE	DESCRIPTION	CHKD	DRAWN	CHKD	APPD

TABLE OF REVISIONS
USE ONLY PRINTS SHOWING LATEST REVISION

STATE OF MISSOURI — ROBERT O. IMHOFF — NUMBER E-32276 — REGISTERED PROFESSIONAL ENGINEER

TABLE OF REVISIONS
USE ONLY PRINTS SHOWING LATEST REVISION

UNITED ENGINEERS & CONSTRUCTORS INC.
PHILADELPHIA

UNION ELECTRIC COMPANY
SIOUX POWER PLANT - UNIT NO. 1

EXCAVATION & PILE PLAN
FOR CIRCULATING WATER CONDUITS
AND INTAKE STRUCTURE

SCALE: 1"=1'-0"
DATE: 11/21/13
JOB:

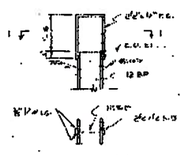
U.E. DWG. NO. 8421-X-31011
U.E.&C. DWG. NO. 8049-F-1006

*8421-X-831011

FILMED

CONFIDENTIAL
INFORMATION

PLAN



NOTES:

1. ALL PILES TO BE DRIVEN TO REFUSAL DRIVING AND SPLICES TO BE IN ACCORDANCE WITH SPECIFICATION 9949-B-1
2. ALL PILES SHOWN THUS ⊕ ARE TO TON DESIGN LOAD 10 BP 88 PILES
3. ALL PILES SHOWN THUS ⊕ ARE TO TON DESIGN LOAD 12 BP 88 PILES ANCHORED IN PILE CAP AS SHOWN ON DETAIL "A"
4. ALL PILES SHOWN THUS ⊕ ARE TO TON DESIGN LOAD 12 BP 88 PILES WITH GROUNDING WIRE ATTACHED (SEE SHEET 4 OF B-81674 FOR DETAILS)
5. ALL PILES SHOWN THUS ⊕ ARE TO TON DESIGN LOAD 10 BP 88 PILES ANCHORED IN PILE CAP WITH GROUNDING WIRE ATTACHED (SEE DETAIL "A" AND DWGS. 3401-X-SHEET 4 & X-81624
6. ALL PILES SHOWN THUS ⊕ ARE 200 KIP DESIGN LOAD 140 KIPS TEST PILES
7. " " " " ⊕ ARE TO TON DESIGN LOAD 12 BP 88 TEST PILES
8. " " " " ⊕ ARE TO TON DESIGN LOAD 10 BP 42 TEST PILES
9. ALL TEST PILES TO BE UTILIZED WHERE THEY MAY AGREE WITH DRIVING, BUT OBTAIN NEW PILES TO SUIT
10. ELEVATIONS SHOWN THUS (EL. 424'-6") IN MEAN ELEVATION OF TOP OF PILE CAP. ELEVATIONS SHOWN THUS (E.O.P.EL. 424'-10) DENOTE ELEV. OF PILE CUT OFF.
11. ALL PILE NUMBERS TO BE PREFIXED BY COLUMN NUMBER, UNLESS OTHERWISE NOTED.
12. THE ALL PILES IDENTIFIED BY "EW" & "NW" WITH SINGLE CONTINUOUS #6 BAR WELDED TO EACH PILE.
13. ALL PILES SHOWN THUS D ARE 50 TON DESIGN LOAD 10 BP 42.
14. " " " " " ⊕ " " " " " 10 BP 42 ANCHORED IN PILE CAP AS SHOWN ON DETAIL "A"

CONFIDENTIAL INFORMATION

UNION ELECTRIC COMPANY
SIOUX POWER PLANT - UNIT NO. 1

EXCAVATION & PILE PLAN
TURBINE & BOILER AREA

U.E. DWG. NO. 8421-X-31813
U.E.S.D. DWG. NO. 8048-E-11803

DO NOT SCALE

TYPICAL R.R. ROADBED SECTION
NORTH OF STATE HIGHWAY NO 64

SECTION 1-1

SECTION 2-2

SECTION X-X

SECTION Y-Y

SECTION 3-3

TYPICAL PAVEMENT JOINT DETAILS

TYPICAL PAVING DETAIL @ R.R. CROSSING

SECTION 7-7

SECTION 4-4

SECTION 5-5

SECTION 6-6

RIVER

STATE HIGHWAY NO. 64

CONFIDENTIAL INFORMATION

CONFIDENTIAL INFORMATION

SUPERSEDES 8430-X-31008 REV 20 DATE 5-20-93

SCANNED HYBRID DRAWING

8430-X-031008

PREPARED FOR Ameren IP

EXCAVATIONS & FILL FOR PLANT SITE AND R.R. TRACK LAYOUT

SIOUX PLANT

8430-X-31008

SCALE RATIO = 200
THIS DRAWING HAS BEEN REFERENCED TO FILE(S):

R:\SIOUX\STR\31008.dgn 09/10/2010 9:28:47 AM

Ameren
MISSOURI

October 6, 2010

Mr. James Filson, P.E.
Associate
Dewberry
8401 Arlington Boulevard
Fairfax, VA 22031

Re: United States Environmental Protection Agency
Ash Pond Inspection - Request for Data

Dear Mr. Filson:

Enclosed is one (1) copy of each of the documents you requested during your EPA required inspections of the ash pond embankments at Ameren's Rush Island, Meramec, and Sioux Power plants on September 29 and 30, 2010. Each of the documents has been reviewed by Ameren's Legal department. Certain categories of documents have been stamped "confidential" as appropriate. These documents should be treated as "Confidential Business Information" and the Company reserves its rights with respect to the public release or use of such information. We understand that the use of these documents will assist you in assessing the structural integrity of the ash pond embankments and will be destroyed upon completion of the assessment reports. The stability analysis that you requested for the Sioux and Meramec ash ponds is ongoing and will be submitted to you upon completion.

If you need further information, please feel free to contact me at 314-957-3426.

Sincerely,

Matthew K. Frerking P.E.
Managing Supervisor, Dam Safety

Enclosures

1901 Chouteau Avenue
PO Box 66149
St. Louis, MO 63166-6149
AmerenMissouri.com

AmerenUE Response

Sioux Power Station
8501 North State Route 94
West Alton, Missouri 63386

1. Coal-combustion by-product surface impoundments at this Station are not classified as dams by State or Federal regulatory agencies so they have not been rated.

2. See table below.

Management Unit	Year Commissioned or Expanded
Fly Ash Pond	1994
Ash Pond	1967

None of these units have been expanded.

3. See table below.

Management Unit	Materials Contained in Unit*
Fly Ash Pond	1, 5
Ash Pond	1, 3, 5

*Use the following categories to respond to this question: (1) fly ash; (2) bottom ash: (3) boiler slag; (4) flue gas emission control residuals; (5) other.

Other types of materials that are temporarily or permanently contained in the unit(s) include, but are not limited to residual wastes remaining following treatment of wastewater from these systems: primary water treatment; boiler water make-up treatment; sanitary wastewater treatment; laboratory and sampling streams; boiler blowdown; floor drains; coal pile run off; house service water systems; and pyrites.

4. The management units at this facility were designed by a Professional Engineer. The construction of the management units were done under the supervision of a Professional Engineer. And, inspection and monitoring of the safety of the waste management units is under the supervision of a Professional Engineer.

5. The most recent annual internal professional engineering inspection of the management units occurred in 2009. Since these management units are not classified by regulation as dams the evaluation only included a visual inspection of the units. AmerenUE has formed a Dam Safety Group consisting of civil and geotechnical engineers who oversee the implementation

of the company Dam Safety Program and this Group is supervised by a licensed Professional Engineer. The Dam Safety Program requires routine, annual and special inspection of the ash ponds and employees performing these inspections receive dam safety training. If maintenance issues are identified in these visual inspections, then corrective actions are taken by either plant employees or contractors to remedy the issue and final acceptance of the work is reviewed and evaluated by Dam Safety Group personnel.

6. No State, or Federal regulatory official has inspected or evaluated the safety (structural integrity) of the management unit(s), and we are not aware of a planned state or federal inspection or evaluation in the future.

7. Not applicable, see response to Question 6.

8. See table below.

Management Unit	**Surface Area (Acres)**	**Total Storage Capacity (Acre-ft)**	**Volume of Stored Ash (Acre-ft)**	**Maximum Height of Unit (ft.)**
Fly Ash Pond	60	960	676	22
Bottom Ash Pond	47	2,100	1,859	27

9. Assuming that brief history means incident(s) which could have occurred in the last ten (10) years, we are not aware of any spills or unpermitted releases of coal-combustion by-products from our surface impoundments to surface water or to the land.

10. The current legal owner and operator at the facility is AmerenUE

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

May 4, 2009

Mr. Richard Kinch
US Environmental Protection Agency (53306P)
!200 Pennsylvania Avenue, NW
Washington, DC 20460

Ameren

RE: Request for Information under Section 104 (e) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9604(e)

Dear Mr. Kinch:

This letter is in response to the letter sent to Mr. Thomas Voss who is the Chief Executive Officer of AmerenUE regarding the United States Environmental Protection Agency's request for information relating to the surface impoundments or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material from a surface impoundment 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.

AmerenUE operates four coal-fired power stations in Missouri and responses for those facilities were sent to you within the required ten (10) business days of receipt of their letters. AmerenUE has no additional facilities which have surface impoundments or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material from a surface impoundment 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.

Although our surface impoundments are not considered to be dams by State or Federal regulations, we are subject to State and Federal NPDES regulations and have had Agency personnel inspect these units. We are providing a full and complete response to each separate request for information set forth in your Enclosure A (attached) with responses corresponding to numbering in your questions. If you have any further questions please feel free to contact Paul Pike at (314) 554-2388.

I certify that the information contained in this response to EPA's request for information and the accompanying documents is true, accurate, and complete. As to the identified portions of this response for which I cannot personally verify their accuracy, I certify under penalty of law that this response and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Sincerely,

Michael L. Menne
Vice President – Environmental Services

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

March 26, 2009

Mr. Richard Kinch
US Environmental Protection Agency (53306P)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: Request for Information under Section 104 (e) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9604(e)

Dear Mr. Kinch:

This letter and attachments are AmerenUE's response to the United States Environmental Protection Agency's request for information relating to the surface impoundments or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material from a surface impoundment 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.

AmerenUE operates four coal-fired power stations in Missouri. Although our surface impoundments are not considered to be dams by State or Federal regulations, we are subject to State and Federal NPDES regulations and have had Agency personnel inspect these units. We are providing a full and complete response to each separate request for information set forth in your Enclosure A (attached) with responses corresponding to numbering in your questions. If you have any further questions please feel free to contact Paul Pike at (314) 554-2388.

I certify that the information contained in this response to EPA's request for information and the accompanying documents is true, accurate, and complete. As to the identified portions of this response for which I cannot personally verify their accuracy, I certify under penalty of law that this response and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, those persons directly responsible for gathering the information, the information submitted is, to the best of my

knowledge, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Sincerely,

Michael L. Menne
Vice President – Environmental Services

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.:	MO-0000353
Owner:	Union Electric Company dba AmerenUE
Address:	One Ameren Plaza, PO Box 66149 (MC 602), St. Louis, MO 63166
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	AmerenUE, Sioux Power Plant
Address:	8501 North State Route 94, West Alton, MO 63386
Legal Description:	USG Survey 1838, T48N, R6E, St. Charles County
Receiving Stream:	Mississippi River (P)
First Classified Stream and ID:	Mississippi River (P) (00001)
USGS Basin & Sub-watershed No.:	(07110009-030004)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

See page 2

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

April 16, 2004
Effective Date

Stephen M. Mahfood, Director, Department of Natural Resources
Executive Secretary, Clean Water Commission

April 15, 2009
Expiration Date

Jim Hull, Director of Staff, Clean Water Commission

FACILITY DESCRIPTION (continued)

Outfall #001 - Power Plant - SIC #4911
Non-contact cooling water discharge.
Design flow is 1,344 MGD.
Actual flow is 863 MGD.

Outfall #002 - Power Plant - SIC #4911
Ash pond/pH neutralization.
Design flow is 16.662 MGD.
Actual flow is 4.855 MGD.

Outfall #002A - Power Plant - SIC #4911
Flow equalization/extended aeration/sludge holding tank/sludge disposal is by contract hauler.
Design population equivalent is 170.
Design flow is 0.039 MGD.
Actual flow is 0.005 MGD.
Design sludge production is 3.06 dry tons/year.

Outfall #003 - Power Plant - SIC #4911
Emergency overflow from the combined drain sump.
Design flow is 3.48 MGD.

Outfalls #004 & #005 - Power Plant - SIC #4911
These outfalls still exist but are not currently being monitored due to Implementation of Best Management Practices & minimal risk to waters of the state.

Outfall #006 - Power Plant - SIC #4911
Ash pond #2/pH neutralization.
Design flow is 13.656 MGD.
Actual flow is 5.64 MGD.
This outfall will receive storm water from chipped tire pile.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #001 - Non-Contact Cooling Water						
Flow	MGD	*		*	once/weekday**	24 hr. estimate
Intake Water Temperature	°F	*		*	once/weekday**	grab
Effluent Temperature	°F	*		*	once/weekday**	grab
Thermal Discharge (Internal Energy Increase)	btu/hr	5.50×10^9			once/weekday**	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE June 28, 2004.						
Whole Effluent Toxicity (WET) Test	% Survival	See Special Condition #1			once/year	grab
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE October 28, 2004.						
Outfall #002 - Ash Pond						
Flow	MGD	*		*	once/week	24 hr. estimate
Intake Total Suspended Solids***	mg/L	*		*	once/week	grab
Effluent Total Suspended Solids***	mg/L	*		*	once/week	grab
Net Total Suspended Solids	mg/L	100		30	once/week	grab
Oil and Grease	mg/L	20		15	once/month	grab
pH - Units	SU	****		****	once/week	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE June 28, 2004.						
Sulfate (as SO_4^{-2})	mg/L	*		*	once/quarter*****	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE July 28, 2004.						
Whole Effluent Toxicity (WET) Test	% Survival	See Special Condition #1			once/year in January	grab
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE October 28, 2004. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Parts I & III STANDARD CONDITIONS DATED October 1, 1980 and August 15, 1994, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #002A - Sewage Treatment Plant						
Flow	MGD	*		*	once/month	24 hr. estimate
Biochemical Oxygen Demands	mg/L		45	30	once/quarter*****	******
Total Suspended Solids	mg/L		45	30	once/quarter*****	******
pH - Units	SU	****		****	once/quarter*****	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE July 28, 2004.						
Outfall #003 - Emergency Overflow From Sump						
Flow	MGD	*		*	once/day when discharge occurs	24 hr. estimate
Total Suspended Solids	mg/L	100		30	once/day when discharge occurs	grab
Oil and Grease	mg/L	20		15	once/day when discharge occurs	grab
pH - Units	SU	****		****	once/day when discharge occurs	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE June 28, 2004. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Parts I & III STANDARD CONDITIONS DATED October 1, 1980 and August 15, 1994, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #006 - New Ash Pond						
Flow	MGD	*		*	once/week	24 hr. total
Intake Total Suspended Solids***	mg/L	*		*	once/week	grab
Effluent Total Suspended Solids***	mg/L	*		*	once/week	grab
Net Total Suspended Solids***	mg/L	100		30	once/week	grab
Oil and Grease	mg/L	20		15	once/month	grab
pH - Units	SU	****		****	once/week	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE June 28, 2004.						
Sulfate (as SO_4^{-2})	mg/L	*		*	once/quarter*****	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE July 28, 2004.						
Whole Effluent Toxicity (WET) Test	% Survival	See Special Condition #1			once/year in January	grab
MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE October 28, 2004. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

B. STANDARD CONDITIONS

IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Parts I & III STANDARD CONDITIONS DATED October 1, 1980 and August 15, 1994, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.

MO 780-0010 (8/91)

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

* Monitoring requirement only.
** Sample once a weekday means: Monday, Tuesday, Wednesday, Thursday, and Friday.
*** Intake Non-Filterable Residue (Total Suspended Solids) values may be used to calculate "net" limitations. However, the permittee must continue to maintain the ash pond system for adequate retention time for settling. River solids present in intake water are "treated" in the ash pond system but treatment levels are dependent on concentration and types of river solids present in intake water.
**** pH is measured in pH units and is not to be averaged. The pH is limited to the range of 6.0-9.0 pH units.
***** Sample once per quarter in the months of February, May, August, and November.
****** A composite sample made up from a minimum of four grab samples collected within a 24-hour period with a minimum of two hours between each grab sample.

C. SPECIAL CONDITIONS

1. This permit may be reopened and modified, or alternatively revoked and reissued, to:
   (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
      (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
      (2) controls any pollutant not limited in the permit.
   (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.
   (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.

   The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.

2. Report as no-discharge when a discharge does not occur during the report period.

3. There shall be no discharge of polychlorinated biphenyl compounds.

4. Discharge of wastewater from this facility must not alone or in combination with other sources cause the receiving stream to violate the following:
   (a) Water temperatures and temperature differentials specified in Missouri Water Quality Standards shall be met.

5. Any pesticide discharge from any point source shall comply with the requirements of Federal Insecticide, Fungicide and Rodenticide Act, as amended (7 U.S.C. 136 et. seq.) and the use of such pesticides shall be in a manner consistent with its label.

6. Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day.

7. An upset provision, identical to the upset provision set forth at 40 CSR 122.41(n), is hereby incorporated in this permit.

8. Changes in Discharges of Toxic Substances

   The permittee shall notify the Director as soon as it knows or has reason to believe:
   (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
      (1) One hundred micrograms per liter (100 µg/L);
      (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
      (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
      (4) The level established in Part A of the permit by the Director.
   (b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.

9. Permittee will cease discharge by connection to areawide wastewater treatment system within 90 days of notice of its availability.

C. SPECIAL CONDITIONS (continued)

10. General Criteria. The following water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
    (a) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
    (b) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
    (c) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
    (d) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
    (e) There shall be no significant human health hazard from incidental contact with the water;
    (f) There shall be no acute toxicity to livestock or wildlife watering;
    (g) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
    (h) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

11. Sludge and Biosolids Use For Domestic Wastewater Treatment Facilities
    (a) Permittee shall comply with the pollutant limitations, monitoring, reporting, and other requirements in accordance with the attached permit Standard Conditions.
    (b) If sludge is not removed by a contract hauler, permittee is authorized to land apply biosolids. Permit Standard Conditions, Part III shall apply to the land application of biosolids. Permittee shall notify the department at least 180 days prior to the planned removal of biosolids. The department may require submittal of a biosolids management plan for department review and approval as determined appropriate on a case-by-case basis.

12. Use or Disposal of Ash from Power Plants

    a. Disposal of ash is not authorized by this permit.
    b. This permit does not pertain to permits for disposal of ash or exemptions for beneficial uses of ash under the Missouri Solid Waste Management Law and regulations.
    c. This permit does not authorize off-site storage, use or disposal of ash in regard to water pollution control permits required under 10 CSR 20-6.015 and 10 CSR 20-6.200.
    d. Subsurface discharges from wastewater treatment ponds or ash ponds shall, at the property boundary, meet the effluent limitations for subsurface waters of the state under 10 CSR 20-7.015(7), with appropriate consideration of up-gradient water quality.

13. Permittee is exempt from Clean Water Act section 311 reporting for sulfuric acid and sodium hydroxide as per 40 CFR 117.12.

C. SPECIAL CONDITIONS (continued)

14. Whole Effluent Toxicity (WET) tests shall be conducted as follows:

WET test samples shall be collected during a period of time when biocide residuals will be present in the effluent.

At the Ameren, UE Sioux Plant, Whole Effluent Toxicity (WET) tests will be required for Outfall #001 only if biocides are used. The WET test will only be required in the first year if the initial test passes. If the WET test does not pass in the first year, the test must be run annually for the duration of the permit or until biocide use is discontinued.

An initial WET test will be required for Outfall #002 (Ash Pond) and #006 (New Ash Pond). The WET test will only be required in the first year if it passes at all effluent concentrations. If the WET test does fail at any concentration in the first year, the test must be run annually for the duration of the permit.

(PRIVATE) SUMMARY OF WET TESTING FOR THIS PERMIT				
OUTFALL	A.E.C. %	FREQUENCY	SAMPLE TYPE	MONTH
Outfall #001	66%	Annually	grab	January
Outfall #002, #006	10%	Annually	grab	January

(a) Test Schedule and Follow-Up Requirements

(1) Perform a single-dilution test in the months and at the frequency specified above. If the effluent passes the test, do not repeat the test until the next test period.
Submit test results along with complete copies of the test reports as received from the laboratory within 30 calendar days of availability to the WPCP, Water Quality Section, P.O. Box 176, Jefferson City, MO 65102.

(2) If the effluent fails the test, a multiple dilution test shall be performed within 30 calendar days , and biweekly thereafter, until one of the following conditions are met:

(a) THREE CONSECUTIVE MULTIPLE-DILUTION TESTS PASS. No further tests need to be performed until next regularly scheduled test period.
(b) A TOTAL OF THREE MULTIPLE-DILUTION TESTS FAIL.

(3) The permittee shall submit a summary of all test results for the test series along with complete copies of the test reports as received from the laboratory to the WPCP, Planning Section, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the third failed test.

(4) Additionally, the following shall apply upon failure of the third test: A toxicity identification evaluation (TIE) or toxicity reduction evaluation (TRE) is automatically triggered. The permitee shall contact WPCP, Planning Section to ascertain as to whether a TIE or TRE is appropriate . The permittee shall submit a plan for conducting a TIE or TRE to the Planning Section of the WPCP within 60 calendar days of the date of DNR's direction to perform either a TIE or TRE. This plan must be approved by DNR before the TIE or TRE is begun. A schedule for completing the TIE or TRE shall be established in the plan approval.

C. SPECIAL CONDITIONS (continued)

14. Whole Effluent Toxicity (WET) (continued)

(a) Test Schedule and Follow-Up Requirements (continued)

(5) Upon DNR's approval, the TIE/TRE schedule may be modified if toxicity is intermittent during the TIE/TRE investigations. A revised WET test schedule may be established by DNR for this period.

(6) If a previously completed TIE has clearly identified the cause of toxicity, additional TIEs will not be required as long as effluent characteristics remain essentially unchanged and the permittee is proceeding according to a DNR approved schedule to complete a TRE and reduce toxicity. Regularly scheduled WET testing as required in the permit, without the follow-up requirements, will be required during this period.

(7) All failing test results shall be reported to WPCP, Planning Section, P.O. Box 176, Jefferson City, MO 65102within 14 calendar days of the availability of the results.

(8) When WET test sampling is required to run over one DMR period, each DMR report shall contain information generated during the reporting period.

(9) Submit a concise summary of all test results with the annual report.

(b) PASS/FAIL procedure and effluent limitations:

(1) To pass a single-dilution test, mortality observed in the AEC test concentration shall not be significantly different (at the 95% confidence level; $p = 0.05$) than that observed in the upstream receiving-water control sample. The appropriate statistical tests of significance will be those outlined in the most current USEPA acute toxicity manual or those specified by the MDNR.

(2) To pass a multiple-dilution test:

(a) the computed percent effluent at the edge of the zone of initial dilution, Acceptable Effluent Concentration (AEC), must be less than three-tenths (0.3) of the LC_{50} concentration for the most sensitive of the test organisms; or,
(b) all dilutions equal to or greater than the AEC must be nontoxic. Failure of one multiple-dilution test is an effluent limit violation.

(c) Test Conditions

(1) Test Type: Acute Static non-renewal

(2) Test species: Ceriodaphnia dubia and Pimephales promelas (fathead minnow). Organisms used in WET testing shall come from cultures reared for the purpose of conducting toxicity tests and cultured in a manner consistent with the most current USEPA guidelines. All test animals shall be cultured as described in the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.

(3) Test period: 48 hours at the "Acceptable Effluent Concentration" (AEC) specified above.

C. SPECIAL CONDITIONS (continued)

14. Whole Effluent Toxicity (WET) (continued)

(c) Test Conditions (continued)

(4) When dilutions are required, upstream receiving stream water shall be used as dilution water. If upstream water is unavailable or if mortality in the upstream water exceeds 10%, "reconstituted" water will be used as dilution water. Procedures for generating reconstituted water will be supplied by the MDNR upon request.

(5) Single-dilution tests will be run with:
(a) Effluent at the AEC concentration;
(b) 100% receiving-stream water (if available), collected upstream of the outfall at a point beyond any influence of the effluent; and
(c) reconstituted water.

(6) Multiple-dilution tests will be run with:
(a) 100%, 50%, 25%, 12.5%, and 6.25% effluent, unless the AEC is less than 25% effluent, in which case dilutions will be 4 times the AEC, two times the AEC, AEC, 1/2 AEC and 1/4 AEC;
(b) 100% receiving-stream water (if available), collected upstream of the outfall at a point beyond any influence of the effluent; and
(c) reconstituted water.

(7) If reconstituted-water control mortality for a test species exceeds 10%, the entire test will be rerun.

SUMMARY OF TEST METHODOLOGY FOR WHOLE-EFFLUENT TOXICITY TESTS

Whole-effluent-toxicity test required in NPDES permits shall use the following test conditions when performing single or multiple dilution methods. Any future changes in methodology will be supplied to the permittee by the Missouri Department of Natural Resources (MDNR). Unless more stringent methods are specified by the DNR,the procedures shall be consistent with the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms,

Test conditions for Ceriodaphnia dubia:

Test duration:	48 h
Temperature:	25 ± 1°C Temperatures shall not deviate by more than 3°C during the test.
Light Quality:	Ambient laboratory illumination
Photoperiod:	16 h light, 8 h dark
Size of test vessel:	30 mL (minimum)
Volume of test solution:	15 mL (minimum)
Age of test organisms:	<24 h old
No. of animals/test vessel:	5
No. of replicates/concentration:	4
No. of organisms/concentration:	20 (minimum)
Feeding regime:	None (feed prior to test)
Aeration:	None
Dilution water:	Upstream receiving water; if no upstream flow, synthetic water modified to reflect effluent hardness.
Endpoint:	Pass/Fail (Statistically significant Mortality when compared to upstream receiving water control or synthetic control if upstream water was not available at $p \leq 0.05$)
Test acceptability criterion:	90% or greater survival in controls

Test conditions for (Pimephales promelas):

Test duration:	48 h
Temperature:	25 ± 1°C Temperatures shall not deviate by more than 3°C during the test.
Light Quality:	Ambient laboratory illumination
Photoperiod:	16 h light/ 8 h dark
Size of test vessel:	250 mL (minimum)
Volume of test solution:	200 mL (minimum)
Age of test organisms:	1-14 days (all same age)
No. of animals/test vessel:	10
No. of replicates/concentration:	4 (minimum) single dilution method 2 (minimum) multiple dilution method
No. of organisms/concentration:	40 (minimum) single dilution method 20 (minimum) multiple dilution method
Feeding regime:	None (feed prior to test)
Aeration:	None, unless DO concentration falls below 4.0 mg/L; rate should not exceed 100 bubbles/min.
Dilution water:	Upstream receiving water; if no upstream flow, synthetic water modified to reflect effluent hardness.
Endpoint:	Pass/Fail (Statistically significant Mortality when compared to upstream receiving water control or synthetic control if upstream water was not available at $p \leq 0.05$)
Test Acceptability criterion:	90% or greater survival in controls

1. **Looking at discharge to Bottom Ash channel from plant.**

2. **Looking at Bottom Ash channel from the plant discharge pipes.**

3. **Looking at the discharge pipes and channel.**

4. Looking West at inlet of permanent pool control device.

5. Looking at interior lined riprap slope problem.

6. Looking Northwest at North side of Bottom Ash Pond.

7. Looking at North side and Northeast corner of Bottom Ash Pond.

8. Runoff erosion in Bottom Ash Pond.

9. Top of embankment looking West. Note - Bottom Ash along embankment.

9A. Looking West along access road to bottom of embankment.

10. Looking West along embankment. Note – heavy vegetation along inside slope of embankment.

11. Seep location approximately 75' from toe of embankment and flows to the Mississippi River. Note – seep water is clear and being monitored by weekly inspection team.

12. Riprap on slope – repair of eroded area.

13. Seepage channel to Mississippi River.

14. Erosion area by riprap. Note - material looks like bottom ash.

15. Erosion area by riprap. Note - material looks like bottom ash.

16. Looking West where the riprap slope problem stops. Note - vegetation along bank.

17. Looking at North side of Bottom Ash Pond and slope protection.

18. Looking at North side of Bottom Ash Pond. Note - vegetation and riprap.

18A. Looking West at stream adjacent to the embankment. Inspection of bank are completed weekly/annual.

19. Looking North along embankment. Note - wide top width.

20. Looking South at inlet control structure.

21. Looking Southeast across Bottom Ash Pond.

22. Boring location for the stability analysis of embankment.

22A. Looking North along top of embankment and slope to channel.

23. Looking North at wide embankment section and North side of Bottom Ash Pond.

24. Looking at debris control device around inlet control structure.

25. Inlet control structure and emergency gate to stop discharge flow.

25A. Looking North at stream.

26. Note - wave action along bank.

27. Water surface measuring device at outlet control structure.

28. Looking Southeast along embankment.

28A. Looking Southeast along toe of embankment. Riprap placed after major tree removal activity.

29. Looking down embankment at riprap section along toe of embankment

30. Looking North across Bottom Ash Pond at the wider top width section along East side of pond.

31. Repair of eroded area lined with riprap.

32. Exterior slope along Southwest side lined with riprap.

33. Looking Southeast along top of embankment. Note - some maintenance area to reduce runoff erosion.

33A. Looking Northwest at toe of embankment.

34. Looking East along top of embankment. Note - area not considered part of embankment see photo 36.

35. Erosion area caused by surface runoff.

36. Looking West along access road and top of embankment. Note - area not considered part of embankment.

37. Maintenance of erosion area.

38. Looking East along access road.

39. Looking Southeast at Fly Ash Pond and location of inlet structure.

40. Looking at outlet pipe from Fly Ash Pond.

41. Look at access to outlet pipe from Fly Ash Pond.

42. Looking South along top of embankment. Note - railroad and access road to plant. Very wide top width is 75 yards.

43. Fly Ash Pond outlet erosion control to reduce velocity.

44. Looking East along interior of embankment. Note - Fly Ash Pond was lined in 1993.

45. Looking at West side of Fly Ash Pond.

46. Looking at debris control and measuring device at inlet structure.

47. Looking Southeast across Fly Ash Pond.

48. Looking South at embankment and lined slopes.

49. Looking at riprap that is used to repair surface runoff erosion.

50. Looking East across Fly Ash Pond.

51. Looking East along top of embankment. Note - railroad used 2-3 times a week for plant use only; 30' wide top width.

52. Looking at Northwest corner of Fly Ash Pond.

53. Looking at low wetland area and channel adjacent to toe of embankment.

54. Looking West along top of embankment.

55. Looking East along top of embankment. Note - top width increases for 2x the width of the South side of the Fly Ash Pond embankment .

56. Looking East along embankment. Top width is approximately 40'.

57. Looking North across Fly Ash Pond.

58. Looking at Southeast corner of Fly Ash Pond.

59. Looking Northeast along embankment. Note - wide top width.

60. Looking North along top of embankment.

61. Looking toward the area to the East of the embankment.

62. Looking Southeast at Fly Ash roadway.

63. Looking Northwest along embankment. Note - fill on both sides of embankment.

64. Looking at liner under fill material (Fly Ash).

65. Looking at construction staging area within Fly Ash Pond.

66. Looking South at channel in fill area. Note - channel flowing into pool area.

67. Outfall channel from plant into Fly Ash Pond.

68. Outfall pipes.

69. Outfall channel – Note - heavy Fly Ash in channel.

70. Looking along embankment and repair measures addressing runoff erosion.

71. Looking at pond embankment and liner. Note - fill material (Fly Ash) over liner.

72. Looking South along embankment.

73. Looking at Northwest corner of Fly Ash Pond.

Site Name:	**Sioux**	**Date:**	**September 30, 2010**
Unit Name:	**Fly Ash Pond**	**Operator's Name:**	**AmerenUE**
Unit I.D.:	**Fly Ash**	**Hazard Potential Classification:**	**High** ☐ **Significant** ☐ **Low** X
	Inspector's Name:	Jeffrey Crabtree, PE and James Filson, PE	

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 and Annually		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)? 9/30/10reading	440		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)? plans	434.5		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		X	Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)? plans	441.5		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	X		Is water exiting outlet flowing clear?	X	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below): **See Note**		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?		X	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	X		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		
17. Cracks or scarps on slopes?	X		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.

Issue #	Comments
#6	Pool elevation is recorded weekly.
#17	Minor erosion from runoff – evidence of erosion corrective measures part of action plan from weekly inspections
#21	Unable to inspect toe area due to wet low area South of unit
Note:	Liner installed in 1993, Railroad on embankment of units for facility use only

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit MO-0000353 **INSPECTOR**

Date 4/16/04 to 4/15/09
Impoundment Name Sioux

Impoundment Company AmerenUE
EPA Region Region 7

State Agency State of Missouri
(Field Office) Address Department of Natural Resources
Name of Impoundment Fly Ash

(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 and ph neutralization

Nearest Downstream Town Name: West Alton

Distance from the impoundment:

Location:

Latitude	38	Degrees	54	Minutes	30.25	Seconds	**N**
Longitude	90	Degrees	17	Minutes	27.32	Seconds	**W**

State Missouri **County** St. Charles

	Yes	No
Does a state agency regulate this impoundment?	☐	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.

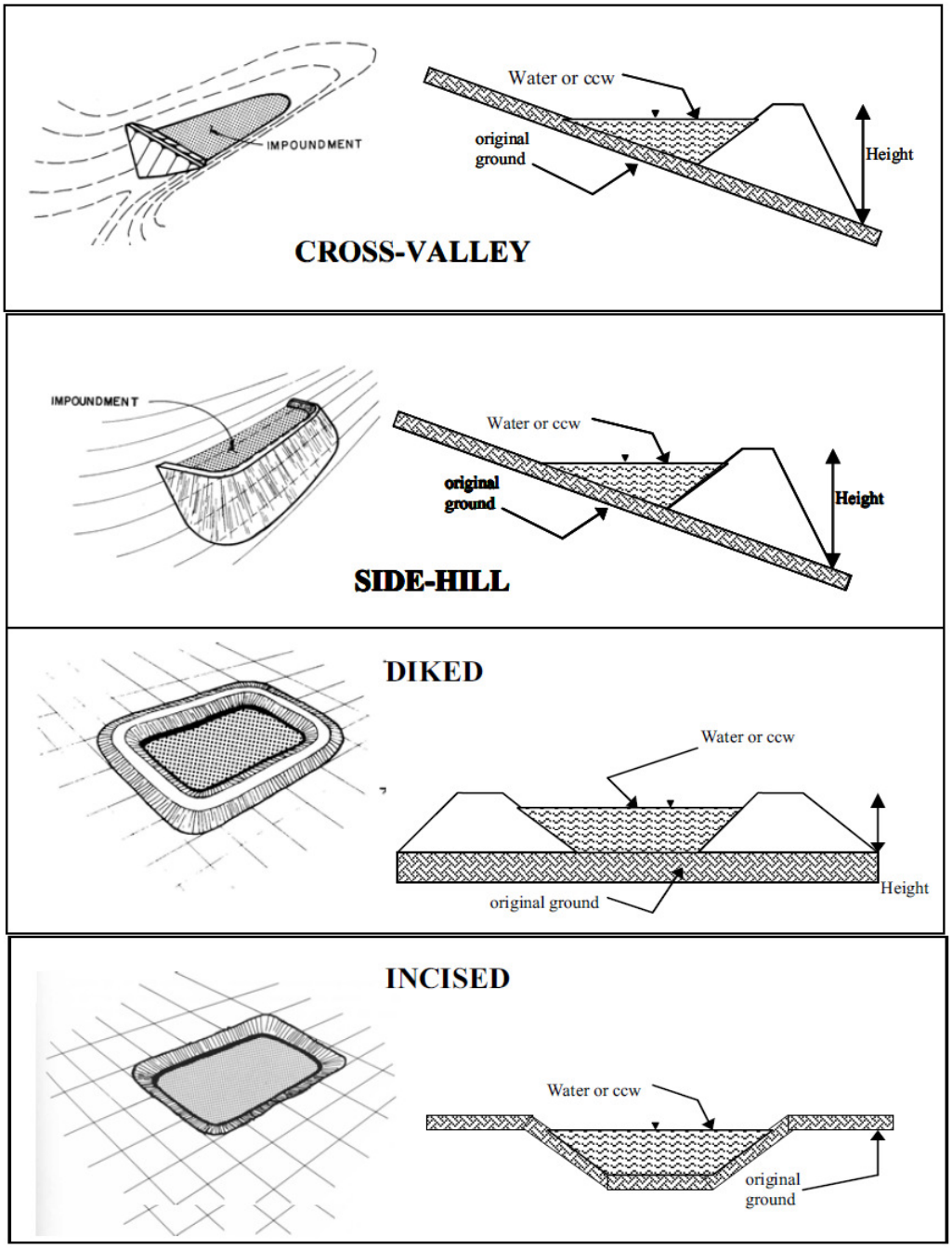
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Early assessment is determined to be low based on site assessment only. Visual assessment of unit was conducted and wet low (drainage swale for offsite area) area along the south side of this unit. AmerenUE has been monitoring this location as noted in their annual inspection report. Units and site in good conditions. AmerenUE has a dam safety group which oversees the unit and conducts weekly inspections.

The unit was lined in 1993 and a railroad track is along the top of the embankment. The railroad is used 2-3 times a week for coal deliveries. The embankment top widths are approximately 50-75 ft. AmerenUE are current conducting a stability analysis for this unit and final assessment of embankment will be determined once this report is reviewed. The report is anticipated to be completed by the end of the year.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill X Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	22’	**Embankment Material**	Unknown –Stability Analysis to be completed by end of year
Pool Area (ac)	60’	**Liner**	Yes, Lined
Current Freeboard (ft)	2’	**Liner Permeability**	

TYPE OF OUTLET (Mark all that apply)

N/A **Open Channel Spillway**

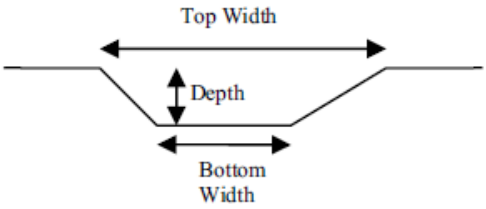
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

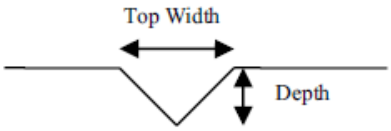
average bottom width (ft)

top width (ft)

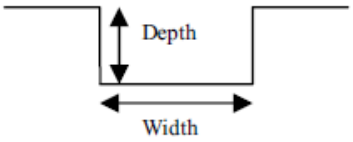
TRAPEZOIDAL



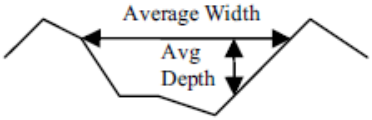
TRIANGULAR



RECTANGULAR

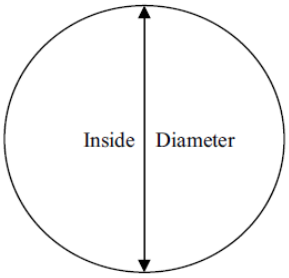


IRREGULAR



X **Outlet**

18” inside diameter



Material

- ☐ corrugated metal
- ☐ welded steel
- ☐ concrete
- X plastic (hdpe, pvc, etc.)
- ☐ other (specify):

	Yes	No
Is water flowing through the outlet?	X	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

	Yes	No
Has there ever been a failure at this site?	☐	X

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	X
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	X
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

Not available – However, Stability Analysis of Unit will be completed by end of this year. Visible inspection did not see any issues, liner and slopes is good condition.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

No – requested a copy of Stability Analysis for this assessment

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

No-

Site Name:	**Sioux**	**Date:**	**September 30, 2010**
Unit Name:	**Bottom Ash Pond**	**Operator's Name:**	**AmerenUE**
Unit I.D.:	**Bottom Ash**	**Hazard Potential Classification:**	**High** ☐ **Significant** X **Low** ☐
	Inspector's Name:	Jeffrey Crabtree, PE and James Filson, PE	

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 and Annually		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)? 9/30/10 reading	434		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	plan		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?		X	Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	443		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	plans		Is water exiting outlet flowing clear?	X	
7. Is the embankment currently under construction?		X	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)?		X	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?	X	
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	X		From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?	X	
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

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.

Issue #	Comments
#4	Spillway/Control – bulkhead with gate structure inside riser – Outfalls through a 30" pipe.
#9	Tree on embankment at end of "Embankment" embankment classification by AmerenUE Dam Safety Group based on not impounding water.
#12	No trash rack but floating device and area clear of debris
#17	Erosion in small areas (south side) and riprap placed a exterior (North and South sides) and interior (North and NW corner)
#19	Minor is areas – noted on weekly and annual report, being monitored.
#21	Seep in NE corner (Clearwater exiting from toe area) and AmerenUE are monitoring.

#23	West side – Channel adjacent to toe, unable to assess area. Incised channel flow adjacent to toe. This area is inspected by Ameren during their weekly and annual inspections.

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit MO-0000353 **INSPECTOR**

Date 4/16/04 to 4/15/09
Impoundment Name Sioux

Impoundment Company AmerenUE
EPA Region Region 7

State Agency State of Missouri
(Field Office) Address Department of Natural Resources
Name of Impoundment Bottom Ash outfall 002

(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 and ph neutralization

Nearest Downstream Town Name: West Alton

Distance from the impoundment:

Location:

Latitude	38	Degrees	54	Minutes	46.62	Seconds	**N**
Longitude	90	Degrees	17	Minutes	42.43	Seconds	**W**

State Missouri **County** St. Charles

	Yes	No
Does a state agency regulate this impoundment?	☐	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.

☐ **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.

x **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.

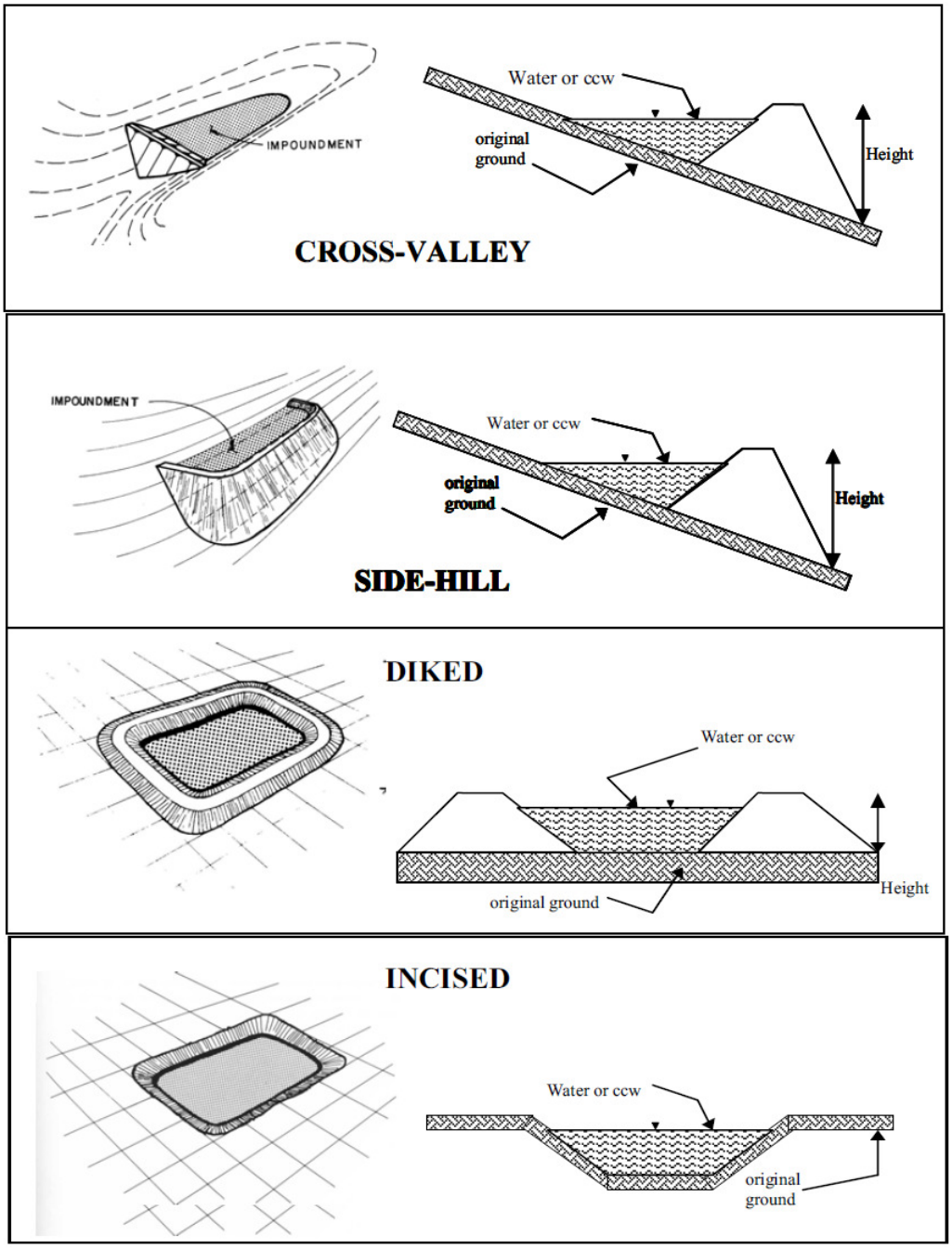
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Early assessment is determined to be appears to be low based on site assessment only; however, unknown embankment material pushes us to a significant hazard. Visual assessment of unit was conducted and site in good conditions. AmerenUE has been monitoring this location as noted in their annual inspection report. AmerenUE has a dam safety group which oversees the unit and conducts weekly inspections.

The unit is not lined. The embankment top widths are approximately 30-75 ft. The material of this embankment is unknown and unable to determine. AmerenUE is currently conducting a stability analysis for this unit and final assessment of embankment will be determined once this report is reviewed. The report is anticipated to be completed by the end of the year.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill X Diked

☐ Incised (form completion optional) ☐ Combination Incised/Diked

Embankment Height (ft)	27’	**Embankment Material**	Unknown –Stability Analysis to be completed by end of year
Pool Area (ac)	47ac	**Liner**	No
Current Freeboard (ft)		**Liner Permeability**	

TYPE OF OUTLET (Mark all that apply)

N/A **Open Channel Spillway** (Spillway tied to outlet pipe)

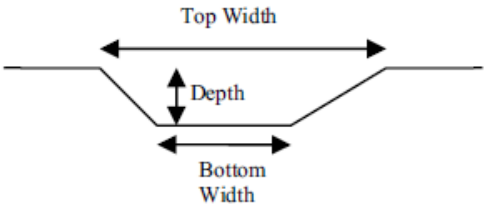
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

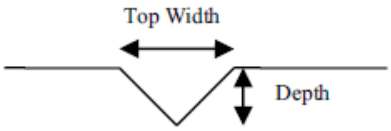
average bottom width (ft)

top width (ft)

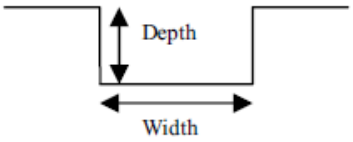
TRAPEZOIDAL



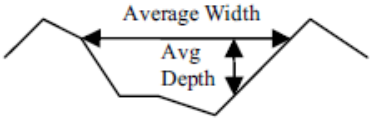
TRIANGULAR



RECTANGULAR

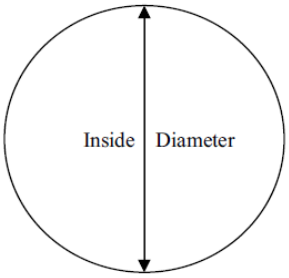


IRREGULAR



X **Outlet**

30” inside diameter



Material

- ☐ corrugated metal
- ☐ welded steel
- X concrete
- ☐ plastic (hdpe, pvc, etc.)
- ☐ other (specify):

	Yes	No
Is water flowing through the outlet?	X	☐

☐ **No Outlet**

☐ **Other Type of Outlet** (specify):

	Yes	No
Has there ever been a failure at this site?	☐	X

If So When?

If So Please Describe :

	Yes	No
Has there ever been significant seepages at this site?	☐	X
If So When?		

If So Please Describe :

	Yes	No
Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site?	☐	X
If so, which method (e.g., piezometers, gw pumping,...)?		

If So Please Describe :

ADDITIONAL INSPECTION QUESTIONS

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

Not available – However, Stability Analysis of Unit will be completed by end of this year. Visible inspection did not see any issues, liner and slopes is good condition.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

No – requested a copy of stability Analysis for this assessment

From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

No-