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Coal Combustion Waste Impoundment
Round 7 - Dam Assessment Report

Meramec Power Station (Site #002)

AmerenUE
St. Louis, Missouri

Prepared for:

United States Environmental Protection Agency
Office of Resource Conservation and Recovery

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INTRODUCTION, SUMMARY, CONCLUSION AND RECOMMENDATIONS

The release of over five million cubic yards of coal ash 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. A first step to prevent such catastrophic failure and damage is to assess the stability and functionality of ash impoundments and other units, then quickly take any needed corrective measures.

This assessment of the stability and functionality of the Meramec Power Station coal combustion waste (CCW) management units is based on a review of available documents and on the site assessment conducted by Dewberry personnel on September 29, 2010. We found the supporting technical information to be limited (Section 1.1.3). As detailed in Section 1.2 there are several recommendations that may help to maintain a safe and trouble-free operation.

In summary, the Meramec Power Station CCW bottom ash pond, Pond 4, is rated **POOR**, all other CCW ponds are rated **FAIR** for continued safe and reliable operation (Section 1.1.8). The rating is influenced by the lack of critical engineering data for the dam that impounds the CCW pond. Evaluation and ratings are subject to change based on receipt of the requested Embankment Stability Analysis which is anticipated to be completed at the end of the 2010. The stability study was on-going at the time of site assessment and was requested at that time.

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 units) 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 impoundment contents. 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 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.)

In March 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 asked utility companies to identify all management units, such as surface impoundments or similar diked or bermed structures and landfills receiving liquid-borne materials, that store or dispose of coal-combustion residuals or by-products, including, but not limited to, fly ash, bottom ash, boiler slag, and flue gas emission control residuals. Utility companies responded with information on the size, design, age, and the amount of material placed in the units so that EPA could gauge which management units had or potentially could rank as having High Hazard Potential. The USEPA and its contractors used the following definitions for this study:

> "Surface Impoundment or impoundment means a facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling and aeration pits, ponds, and lagoons."
>
> For this study, the earthen materials could include coal combustion residuals. EPA did not provide an exclusion for small units based on whether the placement was temporary or permanent. Furthermore, the study covers not only waste units designated as surface impoundments, but also other units designated as landfills which receive free liquids.
>
> EPA is addressing any land-based units that receive fly ash, bottom ash, boiler slag, or flue gas emission control wastes along with free liquids. If the landfill is receiving coal combustion wastes with liquids limited to that for proper compaction, then there should not be free liquids present and the EPA did not seek information on such units which are appropriately designated a landfill.
>
> In some cases coal combustion wastes are separated from the water, and the water containing de minimus levels of fly ash, bottom ash, boiler slag, or flue gas emission control wastes are sent to an impoundment. EPA is including such impoundments in this study, because chemicals of concern may have leached from the solid coal combustion wastes into the waster waters, and the suspended solids from the coal combustion wastes remain.

The purpose of this report is to evaluate the condition and potential of waste release from management units. **Management units at this site have not been rated for hazard potential classification**. A two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal agencies regarding the unit potential

hazard classification (if any) and accepted information provided via telephone communication with a management unit representative.

This evaluation included a site visit. EPA sent two engineers, one licensed in the State of Missouri, for a one-day visit. The two-person team met with the technical and management representatives of the management unit(s) to discuss the engineering characteristics of the unit as part of the site visit. During the site visit the team collected additional information about the management unit(s) to be used in determining the hazard potential classifications of the management unit(s). Subsequent to the site visit the management unit owner provided additional engineering data pertaining to the management unit(s).

Factors considered in determining the hazard potential classification of the management unit(s) included the age and size of the impoundment, the quantity of coal combustion residuals or by-products that were stored or disposed in the 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). For evaluating the dams, the team considered criteria under the National Inventory of Dams in making these determinations.

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.

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1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from our one-day site visit and review of technical and historical documentation provided by AmerenUE.

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

No stability analyses of the perimeter embankment levee were provided for review. An Embankment Stability Analysis Study of the embankment levee at Pond 4 was on-going at the time of the site assessment; the study is anticipated to be completed at the end of the year. On the basis of Dewberry engineers' visual observations and review of limited available information, the embankment levees probably have adequate stability under static loading conditions (see Section 7.3). A moderate earthquake is possible in the area. The stability of the dams during a strong earthquake is unknown, but the apparent absence of poor foundation soil conditions, and satisfactory static stability performance over 45 years of service are favorable indications that the embankment could perform satisfactorily during an earthquake. The outlet structures observed appear to be in sound and stable condition with no visual evidence of significant deterioration.

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

No hydrologic/hydraulic analyses of the CCW basins were provided for review. On the basis of the 45-year experience record in which there have been no apparent issues with safe containment of water in the basins during significant flooding events, the ash ponds are believed to have substantial hydrologic/hydraulic safety. However, based on 2004 Army Corps of Engineers (USACE) 100-year Mississippi River flood elevation and FEMA August 2, 1995 Flood Insurance Rate Map 29189C0415 H, Meramec Power Station would be inundated during a 100-year flood. The hydrologic/hydraulic safety should be verified for flood conditions by documented analysis.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

Supporting technical documents are limited. The original design documentation was partially illegible and the design sequence was not identified. 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. Embankment

stability analysis is unavailable until the report is finalized by the end of 2010. A copy has been requested.

The supporting hydrologic/hydraulic documentation for the CCW ponds is considered inadequate at this time.

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

Documentation of descriptions of the CCW ponds were not provided. AmerenUE employee descriptions of the CCW ponds were appropriate and sufficient.

1.1.5 Conclusions Regarding the Field Observations

The embankment levee appeared maintained, safe, and structurally sound. There are no apparent indications of any unsafe conditions. The visible parts of the embankment levee and outlet structures were observed to have no signs of overstress, significant settlement, shear failure, or other signs of instability. Erosion on the inside slope and wooden retaining wall failure was observed at Pond 1. Runoff erosion was observed on the outside slope of the perimeter levee embankment. The outside slope of the levee embankment was observed to be covered in tall grass and brush. An indication of seepage was observed at the outside toe of Pond 4, although visual observations were severely hampered by the presence of tall vegetation. Runoff erosion is being managed through a maintenance program. The seepage area is being monitored and inspected per weekly inspection reports.

1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation

No evidence of major repairs to the embankments or prior releases was observed during the field assessment. Evidence of slope repair due to erosion on the outside slope of the perimeter levee was observed. Maintenance and methods of operation are adequate.

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

The surveillance program is generally adequate. The informal weekly and formal annual internal inspections by AmerenUE engineers are of sufficient frequency and should continue. Internal inspection of the outlet structures should be performed at a frequency of at least once every 5 years and documented. There is no dam monitoring program in place that includes such instruments as observation wells/piezometers, settlement monitoring points, inclinometers, seepage monitoring points, etc. However, piezometers were installed on the embankment of Pond 7 for ash excavation purposes. Program pond discharge

monitoring is in place and will continue in accordance with Missouri Department of Natural Resources (MDNR) Division of Environmental Quality permit requirements.

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation

In accordance with EPA criteria CCW ponds are rated **FAIR** for continued safe and reliable operation, except for Pond 4. **Pond 4 is rated POOR**. The rating is influenced by the lack of critical engineering data for the dam that impounds the CCW pond. See Table 1.1 for structural stability rating. Implementation of recommendations as presented below would help improve the rating.

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.

1.2 RECOMMENDATIONS

1.2.1 Recommendations Regarding the Structural Stability

None appear warranted at this time to satisfy a critical need. An embankment stability analysis is being 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 review and document the design flood for the CCW basins. It is also recommended that AmerenUE review and document the effects of the 100-year frequency rainfall event with the Mississippi River flood elevation on the plant.

1.2.3 Recommendations Regarding the Supporting Technical Documentation

Provide documentation as recommended above in Subsections 1.2.1 and 1.2.2.

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

Documented descriptions of the CCW ponds and operational procedures were not provided. It is recommended that the purpose and processes within the CCW ponds be summarized in an operations manual.

1.2.5 Recommendations Regarding the Field Observations

None appear warranted at this time.

1.2.6 Recommendations Regarding the Maintenance and Methods of Operation

It is recommended that woody vegetation be removed from embankment slopes and groin areas, and embankment slopes and toe areas be mowed at least twice annually.

It is recommended that the seepage area observed at the outside toe of Pond 4 continue to be monitored for changed conditions.

It is recommended that the inside slope and retaining wall of Pond 1 be monitored and maintained.

1.2.7 Recommendations Regarding the Surveillance and Monitoring Program

It is recommended that internal inspection of the outlet structures be performed at a frequency of at least once every 5 years and be documented with a written report.

1.2.8 Recommendations Regarding Continued Safe and Reliable Operation

No additional recommendations for continued safe and reliable operation appear warranted at this time.

1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

*Jeffrey Crabtree, Dewberry
*James Filson, Dewberry
*Matthew Frerking, AmerenUE
*Paul Pike, AmerenUE
*Richard Fleschner, AmerenUE
*Steve Weiss, AmerenUE

*Participated in field dam inspections.

1.3.2 Acknowledgement and Signature

We acknowledge that the management units referenced herein at Meramec Power Station have been assessed on September 29, 2010.

_____

Jeffrey Crabtree, PE
Registered, MO E-2001000889

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James Filson, PE

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

2.1 LOCATION AND GENERAL DESCRIPTION

The Meramec Power Station (Meramec PS) is physically located north of the confluence of the Mississippi and Meramec River on the southern point of St. Louis County, Missouri, approximately 2.8 miles southeast of Arnold. The Meramec PS is located on Fine Road, Saint Louis, Missouri 63129. The Missouri Pacific railroad is to the southeast of Meramec PS. See Appendix A – Doc. 1.1 for location of the Meramec PS on an aerial map.

Meramec PS has ten impoundments used for managing coal combustion waste (CCW) that are designated as Retention Pond (Pond 1), Old Fly Ash Pond #489 (Pond 2), New Fly Ash Pond #498 (Pond 3), Bottom Ash Pond #493 (Pond 4), Bottom Ash Pond #492 (Pond 5), Bottom Ash Pond #496 (Pond 6), Fly Ash Pond #494 (Pond 7), Fly Ash Pond #495 (Pond 8), Fly Ash Pond #490 (Pond 9), Fly Ash Pond #491 (Pond 10).

A single perimeter levee creates the impoundment around the west and south sides, and ties into high existing ground on the northeast and southeast side. No offsite drainage enters the impoundment. A private railroad embankment is within the perimeter levee of the plant, and connects to the Missouri Pacific railroad. The perimeter levee forms the embankments of Pond 1, 2, 4, 7, and 8. (Note: The terms “dike” and “dam” are used interchangeably in this report, as are the terms “pond” and “basin.”)

The ponds are characterized as follows:

- Pond 1 is active and receives surface stormwater and discharge from Ponds 3 and 4 at the Meramec PS.
- Pond 2 is active and receives fly ash and wastewater residual wastes.
- Pond 3 is active, receives fly ash from coal-fired units, and discharges into the Retention Pond.
- Basins designated as Bottom Ash Ponds (Ponds 4, 5, and 6) are in series, and receive bottom ash from coal-fired units, which discharge into the Retention Pond.
- The fly ash ponds, Ponds 7, 8, 9, and 10, are filled to capacity with coal combustion ash and are no longer active.

See Appendix A – Doc. 1.2 for relative locations of the basins on an aerial view map of the Meramec PS. The basins highlighted in yellow are currently active. Numbered bullets correspond to the location of the photos shown in Section 5.3.

Pond 1 has a surface area of approximately 0.7 acres. The pond is an incised pond with a perimeter dike. The northwest portion of the dike is a relatively short section of outer perimeter levee. The edge of water within the pond is approximately 30 feet from the centerline of the perimeter levee. The design top elevation of the perimeter levee is 418.0 feet (Appendix A – Doc. 1.3). According to the August 2007 Ameren UE Dam Inventory and Inspection Program Phase I Presentation of Field Observation, Analysis and Recommendations, the lowest top of

dam elevation - the top of the perimeter levee at Pond 1- is 414.3 feet; the lowest elevation of the outside toe adjacent to the embankment is 389.6 feet (Reitz&Jens, Inc., 2007). Thus, the maximum design height of perimeter dike at Pond 1 is approximately 28 feet above the outside toe, AmerenUE has listed the maximum height of the perimeter levee as 25 feet. The dike is slightly lower than the perimeter levee; it is noted on furnished drawings (Appendix A – Doc. 1.3) to be at an elevation of 416.7 feet at the drainage structure between Ponds 1 and 3, and Ponds 1 and 7. The bottom elevation of Pond 1 is unknown but appears to have originally been on the order of 396.0 feet, based on design information on the furnished drawings (Appendix A – Doc. 1.3). Thus, the dike may approach 21 ft height above the Pond 1 bottom.

The Pond 1 retention pond is an unlined basin that receives onsite surface runoff from Ponds 7 and 8, and discharge from Ponds 3 and Pond 4. Pond 1 was designed to be used for water treatment and chemical stabilization.

Pond 2 has a surface area of approximately 17.6 acres. The pond is diked and bound on the southwest by a relatively short section of the outer perimeter levee. According to furnished drawings (Appendix A – Doc. 1.3), the design top elevation of the perimeter levee is 420.0 feet and the elevation of the top of the concrete base of the outfall structure is 398.0 feet. Thus, the maximum height of perimeter levee at Pond 2 is approximately 22 feet above the outside toe. AmerenUE has listed the maximum height of the perimeter levee as 25 feet. The bottom elevation of Pond 2 according to furnished drawings (Appendix A – Doc.1.3) is 400.0 feet. Thus, the levee may approach 20 foot height above the Pond 2 bottom.

The Pond 2 ash pond is a lined basin that receives onsite surface runoff, fly ash, bottom ash, and wastewater residual wastes. Overflow from Pond 2 discharges into the deactivated Pond 8 fly ash pond. Pond 2 is used for fly ash sedimentation, water treatment, and chemical stabilization.

Pond 3 has a surface area of approximately 13.5 acres. The pond is an incised pond with a perimeter dike, bound on the northeast by the bottom ash ponds, the southwest by the deactivated Pond 7, and to the southeast by the deactivated Pond 9. According to furnished drawings (Appendix A – Doc. 1.3), the design top elevation of the perimeter dike is 425.0 feet and the elevation of the bottom of Pond 2 is 400.0 feet. Thus, the maximum height of perimeter dike at Pond 3 is approximately 25 feet above the outside toe. The bottom elevation of Pond 3 according to furnished drawings (Appendix A – Doc. 1.3) is 395.0 feet. Thus, the dike may approach 30 foot height above the Pond 3 bottom.

The Pond 3 ash pond is a lined basin that receives fly ash. Discharge from Pond 3 flows into the Pond 1 retention pond.

Bottom Ash Ponds (***Ponds 4, 5, and 6***) have a combined surface area of approximately 14 acres. Coal combustion residue is sluiced into Pond 6. Drainage from Pond 6 to Pond 4 is conveyed through excavated interior ditches within the ash. Pond 4 is a partially incised pond bound on the west by a relatively short section of the outer perimeter levee. The internal rail road embankment crosses through Pond 4 from the west to the east corner. The incised Ponds 5 and 6

are bound on the northeast by the internal rail road embankment. According to a furnished drawings (Appendix A – Doc. 1.3), the design top elevation of the perimeter levee is 411.5 feet, and Pond 3 embankment dike between Ponds 3 and 4 is at an elevation of 418.0 feet. The elevation of the top of the abandoned outfall pipe is 397.4 feet. Thus, the maximum height of perimeter levee at Pond 4 is approximately 14.1 feet above the outside toe. AmerenUE has listed the maximum height of the perimeter levee as 25 feet. The bottom elevation of Pond 4 is 398.0 feet, based from the May 2010 Steam Electric Questionnaire (OMB Control Number: 2040-0281).

The Ponds 4, 5, and 6 ash ponds are unlined basins that receive bottom ash. Discharge from Pond 4 discharges into Pond 1 retention pond.

Pond 7 and ***Pond 8*** are diked and bound on the west by the outer perimeter levee. Pond 7 is bound by Pond 8 to the south, and to the east by the plant structures, Pond 1 and Pond 3. Ponds 7 and 8 are filled to capacity by fly ash and are no longer active. The southern portion of Pond 7 is currently used for coal storage.

Incised ponds, ***Pond 9*** and ***Pond 10***, are deactivated and are currently supporting plant structures and activity. Pond 9 is at the center of the site and is bound on the northwest by Pond 3. Pond 10 is bound on the southwest by Pond 2 and coal storage area on the southeast.

2.2 SIZE AND HAZARD CLASSIFICATION

In the following paragraphs, a hazard potential determination is given on the basis of the Federal Emergency Management Agency (FEMA) hazard potential classification, which has been adopted by USEPA; this classification system and the hazard potential determination and basis are presented on the field observation checklists for the Meramec PS CCW ponds included in Appendix B. The classification for size is given on the basis of the USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106 criteria, based on the height of the embankment and the impoundment storage capacity.

Pond 1 – Maximum dam height is 25 feet, according to furnished information, but it appears to be approximately 23 feet, as previously discussed. The total storage capacity is 10 acre-feet. Other physical data are summarized in Table 2.1. The MDNR criteria for Environmental Zone classification is presented in Table 2.2. No dwellings are downstream of the levee, therefore the levee should be classified Environmental Zone Class III. The levee currently has an undetermined hazard potential rating. Failure of the levee would discharge mostly water and some CCW into a tributary to the Meramec River; the amount of CCW stored in Pond 1 is minor. The failure would not likely cause loss of life, but would cause relatively minor environmental damage. Therefore, per the USEPA classification (Table 2.3) the Pond 1 levee should be given a Low (Class III) Hazard Potential Classification, but it should be reviewed periodically to evaluate status of CCW stored in the basin. The USACE size classification is presented in Table 2.4. Pond 1 classification for size, based on the height of the embankment and the basin storage capacity, is small.

Pond 2 - Maximum dam height is 25 feet, according to furnished information, but it appears to be more on the order of 22 feet, as previously discussed. The total storage capacity is 300 acre-feet. Other physical data are also summarized in Table 2.1. The MDNR criteria for Environmental Zone classification is presented in Table 2.2. No dwellings are downstream of the levee, therefore the levee should be classified Environmental Zone Class III. The levee currently has an undetermined hazard potential rating. Failure of the levee would discharge CCW into the Meramec River. The failure would not cause loss of life, and it would likely cause relatively minor environmental damage and potential disruption of navigation in the Meramec River. Therefore, per the USEPA classification the Pond 2 levee should be given a Low (Class III) Hazard Potential Classification. The USACE size classification is presented in Table 2.4. Pond 2 classification for size, based on the height of the embankment and the basin storage capacity, is small.

Pond 3 - Maximum dam height is 25 feet, according to furnished information. The total storage capacity is 230 acre-feet. Other physical data are summarized in Table 2.1. The MDNR criteria for Environmental Zone classification is presented in Table 2.2. No dwellings are downstream of the levee, therefore the levee should be classified Environmental Zone Class III. The levee currently has an undetermined hazard potential rating. Failure of the levee would discharge CCW within the Meramec PS perimeter levee, and possibly into a tributary to the Meramec River. The failure would not cause loss of life, and it would likely cause relatively minor environmental damage and potential plant disruption. Therefore, per the USEPA classification the Pond 3 levee should be given a Low (Class III) Hazard Potential Classification. The USACE size classification is presented in Table 2.4. Pond 3 classification for size, based on the height of the embankment and the basin storage capacity, is small.

Ponds 4, 5, & 6 - Maximum dam height is 25 feet, according to furnished information, but it appears to be more on the order of 14.1 feet, as previously discussed. The total combined storage capacity of Ponds 4, 5, and 6 is 280 acre-feet. Other physical data are also summarized in Table 2.1. The levee currently has an undetermined hazard potential rating. Failure of the levee would discharge CCW into a tributary to the Meramec River. The failure would not cause loss of life, and it would likely cause relatively minor environmental damage and potential disruption of navigation in the Meramec River and Mississippi River. Therefore, per the USEPA classification the Pond 4 levee should be given a Low (Class III) Hazard Potential Classification. The USACE size classification is presented in Table 2.4. Pond 4, 5, and 6 classification for size, based on the height of the embankment and the basin storage capacity, is small.

Pertinent physical data are presented in the following Table 2.1.

Table 2.1: Summary of Dam Dimensions and Size				
	Pond 1	Pond 2	Pond 3	Ponds 4, 5, & 6
Dam Height	25' **	25' **	25' **	25' **
Crest Width	15'	15'	15'	10'
Length	~79'***	~854'***	~3,320'	~679'***
Side Slopes (inside)	1.5:1*, 3:1	3:1	4:1	---
Side Slopes (outside)	1.5:1	3:1	3:1	2:1
Hazard Classification**	Class III (Low)	Class III (Low)	Class III (Low)	Class III (Low)

**Embankment slope above incised elevation.*
***Based on data in AmerenUE's response to EPA's RFI dated March 26, 2009 (See Doc. 1.4 of Appendix A); review of furnished data indicates 23.0' for Pond 1, and 22.0' for Pond 2.*
****Perimeter levee embankment length; total perimeter levee length is approximately 5,400'.*
*****Based on available information and USEPA classification*

Table 2.2: Environmental Zone Classification	
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.

MDNR Division 22 Reservoir Safety Council Rules and Regulations.

Table 2.3: Hazard Potential Classification	
Category	Hazard Potential
High Hazard (Class I)	Dams located where failure will likely cause loss of life or serious damage to home(s), industrial and commercial facilities, important public utilities, main highway(s) or railroad(s).
Significant Hazard (Class II)	Dams located where failure will not likely cause loss of life but may damage home(s), industrial and commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important public utilities.
Low Hazard (Class III)	Dams located where failure may cause minimal property damage to others. Loss of life is not expected.

USEPA Hazard Potential Classification

Table 2.4: Size Classification		
	Impoundment	
Category	**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

USACE ER 1110-2-106

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

The amount of CCW residuals currently stored in the units and maximum capacities are summarized in Table 2.3.

Pond 1 - Based on information from AmerenUE, this basin contains a minimal amount of fly ash and bottom ash deposited over 33 years. This basin is currently active and remaining storage volume is unknown. The total storage capacity is 10 acre-feet. A normal pool of water is maintained at about elevation 405.0 feet.

Pond 2 - Based on information from AmerenUE, this basin contains fly ash, bottom ash, and wastewater residual wastes deposited over 10 years. This basin is currently active and remaining storage volume varies due to the dredging of ash. A total of 260 acre-feet of fly ash and bottom ash material were contained within Pond 2, according to the AmerenUE response to EPA's RFI dated March 26, 2009. As of 2009, Pond 2 had an estimated 13 percent remaining in total storage capacity. The expected year of closure for Pond 2 is 2012, based on the approved May 2010 Steam Electric Questionnaire. A normal pool of water is maintained at about elevation 416.5 feet.

Pond 3 - Based on information from AmerenUE, this basin contains fly ash deposited over 7 years. This basin is currently active and remaining storage volume varies due to the dredging of ash. A total of 190 acre-feet of fly ash material is contained within Pond 3, according to the AmerenUE response to EPA's RFI dated March 26, 2009. As of 2009, Pond 3 had an estimated 17 percent remaining in total storage capacity. The expected year of closure for Pond 3 is 2014, based on the approved May 2010 Steam Electric Questionnaire. A normal pool of water is maintained at about elevation 418.0 feet.

Ponds 4, 5 & 6 - Based on information from AmerenUE, this basin contains bottom ash deposited over 60 years. These basins are currently active and remaining storage volume varies due to the dredging of ash. A total of 171 acre-feet of bottom ash material is contained within Ponds 4, 5, and 6 according to the AmerenUE response to EPA's RFI dated March 26, 2009. As of 2009, Ponds 4, 5, and 6 had an estimated 39 percent remaining in total storage capacity. The expected year of closure for Pond 4 is 2014, per the approved May 2010 Steam Electric Questionnaire. A normal pool of water is maintained at about elevation 408.0 feet.

Table 2.3: Amount of Residuals and Maximum Capacity of Unit*				
	Pond 1	Pond 2	Pond 3	Ponds 4, 5 & 6
Surface Area (acre)	0.7	17.6	13.5	14
Current Volume of Stored Ash (acre-feet)	minimal	260	190	171
Total Storage Capacity (acre-feet)	10	300	230	280

*Based on data in AmerenUE response to EPA's RFI dated March 26, 2009

2.4 PRINCIPAL PROJECT STRUCTURES

2.4.1 Earth Embankment Dam

Based on boring information for Pond 7 piezometer installation (Appendix A – Doc. 1.5), the perimeter levee at Pond 7 is constructed of silty clay, clay with silt, sand layers, clay with gravel and sand with gravel. The source and type of soils used for the original fill is unknown. The perimeter levee forming the impoundment is approximately 5,400 feet. The ponds are impounded by a perimeter levee and do not receive offsite surface runoff. Doc. 1.3 of Appendix A reflects embankment geometry summarized below.

Pond 1 – A perimeter dike along the north, east, and south of Pond 1 ties into the perimeter levee on the northwest side. The basin does not receive offsite surface runoff. Runoff from Pond 7 and 8 is ditched to Pond 1. Discharges from Pond 3 and Pond 4 flow into Pond 1. The embankment around the basin was raised using compacted clay as fill material. Perimeter levee elevations were raised to an elevation of 418.0 feet, and the perimeter dike to 416.7 feet. Operator records indicate the lowest top of levee elevation is at 414.0 feet. The geometry of Pond 1 consists of 3 horizontal (H) to 1 vertical (V) inside incised slope, 1.5 H to 1 V inside embankment slope, and 1.5 H to 1 V outside slope. Representative sections of the perimeter levee and the perimeter dike are shown in Exhibit 1. As shown in this exhibit, the perimeter levee is 15-feet wide, and the perimeter dike is 8-feet wide. The designs of the perimeter dike and levee are shown in Appendix A – Doc. 1.3. The pond is not lined and no internal drainage measures or toe drains were included in the embankment design for seepage control.

Pond 2 – A perimeter dike along the northeast and southwest of Pond 2 ties into the perimeter levee on the south side and high ground on the southeast side. The basin receives surface runoff from the power station plant facilities area and the basin area. Overflow from Pond 2 discharges into Pond 8 and ultimately flows into Pond 1. The perimeter levee and dike embankment around the basin was raised to an elevation of 420.0 feet. Operator records indicate the lowest top of

levee elevation is at 420.2 feet. Compacted ash fill material was used to construct the berm over an existing soil embankment on the interior side of the pond. Pond 2 is lined with 60 MIL HDPE slope liner and a 40 MIL HDPE bottom liner. The geometry of Pond 2 is 3 H to 1 V inside slope, and 3 H to 1 V outside slope. Representative sections of the perimeter levee and the perimeter dike are shown in Exhibit 2. As shown in this exhibit, the berms are 15-feet wide. The designs of the perimeter dike and levee are shown in Appendix A – Doc. 1.3. There are no internal drainage measures or toe drains included in the embankment design for seepage control.

Pond 3 – The basin is an incised pond with a perimeter dike. The basin does not receive surface runoff from outside the basin area. Drainage area for the basin is the basin itself. Pond 3 discharges into Pond 1. Pond 3 is lined with 60 MIL HDPE slope liner and 40 MIL HDPE bottom liner. The geometry of Pond 3 consists of 3 horizontal (H) to 1 vertical (V) outside slope, and 4 H to 1 V inside slope. The top of the perimeter dike embankment around the basin is at elevation of 423.0 feet. Representative sections of the perimeter dike are shown in Exhibit 3. As shown in this exhibit, the perimeter dike is 15-feet wide. The design of the perimeter dike is shown in Appendix A – Doc. 1.3. There were no internal drainage measures or toe drains included in the embankment design for seepage control.

Ponds 4, 5, & 6 – Pond 4 is bound on the northwest by the perimeter levee, and on the southwest by Pond 3 dike. Ponds 6 and 5 are combined, and a cross dike divides Pond 5 from Pond 4. Flow is conveyed from Pond 5 to Pond 4. The embankment from the Meramec PS internal railroad crosses from the west corner to the east corner of Pond 4. Culvert crossings control flow within Pond 4. Culvert crossings were not observed during the site visit due to heavy vegetation around Pond 4.

The drainage area for the basin is the surface area of Ponds 4, 5, and 6. Pond 4 discharges into Pond 1. A portion of the perimeter levee was raised to an elevation of 411.5 feet. Compacted clay was used for fill material to raise the top of the levee. Operator records indicate the lowest top of levee elevation is at 417.4 feet. The geometry of Pond 4 consists of 2 H to 1 V outside slope. A representative section of the perimeter levee is shown in Exhibit 4. As shown in this exhibit, the perimeter levee is 10-feet wide. The design of the perimeter levee is shown in Appendix A – Doc. 1.3. The ponds are not lined and no internal drainage measures or toe drains were included in the embankment design for seepage control.

2.4.2 Outlet Structures

Pond 1 – Drainage from Pond 3 and Pond 4 are discharged into Pond 1. Water passes through outlet works located at the northwest embankment of Pond 1. The outlet works consist of a skimmer, a sealboom fastened to three pipes at 7.3 feet from the center of the riser pipe which drains to a 24-inch diameter carbon steel (CS) discharge pipe. The discharge pipe projects from the perimeter levee into the tributary to the Meramec River with a 90 degree bend at the end. The skimmer box is used to block entry of floating ash particles. Inverts of the outlet are shown in Appendix A – Doc. 1.3.

The water in the basin based on operator records was at a level of 404.0 feet, which is 10.0 feet below the perimeter dam crest. Based on the lowest dam crest elevation based on operator records is 414.0 feet. Basin Information Checklist was provided by AmerenUE at the time of site visit, see Appendix A Doc. 1.6.

Pond 2 - The outlet works are located near the northwest corner of the basin and consist of a 10-ft diameter corrugated steel decant structure outlet with sealbooms. The decant tower is shown in Appendix A – Doc. 1.3. The outlet pipe is a 36-inch high density polyethylene (HDPE) pipe that extends through the west portion of the perimeter levee and discharges into the Meramec River. The top of the decant tower is at elevation 420 feet, the same as the top of dam elevation, and is accessed by a steel footbridge extending from the dam crest to the top of the decant tower. The level of water in the basin recorded from a staff gauge at the time of the site visit was at elevation 416.5 feet, which is 3.5 feet below design dam crest. The lowest dam crest elevation, based on operator records, is 420.2 feet; available freeboard is 3.7 feet. Basin Information Checklist was provided by AmerenUE at the time of site visit, see Appendix A Doc. 1.6.

Overflow from Pond 2 drains into Pond 7 via four 12-inch diameter polyvinyl chloride (PVC) pipes, and ultimately into Pond 1.

Pond 3 – Drainage from Pond 3 is discharged into Pond 1. Water passes through outlet works located at the northwest dike of Pond 3. Outlet works consist of a skimmer, and a drop inlet with a 24-inch HDPE pipe. The discharge pipe projects into the retention pond, Pond 1. The skimmer box is used to block entry of floating debris and ash particles. Inverts of the outlet are shown in Appendix A – Doc. 1.3.

The water in the basin based on operator records was at a level of 418 feet, which is 5.0 feet below the perimeter dam crest. Basin Information Checklist was provided by AmerenUE at the time of site visit, see Appendix A Doc. 1.6.

Pond 4 – Drainage from Pond 4 is discharged into Pond 1. Water passes through outlet works located at the northwest dike of Pond 4. The outlet works consist of a drop inlet and an 18-inch diameter CS pipe. The discharge pipe projects into the retention pond, Pond 1. Inverts of the outlet are shown in Appendix A – Doc. 1.3. Inverts and structure information for culvert crossings were not provided.

The water in the basin based on operator records was at a level of 408.0 feet, which is 3.5 feet below the design perimeter dam crest. Lowest dam crest elevation based on operator records is 420.2 feet, available freeboard is 9.4 feet. Basin Information Checklist was provided by AmerenUE at the time of site visit, see Appendix A Doc. 1.6.

2.5 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

Using Google Maps dated 2010, no critical infrastructure was observed within a 5-mile radius. A regional map showing Meramec PS and ash ponds in relationship to "critical" infrastructure within a 5-mile radius is included as Doc. 1.1 of Appendix A. "Critical" infrastructure includes facilities such as schools and hospitals. There are 52 schools and no hospitals located within the 5 mile radius. These facilities are noted on the 5-mile radius map. In general, the confluence of the Meramec River and Mississippi River is immediately downstream of the facilities.

Flood impacts from postulated failure of the perimeter levee at the Meramec PS would primarily impact the Meramec River or the Mississippi River.

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS AND INCIDENTS

The Meramec PS levee (dike) is not regulated for dam safety by a federal or state agency, and currently does not have federal or state hazard classifications. The CCW Ponds 1 and 2 discharges are regulated by the Missouri Department of Natural Resources (MDNR) Division of Environmental Quality. Meramec PS dam height is less than 35 feet, therefore the dams do not require MDNR registration permits for the continued operation.

3.1 SUMMARY OF REPORTS ON THE SAFETY OF THE MANAGEMENT UNIT(S)

AmerenUE created an internal Dam Safety Group composed of civil and geotechnical engineers supervised by a professional engineer. The group implements and oversees the AmerenUE Dam Safety Program. AmerenUE also developed an Emergency Implementing Procedure (EIT) for emergencies involving dam failures or loss of integrity. The EIT contains response procedures to three severity levels of incidents.

Pond 1 – Annual inspections are conducted by AmerenUE. No major problems were observed for the 2008 and 2009. No significant deterioration was indicated in the documentation reviewed. A 2007 inspection report, conducted as a part of the AmerenUE Dam Inventory and Inspection Program, identified retention wall and upstream slope failing at Pond 1 (Reitz&Jens,Inc., 2007).

Pond 2 – Weekly inspections conducted by AmerenUE were provided for the period September 7, 2010 through September 23, 2010. Wash outs and erosion along several areas on the side of the access roads were identified as needing immediate maintenance. Annual inspections are conducted by AmerenUE. No major problems were observed for the 2008 and 2009. No significant deterioration was indicated in the documentation reviewed. The 2007 inspection report indicated no significant deterioration for Pond 2 in the documentation reviewed (Reitz&Jens,Inc., 2007).

Pond 3 – Annual inspections are conducted by AmerenUE. No major problems were observed for the 2008 and 2009. No significant deterioration was indicated in the documentation reviewed. The 2007 inspection report indicated no significant deterioration for Pond 3 in the documentation reviewed (Reitz&Jens,Inc., 2007).

Pond 4 – Annual inspections are conducted by AmerenUE. No major problems were observed for the 2008 and 2009. It is noted that seepage was observed in both inspection reports. No significant deterioration was indicated in the documentation reviewed. The 2007 inspection report indicated no significant deterioration for Pond 4 in the documentation reviewed (Reitz&Jens,Inc., 2007).

3.2 SUMMARY OF LOCAL, STATE AND FEDERAL ENVIRONMENTAL PERMITS

The Meramec PS is currently regulated under the State Operating Permit No. MO-0000361 (see Doc. 1.7 of Appendix A). This permit was effective on May 19, 2000 and expired on May 18, 2005, according to the furnished documentation.

The facilities at the Meramec PS are regulated for water quality by the Missouri Department of Natural Resources (MDNR) Division of Environmental Quality. Water sampling at the outlet structure of Ponds 1 and 2 are conducted to monitor the quality of the discharge that reaches the Meramec River, and ultimately the Mississippi River.

3.3 SUMMARY OF SPILL/RELEASE INCIDENTS (IF ANY)

There have been no reported spill/release incidents at the Meramec PS CCW basins.

4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

4.1.1 Original Construction

Original construction records are not available, and design dates on the provided Meramec PS design plans are illegible (see Appendix A Doc. 1.3). Therefore, little is known of original construction or the sequence of construction of the CCW ponds, other than the year each pond was brought online.

Pond 1 – The basin was brought online in 1977. The incised basin was constructed on the northwest side of the plant within a portion of the original Pond 3. A perimeter dike around the basin ties into the outer perimeter levee. It is bounded on the northeast side by a filled portion of the original Pond 3, on the northeast side by the outer perimeter levee, on the southwest side by a filled portion of the original Pond 7, and on the southeast side by the internal railroad. The lowest elevation on the basin floor is approximately 396.0 feet. The basin was not lined.

Pond 2 – The basin was brought online in 2000. According to provided plans (Appendix A, Doc. 1.3), stormwater from Pond 2 originally was drained into Pond 8. The diked basin was constructed on the southeast side of the plant. It is bounded on the northwest side by Pond 8, southeast side by the internal railroad, the west by the outer perimeter levee, and northeast side by the filled Pond 10 and the coal storage area. The lowest elevation on the basin floor is approximately 400.0 feet.

Pond 3 – The basin was brought online in 2003. The incised basin was constructed on the west side of the plant within the original Pond 3 location. It is bounded on the northwest side by the internal railroad, southwest side by Pond 7, the east by Ponds 4 and 5, southwest side by the coal storage area, and the south by the filled Pond 9. The lowest elevation on the basin floor is approximately 395.0 feet.

Ponds 4, 5, & 6 – The basin was brought online in 1950s. The basin was constructed adjacent to high ground to the east. The basin is bounded on the east side by an access road, on the northwest side by the perimeter levee, on the southwest by Pond 3 and filled original Pond 9, and on the south side by the plant facilities. The lowest elevation on the basin floor is unknown. The basin was not lined.

Pond 7 – The basin was brought online in 1965. The basin was constructed at the northwest side of the plant. The basin is bounded on the east side by Pond 3 and

Pond 9, on the west side by the perimeter levee, and on the south by Pond 8. The lowest elevation on the basin floor is unknown.

Pond 8 – The basin was brought online in 1965. The basin was constructed between Pond 2 and Pond 7. The basin is bounded on the east side by Pond 10, on the west side by the perimeter levee, on the north by Pond 7, and on the south by Pond 2. The lowest elevation on the basin floor is unknown.

Pond 9 – The basin was brought online in 1965. The basin is bounded on the north side by Pond 3, on the west side by Pond 7, on the south by Pond 10, and on the east by Pond 6. The lowest elevation on the basin floor is unknown.

Pond 10 – The basin was brought online in 1965. The basin is bounded on the east side by Pond 2, on the north side by Pond 9, on the south by a coal storage area, and on the west by plant facilities. The lowest elevation on the basin floor is unknown.

4.1.2 Significant Changes/Modifications in Design since Original Construction

Pond 1 – Based on design information provided (Appendix A, Doc. 1.3), the levee portion of the perimeter levee has been raised to elevation 418.0 feet and the perimeter dike to 416.7 feet. Pond 1 receives surface runoff from Ponds 7 and 8, discharge from Pond 3 and Pond 4, and overflow from Pond 2.

Pond 2 – Based on design information provided (Appendix A, Doc. 1.3), the levee portion of the perimeter levee has been raised to elevation 420.0 feet. A decant structure has been installed since original construction, and Pond 2 discharges directly into the Meramec River. Overflow from Pond 2 discharges into Pond 8 and is ultimately ditched into Pond 1.

Pond 3 – The original basin was filled to capacity. Portions of the original pond support plant equipment and a coal storage area. Pond 1 and the New Fly Ash Pond (Pond 3) are incised within the original Pond 3 basin. Pond 3 discharges directly into Pond 1.

Ponds 4, 5, & 6 – The original outlet structure to the tributary to Meramec River has been abandoned and discharge is directed into Pond 1 via an 18-inch diameter CS pipe. A portion of the perimeter levee at Pond 4 has been raised to elevation 411.5 feet.

Pond 7 – The basin has been filled to capacity and is no longer active. The southern portion of the original basin has been converted into a coal storage area. An internal railroad embankment has been constructed along the outer perimeter levee of the basin.

Pond 8 – The basin has been filled to capacity and is no longer active. A railroad track has been constructed on the dike between Pond 7 and Pond 8.

Pond 9 – The original basin has been filled to capacity and closed. Presently, the basin area supports plant equipment and a portion of the basin area is used for coal storage. A portion of the filled original pond has been incised for Pond 3.

Pond 10 – The original basin has been filled to capacity and closed. Presently, the basin area supports plant equipment and internal railroad tracks.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

There have been no significant repairs/rehabilitation made to the Meramec PS basins since the original construction. Slope repairs have been made along the perimeter levee outside slope due to runoff erosion.

4.2 SUMMARY OF OPERATIONAL HISTORY

4.2.1 Original Operational Procedures

The furnished documents do not include the original operational procedures.

4.2.2 Significant Changes in Operational Procedures since Original Startup

No documents were provided to indicate that basic operational procedures have significantly changed since original startup.

4.2.3 Current Operational Procedures

The Meramec PS CCW ponds are operated and monitored for water quality under a MDNR approved operating permit.

Pond 1 operates mainly as a clarifying pond. Pond 3 and Pond 4 CCW basins decant structures discharge into the basin. A series of ditches directs surface runoff into Pond 1. Water quality is monitored for acceptable pH levels prior to discharge from Pond 1.

Pond 2 operations consist of fly ash sedimentation, water treatment, and chemical stabilization. Ash waste (predominantly bottom ash and fly ash) is mixed with water at the plant and the slurry is pumped to the basin. The CCW slurry is pumped into excavated channels within the basin and gravity settling separates the fine from the coarser materials. Once the channels become full, the ash is excavated. The water flows through channels excavated in the ash to a pond area at the west end of the basin. At the outlet structure in the northwest corner of Pond 2, the water flows to a 10.0-ft diameter corrugated pipe decant structure,

then through a 36-in diameter HDPE pipe to Meramec River. Water quality is monitored for acceptable pH levels prior to discharge from Pond 2.

Pond 3 operation consists of mixing fly ash waste with water at the plant and pumping the slurry to the basin. The CCW slurry is pumped into excavated channels within the basin and gravity settling separates the fine from the coarser materials. Once the channels become full, the ash is excavated. The water flows through channels excavated in the ash to a pond area at the northwest end of the basin. At the outlet structure in the northwest corner of Pond 3, the water flows through a 24-inch diameter HDPE pipe to Pond 1.

Ponds 4, 5, & 6 operation consists of mixing bottom ash waste with water at the plant and pumping the slurry to the basins. The CCW slurry is pumped into excavated channels within Ponds 5 and 6, and gravity settling separates the fine from the coarser materials. Once the channels become full, the ash is excavated. The water flows through channels excavated in the ash to a pond area at Pond 4. At the outlet structure in the northwest corner of Pond 4, the water flows through an 18-inch diameter CS pipe to Pond 1.

4.2.4 Other Notable Events since Original Startup

Based on furnished information, there are no other notable events since original startup of Meramec PS basins to report at this time.

5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel Jeffrey Crabtree, PE and James Filson, PE collected available data and documents and made field observations during a site visit on September 29, 2010, in company with the participants listed in Section 1.3. The design engineer of record for Meramec PS CCW ponds was not present or available to assist with answering questions about these basins.

The site visit began at 1:30 PM. Weather conditions during the visit were 85 degrees Fahrenheit, sunny, and dry. Photographs were taken of conditions observed. Photographs referenced below are contained at the end of this chapter.

The overall visual assessment is that the earthen levee embankment that impounds the Meramec PS CCW ponds is in good condition. No visual signs of imminent instability or inadequacy of the principal structures at these basins that would require emergency remedial action were observed. No evidence of past repairs was observed. No significant findings were noted.

5.2 PONDS

5.2.1 Embankment Dam and Basin Area

Crest

A single perimeter levee creates the impoundment around the west and south sides, and ties into high existing ground on the northeast and southeast side. The outer slope of the levee is tiered. The second tier, the top of the crest, is enclosed within a chain linked fence. Typical views of the crest are shown in Photos 1 and 2. The first tier, the crest of the access road, is on the outer perimeter of the crest and is accessible by automobile from the Meramec PS plant. The gravel and ash-surfaced access road along Pond 2 was observed to be in good condition (Photos 3 and 4). Evidence of a repaired erosion area along the embankment is shown in Photo 5. No major depressions, sags, tension cracks or other signs of significant settlement or mass soil movement were observed. No tension cracks which might suggest soil shear failure were observed in the crest. Gulley erosion was observed at the edge of the first tier crest and downstream slope of the access road and the edge of the second tier crest, see Photos 6 to 8.

Outside Slope and Toe

The outside slope of the second tier of the levee embankment was observed to be maintained free of grass and vegetation, see Photos 1 and 6. The outside slope of the first tier of the levee embankment at Pond 2 is visible in Photos 9 to 11. As

shown, the grass and woody vegetation on the outside slope typically was observed to be unmaintained. The outside slope of the first tier of the levee embankment at Pond 8 is visible in Photo 12. As shown, the grass on the outside slope typically was observed to be unmaintained. Evidence of slope erosion repair was observed. The outside slope of the levee embankment at Pond 1 is visible in Photo 13. As shown, the grass and vegetation on the outside slope typically was observed to be unmaintained. The lower part of the outside slope was observed to be submerged by the water. No areas of significant erosion were observed. No obvious signs of slumps, slides, bulges, tension cracks, seepage, or animal holes were observed.

A perimeter access road at the toe of the levee embankment was submerged at the time of inspection. The submerged perimeter access road is shown in Photos 14 to 19. Photo 14 shows the submerged access road at the toe crossing under the railroad bridge. Photos 20 to 24 show a relatively flat area, approximately 5 feet wide, between the toe of the embankment and the tree line at the outside toe of Pond 7. Organic debris was observed at the outside toe of the levee embankment of Pond 7. A tributary to Meramec River is at the downstream toe along the northwest levee embankment, shown in Photos 25 and 26. The toe of the levee is submerged. Photo 26 shows evidence of outside slope erosion repair. Minor seepage was observed at the outside toe of Pond 4. Photo 27 shows cattails at the outside toe, indicating standing water or consistent moist conditions. No active erosion was observed along the outside toe.

Inside Slope and Basin Area

The inside slope of Pond 1 perimeter dike was observed to be covered in tall vegetation on three sides, and sparse vegetation on the southeast side. Erosion was observed in the inside slope of the perimeter dike. Photo 28 shows wooden retaining wall failure on the west inside slope. The water surface elevation at the time of the inspection was 405.0 feet.

The inside slope of Pond 2 perimeter dike is lined with 60 MIL HDPE slope liner, shown in Photos 29 to 32. Sparse vegetation growth is observed on the slope liner, see Photo 31. Ash build-up was observed at the south side of the pond shown in Photos 29, 30, and 32. The surface of the exposed ash fill is generally covered with brush and woody vegetation. The water surface elevation at the time of the inspection was 416.5 feet. No significant erosion was noted.

The water surface elevation in Pond 3 at the time of the inspection was 413.0 feet. Photo 34 shows the filled fly ash area between Pond 1 and Pond 3. Filled fly ash area was a part of the original Pond 3.

The inside slope of the Pond 4 perimeter embankments were observed to be generally covered in tall vegetation on three sides. The inside slope of the

railroad embankment crossing the pond from the west to the east corner of Pond 4 was observed to be generally covered in tall vegetation. See Photos 34 to 39 for inside slope and pond area. Ash build up was not observed within Pond 4 basin area. The water surface elevation within Pond 4 at the time of the inspection was 408.0 feet. Photo 40 shows ash build up with sparse brush vegetation within Ponds 5 and 6. No significant erosion was noted.

The inside basin area of Pond 8 has been filled to capacity with fly ash and is no longer active. Photo 41 shows ash build-up with sparse brush vegetation within Pond 8. No significant erosion was noted.

Abutments and Groin Areas

The abutment and groin areas where the perimeter levee ties into high ground was not observed.

5.2.2 Outlet Structures

Overflow Structure

Pond 1 outflow structure consists of a 24-inch diameter carbon steel (CS) pipe drop inlet with a sealboom skimmer. Photo 42 shows the skimmer and inlet of the outflow structure. A steel footbridge access to the structure is shown in Photo 28. There was no sign of clogging and the water exiting the outlet was observed to be flowing clear.

Pond 2 outflow structure consists of a 10-ft diameter corrugated steel decant structure outlet with sealbooms. Photo 43 shows the skimmer, decant tower, and the steel footbridge access to the structure. Pond 2 has four 12-inch PVC pipes that convey overflow from Pond 2 into Pond 8. Photo 32 shows the PVC pipes that pass through the northwest perimeter dike. There was no sign of clogging and the water exiting the outlet was observed to be flowing clear.

Pond 3 outflow structure consists of a drop inlet with a 24-inch HDPE and a skimmer. Pond 3 outflow structure was not observed.

Pond 4 outflow structure consist of a decant structure outlet. Photo 35 shows a portion of the decant structure. Observation of the structure was obstructed by tall vegetation.

Outlet Conduit

The outlet conduit at Pond 1 is a 24-inch diameter carbon steel (CS) pipe that extends through the perimeter levee and into the tributary to the Meramec River with a 90 degree bend at the end, see Photo 44. The outlet end appeared to be in

good condition and operating normally. There was no sign of clogging and the water exiting the outlet was observed to be flowing clear.

The outlet conduit at Pond 2 is a 36-inch high density polyethylene (HDPE) pipe that extends through the west portion of the perimeter levee and discharges into the Meramec River with an upward bend at the end, see Photos 45 and 46. Photo 47 shows the outlet conduit discharging into a plunge pool. The outlet end appeared to be in good condition and operating normally. There was no sign of clogging and the water exiting the outlet was observed to be flowing clear.

The Pond 3 24-inch HDPE pipe outlet conduit is submerged and was not observed. The outlet structure discharges into Pond 1.

The Pond 4 18-inch diameter CS pipe outlet conduit is submerged and was not observed. The outlet structure discharges into Pond 1.

Emergency Spillway

There is no emergency spillway.

Low Level Outlet

There is no low level outlet.

5.3 FIELD PHOTOGRAPHS

1. Looking west from access road at levee embankment at Pond 2.

2. Looking east along internal side slope and crest of levee embankment of Pond 2. Note – liner in place.

3. Looking south along embankment between railroad and Pond 2 (#489).

4. Looking Southwest at top of levee embankment of Pond 2 from access road.

5. Repaired erosion area along levee embankment at Pond 8.

6. Looking at runoff erosion along top of levee embankment from runoff at Pond 2.

7. Runoff erosion from edge of crest of access road at Pond 2.

8. Looking at runoff erosion on down side of levee embankment at edge of crest of access road at Pond 8.

9. Looking northwest at outside slope of Pond 2 levee embankment. Note – High water was observed in the Meramec River during site visit. Perimeter access road was submerged.

10. Outside slope of levee embankment at Pond 2. An unknown pipe was observed at the location, see Photo 14.

11. Looking southeast along outside slope of levee embankment of Pond 2. Note - High water was observed in the Meramec River during site visit.

12. Looking at outside slope of levee embankment at Pond 8. Note - Repaired erosion area at edge of crest.

13. Looking northeast along outside slope and toe of the levee embankment along the tributary to Meramec River.

14. Looking at unknown pipe at the outside toe of Pond 2 levee embankment.

15. Looking southeast at railroad bridge. Location of submerged perimeter access road.

16. Looking southeast along perimeter levee embankment. Note - High water was observed in the Meramec River during site visit.

17. Looking southeast at tree line adjacent to submerged perimeter access road.

18. Looking southwest along toe of levee embankment where floodplain is flooded.

19. Looking north at perimeter access road gate. Road under water.

20. Looking south along outside toe of Pond 7.

21. Looking northwest along outside toe and slope of levee embankment of Pond 7. Note - railroad tracks adjacent to top of embankment.

22. Looking northwest along outside toe of levee embankment at Pond 7.

23. Looking north along outside toe of levee embankment at Pond 7. Note - gate for perimeter access road is submerged.

24. Looking northeast along outside toe of levee embankment at Pond 7.

25. Looking southwest along Meramec River just outside from Pond 1 (retention pond) outlet.

26. Evidence of repair to outside slope of levee embankment due to erosion.

27. Looking towards Pond 4 (Bottom Ash Pond) at outside toe and slope of levee embankment. Note - Cat tails.

28. Looking southeast at Pond 1 (retention pond).

29. Looking northwest at Pond 2. Note – Unit has a slope liner.

30. Looking north at Pond 2. Note – Unit has a slope liner.

31. Looking at Pond 2 toward coal storage area. Note - liner with some vegetation.

32. Looking north at overflow pipes and coal storage area. Note - pipe in water for taking water samples.

33. Looking at the Pond 3 ("New" Fly Ash Pond) area in the distance and the fill Fly Ash area to the northeast of Pond 1.

34. Looking through railroad track at southeast side of Pond 4 (Bottom Ash Pond).

35. Looking through railroad tracks at southeast side of pond area of Pond 4.

36. Looking north at northwest side of Pond 4.

37. Looking southeast at railroad tracks between northwest & southeast Pond 4.

38. Looking southwest from railroad track at northwest Pond 4.

39. Looking north at southeast Pond 4 from railroad tracks.

40. Looking towards Pond 5 and 6 (Bottom Ash Pond).

41. Looking northeast at completely filled and deactivated Pond 8 (Fly Ash Pond #495).

42. Looking at retention pond inlet.

43. Looking at Pond 2 (#489) inlet structure.

44. Looking northeast at outfall pipe from Pond 1.

45. Looking west at outfall #009 at Pond 2 toward Meramec River.

46. Outfall #009 from Pond 2.

47. Plunge pool at outfall #009.

6.0 HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCUMENTATION

6.1.1 Floods of Record

Flood record information was not provided for these facilities. The 2007 inspection report referenced the 1995 Federal Emergency Management Agency (FEMA) Mississippi River base flood elevation as 417.4 feet NGVD at the confluence with Meramec River. The 1995 FEMA Flood Insurance Rate Map of the confluence of the Mississippi and Meramec River is shown in Doc. 1.8 of Appendix A. The reported 100-year flood elevation of the Mississippi River at the Meramec PS in Appendix D of the 2004 Army Corps of Engineers (USACE) Upper Mississippi River System Flow Frequency Study is approximately 415.1 feet NGVD (see Doc. 1.9 of Appendix A).

6.1.2 Inflow Design Flood

No hydrologic/hydraulic analyses were provided for the ash ponds; thus, no inflow design flood was available.

As previously mentioned, the Meramec PS dam heights are less than 35 feet, and do not require MDNR registration permits. Based on Environmental Zone Classification III, if safety standards closely follow those given in the Missouri dam safety requirements, the spillway design flood (SDF) criterion is the 100-year frequency rainfall event. This report's assessment of environmental classifications is discussed in Section 2.2 of this report.

6.1.3 Spillway Rating

No spillway ratings were provided for the outlet works.

6.1.4 Downstream Flood Analysis

No downstream flood analysis has been provided.

A qualitative analysis based on field observations and review of available data is as follows:

Failure by flood overtopping would occur at the lowest elevation at the perimeter levee at Pond 1, would release an insignificant volume of ash into the Meramec River. A breach of the perimeter levee (considered an unlikely scenario at Pond 1 and 3) at either Pond 2 or Pond 4 would release water into the Meramec River and could release a significant volume of ash into the Meramec River.

Ash in the Meramec River would cause environmental impact and may disrupt navigation. The water and ash released by a breach of the perimeter dikes within the levee would be contained within the levee embankment.

6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

An analysis of the ability to safely store and pass the inflow design flood was not provided for the Meramec PS CCW basins. Basin elevation-storage curves, spillway rating curves, and a dam break analysis are not available for the basins. Based on lowest top of levee elevation and the 2004 USACE 100-year flood elevation of 415.0 feet NGVD, Pond 1 and Pond 4 would be inundated during the 100-year frequency rainfall event. The deactivated Pond 7 perimeter levee would be overtopped by the 100-year frequency rainfall event, based on surface elevations recorded boring logs at the perimeter levee (Appendix A Doc. 1.5). The ability of the Pond 2 and Pond 3 to store and safely pass runoff from a design storm of 100-year frequency is uncertain due to the internal drainage, from the high filled-in area to the low area of the pond where free-standing water is maintained, within the ponds. The potential of overtopping of the perimeter dike is unknown.

Therefore, the lack of supporting hydrologic/hydraulic documentation for the CCW ponds is considered inadequate at this time.

6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

As noted above the ability of the CCW ponds to safely store and pass the appropriate design flood has not been demonstrated through documented analysis. On the basis of experience record in which there have been no apparent issues with safe containment of water in the basins during significant flooding events, the CCW ponds are believed to have substantial hydrologic/hydraulic safety. However, the hydrologic/hydraulic safety should be verified in the near future by documented analysis.

7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed

No stability analyses were provided for original design and construction. A stability analysis of the perimeter levee has been conducted and will be available at the end of the year (2010). From visual observations in the field the perimeter levee appears stable, at least for static loading conditions.

7.1.2 Design Properties and Parameters of Materials

Soil design properties and parameters were not provided for review.

7.1.3 Uplift and/or Phreatic Surface Assumptions

Phreatic surface assumptions for the perimeter levee were not available for review. From visual observations in the field, the phreatic surface does not crop out on the outside slope of the perimeter levee.

7.1.4 Factors of Safety and Base Stresses

No computed factors of safety from slope stability analyses on the perimeter levee were available for review.

7.1.5 Liquefaction Potential

No liquefaction potential analyses have been provided for the perimeter levee or embankment dikes that impound the CCW ponds. Limited available subsurface information, discussed below in Subsection 7.1.6, suggests that foundation soils are of the type that are not normally susceptible to liquefaction.

7.1.6 Critical Geological Conditions and Seismicity

The reviewed documents did not include any information regarding the critical geological conditions and seismicity used in the original design of perimeter levee or embankment dikes that impound CCW ponds. Minimal subsurface information was provided by the boring log profiles developed during the drilling and piezometer installation within Pond 7 (see Doc. 1.5 in Appendix A). The pertinent boring logs show that the virgin soils in the vicinity (along Pond 7) generally consisted of silty clay and clayey silt underlain by clay and silty clay.

Static water level readings indicate the depth to groundwater to be less than 40 feet. The types of soils within the perimeter levee, shown in the Pond 7 soil

boring logs, would not typically be susceptible to liquefaction. However, due to the location of the Meramec PS within the Meramec River floodplain, high static water level in the area, and its proximity to the New Madrid and Wabash Valley seismic zones, the susceptibility of surrounding ground to liquefaction is moderate.

Seismicity – The site of the ash basins is in an area of moderate seismic hazard, however, the site is within 150 miles of two known active seismogenic source areas (New Madrid and Wabash Valley seismic zones). Based on USGS Seismic-Hazard Maps for Central and Eastern United States, dated 2008, the Meramec Power Station, is located in an area anticipated to experience 0.20g or higher peak ground acceleration with a 2-percent probability of exceedance in 50-years.

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Structural stability documentation is absent. However, it does not appear to be critical documentation that is needed at this time for assessment. Structural stability documentation is considered non-critical based on 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. 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

The reviewed documents did not include any information regarding the design loads or the comparison of loads to potential credible loading conditions of the perimeter levee embankment. The available design data are impoundment drawings and boring logs for Pond 7, as previously discussed.

Overall, the structural stability under static loading conditions of the perimeter levee embankment probably is satisfactory based on the following observations during the September 29, 2010 field visit by Dewberry, available recent dam inspection reports, the 2008 to 2009 dike inspection reports, and the August 2007 Ameren UE Dam Inventory and Inspection Program Phase I Presentation of Field Observation, Analysis and Recommendations.

- There were no indications of scarps, sloughs, depressions or bulging anywhere along the dam;
- Boils or sinks was not observed along the slopes, groins or toe (note minor seepage observed at the northwest toe of Pond 4 and is monitored weekly by AmerenUE personnel); 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 assessed. 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. A seismic stability analyses performed in 2010 will be provided when the analyses 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 OPERATIONAL PROCEDURES

Pond 1 – This basin is mainly used for water treatment and chemical stabilization prior to discharge to a tributary to the Meramec River. Ash waste material from production operations is not placed directly in the basin. Pond 3 and Pond 4 discharge directly into the basin. Surface runoff from Pond 7 and 8 is ditched to Pond 1. Overflow from Pond 2 discharges into surface ditches of Pond 8. Water is monitored and discharged when pH is within permit limits.

Pond 2 – This basin is currently used for fly ash sedimentation, water treatment, and chemical stabilization. Pond 2 receives onsite surface runoff, fly ash, bottom ash, and wastewater residual wastes. Ash waste material is sluiced into the basin. The ash is excavated and placed in windrowed stockpiles to allow the material to drain prior to loading and transport offsite.

Pond 3 – This basin is currently used for storage and disposal of fly ash. Ash waste material is sluiced into the basin. The slurry is pumped into excavated channels within the basin and gravity settling separates the fine from the coarser materials. Once the channels become full, the ash is excavated. The water flows through channels excavated in the ash to a pond area.

Pond 4 – This basin is currently used for storage and disposal of bottom ash. Ash waste material is sluiced into Ponds 5 and 6. The slurry is pumped into excavated channels within the basin and gravity settling separates the fine from the coarser materials. Once the channels become full, the ash is excavated. The water flows through channels excavated in the ash to a pond area in Pond 4.

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

Maintenance of the impounding embankments and outlet works of the CCW Ponds is performed as needed, as determined by routine inspections performed by operating personnel. Vegetation on the embankment slopes and crest is mowed or cut twice a year or whenever it becomes necessary.

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATION

8.3.1 Adequacy of Operational Procedures

Operational procedures at the CCW ponds appear to be appropriate and adequate.

8.3.2 Adequacy of Maintenance

No major maintenance issues were observed during the site visit and no major maintenance issues were noted from review of dam inspection reports and checklists. Maintenance of the impounding embankments and outlet works of the CCW ponds appear to be adequate.

9.0 SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

AmerenUE formed a Dam Safety Group and associated Dam Safety Program supervised by a licensed professional engineer. The program requires Meramec PS to conduct weekly, annual, and special inspections. Employees trained in dam safety, overseen by civil and geotechnical engineers, inspect the CCW embankments following inspection procedures based on the type of dam safety inspection conducted. The weekly and annual inspections are documented on Inspection 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 instruments.

9.2.3 Dam Performance Data Evaluation

Not applicable.

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.

DRAFT

EXHIBIT 1: REPRESENTATIVE POND 1 EMBANKMENT SECTIONS

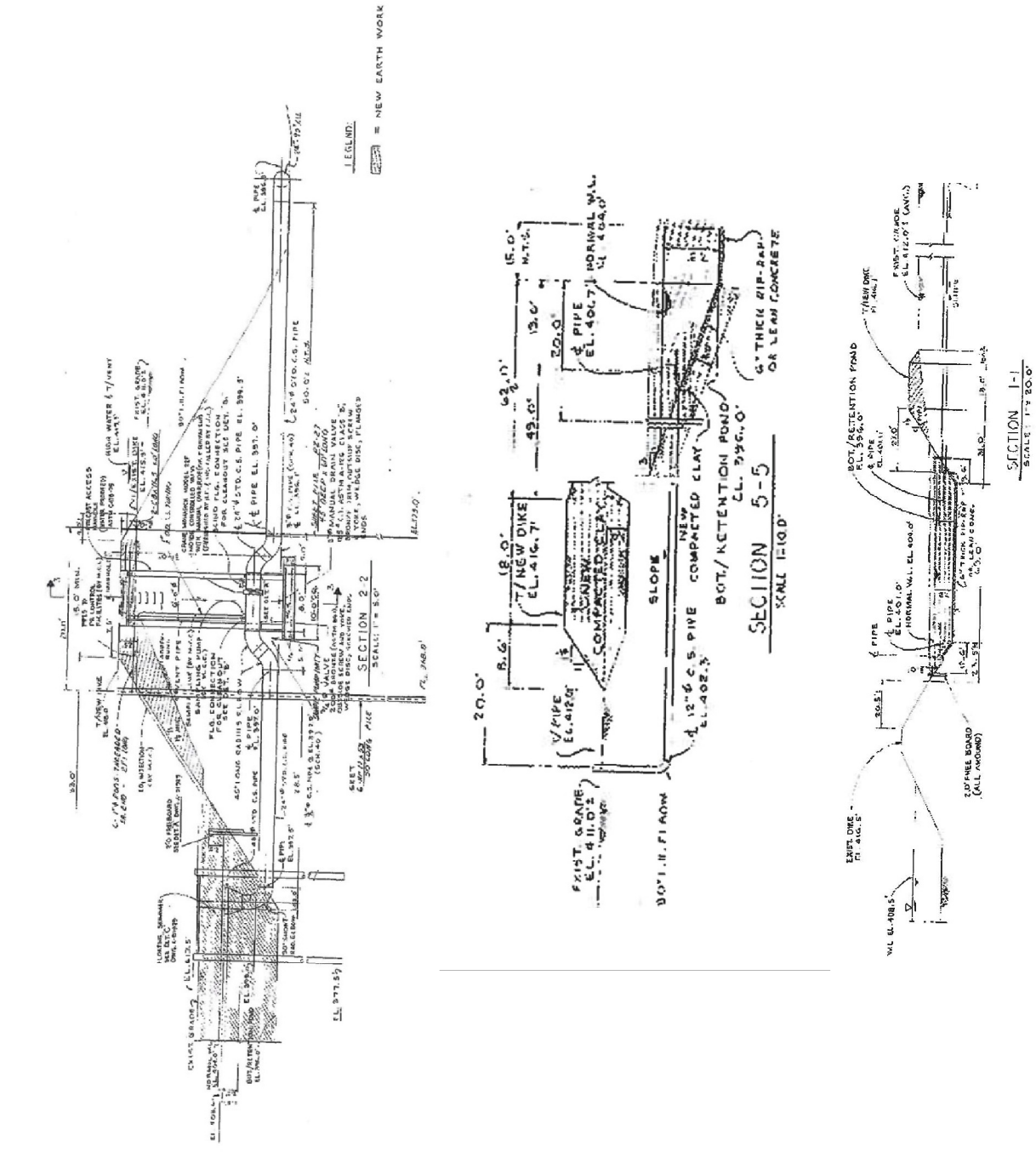

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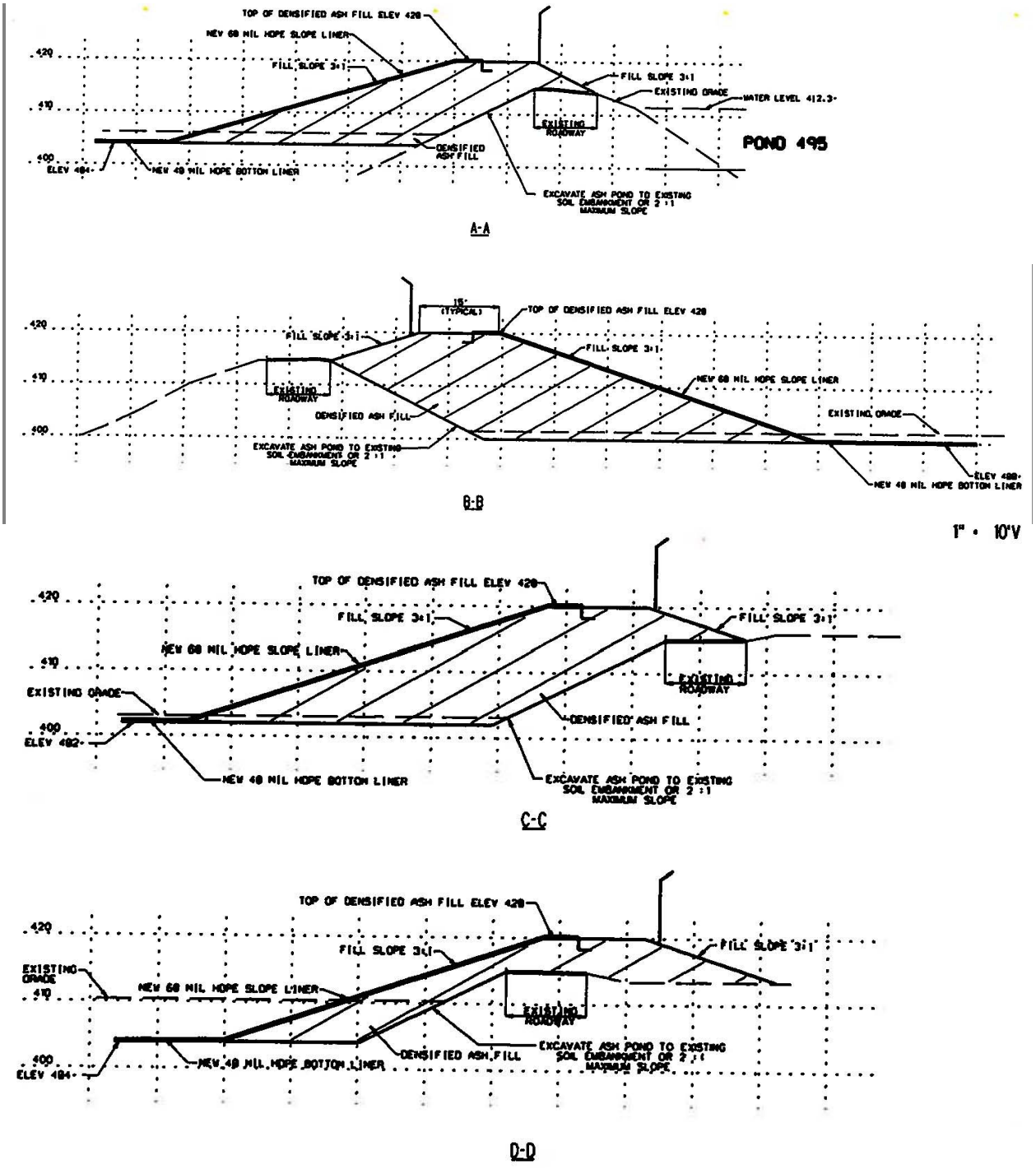
EXHIBIT 2: REPRESENTATIVE POND 2 EMBANKMENT SECTIONS



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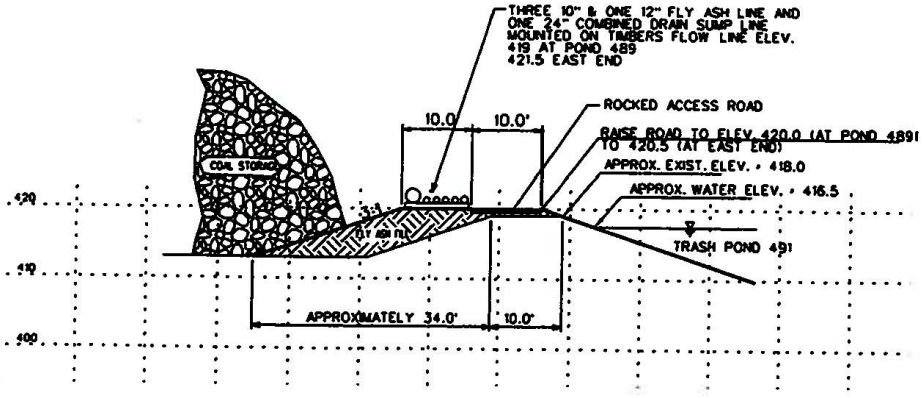
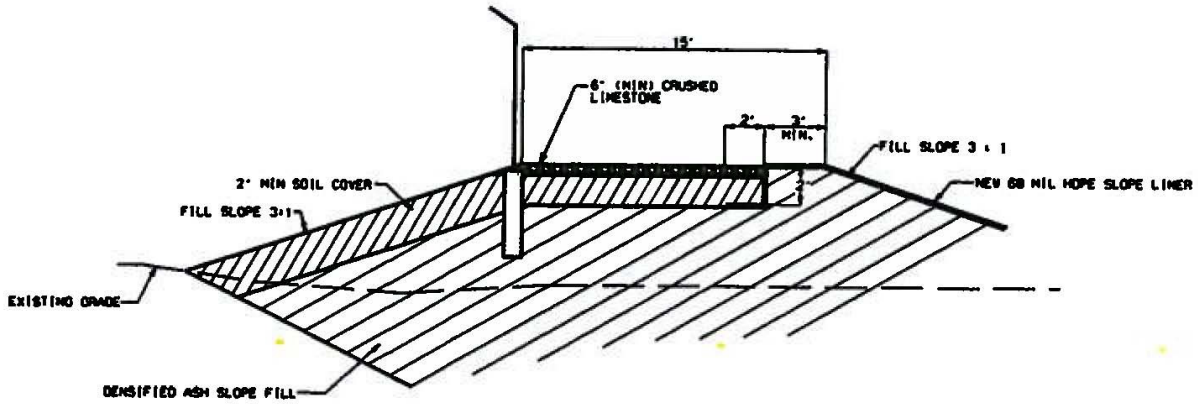


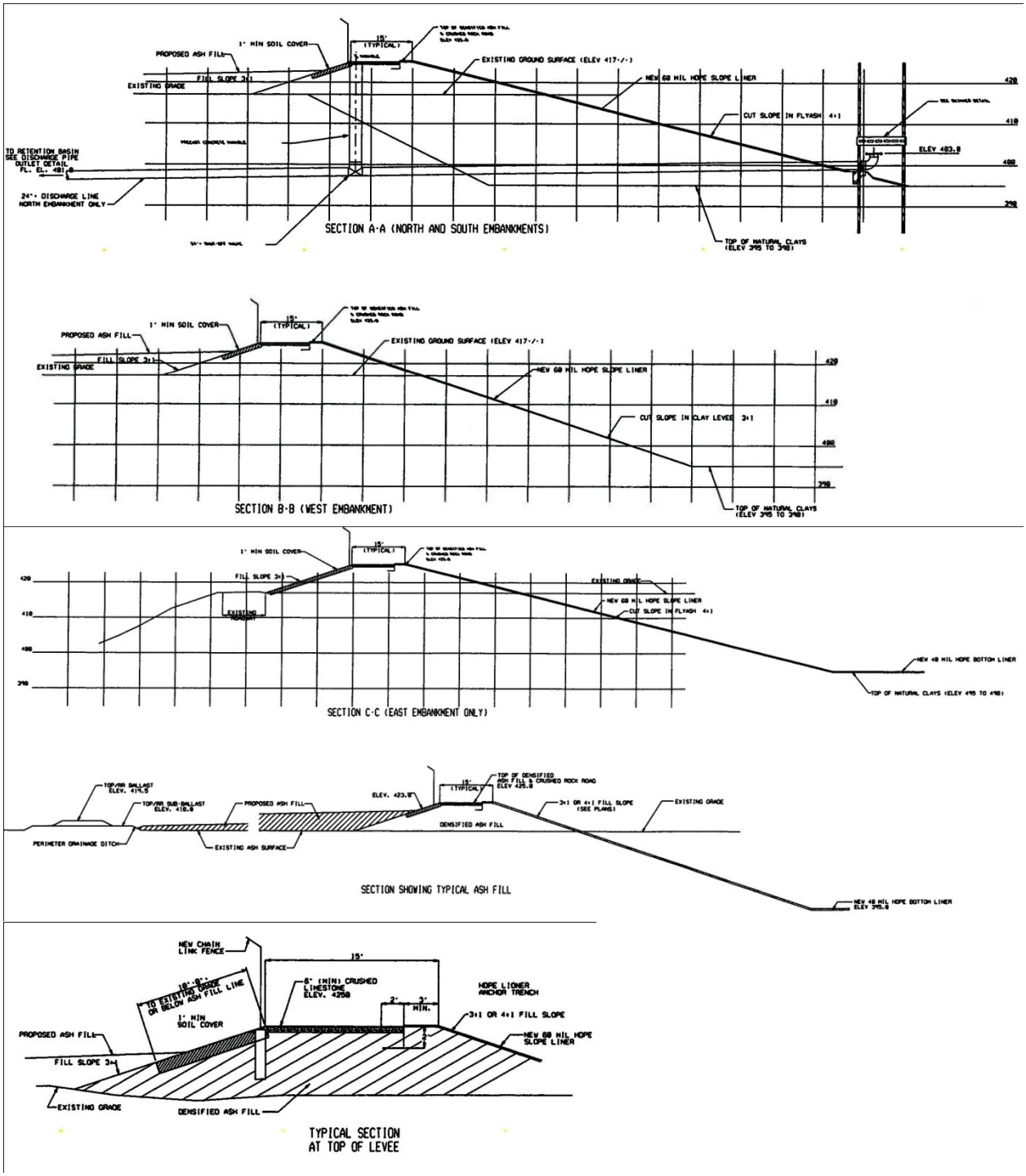
E-E
SECTION LOOKING WEST THRU LEVEE BETWEEN POND 491 & COAL PILE



TYPICAL LEVEE CAP AT POND 489
SCALE 1/4" = 1'

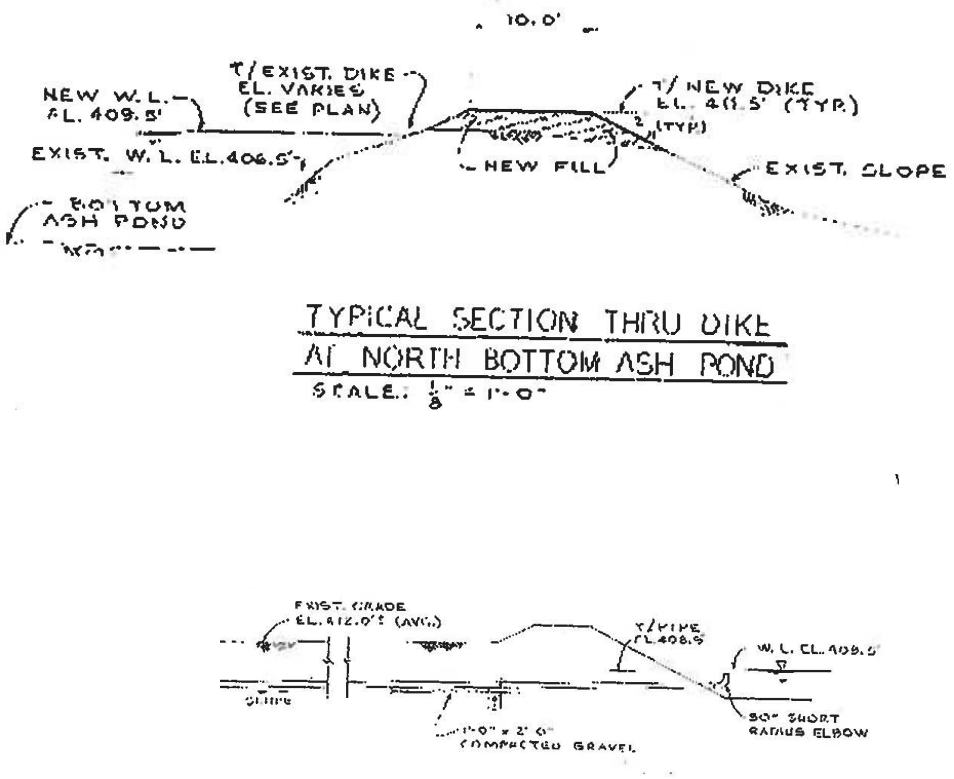
DRAFT

EXHIBIT 3: REPRESENTATIVE POND 3 EMBANKMENT SECTIONS



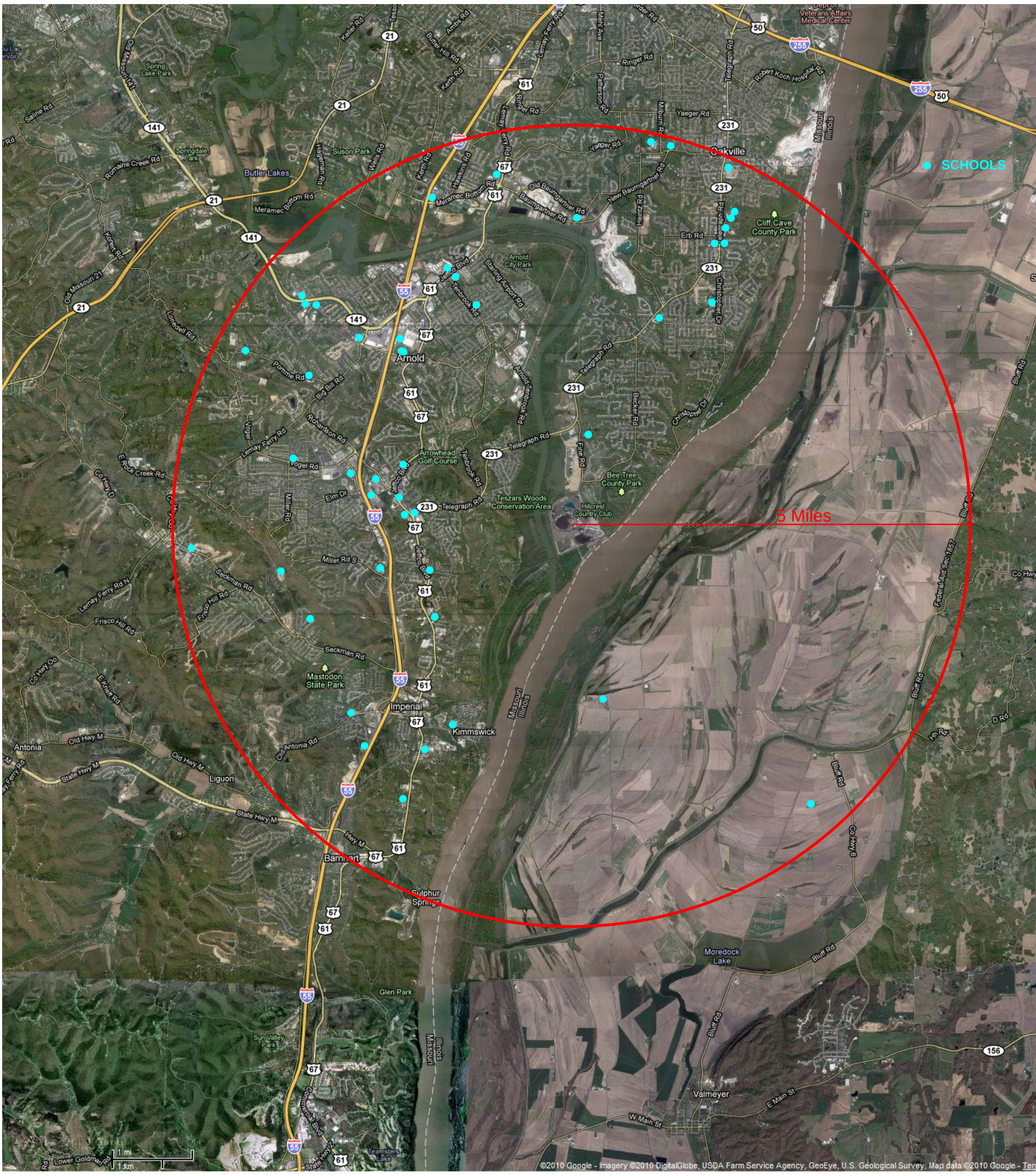
DRAFT

EXHIBIT 4: REPRESENTATIVE POND 4 EMBANKMENT SECTION



APPENDIX A

DOC 1.1 MERAMEC POWER STATION VICINITY MAP (5-MILE)


SCHOOLS
5 Miles
Arnold
Oakville
Imperial
Kimmswick
Barnhart
Sulphur Springs
Antonia
Liguori
Valmeyer
Butler Lakes
Spring Lake Park
Springdale Park
Suson Park
Arnold City Park
Arrowhead Golf Course
Teszars Woods Conservation Area
Hillcrest Country Club
Bee Tree County Park
Cliff Cave County Park
Mastodon State Park
Moredock Lake
Glen Park
Sun Valley Park
Teamsters Lake
Dept of Veterans Affairs Medical Center
Missouri
Illinois
Meramec Bottom Rd
Telegraph Rd
Jeffco Blvd
Tenbrook Rd
Lemay Ferry Rd
Seckman Rd
Old Antonia Rd
State Hwy M
Bluff Rd
Co Hwy 6
Federal-Aid Sec 1857
Christopher Dr
Baumgartner Rd
New Baumgartner Rd
Yaeger Rd
Ringer Rd
Erb Rd
Becker Rd
Fine Rd
Pomme Rd
Big Bill Rd
Richardson Rd
Vogel Rd
Miller Rd
Miller Rd S
Elm Dr
Frisco Hill Rd
W Main St
E Main St
1 mi
1 km
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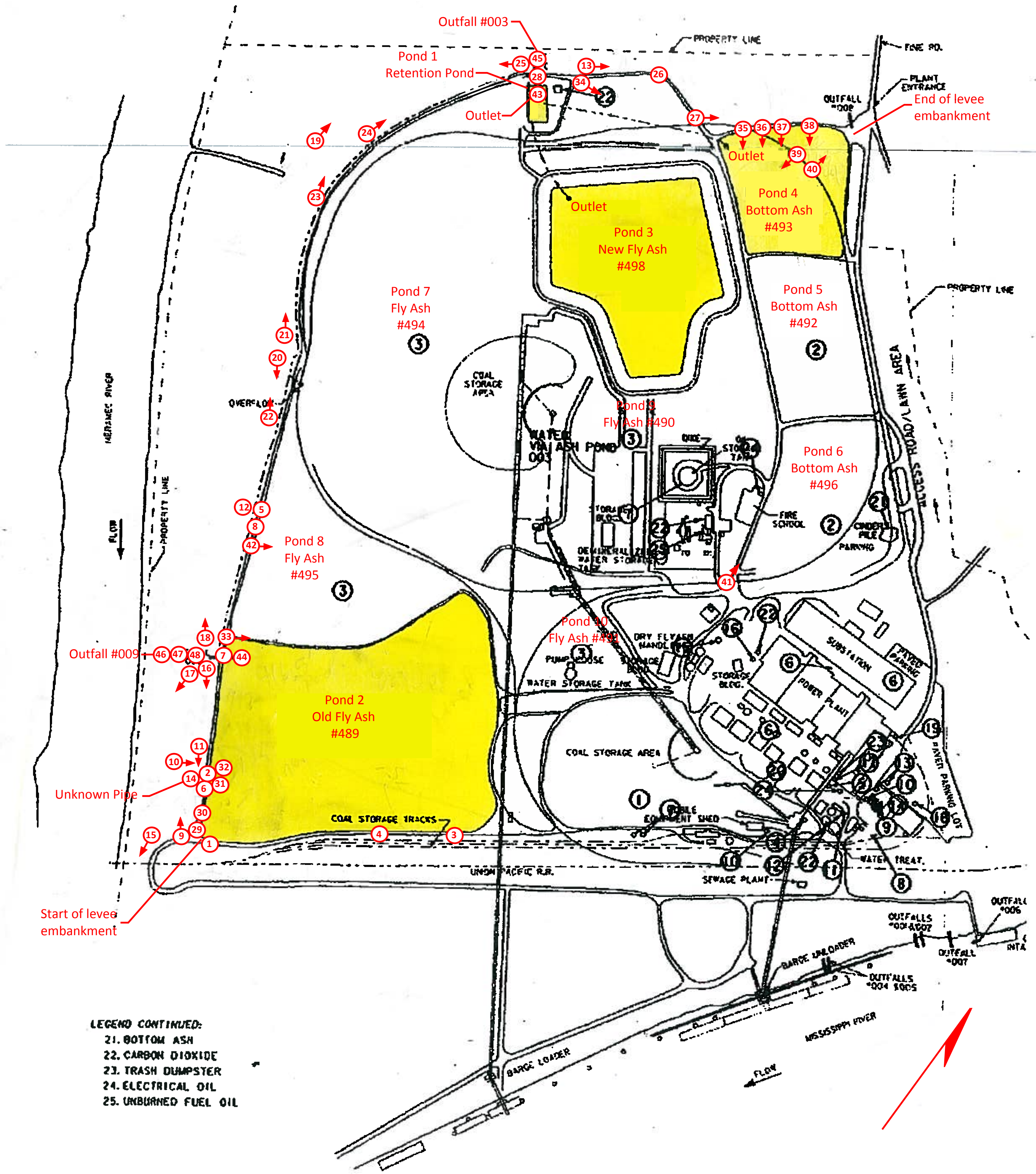
APPENDIX A

DOC 1.2 MERAMEC POWER STATION MAP

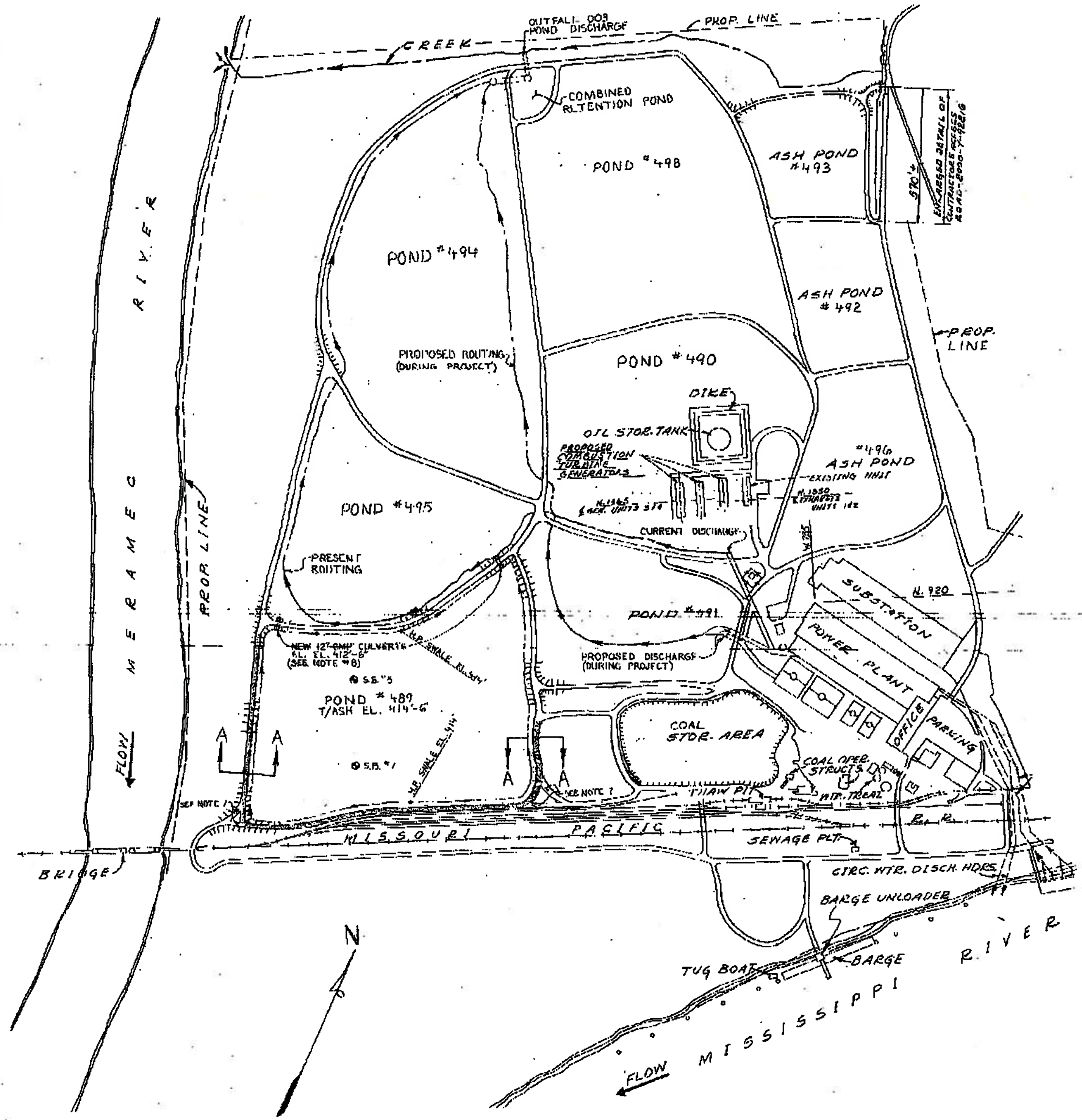


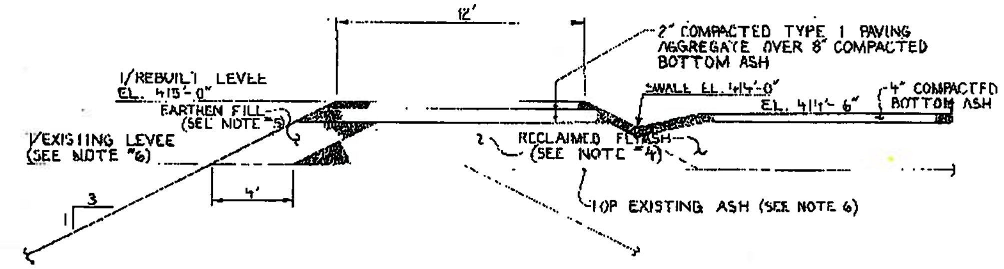
LEGEND CONTINUED:

21. BOTTOM ASH
22. CARBON DIOXIDE
23. TRASH DUMPSTER
24. ELECTRICAL OIL
25. UNBURNED FUEL OIL

APPENDIX A

DOC 1.3 MERAMEC PLANT PLANS





SECTION A-A
LEVEE RENOVATION

CONFIDENTIAL INFORMATION

NOTES:

1) DEPRESSED SECTIONS OF POND #489 LEVEES SHALL FIRST BE RESTORED TO THEIR ORIGINAL TOP-OF-LEVEE ELEVATION 415', AS SHOWN IN SECTION A-A.

2) FLYASH SHALL BE RECLAIMED FROM POND #495 BY APPROPRIATE METHODS. FLYASH SHALL BE DRYED, PLACED AND COMPACTED IN POND #489, TO AN EL. OF 414'-6".

3) METHODS OF DRYING (I.E. MOISTURE REDUCTION) SHALL BE RESTRICTED SUCH THAT ANY RESULTING RUNOFF BE KEPT WITHIN EXISTING ASH POND LIMITS AND BE ROUTED TO THE EXISTING PERMITTED DISCHARGE.

4) RECLAIMED FLYASH SHALL BE PLACED IN LOOSE LIFTS NOT TO EXCEED 8-12 INCHES, AND IMMEDIATELY COMPACTED AT OPTIMUM MOISTURE CONTENT BY MEANS OF A VIBRATORY ROLLER. SEE SPECIFICATION FOR COMPACTION REQUIREMENT. (SEE ALSO NOTE #9)

5) EARTHEN MATERIAL REQUIRED FOR EROSION PROTECTION AND CONTAINMENT SHALL CONFORM TO CL, CH, ML, OR MH SOIL CLASSIFICATIONS, AS GIVEN BY ASTM DESIGNATION D-2487. THIS MATERIAL SHALL BE COMPACTED WITH A SHEEPS-FOOT TYPE COMPACTOR. SEE SPECIFICATION FOR COMPACTION REQUIREMENT. (SEE ALSO NOTE #9)

6) SEE TOPOGRAPHIC MAP DRAWING 8020-W-122627 FOR EXISTING ELEVATIONS.

7) REBUILD ACCESS ROADS TO RENOVATED LEVEE TO PROVIDE SMOOTH TRANSITIONS FOR SMALL VEHICLES.

8) TWO NEW CULVERTS WILL BE INSTALLED AS SHOWN TO PROVIDE STORMWATER DRAINAGE FROM POND #489 INTO POND #495.

9) COMPACTION SPECIFICATIONS SHOULD YIELD PERMEABILITIES WITHIN THE REPAIRED LEVEE AS FOLLOWS:
   CLAY FILL LESS THAN 10^{-7} CM/SEC.
   FLYASH - LESS THAN 10^{-4} CM/SEC.

10) SURVEY MONUMENT #2 SHALL BE RAISED TO ELEVATION 415'-0"±2". SEE DRAWING 8020 W-122627 FOR LOCATION.

11) S.B. #5/7 - SOIL BORINGS (SEE U.E. SPEC. FC-2392, APPENDIX E)

12) RENOVATED LEVEE SHOWN THUS

13) ALL WORK SHALL BE DONE IN ACCORDANCE WITH U.E. SPECIFICATION EC 2392.

REFERENCE DRAWING:
TOPOGRAPHIC MAP ---------------- 8020-W-122627

8020 Y-122626

NOTICE OF LIMITED RESPONSIBILITY

DRAWN 5/6/91 SCOTT HELD	PROPERTY PLAN ASH RETENTION PONDS
CHKD P.O.	
SUPV. 5-7-91	
APPD 5-1-91 R. KINDER	LOCATION 001005 — MERAMEC PLANT — CLASS 02010
UNION ELECTRIC COMPANY ST. LOUIS, MO.	8020-Y-122626 — REV. 0

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CONFIDENTIAL
INFORMATION

NOTE:
SEE AMEREN DRAWING NUMBER 8020-S-144280 FOR ASH POND 4B3 MODIFICATIONS

LEGEND

Sidewalk
Building
Foundation
Fence
Rail
Tree Line
Stream
Brush/Shrub Line
Index Contour
Intermediate Contour
Depression Contour
Guard Rail
Swamp Symbol
Control Point
Spot Elevation
Single Tree
Loading Dock
Catch Basin
Manhole
Pole
Sign
Fire Hydrant
Light Pole
Railroad
Paved Road
Unpaved Road
Trail
Pipe Line
Driveway

NOTE: DASHED CONTOURS MAY BE UNRELIABLE.

PREPARED FOR AMEREN

M. ENGLUND

PROPERTY
TOPO MAP
ASH PONDS

001005 MERAMEC PLANT 02010

Ameren ST. LOUIS 8020-X-144271 0

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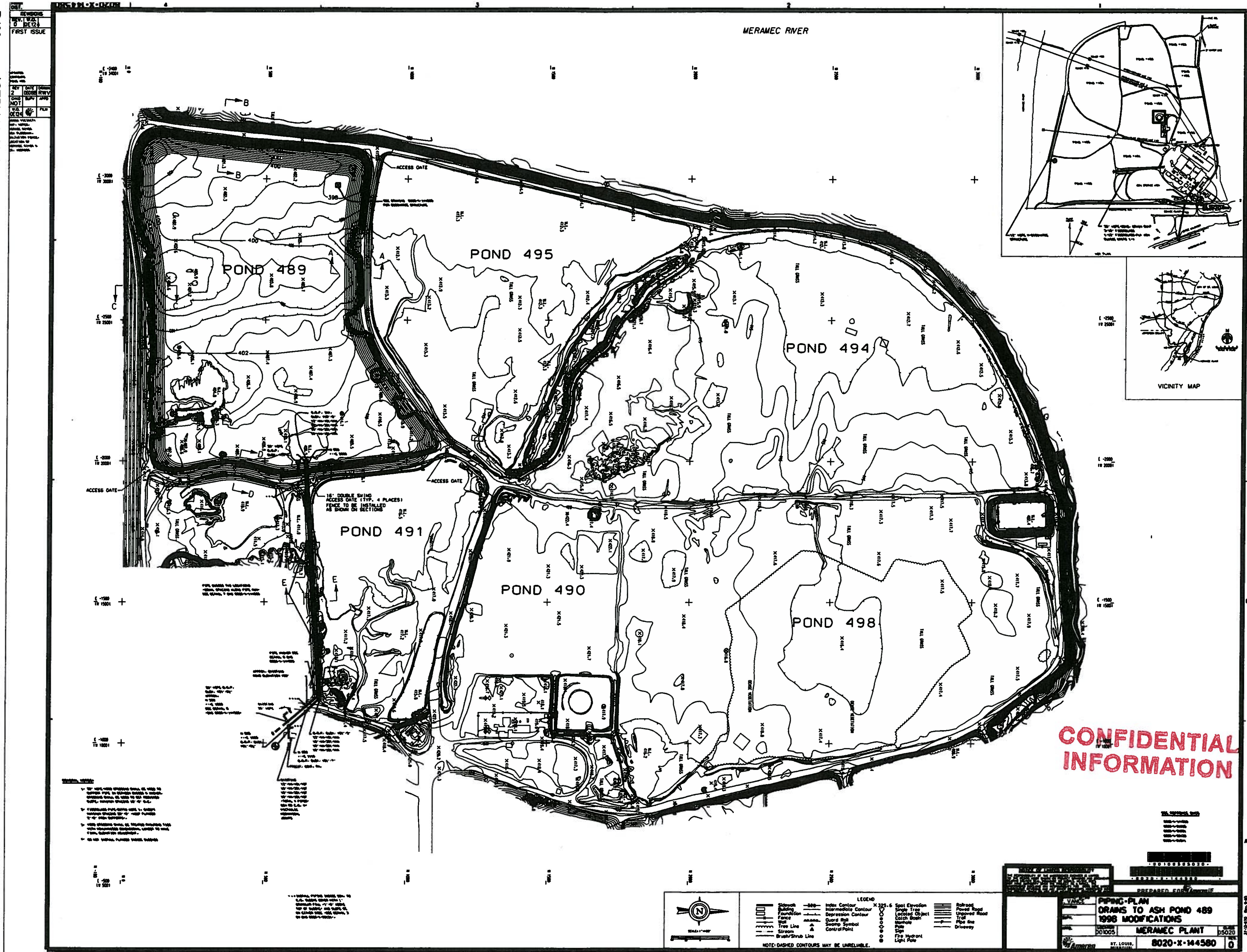

CONFIDENTIAL INFORMATION

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MERAMEC RIVER

POND 489

POND 495

POND 494

POND 491

POND 490

POND 498

ACCESS GATE

VICINITY MAP

CONFIDENTIAL INFORMATION

100 YEAR FLOOD ELEVATIONS:
RIVER MILE .513 ELEVATION 482.29'
RIVER MILE .659 ELEVATION 485.17'

EARTHWORK QUANTITIES:
CUT-119,000 CUBIC YARDS
FILL-119,000 CUBIC YARDS

BENCHMARK NOTES:
1. ELEVATIONS BASED ON U.S.G.S. BENCHMARK LOCATED ON THE SOUTHEAST ABUTMENT OF THE MISSOURI PACIFIC RAILROAD BRIDGE OVER THE MERAMEC RIVER. SPIKES TABLET ELEVATION = 418.407'
2. LOCAL BENCHMARK: CUT SQUARE ON THE SOUTHEAST CORNER OF LOADING DOCK WALL. ELEVATION = 414.08'

REFERENCE DRAWINGS:
PROPERTY - SECTIONS — — — 8020-X-144289

COMPANY ADDRESS
AMEREN UE
ONE AMEREN PLAZA
1901 CHOUTEAU AVE.
ST. LOUIS, MO 63103

COMPANY MAILING ADDRESS
AMEREN UE
P.O. BOX 66149
ST. LOUIS, MO 63166-6149

PLANT ADDRESS
AMEREN UE
MERAMEC PLANT
2200 FINE ROAD
ST. LOUIS COUNTY, MO 63129

LEGEND

NOTE: DASHED CONTOURS MAY BE UNRELIABLE.

PREPARED FOR: Ameren UE

PROPERTY - PLAN
FLYASH POND 489
RECLAMATION AND NEW LINER

MERAMEC PLANT

8020-X-144288

2

8020-X-135359

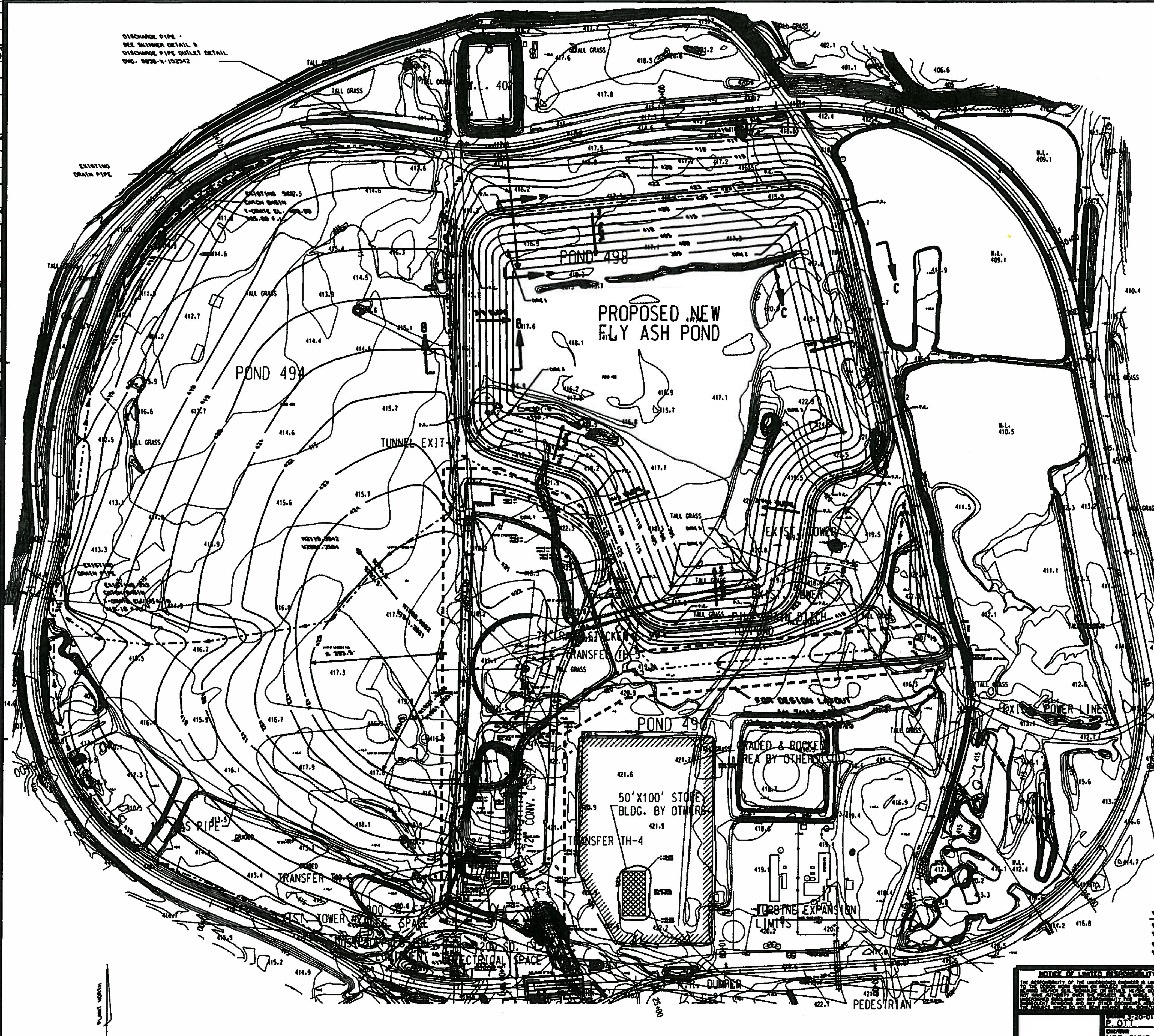
ALL WATERSHED AREAS TO BE EXCAVATED OR FILLED DRAIN TO THE EXISTING SETTLING BASIN AT THE NORTH END OF POND 498. NO SILT FENCES, STAKED BALES OR OTHER EROSION CONTROL MEASURES WILL BE UTILIZED IN THIS PLAN.

EXISTING TOPOGRAPHY COMPILED FROM AERIAL SURVEY CONDUCTED BY WALKER & ASSOCIATES, FLOWN 4-20-94.

NOTICE OF LIMITED RESPONSIBILITY

SEPTEMBER 19, 1994

DRAWN MRF	FLYASH POND 491 & 495 INTERIM GRADING PLAN
CHKD. PHR	
SUPV.	
APPD.	LOCATION 000005 — MERAMEC POWER PLANT — CLASS 08010
UNION ELECTRIC COMPANY ST. LOUIS, MO.	8020-X-135359 — REV. 0



GRADING PLAN

AREA KEY PLAN

TOTAL CUT 220,000yd^3
TOTAL FILL 221,800yd^3

CURVE NO.	RADIUS	CENTER	P.C. POINT @ CURVATURE	P.T. POINT @ TANGENCY
1	87'-6"	N2795.9654 W1766.7163	N2794.9985 W1854.2110	N2883.0642 W1775.0847
2	87'-6"	N2857.8626 W1122.4817	N2944.9616 W1130.8501	N2878.1002 W1037.3542
3	87'-6"	N2389.1821 W1011.0613	N2409.4196 W925.9338	N2303.9035 W991.4702
4	87'-6"	N2211.0398 W1004.8965	N2296.3184 W1024.4876	N2223.8795 W1091.4493
5	87'-6"	N2058.1369 W1204.4941	N2045.2973 W1117.9412	N1970.9244 W1197.4075
6	87'-6"	N2042.6838 W1394.6702	N1955.4713 W1387.5836	N2011.3974 W1476.3856
7	87'-6"	N2216.2748 W1648.5213	N2247.5612 W1566.8058	N2300.2443 W1623.9170
8	87'-6"	N2432.0871 W1762.6952	N2348.1176 W1787.2994	N2431.1202 W1850.1898

REFERENCE DRAWINGS:
FOR SECTION CUTS AND TYPICAL SECTIONS SEE 8030-Y-152542
FOR ADDITIONAL DESIGN LAYOUTS SEE 8030-X-149714 & 8030-X-149715

SCALE: 1" = 100'

NOTICE OF LIMITED RESPONSIBILITY

8030-Y-152541

PREPARED FOR AmerenUE

DRAWN 3-20-01 P. OTT	PROPERTY - SITE PLAN AREA A NEW ASH POND AND GRADING OVER PONDS 490, 494 & 498
CHK/REV NOT CHKD	
SUPV. 3-20-01 SAH	
APPD.	LOCATION 001005 — MERAMEC PLANT — CLASS 02010
Ameren ST. LOUIS, MISSOURI	8030-Y-152541 — REV. 5

REVISIONS

REV	DATE	DRAWN	CHKD	SUPV	W.O.	Description
0					10775	FIRST ISSUE
1	032001	PDO	NOT	SAH	10775	ADDED COORDINATES AND RADIUS FOR NEW COAL PILE; SHOWED EXISTING CATCH BASINS
2	040201	MLE	NOT	SAH	10775	REVISED CONTOURS PER ENGINEERING COMMENTS
3	041701	MGL	NOT	SAH	10775	REVISED CONTOURS PER ENGINEERING COMMENTS
4	042001	MGL	NOT	SAH	10775	REVISED CONTOURS PER ENGINEERING COMMENTS
5	051501	DAG			10775	REVISED CONTOURS PER ENGINEERING COMMENTS ADD DISCHARGE PIPE FROM FLY ASH POND TO RETENTION BASIN & TABLE

37-13-110 Rev. 9-85

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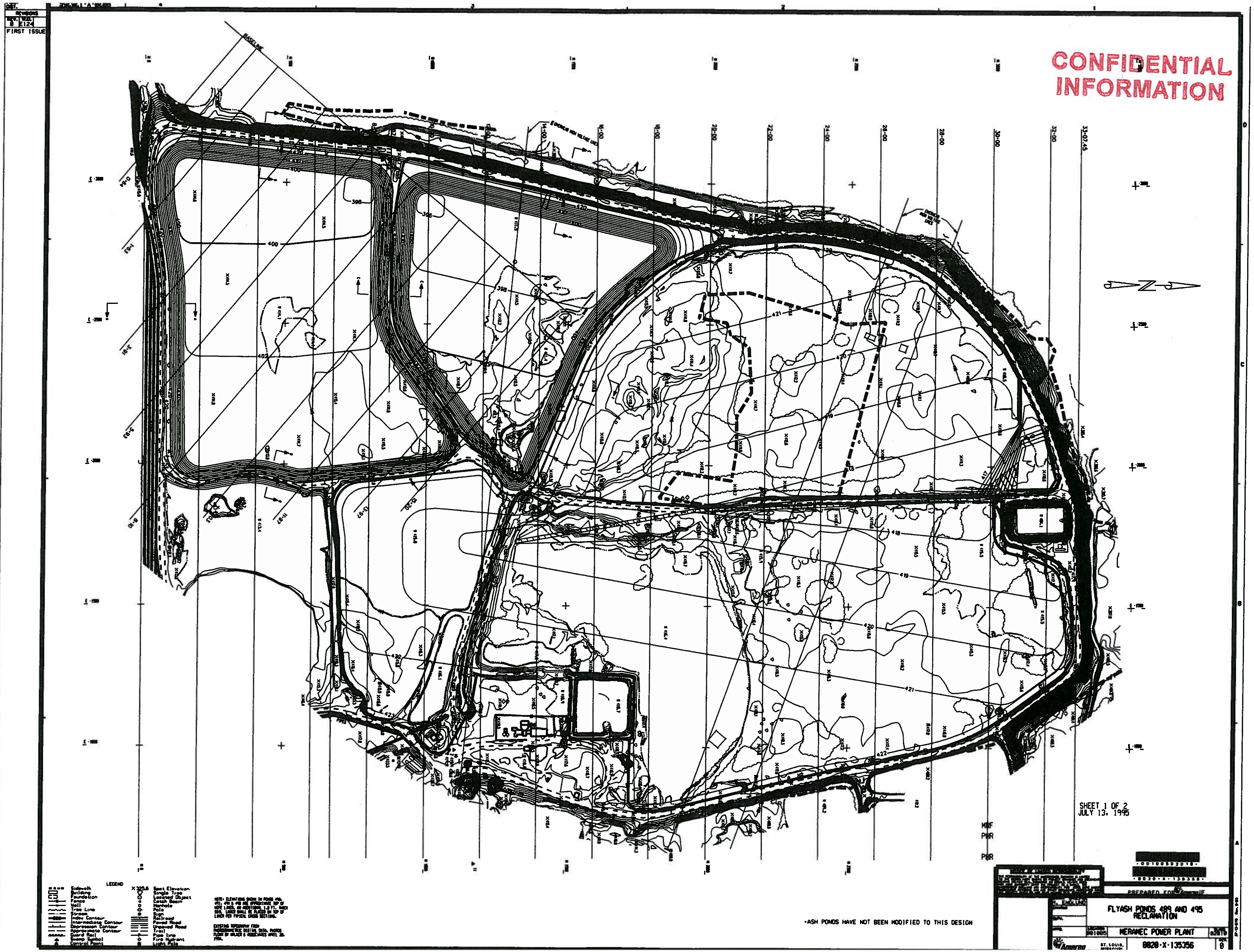
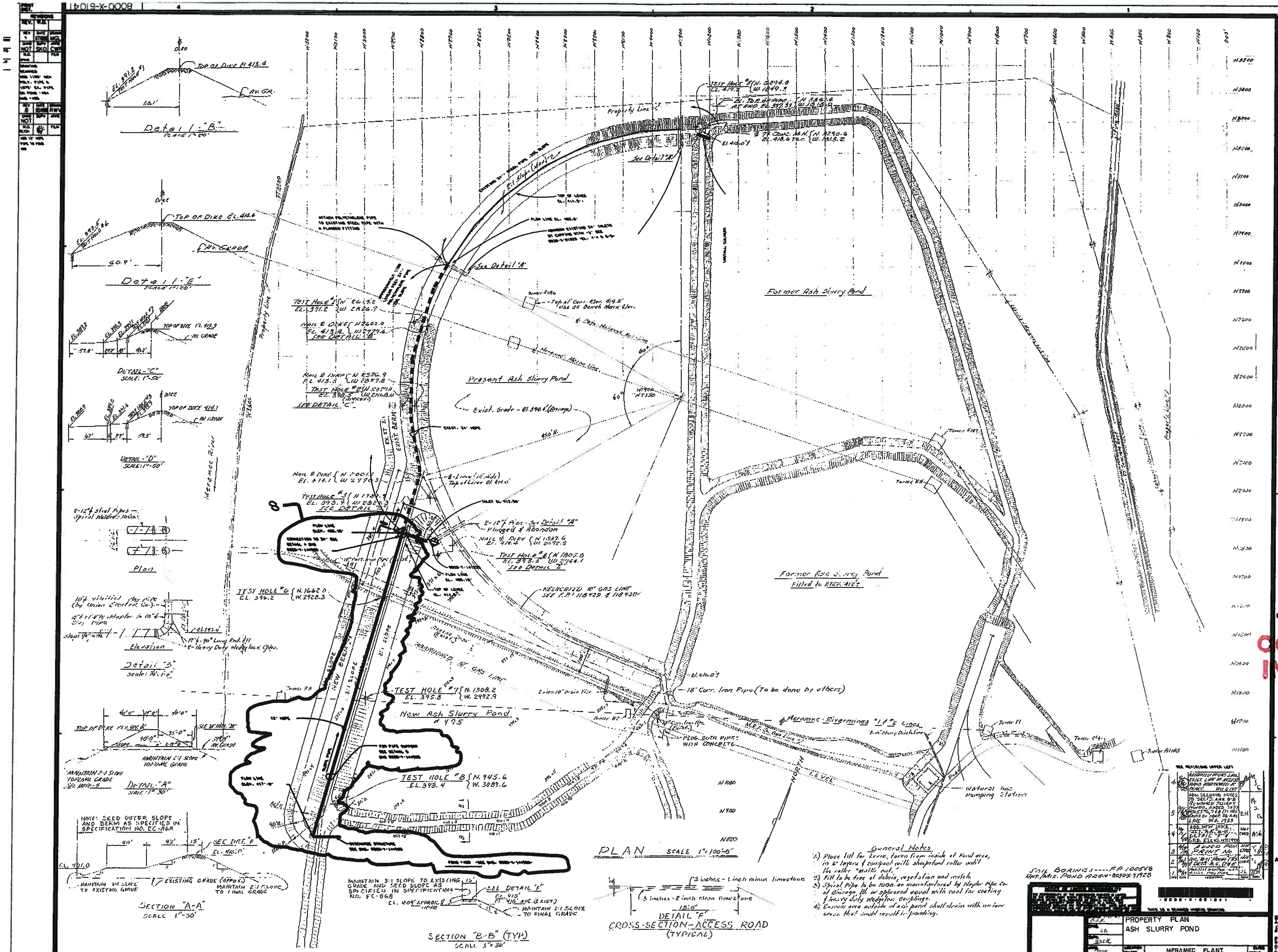
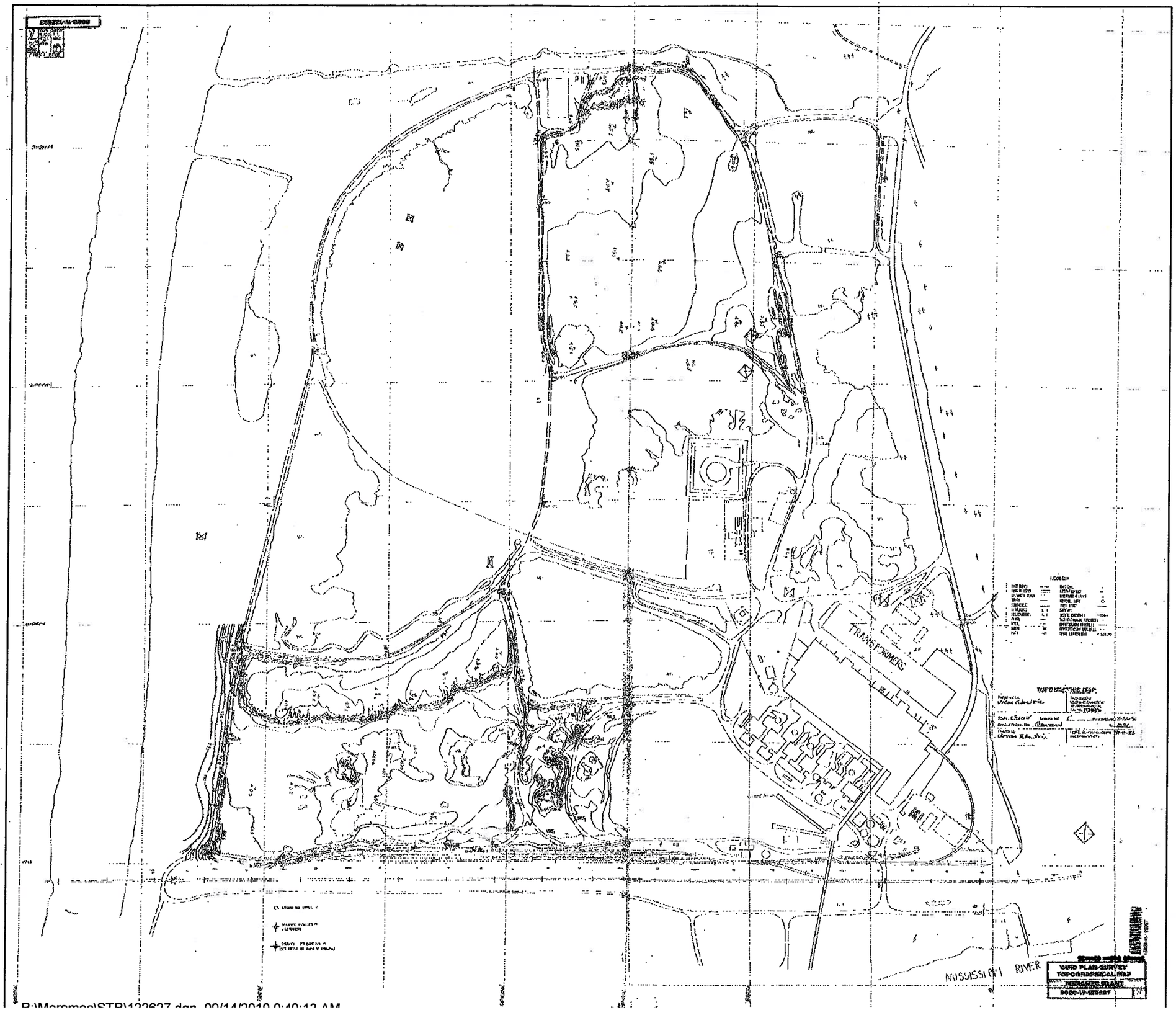
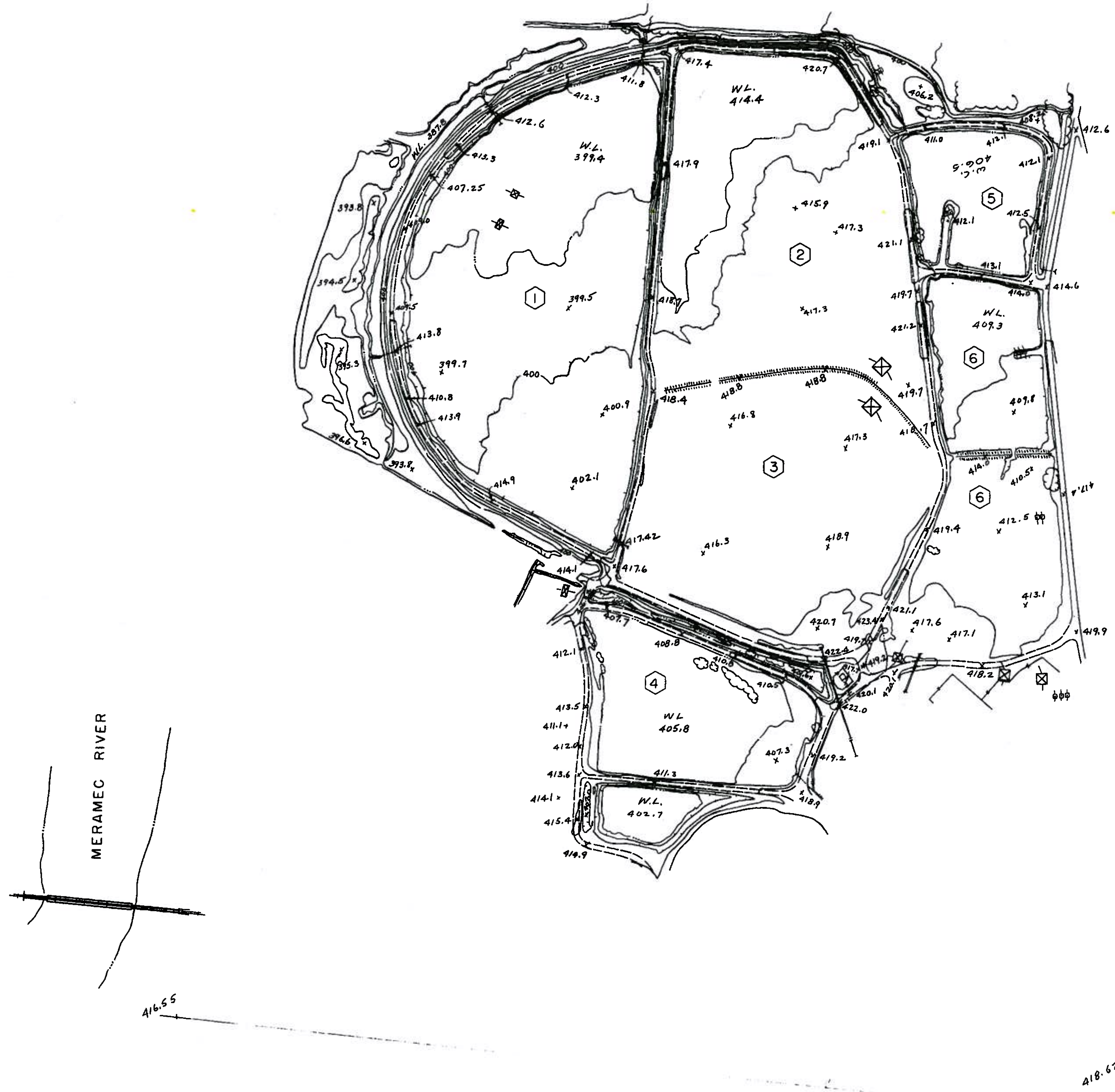
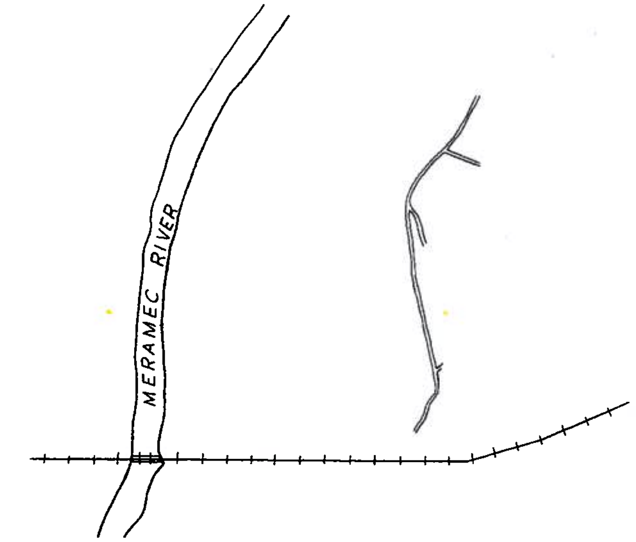






8020-W-122627





KEY PLAN

POND	AREA, SQ. FT. TOP OF LEVEE	AREA, SQ. FT. TOE OF LEVEE
1 FLY ASH POND IN USE	1,330,000	1,185,400
2 NORTH FILLED FLY ASH POND	1,051,000	933,500
3 SOUTH FILLED FLY ASH POND	930,400	864,500
4 REFUSE BURNING ASH POND	429,200	380,700
5 NORTH BOTTOM ASH POND	249,900	214,400
6 SOUTH BOTTOM ASH POND	698,000	620,000

REFERENCE SURDEX CORP PHOTOGRAPH NO. 708-135 AND 708-136 DATED 12-1-72

PREPARED FOR
UNION ELECTRIC COMPANY
SCALE: 1"=200'
5' CONTOURS
BY
SURDEX CORP. CHESTERFIELD MO.

PROPERTY PLAN
ASH PONDS

UNION ELECTRIC SYSTEM ST. LOUIS, MO.
LOCATION MERAMEC PLANT
8000-Y-73581

PLAN
SCALE: 1"=50.0'

SECTION 6-6
(10 SCALE)

SECTION 1-1
SCALE: 1"=20.0'

DETAIL PLAN
SHEET PILE
SCALE: 1"=20'

DETAIL E

DETAIL F

SECTION 3-3
SCALE: 1/4"=1'-0"

SECTION 2-2
SCALE: 1"=5.0'

SECTION 4-1
SCALE: 3/8"=1'-0"

SECTION 5-5
SCALE 1:10.0'

DETAIL "A"
SCALE: 3/4"=1'-0"

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

DETAIL "C"
SCALE: 1 1/2"=1'-0"

DETAIL "D"
SCALE: 3/4"=1'-0"

TYPICAL SECTION THRU DIKE AT NORTH BOTTOM ASH POND
SCALE: 1/8"=1'-0"

GENERAL NOTES:
1. FILL FOR RETENTION POND DIKES SHALL BE FREE OF DEBRIS, VEGETATION AND MULCH.
2. PLACE FILL IN 6" LAYERS COMPACTED TO 95% MODIFIED PROCTOR DENSITY.
3. MANHOLE JOINTS SHALL BE SEALED WITH A BITUMINOUS MASTIC SEALER.
4. FILL SHALL BREAK OPENINGS FOR PIPES AND DRYPACK PIPES SECURELY IN PLACE.

REFERENCE DWG'S:
1. RETENTION POND AREA - MISC. SECTIONS & DETAILS ... 8030-X-91929
2. PROPERTY PLAN - ASH SLURRY POND 8000-Y-61041
3. MERAMEC ASH POND - TOPOGRAPHICAL MAP PREPARED BY SURVEY CORP. RECEIVED MAR. 1977

LEGEND:
= NEW EARTH WORK

NOTE:
ALL WORK BY STRUCTURAL / CIVIL CONSTRUCTION CONTRACTOR UNLESS NOTED OTHERWISE

REVISIONS
0 C & I-1 & J-8, ADDED DET. "O". REVISED SIZE & SHAPE OF MANHOLE IN SECTS. 2-2, 3-3 & A-A. @ A1 & B-1 THRU 3 RELOCATED NEW 24"ϕ OVERFLOW LINE FROM INSIDE TO OUTSIDE OF DIKE & LOCATED NEW CONC. SUPPORTS IN RETENTION POND. M-0-5 REVISED SECT. L-L. @ C-12 DIKE WORK NOTE ADDED. DWG. CHECKED, SIGNED APPROVED & RELEASED FOR CONSTRUCTION. CHK'D: APP'D: 7-14-77 FILMED: 7-14-77
01 D-1, A6 & C9: STANDARDIZED NOMENCLATURE. E-4, H-1 & G-10: REVISED NORMAL W.L. EL. 404.5'± WAS EL. 403.9'± & DELETED MAX. W.L. EL. 444.8'. CHK'D: C.C. APP'D: 8-5-77 FILMED: 8-5-77
02 B-3: RELOCATED NEW 24"ϕ OVERFLOW LINE IN RETENTION POND. E-3 & G1: REVISED SECT. 1-1, M-2 & G-3: REVISED SECT'S. 2-2 & 5-5. CHK'D: S.A.K. APP'D: 8-25-77 FILMED: 8-25-77
03 G-11: CLARIFIED FLANGE REQUIREMENTS FOR 24"ϕ CONTROL VALVE. CHK'D: APP'D: 11-30-77 FILMED: 11-30-77
04 B-3 & G-8, 9: REVISED SOUTH DIKE FOR RETENTION/MIXING POND. E & F-11: INDICATED TELEDYNE VALVE OPERATOR & RELOCATION OF 4" VENT BY FIELD. CHK'D: APP'D: FILMED: SEP 04, REV. 5
05 DWG. SIGNED, STAMPED AND RELEASED FOR EXCAVATION ONLY. APP'D: 1-9-78 FILMED: 1-9-78
C RELEASED FOR PERMITS AS REQUESTED BY M. BECKER. APP'D: 4/7/77 FILMED: 4-7-77
B RELEASED FOR CONSTRUCTION BIDS ONLY. APP'D: 4-26-77 FILMED: 4-26-77
A RELEASED FOR COE BIDS ONLY. APP'D: 3-8-77 FILMED: 11-26-76
RELEASED WITH STRUCTURAL SPECS FOR CLIENT'S COMMENTS APP'D: 3-7-77 FILMED: 3-8-77

STATE OF MISSOURI ROBERT A. MARKS NUMBER E27828 REGISTERED PROFESSIONAL ENGINEER

Prepared by FLUOR PIONEER INC.

CONFIDENTIAL INFORMATION

8030-X-91928

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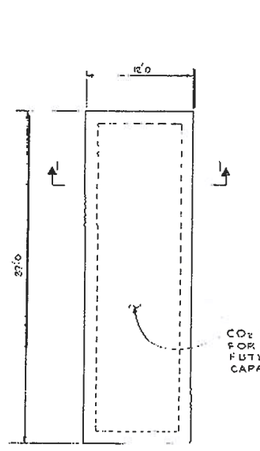
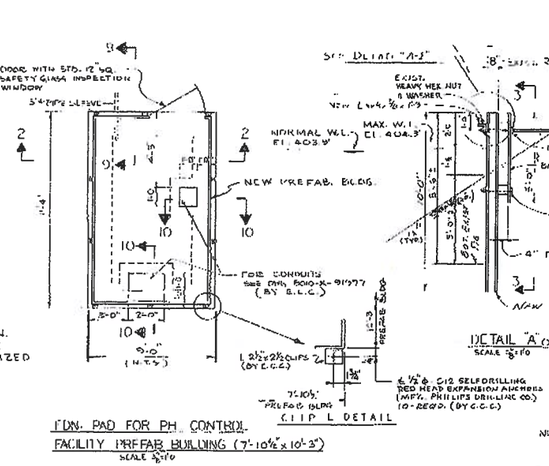
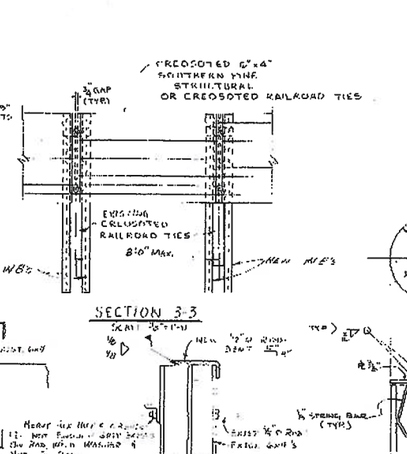
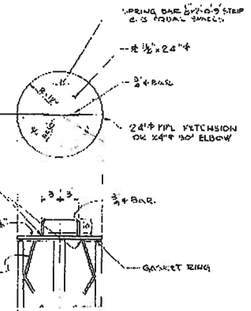
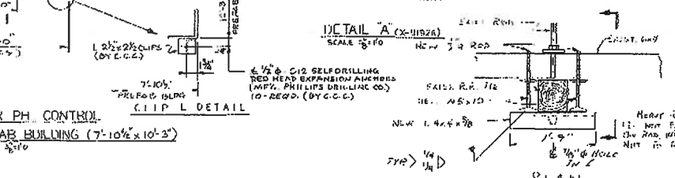




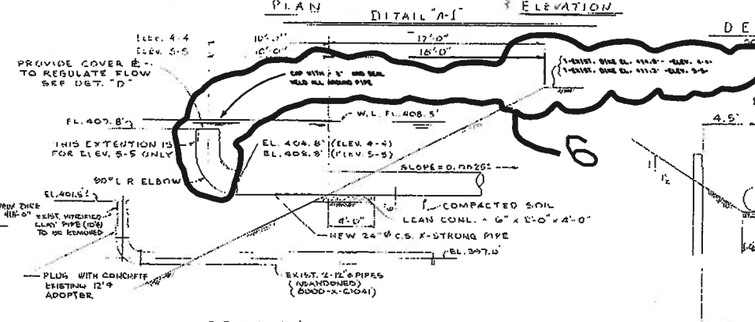
FDN. PAD FOR PH CONTROL FACILITY PREFAB BUILDING (7'-10⅝"x 10'-3")
SCALE ½"=1'0





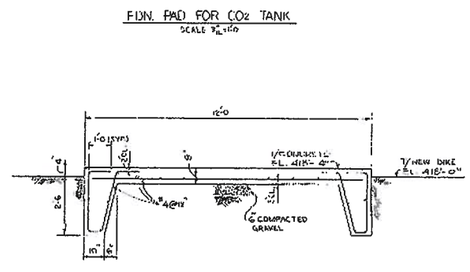


PLAN

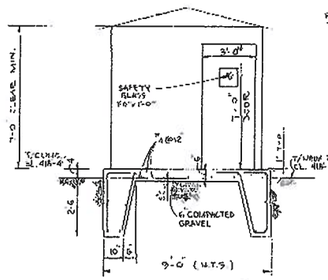


ELEVATION

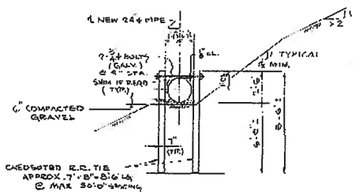
SECTION 11-11 (X 91928)
SCALE: ½"=1'0



SECTION 1-1

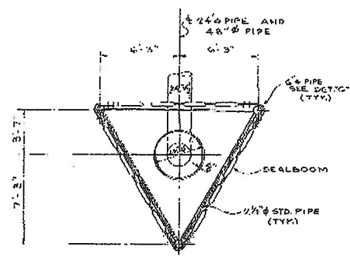


SECTION 2-2

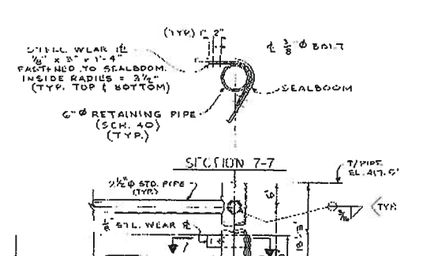


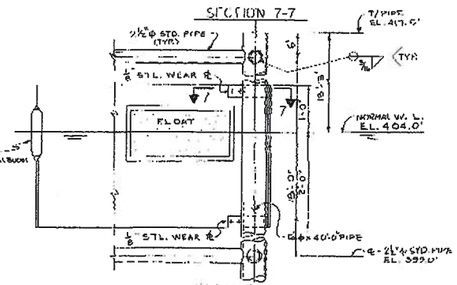
SECTION 6-6 (X-91928)
SCALE: ½"=1'0

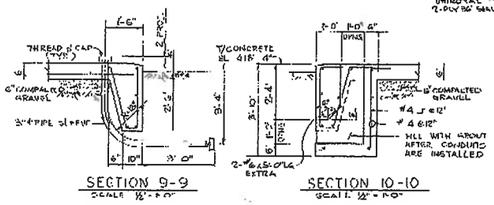
NOTE:
EXISTING TOPOGRAPHICAL CONDITIONS MAY REQUIRE PIPE SUPPORT MODIFICATION. FOR ALTERNATE "1" & "2" SEE DWG. X-91924. FOR ALTERNATE PREFERENCE SEE U.E.



ENLARGED PLAN "B" (X 91921)
SKIMMER SUPPORT
SCALE ½"=1'0







NOTES:
1. FOR ORIGINAL NOTES AND ADDITIONAL LIST OF DWG'S. SEE DWG 8030 X 91925.
2. ALL WORK BY STRUCTURAL/CIVIL CONSTRUCTION CONTRACTOR UNLESS OTHERWISE NOTED.

REFERENCE DWG'S.
1. DETENTION/MIXING POND AREA - PLAN & SECTIONS ..... 8030 X 91925

CONFIDENTIAL INFORMATION

Prepared by FLUOR PIONEER INC.
CHICAGO, ILLINOIS

UNION ELECTRIC COMPANY
MERAMEC PLANT
8030-X-91929

8030-X-91929

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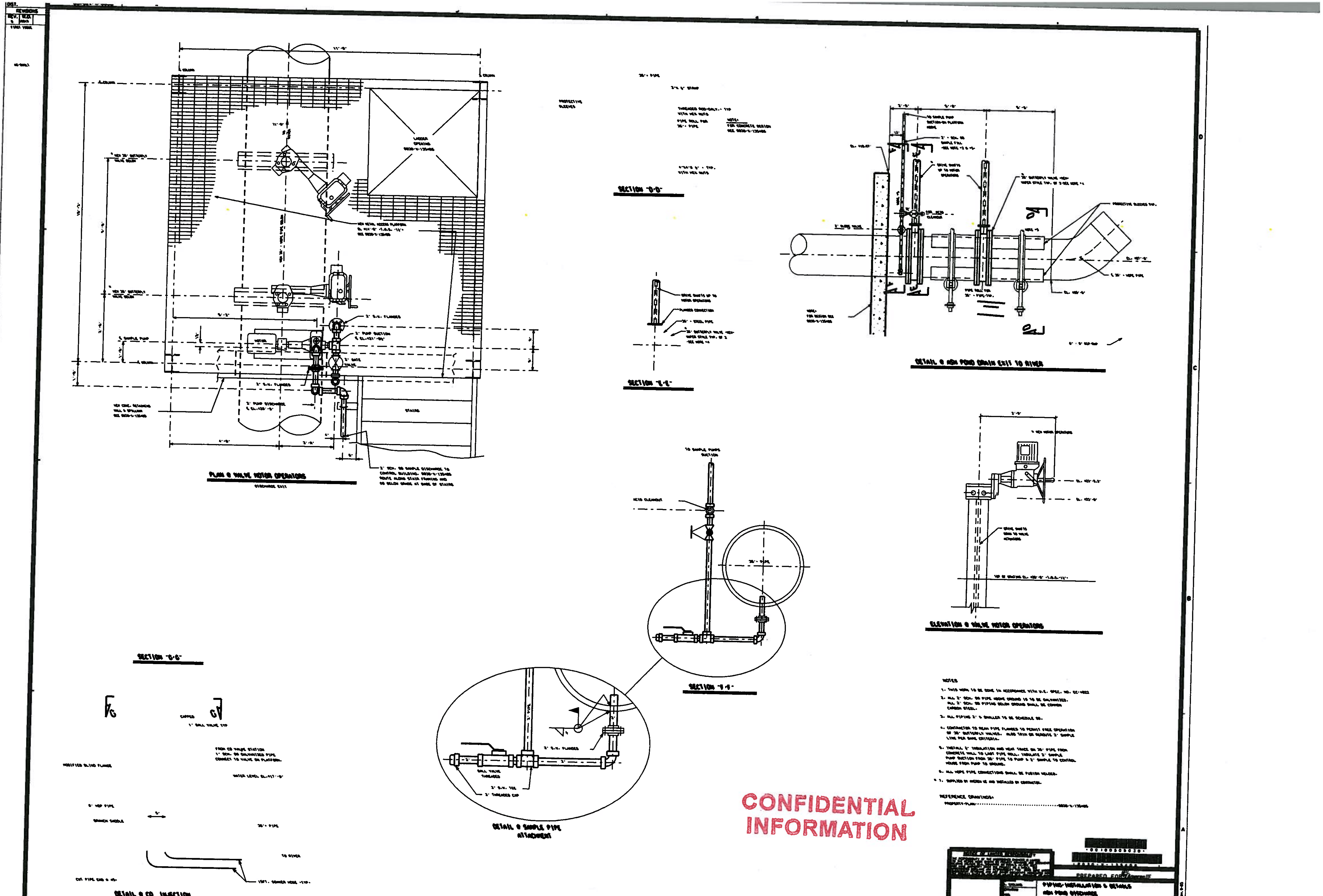

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REVISIONS

AS-BUILT

ASH POND #489

FENCE

CONFIDENTIAL INFORMATION

PROPERTY SITE PLAN
NEW ASH POND 489
DISCHARGE STRUCTURE

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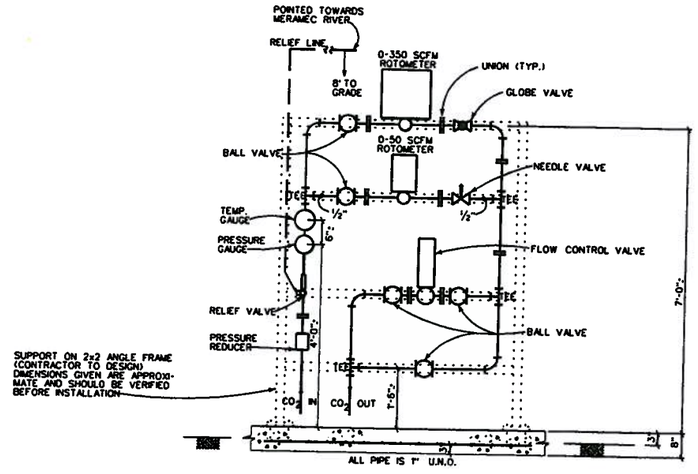
REVISIONS		
REV	DATE	
0	10/78	FIRST ISSUE



DETAIL J
CO_2 REGULATING STATION
LOOKING WEST

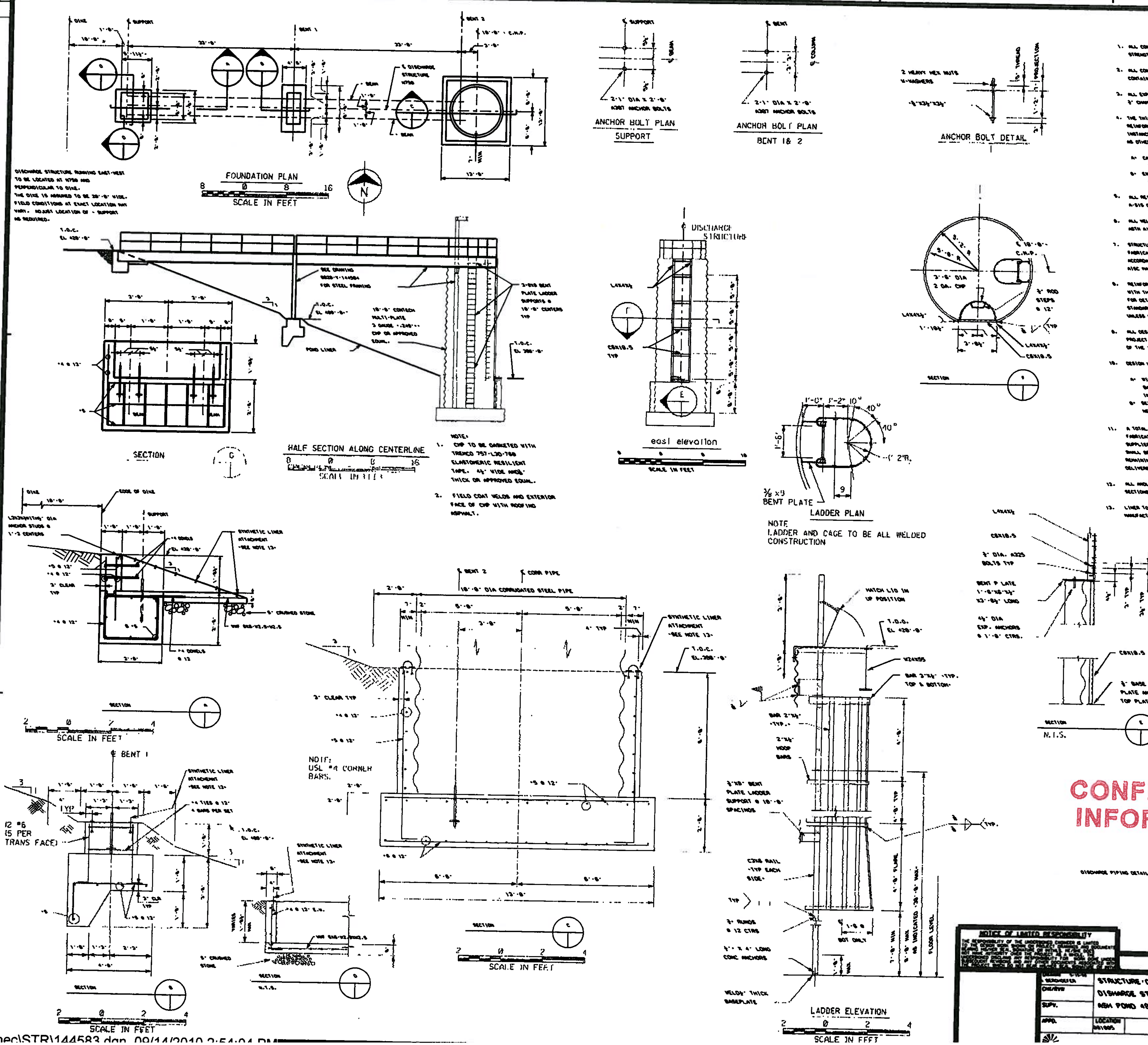
EQUIPMENT LIST	
PRESSURE GAUGE	ASHCROFT "DURAGAUGE" #1349SS 4½" BACK ½" NPT 0-100 psig, MSI 316SS BOURDON SYSTEM, 4½" FACE, BACK STEM, ½" NPT, ALUMINUM CASE, COLOR BLACK.
TEMPERATURE GAUGE	ASHCROFT INDUSTRIAL BIMETAL THERMOMETER, CODE 50I060RD25, -20/120 F, 5" DIA. DIAL, ½" NPT REAR CONNECTION, 2½" STEM.
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.

THIS DRAWING HAS NO SCALE

NOTES:
1. THIS WORK TO BE DONE IN ACCORDANCE WITH U.E. SPEC. NO. EC-402

PREPARED FOR [redacted]

[redacted] INSTALLATION AND DETAILS
CO_2 REGULATING STATION
ASH POND 489
MERAMEC PLANT



GENERAL STRUCTURAL NOTES

1. ALL CONCRETE USED SHALL DEVELOP A MINIMUM STRENGTH OF 4000 P.S.I. IN 28 DAYS.
2. ALL CONCRETE SHALL BE AIR ENTRAINED AND CONTAIN FLY ASH FROM THE LABADIE PLANT.
3. ALL EXPOSED EDGES OF CONCRETE SHALL HAVE ¾" CHAMFER.
4. THE THICKNESS OF CONCRETE COVERING OVER REINFORCING STEEL SHALL BE IN THE FOLLOWING INSTANCES NOT LESS THAN SPEIFIED BELOW OR AS OTHERWISE SHOWN.
   A- CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH - 3
   B- EXPOSED TO EARTH OR WEATHER AFTER FORMS ARE REMOVED - 2
5. ALL REINFORCING STEEL SHALL CONFORM TO A-615 GRADE 60 STEEL.
6. ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185
7. STRUCTURAL STEEL SHALL CONFORM TO ASTM A-36 FABRICATION AND ERECTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION.
8. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH THE ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE ACI STANDARD 318-89. ALL HOOKS SHALL BE STANDARD UNLESS NOTED OR SHOWN OTHERWISE.
9. ALL DESIGN AND CONSTRUCTION WORK FOR THIS PROJECT SHALL CONFORM TO THE REQUIREMENTS OF THE 1996 BOCA CODE.
10. DESIGN LOADS ARE AS FOLLOWS:
   A- WIND LOADS ARE CALCULATED AND APPLIED BASED ON A 70 MPH WIND VELOCITY WITH AN IMPORTANCE FACTOR - 10 EXPOSURE C.
   B- SEISMIC
   NEW STRUCTURES ZONE 11-2, 2-0- 1/10 S-10
11. A TOTAL OF 44 C8X18.5 X 2'-7" SHALL BE FABRICATED AND 176 ¾" DIA A325 BOLTS SUPPLIED. A TOTAL OF 5 C8X18.5 AND 24 BOLTS SHALL BE INSTALLED PER EAST ELEVATION. THE REMAINING C8X18.5 AND BOLTS SHALL BE DELIVERED TO THE OWNER FOR STORAGE.
12. ALL ANGLES CHANNELS AND PLATES SHOWN IN SECTIONS D & E TO BE GALVANIZED.
13. LINER TO BE ATTACHED TO CONCRETE PER MANUFACTURER'S SPECIFICATIONS.

CONFIDENTIAL INFORMATION

DISCHARGE PIPING DETAIL 8020-Y-144585

NOTICE OF LIMITED RESPONSIBILITY

•0010050405 0•
•8020-Y-144583•

PREPARED FOR AmerenUE

STRUCTURE-CONCRETE
DISHARGE STRUCTURE FOUNDATION
ASH POND 489

LOCATION 0A1005 | MERAMEC PLANT | CLASS 04050

37-13-118 Rev. 9-85

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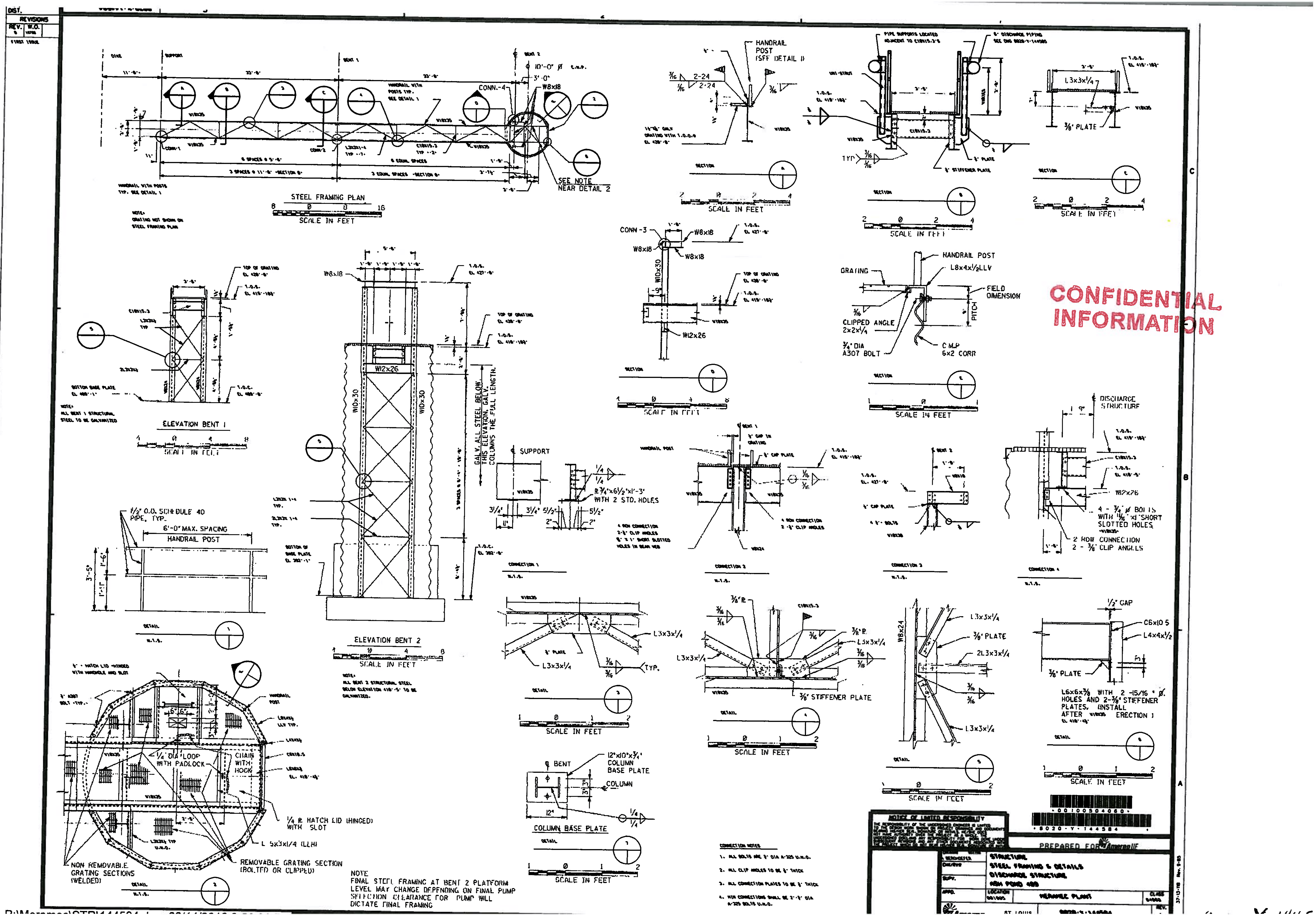
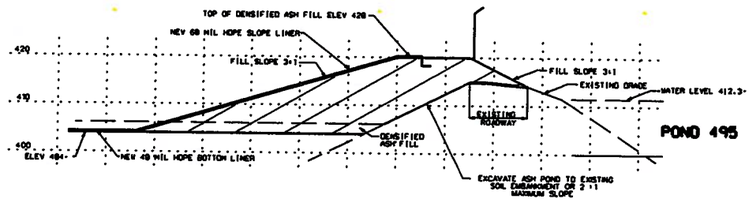
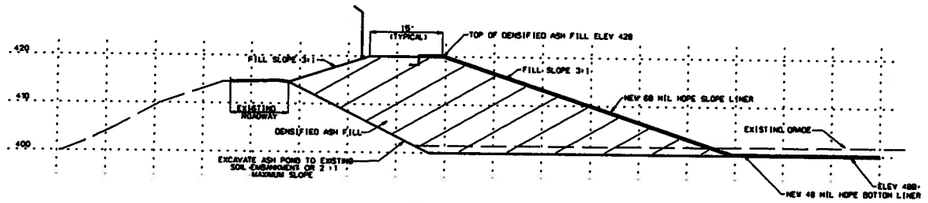


STEEL FRAMING PLAN
SCALE IN FEET
NOTE:
GRATING NOT SHOWN ON STEEL FRAMING PLAN
HANDRAIL WITH POSTS TYP. SEE DETAIL 1
CONN.-4
W8x18
10'-0" Ø C.M.P.
SEE NOTE NEAR DETAIL 2
ELEVATION BENT 1
NOTE:
ALL BENT 1 STRUCTURAL STEEL TO BE GALVANIZED
ELEVATION BENT 2
W12x26
W10x30
GALV. ALL STEEL BELOW THIS ELEVATION, GALV. COLUMNS THE FULL LENGTH.
1½" O.D. SCHEDULE 40 PIPE, TYP.
6'-0" MAX. SPACING
HANDRAIL POST
DETAIL 1
N.T.S.
¼" DIA LOOP WITH PADLOCK
CHAIN WITH HOOK
¼ ℞ HATCH LID (HINGED) WITH SLOT
L 5x3x1/4 (LLH)
REMOVABLE GRATING SECTION (BOLTED OR CLIPPED)
NON REMOVABLE GRATING SECTIONS (WELDED)
DETAIL 2
N.T.S.
NOTE
FINAL STEEL FRAMING AT BENT 2 PLATFORM LEVEL MAY CHANGE DEPENDING ON FINAL PUMP SELECTION. CLEARANCE FOR PUMP WILL DICTATE FINAL FRAMING
HANDRAIL POST (SEE DETAIL 1)
SECTION A
SECTION B
SECTION C
L3x3x¼
⅜" PLATE
CONN-3
W8x18
W10x30
W12x26
SECTION D
HANDRAIL POST
L8x4x½LLV
GRATING
FIELD DIMENSION
CLIPPED ANGLE 2x2x¼
¾" DIA A307 BOLT
C.M.P. 6x2 CORR
PITCH
SECTION E
SCALE IN FEET
SUPPORT
℞ ¾"x6½"x1'-3" WITH 2 STD. HOLES
CONNECTION 1
CONNECTION 2
CONNECTION 3
CONNECTION 4
DISCHARGE STRUCTURE
W12x26
4 - ¾" Ø BOLTS WITH 1 1/16"x1" SHORT SLOTTED HOLES
2 ROW CONNECTION 2 - ⅜" CLIP ANGLES
L3x3x¼
DETAIL 3
⅜" STIFFENER PLATE
DETAIL 4
W8x24
⅜" PLATE
2L3x3x¼
DETAIL 5
½" GAP
C6x10.5
L4x4x½
⅜" PLATE
L6x6x⅜ WITH 2 -15/16" Ø HOLES AND 2-⅜" STIFFENER PLATES. (INSTALL AFTER ERECTION)
DETAIL 6
℄ BENT
12"x10"x¾" COLUMN BASE PLATE
COLUMN
COLUMN BASE PLATE
DETAIL 7
CONFIDENTIAL INFORMATION
NOTICE OF LIMITED RESPONSIBILITY
PREPARED FOR AmerenUE
STRUCTURE
STEEL FRAMING & DETAILS
DISCHARGE STRUCTURE
ASH POND 485
MERAMEC PLANT
ST. LOUIS
8020-Y-144584

REVISIONS			
NEXT ISSUE 0 | E124			
FIRST ISSUE			
REV 1	DATE 09/2010	DESIGN RWV	
CHKD NOT	SUPV RACK	APVD CWR	
P.O. NO. QE124	BY	PLM	
ADDED SECTION E			
REV 2	DATE	DESIGN RWV	
CHKD NOT	SUPV	APVD	
P.O. NO. QE124	BY	PLM	
ADDED SILTATION FENCE DETAIL			

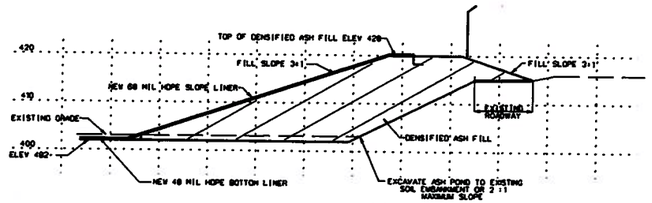


A-A



B-B

TYPICAL SECTIONS
SCALE 1" = 10'H
1" = 10'V



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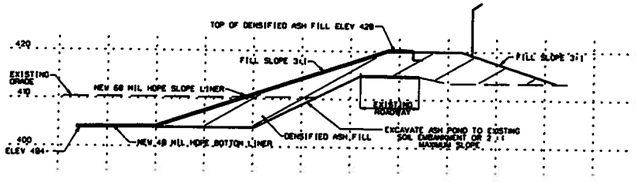
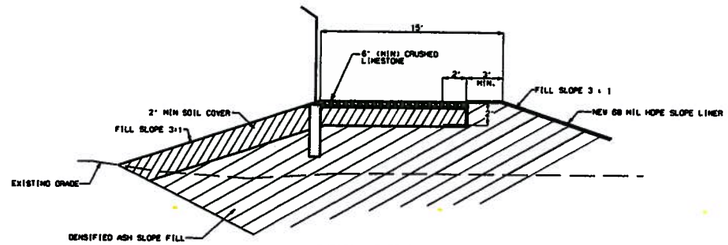
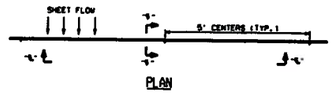


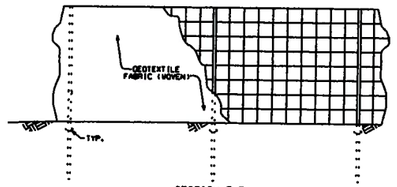
D-D



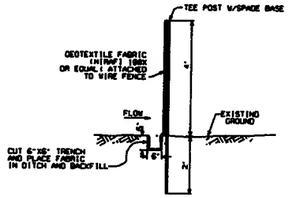
TYPICAL LEVEE CAP AT POND 489
SCALE 1/4" = 1'



PLAN

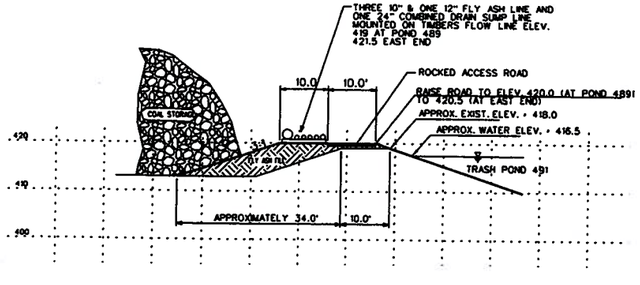


SECTION E-E



SECTION F-F

DETAIL 1
SILTATION FENCE
N.T.S.



E-E
SECTION LOOKING WEST THRU LEVEE
BETWEEN POND 491 & COAL PILE

CONFIDENTIAL
INFORMATION

PROPERTY - SECTIONS
FLYASH POND 489
RECLAMATION AND NEW LINER
MERAMEC PLANT

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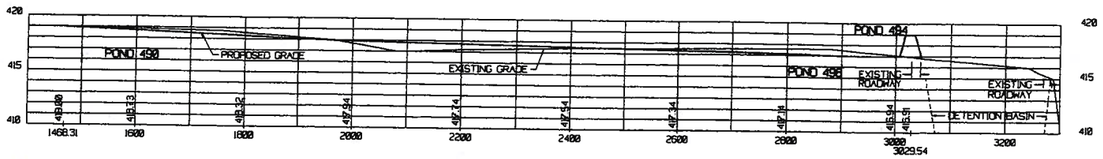
PRINT DIST. BASIN

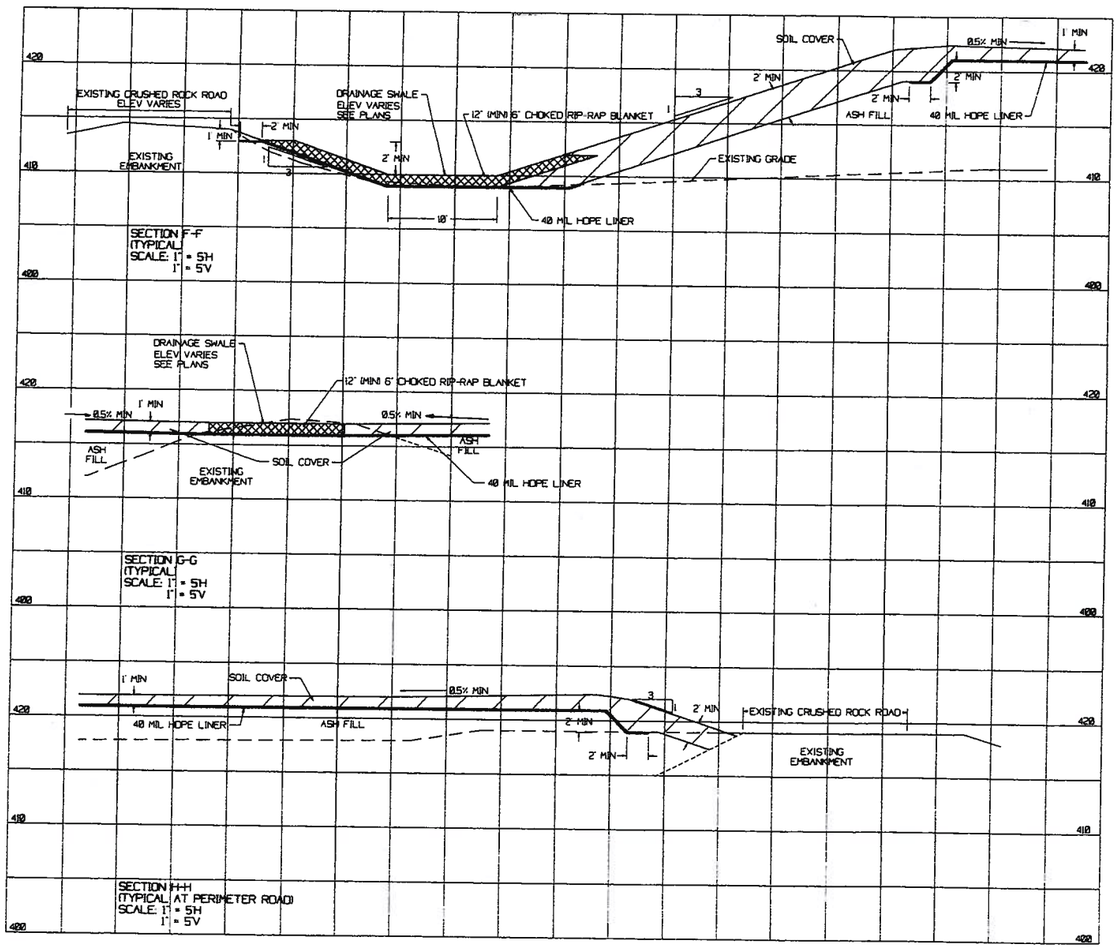
REVISIONS

REV.	NO.	DATE

8020-X-135358



SECTION E-E (ROAD PROFILE)
SCALE 1" = 100H
1" = 5V



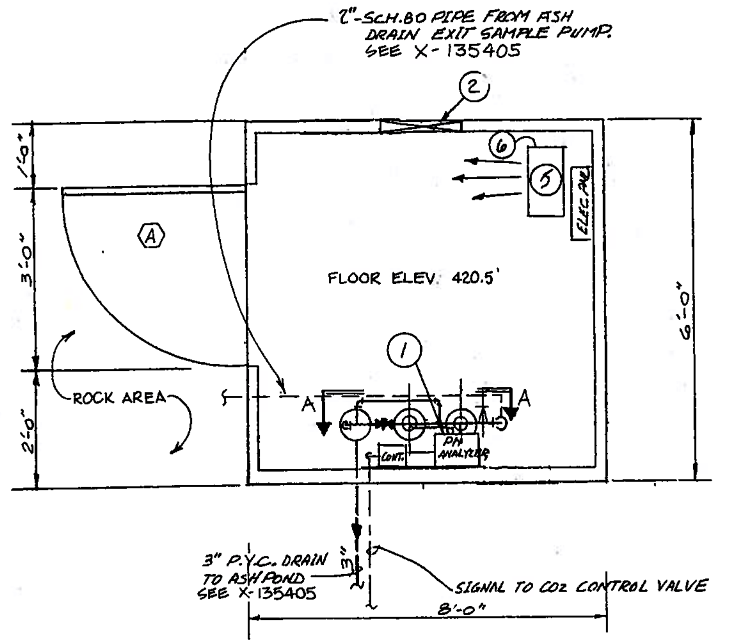
CONFIDENTIAL INFORMATION

NOTICE OF LIMITED RESPONSIBILITY

SEPTEMBER 14, 1994

DRAWN	MCF	FLYASH POND 489 RECLAMATION
CHKD.	PHR	
SUPV.		
APPD.		LOCATION: MERAMEC POWER PLANT
		CLASS: 06010
UNION ELECTRIC COMPANY ST. LOUIS, MO.		8020-X-135358 REV. 0

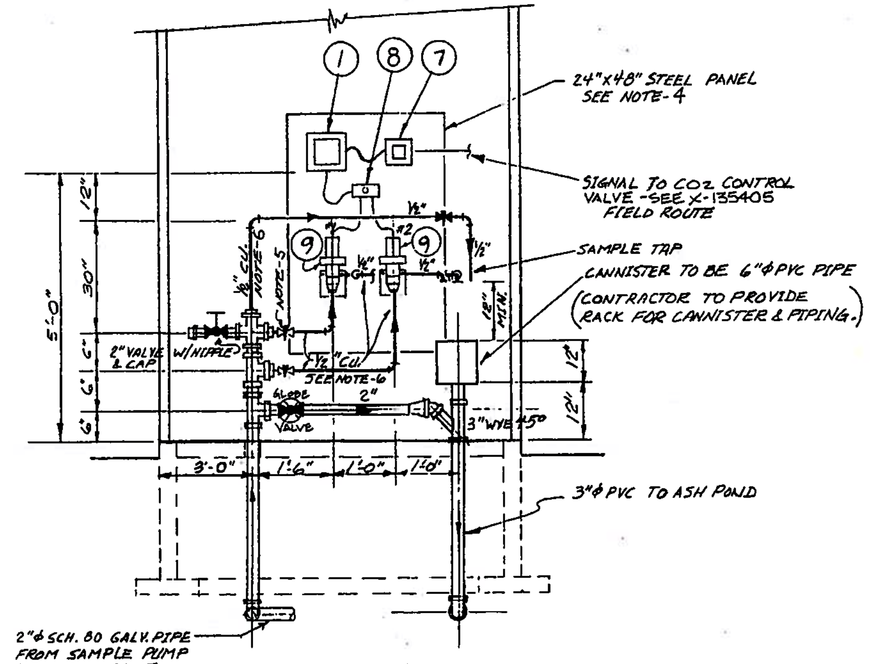
REV.	X.O.	
0	E44	FIRST ISSUE



PLAN @ SAMPLE CONTROL HOUSE

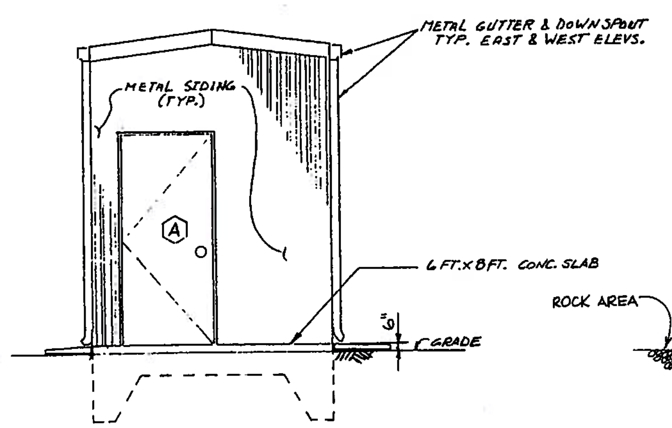
NO SCALE

FOR CONTROL HOUSE LOCATION, SEE X-135405



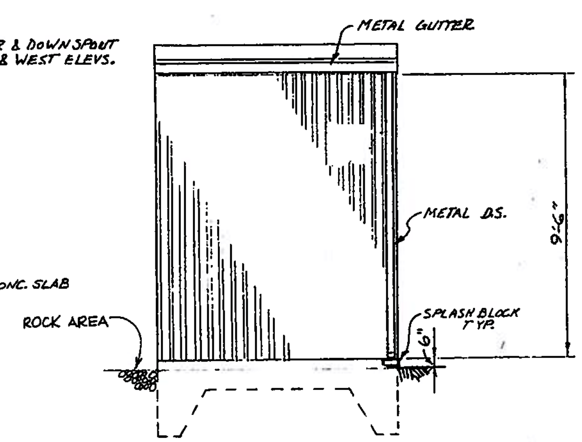
ELEVATION A-A

NO SCALE

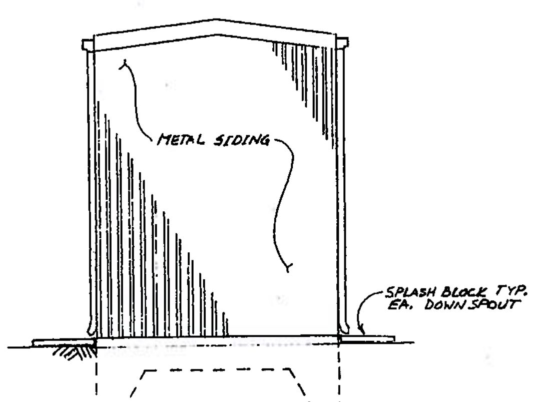


SOUTH ELEVATION

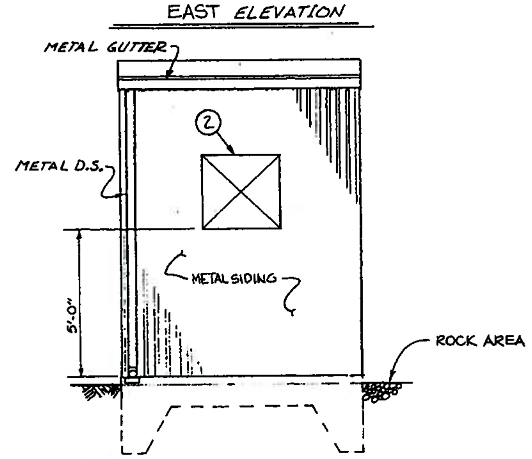
NOTE:
FOR BUILDING FDN. SEE X-135521



EAST ELEVATION



NORTH ELEVATION



WEST ELEVATION

EQUIPMENT BILL OF MATERIAL

ITEM NO.	ITEM QTY.	DESCRIPTION	REMARKS
1	1	#pH400-P-U-1*A/U MICROPROCESSOR pH ANALYZER YOKOGAWA	MOUNT ON STL. PANEL SEE NOTE-4 BY AMEREN-UE
2	1	110V AIR CONDITIONER - SEE SPECIFICATION FOR DESIGN CRITERIA	
~~3~~	~~1~~	~~EXHAUST FAN - NEW YORK BLOWER MODEL E82-H W/ MOTOR SIDE FAN GUARD, AUTOMATIC SHUTTER, 115V, 1Ø MOTOR.~~	
~~4~~	~~1~~	~~THERMOSTAT (EXHAUST FAN) BARBER-COLEMAN #TC-4111. MOUNT SENSING BULB ON EXHAUST FAN GUARD.~~	
5	1	UNIT HEATER - MARLEY "Q-MARK" MODEL MUH-03-81. 3.0 KW, 480V, 3Ø, WITH WALL & CEILING MOUNTING BRACKET #MMB-5, WITH POWER DISCONNECT SWITCH MPDS-25.	
6	1	THERMOSTAT (UNIT HEATER) MARLEY "Q-MARK" MODEL WR-1E30-S.	MOUNT ON WALL 3'-6" AFF.
7	1	#UT37-A13301*A/SPD CONTROLLER YOKOGAWA	MOUNT ON STL. PNL SEE NOTE-4 BY AMEREN-UE
8	1	SWITCH BOX	MOUNT ON STL. PNL. SEE NOTE-4 BY AMEREN-UE
9	2	FLOW-THROUGH SENSOR ASSEMBLY #FF20-S33-FNU-C2-SA-T YOKOGAWA	MOUNT ON STL. PNL. SEE NOTE-4 BY AMEREN-UE

DOOR SCHEDULE

DOOR NO.	DOOR SIZE	DESCRIPTION
A	1-3°x7°x1¾"	HOLLOW METAL FLUSH TYPE DOOR (INSULATED) W/ PRESSED METAL FRAME (5½" STD.), 1½ PAIR FULL MORTISED 2 B.B HINGE-4½"x4½" x 0.134 GA. HOSPITAL TYPE. PROVIDE "LCN" 4040 DOOR CLOSER, LOCKSET 66B, BEST CYLINDER & CONSTRUCTION CORE. PROVIDE FLOOR MOUNTED STOP W/ HOLD OPEN IVES 449. DOOR TO BE FULLY WEATHERSTRIPPED, HAVE ALUMINUM THRESHOLD (NATIONAL GUARD #525) & DOOR BOTTOM SEAL (NATIONAL GUARD #19). ALL HARDWARE US26D FINISH.

NOTES:
1) ALL HARDWARE TO BE US26D FINISH.
2). LOCKSETS TO RECIEVE "BEST" CYLINDERS. PERMANENT CORES TO BE PROVIDED BY UNION ELECTRIC CO..
3). CONSTRUCTION CORES TO BE PROVIDED BY CONTRACTOR.

NOTES:

1. THIS WORK TO BE DONE IN ACCORDANCE WITH U.E. SPEC. NO. EO-4022.
2. (DELETED)
3. (DELETED)
4. 24"x48" STEEL PANEL AND ITEMS 1, 7, 8 & 9 FURNISHED BY U.E. CO. & INSTALLED BY CONTRACTOR. PIPING & ELECTRICAL CONNECTIONS SUPPLIED BY CONTRACTOR.
5. VALVES FOR ½" COPPER TUBING TO SENSORS TO BE WHITEY NEEDLE VALVES, BRONZE BODY, TYPICAL.
6. COPPER TUBING CONNECTIONS TO BE MADE WITH SWAGLOK FITTINGS.

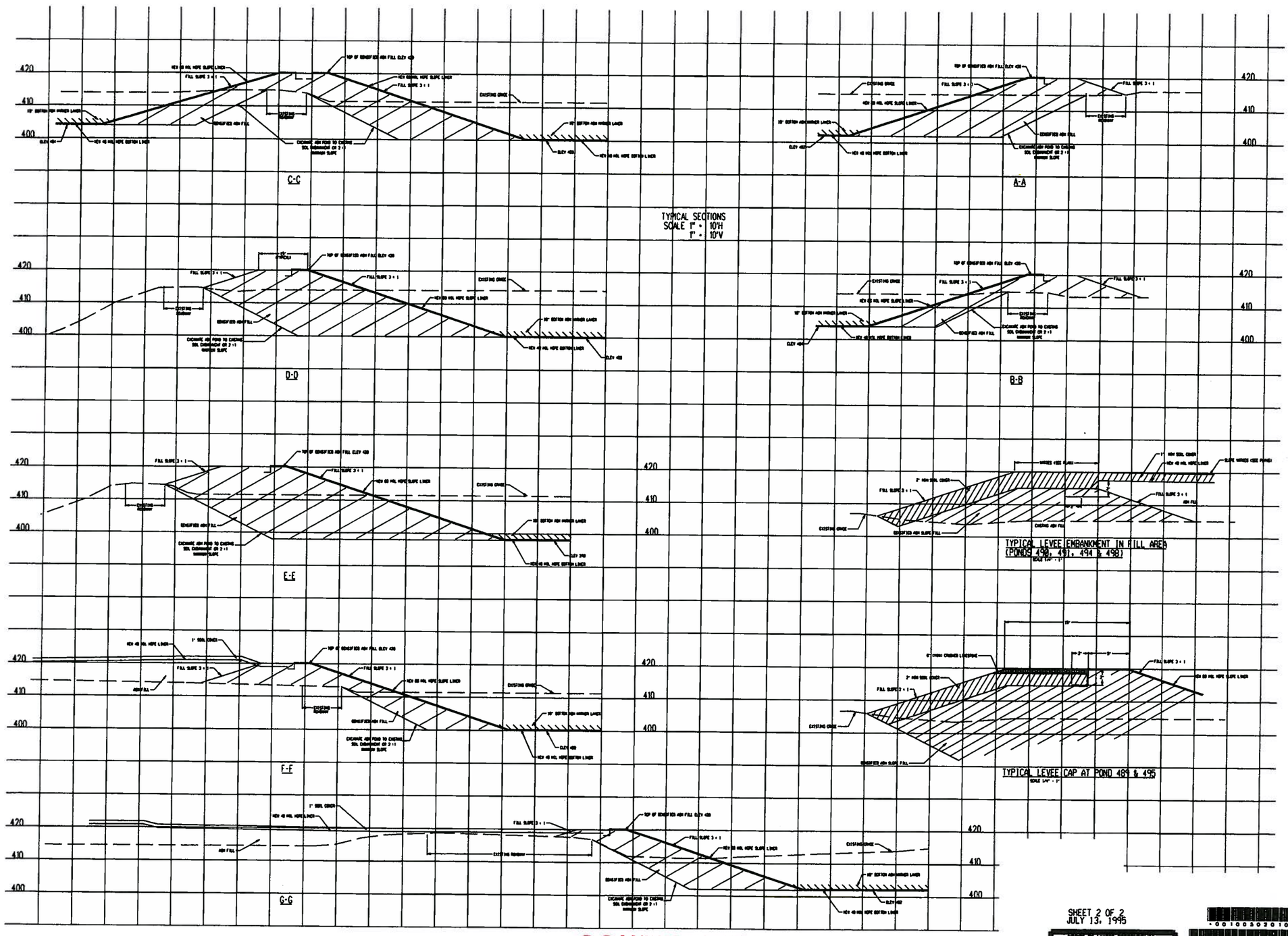
REFERENCE DRAWINGS:
8030-X-135405 ----- PROPERTY PLAN

THIS DRAWING HAS NO SCALE

DRAWN 8-12-99 M. ENGLUND	BUILDING-PLAN SAMPLE CONTROL BUILDING ASH POND 489
CHKD. NOT	
SUPV. 10-21-99	
APPD. 12/16/99	LOCATION 001005 — MERAMEC PLANT — CLASS 03020
UNION ELECTRIC COMPANY ST. LOUIS, MO.	8030-Y-135407 — REV. 0

8030-Y-135407

REVISIONS		
REV.	BY	DATE
0		5/24/
FIRST ISSUE		



CONFIDENTIAL
INFORMATION

* ASH PONDS HAVE NOT BEEN MODIFIED TO THIS DESIGN

SHEET 2 OF 2
JULY 13, 1995

FLYASH PONDS 489 AND 495 RECLAMATION

MERAMEC POWER PLANT

ST. LOUIS

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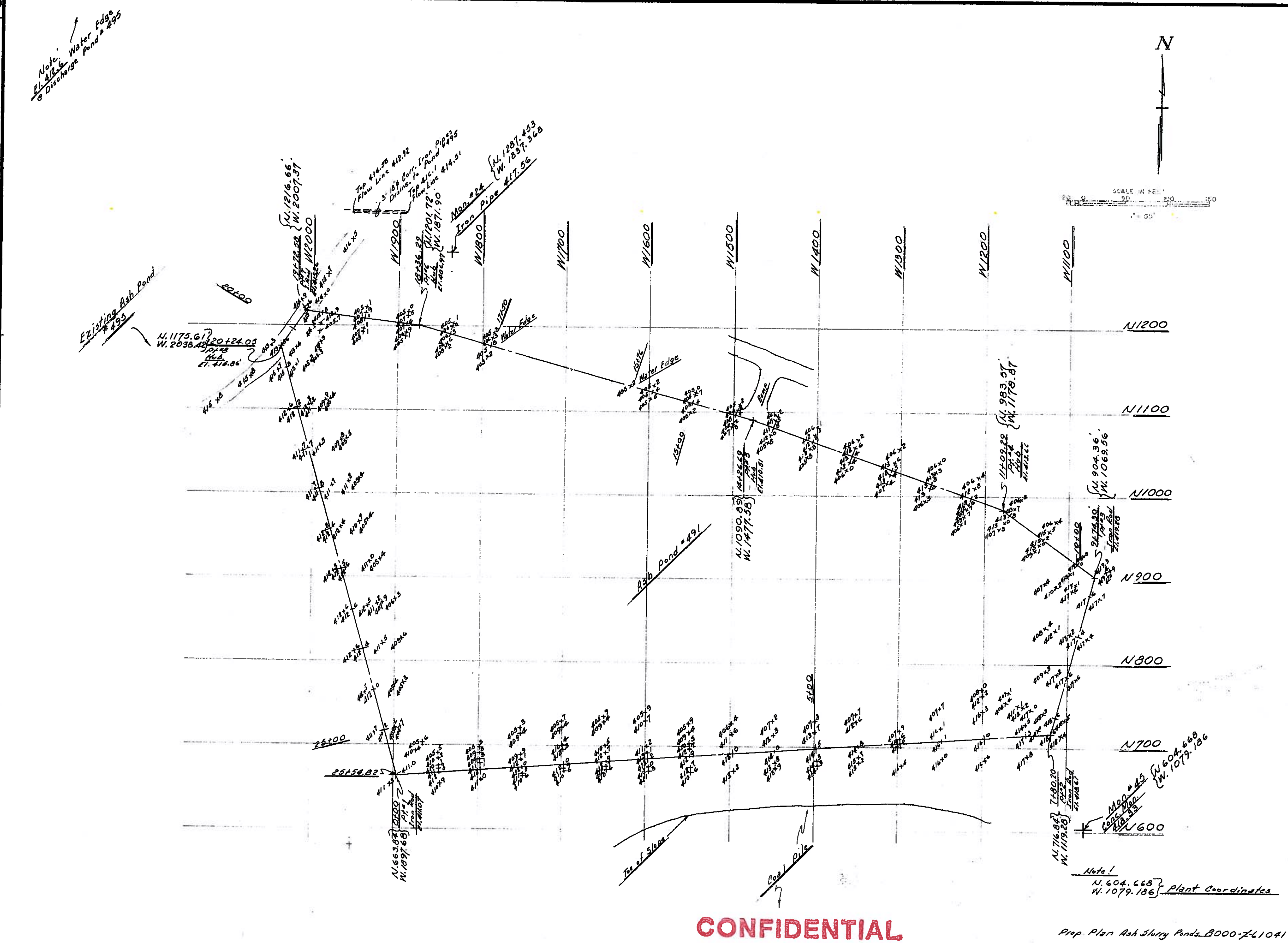
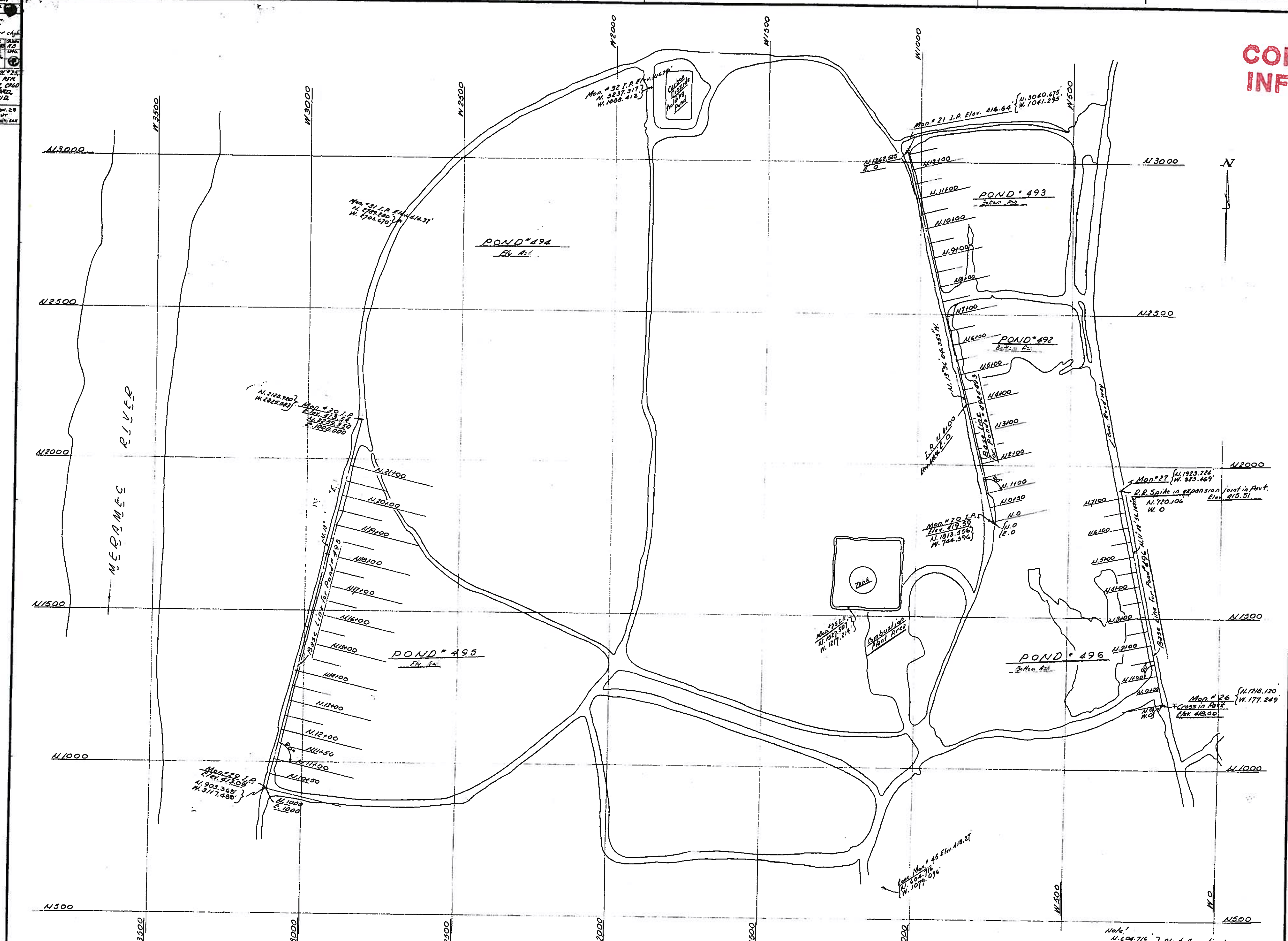
PRINT DIST.
REVISIONS (E)
REV.	W.O.
First Issue	



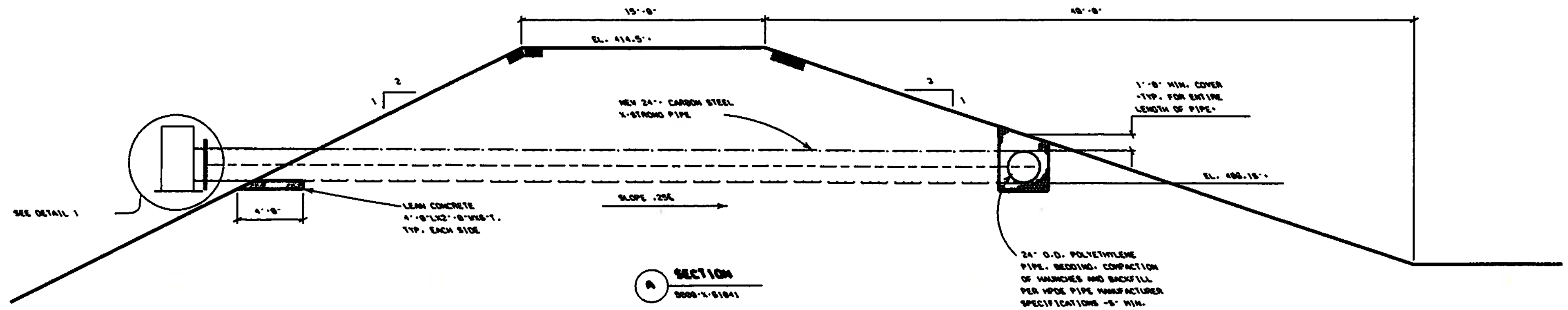
DRAWN R. Weber	PROPERTY PLAN SURVEY CROSS SECTIONS ASH POND 491
CHKD. R. Weber	
SUPV.	
APPD. LOCATION 001005	MERAMEC PLANT — CLASS 02010
UNION ELECTRIC COMPANY ST. LOUIS, MO.	8000-Y-54505 — REV. 0



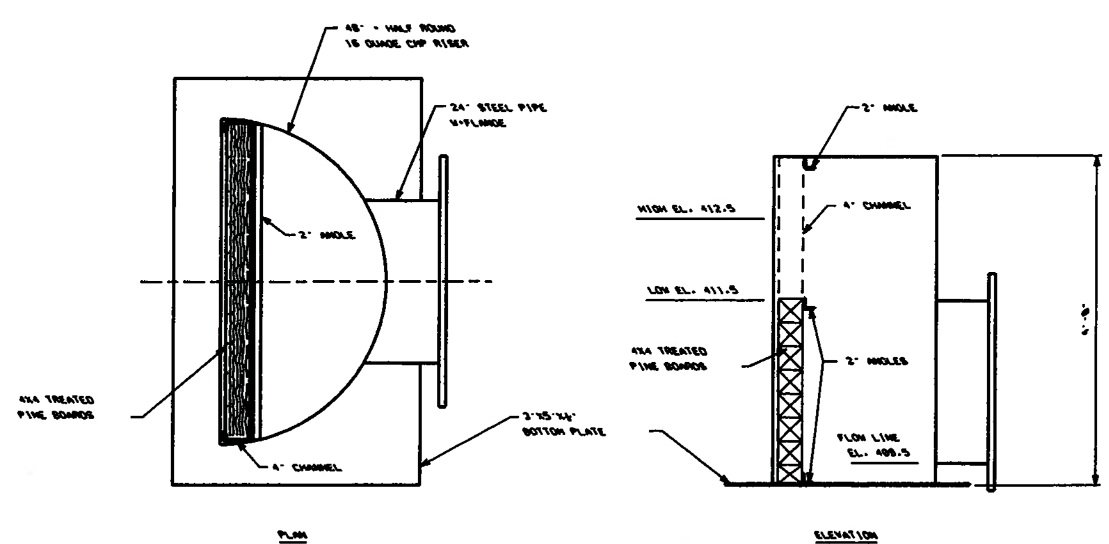
PROPERTY PLAN SURVEY
ASH POND #492 THRU #496
INSTRUMENT PT. LOCATION

DRAWN	3-16-84 R. Weber
CHKD.	3-16-84 H. Miltner
SUPV.	HEM
APPD	
LOCATION	001005
	MERAMEC PLANT
CLASS	02010
UNION ELECTRIC COMPANY ST. LOUIS, MO.	8000-X-92766
REV.	3

8000-X-92766



A SECTION
8000-X-81841



DETAIL 1
ENLARGED VIEW OF DECANT STRUCTURE

NOTES:

1. THIS WORK TO BE DONE IN ACCORDANCE WITH U.E. SPEC. NO. EC-3572

REFERENCE DRAWINGS:
8000-X-81841·····SITE PLAN
8030-X-81928·····PARTIAL PLAN & SECTIONS
8030-X-81929·····MISC. DETAILS

CONFIDENTIAL INFORMATION

NOTICE OF LIMITED RESPONSIBILITY

REV. 0 SEALED BY

CARL W. REZSONYA NUMBER E-18282

PIPING-ASH POND DISCHARGE
POND #494 & #495
1996 ADDITION

DRAWN: MIKE LOWRY
CHKD.
NOT CHKD.
SUPV. STEVE OTT
APPD. 7-25-96 C.W. REZSONYA

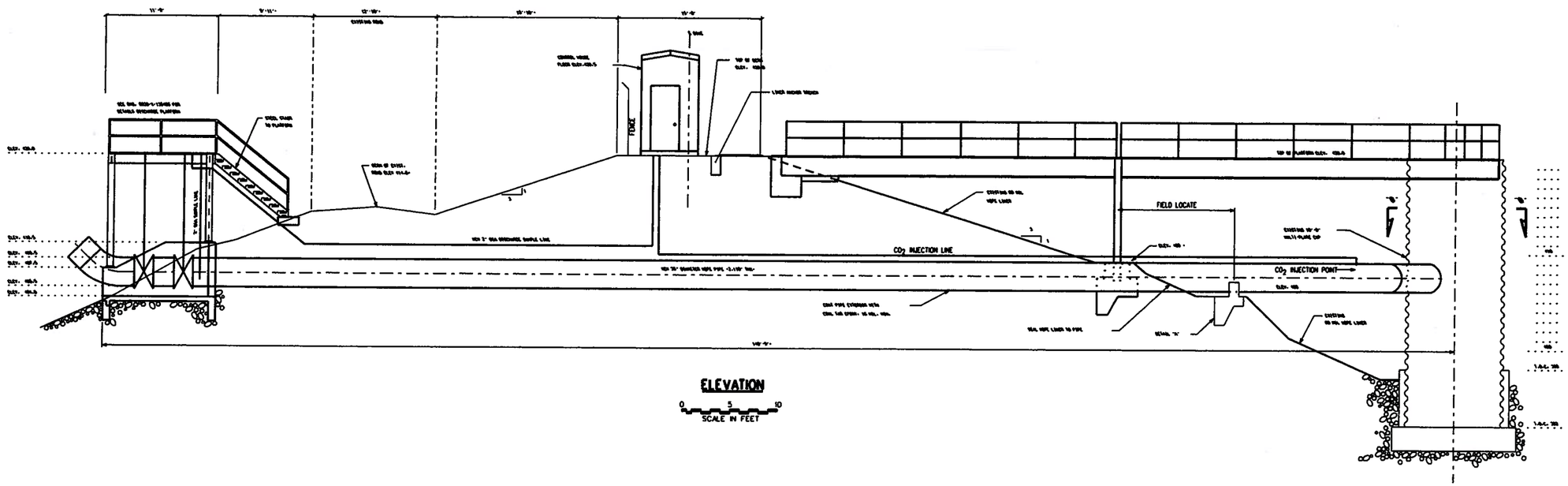
LOCATION 001005 | MERAMEC PLANT | CLASS 8020

UNION ELECTRIC COMPANY
ST. LOUIS, MO.

8020-Y-141535 | REV. 1

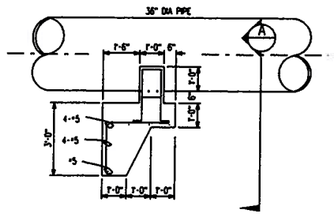
8020-Y-141535

NORTH

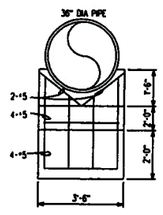


ELEVATION

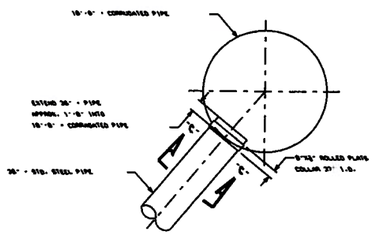
SCALE IN FEET



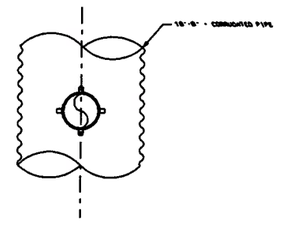
DETAIL "A"



SECTION "A"



SECTION "B"



SECTION "C"

NOTE:
THIS WORK TO BE DONE IN ACCORDANCE WITH U.S. SPEC. NO. EC-4022.

STEEL FRAMING - INTAKE & DISCHARGE PLATFORM	8030-X-139406
CONCRETE DETAILS - 48IN POND DISCHARGE	8030-X-139021
BUILDING - CONTROL HOUSE	8030-X-139403
PIPING - 48IN POND DISCHARGE	8030-X-139408
PIPING - CO2 REGULATING STATION	8030-X-139409

1993 FLOOD LEVEL - 419.6

PREPARED FOR: Ameren UE

8030-X-147376

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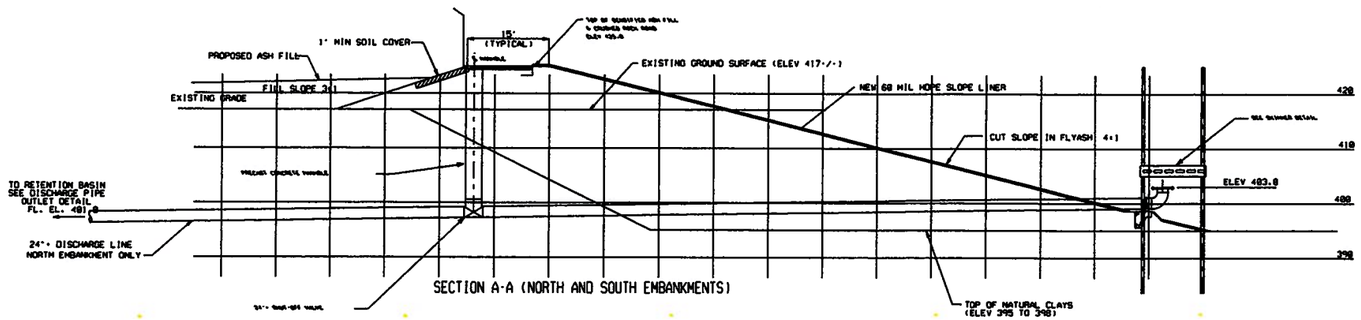
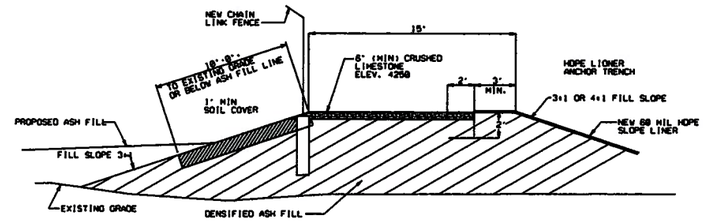
8030-X-147376

8030-X-152542

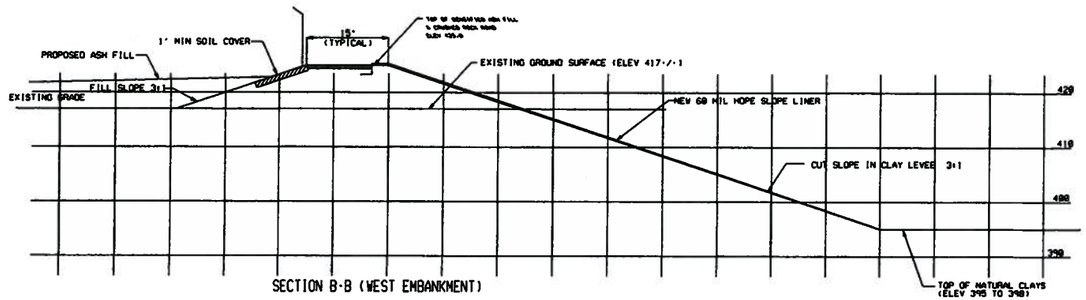
REVISIONS		
REV. 0	W.O.	
FIRST ISSUE		
REV 1	DATE 04/08/08	DRAWN MGL
CHKD NOT	SUPV	APPD
W.O. 10775	FILE	FILM
BOTTOM OF LINER WAS EL. 405.0'		
REV 2	DATE 09/08/10	DRAWN DAC
CHKD	SUPV	APPD
W.O. 10775	FILE	FILM
REV. DWG. PER ENGINEER'S COMMENTS; REV. DWG. SIZE		



SECTION A-A (NORTH AND SOUTH EMBANKMENTS)

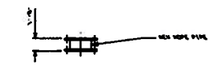


TYPICAL SECTION
AT TOP OF LEVEE

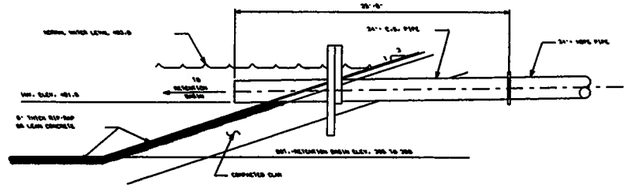


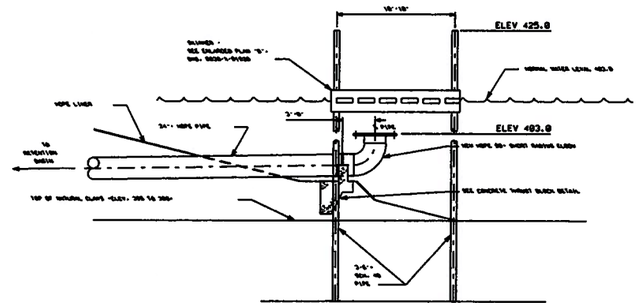
SECTION B-B (WEST EMBANKMENT)

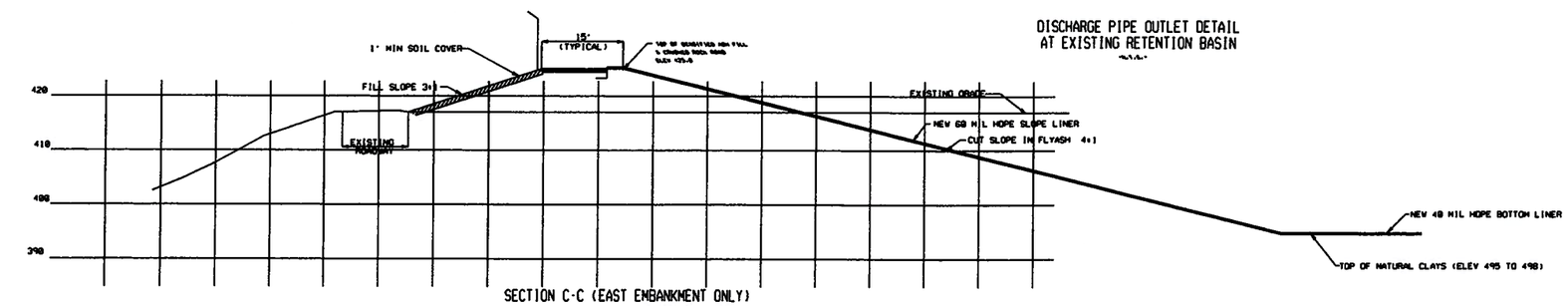
CONFIDENTIAL INFORMATION



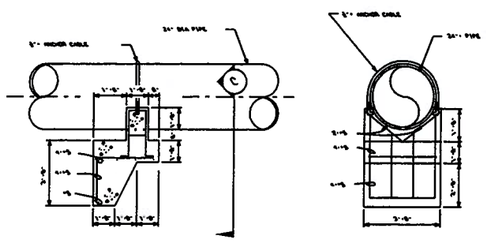
SKIMMER EXTENSION SECTION DETAIL





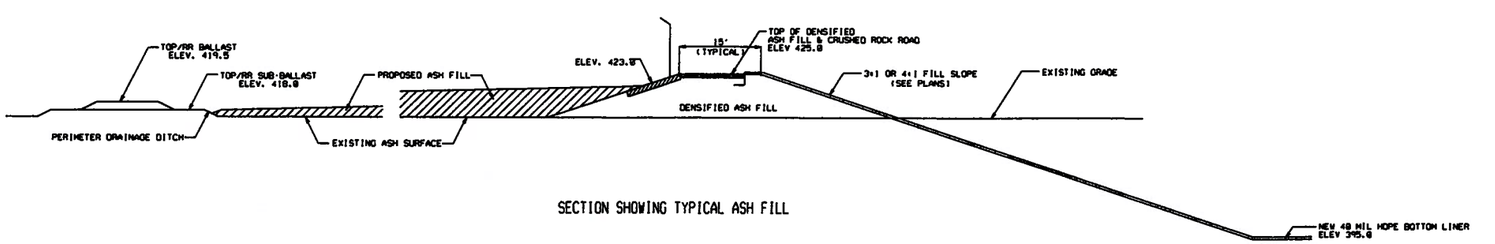


SECTION C-C (EAST EMBANKMENT ONLY)



CONCRETE THRUST BLOCK DETAIL

SECTION "C"



SECTION SHOWING TYPICAL ASH FILL

REFERENCE DRAWINGS:
ASH POND AND FILL AREA 8030-Y-154541

PREPARED FOR Ameren UE

DRAWN P. OTT	PROPERTY - SECTIONS NEW ASH POND AND GRADING OVER PONDS 490, 494 & 498
CHECKED NOT CHKD	
APPR. 032101	
SAH	
APPR.	CONTRACT 001005 — MERAMEC PLANT — CLASS 02100
Ameren	ST. LOUIS, MISSOURI — 8030-X-152542 — REV. 2

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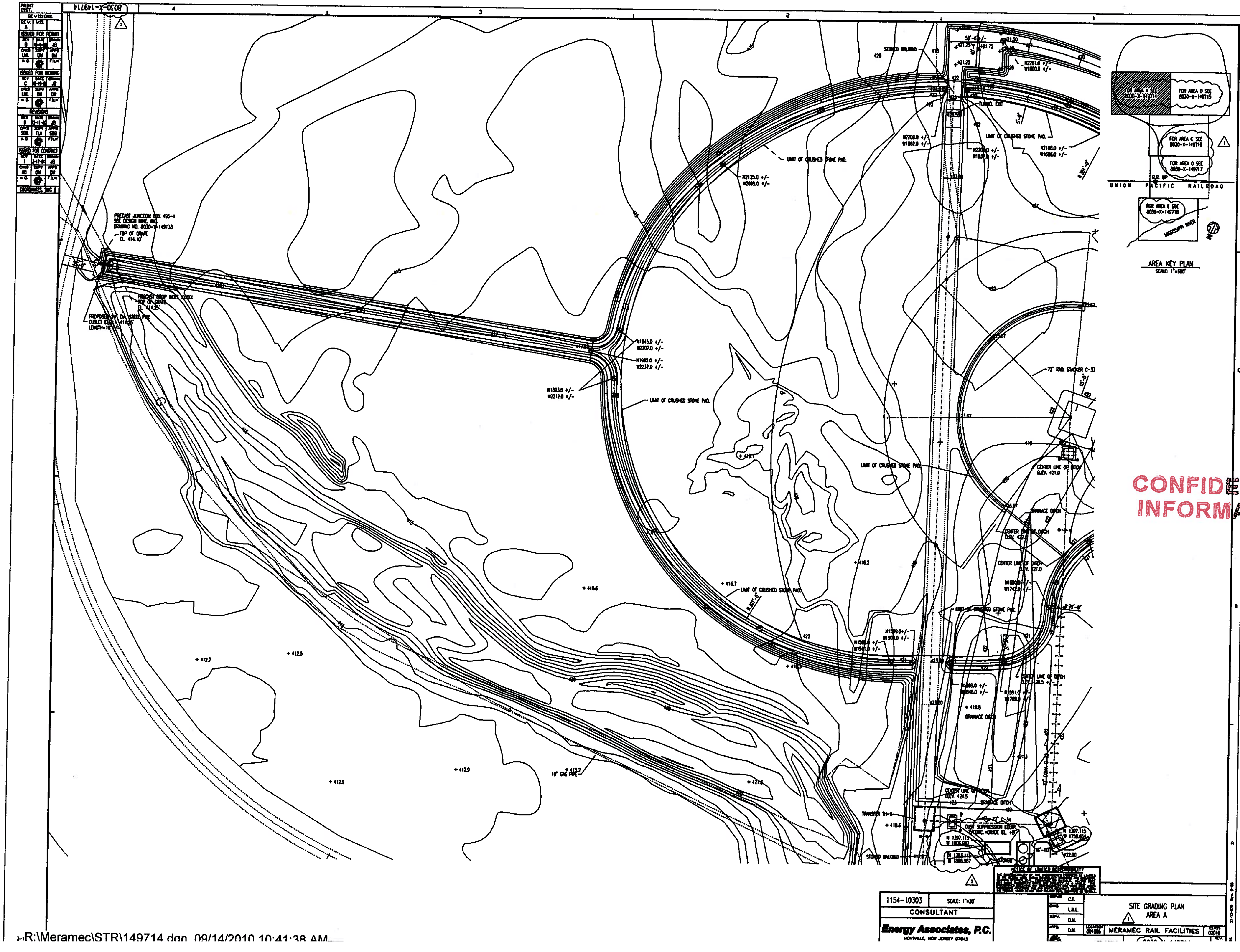

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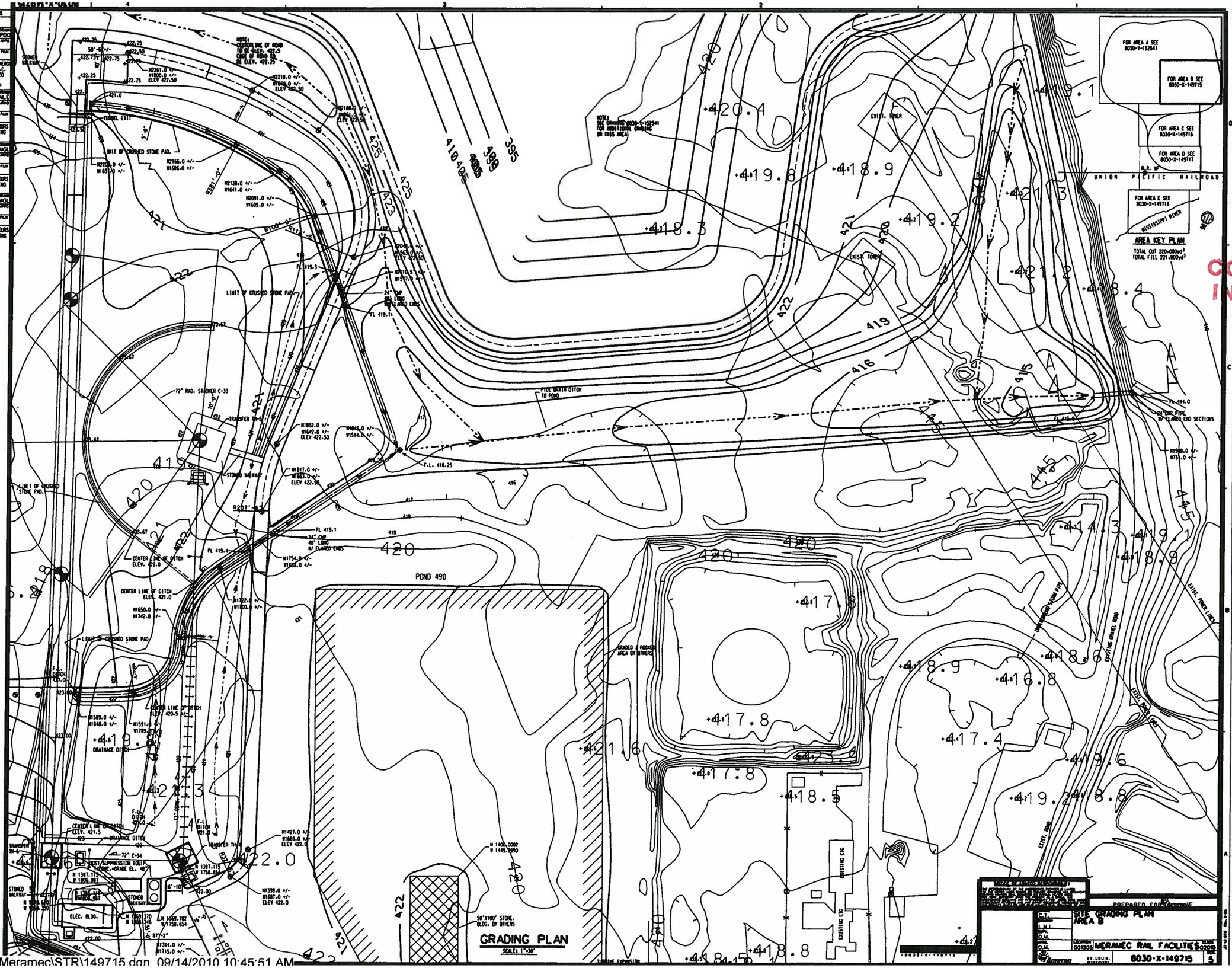
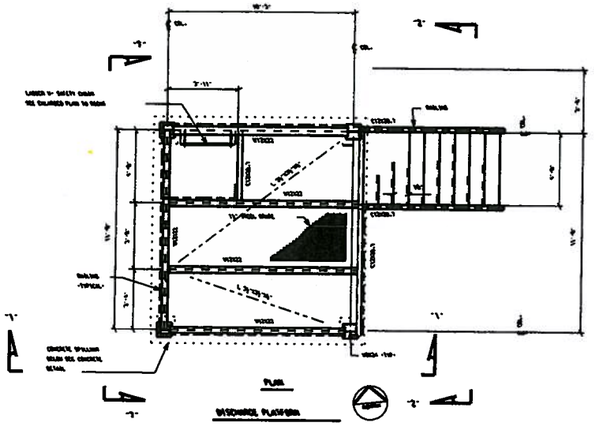
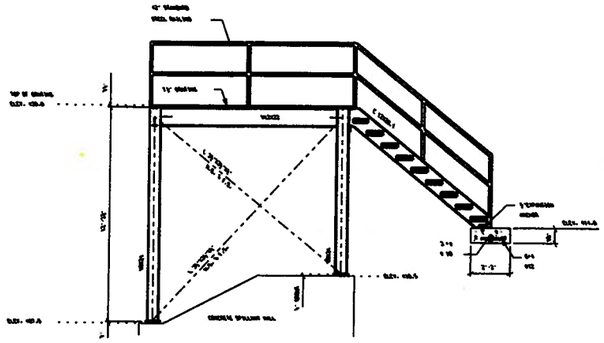
REVISIONS				
REV.	W.O.			
—	—			
REV 2	DATE 03/2001	DRAWN PDC		
CHKD NOT	SUPV SAH	APPD		
W.O. 10775		FILM		
SUPERSEDES ENERGY ASSOCIATES-P.C. REV 1= REVISED GRADING & ADDED 24" CMP				
REV 3	DATE 04/2001	DRAWN MLE		
CHKD NOT	SUPV	APPD		
W.O. 10775		FILM		
REVISED CONTOURS PER ENGINEERING COMMENTS				
REV 4	DATE 04/2001	DRAWN MGL		
CHKD NOT	SUPV	APPD		
W.O. 10775		FILM		
REVISED CONTOURS PER ENGINEERING COMMENTS				
REV 5	DATE 04/2001	DRAWN MGL		
CHKD NOT	SUPV	APPD		
W.O. 10775		FILM		
REVISED CONTOURS PER ENGINEERING COMMENTS				



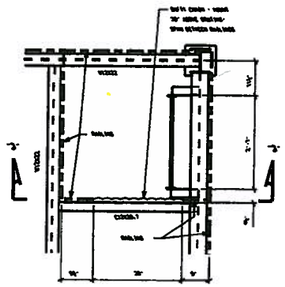


PLAN

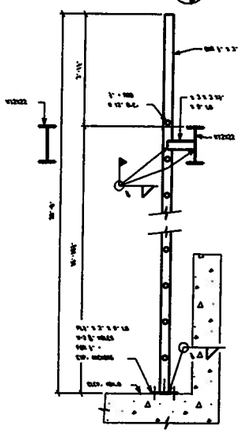
DISCHARGE PLATFORM



ELEVATION "1-1"

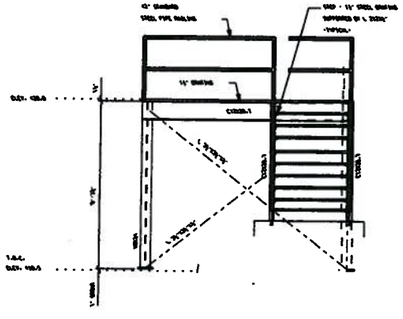


PLAN

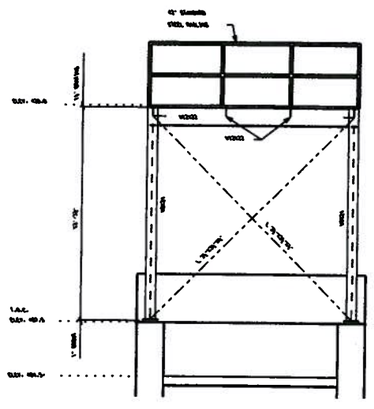


SECTION "2-2"

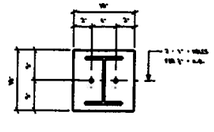
PLATFORM LADDER



ELEVATION "3-3"



ELEVATION "4-4"



BASE PLATE DETAIL

TYPICAL

CONFIDENTIAL
INFORMATION

STRUCTURE - STEEL
ASH POND - DISCHARGE STRUCT.

MERAMEC PLANT

UNION ELECTRIC COMPANY

8030-X-135406

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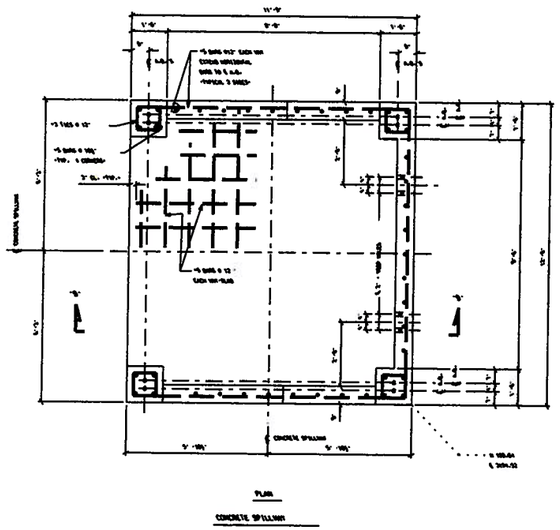
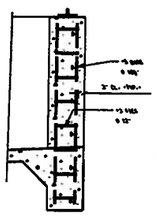


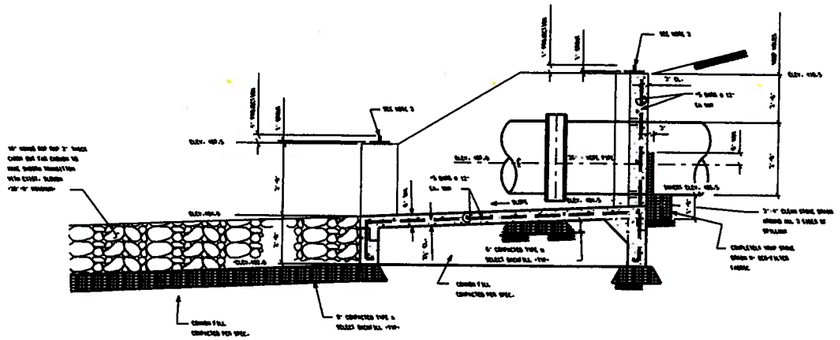
PLAN

CONCRETE SPILLWAY



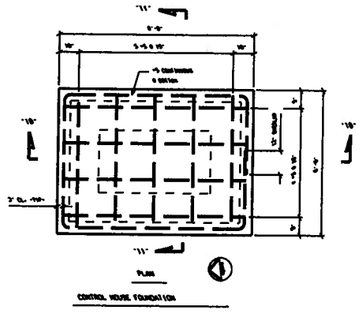
DETAIL

TYPICAL COLUMN SECTION



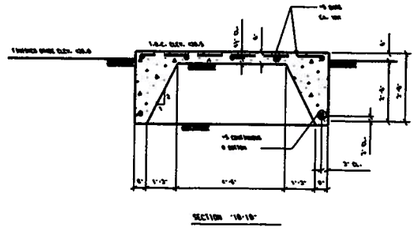
SECTION "B-B"

CONCRETE SPILLWAY

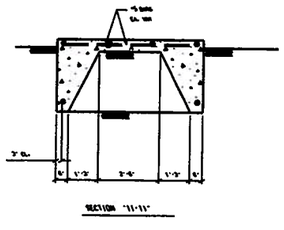


PLAN

CONTROL HOUSE FOUNDATION



SECTION "10-10"



SECTION "11-11"

CONFIDENTIAL
INFORMATION

REV. 0 SEALED

STRUCTURE - CONCRETE
ASH POND - DISCHARGE STRUCT.

MERAMEC PLANT

UNION ELECTRIC Company

8030-X-135521

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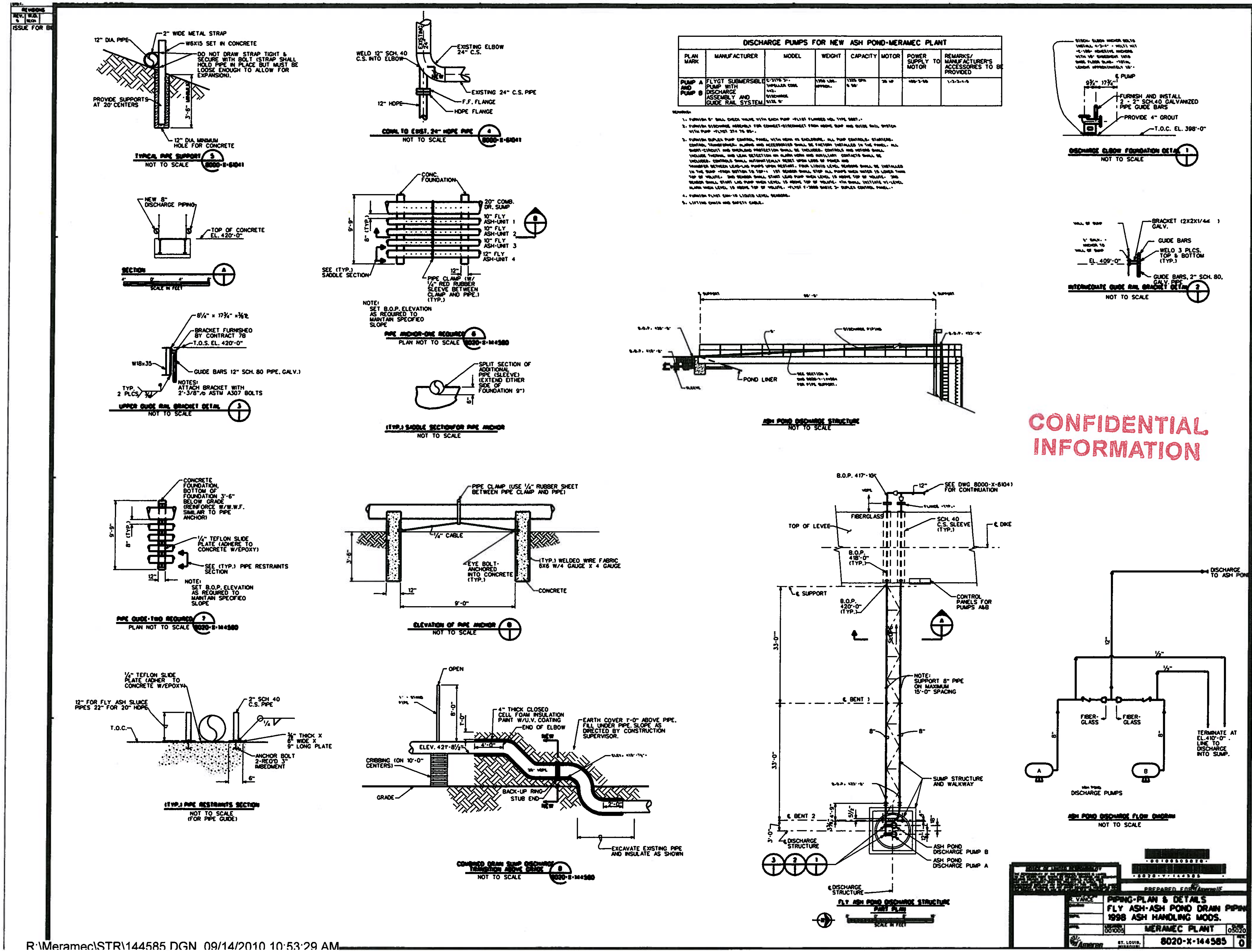
TYPICAL PIPE SUPPORT
NOT TO SCALE 8020-X-61041
12" DIA. PIPE
2" WIDE METAL STRAP
W6X15 SET IN CONCRETE
DO NOT DRAW STRAP TIGHT & SECURE WITH BOLT (STRAP SHALL HOLD PIPE IN PLACE BUT MUST BE LOOSE ENOUGH TO ALLOW FOR EXPANSION).
PROVIDE SUPPORTS AT 20' CENTERS
12" DIA. MINIMUM HOLE FOR CONCRETE
CONN. TO EXIST. 24" HDPE PIPE
NOT TO SCALE 8020-X-61041
WELD 12" SCH. 40 C.S. INTO ELBOW
EXISTING ELBOW 24" C.S.
EXISTING 24" C.S. PIPE
F.F. FLANGE
HDPE FLANGE
12" HDPE
SECTION
NEW 8" DISCHARGE PIPING
TOP OF CONCRETE EL. 420'-0"
UPPER GUIDE RAIL BRACKET DETAIL
NOT TO SCALE
8¼" x 17¾" x⅜"
BRACKET FURNISHED BY CONTRACT 78
T.O.S. EL. 420'-0"
W18x35
GUIDE BARS 12" SCH. 80 PIPE, GALV.
NOTES: ATTACH BRACKET WITH 2'-3/8"ø ASTM A307 BOLTS
TYP. 2 PLCS
PIPE ANCHOR-ONE REQUIRED
PLAN NOT TO SCALE 8020-X-144580
CONC. FOUNDATION
20" COMB. DR. SUMP
10" FLY ASH-UNIT 1
10" FLY ASH-UNIT 2
10" FLY ASH-UNIT 3
12" FLY ASH-UNIT 4
SEE (TYP.) SADDLE SECTION
PIPE CLAMP (W/ ¼" RED RUBBER SLEEVE BETWEEN CLAMP AND PIPE.) (TYP.)
NOTE: SET B.O.P. ELEVATION AS REQUIRED TO MAINTAIN SPECIFIED SLOPE
(TYP.) SADDLE SECTION FOR PIPE ANCHOR
NOT TO SCALE
SPLIT SECTION OF ADDITIONAL PIPE (SLEEVE) (EXTEND EITHER SIDE OF FOUNDATION 9")
ASH POND DISCHARGE STRUCTURE
NOT TO SCALE
POND LINER
CONFIDENTIAL INFORMATION
DISCHARGE ELBOW FOUNDATION DETAIL
NOT TO SCALE
℄ PUMP
FURNISH AND INSTALL 2 - 2" SCH.40 GALVANIZED PIPE GUIDE BARS
PROVIDE 4" GROUT
T.O.C. EL. 398'-0"
INTERMEDIATE GUIDE RAIL BRACKET DETAIL
NOT TO SCALE
BRACKET (2X2X1/4) GALV.
GUIDE BARS
WELD 3 PLCS. TOP & BOTTOM (TYP.)
EL. 409'-0"
GUIDE BARS, 2" SCH. 80, GALV. PIPE
PIPE GUIDE-TWO REQUIRED
PLAN NOT TO SCALE 8020-X-144580
CONCRETE FOUNDATION, BOTTOM OF FOUNDATION 3'-6" BELOW GRADE (REINFORCE W/W.W.F. SIMILAR TO PIPE ANCHOR)
¼" TEFLON SLIDE PLATE (ADHERE TO CONCRETE W/EPOXY)
SEE (TYP.) PIPE RESTRAINTS SECTION
NOTE: SET B.O.P. ELEVATION AS REQUIRED TO MAINTAIN SPECIFIED SLOPE
ELEVATION OF PIPE ANCHOR
NOT TO SCALE
PIPE CLAMP (USE ¼" RUBBER SHEET BETWEEN PIPE CLAMP AND PIPE)
¼" CABLE
EYE BOLT-ANCHORED INTO CONCRETE (TYP.)
(TYP.) WELDED WIRE FABRIC 6X6 W/4 GAUGE X 4 GAUGE
CONCRETE
9'-0"
B.O.P. 417'-10"
SEE DWG 8000-X-6104) FOR CONTINUATION
FIBERGLASS
TOP OF LEVEE
SCH. 40 C.S. SLEEVE (TYP.)
℄ DIKE
B.O.P. 418'-0" (TYP.)
℄ SUPPORT
B.O.P. 420'-0" (TYP.)
CONTROL PANELS FOR PUMPS A&B
NOTE: SUPPORT 8" PIPE ON MAXIMUM 15'-0" SPACING
℄ BENT 1
℄ BENT 2
SUMP STRUCTURE AND WALKWAY
℄ DISCHARGE STRUCTURE
ASH POND DISCHARGE PUMP B
ASH POND DISCHARGE PUMP A
FLY ASH POND DISCHARGE STRUCTURE PART PLAN
SCALE IN FEET
DISCHARGE TO ASH POND
FIBER-GLASS
TERMINATE AT EL.410'-0" - LINE TO DISCHARGE INTO SUMP.
DISCHARGE PUMPS
ASH POND DISCHARGE FLOW DIAGRAM
NOT TO SCALE
¼" TEFLON SLIDE PLATE (ADHER TO CONCRETE W/EPOXY)
12" FOR FLY ASH SLUICE PIPES 22" FOR 20" HDPE
T.O.C.
2" SCH 40 C.S. PIPE
⅜" THICK X 6" WIDE X 9" LONG PLATE
ANCHOR BOLT 2-REQ'D 3" IMBEDMENT
(TYP.) PIPE RESTRAINTS SECTION
NOT TO SCALE (FOR PIPE GUIDE)
OPEN
4" THICK CLOSED CELL FOAM INSULATION PAINT W/U.V. COATING
END OF ELBOW
EARTH COVER 1'-0" ABOVE PIPE. FILL UNDER PIPE. SLOPE AS DIRECTED BY CONSTRUCTION SUPERVISOR.
ELEV. 421'-8½"
CRIBBING (ON 10'-0" CENTERS)
GRADE
BACK-UP RING-STUB END
NEW
EXCAVATE EXISTING PIPE AND INSULATE AS SHOWN
COMBINED DRAIN SUMP DISCHARGE TRANSITION ABOVE GRADE
NOT TO SCALE 8020-X-144580
PREPARED FOR Ameren UE
PIPING-PLAN & DETAILS
FLY ASH-ASH POND DRAIN PIPING
1998 ASH HANDLING MODS.
MERAMEC PLANT
ST. LOUIS, MISSOURI
8020-X-144585
ISSUE FOR BID

DISCHARGE PUMPS FOR NEW ASH POND-MERAMEC PLANT							
PLAN MARK	MANUFACTURER	MODEL	WEIGHT	CAPACITY	MOTOR	POWER SUPPLY TO MOTOR	REMARKS/ MANUFACTURER'S ACCESSORIES TO BE PROVIDED
PUMP A AND PUMP B	FLYGT SUBMERSIBLE PUMP WITH DISCHARGE ASSEMBLY AND GUIDE RAIL SYSTEM.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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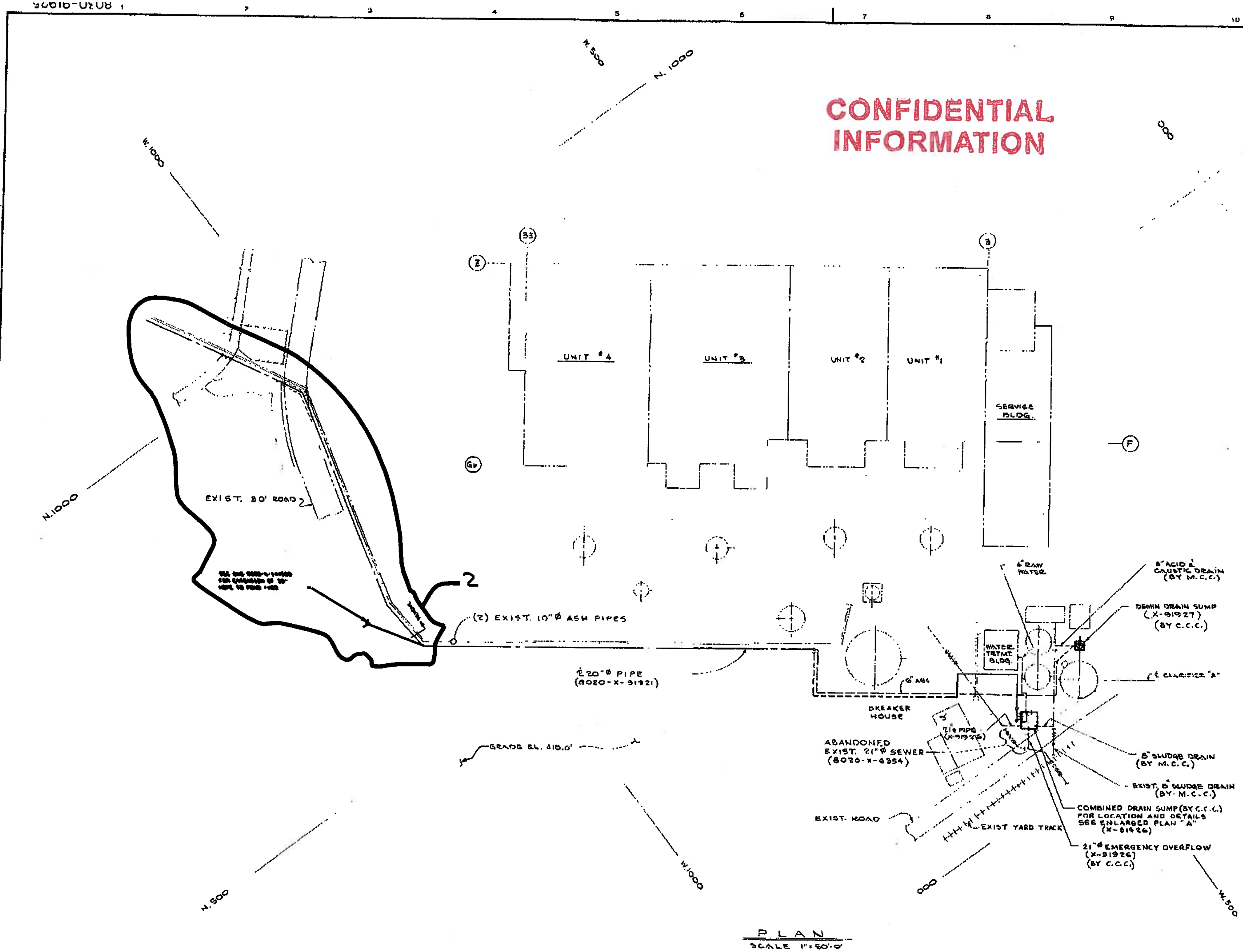
CONFIDENTIAL INFORMATION



PLAN
SCALE 1"=50'-0"

INDEX OF FLUOR PIONEER DRAWINGS

1. 8030-X-91925 PLANT DRAINAGE PLAN-STRUCTURAL COMPONENTS.
2. 8030-X 91926-COMBINED DRAIN SUMP REINF. CONC.-PLAN SECTIONS & DETAILS.
3. 8030-X-91927-DEMINERALIZER DRAIN SUMP-CONC. FDN. & STRUCTURAL STEEL DETAILS.
4. 8030-X-91928-RETENTION POND AREA-PLAN & SECTIONS
5. 8030-X-91929-RETENTION POND AREA-FDN. & MISC. SECTIONS AND DETAILS.
6. 8030-X-91974-PLANT DRAINAGE-MISC. STRUCTURAL MODIFICATION

LIST OF UNION ELECTRIC REFERENCE DRAWINGS

1. 8000-W-20288-PROPERTY-GENERAL YARD PLAN.
2. 8000-X-21496-PROPERTY PLAN-WEST YARD-UNIT #4.
3. 8000-X-27412-PROPERTY PLAN-YARD-1961 SURFACING & PAVING-SHEET #1.
4. 8020-X-6354 —PIPING INSTALLATION-DRAINS, SLUDGE & SANITARY LINES-SOUTH YARD.
5. 8020-X-23390-PIPING-ASH SLURRY DISCHARGE TO SLURRY POND-SHEET #2-UNIT #1.
6. [illegible]

GENERAL NOTES

1. FOR SPECIFICATION, SEE SPECIFICATION NO. MER-207
2. ALL REINFORCED CONCRETE WORK SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" ACI-318-71
3. CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
4. ALL EXPOSED CONCRETE EDGES ABOVE GRADE TO 6" BELOW NEW FINISH GRADE SHALL BE CHAMFERED 3/4" UNLESS OTHERWISE NOTED.
5. ALL FINAL EXPOSED CONCRETE SURFACES SHALL BE FINISHED IMMEDIATELY UPON REMOVAL OF FORM WORK.
6. CONCRETE CONSTRUCTION JOINTS AND RE-BAR LAP JOINTS OTHER THAN SHOWN ON DRAWINGS MUST BE APPROVED BY THE ENGINEER.
7. REINFORCING BAR STEEL SHALL BE DEFORMED BILLET STEEL AND CONFORM TO ASTM SPECIFICATION A-615 GRADE 60.
8. REINFORCING BARS SHALL BE CLEAN AND FREE OF ALL DEFECTS AND SECURELY TIED IN PLACE BEFORE POURING CONCRETE.
9. ALL WATERSTOPS SHALL BE LABYRINTH TYPE B 3 BY WATER SEALS INC. UNLESS OTHERWISE NOTED.
10. STEEL PIPES FOR HANDRAILS & RETAINING PIPES FOR SKIMMER SHALL CONFORM TO ASTM A-120 OR A-53 GRADE "B."
11. ALL STRUCTURAL STEEL & ANCHOR BOLTS SHALL BE ASTM A-36 UNLESS OTHERWISE NOTED.
12. WELDING ELECTRODES SHALL BE E60XX UNLESS OTHERWISE NOTED.
13. ALL STEEL BEAM CONNECTIONS SHALL BE STANDARD FRAMED BEAM CONNECTIONS WITH 7/8"Ø ASTM-A-307 BOLTS UNLESS OTHERWISE NOTED.
14. ALL CONCRETE PIPES SHALL CONFORM TO ASTM C-76 CLASS III WALL B UNLESS OTHERWISE NOTED.
15. MANHOLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM C 478-75.
16. GRATING EXPOSED TO WEATHER SHALL BE SERRATED AND GALVANIZED.
17. MAXIMUM DESIGN SOIL PRESSURE = 2.5 KSF.
18. DESIGN GROUND WATER LEVEL AT EL. 418'-0".

NOTE:

19. MINIMUM SLOPES INDICATED ON DRAWINGS FOR TEMPORARY EXCAVATION ARE RECOMMENDED VALUES. STEEPER SLOPES MAY BE USED AT CONTRACTOR'S OPTION DEPENDING ON EXISTING SOIL CONDITION PROVIDED ALL APPLICABLE OSHA REQUIREMENTS ARE MET.

ON FILE SENT TO
BURNS & MCDONNELL
7/20/2007

• SCANNED HYBRID DRAWING •

LEGEND:

C.C.C.	INDICATES	STRUCTURAL/CIVIL - CONSTRUCTION CONTRACTOR
M.C.C.	-"-	MECHANICAL CONSTRUCTION CONTRACTOR
E.C.C.	-"-	ELECTRICAL CONSTRUCTION CONTRACTOR
U.E	-"-	UNION ELECTRIC CO.

1 AS BUILT REVISION DJR
REVISION DESCRIPTION CHKD APPD
UNION ELECTRIC REVISIONS

8030-X-91925-0

REVISIONS

2 E-8 TO E-1 TO 6, UPDATE OF C.D.S. DISCHARGE LINE PER U.E. INFO.
@ D-9 REVISED SIZE OF DRAIN FROM 6" TO 8".
@ H-8, 9 & 10 ADDED NOTE 19.
DWG. CHECKED, SIGNED, STAMPED & RELEASED FOR CONSTRUCTION.
CHK'D: E.S.
APP'D: 7-14-77
FILMED: 7-24-77

SEE U.E. REV. 1

B RELEASED FOR PERMITS AS REQUESTED BY M. BECKER. APP'D: 6/1/77 FILMED: 6-1-77

A RELEASED FOR CONSTRUCTION BIDS ONLY. APP'D: 4-26-77 FILMED: 4-26-77

RELEASED WITH STRUCTURAL SPECIFICATIONS FOR CLIENT'S COMMENTS ONLY APP'D: 3-7-77 FILMED: 3-8-77

CAUTION
PRIOR TO ALL FUTURE EXCAVATIONS, CHECK WITH "AS-BUILT UNDERGROUND SERVICES"

STATE OF MISSOURI ROBERT A. MARKS NUMBER E-17575 REGISTERED PROFESSIONAL ENGINEER

UNION ELECTRIC COMPANY
ST. LOUIS, MISSOURI
MERAMEC PLANT

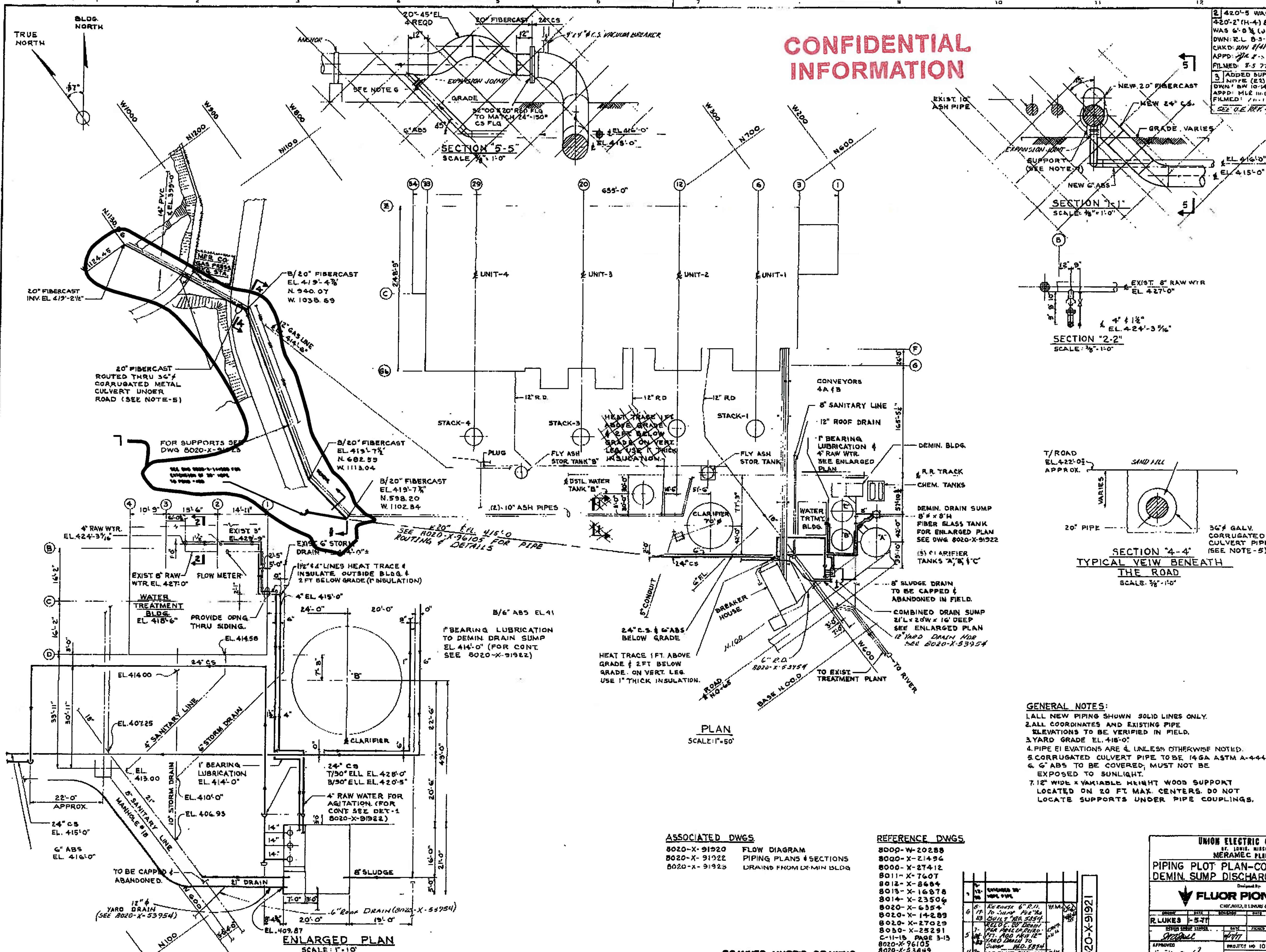
PLANT DRAINAGE PLAN
STRUCTURAL COMPONENTS

Designed By
FLUOR PIONEER INC.

DRAWN	DATE	DESIGNED	DATE	CHECKED	DATE	SCALE
R. Z.	3-8-77	R. Z.	3-8-77	E. S.	4-15-77	

DESIGN GROUP LEADER — DATE 7-12-77 — FILMED DATE — FLUOR PIONEER INC. NO. 112 MP-99-P8-0001

APPROVED
PROJECT NO. 104192 — SHT.
DWG. NO. 8030-X-91925 — REVISION 2



TRUE NORTH
BLDG. NORTH
SECTION "5-5"
SCALE: 3/8" = 1'-0"
20"-45° EL 4 REQD
20" FIBERCAST
24" CS
SEE NOTE 6
EXPANSION JOINT
GRADE
6" ABS
EL. 416'-0"
EL. 415'-0"
SECTION "1-1"
SCALE: 3/8" = 1'-0"
NEW 20" FIBERCAST
NEW 24" C.S.
GRADE, VARIES
EXPANSION JOINT
SUPPORT (SEE NOTE-7)
NEW 6" ABS
EXIST 10" ASH PIPE
EL. 416'-0"
EL. 415'-0"
SECTION "2-2"
SCALE: 3/8" = 1'-0"
EXIST. 8" RAW WTR EL. 427'-0"
4" & 1 1/2" EL. 424'-3 9/16"
UNIT-4
UNIT-3
UNIT-2
UNIT-1
STACK-4
STACK-3
STACK-1
12" R.D.
12" RD
FLY ASH STOR. TANK "B"
FLY ASH STOR. TANK
(2)-10" ASH PIPES
CONVEYORS 4A & B
8" SANITARY LINE
12" ROOF DRAIN
1" BEARING LUBRICATION & 4" RAW WTR. SEE ENLARGED PLAN
DEMIN. BLDG.
R.R. TRACK
CHEM. TANKS
DEMIN. DRAIN SUMP 8' φ x 8' H FIBER GLASS TANK SEE ENLARGED PLAN SEE DWG 8020-X-91922
(3) CLARIFIER TANKS "A", "B", & "C"
8" SLUDGE DRAIN TO BE CAPPED & ABANDONED IN FIELD.
COMBINED DRAIN SUMP 21'L x 20'W x 16' DEEP SEE ENLARGED PLAN
12" YARD DRAIN HDR SEE 8020-X-53954
TO EXIST. TREATMENT PLANT
TO RIVER
BREAKER HOUSE
HEAT TRACE 1 FT. ABOVE GRADE & 2 FT BELOW GRADE. ON VERT. LEG USE 1" THICK INSULATION.
24" C.S. & 6" ABS BELOW GRADE
B/20" FIBERCAST EL. 419'-4 7/8" N. 940.07 W. 1038.69
B/20" FIBERCAST EL. 419'-7 1/2" N. 682.59 W. 1113.04
B/20" FIBERCAST EL. 419'-7 7/8" N. 598.20 W. 1102.84
20" FIBERCAST INV. EL 419'-2 1/2"
20" FIBERCAST ROUTED THRU 36" φ CORRUGATED METAL CULVERT UNDER ROAD (SEE NOTE-5)
FOR SUPPORTS SEE DWG 8020-X-91925
12" GAS LINE
SEE 8020-X-96105 FOR PIPE ROUTING & DETAILS
4" RAW WTR. EL. 424'-3 9/16"
EXIST 8" RAW WTR. EL. 427'-0"
FLOW METER
WATER TREATMENT BLDG. EL. 418'-6"
PROVIDE OPNG. THRU SIDING.
1 1/2" & 4" LINES HEAT TRACE & INSULATE OUTSIDE BLDG. & 2 FT BELOW GRADE (1" INSULATION)
EXIST 6" STORM DRAIN
1" BEARING LUBRICATION TO DEMIN. DRAIN SUMP EL. 414'-0" (FOR CONT SEE 8020-X-91922)
CLARIFIER
24" CS T/90° ELL EL. 428'-0" B/90° ELL EL. 420'-5"
4" RAW WATER FOR AGITATION. (FOR CONT SEE DET-1 8020-X-91922)
8" SLUDGE
21" DRAIN
TO BE CAPPED & ABANDONED.
12" φ YARD DRAIN (SEE 8020-X-53954)
6" ROOF DRAIN (8020-X-53954)
ENLARGED PLAN
SCALE: 1" = 10'
PLAN
SCALE: 1" = 50'
SECTION "4-4"
TYPICAL VEIW BENEATH THE ROAD
SCALE: 3/8" = 1'-0"
T/ROAD EL. 422'-0" APPROX.
SAND FILL
20" PIPE
36" φ GALV. CORRUGATED CULVERT PIPE (SEE NOTE-5)

GENERAL NOTES:

1. ALL NEW PIPING SHOWN SOLID LINES ONLY.
2. ALL COORDINATES AND EXISTING PIPE ELEVATIONS TO BE VERIFIED IN FIELD.
3. YARD GRADE EL. 418'-0".
4. PIPE ELEVATIONS ARE ℄ UNLESS OTHERWISE NOTED.
5. CORRUGATED CULVERT PIPE TO BE 14GA ASTM A-444
6. 6" ABS TO BE COVERED, MUST NOT BE EXPOSED TO SUNLIGHT.
7. 12" WIDE x VARIABLE HEIGHT WOOD SUPPORT LOCATED ON 20 FT MAX. CENTERS. DO NOT LOCATE SUPPORTS UNDER PIPE COUPLINGS.

ASSOCIATED DWGS

8020-X-91920	FLOW DIAGRAM
8020-X-91922	PIPING PLANS & SECTIONS
8020-X-91923	DRAINS FROM DEMIN BLDG

REFERENCE DWGS

8000-W-20288
8000-X-21496
8000-X-27412
8011-X-7607
8012-X-8484
8013-X-16878
8014-X-23506
8020-X-6354
8020-X-14289
8020-X-27029
8030-X-25291
C-11-15 PAGE 3-13
8020-X-96105
8020-X-53849

REVISIONS

RELEASED FOR INFORMATION & REVIEW ONLY FILMED: 11-9-76

A REDRAWN & RELEASED FOR INFORMATION & REVIEW ONLY. FILMED: 2-18-77

B REVISED PIPE ROUTING OF 24" & 6" ABS TO ASH POND & 6" ABS TO AVOID EXIST PIPE NEAR CLARIFIER "A" (E-9). ADDED SECT "3-3" (A-5) & SECT "4-4" (F-11). UPDATED SECT. "1-1" (B-11) & SECT. "2-2" (C-11). REVISED LINE TO DEMIN. DRAIN SUMP (E-9). ISSUED FOR BIDS. FILMED: 4-26-77

C ADDED 1" BEARING LUBRICATION LINE FROM WTR. TRTMT. BLDG. TO COMB. DRAIN SUMP (G-4) & DEMIN. DRAIN SUMP (E-4). UPDATED SECT "2-2" (D-4). REROUTED 24" & 6" ABS (E-3-4-5&6) UPDATED SECT "1-1" (B-11) & SECT "4-4" (F-11). DELETED SECT "3-3" (B-9). ADDED NOTE-6 (H-11). REISSUED FOR BIDS. FILMED: 5-23-77

0 ADDED NOTE-7 (H-11). 20" PIPE WAS 24" (C-1, C-3, E 4&5, F-5). COORD. N. 1130.66 WAS W. 1130.66, W. 1124.45 WAS N. 1124.45 (C-1) W. 1113.04 WAS W. 1102.84 (E-4). EL. 419'-2 1/2" WAS 414'-0" (C-1), EL. 419'-4 7/8" WAS 417'-0" (C-3), EL. 419'-7 1/2" WAS 418'-0" (E-4), EL. 419'-7 7/8" WAS 418'-6" (E-4), EL. 420'-2 1/2" WAS 419'-0" (F-5). UPDATED SECTS "1-1" (B-11) & "4-4" (F-11). SUMP DISCH. WAS 16" (J-9) ADDED NOTE (D-6 & F7) & SECT. "5-5" (A-6). ISSUED FOR CONSTRUCTION (PERMIT) FILMED: 6-30-77

1 20" FIBERCAST WAS FIBERGLASS (C, D1, C3, E4, F5). REROUTED 6" ABS TO CONNECT TO 20" FIBERCAST (B5, B10). DELETED 6" ABS FROM CULVERT PIPE (E12). ADDED HEAT TRACE TO 4" LINE & EXTENDED HEAT TRACE BELOW GROUND FOR 1/2" (F8). ISSUED FOR CONSTRUCTION. FILMED: 9-29-77

2 420'-5 WAS 420'-2" (H-4) 8'-4 3/4" WAS 6'-0 3/4" (J-3). DWN: R.L. 8-3-77. FILMED: 8-5-77

3 ADDED SUPPORT NOTE (E2). DWN: BW 10-14-77. FILMED: 11-17-77. SEE O.E. REF. 4

UNION ELECTRIC COMPANY

ST. LOUIS, MISSOURI
MERAMEC PLANT

PIPING PLOT PLAN-COMBINED SUMP & DEMIN. SUMP DISCHARGE TO ASH POND

FLUOR PIONEER INC.
CHICAGO, ILLINOIS

DRAWN: R. LUKES 1-5-77
SCALE: AS NOTED
UE-MP-99-PD-1000
PROJECT NO 104182
DWG NO. 8020-X-91921
REVISION 1

8020-X-91921

• SCANNED HYBRID DRAWING •

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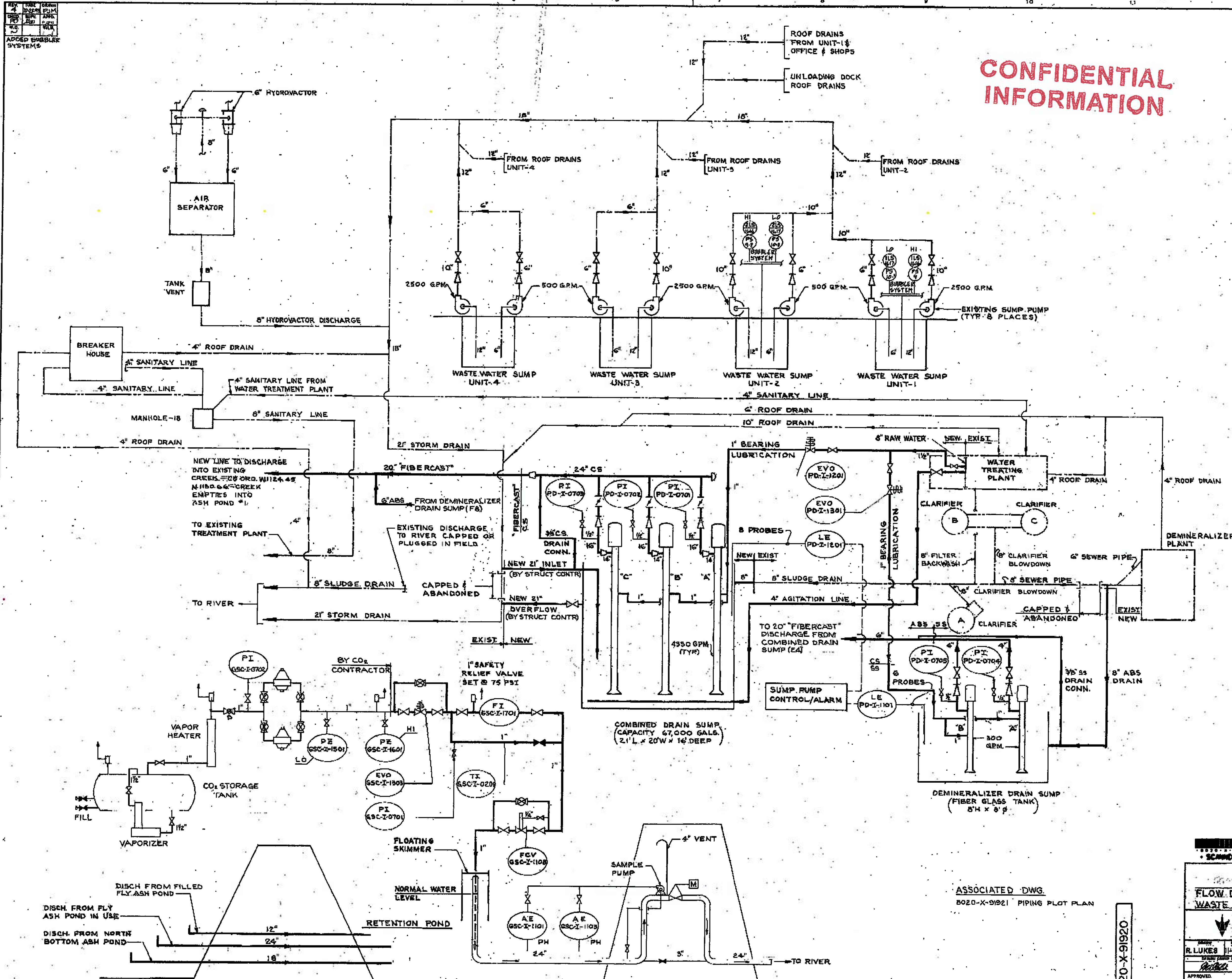


ADDED BUBBLER SYSTEMS
6" HYDROVACTOR
AIR SEPARATOR
TANK VENT
8" HYDROVACTOR DISCHARGE
ROOF DRAINS FROM UNIT-1 & OFFICE & SHOPS
UNLOADING DOCK ROOF DRAINS
FROM ROOF DRAINS UNIT-4
FROM ROOF DRAINS UNIT-3
FROM ROOF DRAINS UNIT-2
BUBBLER SYSTEM
2500 GPM
500 G.P.M.
EXISTING SUMP PUMP (TYP 8 PLACES)
WASTE WATER SUMP UNIT-4
WASTE WATER SUMP UNIT-3
WASTE WATER SUMP UNIT-2
WASTE WATER SUMP UNIT-1
BREAKER HOUSE
4" ROOF DRAIN
4" SANITARY LINE
4" SANITARY LINE FROM WATER TREATMENT PLANT
MANHOLE-18
8" SANITARY LINE
4" SANITARY LINE
6" ROOF DRAIN
10" ROOF DRAIN
21" STORM DRAIN
NEW LINE TO DISCHARGE INTO EXISTING CREEK - CO ORD. W1124.45 N1130.66 - CREEK EMPTIES INTO ASH POND #1.
20" FIBERCAST
24" CS
6" ABS FROM DEMINERALIZER DRAIN SUMP (F8)
TO EXISTING TREATMENT PLANT
EXISTING DISCHARGE TO RIVER CAPPED OR PLUGGED IN FIELD
8" SLUDGE DRAIN
CAPPED & ABANDONED
TO RIVER
21" STORM DRAIN
NEW 21" INLET (BY STRUCT CONTR)
NEW 21" OVERFLOW (BY STRUCT CONTR)
EXIST NEW
PI PD-I-0703
PI PD-I-0702
PI PD-I-0701
DRAIN CONN.
4350 GPM (TYP)
COMBINED DRAIN SUMP (CAPACITY 67,000 GALS.) (21'L x 20'W x 14' DEEP)
1" BEARING LUBRICATION
EVO PD-I-1201
EVO PD-I-1301
LE PD-I-1201
8 PROBES
6" RAW WATER
NEW EXIST
WATER TREATING PLANT
4" ROOF DRAIN
CLARIFIER B
CLARIFIER C
CLARIFIER A
8" FILTER BACKWASH
8" CLARIFIER BLOWDOWN
8" SEWER PIPE
6" SEWER PIPE
DEMINERALIZER PLANT
8" SLUDGE DRAIN
4" AGITATION LINE
CAPPED & ABANDONED
TO 20" "FIBERCAST" DISCHARGE FROM COMBINED DRAIN SUMP (E4)
SUMP PUMP CONTROL/ALARM
LE PD-I-1101
PI PD-I-0705
PI PD-I-0704
6 PROBES
300 GPM
8" ABS DRAIN
DEMINERALIZER DRAIN SUMP (FIBER GLASS TANK) 8'H x 8'ϕ
PI GSC-I-0702
BY CO_2 CONTRACTOR
1" SAFETY RELIEF VALVE SET @ 75 PSI
FI GSC-I-1701
VAPOR HEATER
PS GSC-I-1501
PS GSC-I-1601
EVO GSC-I-1303
PI GSC-I-0701
TI GSC-I-0201
CO_2 STORAGE TANK
FILL
VAPORIZER
FLOATING SKIMMER
FCV GSC-I-1108
SAMPLE PUMP
4" VENT
NORMAL WATER LEVEL
RETENTION POND
AE GSC-I-1101
AE GSC-I-1103
PH
DISCH FROM FILLED FLY ASH POND
DISCH. FROM FLY ASH POND IN USE
DISCH. FROM NORTH BOTTOM ASH POND
TO RIVER

ASSOCIATED DWG.
8020-X-91921 PIPING PLOT PLAN

8020-X-91920

1	20" "FIBERCAST" WAS FIBERGLASS (E4 & E5). REROUTED DEMIN DRAIN SUMP DISCH (F8 & E4). IDENT COMB DRAIN SUMP INLET & OVERFLOW AS BY STRUCT CONTR (F5). 3/4" DRAIN TO COMB DR SUMP & DEMIN DR SUMP WAS 1/2" (E5 & G10). ADDED 17" FILLED FLY ASH POND LINE (J1). SHOWED MATL BREAK IN 1" BEARING LUBE LINE TO DEMIN DR SUMP (G9). ISSUED FOR CONSTRUCTION. DWN: BW 7-13-77. CHKD: 7/13/77. APPD: 7-14-77. FILMED: 7-14-77
2	1" TO FLOATING SKIMMER WAS 1 1/2" (G5 & H5). 1" SAFETY VA WAS 1 1/2" (G5). REVISED CO_2 SYSTEM SUPPLIED BY CO_2 CONTR (G1–G4). DWN: BW 7-28-77. CHKD: 7/29/77. APPD: 8-5-77. FILMED: 8-5-77
3	ADDED NO. GSC-I-0702 TO PI (G2). REV VALVE FCV-GSC-I-1108 (H5). 4350 GPM WAS 5000 (F7). ADDED REP TO COMB DR SUMP PUMP (E6). DWN: BW 9-6-77. CHKD: 9/6/77. APPD: 9/6/77. FILMED: 9-6-77
	See Upper Left

REVISIONS
RELEASED FOR INFORMATION & REVEIW ONLY. FILMED: 11-9-76
A. RELEASED FOR INFORMATION & REVIEW ONLY. FILMED: 1-18-77
B. ADDED COMB. DRAIN SUMP 21" OVERFLOW DISCH. (F-6). REVISED PIPE SIZES ON DISCH. FROM COMB. DRAIN SUMP FROM 14"ϕ TO 16"ϕ (E-7), MAIN DISCH. HEADER FROM 20"ϕ TO 24"ϕ (E-5), AND DISCH. FROM RETENTION POND FROM 18"ϕ TO 24"ϕ (J-5). ISSUED FOR BIDS. FILMED: 4-12-77
C. DELETED 6" DRAIN FROM DEMIN. BLDG & ADDED 8" DRAIN FROM EXIST. 8" (G-11). ISSUED FOR BIDS. FILMED: 4-26-77
D. ADDED 1" BEARING LUBRICATION LINE TO COMB. DRAIN SUMP (F-7) & DEMIN. DRAIN SUMP (G-9). CHANGED COORD N.1124.45 WAS N. 1176 & W.1130.66 WAS W.1059.01 (E-2 & F-8). CHANGED LINE SIZE 24" WAS 20" (J-3). REISSUED FOR BIDS. FILMED: 5-23-77
0. RELOCATED RELIEF VALVE TO BE ADJACENT TO ROTOMETER & PI & TI TO BE UPSTREAM OF ROTOMETER (G-4). RELOCATED S.U.C.T. FOR SAMPLE PUMP IN MANHOLE (J-6). ADDED EVO NUMBERS (E-8). 20" DISCH. WAS 24" (E-4). ADDED NOTE (E-7). COORD W.1124.45 WAS N. 1124.45 & N. 1130.66 WAS W1130.66 (E-3 & F-8). COMB. DRAIN SUMP PUMPS WERE 6000 GPM & 16" DISCH. (E-7 & F-7). DEMIN. DRAIN SUMP PUMPS HAD 3" DISCH. (F9 & 10). ADDED FIBERGLASS NOTE (E-5). ADDED 1/2" DRAIN LINE CONN. (E-8 & G-12). ISSUED FOR CONSTRUCTION (PERMIT). FILMED: 6-30-77

8020-X-091920
SCANNED HYDRO DRAWING

STATE OF MISSOURI — DONALD J. ROY — NUMBER E-17613 — REGISTERED PROFESSIONAL ENGINEER

UNION ELECTRIC COMPANY
ST. LOUIS, MISSOURI
MERAMEC PLANT

FLOW DIAGRAM
WASTE WATER TREATMENT

Designed by
FLUOR PIONEER INC.
CHICAGO, ILLINOIS

DRAWN	DATE	DESIGNED	DATE	CHECKED	DATE	SCALE
R. LUKES	11-5-76	L. FLOOD	11-8-76	L. FLOOD	11-8-76	NONE

UE-MP-99-PD-0100

APPROVED
PROJECT NO. 104132 SHT. 1
DWG. NO. 8020-X-91920 REVISION 4

DRAWING 1

NPDES FLOW DIAGRAM
WATER BALANCE
FOLLOWING PROPOSED MODIFICATIONS

MERAMEC PLANT

8000-X-53973

SUPERSEDES 8000-X-53973, REV. 5, DATE 10-29-92

R:\Meramec\STR\53973.DGN 09/14/2010 11:01:59 AM

APPENDIX A

DOC 1.4 AMERENUE RESPONSE TO EPA'S RFI

AmerenUE Response

Meramec Power Station
8200 Fine Road
St. Louis, Missouri 63129

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
Old Fly Ash Pond	2000
Retention Pond	1977
Bottom Ash Ponds (3)	1950s
New Fly Ash Pond	2003

None of these units have been expanded.

3. See table below.

Management Unit	Materials Contained in Unit*
Old Fly Ash Pond	1, 5
Retention Pond	1, 2
Bottom Ash Ponds	2
New Fly Ash Pond	1

*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; 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.)**
Old Fly Ash Pond	17.6	300	260	25
Retention Pond	0.7	10	minimal	25
Bottom Ash Ponds	14	280	171	25
New Fly Ash Pond	13.5	230	190	25

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

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

Enclosure A

Please provide the information requested below for each surface impoundment or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material for the storage of 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. This includes units that no longer receive coal combustion residues or by-products, but still contain free liquids.

1. Relative to the National Inventory of Dams criteria for High, Significant, Low, or Less-than-Low, please provide the potential hazard rating for each management unit and indicate who established the rating, what the basis of the rating is, and what federal or state agency regulates the unit(s). If the unit(s) does not have a rating, please note that fact.

2. What year was each management unit commissioned and expanded? ;

3. What materials are temporarily or permanently contained in the unit? 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. If the management unit contains more than one type of material, please identify all that apply. Also, if you identify "other," please specify the other types of materials that are temporarily or permanently contained in the unit(s).

4. Was the management unit(s) designed by a Professional Engineer? Is or was the construction of the waste management unit(s) under the supervision of a Professional Engineer? Is inspection and monitoring of the safety of the waste-management unit(s) under the supervision of a Professional Engineer?

5. When did the company last assess or evaluate the safety (i.e., structural integrity) of the management unit(s)? Briefly describe the credentials of those conducting the structural integrity assessments/evaluations. Identify actions taken or planned by facility personnel as a result of these assessments or evaluations. If corrective actions were taken, briefly describe the credentials of those performing the corrective actions, whether they were company employees or contractors. If the company plans an assessment or evaluation in the future, when is it expected to occur?

6. When did a State or a Federal regulatory official last inspect or evaluate the safety (structural integrity) of the management unit(s)? If you are aware of a planned state or federal inspection or evaluation in the future, when is it expected to occur? Please identify the Federal or State regulatory agency or department which conducted or is planning the inspection or evaluation. Please provide a copy of the most recent official inspection report or evaluation.

7. Have assessments or evaluations, or inspections conducted by State or Federal regulatory officials conducted within the past year uncovered a safety issue(s) with the management unit(s), and, if so, describe the actions that have been or are being taken to deal with the issue or issues. Please provide any documentation that you have for these actions.

8. What is the surface area (acres) and total storage capacity of each of the management units? What is the volume of materials currently stored in each of the management unit(s)? Please provide the date that the volume measurement(s) was taken. Please provide the maximum height of the management unit(s). The basis for determining maximum height is explained later in this. Enclosure.

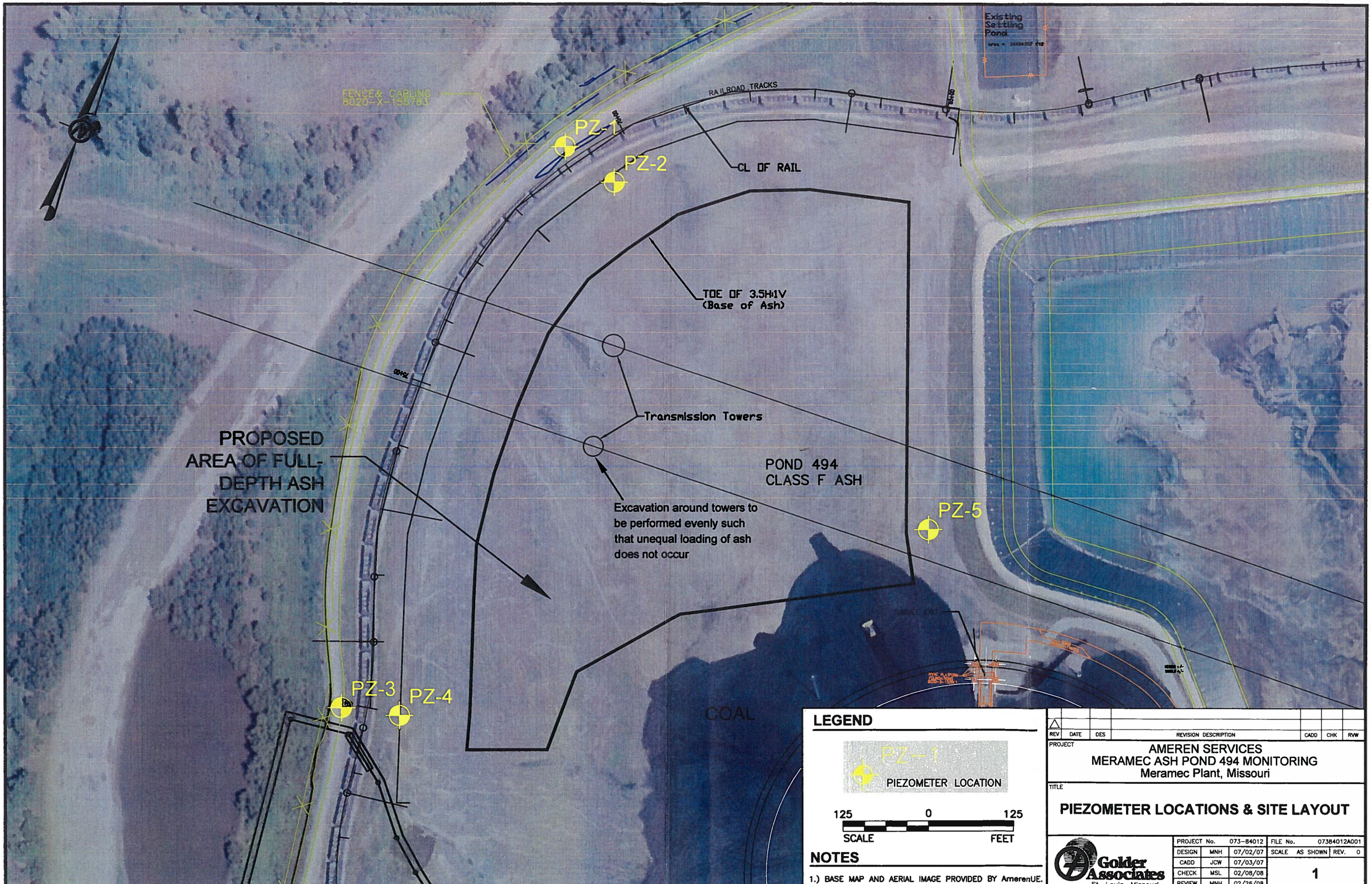
9. Please provide a brief history of known spills or unpermitted releases from the unit within the last ten years, whether or not these were reported to State or federal regulatory agencies. For purposes of this question, please include only releases to surface water or to the land (do not include releases to groundwater).

10. Please identify all current legal owner(s) and operator(s) at the facility.

APPENDIX A

DOC 1.5 ASH POND #494 DRILLING AND PIEZOMETER INSTALLATION FIGURES AND LOGS

FIGURES



LEGEND

PZ-1 PIEZOMETER LOCATION

125 0 125
SCALE FEET

NOTES

1.) BASE MAP AND AERIAL IMAGE PROVIDED BY AmerenUE.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
△						

PROJECT
AMEREN SERVICES
MERAMEC ASH POND 494 MONITORING
Meramec Plant, Missouri

TITLE
PIEZOMETER LOCATIONS & SITE LAYOUT

Golder Associates
St. Louis, Missouri

PROJECT No.	073-84012		FILE No.	07384012A001	
DESIGN	MNH	07/02/07	SCALE	AS SHOWN	REV. 0
CADD	JCW	07/03/07			
CHECK	MSL	02/08/08			1
REVIEW	MNH	02/26/08			

TABLES

TABLE 1
PIEZOMETER CONSTRUCTION DETAILS - MERAMEC POWER PLANT

Piezometer ID	Ground Surface Elevation (ft MSL)	Borehole Depth (ft BGS)	Top of Piezometer Casing Elevation (ft MSL)	Piezometer Screen Length (feet)	Piezometer Screen Depth (ft BGS)		Piezometer Screen Elevation (ft MSL)		Static Water Level 10/25/07
					Top	Bottom	Top	Bottom	ft MSL
PZ-1	413.25	41.5	416.30	9.6	31.6	41.2	381.7	372.1	392.80
PZ-2	416.20	25.0	419.05	9.6	15.1	24.7	401.1	391.5	400.26
PZ-3	414.30	45.0	417.36	9.9	34.7	44.6	379.6	369.7	385.85
PZ-4	414.57	25.0	417.27	9.6	15.1	24.7	399.5	389.9	400.80
PZ-5	420.32	25.0	423.39	9.5	15.1	24.7	405.2	395.6	405.55

Notes:

ft BGS - feet Below Ground Surface
ft MSL - Mean Sea Level
Wells surveyed by Sterling Co. Engineers & Surveyors.

Checked by: JCW
Reviewed by: MNH

TABLE 2
SUMMARY OF GEOTECHNICAL LABORATORY RESULTS - MERAMEC POWER PLANT

Sample Identification	Sample Type	Sample Depth (ft)	Soil Classification	Natural Moisture %	Atterberg Limits				Unit Weight		Additional Tests Conducted (See Abbreviations)
					L.L.	P.L.	P.I.	L.I.	Moisture %	Dry (lb/cuft)	
PZ-1 S-002	SS	9 -10.5	CL	25.7	40	21	19	0.23	NA	NA	
PZ-1 S-003	ST	14.5 - 16.5	CH	32.5	61	23	38	0.24	37.1	83.8	T
PZ-1 S-007	SS	29.5 - 31	CH	31.8	67	24	43	0.18	NA	NA	
PZ-3 S-002	SS	9 - 10.5	CH	39.8	67	24	43	0.36	NA	NA	
PZ-3 S-003	ST	14 - 16	CH	37.8	77	27	50	0.22	37.9	81.2	T
PZ-3 S-007	SS	29 - 30.5	CH	38.5	59	22	37	0.45	NA	NA	

ABBREVIATIONS: LIQUID LIMIT (L.L.)
PLASTIC LIMIT (P.L.)
PLASTICITY INDEX (P.I.)
LIQUIDITY INDEX (L.I.)
TRIAXIAL COMPRESSIVE STRENGTH (T)
NOT APPLICABLE (NA)

Checked By: MNH

APPENDICIES

APPENDIX A
PIEZOMETER BOREHOLE LOGS

RECORD OF BOREHOLE PZ-1

SHEET 1 of 3

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/14/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 413.25
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer, 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p W W_l (20 40 60 80)	REMARKS
0	4.25 Inch ID HSA	(0-9.5) Firm, medium gray (N5) to black (N1) with mottled appearance, CLAYEY SILT, trace fine sand, moist (ML)	ML				HSA	N/A	N/A	N/A / 4.5		
5						1	SS	2 / 3 / 5	11	1.3 / 1.5	■	
							HSA	N/A	N/A	N/A / 3.5		
10		(9.5-39.5) Soft, medium gray (N5), SILTY CLAY, trace F-C sand, moist (CL)	CL		403.8 / 9.5	2	SS	1 / 2 / 2	4	0.8 / 1.5	■ ⊖	
							HSA	N/A	N/A	N/A / 3.5		
15		below 14.5, predominantly CLAY (CH)	CH		398.8 / 14.5	3	SH	N/A	N/A	1.6 / 2.0	⊖	
						4	SS	2 / 2 / 3	5	0.9 / 1.5	■	
							HSA	N/A	N/A	N/A / 1.5		
20		19.5-21.0, trace organics			393.8 / 19.5	5	SS		13	0.5 / 1.5		

Log continued on next page

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MRF
CHECKED: MNH
DATE: 2/26/08

Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

RECORD OF BOREHOLE PZ-1

SHEET 2 of 3

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/14/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 413.25
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p W W_l (20 40 60 80)	REMARKS
20	4.25 Inch ID HSA	below 14.5, predominantly CLAY (CH) *(Continued)*				5	SS	3 / 5 / 8	13	0.5 / 1.5	■	
							HSA	N/A	N/A	N/A / 3.5		
25						6	SS	0 / 2 / 2	4	1.2 / 1.5	■	
							HSA	N/A	N/A	N/A / 3.5		
30		below 29.5, moderate reddish brown (10R 4/6) mottling, wet	CH		383.8 / 29.5	7	SS	2 / 3 / 4	6	1.5 / 1.5	■ ⊢○⊣	
							HSA	N/A	N/A	N/A / 3.5		
35		below 34.5, very soft, trace fine sand			378.8 / 34.5	8	SS	N/A / WH / 2	2	1.5 / 1.5		
							HSA	N/A	N/A	N/A / 3.5		
40		Log continued on next page	ML		373.8 / 39.5 / 373.5	9	SS		2	1.5 / 1.5		

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MRF
CHECKED: MNH
DATE: 2/26/08

Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

RECORD OF BOREHOLE PZ-1

SHEET 3 of 3

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/14/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 413.25
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) w_p — w — w_l (20 40 60 80)	REMARKS
40		39.8-40.0 & 40.4-40.6, F-C sand & F gravel seams (39.5-41.0) Very soft, medium gray (N5), CLAYEY SILT, little F-C sand & F gravel, wet (ML) *(Continued)*	ML		39.8	9	SS	1 1 1	2	1.5 1.5	■	
					372.3							
		END BOREHOLE AT 41.0 FEET BGS.			41.0							
45												
50												
55												
60												

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MRF
CHECKED: MNH
DATE: 2/26/08

Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

RECORD OF BOREHOLE PZ-2

SHEET 1 of 2

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/15/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 416.20
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in, 140 lb hammer 30 inch drop	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) w_p — w — w_l (20 40 60 80)	REMARKS
0	4.25 INCH HSA	(0.0-26.5) Soft, medium gray (N5), FLY ASH, moist (FILL)					HSA	N/A	N/A	N/A / 4.5		
5						1	SS	2 / 3 / 11	14	1.0 / 1.5	■	
							HSA	N/A	N/A	N/A / 3.5		
10		Below 10.0, becomes very soft, wet	N/A		406.2 / 10.0	2	SS	1 / 2 / 1	3	1.5 / 1.5	■	
							HSA	N/A	N/A	N/A / 3.5		
15						3	SS	N/A / WH / WH	WH	0.2 / 1.5		
							HSA	N/A	N/A	N/A / 3.5		
20		Log continued on next page				4	SS		WH	1.5 / 1.5		

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MRF
CHECKED: MNH
DATE: 2/26/08

Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

RECORD OF BOREHOLE PZ-2

SHEET 2 of 2

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/15/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 416.20
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p W W_l (20 40 60 80)	REMARKS
20	4.25 INCH HSA	(0.0-26.5) Soft, medium gray (N5), FLY ASH, moist (FILL) *(Continued)*	N/A			4	SS	N/A / WH / WH	WH	1.5 / 1.5		
							HSA	N/A	N/A	N/A / 4.0		Rods heaving. Added ~20gals of water.
25						5	SS	N/A / WH / WH	WH	1.5 / 1.5		
					389.7							
		END BOREHOLE @ 26.5 FEET BGS.			26.5							
30												
35												
40												

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MRF
CHECKED: MNH
DATE: 2/26/08

Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

RECORD OF BOREHOLE PZ-3

SHEET 1 of 3

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/13/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 414.30
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40)	WATER CONTENT (PERCENT) W_p W W_l (20 40 60 80)	REMARKS
0	4.25 INCH ID HSA	(0.0-9.0) Compact, medium gray (N5) to light gray (N7), SANDY F-C GRAVEL, dry (GW)	GW				HSA	N/A	N/A	N/A / 4.0			
						1	SS	5 / 6 / 5	11	0.9 / 1.5	■		
5							HSA	N/A	N/A	N/A / 3.5			
					405.3								
		(9.0-35.2) Soft, medium gray (N5) to dark yellowish brown (10YR 4/2), SILTY CLAY, trace F-C sand, moist (CH)			9.0	2	SS	1 / 2 / 1	3	0.8 / 1.5	■		
10							HSA	N/A	N/A	N/A / 3.5			
			CH			3	SH	N/A	N/A	1.5 / 2.0			
15						4	SS	1 / 2 / 2	4	0.5 / 1.5	■		
							HSA	N/A	N/A	N/A / 1.5			
						5	SS	2 / 2 / 3	5	1 / 1.5	■		
20		Log continued on next page											

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MNH
CHECKED: MNH
DATE: 2/26/08

Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

RECORD OF BOREHOLE PZ-3

SHEET 2 of 3

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/13/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 414.30
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) WATER CONTENT (PERCENT) W_p W W_l (20 40 60 80)	REMARKS
20	4.25 INCH ID HSA	(9.0-35.2) Soft, medium gray (N5) to dark yellowish brown (10YR 4/2), SILTY CLAY, trace F-C sand, moist (CH) *(Continued)*	CH			5	SS		5	1/1.5	■	
							HSA	N/A	N/A	N/A/3.5		
		Below 24.0, medium dark gray (N4), trace organics & fiberous plant matter, CH plasticity.			390.3 / 24.0	6	SS	1/3/4	7	1.3/1.5	■	
25							HSA	N/A	N/A	N/A/3.5		
		Below 29.0, medium gray (N5) with dark yellowish brown (10YR 4/2) mottling, trace organics (CH)			385.3 / 29.0	7	SS	1/3/4	7	1.5/1.5	■	
30							HSA	N/A	N/A	N/A/3.5		
						8	SS	1/2/3	5	1.5/1.5	■	
35		(35.2-36.0) Very soft, medium gray (N5), CLAYEY SILT, trace F sand, wet (ML)	ML		379.1 / 35.2 / 378.3							
		(36.0-42.0) Soft, medium gray (N5) and dark yellowish brown (10YR 4/2) mottling, SILTY CLAY, wet (CL)	CL		36.0		HSA	N/A	N/A	N/A/3.5		
						9	SS	1/2/2	4	1.5/1.5	■	
40		Log continued on next page										

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MNH
CHECKED: MNH
DATE: 2/26/08

Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

RECORD OF BOREHOLE PZ-3

SHEET 3 of 3

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/13/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 414.30
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in / 140 lb hammer 30 inch drop	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) w_p — w — w_l (20 40 60 80)	REMARKS
40	4.25 INCH ID HSA	(36.0-42.0) Soft, medium gray (N5) and dark yellowish brown (10YR 4/2) mottling, SILTY CLAY, wet (CL) *(Continued)*	CL			9	SS		4	1.5 / 1.5		
							HSA	N/A	N/A	N/A / 1.5		
					372.3							
		(42.0-45.5) C SAND & F GRAVEL, wet, (GP-SP)			42.0	10	SS	N/A	N/A	1.5 / 1.5		@ ~42 Feet, encountered C SAND and F GRAVEL, sand heaved to 41 feet BGS after drilling to 44 feet BGS. Collected sample of heave material representative of 42-44 feet BGS material.
45							HSA	N/A	N/A	N/A / 2.0		
					368.8							
		END BOREHOLE AT 45.5 FEET BGS.			45.5							
50												
55												
60												

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MNH
CHECKED: MNH
DATE: 2/26/08

Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

RECORD OF BOREHOLE PZ-4

SHEET 1 of 2

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/15/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 414.57
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) w_p — w — w_l (20 40 60 80)	REMARKS
0	4.25 INCH HSA	(0.0-26.5) Very soft, medium gray (N5), FLY ASH, moist (FILL)					HSA	N/A	N/A	N/A / 4.0		
5						1	SS	1 / 2 / 1	3	1.5 / 1.5	■	
							HSA	N/A	N/A	N/A / 3.5		
10		Below 10.0, wet			404.6 10.0	2	SS	N/A / WH / 1	1	1.0 / 1.5		
							HSA	N/A	N/A	N/A / 3.5		
15						3	SS	N/A / WH / WH	WH	18 / 1.5		
							HSA	N/A	N/A	N/A / 3.5		
20		Log continued on next page				4	SS	N/A / WH / 1	1	1.5 / 1.5		

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MRF
CHECKED: MNH
DATE: 2/26/08

Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

RECORD OF BOREHOLE PZ-4

SHEET 2 of 2

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/15/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 414.57
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p ⊢ W ⊣ W_l (20 40 60 80)	REMARKS
20	4.25 INCH HSA	(0.0-26.5) Very soft, medium gray (N5), FLY ASH, moist (FILL) *(Continued)*				4	SS		1	1.5 / 1.5		
							HSA	N/A	N/A	N/A / 4.5		
25						5	SS	N/A / WH / WH	WH	1.5 / 1.5		
					388.1							
		END BOREHOLE AT 26.5 FEET BGS.			26.5							
30												
35												
40												

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MRF
CHECKED: MNH
DATE: 2/26/08

Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

RECORD OF BOREHOLE PZ-5

SHEET 1 of 2

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/15/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 420.32
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer, 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p W W_l (20 40 60 80)	REMARKS
0	4.25 INCH HSA	(0.0-26.5) Firm, medium gray (N5), FLY ASH, moist (FILL)					HSA	N/A		N/A / 4.0		
5						1	SS	4 / 6 / 8	16	1.3 / 1.5	■	
							HSA	N/A		N/A / 3.5		
		Below 9.0, Very soft, medium gray (N5) to dark gray (N3) striations.			411.3 / 9.0							
10		Belwo 10.0, wet			410.3 / 10.0	2	SS	1 / 1 / 1	2	1.0 / 1.5	■	
							HSA	N/A		N/A / 3.5		
15						3	SS	1 / 1 / 1	2	1.5 / 1.5	■	
							HSA	N/A		N/A / 3.5		
20						4	SS	N/A / 1 / 1	2	1.5 / 1.5	■	

Log continued on next page

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MRF
CHECKED: MNH
DATE: 2/26/08

Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

RECORD OF BOREHOLE PZ-5

SHEET 2 of 2

PROJECT: Ameren - Meramec Fly Ash
PROJECT NUMBER: 073-84012
LOCATION: Ash Pond #494

DRILLING METHOD: 4.25 Inch ID HSA
DRILLING DATE: 8/15/2007
DRILL RIG: CME 75D

DATUM: LOCAL
AZIMUTH: N/A
COORDINATES: N: E:

ELEVATION: 420.32
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (140 lb hammer 30 inch drop)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p W W_l (20 40 60 80)	REMARKS
20	4.25 INCH HSA	(0.0-26.5) Firm, medium gray (N5), FLY ASH, moist (FILL) *(Continued)*				4	SS		2	1.5 / 1.5		
							HSA	N/A		N/A / 4.5		
25						5	SS	N/A / WH / WH	WH	1.5 / 1.5		
		END BOREHOLE AT 26.5 FEET BGS.			393.8 / 26.5							
30												
35												
40												

SCALE: 1 in = 2.5 ft
DRILLING CONTRACTOR: Lane Western
DRILLER: D. Mahurin

LOGGED: MRF
CHECKED: MNH
DATE: 2/26/08

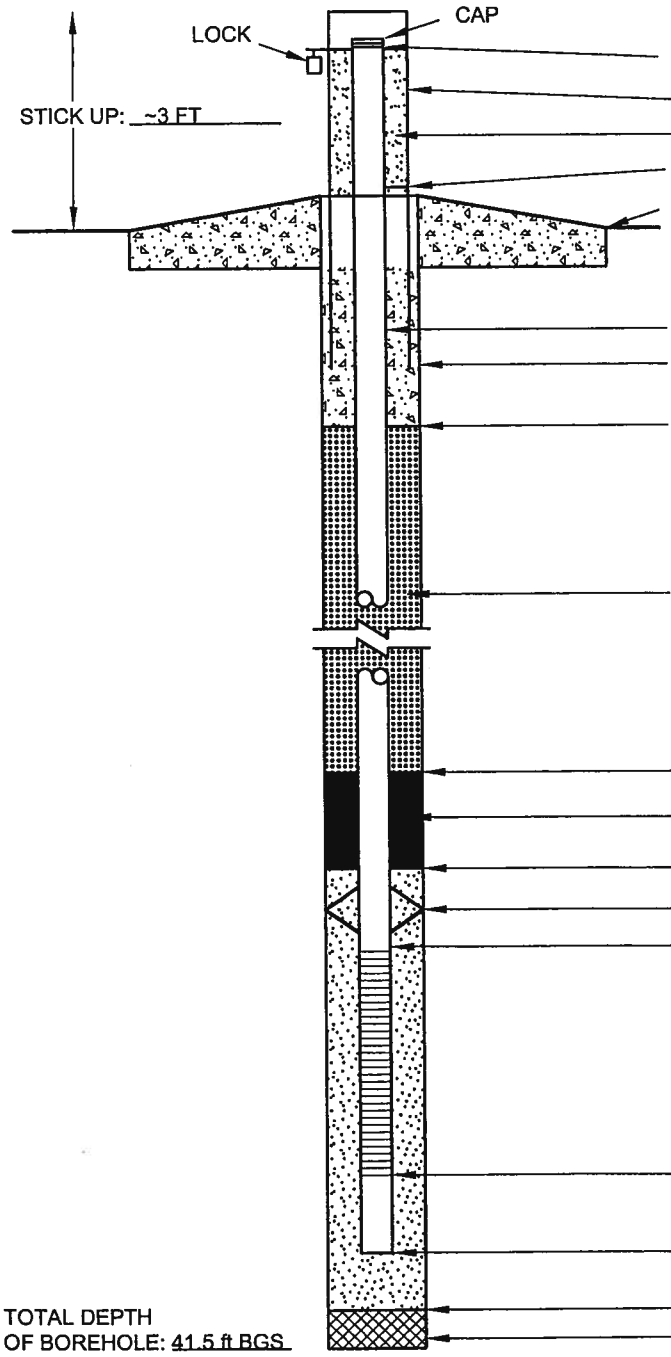
Golder Associates

GOLDER STL RECORD OF BOREHOLE MERAMEC FLY ASH BORING LOGS.GPJ GLDR_CO.GDT 2/26/08

APPENDIX B
PIEZOMETER CONSTRUCTION LOGS AND MDNR CERTIFICATION RECORDS

ABOVE GROUND PIEZOMETER CONSTRUCTION LOG PZ-1

PROJECT NAME: Ameren/Meramec Fly Ash		PROJECT NUMBER: 073-84012
SITE NAME: Meramec Plant		LOCATION: Meramec Plant Pond# 494, St. Louis, MO
CLIENT: AmerenUE		SURFACE ELEVATION: 413.25 feet MSL
GEOLOGIST: MRF	NORTHING:	EASTING:
DRILLER: Dale Mahurin	STATIC WATER LEVEL: 392.80 feet MSL	COMPLETION DATE: 8/14/2007
DRILLING COMPANY: Layne Western		DRILLING METHODS: 4.25-inch HSA



TOP OF CASING ELEVATION: 416.30 feet MSL

PROTECTIVE CASING (yes / no): Yes

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 413.25 feet MSL

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): ~6

CONCRETE SEAL DEPTH (ft. bgs): 3.0

TYPE AND AMOUNT OF ANNULAR SEAL: 2.0 bags Groutwell (50 lbs each)

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 23.0

TYPE AND AMOUNT OF BENTONITE SEAL: 2 bag Enviroplug (50 lbs each)

TOP OF SAND PACK DEPTH (ft. bgs): 28.0

CENTRALIZER (yes / no) - TYPE: N/A

TOP OF SCREEN DEPTH (ft. bgs): 31.6

TYPE OF SCREEN: Boart Longyear Machine Slotted (Schedule 40)

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: 20/40 Silica (NSF)

AMOUNT OF SAND: 7 bags (50 lbs each) Unimin Filter Silica

BOTTOM OF SCREEN DEPTH (ft. bgs): 41.2

BOTTOM OF WELL DEPTH (ft. bgs): 41.5

BOTTOM OF FILTER PACK (ft. bgs): 41.5

TYPE AND AMOUNT OF BACKFILL: N/A

ADDITIONAL NOTES: Water level at ~23.38 feet BGS on 8/14/2007 @ 1115

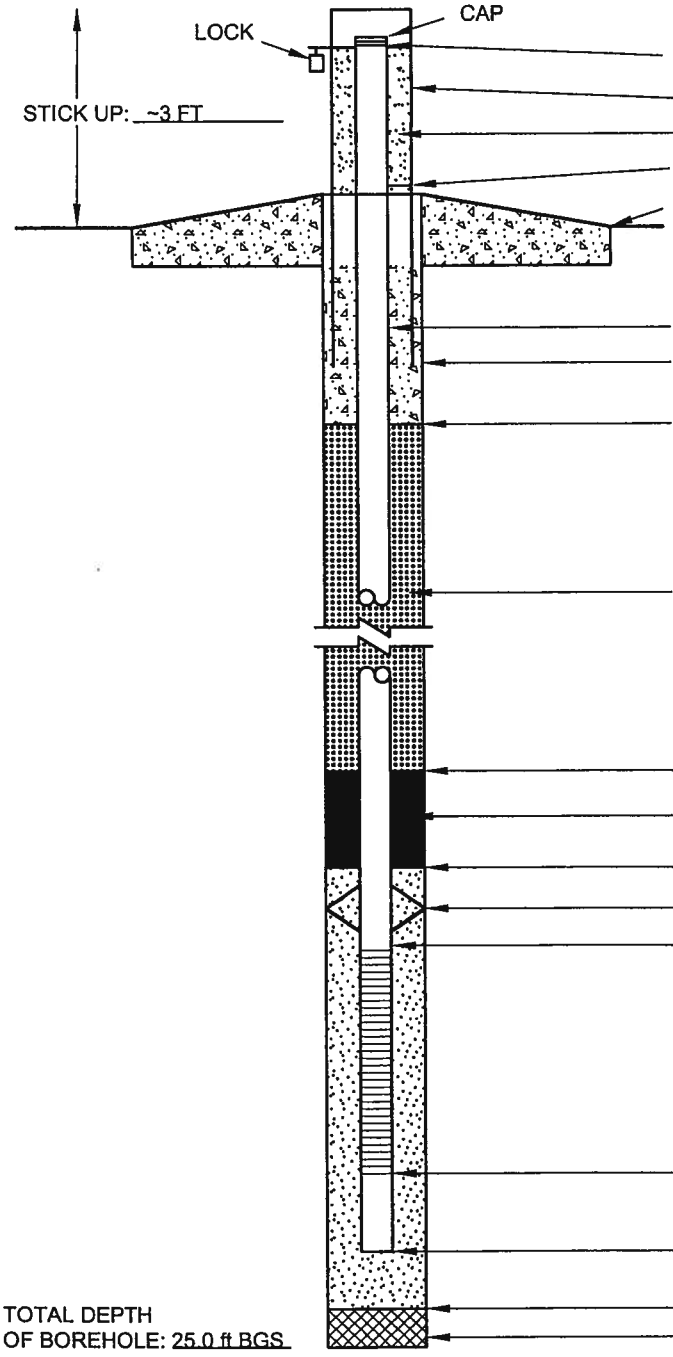
CHECKED BY: JCW

DATE CHECKED: 2/26/08

PREPARED BY: MRF

ABOVE GROUND PIEZOMETER CONSTRUCTION LOG PZ-2

PROJECT NAME: Ameren/Meramec Fly Ash		PROJECT NUMBER: 073-84012
SITE NAME: Meramec Plant		LOCATION: Meramec Plant Pond# 494, St. Louis, MO
CLIENT: AmerenUE		SURFACE ELEVATION: 416.20 feet MSL
GEOLOGIST: MRF	NORTHING:	EASTING:
DRILLER: Dale Mahurin	STATIC WATER LEVEL: 400.26 feet MSL	COMPLETION DATE: 8/15/2007
DRILLING COMPANY: Layne Western		DRILLING METHODS: 4.25-inch HSA



TOP OF CASING ELEVATION: 419.05 feet MSL

PROTECTIVE CASING (yes / no): Yes

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 416.20 feet MSL

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): ~6

CONCRETE SEAL DEPTH (ft. bgs): 3.0

TYPE AND AMOUNT OF ANNULAR SEAL: N/A

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 3.0

TYPE AND AMOUNT OF BENTONITE SEAL: 2 bag Enviroplug (50 lbs each)

TOP OF SAND PACK DEPTH (ft. bgs): 12.0

CENTRALIZER (yes / no) - TYPE: N/A

TOP OF SCREEN DEPTH (ft. bgs): 15.1

TYPE OF SCREEN: Boart Longyear Machine Slotted (Schedule 40)

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: 20/40 Silica (NSF)

AMOUNT OF SAND: 6 bags (50 lbs each) Unimin Filter Silica

BOTTOM OF SCREEN DEPTH (ft. bgs): 24.7

BOTTOM OF WELL DEPTH (ft. bgs): 25.0

BOTTOM OF FILTER PACK (ft. bgs): 25.0

TYPE AND AMOUNT OF BACKFILL: N/A

ADDITIONAL NOTES:

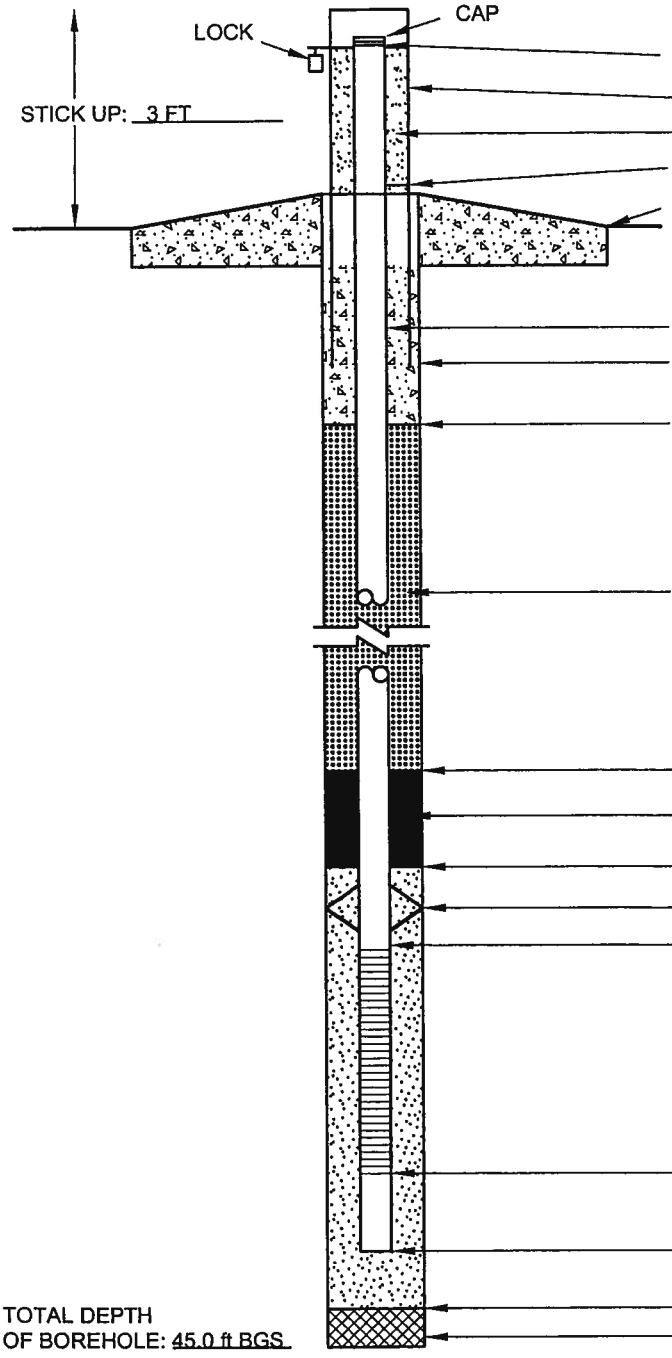
CHECKED BY: JCW

DATE CHECKED: 2/26/08

PREPARED BY: MRF

ABOVE GROUND PIEZOMETER CONSTRUCTION LOG PZ-3

PROJECT NAME: Ameren/Meramec Fly Ash		PROJECT NUMBER: 073-84012
SITE NAME: Meramec Plant		LOCATION: Meramec Plant Pond# 494, St. Louis, MO
CLIENT: AmerenUE		SURFACE ELEVATION: 414.30 feet MSL
GEOLOGIST: MNH	NORTHING:	EASTING:
DRILLER: Dale Mahurin	STATIC WATER LEVEL: 385.85 feet MSL	COMPLETION DATE: 8/14/2007
DRILLING COMPANY: Layne Western		DRILLING METHODS: 4.25-inch HSA



TOP OF CASING ELEVATION: 417.36 feet MSL

PROTECTIVE CASING (yes / no): Yes

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 414.30 feet MSL

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): ~6

CONCRETE SEAL DEPTH (ft. bgs): 3.0

TYPE AND AMOUNT OF ANNULAR SEAL: 2.0 bags Groutwell (50 lbs each)

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 28.0

TYPE AND AMOUNT OF BENTONITE SEAL: 2 bag Enviroplug (50 lbs each)

TOP OF SAND PACK DEPTH (ft. bgs): 32.5

CENTRALIZER (yes / no) - TYPE: N/A

TOP OF SCREEN DEPTH (ft. bgs): 34.7

TYPE OF SCREEN: Boart Longyear Machine Slotted (Schedule 40)

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: 20/40 Silica (NSF)

AMOUNT OF SAND: 7.5 bags (50 lbs each) Unimin Filter Silica

BOTTOM OF SCREEN DEPTH (ft. bgs): 44.6

BOTTOM OF WELL DEPTH (ft. bgs): 45.0

BOTTOM OF FILTER PACK (ft. bgs): 45.0

TYPE AND AMOUNT OF BACKFILL: N/A

ADDITIONAL NOTES: Water level ~37.3 feet BGS
Water level @ 32.55 feet BGS on 8/14/2007 @1055

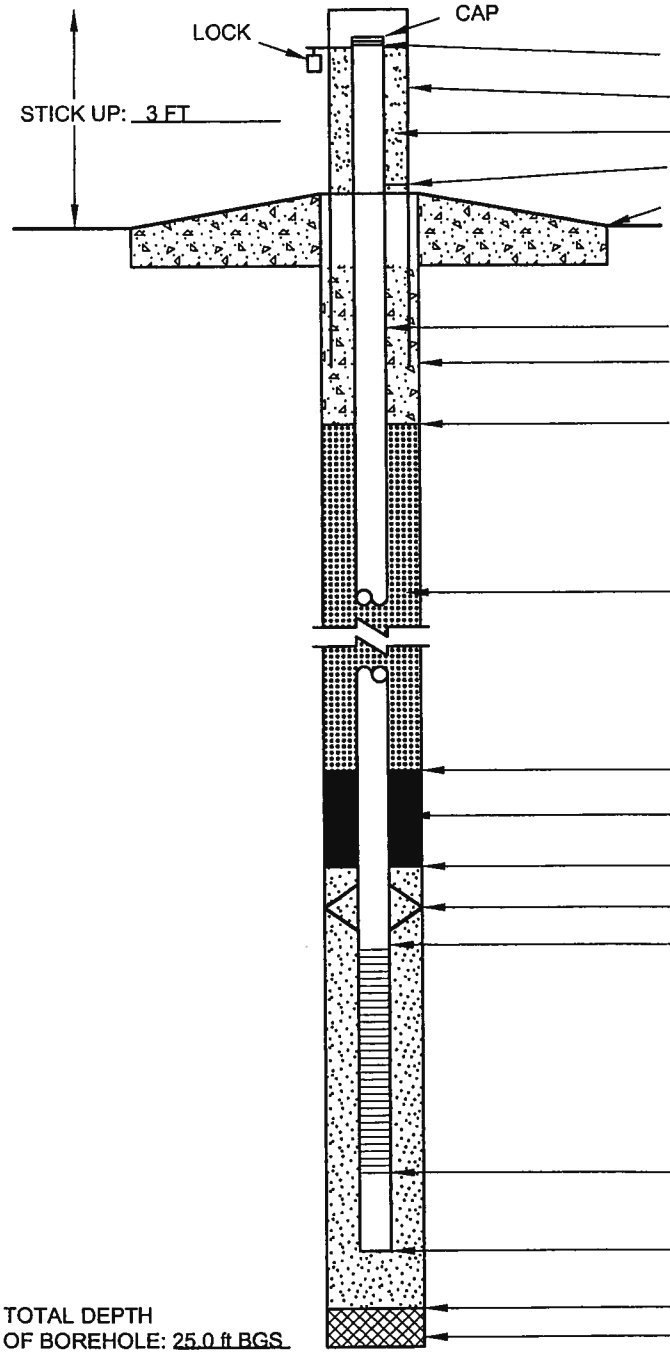
CHECKED BY: JCW

DATE CHECKED: 2/26/08

PREPARED BY: MNH

ABOVE GROUND PIEZOMETER CONSTRUCTION LOG PZ-4

PROJECT NAME: Ameren/Meramec Fly Ash		PROJECT NUMBER: 073-84012
SITE NAME: Meramec Plant		LOCATION: Meramec Plant Pond# 494, St. Louis, MO
CLIENT: AmerenUE		SURFACE ELEVATION: 414.57 feet MSL
GEOLOGIST: MRF	NORTHING:	EASTING:
DRILLER: Dale Mahurin	STATIC WATER LEVEL: 400.8 feet MSL	COMPLETION DATE: 8/15/2007
DRILLING COMPANY: Layne Western		DRILLING METHODS: 4.25-inch HSA



TOP OF CASING ELEVATION: 417.27 feet MSL

PROTECTIVE CASING (yes / no): Yes

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 414.57 feet MSL

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): ~6

CONCRETE SEAL DEPTH (ft. bgs): 3.0

TYPE AND AMOUNT OF ANNULAR SEAL: N/A

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 3.0

TYPE AND AMOUNT OF BENTONITE SEAL: 2 bag Enviroplug (50 lbs each)

TOP OF SAND PACK DEPTH (ft. bgs): 12.0

CENTRALIZER (yes / no) - TYPE: N/A

TOP OF SCREEN DEPTH (ft. bgs): 15.1

TYPE OF SCREEN: Boart Longyear Machine Slotted (Schedule 40)

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: 20/40 Silica (NSF)

AMOUNT OF SAND: 6 bags (50 lbs each) Unimin Filter Silica

BOTTOM OF SCREEN DEPTH (ft. bgs): 24.7

BOTTOM OF WELL DEPTH (ft. bgs): 25.0

BOTTOM OF FILTER PACK (ft. bgs): 25.0

TYPE AND AMOUNT OF BACKFILL: N/A

ADDITIONAL NOTES: Water level at ~23.38 feet BGS on 8/14/2007 @ 1115

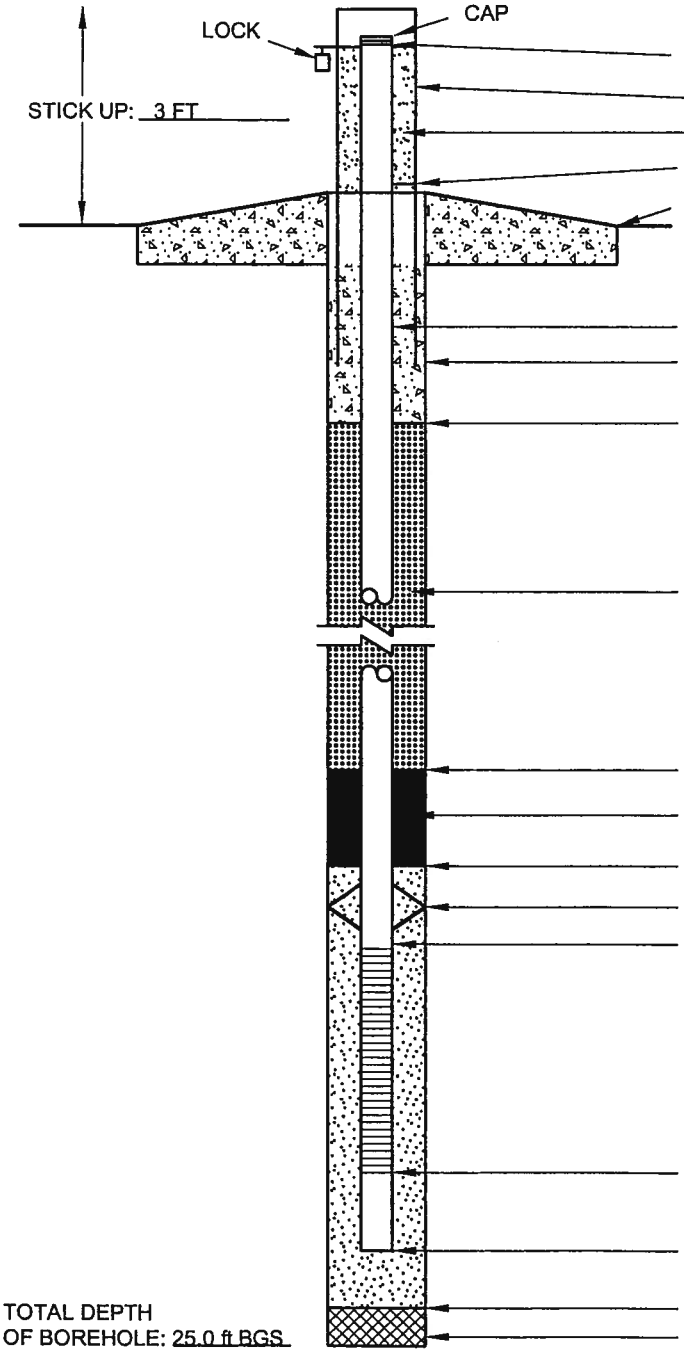
CHECKED BY: JCW

DATE CHECKED: 2/26/08

PREPARED BY: MRF

ABOVE GROUND PIEZOMETER CONSTRUCTION LOG PZ-5

PROJECT NAME: Ameren/Meramec Fly Ash		PROJECT NUMBER: 073-84012
SITE NAME: Meramec Plant		LOCATION: Meramec Plant Pond# 494, St. Louis, MO
CLIENT: AmerenUE		SURFACE ELEVATION: 420.32 feet MSL
GEOLOGIST: MRF	NORTHING:	EASTING:
DRILLER: Dale Mahurin	STATIC WATER LEVEL: 405.55 feet MSL	COMPLETION DATE: 8/15/2007
DRILLING COMPANY: Layne Western		DRILLING METHODS: 4.25-inch HSA



TOP OF CASING ELEVATION: 423.39 feet MSL

PROTECTIVE CASING (yes / no): Yes

PEA GRAVEL OR SAND

WEEP HOLE

GROUND SURFACE ELEVATION: 420.32 feet MSL

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): ~6

CONCRETE SEAL DEPTH (ft. bgs): 3.0

TYPE AND AMOUNT OF ANNULAR SEAL: N/A

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 3.0

TYPE AND AMOUNT OF BENTONITE SEAL: 2 bag Enviroplug (50 lbs each)

TOP OF SAND PACK DEPTH (ft. bgs): 12.0

CENTRALIZER (yes / no) - TYPE: N/A

TOP OF SCREEN DEPTH (ft. bgs): 15.1

TYPE OF SCREEN: Boart Longyear Machine Slotted (Schedule 40)

SCREEN SLOT SIZE (in.): 0.010

SIZE OF SAND PACK: 20/40 Silica (NSF)

AMOUNT OF SAND: 7 bags (50 lbs each) Unimin Filter Silica

BOTTOM OF SCREEN DEPTH (ft. bgs): 24.7

BOTTOM OF WELL DEPTH (ft. bgs): 25.0

BOTTOM OF FILTER PACK (ft. bgs): 25.0

TYPE AND AMOUNT OF BACKFILL: N/A

ADDITIONAL NOTES:

CHECKED BY: JCW

DATE CHECKED: 2/26/08

PREPARED BY: MRF

MISSOURI DEPARTMENT OF NATURAL RESOURCES
(573) 368-2165

MONITORING WELL CERTIFICATION RECORD

OFFICE USE ONLY	DATE RECEIVED
REF. NO. 383660	
C.R. NO.	CHECK NO.
STATE WELL NUMBER	REVENUE NO.
ENTERED Ph 1 Ph 2 Ph 3	APPROVED BY / ROUTE /

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

OWNER NAME: Ameren UE
WELL NUMBER: PZ-1
VARIANCE GRANTED BY THE D.N.R: ☐ NO ☐ YES, ATTACH A COPY OF THE VARIANCE

OWNER ADDRESS: 1901 Chouteau
CITY: St. Louis
STATE: MO
ZIP CODE: 63103

SITE NAME: Ameren UE - Meramec Plant
CONTACT NAME: Kevin Gerhardt

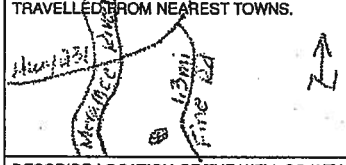
SITE ADDRESS: Fine Rd
CITY: St. Louis
STATE: MO
ZIP CODE: 63129
VARIANCE NUMBER:

PROPOSED USE OF WELL: ☐ GAS MONITORING WELL ☐ MONITORING ☐ EXTRACTION WELL ☒ PIEZOMETERS

TYPE OF POTENTIAL SITE: ☐ HAZARDOUS MATERIAL ☐ LANDFILL ☐ INITIAL SITE ASSESSMENT ☐ L.U.S.T. ☒ WATER LEVEL DRAWDOWN

MONITORING FOR: (CHECK ALL THAT APPLY) ☐ RADIONUCLIDES ☐ PETROLEUM PRODUCTS ONLY ☐ EXPLOSIVES ☐ METALS ☐ V.O.C. ☐ SVOCS ☐ PESTICIDES/HERBICIDES

SKETCH LOCATION OF WELL INCLUDING MILEAGE ON ALL ROADS TRAVELLED FROM NEAREST TOWNS.



LOCATION OF WELL: LAT. 38 · 34 · 14 · LONG. 90 · 30 · 42 ·
AREA: ELEV:
COUNTY: St. Louis
SMALLEST ____ 1/4 ____ 1/4 ____ 1/4 LARGEST
SEC. 3 TWN. 42 N. RNG. 6 E OR W

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE: Fly Ash Road
DRILLER NOTES:

TYPE OF SURFACE COMPLETION	LENGTH OF PROTECTIVE CASING	DIAMETER OF PROTECTIVE CASING	DIAMETER AND DEPTH OF THE HOLE PROTECTIVE CASING WAS PLACED	PROTECTIVE CASING MATERIAL	LOCKING CAP?
☒ ABOVE GROUND ☐ FLUSH MOUNT	5 FT.	4 x 4 IN.	12 IN. 3.5 FT.	☒ STEEL ☐ ALUMINUM ☐ PLASTIC	☒ YES ☐ NO

WEEP HOLE?	VENTED CAP?	LENGTH OF FLUSH MOUNT	DIAMETER OF FLUSH MOUNT	DIAMETER AND DEPTH OF THE HOLE FLUSH MOUNT WAS PLACED	SURFACE COMPLETION GROUT
☒ YES ☐ NO	☐ YES ☒ NO	N/A FT.	N/A IN.	N/A IN. FT.	☒ CONCRETE 34" x 34" ☐ OTHER

RISER PIPE DETAIL	LENGTH	DIAMETER	WEIGHT OR SDR#	DIAMETER OF DRILL HOLE	MATERIAL	BENTONITE SEAL	LENGTH OF SEAL	MATERIAL
	34 FT.	2 IN.	40	8 IN.	☐ STEEL ☒ THERMOPLASTIC (PVC) ☐ OTHER		3 FT.	☐ SLURRY ☐ PELLETS ☐ GRANULAR ☒ CHIPS

GLUED: ☐ YES ☒ NO

SECONDARY FILTER PACK: ☐ SATURATED ZONE ☐ UNSATURATED ZONE HYDRATED ☐ YES ☐ NO ☐ BOTH ZONES ☐ IF YES, HYDRATED ☐ YES ☐ NO N/A

PRIMARY FILTER PACK	LENGTH	DEPTH TO TOP OF PRIMARY FILTER PACK	SECONDARY FILTER PACK LENGTH
	12.5 FT.	29 FT.	N/A FT.

ANNULAR SEAL		LENGTH
	☒ BENTONITE SLURRY ☐ CEMENT/BENTONITE SLURRY ☐ NON SLURRY BENTONITE TYPE BAGS OF CEMENT USED ____ % OF BENTONITE USED ____ Grout Tube II WATER USED/BAG ____ GAL	23.5 FT.

WELL SCREEN	LENGTH	DIAMETER	DIAMETER OF DRILL HOLE	DEPTH TO TOP OF SCREEN	MATERIAL
	10 FT.	2 IN.	8 IN.	31.5 FT.	☐ STEEL ☒ THERMOPLASTIC (PVC) ☐ OTHER

DEPTH FROM	DEPTH TO	FORMATION DESCRIPTION
0	30	Silty gumbo clay
30	41.5	Gumbo clay w/ silt & sand layers

MULTIPLE CASED WELLS ☐ YES ☒ NO PUMP INSTALLED FOR REMEDIATION ☐ YES ☒ NO

SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE AND SIZE OF ALL CASING, HOLE DIAMETERS AND GROUT USED

TOTAL DEPTH: 41.5'

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER	STATIC WATER LEVEL	DATE WELL DRILLING WAS COMPLETED
	1351 WPM	25.5 FEET FROM MEASURING POINT	8-16-07

I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.

SIGNATURE (WELL DRILLER)	PERMIT NUMBER	DATE	SIGNATURE (PUMP INSTALLER)	PERMIT NUMBER	DATE
X [signature]	1358 WPM	8/31/07	X N/A	N/A	8/31/07

MO 780-1415 (2-06)

DISTRIBUTION: WHITE/DIVISION CANARY/CONTRACTOR PINK/OWNER
MAIL WHITE COPY TO: DEPARTMENT OF NATURAL RESOURCES, P.O. BOX 250, ROLLA, MO 65402
ENCLOSE $75 MONITORING WELL CERTIFICATION FEE WITHIN 60 DAYS AFTER WELL COMPLETION

MISSOURI DEPARTMENT OF NATURAL RESOURCES
(573) 368-2165

MONITORING WELL CERTIFICATION RECORD

OFFICE USE ONLY	DATE RECEIVED
REF. NO. 383861	
C.R. NO.	CHECK NO.
STATE WELL NUMBER	REVENUE NO.
ENTERED Ph 1 Ph 2 Ph 3	APPROVED BY / ROUTE /

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

OWNER NAME: Ameren UE
WELL NUMBER: PZ-2
VARIANCE GRANTED BY THE D.N.R: ☒ NO ☐ YES, ATTACH A COPY OF THE VARIANCE

OWNER ADDRESS: 1901 Chouteau
CITY: St. Louis
STATE: MO
ZIP CODE: 63103

SITE NAME: Ameren UE - Meramec Plant
CONTACT NAME: Kevin Gerhardt

SITE ADDRESS: Fine Rd
CITY: St. Louis
STATE: MO
ZIP CODE: 63129
VARIANCE NUMBER:

PROPOSED USE OF WELL: ☐ GAS MONITORING WELL ☐ MONITORING ☐ EXTRACTION WELL ☒ PIEZOMETERS

TYPE OF POTENTIAL SITE: ☐ HAZARDOUS MATERIAL ☐ LANDFILL ☐ INITIAL SITE ASSESSMENT ☐ L.U.S.T. ☒ WATER LEVEL DRAWDOWN

MONITORING FOR: (CHECK ALL THAT APPLY) ☐ RADIONUCLIDES ☐ PETROLEUM PRODUCTS ONLY ☐ EXPLOSIVES ☐ METALS ☐ V.O.C. ☐ SVOCS ☐ PESTICIDES/HERBICIDES

SKETCH LOCATION OF WELL INCLUDING MILEAGE ON ALL ROADS TRAVELLED FROM NEAREST TOWNS.

LOCATION OF WELL
LAT. 38 · 24 · 15 ·
LONG. 90 · 30 · 40 ·
AREA
ELEV
COUNTY: St. Louis
SMALLEST 1/4 LARGEST 1/4 1/4
SEC. 3 TWN. 42 N. RNG. 6 (E) OR W

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE: Fly Ash Pond

DRILLER NOTES:

TYPE OF SURFACE COMPLETION	LENGTH OF PROTECTIVE CASING	DIAMETER OF PROTECTIVE CASING	DIAMETER AND DEPTH OF THE HOLE PROTECTIVE CASING WAS PLACED	PROTECTIVE CASING MATERIAL	LOCKING CAP?
☒ ABOVE GROUND ☐ FLUSH MOUNT	5 FT.	4x4 IN.	12 IN. 3.5 FT.	☒ STEEL ☐ ALUMINUM ☐ PLASTIC	☒ YES ☐ NO

WEEP HOLE?	VENTED CAP?	LENGTH OF FLUSH MOUNT	DIAMETER OF FLUSH MOUNT	DIAMETER AND DEPTH OF THE HOLE FLUSH MOUNT WAS PLACED	SURFACE COMPLETION GROUT
☒ YES ☐ NO	☐ YES ☒ NO	N/A FT.	N/A IN.	N/A IN. FT.	☒ CONCRETE 34"x34" ☐ OTHER

RISER PIPE DETAIL	LENGTH	DIAMETER	WEIGHT OR SDR#	DIAMETER OF DRILL HOLE	MATERIAL	BENTONITE SEAL	LENGTH OF SEAL	MATERIAL
	17.5 FT.	2 IN.	40	8 IN.	☐ STEEL ☒ THERMOPLASTIC (PVC) ☐ OTHER		3 FT.	☐ SLURRY ☐ PELLETS ☐ GRANULAR ☒ CHIPS

GLUED: ☐ YES ☒ NO

SECONDARY FILTER PACK: ☐ SATURATED ZONE ☐ UNSATURATED ZONE HYDRATED ☐ YES ☐ NO ☐ BOTH ZONES IF YES, HYDRATED ☐ YES ☐ NO N/A

PRIMARY FILTER PACK	LENGTH	DEPTH TO TOP OF PRIMARY FILTER PACK	SECONDARY FILTER PACK LENGTH
	12 FT.	13 FT.	N/A FT.

ANNULAR SEAL			LENGTH
	☒ BENTONITE SLURRY ☐ NON SLURRY BENTONITE TYPE Grout Well	☐ CEMENT/BENTONITE SLURRY BAGS OF CEMENT USED % OF BENTONITE USED WATER USED/BAG GAL	7.5 FT.

WELL SCREEN	LENGTH	DIAMETER	DIAMETER OF DRILL HOLE	DEPTH TO TOP OF SCREEN	MATERIAL
	10 FT.	2 IN.	8 IN.	15 FT.	☐ STEEL ☒ THERMOPLASTIC (PVC) ☐ OTHER

DEPTH FROM	DEPTH TO	FORMATION DESCRIPTION
0	25	Fly Ash

MULTIPLE CASED WELLS ☐ YES ☒ NO PUMP INSTALLED FOR REMEDIATION ☐ YES ☒ NO

SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE AND SIZE OF ALL CASING, HOLE DIAMETERS AND GROUT USED

TOTAL DEPTH: 25'

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER	STATIC WATER LEVEL	DATE WELL DRILLING WAS COMPLETED
	1251 WPM	13.5' FEET FROM MEASURING POINT	8-16-07

I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.

SIGNATURE (WELL DRILLER)	PERMIT NUMBER	DATE	SIGNATURE (PUMP INSTALLER)	PERMIT NUMBER	DATE
X [signature]	1258 WPM	8/31/07	X N/A	N/A	N/A

MO 780-1415 (2-06)

DISTRIBUTION: WHITE/DIVISION CANARY/CONTRACTOR PINK/OWNER
MAIL WHITE COPY TO: DEPARTMENT OF NATURAL RESOURCES, P.O. BOX 250, ROLLA, MO 65402
ENCLOSE $75 MONITORING WELL CERTIFICATION FEE WITHIN 60 DAYS AFTER WELL COMPLETION

MISSOURI DEPARTMENT OF NATURAL RESOURCES
(573) 368-2165

MONITORING WELL CERTIFICATION RECORD

OFFICE USE ONLY	DATE RECEIVED
REF. NO. 383862	
C.R. NO.	CHECK NO.
STATE WELL NUMBER	REVENUE NO.
ENTERED Ph 1 Ph 2 Ph 3	APPROVED BY / ROUTE /

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

OWNER NAME	WELL NUMBER	VARIANCE GRANTED BY THE D.N.R
Ameren UE	PZ-3	☒ NO

OWNER ADDRESS	CITY	STATE	ZIP CODE
1901 Chouteau	St. Louis	MO	63103

☐ YES, ATTACH A COPY OF THE VARIANCE

SITE NAME	CONTACT NAME
Ameren UE - Meramec Plant	Kevin Gerhardt

SITE ADDRESS	CITY	STATE	ZIP CODE	VARIANCE NUMBER
Fine Rd	St. Louis	MO	63129	

PROPOSED USE OF WELL
☐ GAS MONITORING WELL ☐ MONITORING
☐ EXTRACTION WELL ☒ PIEZOMETERS

TYPE OF POTENTIAL SITE
☐ HAZARDOUS MATERIAL ☐ LANDFILL
☐ INITIAL SITE ASSESSMENT ☐ L.U.S.T.
☒ WATER LEVEL DRAWDOWN

MONITORING FOR: (CHECK ALL THAT APPLY)
☐ RADIONUCLIDES ☐ PETROLEUM PRODUCTS ONLY
☐ EXPLOSIVES ☐ METALS ☐ V.O.C.
☐ SVOCS ☐ PESTICIDES/HERBICIDES

SKETCH LOCATION OF WELL INCLUDING MILEAGE ON ALL ROADS TRAVELLED FROM NEAREST TOWNS.

LOCATION OF WELL
LAT. 38 · 34 · 35.
LONG. 90 · 20 · 41.

AREA ELEV
COUNTY St. Louis

SMALLEST LARGEST
SEC. 3 1/4 1/4 1/4 TWN. 42 N. RNG. 6 E OR W

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE: Fly Ash Pond

DRILLER NOTES:

TYPE OF SURFACE COMPLETION	LENGTH OF PROTECTIVE CASING	DIAMETER OF PROTECTIVE CASING	DIAMETER AND DEPTH OF THE HOLE PROTECTIVE CASING WAS PLACED	PROTECTIVE CASING MATERIAL	LOCKING CAP?
☒ ABOVE GROUND ☐ FLUSH MOUNT	5 FT.	4x4 IN.	12 IN. 21.5 FT.	☒ STEEL ☐ ALUMINUM ☐ PLASTIC	☒ YES ☐ NO

WEEP HOLE?	VENTED CAP?	LENGTH OF FLUSH MOUNT	DIAMETER OF FLUSH MOUNT	DIAMETER AND DEPTH OF THE HOLE FLUSH MOUNT WAS PLACED	SURFACE COMPLETION GROUT
☒ YES ☐ NO	☐ YES ☒ NO	n/a FT.	n/a IN.	n/a IN. FT.	☒ CONCRETE 24" x 24" ☐ OTHER

RISER PIPE DETAIL

LENGTH	DIAMETER	WEIGHT OR SDR#	DIAMETER OF DRILL HOLE	MATERIAL
37.5 FT.	2 IN.	40	8 IN.	☐ STEEL ☒ THERMOPLASTIC (PVC) ☐ OTHER

GLUED: ☐ YES ☒ NO

BENTONITE SEAL

LENGTH OF SEAL	MATERIAL
3 FT.	☐ SLURRY ☐ PELLETS ☐ GRANULAR ☒ CHIPS

SECONDARY FILTER PACK
☐ SATURATED ZONE ☐ UNSATURATED ZONE HYDRATED ☐ YES ☐ NO
BOTH ZONES ☐ IF YES, HYDRATED ☐ YES ☐ NO n/a

PRIMARY FILTER PACK

LENGTH	DEPTH TO TOP OF PRIMARY FILTER PACK	SECONDARY FILTER PACK LENGTH
12 FT.	33 FT.	n/a FT.

ANNULAR SEAL
☒ BENTONITE SLURRY ☐ CEMENT/BENTONITE SLURRY
☐ NON SLURRY BENTONITE TYPE BAGS OF CEMENT USED
% OF BENTONITE USED
Grout Well WATER USED/BAG GAL
LENGTH: 27.5 FT.

WELL SCREEN

LENGTH	DIAMETER	DIAMETER OF DRILL HOLE	DEPTH TO TOP OF SCREEN	MATERIAL
10 FT.	2 IN.	8 IN.	35 FT.	☐ STEEL ☒ THERMOPLASTIC (PVC) ☐ OTHER

DEPTH FROM	DEPTH TO	FORMATION DESCRIPTION
0	3	Silty clay
3	5	clay & gravel
5	41	Silty gumbo clay
41	45	Sand & gravel

MULTIPLE CASED WELLS ☐ YES ☒ NO PUMP INSTALLED FOR REMEDIATION ☐ YES ☒ NO

SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE AND SIZE OF ALL CASING, HOLE DIAMETERS AND GROUT USED

TOTAL DEPTH: 45'

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER	STATIC WATER LEVEL	DATE WELL DRILLING WAS COMPLETED
	1258 WPM	32.5 FEET FROM MEASURING POINT	8/16/07

I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.

SIGNATURE (WELL DRILLER)	PERMIT NUMBER	DATE	SIGNATURE (PUMP INSTALLER)	PERMIT NUMBER	DATE
X Tamara A. Mach-Dr.	1258 WPM	8/31/07	X n/a	n/a	n/a

MO 780-1415 (2-06)

DISTRIBUTION: WHITE/DIVISION CANARY/CONTRACTOR PINK/OWNER
MAIL WHITE COPY TO: DEPARTMENT OF NATURAL RESOURCES, P.O. BOX 250, ROLLA, MO 65402
ENCLOSE $75 MONITORING WELL CERTIFICATION FEE WITHIN 60 DAYS AFTER WELL COMPLETION

MISSOURI DEPARTMENT OF NATURAL RESOURCES
(573) 368-2165

MONITORING WELL CERTIFICATION RECORD

OFFICE USE ONLY	DATE RECEIVED
REF. NO. 383863	
C.R. NO.	CHECK NO.
STATE WELL NUMBER	REVENUE NO.
ENTERED Ph 1 Ph 2 Ph 3	APPROVED BY / ROUTE

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

OWNER NAME	WELL NUMBER	VARIANCE GRANTED BY THE D.N.R
Ameren UE	PZ-4	☒ NO ☐ YES, ATTACH A COPY OF THE VARIANCE

OWNER ADDRESS	CITY	STATE	ZIP CODE
1901 Chouteau	St. Louis	MO	63103

SITE NAME	CONTACT NAME
Ameren UE - Meramec Plant	Kevin Gerhardt

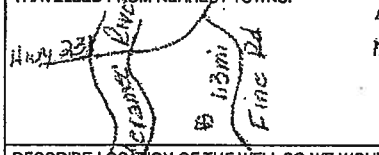
SITE ADDRESS	CITY	STATE	ZIP CODE	VARIANCE NUMBER
Fine Rd	St. Louis	MO	63129	

PROPOSED USE OF WELL
☐ GAS MONITORING WELL ☐ MONITORING
☐ EXTRACTION WELL ☒ PIEZOMETERS

TYPE OF POTENTIAL SITE
☐ HAZARDOUS MATERIAL ☐ LANDFILL
☐ INITIAL SITE ASSESSMENT ☐ L.U.S.T.
☒ WATER LEVEL DRAWDOWN

MONITORING FOR: (CHECK ALL THAT APPLY)
☐ RADIONUCLIDES ☐ PETROLEUM PRODUCTS ONLY
☐ EXPLOSIVES ☐ METALS ☐ V.O.C.
☐ SVOCS ☐ PESTICIDES/HERBICIDES

SKETCH LOCATION OF WELL INCLUDING MILEAGE ON ALL ROADS TRAVELLED FROM NEAREST TOWNS.



LOCATION OF WELL
LAT. 38 · 34 · 34 ·
LONG. 90 · 20 · 40 ·

AREA ELEV
COUNTY St. Louis

SMALLEST 1/4 LARGEST 1/4 1/4
SEC. 3 TWN. 42 N. RNG. 6 (E OR W)

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE: Fly Ash Pond

DRILLER NOTES:

TYPE OF SURFACE COMPLETION	LENGTH OF PROTECTIVE CASING	DIAMETER OF PROTECTIVE CASING	DIAMETER AND DEPTH OF THE HOLE PROTECTIVE CASING WAS PLACED	PROTECTIVE CASING MATERIAL	LOCKING CAP?
☒ ABOVE GROUND ☐ FLUSH MOUNT	5 FT.	4x4 IN.	12 IN. 2.5 FT.	☒ STEEL ☐ ALUMINUM ☐ PLASTIC	☒ YES ☐ NO

WEEP HOLE?	VENTED CAP?	LENGTH OF FLUSH MOUNT	DIAMETER OF FLUSH MOUNT	DIAMETER AND DEPTH OF THE HOLE FLUSH MOUNT WAS PLACED	SURFACE COMPLETION GROUT
☒ YES ☐ NO	☐ YES ☒ NO	n/a FT.	n/a IN.	n/a IN. FT.	☒ CONCRETE 24" x 24" ☐ OTHER

RISER PIPE DETAIL

LENGTH	DIAMETER	WEIGHT OR SDR#	DIAMETER OF DRILL HOLE	MATERIAL	GLUED
17.5 FT.	2 IN.	40	8 IN.	☐ STEEL ☒ THERMOPLASTIC (PVC) ☐ OTHER	☐ YES ☒ NO

BENTONITE SEAL

LENGTH OF SEAL	MATERIAL
3 FT.	☐ SLURRY ☐ PELLETS ☐ GRANULAR ☒ CHIPS

SECONDARY FILTER PACK
☐ SATURATED ZONE ☐ UNSATURATED ZONE HYDRATED ☐ YES ☐ NO
BOTH ZONES ☐ IF YES, HYDRATED ☐ YES ☐ NO n/a

PRIMARY FILTER PACK

LENGTH	DEPTH TO TOP OF PRIMARY FILTER PACK	SECONDARY FILTER PACK LENGTH
12 FT.	13 FT.	n/a FT.

ANNULAR SEAL
☒ BENTONITE SLURRY ☐ CEMENT/BENTONITE SLURRY
☐ NON SLURRY BENTONITE TYPE BAGS OF CEMENT USED _____
% OF BENTONITE USED _____
Grout Well WATER USED/BAG _____ GAL
LENGTH: 7.5 FT.

WELL SCREEN

LENGTH	DIAMETER	DIAMETER OF DRILL HOLE	DEPTH TO TOP OF SCREEN	MATERIAL
10 FT.	2 IN.	8 IN.	15 FT.	☐ STEEL ☒ THERMOPLASTIC (PVC) ☐ OTHER

DEPTH FROM	DEPTH TO	FORMATION DESCRIPTION
0	35	Fly Ash

MULTIPLE CASED WELLS ☐ YES ☒ NO PUMP INSTALLED FOR REMEDIATION ☐ YES ☒ NO

SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE AND SIZE OF ALL CASING, HOLE DIAMETERS AND GROUT USED

TOTAL DEPTH: 35'

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER	STATIC WATER LEVEL	DATE WELL DRILLING WAS COMPLETED
	1251 WPM	12.5 FEET FROM MEASURING POINT	2/16/07

I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.

SIGNATURE (WELL DRILLER)	PERMIT NUMBER	DATE	SIGNATURE (PUMP INSTALLER)	PERMIT NUMBER	DATE
X Tommy N. Mull Jr.	1258 WPM	3/31/07	X n/a	n/a	n/a

MO 780-1415 (2-06)

DISTRIBUTION: WHITE/DIVISION CANARY/CONTRACTOR PINK/OWNER
MAIL WHITE COPY TO: DEPARTMENT OF NATURAL RESOURCES, P.O. BOX 250, ROLLA, MO 65402
ENCLOSE $75 MONITORING WELL CERTIFICATION FEE WITHIN 60 DAYS AFTER WELL COMPLETION

MISSOURI DEPARTMENT OF NATURAL RESOURCES
(573) 368-2165

MONITORING WELL CERTIFICATION RECORD

OFFICE USE ONLY	DATE RECEIVED
REF. NO. 333864	
C.R. NO.	CHECK NO.
STATE WELL NUMBER	REVENUE NO.
ENTERED Ph 1 Ph 2 Ph 3	APPROVED BY / ROUTE 1 / 1

INFORMATION SUPPLIED BY PRIMARY CONTRACTOR OR DRILLING CONTRACTOR

OWNER NAME: Ameren UE
WELL NUMBER: P2-5
VARIANCE GRANTED BY THE D.N.R: [X] NO [ ] YES, ATTACH A COPY OF THE VARIANCE

OWNER ADDRESS: 1901 Chouteau
CITY: St. Louis
STATE: MO
ZIP CODE: 63103

SITE NAME: Ameren UE - Meramec Plant
CONTACT NAME: Kevin Gerhardt

SITE ADDRESS: Fine Rd
CITY: St. Louis
STATE: MO
ZIP CODE: 63129
VARIANCE NUMBER:

PROPOSED USE OF WELL: [ ] GAS MONITORING WELL [ ] MONITORING [ ] EXTRACTION WELL [X] PIEZOMETERS

TYPE OF POTENTIAL SITE: [ ] HAZARDOUS MATERIAL [ ] LANDFILL [ ] INITIAL SITE ASSESSMENT [ ] L.U.S.T. [X] WATER LEVEL DRAWDOWN

MONITORING FOR: (CHECK ALL THAT APPLY) [ ] RADIONUCLIDES [ ] PETROLEUM PRODUCTS ONLY [ ] EXPLOSIVES [ ] METALS [ ] V.O.C. [ ] SVOCS [ ] PESTICIDES/HERBICIDES

SKETCH LOCATION OF WELL INCLUDING MILEAGE ON ALL ROADS TRAVELLED FROM NEAREST TOWNS.

LOCATION OF WELL
LAT. 38 · 24 · 31 ·
LONG. 90 · 30 · 33 ·
AREA
ELEV
COUNTY St. Louis

SMALLEST 1/4 LARGEST 1/4 1/4
SEC. 3 TWN. 43 N. RNG. 6 E OR W

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE: Fly Ash Road

DRILLER NOTES:

TYPE OF SURFACE COMPLETION: [X] ABOVE GROUND [ ] FLUSH MOUNT
LENGTH OF PROTECTIVE CASING: 5 FT.
DIAMETER OF PROTECTIVE CASING: 4x4 IN.
DIAMETER AND DEPTH OF THE HOLE PROTECTIVE CASING WAS PLACED: 12 IN. 2.5 FT.
PROTECTIVE CASING MATERIAL: [X] STEEL [ ] ALUMINUM [ ] PLASTIC
LOCKING CAP? [X] YES [ ] NO

WEEP HOLE? [X] YES [ ] NO
VENTED CAP? [ ] YES [X] NO
LENGTH OF FLUSH MOUNT: n/a FT.
DIAMETER OF FLUSH MOUNT: n/a IN.
DIAMETER AND DEPTH OF THE HOLE FLUSH MOUNT WAS PLACED: n/a IN. FT.
SURFACE COMPLETION GROUT: [X] CONCRETE 24" x 24" [ ] OTHER

RISER PIPE DETAIL: LENGTH 17.5 FT. DIAMETER 2 IN. WEIGHT OR SDR# 40 DIAMETER OF DRILL HOLE 8 IN. MATERIAL [ ] STEEL [X] THERMOPLASTIC (PVC) [ ] OTHER
BENTONITE SEAL: LENGTH OF SEAL 3 FT. MATERIAL [ ] SLURRY [ ] PELLETS [ ] GRANULAR [X] CHIPS
GLUED [ ] YES [X] NO

SECONDARY FILTER PACK: [ ] SATURATED ZONE [ ] UNSATURATED ZONE HYDRATED [ ] YES [ ] NO [ ] BOTH ZONES IF YES, HYDRATED [ ] YES [ ] NO n/a

PRIMARY FILTER PACK: LENGTH 12 FT. DEPTH TO TOP OF PRIMARY FILTER PACK 13 FT. SECONDARY FILTER PACK LENGTH n/a FT.

ANNULAR SEAL: [X] BENTONITE SLURRY [ ] CEMENT/BENTONITE SLURRY [ ] NON SLURRY BENTONITE TYPE BAGS OF CEMENT USED ____ % OF BENTONITE USED ____ WATER USED/BAG ____ GAL
Grout Well
LENGTH 7.5 FT.

WELL SCREEN: LENGTH 10 FT. DIAMETER 2 IN. DIAMETER OF DRILL HOLE 8 IN. DEPTH TO TOP OF SCREEN 15 FT. MATERIAL [ ] STEEL [X] THERMOPLASTIC (PVC) [ ] OTHER

DEPTH FROM	DEPTH TO	FORMATION DESCRIPTION
0	25	Fly Ash

MULTIPLE CASED WELLS [ ] YES [X] NO PUMP INSTALLED FOR REMEDIATION [ ] YES [X] NO
SUBMIT ADDITIONAL AS BUILT DIAGRAMS SHOWING WELL CONSTRUCTION DETAILS INCLUDING TYPE AND SIZE OF ALL CASING, HOLE DIAMETERS AND GROUT USED

TOTAL DEPTH: 35'

SIGNATURE (PRIMARY CONTRACTOR)
PERMIT NUMBER: 1251 WPM
STATIC WATER LEVEL: 12.5' FEET FROM MEASURING POINT
DATE WELL DRILLING WAS COMPLETED: 8/16/07

I HEREBY CERTIFY THAT THE MONITORING WELL HEREIN DESCRIBED WAS CONSTRUCTED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE CONSTRUCTION OF MONITORING WELLS.

SIGNATURE (WELL DRILLER)	PERMIT NUMBER	DATE	SIGNATURE (PUMP INSTALLER)	PERMIT NUMBER	DATE
X [signature]	1258 WPM	8/31/07	X n/a	n/a	n/a

MO 780-1415 (2-06)

DISTRIBUTION: WHITE/DIVISION CANARY/CONTRACTOR PINK/OWNER
MAIL WHITE COPY TO: DEPARTMENT OF NATURAL RESOURCES, P.O. BOX 250, ROLLA, MO 65402
ENCLOSE $75 MONITORING WELL CERTIFICATION FEE WITHIN 60 DAYS AFTER WELL COMPLETION

APPENDIX C
GEOTECHNICAL ANALYSIS FORMS

ATTERBERG LIMITS

ASTM D 4318

PROJECT NAME:	AMEREN / MERAMEC
PROJECT NUMBER:	073-84012
SAMPLE ID:	PZ-1 S-002
SAMPLE TYPE:	BAG

SAMPLE DEPTH: 9 - 10.5'

SAMPLE PREPARATION

Wet or Dry: Wet

Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

Number of Blows		
Weight of Wet Soil & Tare (gm)	26.86	26.96
Weight of Dry Soil & Tare (gm)	25.07	25.14
Weight of Tare (gm)	16.69	16.66
Weight of Water (gm)	1.79	1.82
Weight of Dry Soil (gm)	8.38	8.48
Water Content %	21.36	21.46

LIQUID LIMIT DETERMINATION

	28	28
	55.37	55.55
	45.51	45.78
	20.23	20.69
	9.86	9.77
	25.28	25.09
	39.00	38.94

	TRIAL 1	TRIAL 2
BLOWS:	28	28
K VALUE:	1.014	1.014

NATURAL MOISTURE

69.92
59.62
19.49
10.30
40.13
25.67

PLASTIC LIMIT (PL): 21

LIQUID LIMIT (LL): 40

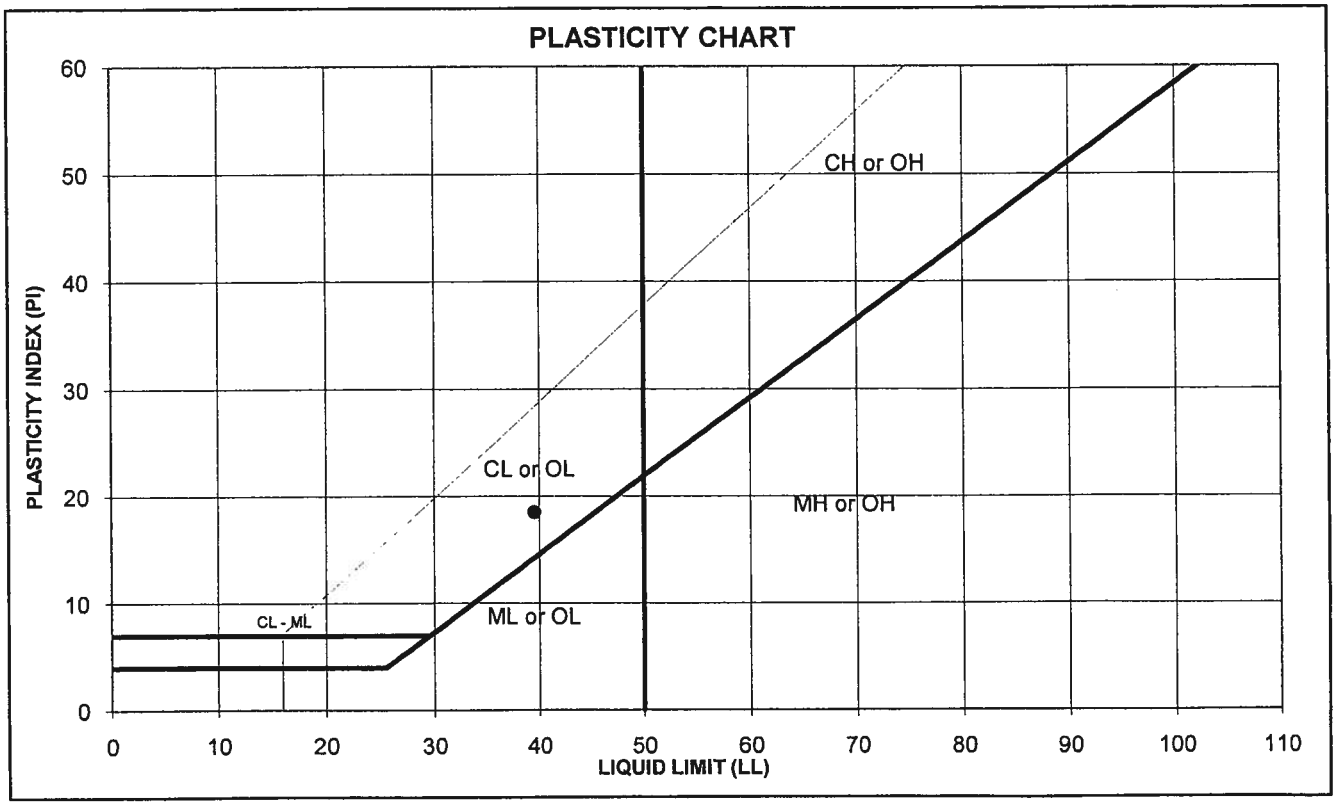
PLASTICITY INDEX (PI): 19

LIQUIDITY INDEX (LI): 0.23

NOTE:

DESCRIPTION: Grayish brown, silty CLAY, trace sand

USCS: CL



TECH	FC
DATE	20-Aug-07
CHECK	PCM
REVIEW	MNH

ATTERBERG LIMITS

ASTM D 4318

PROJECT NAME:	AMEREN / MERAMEC
PROJECT NUMBER:	073-84012
SAMPLE ID:	PZ-1 S-003
SAMPLE TYPE:	SHELBY TUBE

SAMPLE DEPTH: 14.5 - 16.5'

SAMPLE PREPARATION

Wet or Dry: Wet

Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

Number of Blows		
Weight of Wet Soil & Tare (gm)	26.95	27.49
Weight of Dry Soil & Tare (gm)	24.99	25.50
Weight of Tare (gm)	16.62	17.02
Weight of Water (gm)	1.96	1.99
Weight of Dry Soil (gm)	8.37	8.48
Water Content %	23.42	23.47

LIQUID LIMIT DETERMINATION

23	23	
54.47	54.40	
41.95	41.88	
21.50	21.44	
12.52	12.52	
20.45	20.44	
61.22	61.25	

	TRIAL 1	TRIAL 2
BLOWS:	23	23
K VALUE:	0.99	0.99

NATURAL MOISTURE

104.39
83.57
19.53
20.82
64.04
32.51

PLASTIC LIMIT (PL): 23

LIQUID LIMIT (LL): 61

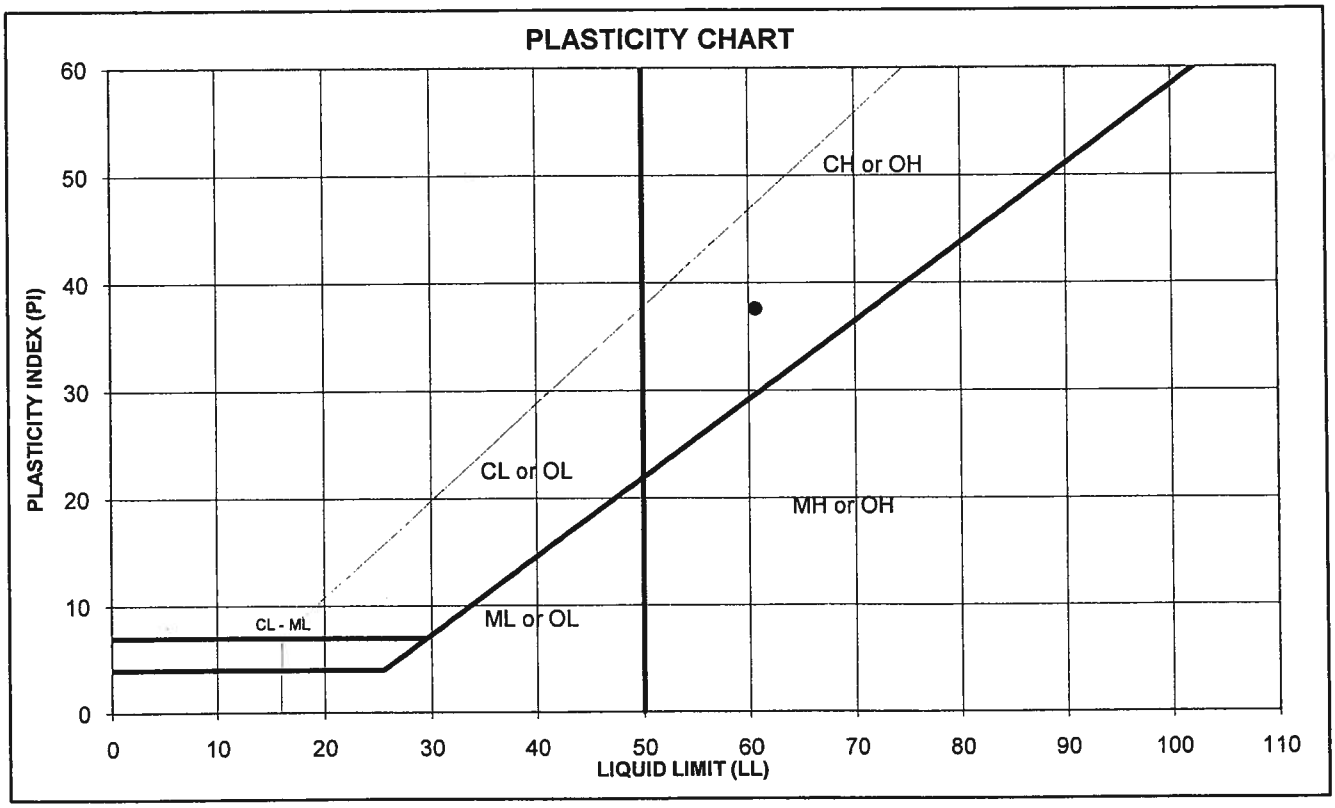
PLASTICITY INDEX (PI): 38

LIQUIDITY INDEX (LI): 0.24

NOTE:

DESCRIPTION: Brown & Gray, CLAY, some sand pockets

USCS: CH



TECH	FC
DATE	21-Aug-07
CHECK	PCM
REVIEW	MNH

ATTERBERG LIMITS

ASTM D 4318

PROJECT NAME:	AMEREN / MERAMEC
PROJECT NUMBER:	073-84012
SAMPLE ID:	PZ-1 S-007
SAMPLE TYPE:	BAG

SAMPLE DEPTH: 29.5 - 31'

SAMPLE PREPARATION

Wet or Dry: Wet

Minus #40 Sieve: Yes

	PLASTIC LIMIT DETERMINATION		LIQUID LIMIT DETERMINATION				NATURAL MOISTURE
Number of Blows			30	30			
Weight of Wet Soil & Tare (gm)	26.85	26.70	50.91	51.66			68.72
Weight of Dry Soil & Tare (gm)	24.86	24.75	39.01	39.78			56.83
Weight of Tare (gm)	16.69	16.59	20.87	21.64	BLOWS:	30	19.42
Weight of Water (gm)	1.99	1.95	11.90	11.88			11.89
Weight of Dry Soil (gm)	8.17	8.16	18.14	18.14	K VALUE:	1.022	37.41
Water Content %	24.36	23.90	65.60	65.49			31.78

	TRIAL 1	TRIAL 2
BLOWS:	30	30
K VALUE:	1.022	1.022

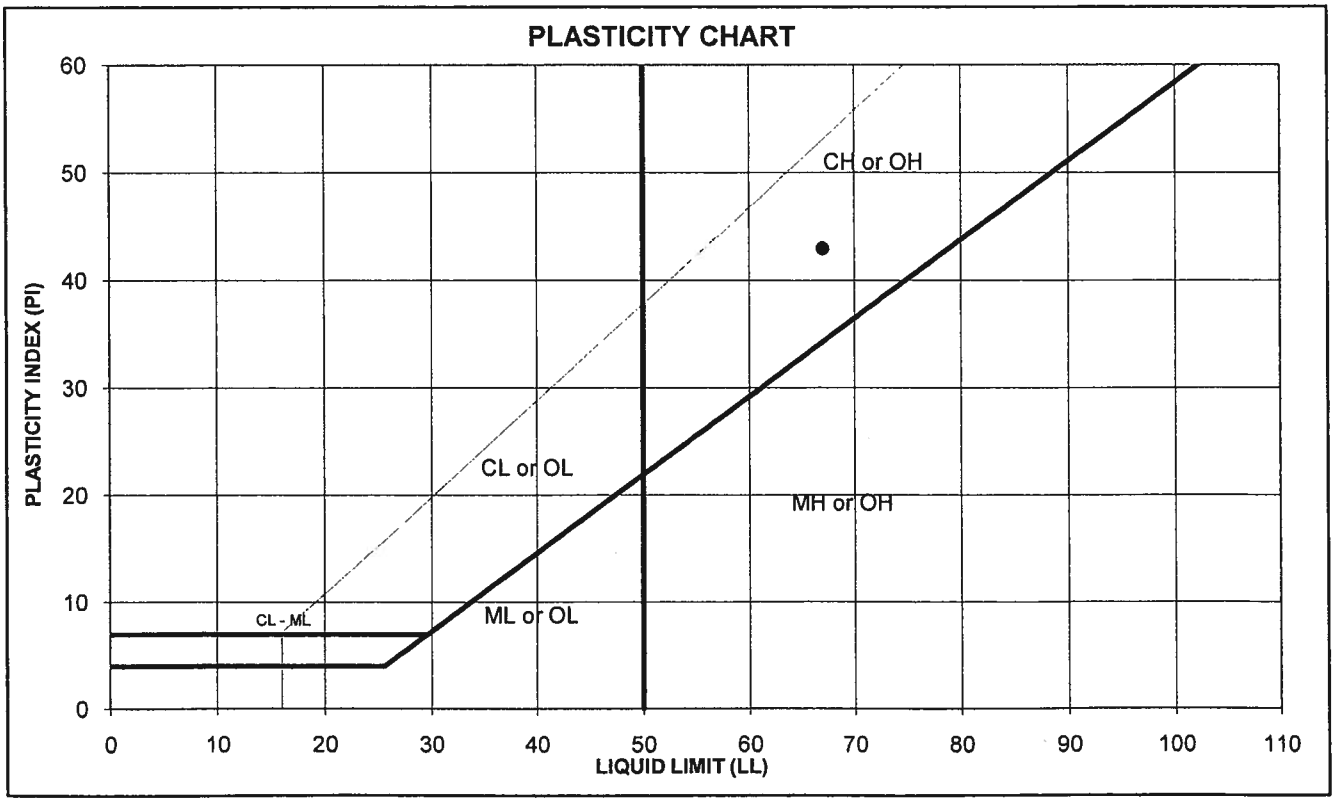
PLASTIC LIMIT (PL)	LIQUID LIMIT (LL)
24	67

PLASTICITY INDEX (PI)	LIQUIDITY INDEX (LI)
43	0.18

NOTE:

DESCRIPTION: Brown, CLAY, some silt

USCS: CH



TECH	FC
DATE	20-Aug-07
CHECK	PCM
REVIEW	MNH

ATTERBERG LIMITS

ASTM D 4318

PROJECT NAME:	AMEREN / MERAMEC
PROJECT NUMBER:	073-84012
SAMPLE ID:	PZ-3 S-002
SAMPLE TYPE:	BAG

SAMPLE DEPTH: 9 - 10.5'

SAMPLE PREPARATION

Wet or Dry: Wet

Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

Number of Blows		
Weight of Wet Soil & Tare (gm)	31.68	31.89
Weight of Dry Soil & Tare (gm)	29.66	29.94
Weight of Tare (gm)	21.41	21.83
Weight of Water (gm)	2.02	1.95
Weight of Dry Soil (gm)	8.25	8.11
Water Content %	24.48	24.04

LIQUID LIMIT DETERMINATION

	30	30
Weight of Wet Soil & Tare (gm)	46.05	45.87
Weight of Dry Soil & Tare (gm)	34.52	34.31
Weight of Tare (gm)	16.91	16.68
Weight of Water (gm)	11.53	11.56
Weight of Dry Soil (gm)	17.61	17.63
Water Content %	65.47	65.57

	TRIAL 1	TRIAL 2
BLOWS:	30	30
K VALUE:	1.022	1.022

NATURAL MOISTURE

53.83
43.90
18.97
9.93
24.93
39.83

PLASTIC LIMIT (PL): 24

LIQUID LIMIT (LL): 67

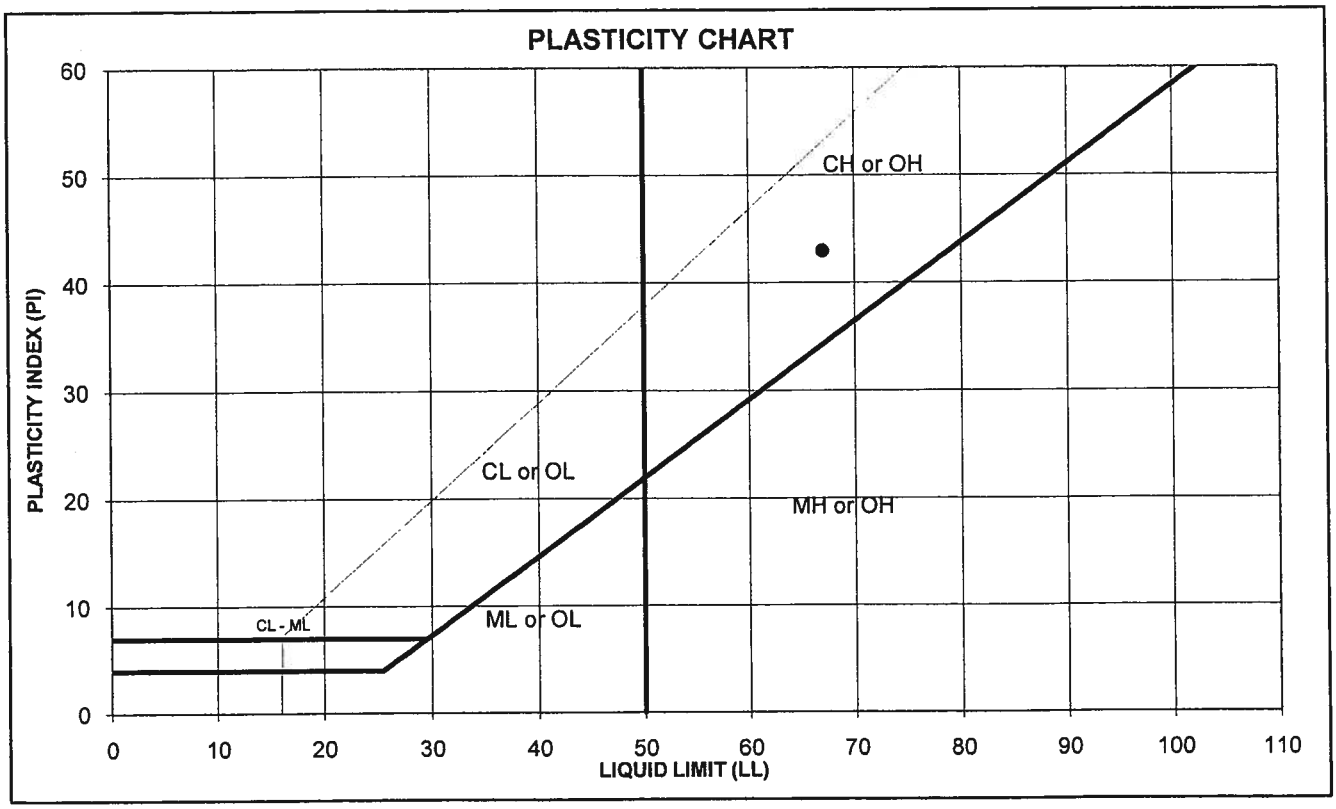
PLASTICITY INDEX (PI): 43

LIQUIDITY INDEX (LI): 0.36

NOTE:

DESCRIPTION: Brown, CLAY, some silt

USCS: CH



TECH	FC
DATE	20-Aug-07
CHECK	PCM
REVIEW	MNH

ATTERBERG LIMITS

ASTM D 4318

PROJECT NAME:	**AMEREN / MERAMEC**		
PROJECT NUMBER:	**073-84012**		
SAMPLE ID:	**PZ-3 S-003**	**SAMPLE DEPTH:**	**14 - 16'**
SAMPLE TYPE:	**SHELBY TUBE**		

SAMPLE PREPARATION

Wet or Dry: Wet

Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

Number of Blows		
Weight of Wet Soil & Tare (gm)	27.16	27.25
Weight of Dry Soil & Tare (gm)	24.98	25.00
Weight of Tare (gm)	16.74	16.72
Weight of Water (gm)	2.18	2.25
Weight of Dry Soil (gm)	8.24	8.28
Water Content %	26.46	27.17

LIQUID LIMIT DETERMINATION

20	20	
53.89	54.34	
39.61	40.15	
21.42	22.11	
14.28	14.19	
18.19	18.04	
78.50	78.66	

	TRIAL 1	TRIAL 2
BLOWS:	20	20
K VALUE:	0.974	0.974

NATURAL MOISTURE

89.23
70.11
19.50
19.12
50.61
37.78

PLASTIC LIMIT (PL): 27

LIQUID LIMIT (LL): 77

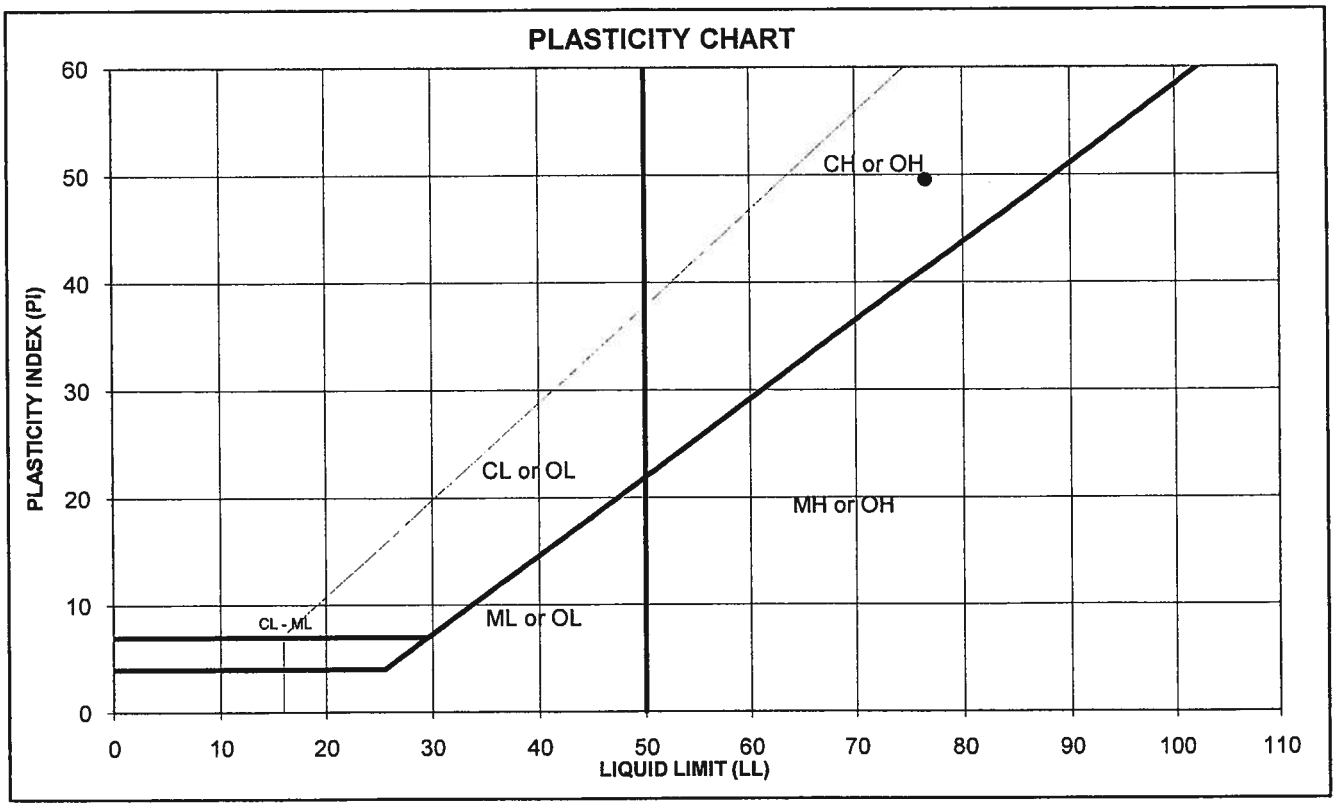
PLASTICITY INDEX (PI): 50

LIQUIDITY INDEX (LI): 0.22

NOTE:

DESCRIPTION: Brown & Gray, CLAY, trace of sand

USCS: CH



TECH	FC
DATE	21-Aug-07
CHECK	PCM
REVIEW	MNH

ATTERBERG LIMITS

ASTM D 4318

PROJECT NAME:	**AMEREN / MERAMEC**		
PROJECT NUMBER:	**073-84012**		
SAMPLE ID:	**PZ-3 S-007**	**SAMPLE DEPTH:**	**29 - 30.5'**
SAMPLE TYPE:	**BAG**		

SAMPLE PREPARATION

Wet or Dry: Wet

Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

Number of Blows		
Weight of Wet Soil & Tare (gm)	27.46	26.96
Weight of Dry Soil & Tare (gm)	25.60	25.12
Weight of Tare (gm)	17.22	16.78
Weight of Water (gm)	1.86	1.84
Weight of Dry Soil (gm)	8.38	8.34
Water Content %	22.20	22.06

LIQUID LIMIT DETERMINATION

	20	20
	51.97	52.54
	40.32	40.97
	20.91	21.75
	11.65	11.57
	19.41	19.22
	60.02	60.20

	TRIAL 1	TRIAL 2
BLOWS:	20	20
K VALUE:	0.974	0.974

NATURAL MOISTURE

71.27
56.91
19.59
14.36
37.32
38.48

PLASTIC LIMIT (PL): 22

LIQUID LIMIT (LL): 59

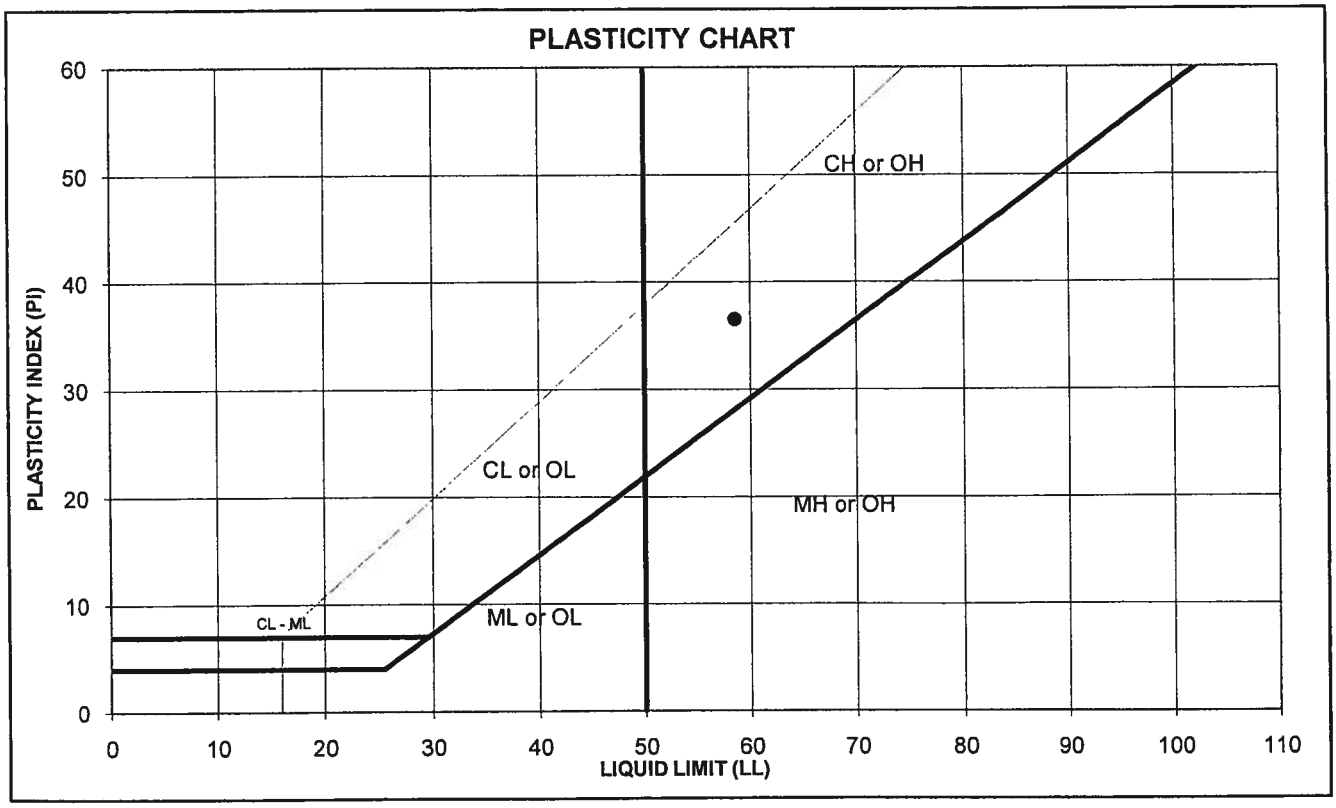
PLASTICITY INDEX (PI): 37

LIQUIDITY INDEX (LI): 0.45

NOTE:

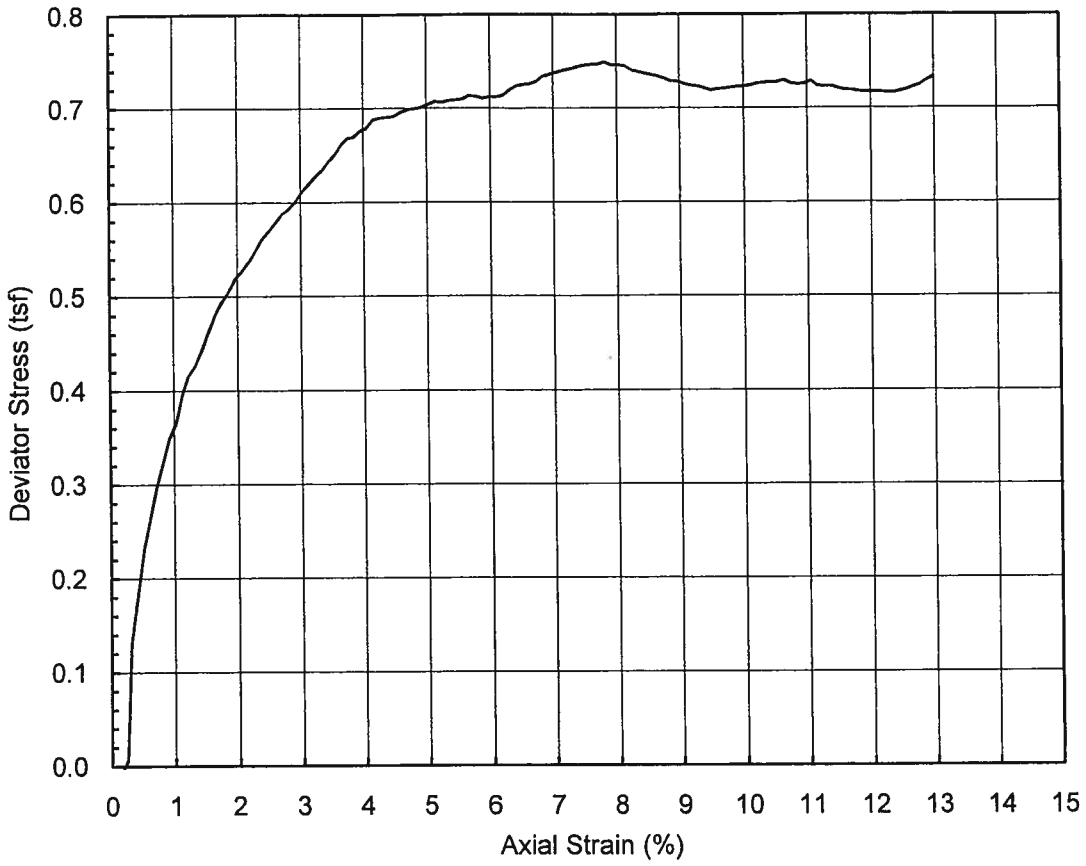
DESCRIPTION: Brown, CLAY, some silt

USCS: CH



TECH	FC
DATE	20-Aug-07
CHECK	PCM
REVIEW	MNH

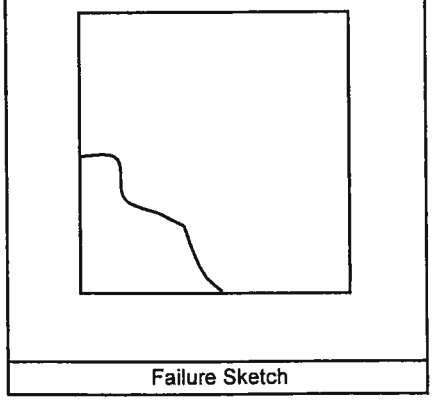
UNCONSOLIDATED / UNDRAINED COMPRESSIVE STRENGTH
ASTM D 2850



Specimen Description	Brown and Gray Clay with some Sand						
LL	61	PI	38	LI	0.4	USCS	CH

Depth (ft)	14.50	Confining Pressure (psi)	13.0
Specimen Height (inch)	5.915	Strain Rate (%/min)	1.0
Specimen Diameter (inch)	2.836	Peak Deviator Stress (tsf)	0.75
Initial Specimen Weight (g)	1127.3	Axial Strain at Peak Stress (%)	7.8
Moist Unit Weight (pcf)	115.0		
Initial Water Content (%)	37.1		
Initial Dry Unit Weight (pcf)	83.8		

Project Title	Ameren / Meramec
Project Number	073-84012
Sample Type	Shelby Tube
Sample ID	PZ-1 S-3
Comments	

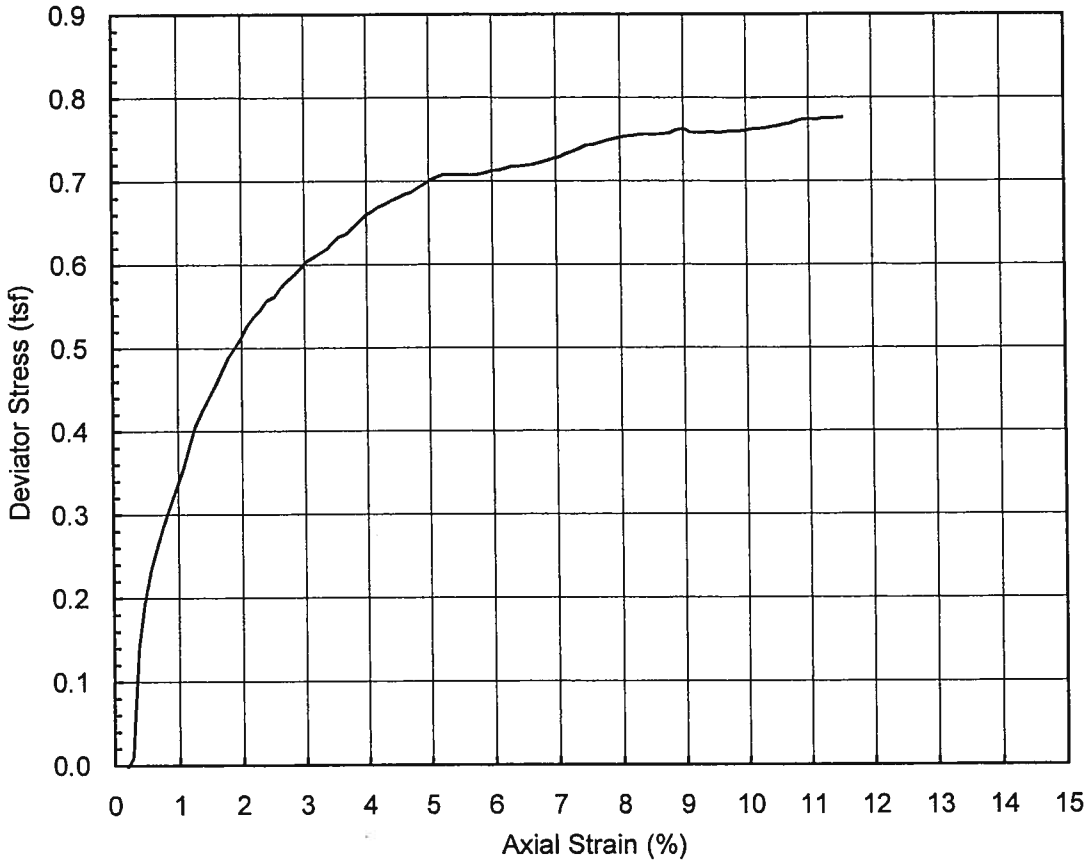


Failure Sketch

Performed by	PN
Date	20-Aug-07
Check	PCM
Review	MNH

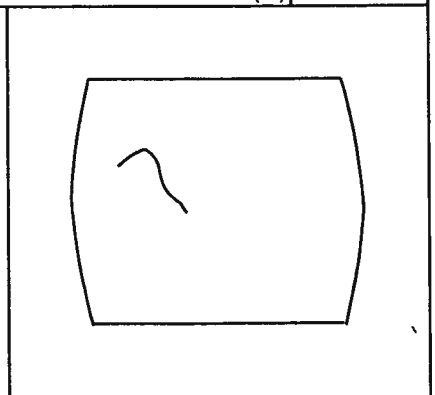
Golder Associates

UNCONSOLIDATED / UNDRAINED COMPRESSIVE STRENGTH
ASTM D 2850



Specimen Description	Brown & Gray Clay with trace of sand						
LL	77	PI	50	LI	0.2	USCS	CH

Depth (ft)	14.00	Confining Pressure (psi)	13.0
Specimen Height (inch)	5.950	Strain Rate (%/min)	1.0
Specimen Diameter (inch)	2.853	Peak Deviator Stress (tsf)	0.78
Initial Specimen Weight (g)	1118.3	Axial Strain at Peak Stress (%)	11.5
Moist Unit Weight (pcf)	112.0		
Initial Water Content (%)	37.9		
Initial Dry Unit Weight (pcf)	81.2		



Failure Sketch

Project Title	Ameren / Meramec
Project Number	073-84012
Sample Type	Shelby Tube
Sample ID	PZ-3 S-3
Comments	

Golder Associates

Performed by	PN
Date	20-Aug-07
Check	PCM
Review	MNH

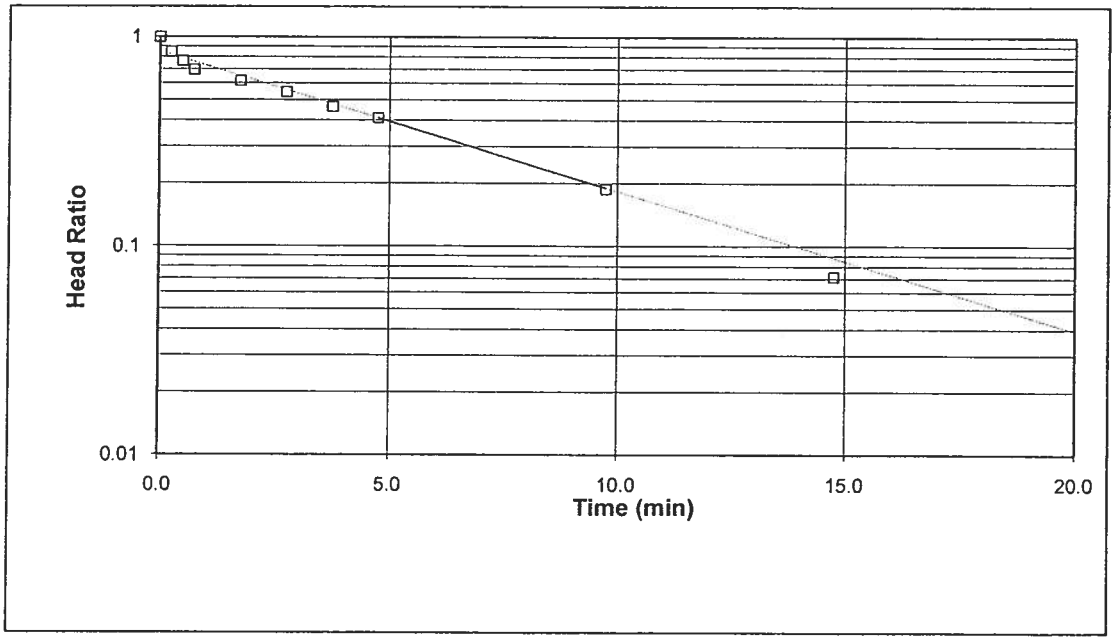
APPENDIX D
SLUG TESTING ANALYSIS FORMS

HVORSLEV SLUG TEST ANALYSIS
RISING HEAD TEST PZ-1

$$K = \frac{r_c^2}{2L_e} \ln\frac{L_e}{R_e}\left[\frac{\ln\left(\frac{h_1}{h_2}\right)}{(t2 - t1)}\right] 30.48$$

where:
r_c = casing radius (feet)
R_e = filter pack radius (feet)
L_e = length of screened interval (feet)
t = time (seconds)
h_t = head at time t (feet)

INPUT PARAMETERS		RESULTS		
r_c =	0.08			
R_e =	0.25			
L_e =	9.6	K=	1.03E-04	cm/sec
t_1 =	4.75	K=	2.92E-01	ft/day
t_2 =	9.75			
h_1/h_0 =	0.41			
h_2/h_0 =	0.19			



Project Name: Meramec Fly Ash
Project No.: 073-84012
Test Date: 08/17/07

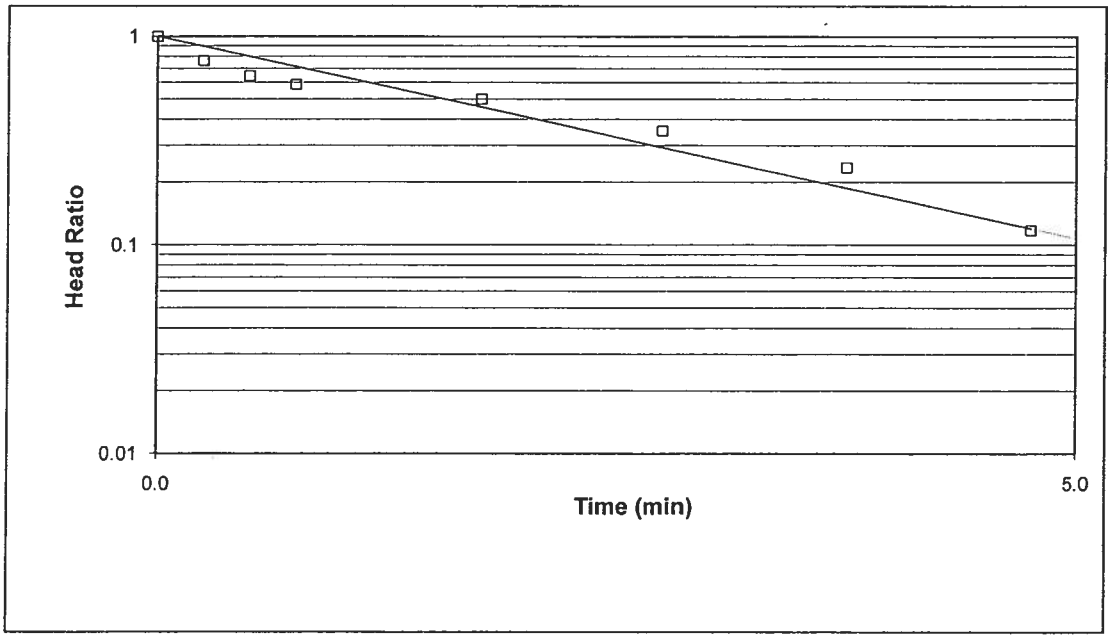
Analysis By: JCW
Checked By: MSL
Analysis Date: 2/26/2008

HVORSLEV SLUG TEST ANALYSIS
RISING HEAD TEST PZ-2

$$K = \frac{r_c^2}{2L_e} \ln\frac{L_e}{R_e}\left[\frac{\ln\left(\frac{h_1}{h_2}\right)}{(t2 - t1)}\right] 30.48$$

where:
- r_c = casing radius (feet)
- R_e = filter pack radius (feet)
- L_e = length of screened interval (feet)
- t = time (seconds)
- h_t = head at time t (feet)

INPUT PARAMETERS		RESULTS		
r_c =	0.08			
R_e =	0.25			
L_e =	6.17	K=	4.09E-04	cm/sec
t_1 =	0	K=	1.16E+00	ft/day
t_2 =	4.75			
h_1/h_0 =	1.00			
h_2/h_0 =	0.12			



Project Name: Meramec Fly Ash
Project No.: 073-84012
Test Date: 08/17/07

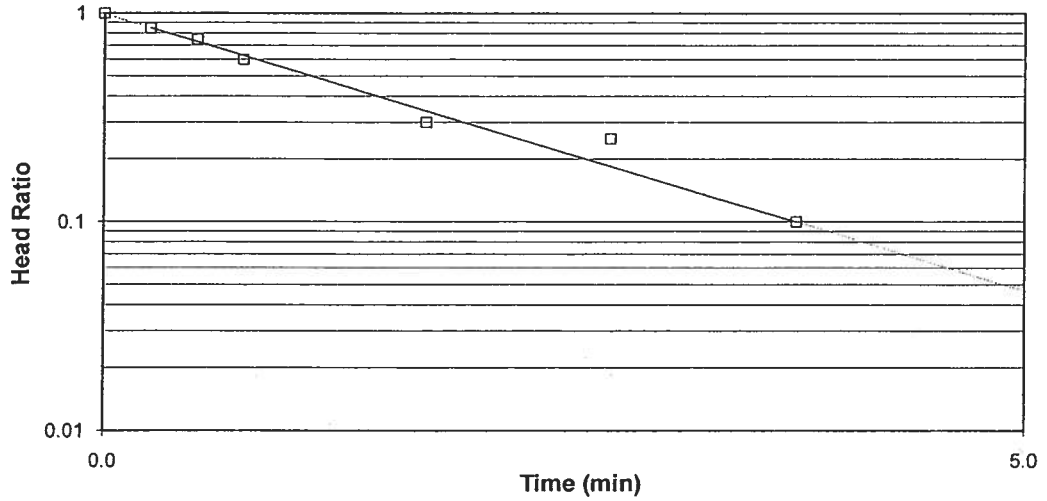
Analysis By: JCW
Checked By: MSL
Analysis Date: 2/26/2008

HVORSLEV SLUG TEST ANALYSIS
RISING HEAD TEST PZ-3

$$K = \frac{r_c^2}{2L_e} \ln\frac{L_e}{R_e}\left[\frac{\ln\left(\frac{h_1}{h_2}\right)}{(t2 - t1)}\right] 30.48$$

where:
r_c = casing radius (feet)
R_e = filter pack radius (feet)
L_e = length of screened interval (feet)
t = time (seconds)
h_t = head at time t (feet)

INPUT PARAMETERS		RESULTS		
r_c =	0.08			
R_e =	0.25			
L_e =	3.59	K=	8.00E-04	cm/sec
t_1 =	0.25	K=	2.27E+00	ft/day
t_2 =	3.75			
h_1/h_0 =	0.85			
h_2/h_0 =	0.10			



Project Name: Meramec Fly Ash
Project No.: 073-84012
Test Date: 08/17/07

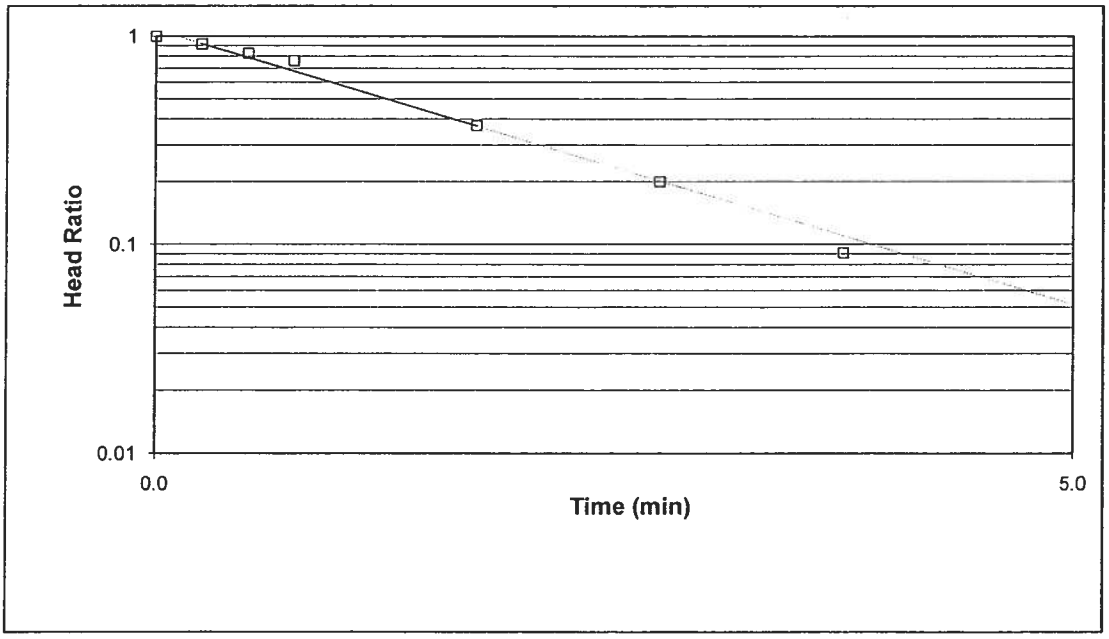
Analysis By: JCW
Checked By: MSL
Analysis Date: 2/26/2008

HVORSLEV SLUG TEST ANALYSIS
RISING HEAD TEST PZ-4

$$K = \frac{r_c^2}{2L_e} \ln\frac{L_e}{R_e}\left[\frac{\ln\left(\frac{h_1}{h_2}\right)}{(t2 - t1)}\right] 30.48$$

where:
r_c = casing radius (feet)
R_e = filter pack radius (feet)
L_e = length of screened interval (feet)
t = time (seconds)
h_t = head at time t (feet)

INPUT PARAMETERS		RESULTS		
r_c =	0.08			
R_e =	0.25			
L_e =	9.6	K=	4.07E-04	cm/sec
t_1 =	0.25	K=	1.15E+00	ft/day
t_2 =	1.75			
h_1/h_0 =	0.92			
h_2/h_0 =	0.37			



Project Name: Meramec Fly Ash
Project No.: 073-84012
Test Date: 08/17/07

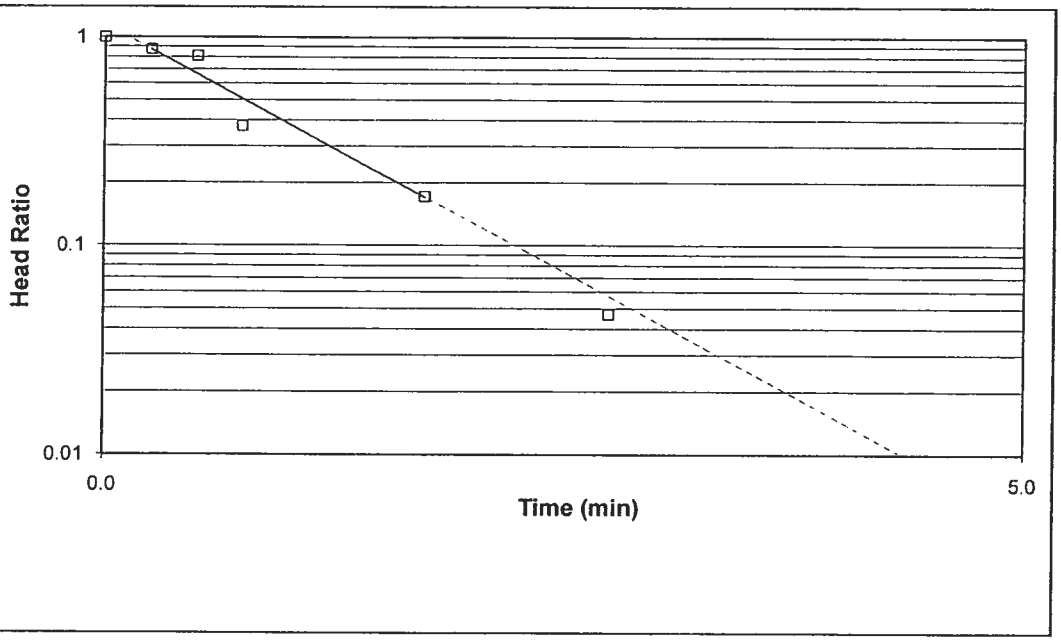
Analysis By: JCW
Checked By: MSL
Analysis Date: 2/26/2008

HVORSLEV SLUG TEST ANALYSIS
RISING HEAD TEST PZ-5

$$K = \frac{r_c^2}{2L_e} \ln\frac{L_e}{R_e}\left[\frac{\ln\left(\frac{h_1}{h_2}\right)}{(t2 - t1)}\right] 30.48$$

where:
- r_c = casing radius (feet)
- R_e = filter pack radius (feet)
- L_e = length of screened interval (feet)
- t = time (seconds)
- h_t = head at time t (feet)

INPUT PARAMETERS		RESULTS		
r_c =	0.08			
R_e =	0.25			
L_e =	7.93	K=	8.37E-04	cm/sec
t_1 =	0.25	K=	2.37E+00	ft/day
t_2 =	1.75			
h_1/h_0 =	0.87			
h_2/h_0 =	0.17			



Project Name: Meramec Fly Ash
Project No.: 073-84012
Test Date: 08/17/07

Analysis By: JCW
Checked By: MSL
Analysis Date: 2/26/2008

APPENDIX A

DOC 1.6 AVAILABLE INFORMATION CHECKLISTS

Available Information Checklist

Coal Combustion Waste Impoundment (CCWI) Dam

MERAMEC RETENTION POND

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
1. Descriptive Information:	X		
a) Impoundment Capacity (Normal & Max) **(435600 FT^3 ORIGINAL DESIGN)**	X		
b) Impoundment Surface Area (0.7 ACRES)	X		
c) Hazard Classification (CLASS III)	X		
d) Freeboard (Normal & Min) **(10 FT NORMAL 2 FT MIN)**	X		
e) Maximum Dam Height (24.7 FT)	X		
f) Dam Crest Elevation (414 FT)	X		
g) Crest Width (15 FT)	X		
h) Upstream Slope Inclination (3H 1V)	X		
i) Downstream Slope Inclination (3H 1V)	X		
j) Spillway Type, Size, & Crest Elevation			X
k) Outlet Condit Type, Size, & Max Flow Capacity (24 INCH DIAMETER CS PIPE – 30CFS	X		
l) Historical Maximum Pond Elevation	X		
m) Year Built	X		
n) Design Life (MAY VARY)	X		
o) Specific Wastes Permitted in Impoundment	X		
p) Other (describe)			
2. Regional Map showing CCWI & schools, hospitals, etc. w/i 5 mi downgradient		X	
3. Management Unit Dwgs:			
a) Plans	X		
b) Sections	X		
c) Elevations	X		
d) Other (describe)			
4. Design Information:			
a) Name of Designer of Record	X		
b) Design Assumptions			X
c) Design Analyses			X

Available Information Checklist (Continued)

Coal Combustion Waste Impoundment (CCWI) Dam

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
d) Spillway Design Flood or Design Basis			X
e) Slope Stability Factors of Safety (ONGOING STABILITY ANALYSIS)			X
f) Design Soil Properties and Parameters (ONGOING STABILITY ANALYSIS)			X
g) Other (describe)			
5. Permits:			
a) NPDES? Number? MO-0000361	X		
b) Dam Safety - Operating Permit? Number?			X
c) Other (describe)			
6. Subsurface Information:			
a) Geology	X		
b) Geotechnical Report	X		
c) Test Boring Logs	X		
d) Subsurface Profiles	X		
f) Other (describe)			
7. Monitoring Information:			
a) Observation Wells/Piezometer Readings			X
b) Seepage Readings		X	
c) Settlement Readings		X	
d) Alignment Readings		X	
e) Inclinometer Readings			X
f) Time vs Reading Graphs			X
g) Other (describe)			
8. Instrumentation Dwgs:			
a) Location Plan			X
b) Section Views			X
c) Other (describe)			

Available Information Checklist (Continued)

Coal Combustion Waste Impoundment (CCWI) Dam

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
9. Operation, Maintenance, & Surveillance:			
a) Operating Procedures			
b) Maintenance Procedures			
c) Inspection Procedures	X		
d) Third Party Inspection Reports			
e) Other (describe)			
10. Emergency Action Plan		X	
11. Inundation Map			X

Available Information Checklist

Coal Combustion Waste Impoundment (CCWI) Dam

MERAMEC POND 489

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
1. Descriptive Information:	X		
a) Impoundment Capacity (Normal & Max) **(13068000 FT^3 ORIGINAL DESIGN)**	X		
b) Impoundment Surface Area (17.6 ACRES)	X		
c) Hazard Classification (CLASS III)	X		
d) Freeboard (Normal & Min) **(4.4 FT NORMAL 2 FT MIN)**	X		
e) Maximum Dam Height (24.7 FT)	X		
f) Dam Crest Elevation (420.2 FT)	X		
g) Crest Width (15 FT)	X		
h) Upstream Slope Inclination (3H 1V)	X		
i) Downstream Slope Inclination (1.5H:1V)	X		
j) Spillway Type, Size, & Crest Elevation			X
k) Outlet Condit Type, Size, & Max Flow Capacity (36 INCH DIAMETER HDPE - 54 CFS)	X		
l) Historical Maximum Pond Elevation	X		
m) Year Built	X		
n) Design Life (MAY VARY)	X		
o) Specific Wastes Permitted in Impoundment	X		
p) Other (describe)			
2. Regional Map showing CCWI & schools, hospitals, etc. w/i 5 mi downgradient		X	
3. Management Unit Dwgs:			
a) Plans	X		
b) Sections	X		
c) Elevations	X		
d) Other (describe)			
4. Design Information:			
a) Name of Designer of Record	X		
b) Design Assumptions			X
c) Design Analyses			X

Available Information Checklist (Continued)

Coal Combustion Waste Impoundment (CCWI) Dam

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
d) Spillway Design Flood or Design Basis			X
e) Slope Stability Factors of Safety (ONGOING STABILITY ANALYSIS)			X
f) Design Soil Properties and Parameters (ONGOING STABILITY ANALYSIS)			X
g) Other (describe)			
5. Permits:			
a) NPDES? Number? MO-0000361	X		
b) Dam Safety - Operating Permit? Number?			X
c) Other (describe)			
6. Subsurface Information:			
a) Geology	X		
b) Geotechnical Report	X		
c) Test Boring Logs	X		
d) Subsurface Profiles	X		
f) Other (describe)			
7. Monitoring Information:			
a) Observation Wells/Piezometer Readings			X
b) Seepage Readings		X	
c) Settlement Readings		X	
d) Alignment Readings		X	
e) Inclinometer Readings			X
f) Time vs Reading Graphs			X
g) Other (describe)			
8. Instrumentation Dwgs:			
a) Location Plan			X
b) Section Views			X
c) Other (describe)			

Available Information Checklist (Continued)

Coal Combustion Waste Impoundment (CCWI) Dam

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
9. Operation, Maintenance, & Surveillance:			
a) Operating Procedures			
b) Maintenance Procedures			
c) Inspection Procedures	X		
d) Third Party Inspection Reports			
e) Other (describe)			
10. Emergency Action Plan		X	
11. Inundation Map			X

Available Information Checklist

Coal Combustion Waste Impoundment (CCWI) Dam

MERAMEC FLY ASH POND 498

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
1. Descriptive Information:	X		
a) Impoundment Capacity (Normal & Max) **(10018800 FT^3 ORIGINAL DESIGN)**	X		
b) Impoundment Surface Area (13.5 ACRES)	X		
c) Hazard Classification (CLASS III)	X		
d) Freeboard (Normal & Min) **(5 FT NORMAL 2 FT MIN)**	X		
e) Maximum Dam Height (24.7 FT)	X		
f) Dam Crest Elevation (423 FT)	X		
g) Crest Width (15 FT)	X		
h) Upstream Slope Inclination (3H 1V)	X		
i) Downstream Slope Inclination (3H:1V)	X		
j) Spillway Type, Size, & Crest Elevation			X
k) Outlet Condit Type, Size, & Max Flow Capacity (24 INCH DIAMETER HDPE PIPE	X		
l) Historical Maximum Pond Elevation	X		
m) Year Built	X		
n) Design Life (MAY VARY)	X		
o) Specific Wastes Permitted in Impoundment	X		
p) Other (describe)			
2. Regional Map showing CCWI & schools, hospitals, etc. w/i 5 mi downgradient		X	
3. Management Unit Dwgs:			
a) Plans	X		
b) Sections	X		
c) Elevations	X		
d) Other (describe)			
4. Design Information:			
a) Name of Designer of Record	X		
b) Design Assumptions			X
c) Design Analyses			X

Available Information Checklist (Continued)

Coal Combustion Waste Impoundment (CCWI) Dam

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
d) Spillway Design Flood or Design Basis			X
e) Slope Stability Factors of Safety (ONGOING STABILITY ANALYSIS)			X
f) Design Soil Properties and Parameters (ONGOING STABILITY ANALYSIS)			X
g) Other (describe)			
5. Permits:			
a) NPDES? Number? MO-0000361	X		
b) Dam Safety - Operating Permit? Number?			X
c) Other (describe)			
6. Subsurface Information:			
a) Geology	X		
b) Geotechnical Report	X		
c) Test Boring Logs	X		
d) Subsurface Profiles	X		
f) Other (describe)			
7. Monitoring Information:			
a) Observation Wells/Piezometer Readings			X
b) Seepage Readings		X	
c) Settlement Readings		X	
d) Alignment Readings		X	
e) Inclinometer Readings			X
f) Time vs Reading Graphs			X
g) Other (describe)			
8. Instrumentation Dwgs:			
a) Location Plan			X
b) Section Views			X
c) Other (describe)			

Available Information Checklist (Continued)

Coal Combustion Waste Impoundment (CCWI) Dam

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
9. Operation, Maintenance, & Surveillance:			
a) Operating Procedures			
b) Maintenance Procedures			
c) Inspection Procedures	X		
d) Third Party Inspection Reports			
e) Other (describe)			
10. Emergency Action Plan		X	
11. Inundation Map			X

Available Information Checklist

Coal Combustion Waste Impoundment (CCWI) Dam

MERAMEC BOTTOM ASH POND

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
1. Descriptive Information:	X		
a) Impoundment Capacity (Normal & Max) **(12196800 FT^3 ORIGINAL DESIGN)**	X		
b) Impoundment Surface Area (14 ACRES)	X		
c) Hazard Classification (CLASS III)	X		
d) Freeboard (Normal & Min) **(7.9 FT NORMAL 2 FT MIN)**	X		
e) Maximum Dam Height (24.7 FT)	X		
f) Dam Crest Elevation (417.4 FT)	X		
g) Crest Width (15 FT)	X		
h) Upstream Slope Inclination (3H 1V)	X		
i) Downstream Slope Inclination (3H:1V)	X		
j) Spillway Type, Size, & Crest Elevation			X
k) Outlet Condit Type, Size, & Max Flow Capacity (18 INCH DIAMETER CS PIPE)	X		
l) Historical Maximum Pond Elevation	X		
m) Year Built	X		
n) Design Life (MAY VARY)	X		
o) Specific Wastes Permitted in Impoundment	X		
p) Other (describe)			
2. Regional Map showing CCWI & schools, hospitals, etc. w/i 5 mi downgradient		X	
3. Management Unit Dwgs:			
a) Plans	X		
b) Sections	X		
c) Elevations	X		
d) Other (describe)			
4. Design Information:			
a) Name of Designer of Record	X		
b) Design Assumptions			X
c) Design Analyses			X

Available Information Checklist (Continued)

Coal Combustion Waste Impoundment (CCWI) Dam

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
d) Spillway Design Flood or Design Basis			X
e) Slope Stability Factors of Safety (ONGOING STABILITY ANALYSIS)			X
f) Design Soil Properties and Parameters (ONGOING STABILITY ANALYSIS)			X
g) Other (describe)			
5. Permits:			
a) NPDES? **Number? MO-0000361** ✓	X		
b) Dam Safety - Operating Permit? **Number?**			X
c) Other (describe)			
6. Subsurface Information:			
a) Geology	X		
b) Geotechnical Report	X		
c) Test Boring Logs	X		
d) Subsurface Profiles	X		
f) Other (describe)			
7. Monitoring Information:			
a) Observation Wells/Piezometer Readings			X
b) Seepage Readings		X	
c) Settlement Readings		X	
d) Alignment Readings		X	
e) Inclinometer Readings			X
f) Time vs Reading Graphs			X
g) Other (describe)			
8. Instrumentation Dwgs:			
a) Location Plan			X
b) Section Views			X
c) Other (describe)			

Available Information Checklist (Continued)

Coal Combustion Waste Impoundment (CCWI) Dam

ITEM DESCRIPTION	PROVIDED BY UTILITY		
	YES	NO	N/A
9. Operation, Maintenance, & Surveillance:			
a) Operating Procedures			
b) Maintenance Procedures			
c) Inspection Procedures	X		
d) Third Party Inspection Reports			
e) Other (describe)			
10. Emergency Action Plan		X	
11. Inundation Map			X

APPENDIX A

DOC 1.7 MISSOURI STATE OPERATING PERMIT

AmerenUE, Meramec Power Plant
MO-0000361, St. Louis County

STATE OF MISSOURI
Bob Holden, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

February 22, 2002

AmerenUE
One Ameren Plaza
PO Box 66149 (MC-602)
St. Louis, MO 63166

Dear Permittee:

State Operating Permit No. MO-0000361 originally issued on May 19, 2000 is hereby modified as per the enclosed. This modification increases the daily maximum limit on thermal discharges. The attached permit is for your official record.

Please read your permit and attached Standard Conditions. They contain important information on monitoring requirements, effluent limitations, sampling frequencies and reporting requirements.

This modification does not affect any monitoring or analysis of the effluent that may be necessary to comply with other requirements of your permit or other state regulations and does not in any way relieve you of your obligations to achieve the final effluent limitations as provided in the permit.

This permit is both your federal discharge permit and your new state operating permit and replaces all previous state operating permits for this facility. In all future correspondence regarding this facility, please refer to your state operating permit number and facility name as shown on page one of the permit.

If you have any questions concerning this permit, please do not hesitate to call this office or our St. Louis Regional Office, 9200 Watson Road, Suite 201, St. Louis, MO 63127-1017.

Sincerely,

WATER POLLUTION CONTROL PROGRAM

Philip A. Schroeder, Chief
Permit Section

PAS:jc

Enclosure

c: St. Louis Regional Office

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-0000361
Owner:	Union Electric Company
Address:	One Ameren Plaza, P.O. Box 66149, St. Louis, MO 63166
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Ameren UE, Meramec Power Plant
Facility Address:	8200 Fine Road, St. Louis, MO 63129
Legal Description:	SW ¼, Sec. 3, T42N, R6E, St. Louis County
Latitude/Longitude:	See page 2
Receiving Stream:	See page 2
First Classified Stream and ID:	See page 2
USGS Basin & Sub-watershed No.:	See page 2

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.

May 19, 2000
Effective Date

February 22, 2002
Revised

May 18, 2005
Expiration Date

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

Interim Director of Staff, Clean Water Commission

MO 780-0041 (10-93)

FACILITY DESCRIPTION (continued)

Outfall #001 - Power Plant - SIC #4911
Non-contact cooling water.
Design flow is 245 MGD.
Actual flow is 134 MGD.

Latitude/Longitude:	+3824039/-09019574
Receiving Stream:	Mississippi River (P)
First Classified Stream and ID:	Mississippi River (P) (01707)
USGS Basin & Sub-watershed No.:	(07140101-070004)

Outfall #002 - Power Plant - SIC #4911
Non-contact cooling water.
Design flow is 405 MGD.
Actual flow is 251 MGD.

Latitude/Longitude:	+3824039/-09019574
Receiving Stream:	Mississippi River (P)
First Classified Stream and ID:	Mississippi River (P) (01707)
USGS Basin & Sub-watershed No.:	(07140101-070004)

Outfall #003 - Power Plant - SIC #4911
Bottom ash pond/stormwater.
Design flow is 22.8 MGD.
Actual flow is 0.95 MGD.

Latitude/Longitude:	+3824289/-09020362
Receiving Stream:	Unnamed Tributary to Meramec River (U)
First Classified Stream and ID:	Meramec River (P) (02183)
USGS Basin & Sub-watershed No.:	(07140102-080004)

Outfall #004 - Domestic (Human) Sewage - SIC #4952
Extended aeration/sewage treatment plant/sludge disposal is by contract hauler.
Design population equivalent is 238.
Design flow is 0.046 MGD.
Actual flow is 0.028 MGD.
Design sludge production is 4.28 dry tons/year.

Latitude/Longitude:	+3823586/-09020033
Receiving Stream:	Mississippi River (P)
First Classified Stream and ID:	Mississippi River (P) (01707)
USGS Basin & Sub-watershed No.:	(07140101-070004)

Outfall #005
Emergency overflow from combined drain sump.
Design flow is 2.0 MGD.
Actual flow is 0.0 MGD.

Latitude/Longitude:	+3823586/-09020033
Receiving Stream:	Mississippi River (P)
First Classified Stream and ID:	Mississippi River (P) (01707)
USGS Basin & Sub-watershed No.:	(07140101-070004)

Outfall #006
Caisson sump/screen wash.
Design flow is 1.5 MGD.
Actual flow is 0.43 MGD.

Latitude/Longitude:	+3824037/-09019555
Receiving Stream:	Mississippi River (P)
First Classified Stream and ID:	Mississippi River (P) (01707)
USGS Basin & Sub-watershed No.:	(07140101-070004)

FACILITY DESCRIPTION (continued)

Outfall #007
Storm water runoff from the paved employee parking lot and an area which surrounds the oil storage building.
36-inch concrete pipe.
Design flow is 0.39 MGD.
This outfall will not be monitored during this permit period.

Latitude/Longitude:	+3824030/-09019569
Receiving Stream:	Mississippi River (P)
First Classified Stream and ID:	Mississippi River (P) (01707)
USGS Basin & Sub-watershed No.:	(07140101-070004)

Outfall #008
Storm water runoff from the plant access road and adjacent lawn areas.
24-inch corrugated metal pipe.
Design flow is 0.123 MGD.
This outfall will not be monitored during this permit period.

Latitude/Longitude:	+3824323/-09020193
Receiving Stream:	Unnamed Tributary to Meramec River (U)
First Classified Stream and ID:	Meramec River (P) (02183)
USGS Basin & Sub-watershed No.:	(07140102-080004)

Outfall #009 - Power Plant - SIC #4911
Flyash pond #489/storm water/low volume waste.
Design flow is 14.9 MGD.
Actual flow is 8.0 MGD.

Latitude/Longitude:	+3823565/-09020411
Receiving Stream:	Meramec River (P)
First Classified Stream and ID:	Meramec River (P) (02183)
USGS Basin & Sub-watershed No.:	(07140102-080004)

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
Temperature, Intake	°F	*		*	once/weekday**	grab
Temperature, Outfall	°F	*		*	once/weekday**	grab
Thermal Discharge	btu/hr	1.54×10^9		*	once/weekday**	n/a
Outfall #002 - non-contact cooling water						
Flow	MGD	*		*	once/weekday**	24 hr. estimate
Temperature, Intake	°F	*		*	once/weekday**	grab
Temperature, Outfall	°F	*		*	once/weekday**	grab
Thermal Discharge	btu/hr	3.23×10^9			once/weekday**	n/a
Outfall #003 - 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
Oils and Grease	mg/L	20		15	once/month	grab
pH - Units	SU	****		****	once/week	grab
Sulfate (as SO^4)	mg/L	*		*	once/quarter*****	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY, THE FIRST REPORT IS DUE July 28, 2002.

Whole Effluent Toxicity (WET) Test	% Survival	(See Special Condition #3)	initial/year	grab

MONITORING REPORTS SHALL BE SUBMITTED ANNUALLY; THE FIRST REPORT IS DUE October 28, 2002 . 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 #004 - Sewage treatment plant						
Flow	MGD	*		*	once/month	24 hr. estimate
Biochemical Oxygen Demand$_5$	mg/L		45	30	once/quarter*****	******
Total Suspended Solids	mg/L		45	30	once/quarter*****	******
pH - Units	SU	****		****	once/quarter*****	grab
Aeration Tank Testing						
Total Suspended Solids	mg/L	*		*	once/month	grab
Settleability	mg/L	*		*	once/month	grab
Dissolved Oxygen	mg/L	*		*	once/month	grab
Outfall #005 - emergency sump overflow						
Flow	MGD	*		*	(Note 2)	24 hr. estimate
Total Suspended Solids***	mg/L	100		30	(Note 2)	grab
Oil and Grease	mg/L	20		15	(Note 2)	grab
pH - Units	SU	****		****	(Note 2)	grab
Outfall #006 -caisson sump						
Flow	MGD	*		*	once/quarter*****	24 hr. estimate
Total Suspended Solids***	mg/L	*		*	once/quarter*****	(Note 3)
Oil & Grease	mg/L	20		15	once/quarter*****	(Note 3)
pH - Units	SU	*******		*******	once/quarter*****	(Note 3)

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE July 28, 2002 .

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
Outfalls #007 & #008 - (See Special Condition 15)						
Outfall #009 - Flyash Pond #489						
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
Sulfate (as SO^4)	mg/L	*		*	once/quarter*****	grab
Whole Effluent Toxicity (WET) test	% Survival	See Special Condition #3			initial/year	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE July 28, 2002. 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 (continued)

* Monitoring requirement only.

** One each weekday means: Monday, Tuesday, Wednesday, Thursday and Friday.

*** Intake Total Suspended Solids values may be used to calculate "net" limitations, however 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.

***** 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.

******* pH is limited to not less than 6.0 nor greater than the source water. A pH analysis of the source water shall accompany the Discharge Monitoring Reports.

Note 1 - Reserved.

Note 2 - Measurement frequency shall be once/day when discharge occurs. Monitor only when discharge occurs. Report as no-discharge when a discharge does not occur during the report period.

Note 3 - Individual grab samples shall be collected from each Cassion sump and immediately composited for analysis. These samples will be collected prior to mixing with river water used for screen washing.

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. All outfalls must be clearly marked in the field.

C. SPECIAL CONDITIONS (continued)

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

SUMMARY OF WET TESTING FOR THIS PERMIT				
OUTFALLS	A.E.C. %	FREQUENCY	SAMPLE TYPE	MONTH
#001, #002, #003 & #009	10%	annually	24 hr. composite	January

At the Ameren UE, Meramec Plant, Whole Effluent Toxicity (WET) tests will be required for Outfalls #001 and #002 only if biocides are used. If the WET test indicates toxicity in the first year of biocide use, the test must be run annually for the duration of the permit or until biocide use is discontinued.

a. Test Schedule and Follow-Up Requirements

(1) Perform a single-dilution test in the months and at the frequency specified above.

If the test passes the effluent limit do not repeat test until the next test period. Submit results with the annual report.
If the test fails the effluent limit a multiple dilution test shall be performed within 30 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.

(2) The permittee shall submit a summary of all test results for the test series to the Planning Section of the WPCP, DNR, Box 176, Jefferson City, MO within 14 days of the third failed test. DNR will contact the permittee with initial guidance on conducting a toxicity identification evaluation (TIE) or toxicity reduction evaluation (TRE). The permittee shall submit a plan for conducting a TIE or TRE to the Planning Section of the WPCP within 60 days of the date of DNR's letter. 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.

(3) 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.

(4) 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 part b.(1) will be required during this period.

(5) In addition to the WET test summary report required in part (2), all failing test results shall be reported to DNR within 14 days of the availability of results.

(6) All WET test results for the reporting period shall be summarized and submitted to DNR by the end of the following October. When WET test sampling is required to run over one DMR period, each DMR report shall contain information generated during the reporting period.

C. SPECIAL CONDITIONS (continued)

. Whole Effluent Toxicity (WET) tests (continued)

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. 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 (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 considered an effluent limit violation.

c. Test Conditions

(1) Test species: Ceriodaphnia dubia and fathead minnows, Pimephales promelas. Organisms used in WET testing should come from cultures reared for the purpose of conducting toxicity tests and should be cultured in a manner consistent with the most current USEPA guidelines. All test animals should be cultured as described in EPA-600/4-90/027.

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

(3) When dilutions are required, upstream receiving stream water will be used as dilution water. If upstream water is unavailable or if mortality in the upstream water exceeds 10%, "reconstituted" water will be used. Procedures for generating reconstituted water will be supplied by the Department of Natural Resources (DNR).

(4) Tests should be initiated immediately after the sample is collected, but tests must be initiated no later than 36 hours after collection.

(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.

C. SPECIAL CONDITIONS (continued)

4. 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 ug/L);
  (2) Two hundred micrograms per liter (200 ug/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/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.

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

6. 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.

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

8. Discharge of wastewater from this facility must not be 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.

9. 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.

C. SPECIAL CONDITIONS (continued)

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

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

12. Sludge and Biosolids Use For Domestic Wastewater Treatment Facilities (Outfall #004)

    (a) Permittee shall comply with the pollutant limitations, monitoring, reporting, and other requirements in accordance with the attached permit Standard Conditions, Part III dated June 22, 1993.
    (b) Site-Specific conditions applicable to this facility are as follows: N/A

13. Treatment or Storage 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.

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

15. Outfalls #007 & #008 - The company has elected to use best management practices (BMP's) on these outfalls. Monitoring is waived for this permit cycle. If problems occur, monitoring may be reestablished by the department. Periodic inspection of these outfalls will be carried out by AmerenUE to ascertain that BMP's are working.

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 otherwise specified by MDNR, procedures should be consistent with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA/600/4-90/027.

Test conditions for Ceriodaphnia dubia:

Test duration:	48 h
Temperature:	25 ± 2°C
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:	Mortality (Statistically significant difference from upstream receiving water control at p# 0.05)
Test acceptability criterion:	90% or greater survival in controls

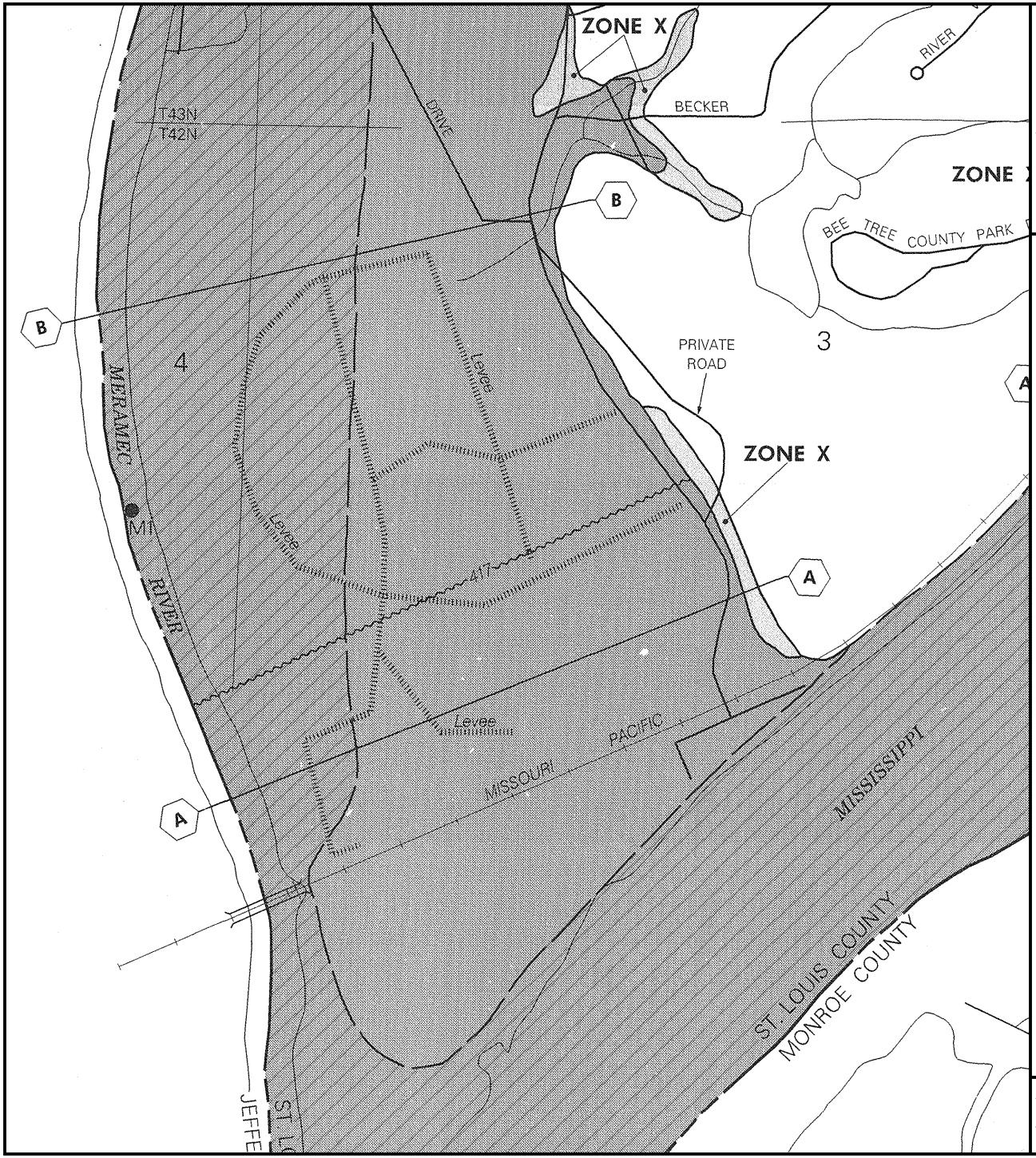
Test conditions for (Pimephales promelas):

Test duration:	48 h
Temperature:	25 ± 2°C
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:	Mortality (Statistically significant difference from upstream receiving water control at p# 0.05)

Test Acceptability criterion:90% or greater survival in controls

APPENDIX A

DOC 1.8 1995 FEMA FLOOD INSURANCE RATE MAP



APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

ST. LOUIS COUNTY, MISSOURI AND INCORPORATED AREAS

PANEL 415 OF 420

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
ST. LOUIS COUNTY, UNINCORPORATED AREAS	290327	0415	H

MAP NUMBER
29189C0415 H

EFFECTIVE DATE:
AUGUST 2, 1995

Federal Emergency Management Agency

APPENDIX A

DOC 1.9 EXCERPT FROM APPENDIX D OF THE 2004 USACE UPPER MISSISSIPPI RIVER SYSTEM FLOW FREQUENCY STUDY

TABLE D-30 CONTINUED TABULAR RESULTS MISSISSIPPI RIVER FREQUENCY

RIVER MILE	STATION NAME	50.0%	20.0%	10.0%	5.0%	4.0%	2.0%	1.0%	0.5%	0.2%
158.21		397.3	402.8	405.8	408.5	409.4	411.9	413.9	414.9	416.8
158.50	WATERS POINT	397.4	402.9	406.0	408.6	409.6	412.0	414.0	415.0	417.0
158.67		397.5	403.0	406.0	408.7	409.6	412.1	414.1	415.1	417.1
159.23		397.8	403.3	406.3	409.0	410.0	412.4	414.4	415.4	417.4
159.73		398.1	403.6	406.6	409.3	410.2	412.7	414.6	415.7	417.7
160.18		398.3	403.8	406.8	409.6	410.5	413.0	414.9	415.9	417.9
160.71		398.6	404.1	407.1	409.8	410.8	413.3	415.1	416.2	418.2
160.71	MERAMEC RIVER	398.6	404.1	407.1	409.8	410.8	413.3	415.1	416.2	418.2
161.24		398.9	404.3	407.4	410.1	411.1	413.6	415.4	416.4	418.5
161.86		399.2	404.7	407.7	410.5	411.4	413.9	415.7	416.8	418.8
162.38		399.5	404.9	408.0	410.8	411.7	414.2	416.0	417.1	419.1
162.99		399.9	405.2	408.3	411.1	412.0	414.5	416.3	417.4	419.4
163.30		400.0	405.4	408.4	411.3	412.2	414.7	416.5	417.5	419.6
163.80		400.3	405.6	408.7	411.5	412.5	415.0	416.7	417.8	419.8
164.20		400.5	405.8	408.9	411.7	412.7	415.2	416.9	418.0	420.1
164.67		400.8	406.1	409.1	412.0	413.0	415.5	417.2	418.3	420.3
165.25		401.1	406.4	409.4	412.3	413.3	415.8	417.5	418.6	420.6
165.81		401.4	406.7	409.7	412.6	413.6	416.1	417.8	418.9	420.9
166.40		401.7	407.0	410.0	412.9	413.9	416.5	418.1	419.2	421.2
167.03		402.1	407.3	410.4	413.3	414.3	416.8	418.4	419.5	421.6
167.52		402.3	407.5	410.6	413.5	414.6	417.1	418.7	419.8	421.8
168.13		402.7	407.8	410.9	413.9	414.9	417.4	419.0	420.1	422.2
168.75	JEFFERSON BARRACKS	403.0	408.2	411.3	414.2	415.2	417.8	419.3	420.4	422.5
168.80		403.0	408.2	411.3	414.2	415.3	417.8	419.3	420.4	422.5
168.81		403.0	408.2	411.3	414.2	415.3	417.8	419.3	420.5	422.5
168.92		403.1	408.3	411.4	414.3	415.3	417.9	419.4	420.5	422.6

APPENDIX B

UNIT 1 (POND 3) FIELD OBSERVATION CHECKLIST

Site Name:	**Meramec**	**Date:**	**September 29, 2010**
Unit Name:	**New Fly Ash Pond**	**Operator's Name:**	**AmerenUE**
Unit I.D.:	**498**	**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?	Annual		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	418		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	plans		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)?	423		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)?		N/A	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		N/A	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?		N/A	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
#3	Information on plans and plans have been requested through AmerenUE Legal Group
#10	Noted as part of normal maintenance
#12	Clear of debris
#17	Cleared areas and scarps are from maintenance of eroded areas from runoff
#21	NW area between Bottom Ash and 498 Pond – Isolated area noted in Maintenance report and being monitored
#23	Floodwater - Mississippi River and backwater conditions on the Meramec River

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit MO-0000361 **INSPECTOR**

Date 05/19/2000 to 05/18/2005
Impoundment Name Meramec Power Plant

Impoundment Company AmerenUE
EPA Region Region 7

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

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

New X **Update** ☐

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

IMPOUNDMENT FUNCTION: Storage – Fly Ash

Nearest Downstream Town Name: Kimmswick

Distance from the impoundment: 2.8 miles

Location:

Latitude	38	Degrees	24	Minutes	25.16	Seconds	**N**
Longitude	90	Degrees	20	Minutes	26.97	Seconds	**W**

State Missouri **County** St. Louis

	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.

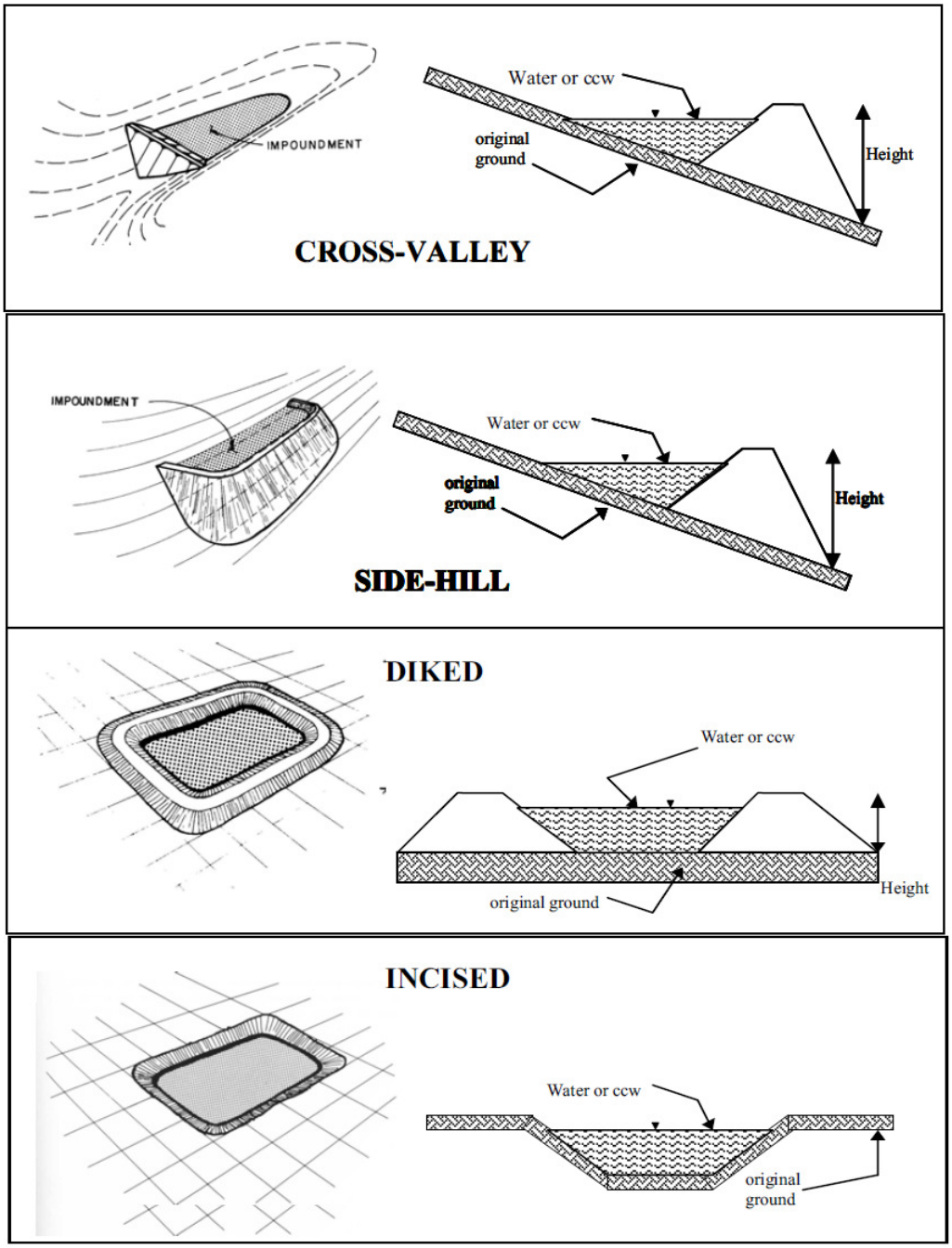
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

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 small isolated seep area noted and 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 new fly ash pond is located in the middle of the site and incised. The embankment is more than 100 yards away from this unit. The unit was built within the old fly ash area and is lined. The potential is low for failure at this unit.

CONFIGURATION:



☐	Cross-Valley	☐	Side-Hill	X	Diked
☐	Incised (form completion optional)	☐	Combination Incised/Diked		

Embankment Height (ft)	25	**Embankment Material**	Ash with liner (in interior of dam)
Pool Area (ac)	13.5 ac	**Liner**	Has Liner
Current Freeboard (ft)		**Liner Permeability**	

TYPE OF OUTLET (Mark all that apply)

N/A **Open Channel Spillway**

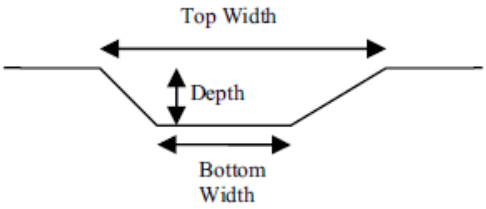
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

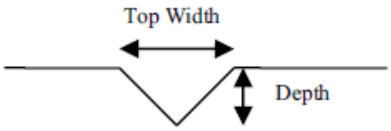
average bottom width (ft)

top width (ft)

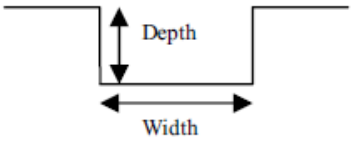
TRAPEZOIDAL



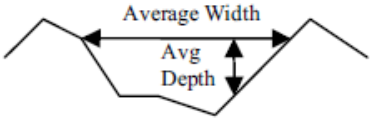
TRIANGULAR



RECTANGULAR

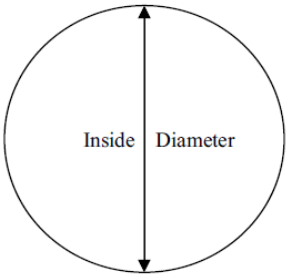


IRREGULAR



X **Outlet**

24” 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 :

Minor seepage noted during the site assessment and AmerenUE is currently monitoring.

	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.

Interior Unit – 498 see detail map. Unknown ; Plans requested through AmerenUE

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

Plans will assist in determining the dam foundation and have been requested and waiting for clearance through AmerenUE Legal.

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

No – minor erosion noted during assessment.

APPENDIX B

UNIT 2 (POND 2) FIELD OBSERVATION CHECKLIST

Site Name:	**Meramec**	**Date:**	**September 29, 2010**
Unit Name:	**Old Fly Ash Pond**	**Operator's Name:**	**AmerenUE**
Unit I.D.:	**489**	**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?	Annual		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	416.5		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	plans		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)?	420.2		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)?		N/A	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		N/A	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?		N/A	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
#3	Information on plans and plans have been requested through AmerenUE Legal Group
#12	Clear of debris
#17	Cleared areas and scarps are from maintenance of eroded areas from runoff
#21	NW area between Bottom Ash and 498 Pond – Isolated area noted in Maintenance report and being monitored
#23	Floodwater - Mississippi River and backwater conditions on the Meramec River

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit MO-0000361 **INSPECTOR**

Date 05/19/2000 to 05/18/2005
Impoundment Name Meramec Power Plant

Impoundment Company AmerenUE
EPA Region Region 7

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

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

New X **Update** ☐

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

IMPOUNDMENT FUNCTION: Storage – Fly Ash

Nearest Downstream Town Name: Kimmswick

Distance from the impoundment: 2.8 miles

Location:

Latitude	38	Degrees	23	Minutes	59.43	Seconds	**N**
Longitude	90	Degrees	20	Minutes	31.67	Seconds	**W**

State Missouri **County** St. Louis

	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.

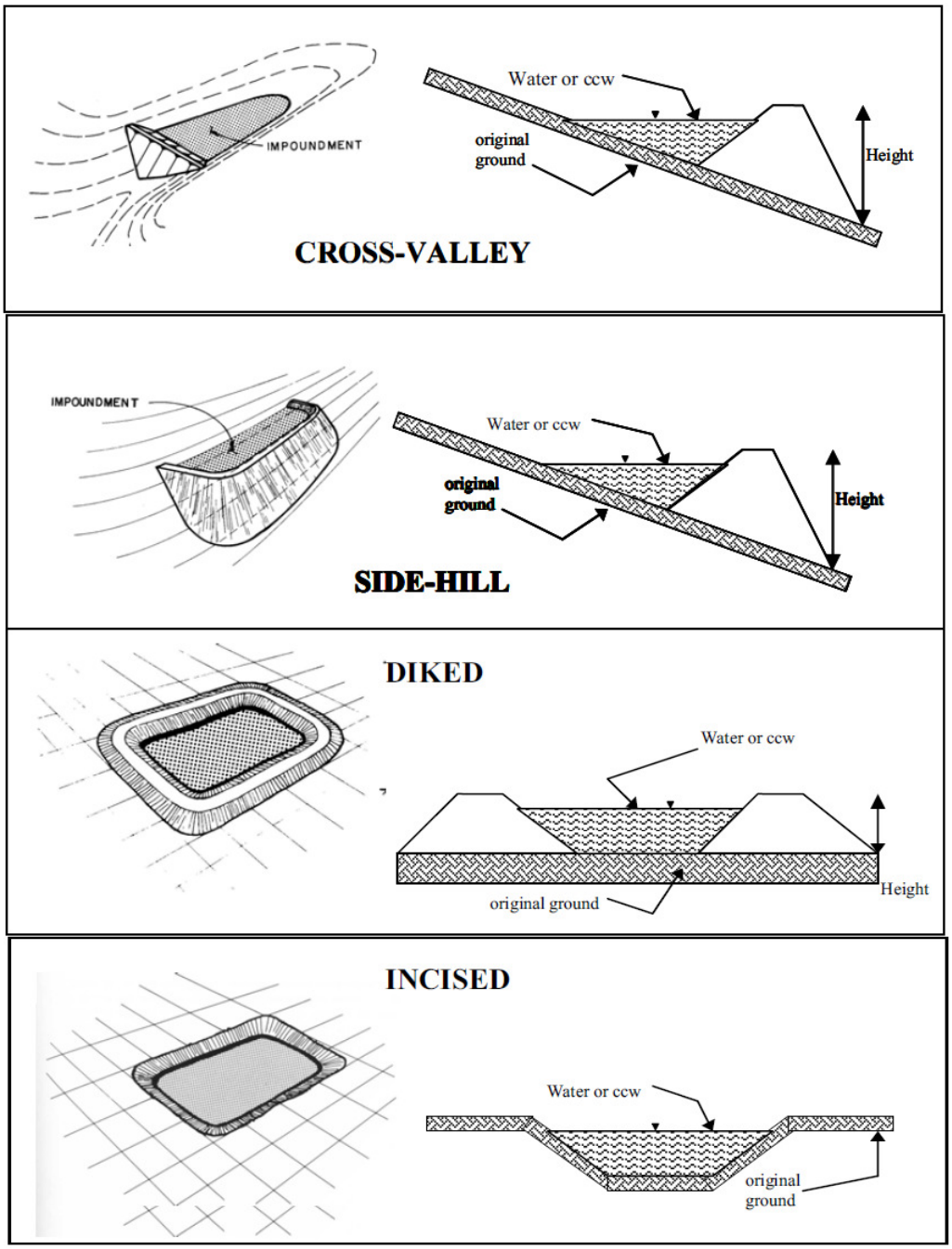
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

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 small isolated seep area noted and 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 old fly ash pond is located along the SE area of the embankments and has three sides incised. The one side which is adjacent to the embankment is approximately 75-100 yards away from this unit. The unit is lined.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill X Diked

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

Embankment Height (ft)	25’ (24.7’)	**Embankment Material**	Ash with liner (in interior of dam)
17.6	13.5 ac	**Liner**	Has Liner
Current Freeboard (ft)	3.7’	**Liner Permeability**	

TYPE OF OUTLET (Mark all that apply)

N/A **Open Channel Spillway**

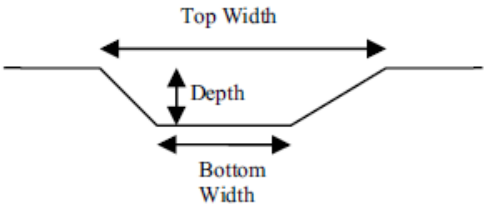
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

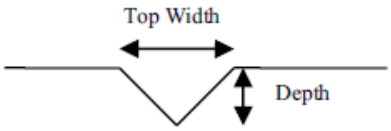
average bottom width (ft)

top width (ft)

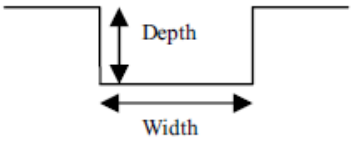
TRAPEZOIDAL



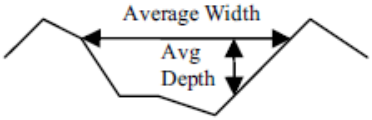
TRIANGULAR



RECTANGULAR

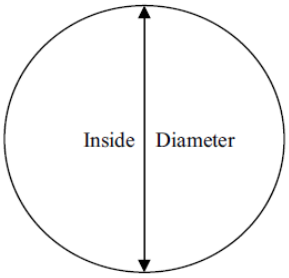


IRREGULAR



X **Outlet**

36” 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 :

Minor seepage noted during the site assessment and AmerenUE is currently monitoring.

	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.

Unknown; Plans requested through AmerenUE

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

Plans will assist in determining the dam foundation and have been requested and waiting for clearance through AmerenUE Legal.

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

No – minor erosion noted during assessment.

APPENDIX B

UNIT 3 (POND 4, 5 & 6) FIELD OBSERVATION CHECKLIST

Site Name:	**Meramec**	**Date:**	**September 29, 2010**
Unit Name:	**Bottom Ash Pond**	**Operator's Name:**	**AmerenUE**
Unit I.D.:	**Bottom 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?	Annual		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	408		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	plans		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)?	417.4		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)?		N/A	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		N/A	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?		N/A	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
#2 #3	Information on plans and plans have been requested through AmerenUE Legal Group
#12	Clear of debris
#21	SW quad of Bottom Ash Pond – Isolated area noted in Maintenance report and being monitored
#23	Floodwater - backwater conditions on the Meramec River

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit MO-0000361 **INSPECTOR**

Date 05/19/2000 to 05/18/2005
Impoundment Name Meramec Power Plant

Impoundment Company AmerenUE
EPA Region Region 7

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

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

New X **Update** ☐

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

IMPOUNDMENT FUNCTION: Storage – Bottom Ash

Nearest Downstream Town Name: Kimmswick

Distance from the impoundment: 2.8 miles

Location:

Latitude	38	Degrees	24	Minutes	30.56	Seconds	**N**
Longitude	90	Degrees	20	Minutes	20.56	Seconds	**W**

State Missouri **County** St. Louis

	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.

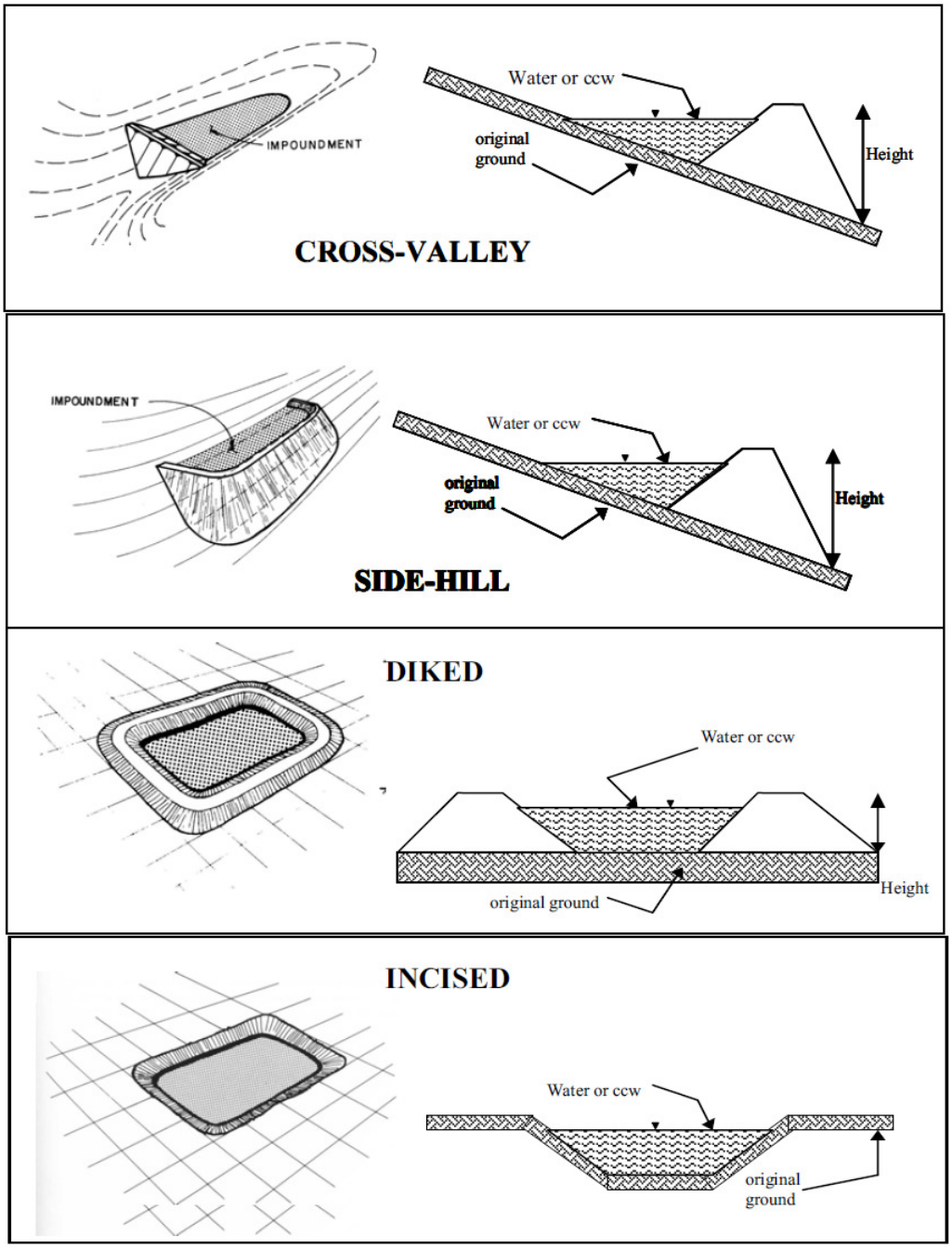
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

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 small isolated seep area noted and 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 bottom ash pond is located NW corner of the embankment and has three sides that are incised. The fourth side is part of the embankment. The seep location is in the SW corner of the unit and is a little wet, no running water. A stability analysis is being conducted and will be completed by the end of the year, we have requested a copy for this site assessment.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill X Diked

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

Embankment Height (ft)	25’ (24.7’)	**Embankment Material**	Noted on Plans – Silty Clay / Clay
Pool Area (ac)	14 ac	**Liner**	
Current Freeboard (ft)	9.4’	**Liner Permeability**	

TYPE OF OUTLET (Mark all that apply)

N/A **Open Channel Spillway**

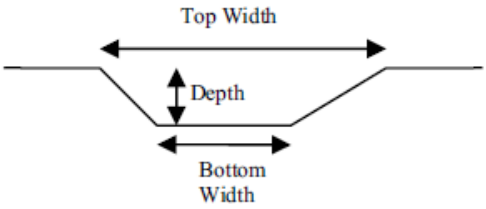
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

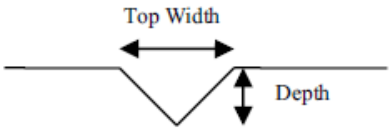
average bottom width (ft)

top width (ft)

TRAPEZOIDAL



TRIANGULAR



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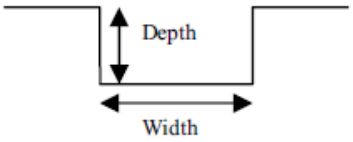
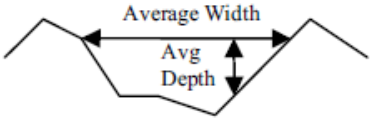
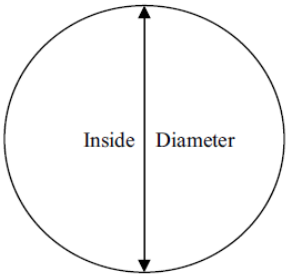


IRREGULAR



X **Outlet**

18” inside diameter



Material

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

	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 :

Minor seepage noted during the site assessment and AmerenUE is currently monitoring.

	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.

Unknown; Plans requested through AmerenUE

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

Plans will assist in determining the dam foundation and have been requested and waiting for clearance through AmerenUE Legal.

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

No –

APPENDIX B

UNIT 4 (POND 1) FIELD OBSERVATION CHECKLIST

Site Name:	**Meramec**	**Date:**	**September 29, 2010**
Unit Name:	**Retention Pond**	**Operator's Name:**	**AmerenUE**
Unit I.D.:	**Retention**	**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?	Annual		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	405		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	plans		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)?	414		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)?		N/A	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		N/A	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?		N/A	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
#2 #3	Information on plans and plans have been requested through AmerenUE Legal Group
#12	Clear of debris
#21	NW corner – Isolated area noted in Maintenance report and being monitored
#23	Floodwater - backwater conditions on the Meramec River

Coal Combustion Waste (CCW)

Impoundment Inspection

Impoundment NPDES Permit MO-0000361 **INSPECTOR**

Date 05/19/2000 to 05/18/2005
Impoundment Name Meramec Power Plant

Impoundment Company AmerenUE
EPA Region Region 7

State Agency State of Missouri
(Field Office) Address Department of Natural Resources
Name of Impoundment Retention Pond

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

New X **Update** ☐

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

IMPOUNDMENT FUNCTION: Storage – Bottom Ash

Nearest Downstream Town Name: Kimmswick

Distance from the impoundment: 2.8 miles

Location:

Latitude	38	Degrees	24	Minutes	27.68	Seconds	**N**
Longitude	90	Degrees	20	Minutes	35.46	Seconds	**W**

State Missouri **County** St. Louis

	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.

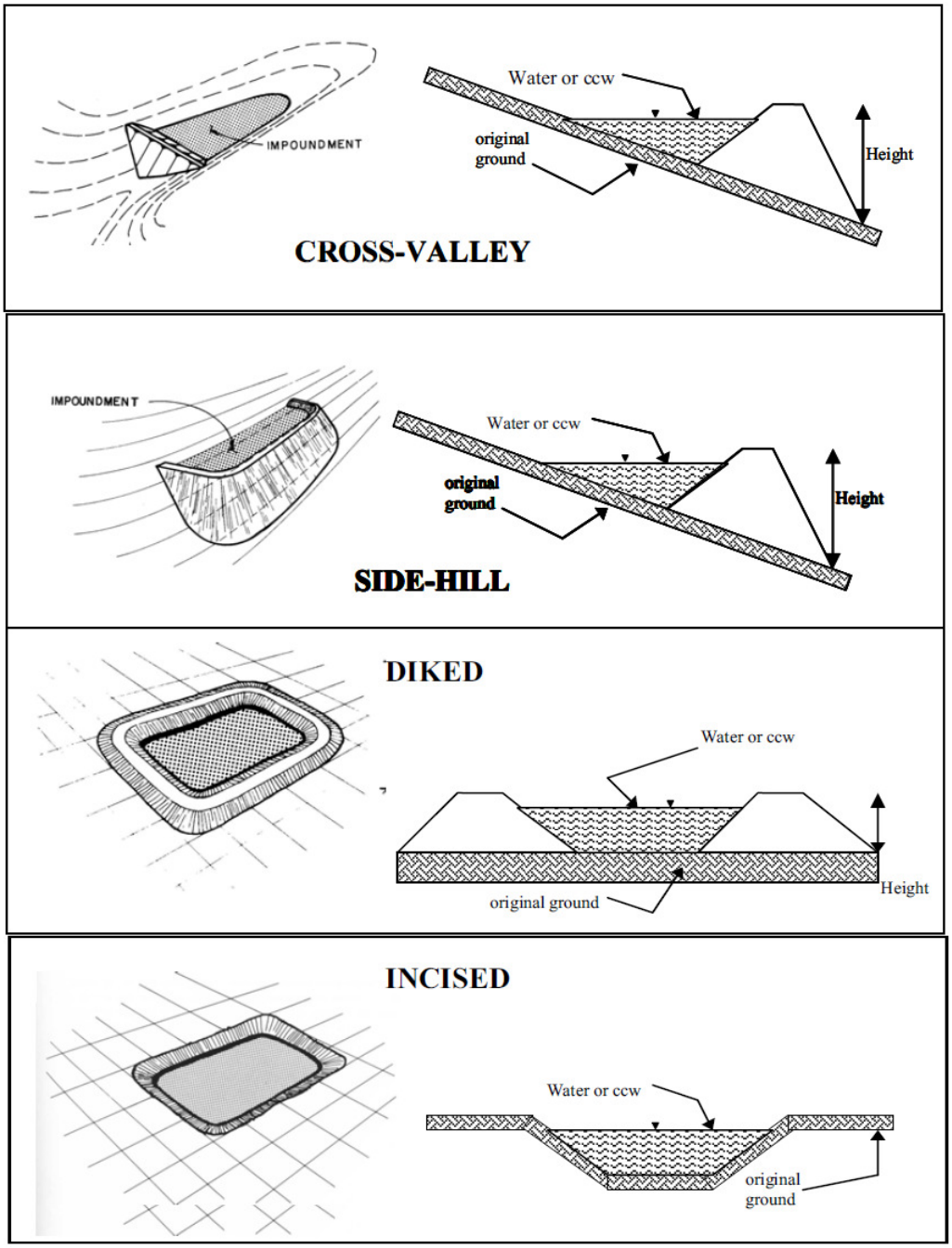
☐ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

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 small isolated seep area noted and 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 retention pond is located west of the embankment and has all sides incised. The edge of the retention pond, shortest distance to the embankment is approximately 75 yards. The side slopes are vertical timber board built within the fly ash pond area.

CONFIGURATION:



☐ Cross-Valley ☐ Side-Hill ☐ Diked

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

Embankment Height (ft)	25’ (24.7’)	**Embankment Material**	Noted on Plans – Vertical wooden boards
Pool Area (ac)	0.7 ac	**Liner**	
Current Freeboard (ft)	9’	**Liner Permeability**	

TYPE OF OUTLET (Mark all that apply)

N/A **Open Channel Spillway**

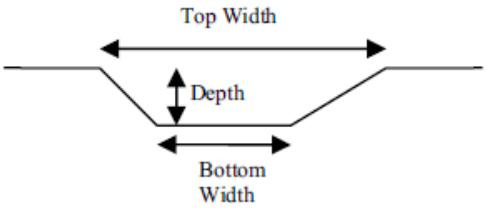
- ☐ Trapezoidal
- ☐ Triangular
- ☐ Rectangular
- ☐ Irregular

depth (ft)

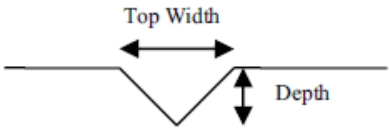
average bottom width (ft)

top width (ft)

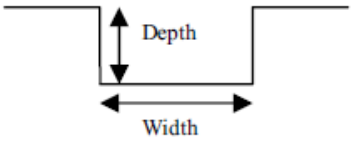
TRAPEZOIDAL



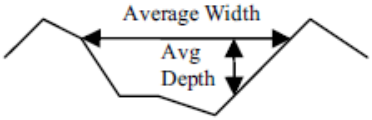
TRIANGULAR



RECTANGULAR

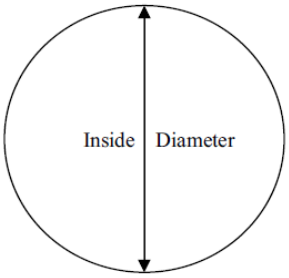


IRREGULAR



X **Outlet**

24” inside diameter



Material

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

	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 :

Minor seepage noted during the site assessment and AmerenUE is currently monitoring.

	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.

Unknown; Plans requested through AmerenUE

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

Plans will assist in determining the dam foundation and have been requested and waiting for clearance through AmerenUE Legal.

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

No –

APPENDIX C

REFERENCES

REFERENCES

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