

US EPA ARCHIVE DOCUMENT

**FINAL**

**Coal Combustion Waste Impoundment  
Round 5 - Dam Assessment Report**

*Greene County Steam Plant (Site 013)*

*Fly Ash Dike*  
*Alabama Power Company*  
**Greene County, Alabama**

**Prepared for:**

United States Environmental Protection Agency  
Office of Resource Conservation and Recovery

**Prepared by:**

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## INTRODUCTION, SUMMARY CONCLUSIONS AND RECOMMENDATIONS

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

This assessment of the stability and functionality of the Greene County Steam Plant Fly Ash Dam management unit is based on a review of available documents and on the site assessment conducted by Dewberry personnel on Thursday, June 24, 2010. We found the supporting technical documentation adequate (Section 1.1.3). As detailed in Section 1.2.5, there are three recommendations based on field observations that may help to maintain a safe and trouble-free operation,

In summary, the Greene County Fly Ash Dam is **SATISFACTORY** for continued safe and reliable operation, with no recognized existing or potential management unit safety deficiencies.

## PURPOSE AND SCOPE

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

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

EPA requested that utility companies identify all management units including surface impoundments or similar diked or bermed management units or management units designated as landfills that receive liquid-borne material used for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom

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ash, boiler slag, or flue gas emission control residuals. Utility companies provided information on the size, design, age and the amount of material placed in the units. The EPA used the information received from the utilities to determine preliminarily which management units had or potentially could have High Hazard Potential ranking.

The purpose of this report is to evaluate the condition and potential of waste release from the selected High Hazard Potential management units. This evaluation included a site visit. Prior to conducting the site visit, a two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal agencies regarding the unit hazard potential classification (if any) and accepted information provided via telephone communication with the management unit owner. Also, after the field visit additional information were received by Dewberry & Davis LLC about the Greene County Plant Fly Ash Dam that were reviewed and used in preparation of this report.

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

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

## 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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- Doc 03: Elevation Check Survey
- Doc 04: Alabama Power Response to Environmental Protection Agency Request for Information
- Doc. 05: Ash Pond Dike Improvements, Drawing No. E 546458
- Doc. 06: Site Area Topographic Map
- Doc 07: 2007 Dam Inspection Report
- Doc 08: 2009 Dam Inspection Report
- Doc 09: 2010 Dam Inspection Report
- Doc 10: Alabama NPDES Permit No. 0002917
- Doc. 11: Greene County Steam Plant Unit 1: Ash Disposal Pond Dike, Drawing D141828, dated September 4, 1964
- Doc 12: Technical Specifications Section 31 for 2009 East Dike Improvements, dated July 13, 2009
- Doc. 13: Ash Pond East Dike Improvements – Topographic Survey with Boring Locations and Grading Plan, Drawing No. E 546457
- Doc. 14: Southern Company Generation Safety Procedure for Dams and Dikes, dated June 29, 2009
- Doc. 15: Discharge Stream Assembly and Concrete Details for New Pond Discharge, Drawing D312781, dated October 1, 1976
- Doc. 16: Plant Greene County Ash Pond Hydrology Study, dated June 25, 2010
- Doc .17: Slope Stability Analyses of Ash Pond, dated July 9, 2010
- Doc. 18: Slope Stability Analyses of Ash Pond, Rev. 1, dated July 15, 2010
- Doc 19: Soil Boring Logs

## Appendix B

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## Appendix C

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## 1.0 Conclusions and Recommendations

### 1.1 CONCLUSIONS

Conclusions are based on visual observations from a one-day site visit and review of technical documentation provided by Alabama Power.

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

The dike embankments and spillway appear to be structurally sound based on a review of the engineering data provided by the owner's technical staff and Dewberry engineers' observations during the site visit.

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

Hydrologic and hydraulic data provided to Dewberry for review indicate adequate impoundment capacity to contain the 1 percent probability design storm without overtopping the dikes.

#### 1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

The supporting technical documentation is adequate. Engineering documentation reviewed is referenced in Appendix A.

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

The description of the management unit provided by Alabama Power was an accurate representation of what Dewberry observed in the field.

#### 1.1.5 Conclusions Regarding the Field Observations

Dewberry staff was provided access to all areas in the vicinity of the management units required to conduct a thorough field observation. The visible parts of the dike embankments and outlet structure were observed to have no signs of overstress, significant settlement, shear failure, or other signs of instability, although visual observations were hampered by the presence of thick vegetation in some areas. Embankments visually appear structurally sound. There are no indications of unsafe conditions or conditions needing remedial action.

#### 1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation

The current maintenance and methods of operation appear to be adequate for the fly ash management unit. There was no evidence of repaired embankments or prior releases observed during the field inspection.

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## 1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

The surveillance program appears to be adequate. The management unit dikes are not instrumented. Based on the size of the dikes, the history of satisfactory performance and the current inspection program, installation of a dike monitoring system is not needed at this time.

## 1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation

**The facility is SATISFACTORY for continued safe and reliable operation. 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.**

## 1.2 RECOMMENDATIONS

### 1.2.1 Recommendations Regarding the Structural Stability

No recommendations appear warranted at this time.

### 1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety

No recommendations appear warranted at this time.

### 1.2.3 Recommendations Regarding the Supporting Technical Documentation

No recommendations appear warranted at this time.

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

No recommendations appear warranted at this time.

### 1.2.5 Recommendations Regarding the Field Observations

No recommendations appear warranted at this time.

### 1.2.6 Recommendations Regarding the Maintenance and Methods of Operation

The following recommendations may help maintain safe and trouble-free operation:

- Investigate cause of and monitor wet spots at toe of the dam
- Continually repair animal burrows
- Monitor encroachment of vegetation

### 1.2.7 Recommendations Regarding the Surveillance and Monitoring Program

No recommendations appear warranted at this time.

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## 1.2.8 Recommendations Regarding Continued Safe and Reliable Operation

No recommendations appear warranted at this time.

## 1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

### 1.3.1 List of Participants

Steven Burns, Balch and Bingham  
Jacob Jordan, Southern Company  
Jim Pegues (Field Observations only), Southern Company  
Tommy Ryals, Alabama Power Company  
Larry Keith, Alabama Power Company  
Charles Tugwell, Alabama Power Company  
Joseph P. Klein, III, P.E., Dewberry  
Julia Moline, E.I.T., Dewberry

### 1.3.2 Acknowledgement and Signature

We acknowledge that the management unit referenced herein has been assessed on June 24, 2010.



A handwritten signature in black ink, reading "Julia Moline". Below the signature is a horizontal line, and underneath that line, the text "Julia Moline, EIT, CFM" is printed in a small, black, sans-serif font.

## 2.0 Description of the Coal Combustion Waste Management Unit(s)

### 2.1 LOCATION AND GENERAL DESCRIPTION

The Greene County Steam Plant is located by the Black Warrior River bank near Demopolis, Alabama. The plant is operated by Alabama Power Company, an operating unit of Southern Companies. The Fly Ash Pond is adjacent to the plant. A project location aerial photograph is provided in Appendix A – Doc. 01. An aerial photograph of the impoundment is provided in Appendix A – Doc. 2

The Greene County Fly Ash Dike is a continuous clayey sand fill embankment that impounds fly ash and pond water. It was constructed between 1960 and 1965.

Dike	Crest Elevation <sup>1</sup>
East	102.6 – 113.6
South	91.0 – 103.0
West	95.4 – 103.2
North	103.3 – 113.6

<sup>1</sup> Survey Elevation Check of Dike (See Appendix A – Doc. 03)

The maximum height of the dike is 25 feet. The impoundment area is approximately 474 acres and has a storage capacity of 8,600,000 cubic yards (5,330 acre-feet) (See Appendix A – Doc. 4). Construction began on the dike in 1960, and the plant opened for operation in 1965. Between 1998 and 2005, the east and west dikes were raised by 2-3 feet. In 2009, the east dike was widened on the inside of the embankment, and in 2010 the base width of the west dike was increased.

### 2.2 SIZE AND HAZARD CLASSIFICATION

The classification for size, based on the height of the dam is “Small” and based on the storage capacity is “Intermediate” in accordance with the USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106 criteria summarized in Table 2.2a.

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

Alabama does not have a dam safety program, and the Greene County Fly Ash Dike is not in the National Inventory of Dams, therefore the dike does not have an established hazard classification. Dewberry conducted a qualitative hazard classification based on the 2004 Federal Guidelines for Dam Safety classification system (shown in Table 2.2b).

<b>Table 2.2b: FEMA Federal Guidelines for Dam Safety Hazard Classification</b>		
	<b>Loss of Human Life</b>	<b>Economic, Environmental, Lifeline Losses</b>
Low	None Expected	Low and generally limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected	Yes (but not necessary for classification)

Loss of human life is not probable in the event of a catastrophic failure of the dikes. However, a failure of the dikes is expected to have a significant economic and environmental impact. Therefore, Dewberry evaluated the east and north dikes as “**significant hazard potential**”.

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

The data reviewed by Dewberry did not include the volume of residuals stored in the fly ash pond at the time of inspection. The pool elevation is approximately 87.5 feet, and the surface area of the pond is approximately 474 acres.

<b>Table 2.3: Amount of Residuals and Maximum Capacity of Unit</b>	
<b>Greene County Fly Ash Pond</b>	
<b>Surface Area (acre)<sup>1</sup></b>	474
<b>Current Storage Capacity (cubic yards)<sup>1</sup></b>	4,700,000
<b>Current Storage Capacity (acre-feet)</b>	2,913
<b>Total Storage Capacity (cubic yards)<sup>1</sup></b>	8,600,000
<b>Total Storage Capacity (acre-feet)</b>	5,331
<b>Crest Elevation (feet)</b>	91.0 to 113.6
<b>Normal Pond Level (feet)</b>	87.5

<sup>1</sup> See Appendix A – Doc. 04

### 2.4 PRINCIPAL PROJECT STRUCTURES

#### 2.4.1 Earth Embankment

The dike is an earthen embankment. The crest width ranges from approximately 30 to 50 feet. The perimeter of the dike is approximately 18,155 feet. The inside slope of the dike embankment ranges from approximately 2.5:1 to 3:1 on each dike. The outside slopes of the dike embankment range from approximately 2.5:1 to 3:1 on the south, west, and north dikes. The outside slope embankment ranges from approximately 1.1:1 to 1.9:1 on the east dike (See Appendix A – Doc. 05). Much of the embankment is covered in

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various species of tall grass, though the grass is spotty in most areas. Several areas of the embankment were recently regraded and have been seeded. The outside slope of the east embankment is covered in dense vegetation (various species of tall grass and other plants). A small portion of the north embankment is also covered in rip-rap. The rip-rap area is used for vehicle access to the crest. The dike crest ranks from 91.9 feet to 113.6 feet. Table 2.4.1 displays a summary of the dimensions of the Greene County Fly Ash Dike.

	<b>East Dike</b>	<b>South Dike</b>	<b>West Dike</b>	<b>North Dike</b>
<b>Dam Height</b>	25'	25'	25'	25'
<b>Crest Width</b>	30'-50'	30'-50'	30'-50'	30'-50'
<b>Length</b>	9,375'	2,150'	5,530'	1,100'
<b>Side Slopes (inside)</b>	2.5: to 3:1	2.5	3:1	2.5
<b>Side Slopes (outside)</b>	1.1:1 to 1.9:1	2.5	3:1	2.5
<b>Hazard Classification</b>	Significant	Significant	Significant	Significant

## 2.4.2 Outlet Structures

The impoundment has a concrete riser/manhole 60" in diameter with invert elevation at 79.0' and a concrete pipe 30" in diameter which discharges through a spillway into the Black Warrior River. There is a corrugated metal skimmer around the riser with a metal grate walkway for access. Adjacent to the riser is a depth gauge to show the water level.

The impoundment has no emergency spillway.

## 2.5 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

Critical infrastructure inventory data were not provided to Dewberry for review.

Based on available area topographic maps, surface drainage in the area of the Fly Ash Pond is to the southwest. A bend in the Warrior River intercepts surface runoff approximately 2 to 3 miles southwest of the Fly Ash Pond (See Appendix A Doc. 06). Releases from the east side of the impoundment will discharge into the barge canal used to transport coal to the plant. Based on available area aerial photographs and a brief driving tour of the area Dewberry did not identify critical infrastructure assets down gradient of the Fly Ash Pond.

The nearest town, Demopolis, is approximately 7 miles down gradient from the impoundment.

## 3.0 Summary of Relevant Reports, Permits, and Incidents

### 3.1 SUMMARY OF REPORTS ON THE SAFETY OF THE MANAGEMENT UNIT

Alabama Power provided reports of three dam safety reports of inspections conducted by Southern Company engineers. The reports provided included:

- "Greene County Steam Plant Ash Pond Dam, Report of Biennial Dam Safety Inspection, November 14, 2007 (See Appendix A – Doc. 07)
- "Greene County Steam Plant Ash Pond Dam, Dam Safety Inspection", report dated September 3, 2009 (See Appendix A – Doc. 08)
- "Greene County Steam Plant Ash Pond Dam, 2010 Dam Safety Inspection", dated June 16, 2010 (See Appendix A – Doc. 09)

The 2007 report concluded that the structures appeared to be performing adequately and no conditions were observed that would affect the continued safe operation of the impoundment. The report included maintenance items to:

- Manage vegetation along east and south dikes
- Destroy beaver dams
- Correct water flow along top and downstream slope of north dike to prevent further erosion

The 2009 report concluded that the structures appeared to be performing adequately and no conditions were observed that would affect the continued safe operation of the impoundment. The report included maintenance items to:

- Establish grass cover in areas where none exists;
- Repair erosion along toe of east dike;
- Recognize that clearing has resulted in scalping in some areas;
- Repair animal burrows;
- Watch areas of erosion and seepage;

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The 2010 report concluded that the structures appeared to be performing adequately and no conditions were observed that would affect the continued safe operation of the impoundment. The report included maintenance items to:

- Armor sloughs along east dike
- Repair areas damaged by equipment traffic
- Flatten over steepened areas along south dike
- Cut back trees encroaching at toe
- Flatten flanks of dam crest
- Clear toe of west dike of vegetation, where possible
- Monitor wet spots

The 2010 report noted that the recommendations presented in the 2009 inspection report have been completed or were in progress at the time of the 2010 inspection.

### 3.2 SUMMARY OF LOCAL, STATE, AND FEDERAL ENVIRONMENTAL PERMITS.

The State of Alabama has not implemented a dam safety program; therefore there is no local or state permit. However, discharge from the impoundment is regulated by the Alabama Department of Environmental Management.

The impoundment has been issued a National Pollutant Discharge Elimination System Permit; Permit No. AL 0002917 was issued September 10, 2007, and expires September 30, 2012 (See Appendix A – Doc 10).

### 3.3 SUMMARY OF SPILL/RELEASE INCIDENTS

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

## 4.0 Summary of History of Construction and Operation

### 4.1 SUMMARY OF CONSTRUCTION HISTORY

#### 4.1.1 Original Construction

The Greene County Fly Ash Pond was constructed beginning in 1960, and was completed in 1965. The original design crest elevation was 94 feet (See Appendix A – Doc. 11).

#### 4.1.2 Significant Changes/Modifications in Design since Original Construction

In 1998, approximately 2,250 feet of the east dike was raised by 2 to 3 feet. A similar project began on the west dike in 1998, and was completed in 2005. In 2009, the east dike was widened by adding to the inside section. Material used to add to the dike was excavated from an area of the impoundment pool at the south end of the fly ash pond. Technical Specifications, plan drawings, and section drawings were provided for the 2009 east dike improvements (Appendices A- Docs. 12, 13, and 05 respectively). In 2010, the base width of the west dike was increased.

#### 4.1.3 Significant Repairs/Rehabilitation since Original Construction

No information was provided regarding major repairs or rehabilitation. No evidence of prior releases, failures, or patchwork was observed on the earthen embankment during the visual site assessment and no documents or statements were provided to the dam assessor that indicates that prior releases or failures have occurred.

### 4.2 SUMMARY OF OPERATIONAL PROCEDURES

#### 4.2.1 Original Operational Procedures

The impoundment was designed and operated for fly ash sedimentation and control. The pond receives plant process waste water, coal combustion waste slurry, and stormwater runoff from the pond embankments. Treated (via sedimentation) process water is discharged through an overflow outlet structure.

#### 4.2.2 Significant Changes in Operational Procedures and Original Startup

No documents were provided to indicate any operational procedures have changed.

#### 4.2.3 Current Operational Procedures

Operational procedures put into effect in 2009 have been implemented at the Greene County Steam Plant Fly Ash Pond (See Appendix A – Doc. 14)

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## 4.2.4 Other Notable Events since Original Startup

No additional information was provided to Dewberry of other notable events impacting the operation of the impoundment.

## 5.0 Field Observations

### 5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel Joseph P. Klein, III, P.E. and Julia Moline, E.I.T., performed a site visit on Thursday, June 24, 2010 in company with the participants.

The site visit began at 9:00 AM. The weather was hot and sunny. Photographs were taken of conditions observed. Please refer to photographs in Appendix B and the Dam Inspection Checklist in Appendix C. Selected photographs are included here for ease of visual reference. All pictures were taken by Dewberry personnel during the site visit.

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

### 5.2 EAST DIKE

#### 5.2.1 Crest

The crest of the east dike had no signs of depressions, tension cracks, or other indications of settlement or shear failure, and appeared to be in satisfactory conditions. Figure 5.2.1-1 shows the conditions of the crest of the east dike. Scattered rodent holes were observed along the crest of the east dike.



Figure 5.2.1-1. Photo Showing Crest of East Dike.

## 5.2.2 Upstream/Inside Slope

The inside or upstream dike embankments include areas protected by various species of grass and areas of bare earth. Figure 5.2.2-1 shows the general condition of the grass-covered inside slope of the east dike. Figure 5.2.2-1 shows the unprotected bare earth interior slope of the east dike. Photographs 1 and 2, Appendix B provide additional views of the crest and inside slope of the east dike.

Subsequent to the site visit Dewberry was informed that the bare earth observed on the east dike had recently been graded at the conclusion of maintenance operations and the standard procedures for establishing grass at that location were being followed.



Figure 5.2.2-1. Photo Showing Grassed Area of the Inside Slope of the East Dike.



Figure 5.2.2-2. Photo Showing Bare Earth Area of the Inside Slope of East Dike.

There were no observed scarps, sloughs or other indications of slope instability or signs of erosions.

### 5.2.3 Downstream/Outside Slope and Toe

The downstream or outside slope of the east dike embankment borders the barge canal used to supply coal to the plant. The outside slope is covered with various species of tall grass and other vegetation. The steepness of the slope makes access difficult. Dewberry inspectors were not able to access the toe of the embankment. Inspection reports noted erosion at the toe of the embankment; photographs taken by Dewberry indicate areas of minor erosion along the canal water line. In addition, some minor sloughs and bulges were observed along the slope as well as animal burrows. Figure 5.2.3-1 shows the outside slope of the east dike along the barge canal.



Figure 5.2.3-1. Outside Slope of East Dike.

Areas of minor erosion and surface damage repairs were observed at the south end of the east dike embankment. Figure 5.3.2-2 shows an area of localized repair and maintenance of the outside slope at the south end of the east dike. Photographs 3 – 8, Appendix B, provide additional views of the outside slopes and toe of the east dike.



Figure 5.2.3-2. Photo Showing Minor Repair Area - Outside Slope of East Dike

## 5.2.4 Abutments and Groin Areas

The dike is continuous therefore there are no abutments. Descriptions of groin areas are included in the description of the dike crest and slopes.

## 5.3 SOUTH DIKE

### 5.3.1 Crest

The crest of the south dike had no signs of any depressions, tension cracks, or other indications of settlement or shear failure, and appeared to be in satisfactory condition. Portions of the crest were recently flattened/re-graded based on recommendations made in the 2010 Inspection Report. Figure 5.3.1-1 shows the conditions of the dike crest. Photographs 9 and 10, Appendix B provide additional views of the crest of the south dike.



Figure 5.3.1-1. South Dike Crest

### 5.3.2 Upstream/Inside Slope

The inside slope of the south dike is vegetated with grass. There were no observed scarps, sloughs, bulging, cracks, scarps, or depressions or other indications of slope instability or signs of erosion. Figure 5.3.2-1 shows the general condition of the inside slope of the south dike.



Figure 5.3.2-1. Inside Slope of South Dike.

### 5.3.3 Downstream/Outside Slope and Toe

The outside slope is covered in various species of tall grass in some parts; in others, a previously reported disturbed area of the slope (See Appendix A – Doc. 09) has been re-graded and seeded. There were no observed scarps, sloughs, bulging, cracks, scarps, or depressions or other indications of slope instability or signs of erosion. The outside slope borders areas of swamp and dense vegetation including trees and ivy. Figure 5.3.3-1 shows the general condition of the outside slope. Figure 5.3.3-2 shows the area that has been re-graded and seeded. Photographs 11 – 13, Appendix B provide additional views of the outside slopes of the south dike.



Figure 5.3.3-1. Photo Showing Typical Condition of Outside Slope of South Dike



Figure 5.3.3-2. Photo Showing Recently Re-graded and Seeded Area - Outside Slope of South Dike

Dewberry observed several soft spots and wet spots at the toe, although these did not appear to be evidence of seepage. In some areas, wet spots appeared to be pooled rainwater in depressions left by maintenance equipment. The 2010 Dam Safety Inspection Report (See Appendix A – Doc. 09) recommended that areas damaged by equipment traffic be repaired. Figure 5.3.3-3 shows a typical wet spot observed at the toe.



Figure 5.3.3-2. Wet Spot at Toe - Outside Slope South Dike.

## 5.3.4 Abutments and Groin Areas

The groin area formed at the junction of the south and west dikes appeared to have been recently widened. Figure 5.3.4-1 shows the newly widened groin area, and Figure 5.3.4-2 shows rip-rap stored along the newly widened crest.



Figure 5.3.4-1. Photo Showing Recent Widened Groin Area at Intersection of South and West Dike Embankments



Figure 5.3.4-2. Photo Showing Graded Materials Storage on Widened Groin Area at Intersection of South and West Dike Embankments

## 5.4 WEST DIKE

### 5.4.1 Crest

The crest of the west dike had no signs of depressions, tension cracks, or other indications of settlement or shear failure, and appeared to be in satisfactory condition. Figure 5.4.1-1 shows the conditions of the dike crest. Photographs 14 – 16, Appendix B provide additional views of the crest of the west dike.



Figure 5.4.1-1. Crest of West Dike

### 5.4.2 Upstream/Inside Slope

Most of the inside slope of the west dike embankment is covered in grass, although in areas the grass is sparse. At the south end, there is no grass cover but the slope has been seeded. There were no observed scarps, sloughs, bulging, cracks, scarps, or depressions or other indications of slope instability or signs of erosion. Figure 5.4.2-1 shows the general condition of the inside slope of the west dike. Photographs 17 and 18, Appendix B, provide additional views of the inside slope of the west dike.



Figure 5.4.2-1. Inside Slope of West Dike

### 5.4.3 Outside Slope and Toe

The outside slope is covered in various species of tall grass; grass cover is spotty along the dike. There were no observed scarps, sloughs, bulging, cracks, scarps, or depressions or other indications of slope instability or signs of erosion. The outside slope borders areas of swamp and dense vegetation including trees and ivy. In the northern section of the dike, there are some areas of flat grassy plain between the toe and the vegetated/marshy areas. The 2010 Dam Safety Inspection Report, (See Appendix A- Doc 09), recommended that, as much as possible, vegetation be cleared from the toe of the west dike. Figure 5.4.3-1 shows the general condition of the outside slope. Figure 5.4.3-2 shows the condition of the outside slope in the northern section, where there is some flat grassy plain between the toe and the vegetated area. Photographs 19 – 21, Appendix B provide additional views of the outside slope of the west dike.

# FINAL



Figure 5.4.3-1. Photo Showing Outside Slope of West Dike at South Section.



Figure 5.4.3-2. Photo Showing Outside Slope of West Dike at Northern Section.

Dewberry observed several soft spots and wet spots at the toe, although these did not appear to be evidence of seepage. In some areas, wet spots appeared to be pooled rainwater in depressions left by equipment. The 2010 Dam Safety Inspection Report (See Appendix A – Doc 09) recommended that areas damaged by equipment traffic be repaired. Figure 5.4.3-3 shows a wet spot at the outside toe



Figure 5.4.3-3. Wet Spot at Toe – Outside Slope West Dike

#### 5.4.4 Abutments and Groin Areas

The dike is continuous therefore there are no abutments. Descriptions of groin areas are including in the description of the dike crest and slopes.

#### 5.5 NORTH DIKE

##### 5.5.1 Crest

The crest of the north dike had no signs of any depressions, tension cracks, or other indications of settlement or shear failure, and appeared to be in satisfactory conditions. Figure 5.5.1-1 shows the conditions of the dike crest. Photograph 22, Appendix B provides an additional view of the crest of the north dike.



Figure 5.5.1-1. Crest of North Dike

## 5.5.2 Upstream/Inside Slope

The inside slope of the north dike embankment is covered in grass, although some of the grass is sparse. Although minor surface irregularities were observed, there were no observed scarps, sloughs, bulging, cracks, scarps, or depressions or other indications of slope instability or signs of erosion. Figure 5.5.2-1 shows the general condition of the inside slope of the west dike embankment.



Figure 5.2.2-1. General Condition of Inside Slope of North Dike.

## 5.5.3 Downstream/Outside Slope and Toe

Most of the outside slope is covered in various species of tall grass, although in some areas grass cover is sparse. In one area, the outside slope is covered in riprap to allow for vehicle access. There were no observed scarps, sloughs, bulging, cracks, scarps, or depressions or other indications of slope instability or signs of erosion. Figure 5.5.3-1 shows the general condition of the outside dike. Figure 5.5.3-2 shows the vehicle access area of the north dike. Photographs 23 and 24, Appendix B provide additional views of the downstream slope of the north dike.



Figure 5.5.3-1. General Condition of Outside Slope of North Dike



Figure 5.5.3-2. Vehicle Access Area

#### 5.5.4 Abutments and Groin Areas

The dike is continuous therefore there are no abutments. Descriptions of groin areas are included in the description of the dike crest and slopes.

#### 5.6 OUTLET STRUCTURES

##### 5.6.1 Overflow Structure

As described on the discharge stream assembly drawings (See Appendix A- Doc. 15), the impoundment has a 60-inch diameter concrete riser/manhole with invert elevation at 79.0' and a concrete pipe 30" in diameter which discharges through a spillway into the Black Warrior River. There is a corrugated metal skimmer around the riser with a metal grate walkway for access. Adjacent to the riser is a depth gauge to show the water level

The primary overflow structure was observed to be working properly, discharging flow from the pond, and visually appeared to be in satisfactory condition. There was no sign of clogging of the spillway and the water exiting the outlet was flowing clear. Figure 5.6.1-1 shows the main outlet structure. Photographs 24 and 26, Appendix B provide additional views of the spillway riser.



Figure 5.6.1-1. Main Outlet Structure.

## 5.6.2 Outlet Conduit

The outlet conduit appeared to be in good shape and operating normally with no sign of clogging and the water exiting the outlet was flowing clear. Figure 5.6.2-1 shows the water discharging from the main spillway tunnel outfall. Photographs 27 and 28, Appendix B provide additional views of the spillway outfall conduit and channel.

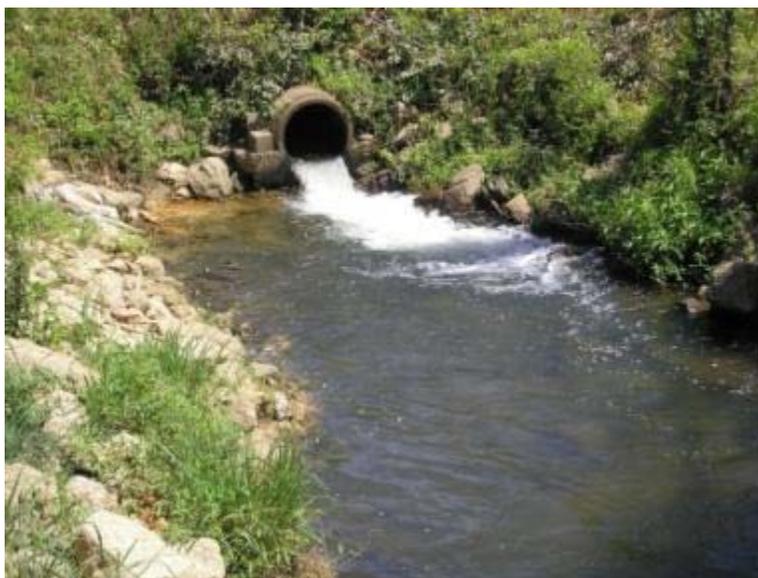


Figure 5.6.2-1. Main Spillway Outfall.

5.6.3 Emergency Spillway

No emergency spillway is present.

5.6.4 Low Level Outlet

No low level outlet is present.

## 6.0 Hydrologic/Hydraulic Safety

### 6.1 SUPPORTING TECHNICAL DOCUMENTATION

#### 6.1.1 Flood of Record

No documentation has been provided about the flood of record.

#### 6.1.2 Inflow Design Flood

Southern Company Engineering and Construction Services conducted a hydrologic and hydraulic analysis of the capacity of the Fly Ash Pond to store water from the design storm event (See Appendix A – Doc. 16). The design storm was a 100-year (1 percent probability in a given year), 24 hour event with an estimated intensity of 9.5-inches. The report estimates that the 1 percent probability storm can be retained in the Fly Ash Pond, raising the spillway pond water elevation to about 90.5 feet, leaving a freeboard of at least 1.5 feet.

#### 6.1.3 Spillway Rating

No spillway hydraulic data were provided for review.

#### 6.1.4 Downstream Flood Analysis

No downstream flood analysis data were provided for review

### 6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Supporting documentation reviewed by Dewberry is adequate.

### 6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

Based on the calculations provided in the hydrologic and hydraulic study (See Appendix A – Doc 16) the Fly Ash Pond can retain the 1 percent design storm event with a freeboard safety of at least 1.5 feet. Hence dike failure by overtopping seems improbable.

## 7.0 Structural Stability

### 7.1 SUPPORTING TECHNICAL DOCUMENTATION

#### 7.1.1 Stability Analyses and Load Cases Analyzed

The July 9, 2010 Plant Greene County Ash Pond, Slope Stability Analyses of Ash Pond (See Appendix A – Doc. 16) summarizes a recent stability analysis following the general guidelines of the US Army Corps of Engineers slope stability engineering manual. The findings were updated July 15, 2020 Slope Stability Analyses of Ash Pond, Rev. 1 (See Appendix A – Doc. 17) The assessment used historical data from soil test borings drilled along the dike embankments. (See Appendix A – 18). The assessment also used historic soil classification and shear strength laboratory results (See Appendix A – Doc. 19).

The stability analyses included the results of three loading conditions:

Steady state conditions based on ground water levels measured at the time of the borings

Seismic loading applied to the steady state loading

A horizontal acceleration of 0.1 g used for seismic loading

Static analysis under rapid draw down conditions.

Based on the results of the analyses it was concluded that the embankments have stability safety factors at or above the minimum recommended values.

#### 7.1.2 Design Parameters and Parameters of Materials

Documentation provided to Dewberry for review was July 15, 2010 Plant Greene County Ash Pond, Slope Stability Analyses of Ash Pond, Rev. 1 (See Appendix A – Doc. 18). The documentation indicated the stability analyses assumed seven material strata: original dike fill; 2009 dike fill; fly ash; soft, organics and silty clay; silty clay, and fine sand and silty sand. The material properties used for the primary stability analyses are shown in Table 7.1.2.

<b>Soil Strata</b>	<b>Unit Weight (pounds/cubic foot)</b>	<b>Cohesive Strength (pounds/square foot)<sup>1</sup></b>	<b>Angle of Internal Friction<sup>1</sup></b>
Original dike fill	113	0 (200)	32 <sup>0</sup> (28 <sup>0</sup> )
2009 dike fill	115	0	30 <sup>0</sup>
Fly ash	80	0	28 <sup>0</sup>
Soft organics and silty clay	90	300 (500)	0 (0)
Silty clay	105	0 (500)	28 <sup>0</sup> (20 <sup>0</sup> )
Fine sand and silty sand	115	0	35 <sup>0</sup>

<sup>1</sup> Values without parentheses are effective strength. Values in parentheses are total strength.

## 7.1.3 Uplift and/or Phreatic Surface Assumptions

No documentation of uplift calculations was provided to Dewberry for review. Based on the Geotechnical Findings (See Appendix A – Doc. 18) the initial phreatic surface was assumed to be at the elevation measured in the borings, projected into the ash stacks.

## 7.1.4 Factors of Safety and Base Stresses

The safety factors computed in the Slope Stability Analysis report (See Appendix A - Doc. 18) are listed in Table 7.1.4.

<b>Table 7.1.4 Factor of Safety E. C. Gaston Fly Ash Pond</b>				
Location	Loading Condition	US Corps of Engineers Recommended Minimum Safety Factors	Upstream Slope	Downstream Slope
East Dike	Steady State	1.5	1.8	1.7
	Steady State with Seismic Loading	1.1	1.4	1.4
South Dike	Steady State	1.5	1.7	1.4
	Steady State with Seismic Loading	1.1	1.2	1.1
	Rapid Draw Down	1.3	1.1	
West Dike – South	Steady State	1.5	2.8	1.5
	Steady State with Seismic Loading	1.1	2.1	1.1
West Dike - North	Steady State	1.5	3.7	1.6
	Steady State with Seismic Loading	1.1	2.6	1.8

The slope stability analyses indicate that with one exception, the calculated safety factors against slope failures are equal to, or greater than the recommended minimum values. The exception is the upstream slope, rapid drawdown analysis.

# FINAL

The stability analysis report (See Appendix A – Doc 18) concludes that the rapid drawdown of 1.1 is acceptable and that the probability of a catastrophic failure is low. The report indicates the conclusion is based on:

The operational characteristics of the impoundment do not lend itself to a rapid drawdown condition. The section with the lower safety factor is located near the discharge structure downstream of an internal diversion dike that currently retains most of the stored ash. This overflow discharge structure is generally not subject to rapid drawdown.

The location of the dike section is such that the probability of ash excursions is considered low.

The computed safety factor, although below the referenced minimum of 1.3, is sufficiently high to indicate the probability of a catastrophic failure is low.

Based on Dewberry's observations at the site, the overflow weir discussed in the slope stability analysis report is the only discharge location provided for the impoundment. As the weir outlet is uncontrolled, it does not provide the capability to conduct a rapid drawdown. Therefore Dewberry concurs with the conclusion that the probability of a catastrophic failure due to a rapid drawdown event is low.

## 7.1.5 Liquefaction Potential

The documentation reviewed by Dewberry did not include an evaluation of liquefaction potential. Foundation soil conditions do not appear to be susceptible to liquefaction.

## 7.1.6 Critical Geological Conditions

Surficial geologic deposits are sedimentary alluvial, coastal plain and low terrace deposits consisting of fine to coarse sands and silty sands with clay lenses and gravel deposits on scattered locations.

In the new stability analyses (See Appendix A – Doc. 18) a peak ground acceleration of 0.10g was used for seismic loading. The basis for the selection was not provided.

The current Seismic Risk Map of the United States was reviewed using the U.S. Geologic Survey web site. The 2% probability of exceedance in 50 years ground acceleration for rock at the site is 0.05g to 0.10 g. The seismic design criteria used in the analyses are appropriate for the Greene County Fly Ash Pond.

## 7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Structural stability documentation is adequate.

## 7.3 ASSESSMENT OF STRUCTURAL STABILITY

Overall, the structural stability of the dikes appears to be satisfactory based on the following observations during the June 24, 2010 filed visit and dam inspection by Dewberry, available recent dam inspection reports and the 2010 Slope Stability Analysis report (See Appendix A - Doc. 18):

- The crest appeared free of depressions and no significant vertical or horizontal alignment variations were observed,
- There were no indication of major scarps, sloughs or bulging along the dikes,
- Boils, sinks or uncontrolled seepage was not observed along the slopes, groins or toe of the dikes,
- The computed factors of safety comply with accepted criteria.

## 8.0 Adequacy of Maintenance and Methods of Operation

### 8.1 OPERATIONAL PROCEDURES

The facility is operated for storage of fly ash deposits. Treated coal combustion process waste water is discharged through an overflow outlet structure.

### 8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

The 2009 Safety Procedure for Dams and Dikes (See Appendix A – Doc. 14) establishes inspection and maintenance requirements for the impoundment dikes. The required procedures include:

- Weekly inspection by plant personnel,
- Annual inspections by Southern Company Generation Hydro Service dam safety engineers,
- Maintaining a uniform cover of suitable species of grass on embankment slopes which shall be mowed at least twice a year
- Dam crests shall be protected by a suitable granular surface, and
- Trees and woody brush should not be allowed on the slopes, crest and along the water line of the dikes unless an exception is approved by Southern Company Generation Hydro Services,

### 8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATIONS

#### 8.3.1 Adequacy of Operational Procedures

Based on the assessments of this report, operation procedures seem to be adequate.

#### 8.3.2 Adequacy of Maintenance

Various dam inspection reports, including Southern Company Dam Inspection Reports dated September 3, 2009 and June 16, 2010 (See Appendix A – Docs. 08 and 09 respectively) and the Dam Inspection Checklist of June 24, 2010 by Dewberry (See Appendix C – Doc 21 “Dam Inspection Checklist”) reported no major maintenance issues. The 2010 Southern Company Dam Inspection Report includes several maintenance recommendations but none that are considered critical or imminent. This indicates that the current maintenance plan is probably followed in practice and that adequate maintenance is provided for the dikes and project facilities.

# FINAL

Although maintenance appears to be adequate, several recommendations have been made. These include recommendations made in the 2010 inspection report:

- Armoring the narrow sloughs along east dike
- Repair areas damaged by equipment traffic
- Flatten over steepened areas along south dike to match the remainder of the embankment
- Cut back trees encroaching on the toe of the embankments
- Flatten flanks of dam crest to match the slope of the embankment
- Clear the toe of west dike of vegetation, where possible, without encroaching on the adjacent wetland
- Monitor wet spots

## 9.0 Adequacy of Surveillance and Monitoring Program

### 9.1 SURVEILLANCE PROCEDURES

#### Weekly Inspections

Weekly inspections are conducted by plant personnel. Inspection reports are submitted to the plant manager for review and appropriate corrective actions

#### Annual Inspections

Annual inspections are conducted by Southern Company Generation Hydro Services dam safety engineers. The frequency of inspections was increased from biannual to annual in the 2009 Safety Procedure for Dams and Dikes (See Appendix A – Doc. 18). The 2010 inspection report was submitted June 14, 2010 (See Appendix A – Doc. 13)

#### Special Inspections

No special inspections have been conducted at the Greene County fly ash pond.

### 9.2 INSTRUMENTATION MONITORING

The Green County Steam Plant fly ash impoundment dikes do not have an instrumentation monitoring system.

### 9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

#### 9.3.1 Adequacy of Inspection Program

Based on the data reviewed by Dewberry, including observations during the site visit, the inspection program is adequate.

#### 9.3.2 Adequacy of Instrumentation Monitoring Program

The Greene County fly ash dikes are not instrumented. Based on the size of the dikes, the portion of the impoundment currently used to store wet fly ash and stormwater, the history of satisfactory performance and the current inspection program, installation of a dike monitoring system is not needed at this time



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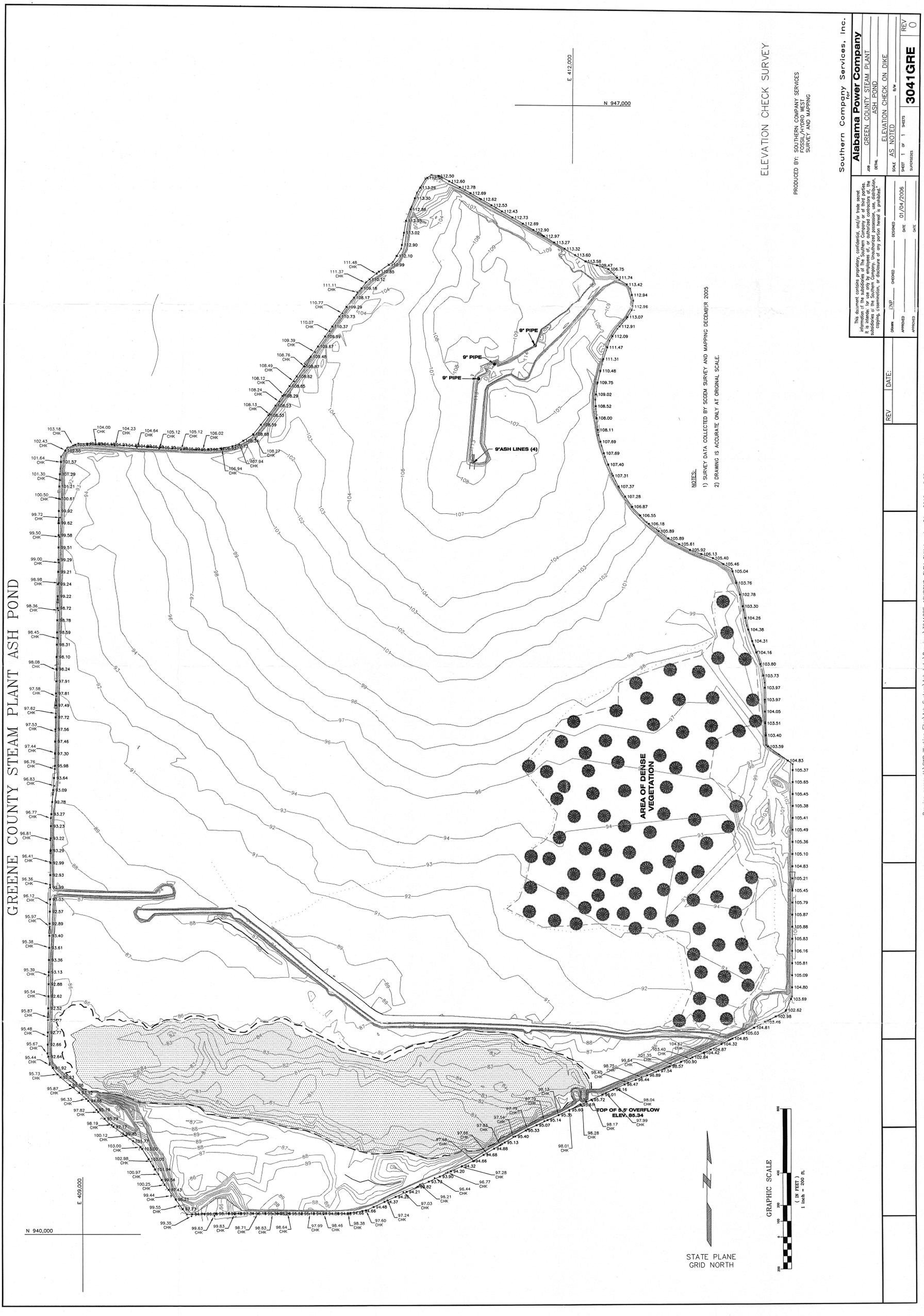
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Eye alt 13621 ft



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GC-API-0001



GREENE COUNTY STEAM PLANT ASH POND

ELEVATION CHECK SURVEY

NOTES:  
 1) SURVEY DATA COLLECTED BY SCGM SURVEY AND MAPPING DECEMBER 2005  
 2) DRAWING IS ACCURATE ONLY AT ORIGINAL SCALE.

PRODUCED BY: SOUTHERN COMPANY SERVICES  
 FOSSIL/HYDRO WEST  
 SURVEY AND MAPPING

Southern Company Services, Inc.

<b>Alabama Power Company</b>	
GREEN COUNTY STEAM PLANT	
ASH POND	
SCALE: AS NOTED	REV: 0
SHEET 1 OF 1	SUBSHEETS
DATE: 01/04/2006	BY: BM
DATE:	DATE:

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APPROVED:	DATE:

REV:	DATE:











ALABAMA POWER COMPANY RESPONSES TO EPA QUESTIONS  
REGARDING MANAGEMENT OF COAL COMBUSTION BY-PRODUCTS

GREENE COUNTY ELECTRIC GENERATING PLANT  
County Road 18  
Demopolis, Alabama 36732

March 26, 2009

Note: The text of EPA's questions is included below in *italics*. Alabama Power's responses are provided in plain text.

*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 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. 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 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.*

The Greene County ash pond dam is not listed in the National Inventory of Dams ("NID") database and therefore is not rated. No federal or state agency regulates the Greene County ash pond dam structures relative to the NID.

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

Available information indicates the Greene County ash pond dam went into service in 1964 and that the ash pond structure was expanded in 1996.

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).*

Fly ash, bottom ash, boiler slag, flue gas emission control residuals, and other (regulatory permitted low volume wastes, i.e., waste that is not hazardous for purposes of RCRA Subtitle C and is otherwise permitted under applicable regulations such as 40 C.F.R. § 423.11).

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?*

Alabama Power's review does not indicate the professional qualifications and credentials of those associated with the original design and construction of the Greene County ash pond dam in the early 1960s. However, the structure is supported by an operational history of more than 40 years. The dam has been subject to a comprehensive dam safety inspection program since 1971, including regular dam safety inspections by engineers who are employed by Southern Company Services and who hold current Professional Engineer licenses in Alabama.

5. [Response provided in an appendix.]

6. [Response provided in an appendix.]

7. [Response provided in an appendix.]

8. [Response provided in an appendix.]

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).*

Alabama Power's review provides no basis to indicate a spill or unpermitted release at the Greene County ash pond within the last ten years.

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

Alabama Power Company is the sole operator of this facility and owns approximately 60 percent. Mississippi Power Company owns the remaining interest.

###

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**CONFIDENTIAL BUSINESS INFORMATION**  
**NOT SUBJECT TO DISCLOSURE UNDER THE FREEDOM OF INFORMATION ACT**

**CONFIDENTIAL APPENDIX**

ALABAMA POWER COMPANY RESPONSES TO EPA QUESTIONS  
REGARDING MANAGEMENT OF COAL COMBUSTION BY-PRODUCTS

GREENE COUNTY ELECTRIC GENERATING PLANT  
County Road 18  
Demopolis, Alabama 36732

March 26, 2009

Note: The text of EPA's questions is included below in *italics*. Alabama Power's responses are provided in plain text. This confidential appendix provides only those questions and responses for which the response includes information subject to a claim of confidentiality.

*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 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. This includes units that no longer receive coal combustion residues or by-products, but still contain free liquids.*

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?*

The most recent dam safety inspection of the Greene County ash pond dam was conducted on January 14, 2009. The inspection was conducted by two engineers from Alabama Power's affiliate, Southern Company Services. The inspectors are both licensed Professional Engineers in Alabama, have multiple years of experience, and specialize in dam safety. The dam safety inspection of the Greene County ash pond dam is currently scheduled on an annual frequency. However, due to an accessibility issue related to a portion of the facility during the most recent inspection, an additional inspection is tentatively planned for April, 2009.

**DO NOT DISCLOSE**

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Certain minor repairs were recommended as a result of the most recent dam safety inspection of the Greene County ash pond dam. One involves repair to flatten the slope near the downstream toe of a short section of dike, which had inadvertently been steepened by dozer operations in the area beyond the toe. Another involves the repair of a small slide on the upstream slope of the dam near the discharge inlet structure. No conditions were noted that would affect the continued safe operation of the ash pond dam. Other recommendations can be characterized as maintenance or monitoring activities and required no action with respect to the structural integrity or continued safe operation of the dam. The actions taken in response to the recommendations require no engineering or dam safety credentials and have been or will be addressed by facility personnel in the course of their normal duties.

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.*

Alabama Power has identified no basis to indicate a federal or state agency has inspected or evaluated the ash pond at Greene County for purposes of the structural integrity of that structure.

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.*

See Question 6. In addition, Alabama Power's dam safety program has not identified any issues or conditions that would affect the continued safe operation of the facility.

8. *What is the surface area (acres) and total storage capacity of each of the management units? What is the volume of material 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.*

**DO NOT DISCLOSE**

**CONFIDENTIAL BUSINESS INFORMATION  
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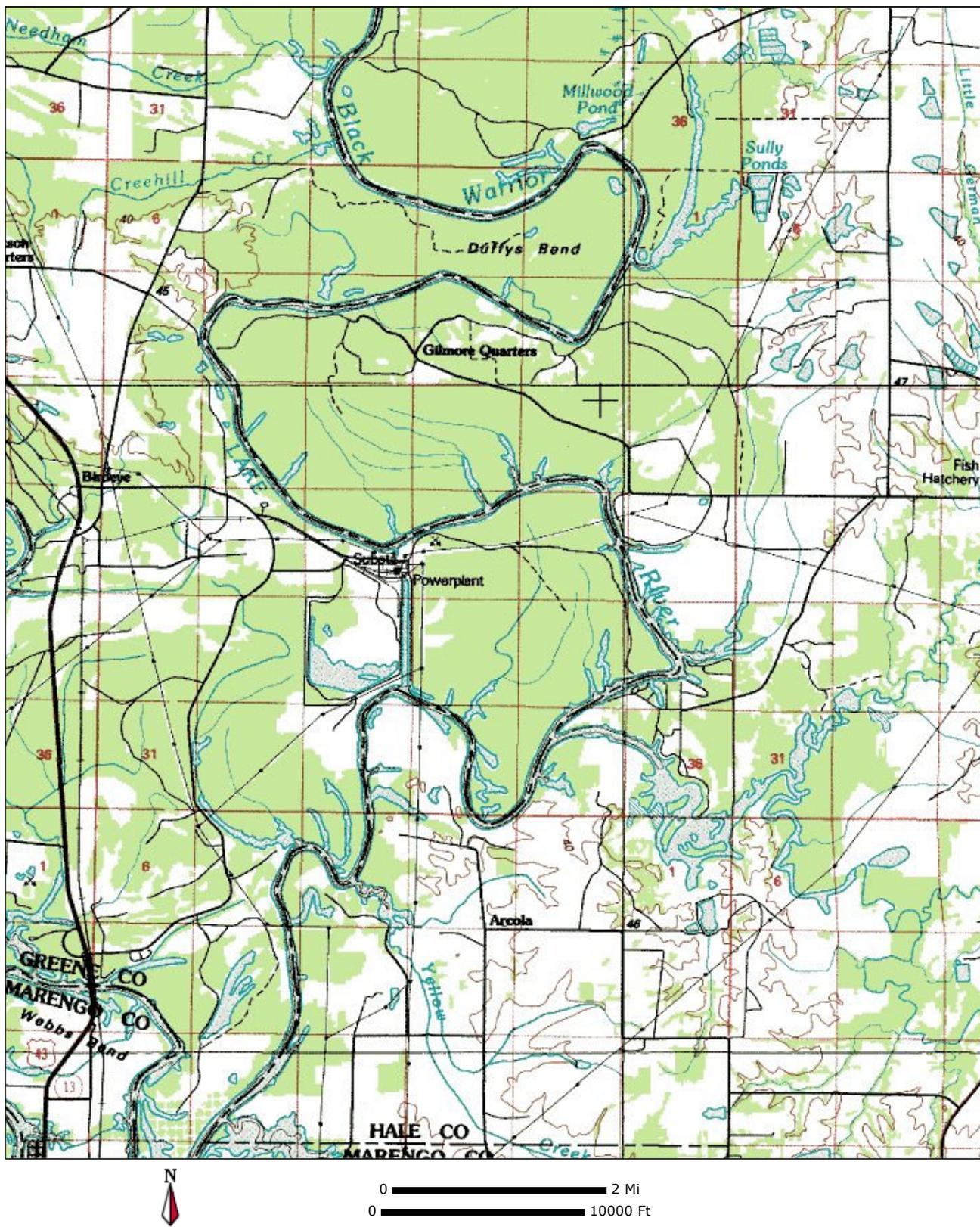
<b>Greene County Ash Pond</b>	
<b>Approximate acres</b>	474
<b>Approximate storage capacity (cubic yards)*</b>	8,600,000
<b>Approximate volume stored (cubic yards)*</b>	4,700,000
<b>Approximate date measurement taken</b>	2009
<b>Approximate maximum height</b>	25 feet

\* Cubic yard figures are estimates derived by qualified personnel from available information.

###



US EPA ARCHIVE DOCUMENT



Greene County Steam Plant Ash Pond Dam  
Report of Biennial Dam Safety Inspection  
November 14, 2007

General

The Green County Steam Plant ash pond dam inspection was conducted on Wednesday, November 14, 2007. The inspection team consisted of Larry Dunlap and Richard Mickwee. The team was accompanied on the inspection by Bob McCants of the plant staff. Weather conditions were sunny, clear, and mild. All sections of the main dam, the canal to the Black Warrior, and the discharge structure were included in the inspection.

Observations.

- Ash Pond East Dike

The inspection began at the east dike, beginning at the north and then moving to the south toward the river. Erosion of the toe of the dike, as noted in previous inspections, is continuing. This dike is alongside the canal to the Black Warrior and is also used by coal barges. We understand that the canal is dredged on a regular basis, and this may aggravate the toe erosion. It is recommended that this area be monitored.

After the inspection of the main dikes, the inspection team observed the east dike from the opposite side of the canal. The erosion of the canal bank was readily observed from this location (see Photos 1 and 2).

Based on conversations with Mr. McCants, it is the understanding of the inspection team that the downstream side of the east dike is periodically cleared by hand methods.

- Discharge Structure

The pond discharge inlet (see Photo 3) and outlet structures were inspected and observed to be in good condition. The flow from the discharge pipe was relatively clear. No problematic conditions were noted at the ash pond discharge point.

- South Dike

The south dike was inspected and generally found to be in good condition. A significant portion of the downstream side of the embankment was covered in very dense vegetation and trees (see Photo 4). It is the understanding of the inspection team that periodic clearing with a small bulldozer is performed in this area, but has not been done in some time. It is recommended that this clearing be done.

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- West Dike

The west Dike was inspected, beginning at the south end and proceeding north along the crest. The growth of underbrush along the downstream slope appeared to be controlled better than at the south dike (see Photos 5 and 6), and healthy stands of Bermuda grass were observed in many areas of the dike.

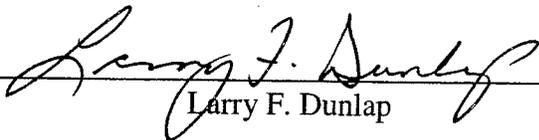
During the inspection, small beaver dams were noted inside the ash pond (see Photo 7), and in some cases water was being backed up almost to the crest of the dike. Based on conversations with Mr. McCants, the inspection team understands that periodically these dams are destroyed by the project staff. It is recommended that this practice continues.

- North Dike

The north dike was inspected, starting on the northwest corner of the ash pond. Generally, no unusual conditions were noted. However, at the time of our inspection water was observed to be flowing along the top and downstream slope of the dike in the area of the ash discharge. A small but significant erosion feature had developed as a result (see Photos 8 and 9). The surface water was due to discharge from a service water pipe, and we understand that this water was to be directed further into the pond area to prevent this from reoccurring.

### Conclusion

The project structures appear to be performing adequately. There were no conditions observed that, in the opinion of the inspection team, would affect the continued safe operation of the project. It is recommended that the periodic maintenance and inspection indicated by project staff be continued.

  
Larry F. Dunlap

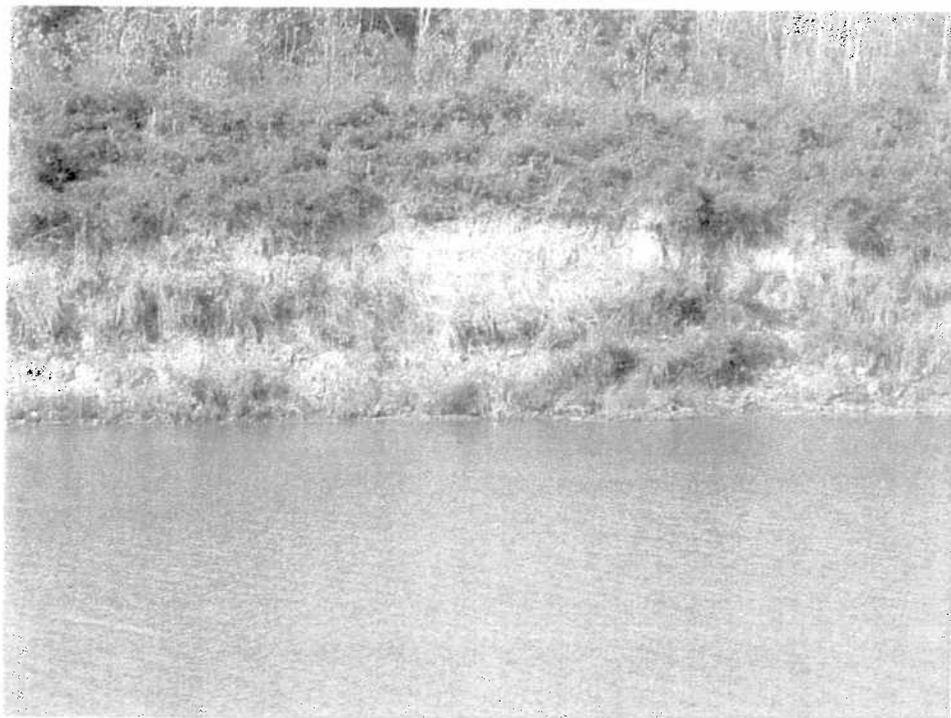
  
Richard L. Mickwee

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**Photo 1: Typical Photo of Canal Erosion, #1**

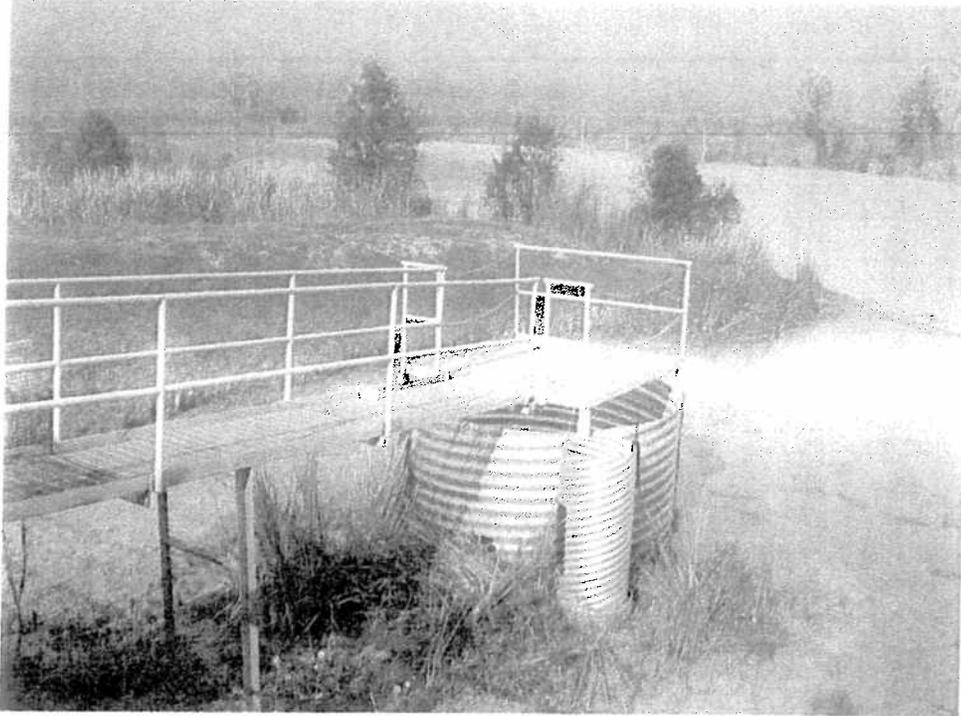


**Photo 2: Typical View of Canal Erosion, #2**



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**Photo 3: Ash Pond Discharge Inlet Structure**



**Photo 4: Trees and Dense Vegetation on Downstream Side of South Dike**



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**Photo 5: Downstream Side of West Dike Embankment, #1**



**Photo 6: Downstream Side of West Dike Embankment, #2**



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**Photo 7: Beaver Dam Inside the Ash Pond, Adjacent to West Dike Crest**



**Photo 8: Surface Water Flowing from Ash Discharge Area**



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**Photo 9: Rilling of Embankment Due to Surface Water**



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600 18th Street North  
Birmingham, AL 35203

205/257-1000



September 3, 2009

**Greene County Steam Plant**  
Dam Safety Inspection

Mr. Charles Tugwell  
Plant Manager  
Greene County Steam Plant  
Alabama Power Company

Dear Mr. Tugwell,

Enclosed please find the Report of Annual Dam Safety Inspection for the Greene County Steam Plant Ash Pond Dam based on the inspection performed on January 14, 2009, and a supplemental inspection performed on March 24, 2009. The inspection team, consisting of myself and Richard Mickwee, appreciate the support provided by Mr. Foy Wright and Mr. Bob McCants in coordinating and conducting this inspection. This report includes a discussion and photographs of site conditions noted during the inspection and a list of recommendations.

During the inspection, no conditions were noted that posed an immediate threat, or that would affect the continued safe operation of the facilities inspected. There are, however, some recommendations in the report for maintenance and monitoring related actions to reduce the likelihood of future problems:

- It is recommended that efforts be made to establish grass cover on areas of the embankment slopes where little or none exists, particularly on the downstream slope of the north dike. This vegetation should be controlled by a program of periodic mowing.
- Erosion along the west bank of the barge canal has progressed to a point where the downstream toe of the east dike (adjacent to the canal) has been affected. Repair and/or armoring of this area should be given strong consideration. We understand that SCG ES&EE and SCG Civil Design have developed a repair for this area, and the remedial construction work is underway. Please keep the inspection team informed as construction progresses.

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GC-API-0005

- Past clearing along portions of the south dike has resulted in a scalping and steepening of the slope near the toe of the embankment. At the time of our supplemental inspection these areas were being repaired. We recommend that these efforts continue, and once completed the embankment should be seeded with grass. Erosion protection measures, such as the spreading of straw over the embankment, may be required until the grass matures.
- Continue repairing animal burrows as they are observed.
- Several erosion features were noted along the dam crest. While these are not an immediate threat to dam safety, it is recommended that they be repaired.
- Some small areas of seepage were noted along the downstream toe of the north dike. It is recommended that the plant staff pay close attention to these areas during their regular inspections of the ash pond. It is possible that the seeps resulted from the prolonged rainfall during late December and early months of 2009 and may dry out during hotter and drier weather. We do not consider these seeps to be a major concern at this time, but any changes noted by the plant staff should be reported to SCG Hydro Services as soon as possible.

Details of the inspection were discussed with Mr. Wright at the conclusion of our January field visit, and with Mr. McCants, Mr. George Downer, and yourself at the conclusion of the supplemental field visit. If you have any questions, please do not hesitate to contact me at 8-257-1396, or Mr. Mickwee at 8-257-1322.

Respectfully,



Larry Durlap  
Principal Engineer  
SCG Hydro Services – Dam Safety

/enclosure

CC: **Alabama Power Company**  
Mr. Larry Keith  
Mr. Robert B. McCants, III

**Southern Company Generation**  
Mr. Eugene B. Allison, Jr.  
Mr. Richard L. Mickwee, II

**CONFIDENTIAL**

**GREENE COUNTY STEAM PLANT ASH POND DAM  
REPORT OF ANNUAL DAM SAFETY INSPECTION  
JANUARY 14 AND MARCH 24 - 2009**

GENERAL

The Greene County Steam Plant ash pond dam was inspected on Wednesday, January 14, 2009. The inspection team consisted of Larry Dunlap and Richard Mickwee with SCG Hydro Services. The inspection team was accompanied by Foy Wright with the plant staff. At the conclusion of the inspection, the inspection team recommended the clearing of thick vegetation from some of the embankment structures, to be followed by a supplemental inspection.

Upon completion of the recommended clearing, the inspection team was notified and the supplemental inspection was performed on March 24, 2009. The inspection team, again consisting of Larry Dunlap and Richard Mickwee, was accompanied by Bob McCants with the plant staff. At the conclusion of the inspection, the inspection team met with Mr. McCants, George Downer (Contractor Support Specialist), and Charles Tugwell (Plant Manager). At that time, final recommendations were provided.

Weather conditions on the day of the initial inspection were sunny, clear, and cold. On the day of the supplemental inspection the weather was overcast and cool. All sections of the ash pond dam and appurtenant structures were included in the inspection(s). Photograph locations referenced in this report are provided on the attached Figure 1. Photographs taken during the initial January 14 inspection are labeled with an "IN" prefix, and photographs taken during the supplemental March 24 inspection are labeled with an "SU" prefix.

OBSERVATIONS – INITIAL INSPECTION (JANUARY 14)

*East Dike – Initial Inspection*

The inspection began at the east dike, beginning at the north and then moving to the south toward the river. The downstream face of the embankment was heavily overgrown with thick vines and briars that both obscured the dike and prevented passage on foot (see Photo IN-1). At the time of our visit, however, the impounded water and/or ash slurry was well away from the dike. Some filling had been done on the upstream side, where there appeared to be between 8 and 10 feet of free height (see Photo IN-2).

The roadway on the crest appeared to be performing well, and no tension cracks and/or other signs of distress were noted.

In the past, erosion was noted along the bank of the barge canal adjacent to the downstream toe of the dike. Historically, it has been noted that this erosion is aggravated by dredging operations and tugboat activity, which occurs on a regular basis. During the January 14 inspection, the toe was observed from the crest, but due to high levels in the river (resulting from recent rains) and the fairly dense vegetation on the embankment face, any advancement of the erosion could not be discerned.

#### *South Dike – Initial Inspection*

The inspection team walked the full length of the south dike with one inspector walking along the crest and one inspector walking along the downstream toe. At the time of the January 14 inspection, the upstream face of the embankment was overgrown with thick bushes and small trees, and complete inspection of the embankment was not possible (see Photo IN-3). Locations were observed where minor slides had occurred, and additional slides could have been present but obscured by the vegetation.

At several locations along the crest, significant rills, most likely resulting from concentrated surface flows, were observed (see Photo IN-4). Apart from this minor noted condition, the majority of the crest along the south dike appeared to be in good condition.

Compared with the east dike, the majority of the downstream face of the south dike was fairly clear of dense vegetation, and this facilitated inspection of this portion of the dam (see Photo IN-5). It is our understanding that somewhat regularly portions of this area are cleared by use of a bulldozer operated by plant staff. While this effort is appreciated by the inspection team, the bulldozer operator must proceed with the clearing carefully so as not to 'scalp' the exposed dam face near the toe of the dam. In localized portions of the dike, the downstream slope had accidentally been steepened by the dozer (see Photo IN-6).

As stated previously, at the time of the initial inspection the Black Warrior River was still in flood stage. As a result, a large portion of the flood plain just to the south of the dike was inundated (see Photo IN-7), and based on our conversations with Foy Wright, we understand that the water was several feet higher just days before. Despite the high water conditions, no scouring or other damage to the downstream face of the south dike was observed during the inspection.

The south dike has the most significant depth of clear water impounded on its upstream face. No signs of detrimental seepage or other indications of poor dike performance were observed during the inspection.

#### *Discharge Structure – Initial Inspection*

The pond discharge inlet structure was inspected and observed to be in good condition (see Photo IN-8). The flow from the discharge pipe could not be examined as the discharge outlet structure was inundated by the high water in the river.

Just to the east of the discharge structure on the upstream side of the dam a small slide was noted (see Photo IN-9).

#### *West Dike – Initial Inspection*

The west dike was inspected, beginning at the south end and proceeding north. As with the south dike, one inspector walked the full length of the embankment along the crest and another inspector walked the full length along the downstream toe. The crest of the dam appeared to be in good condition, and no indications of distress were observed here although a large portion of the upstream side of the dam just below the crest was covered in dense vegetation (see Photo IN-10). This vegetation may have obscured localized areas of slumping and/or sloughing along the face of the dike. In areas not covered by the vegetation some minor erosion was noted, but generally this condition is of no concern.

The pond in this area (and in much of the central portion of the pond) was covered in thick stands of cattails (see Photo IN-11). Based on conversations with Foy Wright, we understand that on an annual basis, these plants are cleared from the pond by burning. We also understand that the plant has hired a local exterminator to trap and remove beavers from the pond area. This has been a continuing struggle for the plant staff as the beavers have been noted in the past as having built small dams inside the pond.

As has been noted in previous inspections at Greene County, the growth of brush and other thick vegetation along the downstream toe of this section appeared to be controlled better than at the south dike, and stands of Bermuda grass were observed in many areas of the dike (see Photo IN-12). As with the south dike, almost the entire west dike impounds ash pond water, and no signs of detrimental seepage or other indications of poor dike performance were observed during the inspection.

#### *North Dike – Initial Inspection*

The north dike was inspected, beginning at the northwest corner of the pond and heading back toward the main plant facilities. One inspector walked the full length of the dike along the crest and one inspector walked the full length of the dike along the toe. It was noted that most of the downstream face of the northwestern portion of the north dike was not protected by vegetation, and numerous small rills (nothing of any major concern) were observed on the downstream face (see Photo IN-13). It is recommended that an attempt be made to establish a grass cover for this embankment. About 100 yards northeast of the northwest corner of the dike, several small seeps were observed along the downstream toe (see Photos IN-14 and IN-15). Water was not observed to be flowing from these locations, and dike material was not being transported. The dam height at this location appeared to be on the order of 10 feet, and the depth of the water on the upstream side appeared to be less than 5 feet.

The remainder of the north dike was inspected, and no unusual conditions or concerns were noted. Closest to the main plant structures, the north dike is grassed and well-maintained (see Photo IN-16). A portion near the coal pile has recently been raised approximately 2 feet with on-site clay fill material (see Photo IN-17). The raising was performed to reduce the risk of overtopping at this location.

As mentioned previously, portions of the upstream side of this dike just below the crest were largely covered in dense vegetation which could obscure localized slumping or sloughing of the face of the dike.

#### *Diversion Dike – Initial Inspection*

The diversion dike running east-west through the middle-southern portion of the pond was inspected by driving. It is our understanding that this structure, whose purpose is solely to increase settlement time for water pumped into the pond, was constructed of bottom ash. The diversion dike appeared to be performing adequately, and no problem conditions were noted. It is worth noting that the structure is not integral to the main dam and is not continuous; its unlikely failure would not be expected to result in an uncontrolled release of the pond's contents or have much if any impact on the main dam structure.

#### OBSERVATIONS – SUPPLEMENTAL INSPECTION (MARCH 24)

The dam inspection team's supplemental inspection on March 24, 2009, was performed at specific locations that were unable to be thoroughly inspected during the initial inspection either due to high water conditions or excessive vegetation. The following summarizes the conditions observed during the supplemental inspection.

- East Dike – Between the initial and supplemental inspections, significant maintenance and vegetation control work had been conducted. With the enhanced visibility (due to the vegetation clearing and lowered water levels in the barge canal), the downstream embankment slope was thoroughly examined from the top of the embankment as well as from the opposite bank of the canal (see Photos SU-1 and SU-2). The inspection team appreciates the effort to clear the vegetation and allow close inspection of the embankment. As has been noted in past inspections, the west bank of the barge canal continues to exhibit erosion, which is now affecting the downstream embankment toe. Compared with photos from the 2007 inspection it appears that the erosion is worsening.

As was noted across most of the ash pond embankments, the roadway surface at the top of the dam had recently been covered/protected with a fresh layer of bottom ash material.

- South Dike and Discharge Structures – Similar to the east dike, the plant staff have made significant effort in vegetation control along the south dike. Thick brush and (in some cases) small trees were cleared from the upstream face of the embankment, allowing for a close inspection (see Photo SU-3). Where observed by the plant staff, small slides in the upstream face of the dam had been repaired, including the small slide adjacent to the discharge inlet structure (see Photo SU-4).

At the time of the supplemental inspection, repair of the ‘scalped’ portions of the downstream face of the south dike was underway (see Photo SU-5). The work was being performed by a local grading contractor, and the fill being placed was being spread by bulldozer and compacted with a towed sheepsfoot roller (visible in Photo SU-4). A stockpile of the fill material being placed was observed, and this material appeared to be suitable for use on the dam.

Based on conversations with Bob McCants, we understand that during the clearing operations along the dike upstream face, several nutria rat and/or beaver burrows were observed. We understand that these areas were excavated and repaired when found (see Photo SU-6). One such burrow was observed during the supplemental inspection, and it was stated that repair of that area would be conducted shortly.

At the time of the supplemental inspection, the ash pond discharge outlet pipe was no longer underwater and could be inspected (see Photo SU-7). No problems or conditions of concerns were noted.

- West Dike – The west dike was observed, largely by a driving inspection with intermittent stops for closer observation. As with the other embankments, the dense vegetation on the upstream face had been cleared, which significantly enhanced the visibility of the dike structure (see Photo SU-8). Cattails were observed on the embankment at the waterline. Also, in this area it appeared that the course of bottom ash on the top of the dike had been placed somewhat thicker than at other locations. This is not a concern, but is simply worthy of note.
- North Dike – The north dike was observed, largely by a driving inspection with intermittent stops for closer observation. As during the January 14 inspection, the small seeps were noted on the downstream toe of the embankment. Based on information provided by Bob McCants, we understand that years ago the embankment in question had been realigned toward the interior of the pond, and the actual foundation conditions beneath the embankment’s current configuration are not known. The seepage observed did not appear to have worsened from the initial inspection, but did not appear to have lessened, either.

## RECOMMENDATIONS

Based on the inspection team's findings, the following is recommended to be performed at the Greene County Steam Plant ash pond:

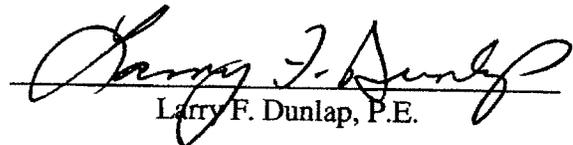
- 1) Following the initial inspection on January 14, the inspection team recommended that excessive vegetation on the embankment be removed. After notable effort by the plant staff, this work has largely been completed and is greatly appreciated by the inspection team. The inspection team recommends that efforts be made to establish grass cover on all of the embankment slopes, and that this vegetation be controlled by periodic mowing. The grassed slopes should be fairly easy to maintain, will protect the embankment from erosion, and will facilitate future inspections by the plant staff and dam safety inspection team.
- 2) Based upon the condition of the west bank of the barge canal, and the continuing progression of the erosion, it is the recommendation of the inspection team that the plant give strong consideration to repairing and/or armoring this area. We understand that the SCG Earth Sciences & Environmental Engineering (ES&EE) and SCG Civil Design have developed a repair for this area, and construction is now underway (as of the date of issue of this report). We request that SCG Hydro Services be kept informed as to the progress of the embankment repair throughout construction.
- 3) As noted above, repair of the oversteepened portions of the south dike downstream face has been started. The procedures being utilized in this repair appear to be reasonable and appropriate, and it is the recommendation of the inspection team that similar efforts be continued at the remaining 'scalped' areas. Upon completion of the embankment repair, it is recommended that the embankment be seeded with grass. Erosion protection measures, such as the spreading of straw over the embankment, may be required until the grass matures.
- 4) During the supplemental inspection, it was noted that animal activity (i.e. nutria rat and/or beaver burrows) have been observed during the clearing of the upstream face of the embankment. These burrows should be filled and/or repaired whenever observed.
- 5) At several locations along the dam, significant rills resulting from surface rainwater flows were observed along the dam crest. This condition was noted in both the January 14 and March 24 inspections. Over time, these will likely become larger as more material is moved. While not an immediate threat to dam safety, it is recommended that these areas be repaired.

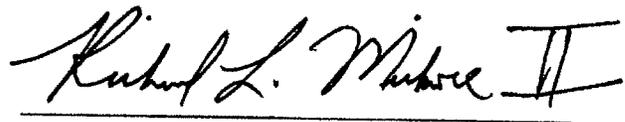
- 6) Along the north dike, several small points of seepage were noted on the downstream toe. It is recommended that the plant staff pay close attention to this area during their regular inspections of the ash pond dike. Due to the effect of the extended period of heavy rainfall observed in Alabama from December 2008 and through early spring of 2009, the origin of these seeps is uncertain and it is possible that these areas may dry out during drier and hotter weather. If any changes in the seepage are noted, or if dike material is observed to be carried by flow, SCG Hydro Services should be contacted immediately. It is recommended that the inspection team perform another inspection of this condition during the summer to see if this condition persists even through the drier portions of the year. As noted above, the foundation materials for this embankment are unknown due to the reported realignment of the dike many years ago.

For quick reference, the inspection team's recommendations have been summarized on the attached Table 1.

#### CONCLUSION

In summary, the project structures appear to be performing adequately. This report provides the inspection team's recommendations concerning maintenance activities related to the dike structures. Otherwise, there were no conditions noted that, in the opinion of the inspection team, would affect the continued safe operation of the inspected facilities.

  
Larry F. Dunlap, P.E.

  
Richard L. Mickwee II, P.E.

**TABLE 1: RECOMMENDATIONS FROM 2009 ASH POND INSPECTION**  
**GREENE COUNTY STEAM PLANT**

<b>No.</b>	<b>Description</b>	<b>Location</b>
1	The earthen embankment structures should be grassed, and this vegetation should be controlled by periodic mowing.	All Earth Embankment Structures
2	Give consideration to repairing and/or armoring the west bank of the barge canal. As the remedial construction work proceeds, it is requested that SCG Hydro Services be kept informed as to the progress.	East Dike (Photo SU-1 and SU-2)
3	Continue repairing portions of south dike steepened by past clearing operations. Once the embankment repair is completed, seed areas with grass. Erosion protection measures, such as the spreading of straw over the embankment, may be required until the grass matures.	South Dike (Photo IN-6 and SU-5)
4	Repair animal burrows in embankment whenever they are observed.	All Earth Embankment Structures, specifically noted at the South Dike (Photo SU-6)
5	Repair significant rills along crest of dam.	All Earth Embankment Structures (Photo IN-4)
6	Monitor seeps observed along toe of north dike. Should seepage increase, or if material is observed being transported by flow, contact the SCG dam safety team as soon as possible. During the summer, the inspection team should perform an additional inspection of this area to observe its condition during the drier portions of the year.	North Dike (Photos IN-14 and IN-15)



**Photo IN-1: Condition of Downstream Face of East Dike**



**Photo IN-2: Condition of Upstream Face of East Dike**



**Photo IN-3: Typical Vegetation on Upstream Face, South Dike**



**Photo IN-4: Example of Significant Rilling on Dam Crest, South Dike**



**Photo IN-5: Typical Condition of Downstream Toe of South Dike**



**Photo IN-6: Portion of South Dike Oversteepened during Clearing**



**Photo IN-7: Black Warrior at High River Stage**



**Photo IN-8: Discharge Inlet Structure**



**Photo IN-9: Small Slide Adjacent to Discharge Inlet Structure**



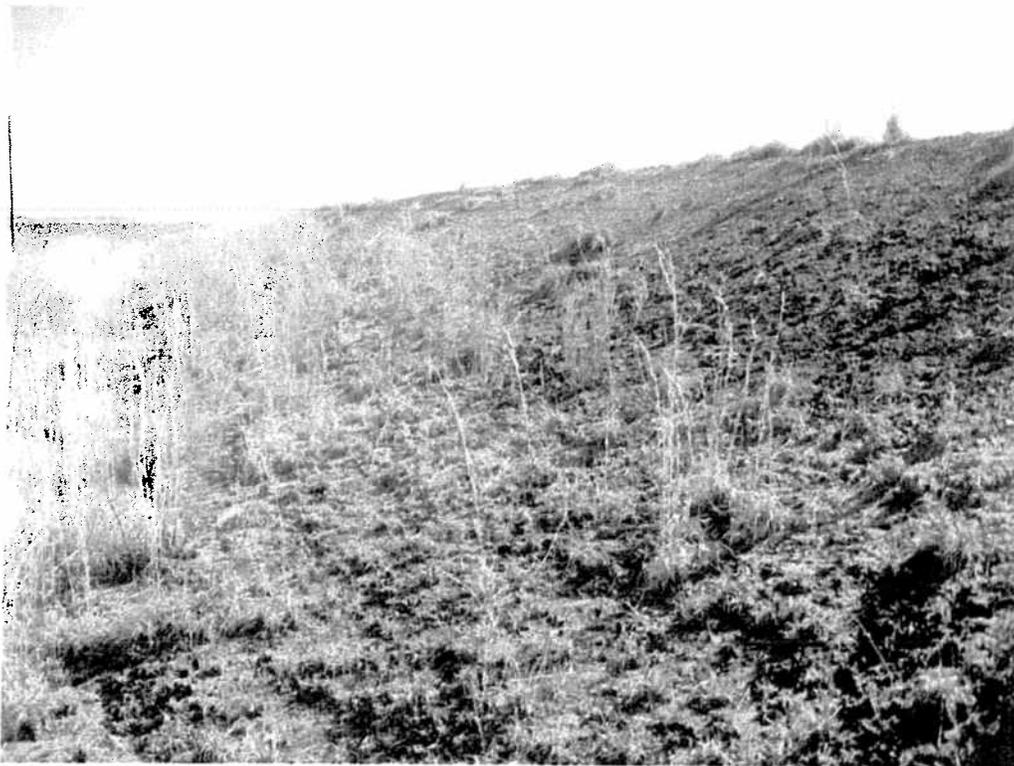
**Photo IN-10: Vegetation on Upstream Face of Embankment, West Dike**



**Photo IN-11: Cattails in Ash Pond, Photo Taken Near West Dike**



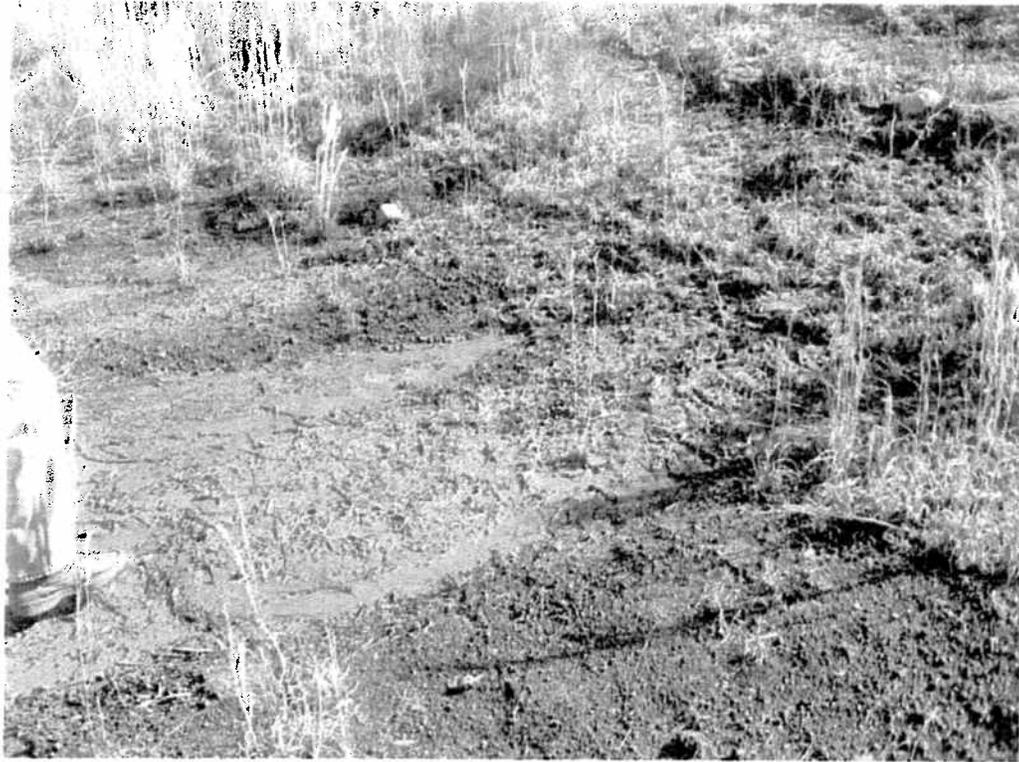
**Photo IN-12: Typical Condition of Downstream Toe, West Dike**



**Photo IN-13: Typical Condition of Downstream Face, NW Portion of North Dike**



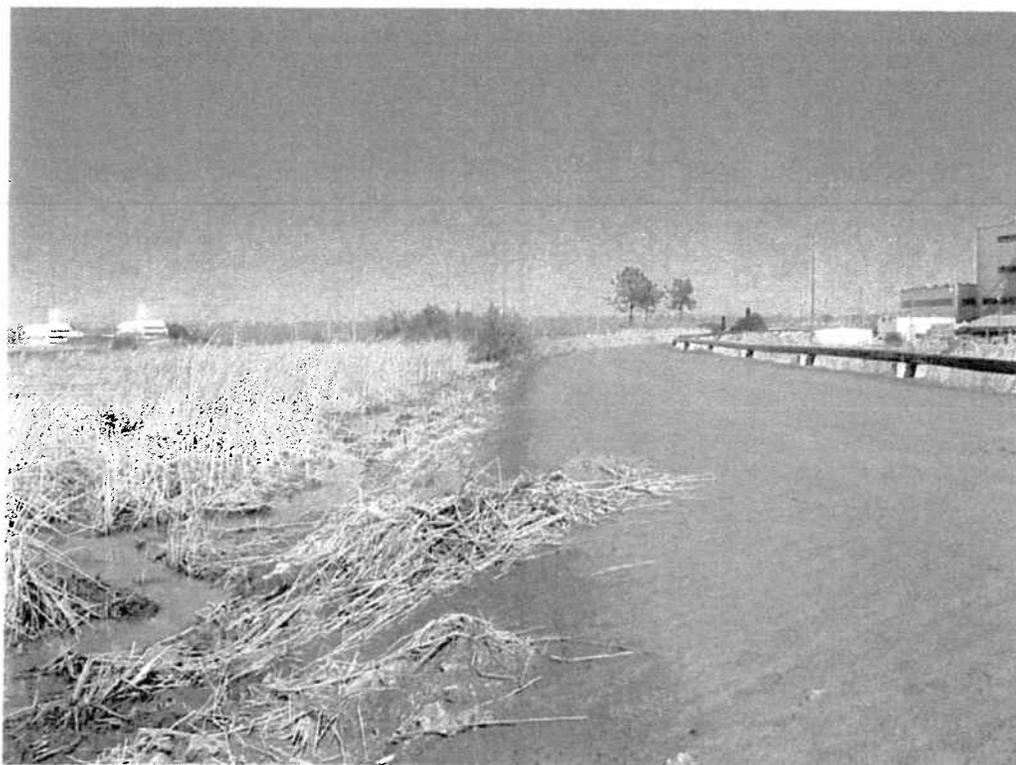
**Photo IN-14: Small Seep on Downstream Toe, North Dike**



**Photo IN-15: Small Seeps on Downstream Toe, North Dike**



**Photo IN-16: Condition of North Dike Adjacent to Main Facilities**



**Photo IN-17: Recently Raised Portion of North Dike**



**Photo SU-1: Erosion of East Dike, Typical**



**Photo SU-2: Erosion of East Dike, Observed from Opposite Bank**



**Photo SU-3: Upstream Face of South Dike After Clearing of Vegetation**



**Photo SU-4: Repair of Small Slide Adjacent to Discharge Inlet Structure**



**Photo SU-5: Repair/Flattening of Downstream Face of South Dike**



**Photo SU-6: Repair of Animal Burrow on Upstream Face of South Dike**

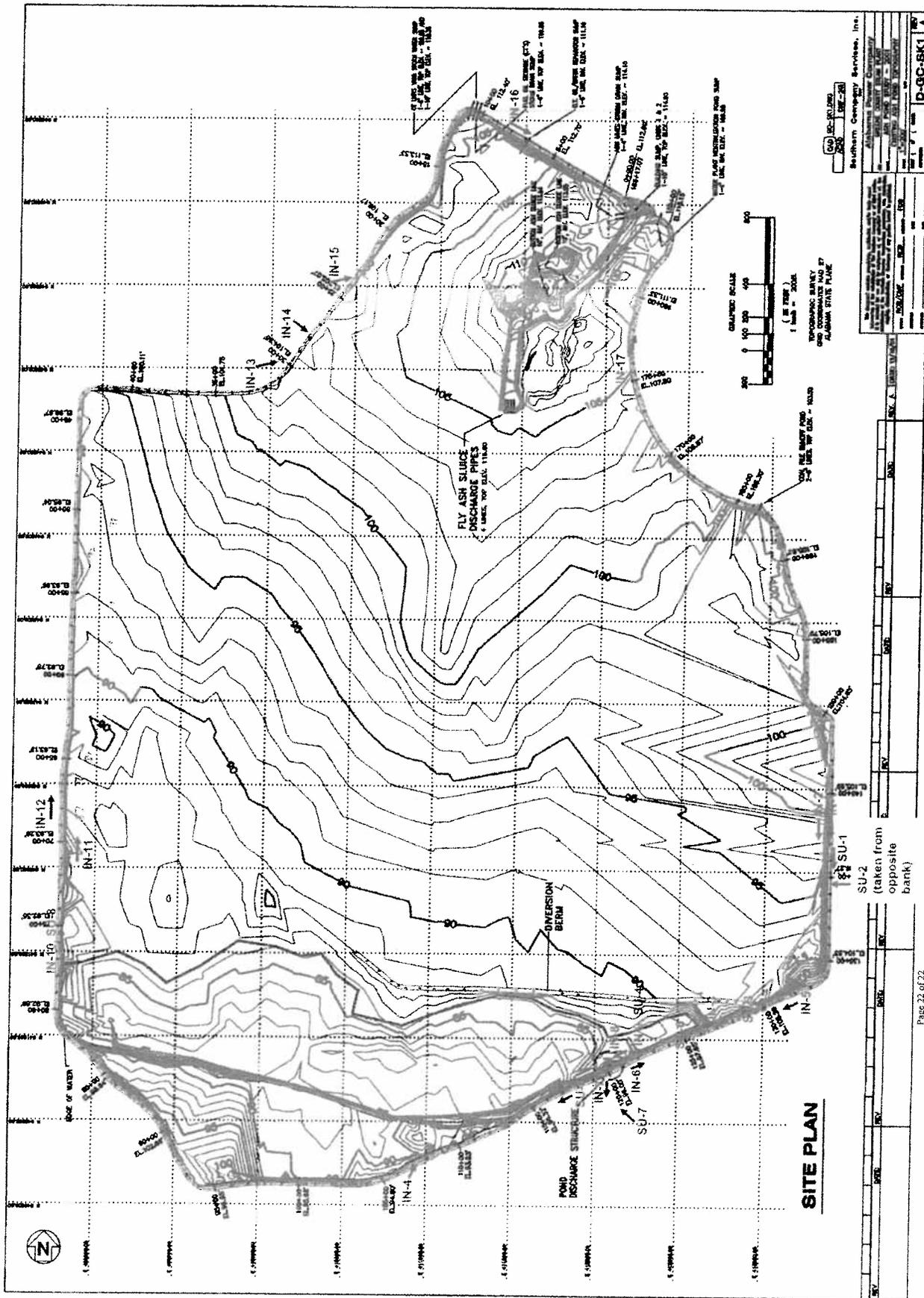


**Photo SU-7: Ash Pond Discharge Outlet Pipe**



**Photo SU-8: General Condition of Upstream Face of West Dike**

Figure 1



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600 18th Street North  
Birmingham, AL 35203

205/257-1000



June 16, 2010

**Greene County Steam Plant**  
2010 Dam Safety Inspection

Mr. Charles Tugwell  
Plant Manager  
Greene County Steam Plant  
Alabama Power Company

Dear Mr. Tugwell,

Enclosed please find the Report of Annual Dam Safety Inspection for the Greene County Steam Plant Ash Pond Dam based on the inspection performed on June 10, 2010. The inspection team, consisting of myself and Richard Mickwee, appreciate the support provided by Mr. Bob McCants in coordinating and conducting this inspection. This report includes a discussion and photographs of site conditions noted during the inspection and a list of recommendations.

During the inspection, no conditions were noted that posed an immediate threat, or that would affect the continued safe operation of the facilities inspected. There are, however, some recommendations in the report for maintenance and monitoring related actions to reduce the likelihood of future problems:

- It is suggested that the plant consider armoring the narrow, extended sloughs along the east dike. This could be done with riprap to slow the sloughs' advancement.
- It is recommended that any areas damaged by equipment traffic (specifically the dike toe area) be repaired.
- The oversteepened area on the South Dike indicated to Mr. McCants should be flattened to match the remainder of the embankment.
- It is recommended that trees encroaching on the dam toe be cut back from the embankment.

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GC-API-0004

- It is recommended that the flanks of the dam crest be gradually flattened so that it matches the slope of the embankment. This will reduce surface erosion of the crest along the upstream and downstream edges.
- The area along the toe of the west dike should be cleared 5-7 feet (or to the extent possible without encroaching on the adjacent wetland) to facilitate inspection along the toe of this portion of the dike.
- It is recommended that the plant staff, during their regular inspections, pay close attention to any wet areas of areas of known seepage.

Details of the inspection were discussed with Mr. McCants, Mr. George Downer, Mr. Larry Keith, Mr. Mike Willingham, and yourself at the conclusion of the field visit. If you have any questions, please do not hesitate to contact me at 8-257-1396, or Mr. Mickwee at 8-257-1322.

Respectfully,



Larry Dunlap  
Principal Engineer  
SCG Hydro Services – Dam Safety

/enclosure

CC: **Alabama Power Company**  
Mr. Mike Willingham  
Mr. Larry Keith  
Mr. Robert B. McCants, III

**Southern Company Generation**  
Mr. Eugene B. Allison, Jr.  
Mr. James F. Crew  
Mr. James C. Pegues  
Mr. Richard L. Mickwee, II

**CONFIDENTIAL**

**GREENE COUNTY STEAM PLANT ASH POND DAM  
REPORT OF ANNUAL DAM SAFETY INSPECTION  
JUNE 10, 2010**

GENERAL

The Greene County Steam Plant ash pond dam was inspected on June 10, 2010. The inspection team consisted of Larry Dunlap and Richard Mickwee with SCG Hydro Services. The inspection team was accompanied by Mr. Bob McCants with the plant staff. Prior to the inspection, the team met with Mr. Charles Tugwell (Plant Manager), Mr. Mike Willingham (Plant Assistant Manager), Mr. Larry Keith (Compliance and Support Manager), Mr. George Downer (Senior Contractor Support Specialist), Mr. Jim Pegues (SCG ES&EE Principal Engineer), Mr. Jake Jordan (SCG ES&EE Senior Engineer). At that time, the general inspection procedure was discussed.

Once the inspection was completed, an exit meeting was held with Messrs. Tugwell, Willingham, Keith, McCants, and Downer. At that time, the inspection team's findings and preliminary recommendations were discussed.

During the inspection, a spot review of the plant's weekly inspection checklists was performed, and they were found to be complete and satisfactory.

Weather conditions on the day of the inspection were sunny, partly cloudy, and hot. All sections of the ash pond dike and discharge structures were included in the inspection. Photograph locations referenced in this report are provided on the attached Figure 1. Recommendations provided in this report are highlighted in *italics*, and are also provided on the attached Table 1.

It should be noted that in the time between the 2009 and 2010 dam safety inspections, a considerable amount of sitework and modification to the ash pond has been performed. The work observed is expected to enhance the safety of the ash pond dike.

OBSERVATIONS AND RECOMMENDATIONS

*East Dike – Adjacent to Barge Canal*

The inspection began at the east dike, beginning at the north and then moving on to the south toward the river. In this area, a significant widening of the crest (with the widening occurring on the inside of the pond) had been performed since the 2009 inspection. This widening on the upstream side of the dike was evaluated and designed by SCG. It is our understanding that any ash on the upstream side of the dam was removed down to natural ground so that the new embankment fill is not founded on ash. With the new widened section, the west bank of the barge canal, which makes up the outer, downstream face of the dike, is now seen as a sacrificial part of the structure. As a result, advancement of the sloughing/erosion of the canal bank, which is expected, is not a concern with regard to the integrity of the dike.

Vegetation on the downstream face of the dike (where the dike had not sloughed off due to erosion) was noted as being suitable and appropriately maintained (see Photo 1). At four points along the canal, narrow localized "channels" of advanced sloughing were noted (see examples in Photo 2), possibly in areas of concentrated runoff. It appeared that these features had developed a relatively flat bottom that would support placement of a limited amount of rock. Although the widening work discussed above has greatly reduced the significance of this erosion as it relates to the integrity of the dike, ***it is suggested that the plant consider selective placement of a limited amount of riprap in these channels so as to slow their advancement.***

The upstream face of the east dike appeared to be suitably vegetated (see Photo 3). At the time of the inspection, final grading of the crest was being performed (see Photo 4), and it is our understanding that the roadway along this wide crest will be located along the upstream edge of the top of the embankment. The remainder of the crest is to be seeded and grassed.

#### *South Dike*

The south dike was inspected, starting on the east side, moving west. The vegetation on the embankment was generally observed to be adequately maintained (see Photo 5 for typical), and it is our understanding that it is mowed on a monthly basis during the heavier growing months. Near the southeast corner of the ash pond dike, an area disturbed by equipment traffic (most likely during mowing) was observed (see Photo 6). ***It is recommended that this area be repaired.***

One portion of the south dike appeared to be considerably steeper than the remainder of the embankment, and this makes maintenance in this area difficult. ***It is recommended that this area be flattened to match the remainder of the embankment.***

Along the toe of the dike in a few locations, trees were close enough to the embankment that their shade was preventing rainfall moisture from drying appropriately. In these areas, disturbance of the embankment toe by equipment (tracks, ruts, etc.) was observed (see Photo 7). It is understood that the amount of tree clearing that can be done is somewhat limited due to wetland boundaries, but the shade on the embankment is not optimal. ***To the extent feasible, it is recommended that the trees in this area be cut back from the embankment. Any areas damaged by equipment tracks should be repaired.***

Generally, the crest of the south dike and the crest roadway were observed to be in excellent condition. Along both the upstream and downstream flanks of the crest where the road has been built up, it appears that concentrated runoff has resulted in several small rills (see Photo 8). The concentrated runoff appears to have been caused in some areas by a slight steepening of the crest that occurred when the road was built up. ***It is recommended that the rills be repaired and the flanks of the crest be gradually flattened (by a road-grader, bulldozer, etc.) so that it more closely matches the slope of the embankment.*** This should reduce the increased runoff velocities that cause this minor erosion.

The intake and discharge structures (see Photo 9) were inspected. No problem conditions were noted.

Along the southwestern corner of the ash pond dam, an expansion of the existing pond was underway. The majority of this new portion of the pond is incised within the existing natural topography, but the pond bank slopes have been adequately flattened and vegetated (see Photo 10). The new portion of the pond has not yet been connected with the existing pond, but is expected to be within days of the inspection by breaching the narrow strip of natural ground between the two (see Photo 11).

At this time, the inspection team did not see any issues with this portion of the pond, but after breaching it is possible that the portion of the new pond adjacent to the breached areas will endure some scour erosion due to the moving water. If this scour occurs, it will need to be repaired.

#### *West Dike*

The west dike was inspected, starting from the southwest corner and moving north. Along the southern half of this portion of the dike, a considerable amount of work had been done to the downstream face of the embankment, including flattening of the embankment face (see Photo 12). At the time of the inspection, vegetation had not yet taken hold, but the embankment had been seeded and covered with an erosion protection mat and green shoots of grass were visible. Similar to the south dike, trees were very close to the toe of the embankment. ***It is recommended that the area adjacent to the toe of the dike be cleared at least 5-7 feet where possible without encroaching on the adjacent wetland. This will facilitate inspection of the toe of the dike in this area.***

North of the embankment turnaround, about halfway along the west dike, no new material had been placed to flatten the slope (see Photo 13), but the downstream slope had been reseeded. The vegetation on this portion of the dike was observed to be getting established and was judged to be appropriately maintained.

The crest and upstream portion of the west dike were inspected. The crest appeared to be in excellent condition, and vegetation along the interface with the upstream embankment face and the pond waterline were being appropriately managed (see Photo 14).

Along the toe of the west dike, several small wet areas were noted (see Photo 15). It could not be distinguished if these areas were resulting from poor runoff drainage or due to seepage through the embankment, but in either case no flow could be discerned. It is possible that, given adequate time, these areas could dry out completely. ***It is recommended that the plant staff, during their regular inspections, pay close attention to these areas.*** If the wet zones expand significantly, or if flow that is carrying material is discernable, Dam Safety staff should be contacted immediately.

### *North Dike*

The north dike was inspected, starting on the northwest corner of the ash pond and moving east. In the 2009 inspection, it was noted that portions of the downstream face of the north dike were sparsely vegetated. This condition has been corrected (see Photo 16), and now the embankment is adequately vegetated and this vegetation is appropriately maintained.

Seepage along the toe of the north dike, noted in past inspections, was not noted during the 2010 inspection, although the area where it occurs (during the colder, wetter months) was discernable (see Photo 17). As discussed with Mr. McCants, it is common for the seepage/wet zones along this portion of the dike toe to dry out during the summer months.

The portion of the north dike parallel to the plant entrance road (and rail line) was inspected (see Photo 18), and no problem conditions were noted.

### STATUS OF PREVIOUS RECOMMENDATIONS

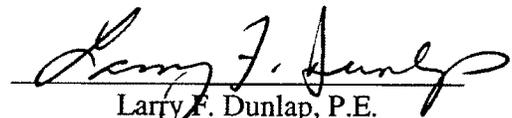
The following summarizes the recommendations from the 2009 inspection report, and their status:

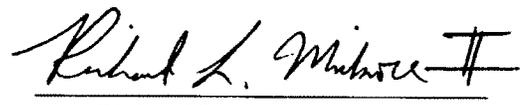
- 1) The inspection team recommends that efforts be made to establish grass cover on all of the embankment slopes, and that this vegetation be controlled by periodic mowing. **Status: Completed. The plant has gone to great effort and expense to ensure that adequate vegetation is established and maintained.**
- 2) Based upon the condition of the west bank of the barge canal, and the continuing progression of the erosion, it is the recommendation of the inspection team that the plant give strong consideration to repairing and/or armoring this area. **Status: Completed. SCG ES&EE provided an alternate repair (widening of the embankment, discussed above), and the plant staff has completed that work.**
- 3) At the time of the 2009 supplemental inspection, repair of oversteepened portions of the south dike downstream face had been started. The procedures utilized in this repair were noted as being reasonable and appropriate, and it is the recommendation of the inspection team that similar efforts be continued at the remaining 'scalped' areas. **Status: Ongoing. One additional area requiring attention was discussed with the plant staff during the 2010 inspection. This area is expected to be repaired, and appropriately vegetated, shortly.**
- 4) Animal burrows should be filled and/or repaired whenever observed. **Status: Completed. Considering the animal activity on the plant property, this will continue to be an on-going maintenance item.**

- 5) At several locations along the dam, significant rills resulting from surface rainwater flows were observed along the dam crest. While not an immediate threat to dam safety, it is recommended that these areas be repaired. **Status: Ongoing. As discussed above, portions of the south dike crest require some attention, but the erosion of the crest noted in the 2010 inspection is far less significant than noted in the 2009 inspection.**
  
- 6) Along the north dike, several small points of seepage were noted on the downstream toe. It is recommended that the plant staff pay close attention to this area during their regular inspections of the ash pond dike. **Status: Ongoing. The plant staff should continue to pay close attention to any known wet areas or areas of known seepage.**

CLOSING

In summary, the project structures appear to be performing adequately. This report provides the inspection team's recommendations concerning maintenance activities relating to the dike structures. Otherwise, there were no conditions noted that, in the opinion of the inspection team, would affect the continued safe operation of the inspected facilities. The inspection team would like to extend our appreciation for the cooperation that the Greene County plant staff has extended to us throughout the past year.

  
Larry F. Dunlap, P.E.

  
Richard L. Mickwee II, P.E.

**TABLE 1: RECOMMENDATIONS FROM 2010 ASH POND INSPECTION**  
**GREENE COUNTY STEAM PLANT**

<b>No.</b>	<b>Description</b>	<b>Location</b>
1	It is suggested that the plant consider armoring the narrow, extended sloughs along the east dike. This could be done with riprap and could slow the sloughs' advancement.	East Dike (see Photo 2)
2	It is recommended that any areas damaged by equipment traffic be repaired.	All Embankments, but specifically the South Dike (see Photo 6)
3	It is recommended that the oversteepened area on the South Dike be flattened to match the remainder of the embankment.	South Dike
4	To the extent feasible, it is recommended that trees encroaching on the dam toe be cut back from the embankment.	South Dike (see Photo 7)
5	It is recommended that the flanks of the crest be gradually flattened (by a road-grader, bulldozer, etc.) so that it more closely matches the slope of the embankment.	All Embankments, but especially along the South Dike (see Photo 8)
6	It is recommended that the area along the toe of the west dike be cleared 5-7 feet to the extent possible without encroaching on the adjacent wetland.	West Dike
7	It is recommended that the plant staff, during their regular inspections, pay close attention to any wet areas or areas of known seepage.	All Embankments, but especially the West Dike and North Dike (see Photos 15 and 17)



**Photo 1: General Condition of East Dike Embankment**



**Photo 2: Sloughing on Edge of East Dike Embankment**



**Photo 3: Upstream Face of East Dike Embankment**



**Photo 4: Widened Crest of East Dike Embankment**



**Photo 5: General Condition of South Dike Embankment**



**Photo 6: Damaged Area on South Dike Embankment**



**Photo 7: Trees Encroaching on South Dike, and Damaged Area on Toe**



**Photo 8: Minor Rills on Crest of South Dike**



**Photo 9: Condition of Pond Outlet Discharge Structure**



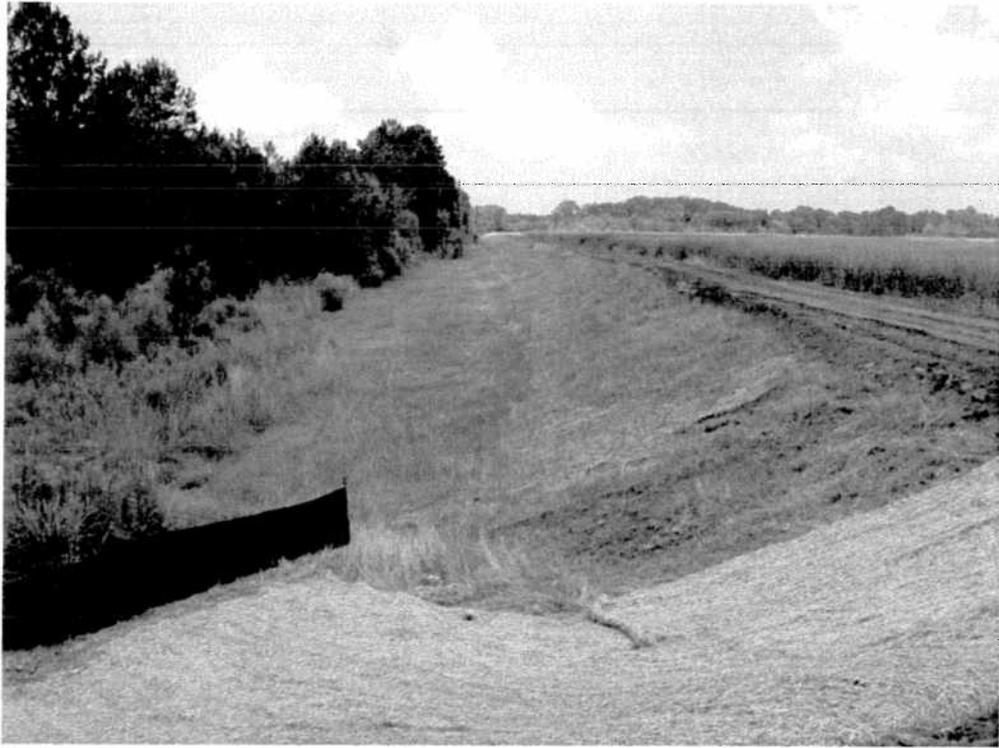
**Photo 10: Bank of New Pond Section at SW Corner of Ash Pond**



**Photo 11: Area to be Breached Between Existing Pond and New Pond Section**



**Photo 12: General Condition of West Dike Embankment, South of Turn-Around**



**Photo 13: General Condition of West Dike Embankment, North of Turn-Around**



**Photo 14: General Condition of West Dike Embankment Crest**



**Photo 15: Wet Area Along Toe of West Embankment**



**Photo 16: General Condition of North Dike Embankment**



**Photo 17: Area Noted in Past as Showing Seepage, Now Dry**



**Photo 18: General Condition of North Dike Embankment, Adjacent to Plant Access Road**



**FIGURE 1**



**NATIONAL POLLUTANT  
DISCHARGE ELIMINATION  
SYSTEM PERMIT**

**PERMITTEE:** ALABAMA POWER COMPANY – GREENE COUNTY STEAM PLANT

**FACILITY LOCATION:** GREENE COUNTY HIGHWAY 18  
FORKLAND, AL

**PERMIT NUMBER:** AL 0002917

**RECEIVING WATERS:** BLACK WARRIOR RIVER

*In accordance with and subject to the provisions of the Federal Water Pollution Control Act, as amended, 33 U.S.C. §§1251-1378 (the "FWPCA"), the Alabama Water Pollution Control Act, as amended, Code of Alabama 1975, §§ 22-22-1 to 22-22-14 (the "AWPCA"), the Alabama Environmental Management Act, as amended, Code of Alabama 1975, §§22-22A-1 to 22-22A-15, and rules and regulations adopted thereunder, and subject further to the terms and conditions set forth in this permit, the Permittee is hereby authorized to discharge into the above-named receiving waters.*

**ISSUANCE DATE:** SEPTEMBER 10, 2007

**EFFECTIVE DATE:** OCTOBER 1, 2007

**EXPIRATION DATE:** SEPTEMBER 30, 2012

Alabama Department of Environmental Management

INDUSTRIAL SECTION  
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT

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PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge from the following point source(s) outfall(s), described more fully in the permittee's application:

DSN001: Once-through condenser cooling water.

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	UNITS	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS 1/
		Daily Minimum	Daily Maximum	Monthly Average	
Flow	MGD	-	Monitor	Monitor	Daily Frequency Sample Type
Effluent Temperature	°F	-	Monitor	104 2/	Daily Pump Log
Inlet Temperature 3/	°F	-	Monitor	Monitor	Daily Grab or Recorder
Total Residual Chlorine 4/	mg/l	-	0.02	0.02 2/	Daily Grab or Recorder
Time of Chlorine Addition 4/	min/unit/day	-	120	-	Daily Clock

THE DISCHARGE SHALL HAVE NO SHEEN, AND THERE SHALL BE NO DISCHARGE OF VISIBLE OIL, FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

THERE SHALL BE NO DISCHARGE OF POLYCHLORINATED BIPHENYL COMPOUNDS SUCH AS THOSE COMMONLY USED IN TRANSFORMER FLUID.

- 1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment. Unless otherwise specified, composite samples shall be time composite samples collected using automatic sampling equipment or a minimum of eight (8) equal volume grab samples collected over equal time intervals. All composite samples shall be collected for the total period of discharge not to exceed 24 hours.
- 2/ If only one sampling event occurs during a month, the sample result shall be reported on the discharge monitoring report as both the monthly average and daily maximum value for all parameters with a monthly average limitation.
- 3/ Samples shall be taken at the intake pump station.
- 4/ Total Residual Chlorine (TRC) may not be discharged from any single generating unit for more than two hours per day unless the discharger demonstrates to ADEM that discharge for more than two hours is required for macroinvertebrate control. TRC limitations apply at the outlet to the individual unit being chlorinated, prior to combination with any other waste stream or entering the receiving water. When chlorination is occurring, grab samples shall be taken at least every 30 minutes to verify compliance with total residual chlorine limitations. Simultaneous multi-unit chlorination is permitted. Sampling is only required during chlorination.

PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge from the following point source(s) outfall(s), described more fully in the permittee's application:

**DSN002: Ash pond discharge including sanitary wastewater, pretreated metal cleaning wastes, low volume wastes, coal pile runoff, and storm water from fuel handling areas.**

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	UNITS	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS 1/
		Daily Minimum	Daily Maximum	Monthly Average	
Flow	MGD	-	Monitor	-	1/month
pH	s.u.	6.0	9.0	-	1/month
Oil and Grease	mg/l	-	20	15 2/	2/quarter
Total Suspended Solids	mg/l	-	100	30 2/	2/quarter
Dissolved Copper 3/	mg/l	-	Monitor	-	1/quarter
Dissolved Iron 3/	mg/l	-	Monitor	-	1/quarter
Total Recoverable Arsenic	mg/l	-	Monitor	0.33	1/quarter
Total Phosphorus	mg/l	-	Monitor	-	1/quarter
Ammonia as Nitrogen	mg/l	-	Monitor	-	1/quarter
Nitrate + Nitrite as Nitrogen	mg/l	-	Monitor	-	1/quarter
Chronic Biomonitoring 4/	mg/l	-	Monitor	-	1/year

THE DISCHARGE SHALL HAVE NO SHEEN, AND THERE SHALL BE NO DISCHARGE OF VISIBLE OIL, FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

THERE SHALL BE NO DISCHARGE OF POLYCHLORINATED BIPHENYL COMPOUNDS SUCH AS THOSE COMMONLY USED IN TRANSFORMER FLUID.

- 1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment. Unless otherwise specified, composite samples shall be time composite samples collected using automatic sampling equipment or a minimum of eight (8) equal volume grab samples collected over equal time intervals. All composite samples shall be collected for the total period of discharge not to exceed 24 hours.
- 2/ If only one sampling event occurs during a month, the sample result shall be reported on the discharge monitoring report as both the monthly average and daily maximum value for all parameters with a monthly average limitation. If sampling occurs in only one month, sampling events shall be at least 10 days apart.
- 3/ To be monitored only when metal cleaning wastewaters have been discharged to the ash pond. Samples must be collected within 30 days after metal cleaning wastewaters are discharged.
- 4/ See Part IV.A. for Biomonitoring Requirements.

PART I

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge from the following point source(s) outfall(s), described more fully in the permittee's application:

**DSN002A: Storm water from the combustion turbine fuel handling area.**

Such discharge shall be limited and monitored by the permittee as specified below:

1. The facility will have a valid SPCC plan pursuant to 40 CFR 112.
2. Best Management Practices (BMP) are used in draining the diked area. BMP is defined as use of a portable oil skimmer or similar device or the use of absorbent material to remove oil and grease (as indicated by the presence of a sheen) immediately prior to draining.
3. Monitoring records shall be maintained in the form of a log and shall contain the following information, as a minimum:
  - a. Date and time of discharge
  - b. Estimated volume of discharge
  - c. Initials of person making visual inspection and authorizing dischargeThe discharge shall have no sheen, and there shall be no discharge of visible oil, floating solids or visible foam in other than trace amounts. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used in transformer fluid.
4. The permittee shall submit an annual certification by January 28th that all discharges associated with the above were in accordance with the conditions of this permit.

**A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS**

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge from the following point source(s) outfall(s), described more fully in the permittee's application:

- DSN002B (formerly DSN005): Pretreated metal cleaning waste. 3/
- DSN002C: Pretreated metal cleaning wastes from combustion turbines. 3/

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	UNITS	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS <u>1/</u>
		Daily Minimum	Daily Maximum	Monthly Average	
Flow	MGD	-	Monitor	-	1/discharge Measurement Frequency
pH	s.u.	6.0	10.5	-	1/discharge Pump log or Instantaneous
Dissolved Copper	mg/l	-	1.0	1.0 <u>2/</u>	1/discharge Grab
Dissolved Iron	mg/l	-	1.0	1.0 <u>2/</u>	1/discharge Composite

**THERE SHALL BE NO DISCHARGE OF POLYCHLORINATED BIPHENYL COMPOUNDS SUCH AS THOSE COMMONLY USED IN TRANSFORMER FLUID.**

- 1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment. Unless otherwise specified, composite samples shall be time composite samples collected using automatic sampling equipment or a minimum of eight (8) equal volume grab samples collected over equal time intervals. All composite samples shall be collected for the total period of discharge not to exceed 24 hours.
- 2/ If only one sampling event occurs during a month, the sample result shall be reported on the discharge monitoring report as both the monthly average and daily maximum value for all parameters with a monthly average limitation.
- 3/ Metal cleaning wastes as defined in 40 CFR 423. No monitoring required if wastewater is rainwater only. To qualify as rainwater only, all metal cleaning waste must be removed from the boiler cleaning pond, and only rainwater discharged to, or collected in the pond.

PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge from the following point source(s) outfall(s), described more fully in the permittee's application:

- DSN002D: Main sanitary wastewater treatment plant. 2/
- DSN002E: Coal handling sanitary wastewater treatment plant. 2/

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	UNITS	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS 1/	
		Daily Minimum	Daily Maximum	Monthly Average	Measurement Frequency	Sample Type
Flow	MGD		Monitor		1/month	Instantaneous

THERE SHALL BE NO DISCHARGE OF POLYCHLORINATED BIPHENYL COMPOUNDS SUCH AS THOSE COMMONLY USED IN TRANSFORMER FLUID.

1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment. Unless otherwise specified, composite samples shall be time composite samples collected using automatic sampling equipment or a minimum of eight (8) equal volume grab samples collected over equal time intervals. All composite samples shall be collected for the total period of discharge not to exceed 24 hours.  
 2/ The wastewater treatment plant and the effluent shall be observed at least weekly to determine if the system is operating effectively and a log shall be kept as a record of these observations. The logs shall include the date of the inspection, personnel who conducted inspection, any deficiencies notes and corrective action(s) taken, if necessary.

PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge from the following point source(s) outfall(s), described more fully in the permittee's application:

DSN006: Miscellaneous once-through cooling water.

Such discharge shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTIC</u>	<u>UNITS</u>	<u>DISCHARGE LIMITATIONS</u>			<u>MONITORING REQUIREMENTS 1/</u>	
		<u>Daily Minimum</u>	<u>Daily Maximum</u>	<u>Monthly Average</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Total Residual Chlorine 2/	mg/l	-	0.2	-	Daily	Grab
Time of Chlorine Addition 2/	min/unit/day	-	120	-	Daily	Clock

THE DISCHARGE SHALL HAVE NO SHEEN, AND THERE SHALL BE NO DISCHARGE OF VISIBLE OIL, FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

THERE SHALL BE NO DISCHARGE OF POLYCHLORINATED BIPHENYL COMPOUNDS SUCH AS THOSE COMMONLY USED IN TRANSFORMER FLUID.

1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment. Unless otherwise specified, composite samples shall be time composite samples collected using automatic sampling equipment or a minimum of eight (8) equal volume grab samples collected over equal time intervals. All composite samples shall be collected for the total period of discharge not to exceed 24 hours.

2/ Total Residual Chlorine (TRC) may not be discharged from any single generating unit for more than two hours per day unless the discharger demonstrates to ADEM that discharge for more than two hours is required for macroinvertebrate control. TRC limitations apply at the outlet to the individual unit being chlorinated, prior to combination with any other waste stream or entering the receiving water. When chlorination is occurring, grab samples shall be taken at least every 30 minutes to verify compliance with total residual chlorine limitations. Simultaneous multi-unit chlorination is permitted. Sampling is only required during chlorination.

PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge from the following point source(s) outfall(s), described more fully in the permittee's application:

- DSN007: Storm water runoff from fan yard and area south of fan yard.
- DSN008: Storm water runoff from crusher house area.
- DSN009: Transformer yard and roof drains, plus intake screen backwash.
- DSN010: Storm water from central coal handling area. 2/
- DSN011 and DSN012: Storm water from combustion turbine area.
- DSN017: Storm water runoff from emergency reclaim conveyor area.
- DSN018: Storm water runoff from south coal handling area.

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	UNITS	DISCHARGE LIMITATIONS <sup>1/</sup>			MONITORING REQUIREMENTS <sup>1/</sup>
		Daily Minimum	Daily Maximum	Monthly Average	
Flow	MGD	-	Monitor	-	Frequency 1/year
pH	s.u.	-	Monitor	-	Type <u>3/</u> Grab
Total Suspended Solids	mg/l	-	Monitor	-	Grab
Oil and Grease	mg/l	-	15	-	1/year

THE DISCHARGE SHALL HAVE NO SHEEN, AND THERE SHALL BE NO DISCHARGE OF VISIBLE OIL, FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

THERE SHALL BE NO DISCHARGE OF POLYCHLORINATED BIPHENYL COMPOUNDS SUCH AS THOSE COMMONLY USED IN TRANSFORMER FLUID.

- 1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment. Unless otherwise specified, composite samples shall be time composite samples collected using automatic sampling equipment or a minimum of eight (8) equal volume grab samples collected over equal time intervals. All composite samples shall be collected for the total period of discharge not to exceed 24 hours.
- 2/ Monitoring only required at DSN010.
- 3/ See Part IV.F.

## DISCHARGE MONITORING AND RECORD KEEPING REQUIREMENTS

### 1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge and shall be in accordance with the provisions of this permit.

### 2. Test Procedures

For the purpose of reporting and compliance, permittees shall use one of the following procedures:

- a. For parameters with an EPA established Minimum Level (ML), report the measured value if the analytical result is at or above the ML and report "0" for values below the ML. Test procedures for the analysis of pollutants shall conform to 40 CFR Part 136 and guidelines published pursuant to Section 304(h) of the FWPCA, 33 U.S.C. Section 1314(h). If more than one method for analysis of a substance is approved for use, a method having a minimum level lower than the permit limit shall be used. If the minimum level of all methods is higher than the permit limit, the method having the lowest minimum level shall be used and a report of less than the minimum level shall be reported as zero and will constitute compliance, however should EPA approve a method with a lower minimum level during the term of this permit the permittee shall use the newly approved method.
- b. For pollutants parameters without an established ML, an interim ML may be utilized. The interim ML shall be calculated as 3.18 times the Method Detection Level (MDL) calculated pursuant to 40 CFR Part 136, Appendix B.

Permittees may develop an effluent matrix-specific ML, where an effluent matrix prevents attainment of the established ML. However, a matrix specific ML shall be based upon proper laboratory method and technique. Matrix-specific MLs must be approved by the Department, and may be developed by the permittee during permit issuance, reissuance, modification, or during compliance schedule.

In either case the measured value should be reported if the analytical result is at or above the ML and "0" reported for values below the ML.

- c. For parameters without an EPA established ML, interim ML, or matrix-specific ML, a report of less than the detection limit shall constitute compliance if the detection limit of all analytical methods is higher than the permit limit using the most sensitive EPA approved method. For the purpose of calculating a monthly average, "0" shall be used for values reported less than the detection limit.

The Minimum Level utilized for procedures A and B above shall be reported on the permittee's DMR. When an EPA approved test procedure for analysis of a pollutant does not exist, the Director shall approve the procedure to be used.

### 3. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

- a. The facility name and location, point source number, date, time and exact place of sampling;
- b. The name(s) of person(s) who obtained the samples or measurements;
- c. The dates and times the analyses were performed;
- d. The name(s) of the person(s) who performed the analyses;
- e. The analytical techniques or methods used, including source of method and method number, and
- f. The results of all required analyses.

### 4. Records Retention and Production

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the above reports or the application for this permit, for a period of at least three years from the date of the sample measurement, report or application. This period may be extended by request of the Director at any time. If litigation or other enforcement action, under the AWPCA and/or the FWPCA, is ongoing which involves any of the above records, the records shall be kept until the litigation is resolved. Upon the written request of the Director or his designee, the permittee shall provide the Director with a copy of any record required to be retained by this paragraph. Copies of these records shall not be submitted unless requested.

All records required to be kept for a period of three years shall be kept at the permitted facility or an alternate location approved by the Department in writing and shall be available for inspection.

5. Monitoring Equipment and Instrumentation

All equipment and instrumentation used to determine compliance with the requirements of this permit shall be installed, maintained, and calibrated in accordance with the manufacturer's instructions or, in the absence of manufacturer's instructions, in accordance with accepted practices. The permittee shall develop and maintain quality assurance procedures to ensure proper operation and maintenance of all equipment and instrumentation. The quality assurance procedures shall include the proper use, maintenance, and installation, when appropriate, of monitoring equipment at the plant site.

C. DISCHARGE REPORTING REQUIREMENTS

f. Reporting of Monitoring Requirements

- a. The permittee shall conduct the required monitoring in accordance with the following schedule:

MONITORING REQUIRED MORE FREQUENTLY THAN MONTHLY AND MONTHLY shall be conducted during the first full month following the effective date of coverage under this permit and every month thereafter.

QUARTERLY MONITORING shall be conducted at least once during each calendar quarter. Calendar quarters are the periods of January through March, April through June, July through September, and October through December. The permittee shall conduct the quarterly monitoring during the first complete calendar quarter following the effective date of this permit and is then required to monitor once during each quarter thereafter. Quarterly monitoring may be done anytime during the quarter, unless restricted elsewhere in this permit, but it should be submitted with the last DMR due for the quarter, i.e. (March, June, September and December DMRs).

SEMIANNUAL MONITORING shall be conducted at least once during the period of January through June and at least once during the period of July through December. The permittee shall conduct the semiannual monitoring during the first complete calendar semiannual period following the effective date of this permit and is then required to monitor once during each semiannual period thereafter. Semiannual monitoring may be done anytime during the semiannual period, unless restricted elsewhere in this permit, but it should be submitted with the last DMR due for the month of the semiannual period, i.e. (June and December DMRs).

ANNUAL MONITORING shall be conducted at least once during the period of January through December. The permittee shall conduct the annual monitoring during the first complete calendar annual period following the effective date of this permit and is then required to monitor once during each annual period thereafter. Annual monitoring may be done anytime during the year, unless restricted elsewhere in this permit, but it should be submitted with the December DMR.

- b. The permittee shall submit discharge monitoring reports (DMRs) on the forms provided by the Department and in accordance with the following schedule:

REPORTS OF MORE FREQUENTLY THAN MONTHLY AND MONTHLY TESTING shall be submitted on a **quarterly** basis. The first report is due on the **28th** day of **January 2007**. The reports shall be submitted so that they are received by the Department no later than the 28th day of the month following the reporting period.

REPORTS OF QUARTERLY TESTING shall be submitted on a **quarterly** basis. The first report is due on the **28th** day of **January 2007**. The reports shall be submitted so that they are received by the Department no later than the 28th day of the month following the reporting period.

REPORTS OF SEMIANNUAL TESTING shall be submitted on a semiannual basis. The reports are due on the 28th day of JANUARY and the 28th day of JULY. The reports shall be submitted so that they are received by the Department no later than the 28th day of the month following the reporting period.

REPORTS OF ANNUAL TESTING shall be submitted on an annual basis. The first report is due on the 28th day of JANUARY. The reports shall be submitted so that they are received by the Department no later than the 28th day of the month following the reporting period.

- c. The DMR must be legible and bear an original signature. Photo and electronic copies of the signature are not acceptable and shall not satisfy the reporting requirements of this permit. If the permittee, using approved analytical methods as specified in Provision I. B. 2 monitors any discharge from a point source for a limited substance identified in Provision I. A. of this permit more frequently than required by this permit, the results of such monitoring shall be included in the calculation and reporting of values on the DMR Form and the increased frequency

shall be indicated on the DMR Form. In the event no discharge from a point source identified in Provision I. A. of this permit and described more fully in the permittee's application occurs during a monitoring period, the permittee shall report "No Discharge" for such period on the appropriate DMR Form.

- d. All reports and forms required to be submitted by this permit, the AWPCA and the Department's Rules and regulations, shall be signed by a "responsible official" of the permittee as defined in ADEM Administrative Code Rule 335-6-6-.09 or a "duly authorized representative" of such official as defined in ADEM Administrative Code Rule 335-6-6-.09 and shall bear the following certification.

*"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision 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, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

- e. The permittee may certify in writing that a discharge will not occur for an extended period of time and after such certification shall not be required to submit monitoring reports. Written notification of a planned resumption of discharge shall be submitted at least 30 days prior to resumption of the discharge. If an unplanned resumption of discharge occurs, written notification shall be submitted within 7 days of the resumption. In any case, all discharges shall comply with all provisions of this permit.
- f. All Discharge Monitoring Report forms required to be submitted by this permit, the AWPCA and the Department's Rules, shall be addressed to:

**Alabama Department of Environmental Management  
Permits and Services Division  
Info Sys Branch/EDS  
Post Office Box 301463  
Montgomery, Alabama 36130-1463**

Certified and Registered Mail containing Discharge Monitoring Reports shall be addressed to:

**Alabama Department of Environmental Management  
Permits and Services Division  
Info Sys Branch/EDS  
1400 Coliseum Boulevard  
Montgomery, Alabama 36110-2059**

- g. All other correspondence and reports required to be submitted by this permit, the AWPCA and the Department's Rules, shall be addressed to:

**Alabama Department of Environmental Management  
Industrial Section, Water Division  
Post Office Box 301463  
Montgomery, Alabama 36130-1463**

Certified and Registered Mail shall be addressed to:

**Alabama Department of Environmental Management  
Industrial Section, Water Division  
1400 Coliseum Boulevard  
Montgomery, Alabama 36110-2059**

- h. If this permit is a reissuance, then the permittee shall continue to submit DMRs in accordance with the requirements of their previous permit until such time as DMRs are due as discussed in Part I.C.1.b. above.

## 2. Noncompliance Notification

- a. 24-Hour Noncompliance Reporting

The permittee shall report to the Director, within 24-hours of becoming aware of any noncompliance which may endanger health or the environment. This shall include but is not limited to the following circumstances:

- (1) does not comply with any daily minimum or maximum discharge limitation for an effluent characteristic specified in Provision I. A. of this permit which is denoted by an "(X)",

- (2) threatens human health or welfare, fish or aquatic life, or water quality standards,
- (3) does not comply with an applicable toxic pollutant effluent standard or prohibition established under Section 307(a) of the FWPCA, 33 U.S.C. Section 1317(a),
- (4) contains a quantity of a hazardous substance which has been determined may be harmful to public health or welfare under Section 311(b)(4) of the FWPCA, 33 U.S.C. Section 1321(b)(4),
- (5) exceeds any discharge limitation for an effluent characteristic as a result of an unanticipated bypass or upset, and
- (6) is an unpermitted direct or indirect discharge of a pollutant to a water of the state (unpermitted discharges properly reported to the Department under any other requirement are not required to be reported under this provision).

The permittee shall orally report the occurrence and circumstances of such discharge to the Director within 24-hours after the permittee becomes aware of the occurrence of such discharge. In addition to the oral report, the permittee shall submit to the Director or Designee a written report as provided in Part I.C.2.c. no later than five (5) days after becoming aware of the occurrence of such discharge.

- b. If for any reason, the permittee's discharge does not comply with any limitation of this permit, the permittee shall submit to the Director or Designee a written report as provided in Part I.C.2.c. below, such report shall be submitted with the next Discharge Monitoring Report required to be submitted by Part I.C.1. of this permit after becoming aware of the occurrence of such noncompliance.
- c. Any written report required to be submitted to the Director or Designee by Part I.C.2 a. or b. shall be submitted using a copy of the Noncompliance Notification Form provided with this permit and shall include the following information:
  - (1) A description of the discharge and cause of noncompliance;
  - (2) The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and
  - (3) A description of the steps taken and/or being taken to reduce or eliminate the noncomplying discharge and to prevent its recurrence.

#### **D. OTHER REPORTING AND NOTIFICATION REQUIREMENTS**

##### 1. Anticipated Noncompliance

The permittee shall give the Director written advance notice of any planned changes or other circumstances regarding a facility which may result in noncompliance with permit requirements.

##### 2. Termination of Discharge

The permittee shall notify the Director, in writing, when all discharges from any point source(s) identified in Provision I. A. of this permit have permanently ceased. This notification shall serve as sufficient cause for instituting procedures for modification or termination of the permit.

##### 3. Updating Information

- a. The permittee shall inform the Director of any change in the permittee's mailing address or telephone number or in the permittee's designation of a facility contact or office having the authority and responsibility to prevent and abate violations of the AWPCA, the Department's Rules and the terms and conditions of this permit, in writing, no later than ten (10) days after such change. Upon request of the Director or his designee, the permittee shall furnish the Director with an update of any information provided in the permit application.
- b. If the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information with a written explanation for the mistake and/or omission.

##### 4. Duty to Provide Information

The permittee shall furnish to the Director, within a reasonable time, any information which the Director or his designee may request to determine whether cause exists for modifying, revoking and re-issuing, suspending, or terminating this permit, in whole or in part, or to determine compliance with this permit.

##### 5. Cooling Water and Boiler Water Additives

- a. The permittee shall notify the Director in writing not later than thirty (30) days prior to instituting the use of any biocide corrosion inhibitor or chemical additive in a cooling or boiler system, not identified in the application for this permit, from which discharge is allowed by this permit. Notification is not required for additives that do not contain a heavy metal(s) as an active ingredient and that pass through a wastewater treatment system prior to discharge nor is notification required for additives that should not reasonably be expected to cause the cooling water or boiler water to exhibit toxicity as determined by analysis of manufacturer's data or testing by the permittee. Such notification shall include:
- (1) name and general composition of biocide or chemical,
  - (2) 96-hour median tolerance limit data for organisms representative of the biota of the waterway into which the discharge will ultimately reach,
  - (3) quantities to be used,
  - (4) frequencies of use,
  - (5) proposed discharge concentrations, and
  - (6) EPA registration number, if applicable.
- b. The use of a biocide or additive containing tributyl tin, tributyl tin oxide, zinc, chromium or related compounds in cooling or boiler system(s), from which a discharge regulated by this permit occurs, is prohibited except as exempted below. The use of a biocide or additive containing zinc, chromium or related compounds may be used in special circumstances if (1) the permit contains limits for these substances, or (2) the applicant demonstrates during the application process that the use of zinc, chromium or related compounds as a biocide or additive will not pose a reasonable potential to violate the applicable State water quality standards for these substances. The use of any additive, not identified in this permit or in the application for this permit or not exempted from notification under this permit is prohibited, prior to a determination by the Department that permit modification to control discharge of the additive is not required or prior to issuance of a permit modification controlling discharge of the additive.
6. Permit Issued Based On Estimated Characteristics
- a. If this permit was issued based on estimates of the characteristics of a process discharge reported on an EPA NPDES Application Form 2D (EPA Form 3510-2D), the permittee shall complete and submit an EPA NPDES Application Form 2C (EPA Form 3510-2C) no later than two years after the date that discharge begins. Sampling required for completion of the Form 2C shall occur when a discharge(s) from the process(s) causing the new or increased discharge is occurring. If this permit was issued based on estimates concerning the composition of a storm water discharge(s), the permittee shall perform the sampling required by EPA NPDES Application Form 2F (EPA Form 3510-2F) no later than one year after the industrial activity generating the storm water discharge has been fully initiated.
- b. This permit shall be reopened if required to address any new information resulting from the completion and submittal of the Form 2C and or 2F.

#### E. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the discharge limitations specified in Provision I. A. in accordance with the following schedule:

##### **COMPLIANCE SHALL BE ATTAINED ON THE EFFECTIVE DATE OF THIS PERMIT**

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

## PART II

### A. OPERATIONAL AND MANAGEMENT REQUIREMENTS

1. Facilities Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities only when necessary to achieve compliance with the conditions of the permit.

2. Best Management Practices

- a. Dilution water shall not be added to achieve compliance with discharge limitations except when the Director or his designee has granted prior written authorization for dilution to meet water quality requirements.
  - b. The permittee shall prepare, implement, and maintain a Spill Prevention, Control and Countermeasures (SPCC) Plan in accordance with 40 C.F.R. Section 112 if required thereby.
  - c. The permittee shall prepare, submit for approval and implement a Best Management Practices (BMP) Plan for containment of any or all process liquids or solids, in a manner such that these materials do not present a significant potential for discharge, if so required by the Director or his designee. When submitted and approved, the BMP Plan shall become a part of this permit and all requirements of the BMP Plan shall become requirements of this permit.
3. Spill Prevention, Control, and Management

The permittee shall provide spill prevention, control, and/or management sufficient to prevent any spills of pollutants from entering a water of the state or a publicly or privately owned treatment works. Any containment system used to implement this requirement shall be constructed of materials compatible with the substance(s) contained and which shall prevent the contamination of groundwater and such containment system shall be capable of retaining a volume equal to 110 percent of the capacity of the largest tank for which containment is provided.

## B. OTHER RESPONSIBILITIES

### 1. Duty to Mitigate Adverse Impacts

The permittee shall promptly take all reasonable steps to mitigate and minimize or prevent any adverse impact on human health or the environment resulting from noncompliance with any discharge limitation specified in Provision I. A. of this permit, including such accelerated or additional monitoring of the discharge and/or the receiving waterbody as necessary to determine the nature and impact of the noncomplying discharge.

### 2. Right of Entry and Inspection

The permittee shall allow the Director, or an authorized representative, upon the presentation of proper credentials and other documents as may be required by law to:

- a. enter upon the permittee's premises where a regulated facility or activity or point source is located or conducted, or where records must be kept under the conditions of the permit;
- b. have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit;
- c. inspect any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under the permit; and
- d. sample or monitor, for the purposes of assuring permit compliance or as otherwise authorized by the AWPCA, any substances or parameters at any location.

## C. BYPASS AND UPSET

### 1. Bypass

- a. Any bypass is prohibited except as provided in b. and c. below:
- b. A bypass is not prohibited if:
  - (1) It does not cause any discharge limitation specified in Provision I. A. of this permit to be exceeded;
  - (2) It enters the same receiving stream as the permitted outfall and;
  - (3) It is necessary for essential maintenance of a treatment or control facility or system to assure efficient operation of such facility or system.
- c. A bypass is not prohibited and need not meet the discharge limitations specified in Provision I. A. of this permit if:
  - (1) It is unavoidable to prevent loss of life, personal injury, or severe property damage;
  - (2) There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime (this condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering

judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance); and

- (3) The permittee submits a written request for authorization to bypass to the Director at least ten (10) days prior to the anticipated bypass (if possible), the permittee is granted such authorization, and the permittee complies with any conditions imposed by the Director to minimize any adverse impact on human health or the environment resulting from the bypass.

- d. The permittee has the burden of establishing that each of the conditions of Provision II.C.1 b. or c. have been met to qualify for an exception to the general prohibition against bypassing contained in a and an exemption, where applicable, from the discharge limitations specified in Provision I. A. of this permit.

## 2. Upset

- a. A discharge which results from an upset need not meet the discharge limitations specified in Provision I. A. of this permit if:

- (1) No later than 24-hours after becoming aware of the occurrence of the upset, the permittee orally reports the occurrence and circumstances of the upset to the Director or his designee; and
- (2) No later than five (5) days after becoming aware of the occurrence of the upset, the permittee furnishes the Director with evidence, including properly signed, contemporaneous operating logs, or other relevant evidence, demonstrating that (i) an upset occurred; (ii) the permittee can identify the specific cause(s) of the upset; (iii) the permittee's facility was being properly operated at the time of the upset; and (iv) the permittee promptly took all reasonable steps to minimize any adverse impact on human health or the environment resulting from the upset.

- b. The permittee has the burden of establishing that each of the conditions of Provision II. C.2.a of this permit have been met to qualify for an exemption from the discharge limitations specified in Provision I.A. of this permit.

## D. DUTY TO COMPLY WITH PERMIT, RULES, AND STATUTES

### 1. Duty to Comply

- a. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the AWPCA and the FWPCA and is grounds for enforcement action, for permit termination, revocation and reissuance, suspension, modification; or denial of a permit renewal application.
- b. The necessity to halt or reduce production or other activities in order to maintain compliance with the conditions of the permit shall not be a defense for a permittee in an enforcement action.
- c. The discharge of a pollutant from a source not specifically identified in the permit application for this permit and not specifically included in the description of an outfall in this permit is not authorized and shall constitute noncompliance with this permit.
- d. The permittee shall take all reasonable steps, including cessation of production or other activities, to minimize or prevent any violation of this permit or to minimize or prevent any adverse impact of any permit violation.
- e. Nothing in this permit shall be construed to preclude and negate the permittee's responsibility or liability to apply for, obtain, or comply with other ADEM, Federal, State, or Local Government permits, certifications, licenses, or other approvals.

### 2. Removed Substances

Solids, sludges, filter backwash, or any other pollutant or other waste removed in the course of treatment or control of wastewaters shall be disposed of in a manner that complies with all applicable Department Rules.

### 3. Loss or Failure of Treatment Facilities

Upon the loss or failure of any treatment facilities, including but not limited to the loss or failure of the primary source of power of the treatment facility, the permittee shall, where necessary to maintain compliance with the discharge limitations specified in Provision I. A. of this permit, or any other terms or conditions of this permit, cease, reduce, or otherwise control production and/or all discharges until treatment is restored. If control of discharge during loss or failure of the primary source of power is to be accomplished by means of alternate power sources, standby generators, or retention of inadequately treated effluent, the permittee must furnish to the Director within six months a certification that such control mechanisms have been installed.

## 4. Compliance with Statutes and Rules

- a. This permit has been issued under ADEM Administrative Code, Chapter 335-6-6. All provisions of this chapter, that are applicable to this permit, are hereby made a part of this permit. A copy of this chapter may be obtained for a small charge from the Office of General Counsel, Alabama Department of Environmental Management, 1400 Coliseum Blvd., Montgomery, AL 36130
- b. This permit does not authorize the noncompliance with or violation of any Laws of the State of Alabama or the United States of America or any regulations or rules implementing such laws. FWPCA, 33 U.S.C. Section 1319, and Code of Alabama 1975, Section 22-22-14.

**E. PERMIT TRANSFER, MODIFICATION, SUSPENSION, REVOCATION, AND REISSUANCE**

## 1. Duty to Reapply or Notify of Intent to Cease Discharge

- a. If the permittee intends to continue to discharge beyond the expiration date of this permit, the permittee shall file a complete permit application for reissuance of this permit at least 180 days prior to its expiration. If the permittee does not intend to continue discharge beyond the expiration of this permit, the permittee shall submit written notification of this intent which shall be signed by an individual meeting the signatory requirements for a permit application as set forth in ADEM Administrative Code Rule 335-6-6-.09.
- b. Failure of the permittee to apply for reissuance at least 180 days prior to permit expiration will void the automatic continuation of the expiring permit provided by ADEM Administrative Code Rule 335-6-6-.06 and should the permit not be reissued for any reason any discharge after expiration of this permit will be an unpermitted discharge.

## 2. Change in Discharge

- a. The permittee shall apply for a permit modification at least 180 days in advance of any facility expansion, production increase, process change, or other action that could result in the discharge of additional pollutants or increase the quantity of a discharged pollutant such that existing permit limitations would be exceeded or that could result in an additional discharge point. This requirement applies to pollutants that are or that are not subject to discharge limitations in this permit. No new or increased discharge may begin until the Director has authorized it by issuance of a permit modification or a reissued permit.
- b. The permittee shall notify the Director as soon as it is known or there is reason to believe:
  - (1) That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis, of any toxic pollutant which is not limited in this permit, if that discharge will exceed the highest of the following notification levels:
    - (a) one hundred micrograms per liter;
    - (b) two hundred micrograms per liter for acrolein and acrylonitrile; five hundred micrograms per liter for 2,4-dinitrophenol and for 2-methyl-4,6-dini-trophenol; and one milligram per liter for antimony;
    - (c) five times the maximum concentration value reported for that pollutant in the permit application; or
  - (2) That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:
    - (a) five hundred micrograms per liter;
    - (b) one milligram per liter for antimony;
    - (c) ten times the maximum concentration value reported for that pollutant in the permit application.

## 3. Transfer of Permit

This permit may not be transferred or the name of the permittee changed without notice to the Director and subsequent modification or revocation and reissuance of the permit to identify the new permittee and to incorporate any other changes as may be required under the FWPCA or AWPCA. In the case of a change in name, ownership or control of the permittee's premises only, a request for permit modification in a format acceptable to the Director is required at least 30 days prior to the change. In the case of a change in name, ownership or control of the permittee's premises accompanied by a change or proposed change in effluent characteristics, a complete permit application is required to be submitted to the Director at least 180 days prior

to the change. Whenever the Director is notified of a change in name, ownership or control, he may decide not to modify the existing permit and require the submission of a new permit application.

4. Permit Modification and Revocation

a. This permit may be modified or revoked and reissued, in whole or in part, during its term for cause, including but not limited to, the following:

- (1) If cause for termination under Provision II. E. 5 of this permit exists, the Director may choose to revoke and reissue this permit instead of terminating the permit;
- (2) If a request to transfer this permit has been received, the Director may decide to revoke and reissue or to modify the permit, or
- (3) If modification or revocation and reissuance is requested by the permittee and cause exists, the Director may grant the request.

b. This permit may be modified during its term for cause, including but not limited to, the following:

- (1) If cause for termination under Provision II. E. 5 of this permit exists, the Director may choose to modify this permit instead of terminating this permit;
- (2) There are material and substantial alterations or additions to the facility or activity generating wastewater which occurred after permit issuance which justify the application of permit conditions that are different or absent in the existing permit;
- (3) The Director has received new information that was not available at the time of permit issuance and that would have justified the application of different permit conditions at the time of issuance;
- (4) A new or revised requirement(s) of any applicable standard or limitation is promulgated under Sections 301(b)(2)(C), (D), (E), and (F), and 307(a)(2) of the FWPCA;
- (5) Errors in calculation of discharge limitations or typographical or clerical errors were made;
- (6) To the extent allowed by ADEM Administrative Code, Rule 335-6-6-.17, when the standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued;
- (7) To the extent allowed by ADEM Administrative Code, Rule 335-6-6-.17, permits may be modified to change compliance schedules;
- (8) To agree with a granted variance under 301(c), 301(g), 301(h), 301(k), or 316(a) of the FWPCA or for fundamentally different factors;
- (9) To incorporate an applicable 307(a) FWPCA toxic effluent standard or prohibition;
- (10) When required by the reopener conditions in this permit;
- (11) When required under 40 CFR 403.8(e) (compliance schedule for development of pretreatment program);
- (12) Upon failure of the state to notify, as required by Section 402(b)(3) of the FWPCA, another state whose waters may be affected by a discharge permitted by this permit;
- (13) When required to correct technical mistakes, such as errors in calculation, or mistaken interpretations of law made in determining permit conditions; or
- (14) When requested by the permittee and the Director determines that the modification has cause and will not result in a violation of federal or state law, regulations or rules, or

5. This permit may be terminated during its term for cause, including but not limited to, the following:

- a. Violation of any term or condition of this permit;
- b. The permittee's misrepresentation or failure to disclose fully all relevant facts in the permit application or during the permit issuance process or the permittee's misrepresentation of any relevant facts at any time;

- c. Materially false or inaccurate statements or information in the permit application or the permit;
  - d. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge;
  - e. The permittee's discharge threatens human life or welfare or the maintenance of water quality standards;
  - f. Permanent closure of the facility generating the wastewater permitted to be discharged by this permit or permanent cessation of wastewater discharge;
  - g. New or revised requirements of any applicable standard or limitation that is promulgated under Sections 301(b)(2)(C), (D), (E), and (F), and 307(a)(2) of the FWPCA that the Director determines cannot be complied with by the permittee.
  - h. Any other cause allowed by the ADEM Administrative Code, Chapter 335-6-6.
- 6. This permit may be suspended during its term for noncompliance until the permittee has taken action(s) necessary to achieve compliance.
  - 7. The filing of a request by the permittee for modification, suspension or revocation of this permit, in whole or in part, does not stay any permit term or condition.

#### F. COMPLIANCE WITH TOXIC POLLUTANT STANDARD OR PROHIBITION

If any applicable effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the FWPCA, 33 U.S.C. Section 1317(a), for a toxic pollutant discharged by the permittee and such standard or prohibition is more stringent than any discharge limitation on the pollutant specified in Provision I. A. of this permit, or controls a pollutant not limited in Provision I. A. of this permit, this permit shall be modified to conform to the toxic pollutant effluent standard or prohibition and the permittee shall be notified of such modification. If this permit has not been modified to conform to the toxic pollutant effluent standard or prohibition before the effective date of such standard or prohibition, the permittee shall attain compliance with the requirements of the standard or prohibition within the time period required by the standard or prohibition and shall continue to comply with the standard or prohibition until this permit is modified or reissued.

#### G. DISCHARGE OF WASTEWATER GENERATED BY OTHERS

The discharge of wastewater, generated by any process, facility, or by any other means not under the operational control of the permittee or not identified in the application for this permit or not identified specifically in the description of an outfall in this permit is not authorized by this permit.

### PART III

#### A. CIVIL AND CRIMINAL LIABILITY

- 1. Tampering
 

Any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained or performed under the permit shall, upon conviction, be subject to penalties as provided by the AWPCA.
- 2. False Statements
 

Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be subject to penalties as provided by the AWPCA.
- 3. Permit Enforcement
  - a. Any NPDES permit issued or reissued by the Department is a permit for the purpose of the AWPCA and the FWPCA and as such any terms, conditions, or limitations of the permit are enforceable under state and federal law.
  - b. Any person required to have a NPDES permit pursuant to ADEM Administrative Code Chapter 335-6-6 and who discharges pollutants without said permit, who violates the conditions of said permit, who discharges pollutants in a manner not authorized by the permit, or who violates applicable orders of the Department or any applicable rule or standard of the Department, is subject to any one or combination of the following enforcement actions under applicable state statutes

- (1) An administrative order requiring abatement, compliance, mitigation, cessation, clean-up, and/or penalties;
  - (2) An action for damages;
  - (3) An action for injunctive relief, or
  - (4) An action for penalties.
- c. If the permittee is not in compliance with the conditions of an expiring or expired permit the Director may choose to do any or all of the following provided the permittee has made a timely and complete application for reissuance of the permit:
- (1) initiate enforcement action based upon the permit which has been continued;
  - (2) issue a notice of intent to deny the permit reissuance. If the permit is denied, the owner or operator would then be required to cease the activities authorized by the continued permit or be subject to enforcement action for operating without a permit;
  - (3) reissue the new permit with appropriate conditions; or
  - (4) take other actions authorized by these rules and AWPCA.

4. Relief from Liability

Except as provided in Provision II. C. 1. (Bypass) and Provision II. C. 2. (Upset), nothing in this permit shall be construed to relieve the permittee of civil or criminal liability under the AWPCA or FWPCA for noncompliance with any term or condition of this permit.

**B. OIL AND HAZARDOUS SUBSTANCE LIABILITY**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties to which the permittee is or may be subject under Section 311 of the FWPCA, 33 U.S.C. Section 1321.

**C. PROPERTY AND OTHER RIGHTS**

This permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to persons or property or invasion of other private rights, trespass, or any infringement of federal, state, or local laws or regulations, nor does it authorize or approve the construction of any physical structures or facilities or the undertaking of any work in any waters of the state or of the United States.

**D. AVAILABILITY OF REPORTS**

Except for data determined to be confidential under Code of Alabama 1975, Section 22-22-9(c), all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department. Effluent data shall not be considered confidential.

**E. EXPIRATION OF PERMITS FOR NEW OR INCREASED DISCHARGES**

1. If this permit was issued for a new discharger or new source, this permit shall expire eighteen months after the issuance date if construction of the facility has not begun during the eighteen-month period.
2. If this permit was issued or modified to allow the discharge of increased quantities of pollutants to accommodate the modification of an existing facility and if construction of this modification has not begun during the eighteen month period after issuance of this permit or permit modification, this permit shall be modified to reduce the quantities of pollutants allowed to be discharged to those levels that would have been allowed if the modification of the facility had not been planned.
3. Construction has begun when the owner or operator has:
  - a. begun, or caused to begin as part of a continuous on-site construction program:
    - (1) any placement, assembly, or installation of facilities or equipment; or
    - (2) significant site preparation work including clearing, excavation, or removal of existing buildings, structures, or facilities which is necessary for the placement, assembly, or installation of new source facilities or equipment; or

- b. entered into a binding contractual obligation for the purpose of placement, assembly, or installation of facilities or equipment which are intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility, engineering, and design studies do not constitute a contractual obligation under the paragraph. The entering into a lease with the State of Alabama for exploration and production of hydrocarbons shall also be considered beginning construction.

#### F. COMPLIANCE WITH WATER QUALITY STANDARDS

1. On the basis of the permittee's application, plans, or other available information, the Department has determined that compliance with the terms and conditions of this permit should assure compliance with the applicable water quality standards.
2. Compliance with permit terms and conditions notwithstanding, if the permittee's discharge(s) from point sources identified in Provision I. A. of this permit cause or contribute to a condition in contravention of state water quality standards, the Department may require abatement action to be taken by the permittee in emergency situations or modify the permit pursuant to the Department's Rules, or both.
3. If the Department determines, on the basis of a notice provided pursuant to this permit or any investigation, inspection or sampling, that a modification of this permit is necessary to assure maintenance of water quality standards or compliance with other provisions of the AWPCA or FWPCA, the Department may require such modification and, in cases of emergency, the Director may prohibit the discharge until the permit has been modified.

#### G. GROUNDWATER

Unless specifically authorized by a permit issued by the Department, the discharge of pollutants to groundwater is prohibited. Should a threat of groundwater contamination occur, the Director may require groundwater monitoring to properly assess the degree of the problem and the Director may require that the permittee undertake measures to abate any such discharge and/or contamination.

#### H. DEFINITIONS

1. Average monthly discharge limitation - means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month (zero discharge days shall not be included in the number of "daily discharges" measured and a less than detectable test result shall be treated as a concentration of zero if the most sensitive EPA approved method was used).
2. Average weekly discharge limitation - means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week (zero discharge days shall not be included in the number of "daily discharges" measured and a less than detectable test result shall be treated as a concentration of zero if the most sensitive EPA approved method was used).
3. Arithmetic Mean - means the summation of the individual values of any set of values divided by the number of individual values
4. AWPCA - means the Alabama Water Pollution Control Act.
5. BOD - means the five-day measure of the pollutant parameter biochemical oxygen demand.
6. Bypass - means the intentional diversion of waste streams from any portion of a treatment facility.
7. CBOD - means the five-day measure of the pollutant parameter carbonaceous biochemical oxygen demand.
8. Daily discharge - means the discharge of a pollutant measured during any consecutive 24-hour period in accordance with the sample type and analytical methodology specified by the discharge permit.
9. Daily maximum - means the highest value of any individual sample result obtained during a day.
10. Daily minimum - means the lowest value of any individual sample result obtained during a day.
11. Day - means any consecutive 24-hour period.
12. Department - means the Alabama Department of Environmental Management.
13. Director - means the Director of the Department.
14. Discharge - means "[t]he addition, introduction, leaking, spilling or emitting of any sewage, industrial waste, pollutant or other waste into waters of the state". Code of Alabama 1975, Section 22-22-1(b)(9).

15. Discharge Monitoring Report (DMR) - means the form approved by the Director to accomplish reporting requirements of an NPDES permit.
16. DO - means dissolved oxygen.
17. 8HC - means 8-hour composite sample, including any of the following:
  - a. The mixing of at least 5 equal volume samples collected at constant time intervals of not more than 2 hours over a period of not less than 8 hours between the hours of 6:00 a.m. and 6:00 p.m. If the sampling period exceeds 8 hours, sampling may be conducted beyond the 6:00 a.m. to 6:00 p.m. period.
  - b. A sample continuously collected at a constant rate over period of not less than 8 hours between the hours of 6:00 a.m. and 6:00 p.m. If the sampling period exceeds 8 hours, sampling may be conducted beyond the 6:00 a.m. to 6:00 p.m. period.
18. EPA - means the United States Environmental Protection Agency.
19. FC - means the pollutant parameter fecal coliform.
20. Flow - means the total volume of discharge in a 24-hour period.
21. FWPCA - means the Federal Water Pollution Control Act.
22. Geometric Mean - means the Nth root of the product of the individual values of any set of values where N is equal to the number of individual values. The geometric mean is equivalent to the antilog of the arithmetic mean of the logarithms of the individual values. For purposes of calculating the geometric mean, values of zero (0) shall be considered one (1).
23. Grab Sample - means a single influent or effluent portion which is not a composite sample. The sample(s) shall be collected at the period(s) most representative of the discharge.
24. Indirect Discharger - means a nondomestic discharger who discharges pollutants to a publicly owned treatment works or a privately owned treatment facility operated by another person.
25. Industrial User - means those industries identified in the Standard Industrial Classification manual, Bureau of the Budget 1967, as amended and supplemented, under the category "Division D - Manufacturing" and such other classes of significant waste producers as, by regulation, the Director deems appropriate.
26. MGD - means million gallons per day.
27. Monthly Average - means, other than for fecal coliform bacteria, the arithmetic mean of all the composite or grab samples taken for the daily discharges collected in one month period. The monthly average for fecal coliform bacteria is the geometric mean of daily discharge samples collected in a one month period. The monthly average for flow is the arithmetic mean of all flow measurements taken in a one month period.
28. New Discharger - means a person, owning or operating any building, structure, facility or installation:
  - a. from which there is or may be a discharge of pollutants;
  - b. that did not commence the discharge of pollutants prior to August 13, 1979, and which is not a new source; and
  - c. which has never received a final effective NPDES permit for dischargers at that site.
29. NH3-N - means the pollutant parameter ammonia, measured as nitrogen.
30. Permit application - means forms and additional information that is required by ADEM Administrative Code Rule 335-6-6-.08 and applicable permit fees.
31. Point source - means "any discernible, confined and discrete conveyance, including but not limited to any pipe, channel, ditch, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged." Section 502(14) of the FWPCA, 33 U.S.C. Section 1362(14).
32. Pollutant - includes for purposes of this permit, but is not limited to, those pollutants specified in Code of Alabama 1975, Section 22-22-1(b)(3) and those effluent characteristics specified in Provision I. A. of this permit.
33. Privately Owned Treatment Works - means any devices or system which is used to treat wastes from any facility whose operator is not the operator of the treatment works, and which is not a "POTW".

34. Publicly Owned Treatment Works – means a wastewater collection and treatment facility owned by the State, municipality, regional entity composed of two or more municipalities, or another entity created by the State or local authority for the purpose of collecting and treating municipal wastewater.
35. Receiving Stream – means the “waters” receiving a “discharge” from a “point source”.
36. Severe property damage - means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
37. Significant Source – means a source which discharges 0.025 MGD or more to a POTW or greater than five percent of the treatment work’s capacity, or a source which is a primary industry as defined by the U.S. EPA or which discharges a priority or toxic pollutant.
38. TKN - means the pollutant parameter Total Kjeldahl Nitrogen.
39. TON – means the pollutant parameter Total Organic Nitrogen.
40. TRC – means Total Residual Chlorine.
41. TSS – means the pollutant parameter Total Suspended Solids.
42. 24HC – means 24-hour composite sample, including any of the following:
- the mixing of at least 12 equal volume samples collected at constant time intervals of not more than 2 hours over a period of 24 hours;
  - a sample collected over a consecutive 24-hour period using an automatic sampler composite to one sample. As a minimum, samples shall be collected hourly and each shall be no more than one twenty-fourth (1/24) of the total sample volume collected;
  - a sample collected over a consecutive 24-hour period using an automatic composite sampler composited proportional to flow.
43. Upset - means an exceptional incident in which there is an unintentional and temporary noncompliance with technology-based permit discharge limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
44. Waters - means “[a]ll waters of any river, stream, watercourse, pond, lake, coastal, ground or surface water, wholly or partially within the state, natural or artificial. This does not include waters which are entirely confined and retained completely upon the property of a single individual, partnership or corporation unless such waters are used in interstate commerce.” Code of Alabama 1975, Section 22-22-1(b)(2). Waters “include all navigable waters” as defined in Section 502(7) of the FWPCA, 22 U.S.C. Section 1362(7), which are within the State of Alabama.
45. Week - means the period beginning at twelve midnight Saturday and ending at twelve midnight the following Saturday.
46. Weekly (7-day and calendar week) Average – is the arithmetic mean of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. The calendar week is defined as beginning on Sunday and ending on Saturday. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for the calendar week shall be included in the data for the month that contains the Saturday.

#### **I. SEVERABILITY**

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

PART IV

A. EFFLUENT TOXICITY LIMITATIONS AND BIOMONITORING REQUIREMENTS FOR CHRONIC TOXICITY

1. The permittee shall perform short-term chronic toxicity tests on the wastewater discharges required to be tested for chronic toxicity by Part I of this permit.
  - a. Test Requirements
    - (1) The samples shall be diluted using appropriate control water, to the Instream Waste Concentration (IWC) which is 3% effluent. The IWC is the actual concentration of effluent, after mixing, in the receiving stream during a 7-day, 10-year flow period. Should future modeling efforts indicate the IWC should be greater than the value used for this location, then the permit may be re-opened to modify the IWC.
    - (2) Any test result that shows a statistically significant reduction in survival, growth or reproduction between the control and the test at the 95% confidence level indicate chronic toxicity and constitute noncompliance with this permit.
  - b. General Test Requirements
    - (1) Grab samples shall be obtained for use in the above biomonitoring tests and collected every other day so that the laboratory receives water samples on the first, third and fifth day of the seven-day test period. The holding time for each sample shall not exceed 36 hours. The control water shall be a water prepared in the laboratory in accordance with the EPA procedure described in EPA 821-R-02-013 or the most current edition or another control water selected by the permittee and approved by the Department.
    - (2) Effluent toxicity tests in which the control survival is less than 80%, *P. promelas* dry weight per surviving control organism is less than 0.25 mg, Ceriodaphnia number of young per surviving control organism is less than 15, Ceriodaphnia reproduction where less than 60% of surviving control females produce three broods or in which the other requirements of the EPA Test Procedure are not met shall be unacceptable and the permittee shall rerun the tests as soon as practical within the monitoring period.
    - (3) In the event of an invalid test, upon subsequent completion of a valid test, the results of all tests, valid and invalid, are reported with an explanation of the tests performed and results.
  - c. Reporting Requirements
    - (1) The permittee shall notify the Department in writing within 48 hours after toxicity has been demonstrated by the scheduled test(s).
    - (2) Biomonitoring test results obtained during each monitoring period shall be summarized and reported using the appropriate Discharge Monitoring Report (DMR) form approved by the Department. In accordance with Section 2. of this part, an effluent toxicity report containing the information in Section 2. shall be included with the DMR. Two copies of the test results must be submitted to the Department no later than 28 days after the month in which the tests were performed.
  - d. Additional Testing Requirements
    - (1) If chronic toxicity is indicated (noncompliance with permit limit), the permittee shall perform two additional valid chronic toxicity tests in accordance with these procedures to determine the extent and duration of the toxic condition. The toxicity tests shall run consecutively beginning on the first calendar week following the date on which the permittee became aware of the permit noncompliance and the results of these tests shall be submitted no later than 28 days following the month in which the tests were performed.
    - (2) After evaluation of the results of the follow-up tests, the Department will determine if additional action is appropriate and may require additional testing and/or toxicity reduction measures. The permittee may be required to perform a Toxicity Identification Evaluation (TIE) and/or a Toxicity Reduction Evaluation (TRE). The TIE/TRE shall be performed in accordance with the most recent protocols/guidance outlined by EPA (e.g., EPA/600/2-88/062, EPA/600/R-92/080, EPA/600/R-91-003, EPA/600/R-92/081, EPA/833/B-99/022 and/or EPA/600/6-91/005F, etc.)

e. Test Methods

- (1) The tests shall be performed in accordance with the latest edition of the "EPA Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms." The Larval Survival and Growth Test, Methods 1000.0, shall be used for the fathead minnow (*Pimephales promelas*) test and the Survival and Reproduction Test, Method 1002.0, shall be used for the cladoceran (*Ceriodaphnia dubia*) test.

2. Effluent Toxicity Testing Reports

The following information shall be submitted with each discharge monitoring report unless otherwise directed by the Department. The Department may at any times suspend or reinstate this requirement or may decrease or increase the frequency of submittals.

a. Introduction

- (1) Facility name, location and county
- (2) Permit number
- (3) Toxicity testing requirements of permit
- (4) Name of receiving water body
- (5) Contract laboratory information (if tests are performed under contract)
  - (a) Name of firm
  - (b) Telephone number
  - (c) Address
- (6) Objective of test

b. Plant Operations

- (1) Discharge Operating schedule (if other than continuous)
- (2) Volume of discharge during sample collection to include Mean daily discharge on sample collection dates (MGD, CFS, GPM)
- (3) Design flow of treatment facility at time of sampling

c. Source of Effluent and Dilution Water

- (1) Effluent samples
  - (a) Sampling point
  - (b) Sample collection dates and times (to include composite sample start and finish times)
  - (c) Sample collection method
  - (d) Physical and chemical data of undiluted effluent samples (water temperature, pH, alkalinity, hardness, specific conductance, total residual chlorine (if applicable), etc.)
  - (e) Lapsed time from sample collection to delivery
  - (f) Lapsed time from sample collection to test initiation
  - (g) Sample temperature when received at the laboratory
- (2) Dilution Water
  - (a) Source
  - (b) Collection/preparation date(s) and time(s)
  - (c) Pretreatment (if applicable)
  - (d) Physical and chemical characteristics (water temperature, pH, alkalinity, hardness, specific conductance, etc.)

- d. Test Conditions
- (1) Toxicity test method utilized
  - (2) End point(s) of test
  - (3) Deviations from referenced method, if any, and reason(s)
  - (4) Date and time test started
  - (5) Date and time test terminated
  - (6) Type and volume of test chambers
  - (7) Volume of solution per chamber
  - (8) Number of organisms per test chamber
  - (9) Number of replicate test chambers per treatment
  - (10) Test temperature, pH and dissolved oxygen as recommended by the method (to include ranges)
  - (11) Specify if aeration was needed
  - (12) Feeding frequency, amount and type of food
  - (13) Specify if (and how) pH control measures were implemented
  - (14) Light intensity (mean)
- e. Test Organisms
- (1) Scientific name
  - (2) Life stage and age
  - (3) Source
  - (4) Disease(s) treatment (if applicable)
- f. Quality Assurance
- (1) Reference toxicant utilized and source
  - (2) Date and time of most recent chronic reference toxicant test(s), raw data and current control chart(s). The most recent chronic reference toxicant test shall be conducted within 30 days of the routine
  - (3) Dilution water utilized in reference toxicant test
  - (4) Results of reference toxicant test(s) (NOEC, IC25, PASS/FAIL, etc.), report concentration-response relationship and evaluate test sensitivity
  - (5) Physical and chemical methods utilized
- g. Results
- (1) Provide raw toxicity data in tabular form, including daily records of affected organisms in each concentration (including controls) and replicate
  - (2) Provide table of endpoints: NOECs, IC25s, PASS/FAIL, etc. (as required in the applicable NPDES permit)
  - (3) Indicate statistical methods used to calculate endpoints
  - (4) Provide all physical and chemical data required by method
  - (5) Results of test(s) (NOEC, IC25, PASS/FAIL, etc.), report concentration-response relationship (definitive test only), report percent minimum significant difference (PMSD) calculated for sublethal endpoints determined by hypothesis testing.
- h. Conclusions and Recommendations
- (1) Relationship between test endpoints and permit limits
  - (2) Actions to be taken

**B. BEST MANAGEMENT PRACTICES (BMP) PLAN REQUIREMENTS**

## 1. BMP Plan

The permittee shall develop and implement a Best Management Practices (BMP) Plan which prevents, or minimizes the potential for, the release of pollutants from ancillary activities, including material storage areas; plant site runoff; in-plant transfer, process and material handling areas; loading and unloading operations, and sludge and waste disposal areas, to the waters of the State through plant site runoff, spillage or leaks; sludge or waste disposal; or drainage from raw material storage.

## 2. Plan Content

The permittee shall prepare and implement a best management practices (BMP) plan, which shall:

- a. Establish specific objectives for the control of pollutants:
  - (1) Each facility component or system shall be examined for its potential for causing a release of significant amounts of pollutants to waters of the State due to equipment failure, improper operation, natural phenomena such as rain or snowfall, etc.
  - (2) Where experience indicates a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural condition (e.g. precipitation), or circumstances to result in significant amounts of pollutants reaching surface waters, the plan should include a prediction of the direction, rate of flow, and total quantity of pollutants which could be discharged from the facility as a result of each condition or circumstance.
- b. Establish specific best management practices to meet the objectives identified under paragraph a. of this section, addressing each component or system capable of causing a release of significant amounts of pollutants to the waters of the State, and identifying specific preventative or remedial measures to be implemented;
- c. Establish a program to identify and repair leaking equipment items and damaged containment structures, which may contribute to contaminated storm water runoff. This program must include regular visual inspections of equipment, containment structures and of the facility in general to ensure that the BMP is continually implemented and effective.
- d. Prevent the spillage or loss of fluids, oil, grease, gasoline, etc. from vehicle and equipment maintenance activities and thereby prevent the contamination of storm water from these substances;
- e. Prevent or minimize storm water contact with material stored on site, where practicable;
- f. Designate by position or name the person or persons responsible for the day to day implementation of the BMP;
- g. Provide for routine inspections, on days during which the facility is manned, of any structures that function to prevent storm water pollution or to remove pollutants from storm water and of the facility in general to ensure that the BMP is continually implemented and effective;
- h. Provide for the use and disposal of any material used to absorb spilled fluids that could contaminate storm water;
- i. Develop a solvent management plan, if solvents are used on site. The solvent management plan shall include as a minimum lists of the total organic compounds on site; the method of disposal used instead of dumping, such as reclamation, contract hauling; and the procedures for assuring that toxic organics do not routinely spill or leak into the storm water;
- j. Provide for the disposal of all used oils, hydraulic fluids, solvent degreasing material, etc. in accordance with good management practices and any applicable state or federal regulations;
- k. Include a diagram of the facility showing the locations where storm water exits the facility, the locations of any structures or other mechanisms intended to prevent pollution of storm water or to remove pollutants from storm water, the locations of any collection and handling systems;
- l. Provide control sufficient to prevent or control pollution of storm water by soil particles to the degree required to maintain compliance with the water quality standard for turbidity applicable to the waterbody(s) receiving discharge(s) under this permit;
- m. Provide spill prevention, control, and/or management sufficient to prevent or minimize contaminated storm water runoff. Any containment system used to implement this requirement shall be constructed of materials compatible with the substance(s) contained and shall prevent the contamination of groundwater. The containment system shall also be capable of retaining a volume equal to 110 percent of the capacity of the largest tank for which containment is provided.

- n Provide and maintain curbing, diking or other means of isolating process areas to the extent necessary to allow segregation and collection for treatment of contaminated storm water from process areas;
- o Be reviewed by plant engineering staff and the plant manager; and
- p Bear the signature of the plant manager.

3. Compliance Schedule

The permittee shall have reviewed (and revised if necessary) and fully implemented the BMP plan as soon as practicable but no later than six months after the effective date of this permit.

4. Department Review

- a. When requested by the Director or his designee, the permittee shall make the BMP available for Department review.
- b. The Director or his designee may notify the permittee at any time that the BMP is deficient and require correction of the deficiency.
- c. The permittee shall correct any BMP deficiency identified by the Director or his designee within 30 days of receipt of notification and shall certify to the Department that the correction has been made and implemented.

5. Administrative Procedures

- a. A copy of the BMP shall be maintained at the facility and shall be available for inspection by representatives of the Department.
- b. A log of the routine inspection required above shall be maintained at the facility and shall be available for inspection by representatives of the Department. The log shall contain records of all inspections performed for the last three years and each entry shall be signed by the person performing the inspection.
- c. The permittee shall provide training for any personnel required to implement the BMP and shall retain documentation of such training at the facility. This documentation shall be available for inspection by representatives of the Department. Training shall be performed prior to the date that implementation of the BMP is required.
- d. BMP Plan Modification. The permittee shall amend the BMP plan whenever there is a change in the facility or change in operation of the facility which materially increases the potential for the ancillary activities to result in a discharge of significant amounts of pollutants.
- e. BMP Plan Review. The permittee shall complete a review and evaluation of the BMP plan at least once every three years from the date of preparation of the BMP plan. Documentation of the BMP Plan review and evaluation shall be signed and dated by the Plant Manager.

**C. 316(b) REQUIREMENTS APPLICABLE TO THE COOLING WATER INTAKE STRUCTURE**

The Permittee shall submit the application information required by 40 CFR Part 122.21, including 40 CFR 122.21 (r)(2), (3), and (5), and all applicable sections of 40 CFR Part 125.95 on or before January 7, 2008.

**D. 316(a) DEMONSTRATION REQUIREMENTS**

A variance request under CWA Section 316(a) for the thermal component of the discharge must be filed with the application for permit renewal in accordance with 40 CFR Part 125.70 Subpart H - Criteria for Determining Alternative Effluent Limitations Under Section 316(a) of the Act and 40 CFR 122.21(m)(6) Subpart B - Permit Application and Special NPDES Program Requirements, Variance Requests by Non-POTWs. The application must be received 180 days prior to permit expiration. The application shall include necessary technical data and relevant information to include data collected within the life of the permit to support the request for a variance.

**E. ASH POND FREE BOARD REQUIREMENTS**

There shall be no discharge of plant wastes to the ash pond unless the permittee provides and maintains at all times a minimum free water volume (between the top of the sediment level and the minimum discharge elevation) equivalent to the sum of the maximum 24-hour plant

discharges plus all direct runoff and all runoff flows to the pond resulting from a 10-year, 24-hour rainfall event, when using a runoff coefficient of 1.0. The permittee shall remove settled material from the pond or otherwise enlarge the available storage capacity in order to maintain the required minimum volumes at all times. Not later than 180 days after the effective date of the permit, the permittee shall determine and report to the Department:

A certification that the required volume is available with adequate safety factor to include all solids expected to be deposited in the ponds for the life of the permit. Any changes to plant operations affecting such certification shall be reported to the Director within 5 days.

**F. STORM WATER FLOW MEASUREMENT AND SAMPLING REQUIREMENTS**

1. Storm Water Flow Measurement

- a. All storm water samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches.
- b. The total volume of storm water discharged for the event must be monitored, including the date and duration (in hours) and rainfall (in inches) for storm event(s) sampled. The duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event must be a minimum of 72 hours. This information must be recorded as part of the sampling procedure and records retained according to Part I.B. of this permit.

2. Storm Water Sampling

- a. A grab sample, if required by this permit, shall be taken during the first thirty minutes of the discharge (or as soon thereafter as practicable); and a flow-weighted composite sample, if required by this permit, shall be taken for the entire event or for the first three hours of the event.
- b. All test procedures will be in accordance with part I.B. of this permit.

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
 WATER DIVISION – INDUSTRIAL AND MUNICIPAL SECTIONS  
**NONCOMPLIANCE NOTIFICATION FORM**

PERMITTEE NAME: \_\_\_\_\_ PERMIT NO: \_\_\_\_\_

FACILITY LOCATION: \_\_\_\_\_

DMR REPORTING PERIOD: \_\_\_\_\_

1. DESCRIPTION OF DISCHARGE: (Include outfall number (s))

2. DESCRIPTION OF NON-COMPLIANCE: (Attach additional pages if necessary):

<b>LIST EFFLUENT VIOLATIONS (If applicable)</b>			
Outfall Number (s)	NONCOMPLIANCE PARAMETER(S)	Result Reported (Include units)	Permit Limit (Include units)
<b>LIST MONITORING / REPORTING VIOLATIONS (If applicable)</b>			
Outfall Number (s)	NONCOMPLIANCE PARAMETER(S)	Monitoring / Reporting Violation (Provide description)	

3. CAUSE OF NON-COMPLIANCE (Attach additional pages if necessary):

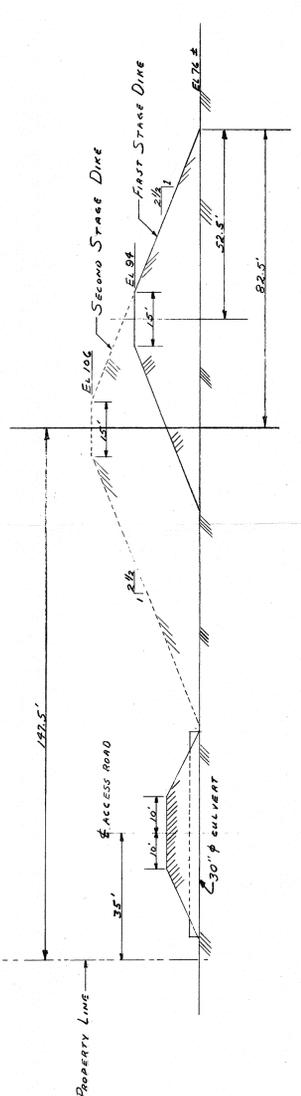
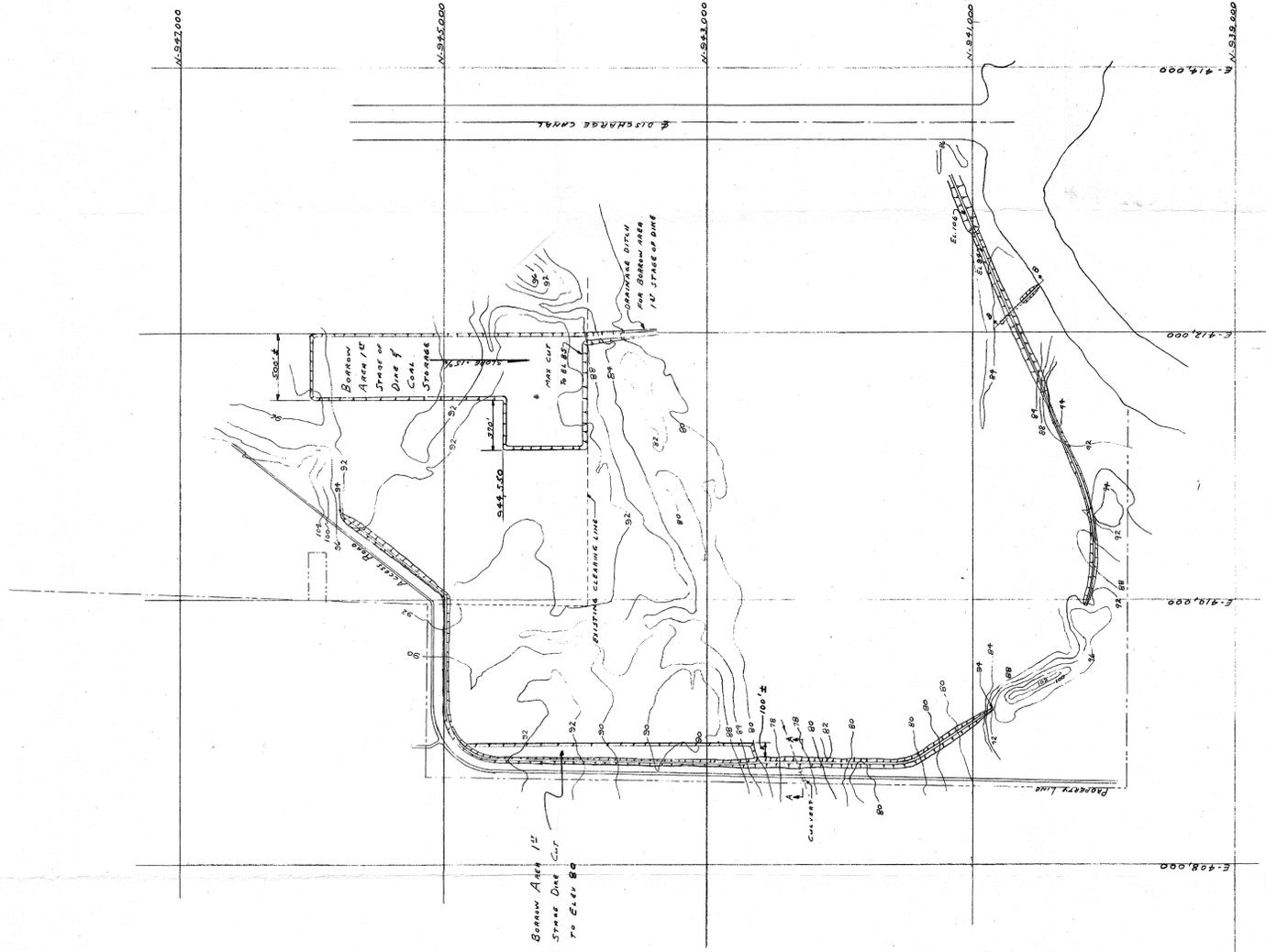
4. PERIOD OF NONCOMPLIANCE: (Include exact date(s) and time(s) or, if not corrected, the anticipated time the noncompliance is expected to continue):

5. DESCRIPTION OF STEPS TAKEN AND/OR BEING TAKEN TO REDUCE OR ELIMINATE THE NONCOMPLYING DISCHARGE AND TO PREVENT ITS RECURRENCE (attach additional pages if necessary):

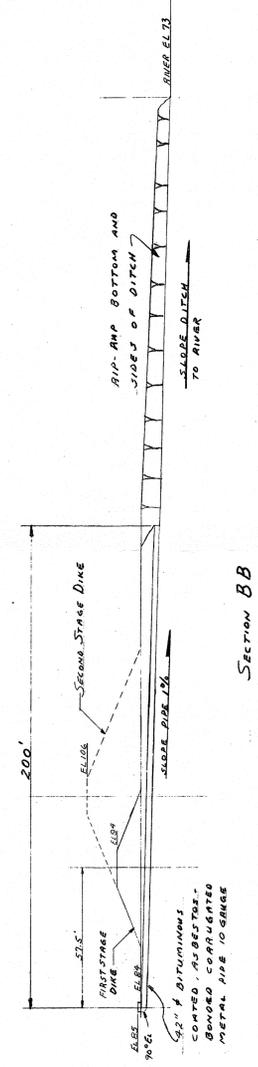
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

\_\_\_\_\_  
 NAME AND TITLE OF RESPONSIBLE OFFICIAL (type or print)

\_\_\_\_\_  
 SIGNATURE OF RESPONSIBLE OFFICIAL / DATE SIGNED



SECTION A A  
SCALE 1" = 20'



SECTION B B  
SCALE 1" = 20'

ALABAMA POWER COMPANY  
JOB GREENE COUNTY STORM SEWER UNIT No. 1  
DETAIL 12" STORM SEWER PIPE

SCALE 1" = 500'  
SHEET OF SHEETS  
SUPERSEDES

APPROVED: *[Signature]* DATE: \_\_\_\_\_  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

DRANN: *[Signature]* CHECKED: \_\_\_\_\_ TRACED: \_\_\_\_\_  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

For #1 Borrow Area  
Accepting Changes  
9-21-54

D-141828

**INQUIRY NUMBER 09-3926-C-APC**

**SOUTHERN COMPANY GENERATION  
ENGINEERING AND CONSTRUCTION SERVICES**

**TECHNICAL SPECIFICATION SECTION 31**

**FOR THE**

**ASH POND EAST DIKE IMPROVEMENTS**

**AT**

**PLANT GREENE COUNTY**

**ALABAMA POWER COMPANY**

Prepared By: James C. Pegues Date: 07/13/2009

Reviewed By:

Name – Discipline	Initials	Date
A. Terri H. Hartsfield – ES&EE	THH	07/13/2009
B. Ronald C. Bryan – Civil Design	RCB	07/13/2009

Approved By: John B. Smith  
Civil Design Supervisor Date: 07/13/2009

**REVISIONS**

NO.	DESCRIPTION	BY	REVIEWED	APPROVED	DATE
0	Issued for Construction	JCP	THH/RCB	JBS	07/13/2009
1	Revisions to Sec 2.5 & 4.1	JCP	THH/RCB	JBS	07/20/2009

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GC-API-0009

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**TECHNICAL SPECIFICATION SECTION 31  
FOR THE ASH POND EAST DIKE IMPROVEMENTS  
AT  
PLANT GREENE  
ALABAMA POWER COMPANY**

**1.0 GENERAL**

Plant Greene County is an electric fossil fueled plant located in Greene County, Alabama, near Forkland, Alabama and north of the city of Demopolis. The purpose of this work is to construct an inboard addition (widening) to the east dike of the Plant Greene County Ash Pond.

**1.1 GENERAL INFORMATION**

- 1.1.1 These Specifications, all related attachments and associated documents cover the furnishing of all materials (unless otherwise noted), labor, supervision, equipment, and tools required for the construction of the Ash Pond East Dike Improvements at Plant Greene County. The technical and construction requirements, including notes, Specifications, and design data continue on the Drawings. The Drawings and Notes are an integral part of these Specifications.
- 1.1.2 The provisions of these Specifications shall govern unless otherwise specified in the contract documents. In case of conflicting requirements, the contract documents shall govern. Discrepancies between the Drawings and the Specifications shall be brought to the attention of the Purchaser for resolution before the performance of the work. In the case of discrepancies between the scale dimensions on the Drawings and the dimensions, the written dimensions shall govern.
- 1.1.3 The Contractor shall ensure that all work is performed in accordance with the Occupational Safety and Health Act of 1970 and other Standards and Codes listed herein (latest revision).
- 1.1.4 The Contractor shall receive, unload, haul to site, handle, store, place, and secure all materials and equipment. Any security measures taken for the protection of the Contractor's equipment shall be at his expense.
- 1.1.5 The Contractor shall furnish and keep in good working condition at all times sufficient equipment of the proper design and capacity to do all work described under these Specifications and in accordance with the established schedule.

- 1.1.6 The Contractor shall furnish appropriate equipment for minimizing fugitive dust. Any additives planned for use in a watering truck for dust control shall be approved by the Purchaser prior to use.
- 1.1.7 The Contractor shall comply with all applicable state and county regulations concerning hazardous material disposal and burning operations, if allowed by the Purchaser. The Contractor shall have the responsibility for obtaining any necessary permits for these activities.
- 1.1.8 All earthwork, including ramps and access roads, done for the convenience of the Contractor shall be done at his expense. Such work will be restored to its original elevation at the Contractor's expense if the Purchaser so desires.
- 1.1.9 The Contractor shall install, at his expense, any drainage piping required because of the Contractor's mode of operation including his ramps and roads.
- 1.1.10 The Contractor shall provide traffic control during roadway related construction activities and material deliveries. This shall be coordinated with other activities or construction projects ongoing at the plant. If within active and congested areas around the plant, traffic control shall include flag persons, barriers, and other control aids to provide for the safe routing of traffic in the affected area.
- 1.1.11 The Contractor shall be responsible for construction surveying to construct the work to the elevations, lines, grades and cross sections shown on applicable Drawings. The Purchaser shall provide a control point near the planned construction for the Contractor's use.

## **1.2 APPLICABLE DOCUMENTS**

- 1.2.1 Drawings – E546457 Topographic Survey with Boring Locations and Grading Plan  
E546458 Cross Sections
- 1.2.2 The following Codes, Standards, Specifications, Publications, and/or Regulations shall be made part of these Specifications and will become part of the contract entered into for performance of the work covered herein. The latest edition in effect at the time of the contract shall apply. Other codes and standards shall be incorporated as referenced in this document. The omission of any Codes and/or Standards from this list does not relieve the Contractor of his responsibility to follow the latest revision of all applicable codes and standards for conducting the work.

Occupational Safety and Health Administration

- Occupational Safety and Health Act of 1970

ASTM International (ASTM)

- ASTM D 422 – Standard Test Method for Particle-Size Analysis of Soils
- ASTM D 698 – Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort
- ASTM D 1556 – Standard Test Method for Density and Unit Weight of Soil In - Place by the Sand Cone Method
- ASTM D 2216 - Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D 2487 - Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- ASTM D 2488 - Description and Identification of Soils (Visual-Manual Procedure)
- ASTM D 6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil – Aggregate In Place by Nuclear Methods
- ASTM D 2937 - Standard Test Method for Density of Soil In Place by the Drive Cylinder Method
- ASTM D 4643 - Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method
- ASTM D 4959 - Standard Test Method for Determination of Water (Moisture) Content of Soil by Direct Heating Method
- ASTM D 4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Codes specific to the local county

Alabama Department of Environmental Management regulations

Environmental Protection Agency (EPA) regulations

Best Management Practices Plan (Alabama Power)

## **2.0 EARTHWORK**

### **2.1 SITE CONDITIONS**

- 2.1.1 The Contractor shall visit the site and acquaint himself with site conditions, utility locations, and the proposed scope of work.
- 2.1.2 Soil borings have been performed along the alignment of the existing east dike, and to the west of the existing dike. The locations of these borings are shown on the Drawings. The logs for the borings are available to the Contractor.
- 2.1.3 Test pit excavations and bulk samples obtained have been performed in the borrow area. The borrow area is located within the limits of and near the southwest portion of the ash pond. The general areas of the locations of the test pits are available for inspection by the Contractor. The results of soil laboratory testing on bulk samples from the borrow area are also available to the Contractor.
- 2.1.4 The field testing, measurements, and associated laboratory testing performed by the Purchaser have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions. The Purchaser assumes no responsibility for the accuracy of the investigations, the resulting data, or the interpretation; nor does the Purchaser guarantee that the materials and conditions will not vary from those indicated by the investigations. In addition, the Purchaser will not be responsible for any deduction, interpretation, or conclusion drawn by the Contractor.
- 2.1.5 The Contractor should be aware of the presence of an underground high pressure natural gas line located in the area of construction. The Purchaser will work with the natural gas company to establish working procedures in the area of the underground line. Prior to construction, the Purchaser shall contact the appropriate utility locating services and/or the natural gas company to provide notification of work in this area. The Contractor is also responsible for contacting appropriate utility locating services and/or the natural gas company prior to beginning of the work, and shall provide confirmation of such notification to the Purchaser within 2 days after the award of the contract. Additional information is provided in Section 2.4 of these Specifications.

## **2.2 LINES AND GRADES**

- 2.2.1 The project shall be constructed to the elevations, lines, grades and cross sections shown on applicable Drawings. The Purchaser reserves the right to increase the foundation widths, change the embankment slopes, and to make such other changes in the embankment sections as conditions indicate are necessary for the construction of a safe and permanent structure. The Contractor shall be compensated for changes in plan and/or sections resulting in changes of quantities of materials.
- 2.2.2 The new inboard embankment will be constructed above existing grade on the west side of the existing embankment, and will tie to the existing embankment soils. Prior to placement of new embankment fill, undercutting will need to be performed to remove uncompacted soil and/or ash. Depth of undercutting as shown on the drawings is an estimate based on the findings of the soil borings. Actual depth of undercutting will be determined in the field at the time of construction, with decisions based on the quality of existing soil, whether or not ash is present, and the condition of the undercut subgrade. Additional details regarding undercutting can be found in Section 2.4 of these specifications.

## **2.3 CLEARING, GRUBBING, AND STRIPPING**

- 2.3.1 Clearing, grubbing and stripping will be required to prepare the work area for construction and to prepare the borrow area for excavation of fill soils.
- 2.3.2 Vegetated areas within the construction footprint shall be cleared, grubbed, and stripped of any vegetation, organic matter and/or any other debris. Stripped topsoil shall be stockpiled at a location on the site to be designated by the Project Construction Manager.
- 2.3.3 The grubbed area shall be harrowed and raked with a tractor-mounted root rake to collect all small material previously overlooked. The tractor shall be of adequate size to achieve a minimum of 4 inches penetration of the root rake teeth. The root rake teeth shall not be more than 12 inches apart.
- 2.3.4 Trees, stumps, and brush cleared from the construction areas shall be disposed of by burning, if allowed by the Purchaser, by mulching, or by disposal within the ash pond at locations designated by the Purchaser. All burning shall be performed in accordance with state and local regulations. Burn pits shall be located within the limits of the ash pond but outside of the construction area, borrow area, and off rights-of-way.
- 2.3.5 Burning operations, if permitted by the Purchaser, shall be conducted only in previously cleared areas and away from standing timber, structures, or other

flammable materials. Materials to be burned shall be properly stacked, by dozers, in piles sufficiently large enough to facilitate the complete burning of all the materials in the pile. The Contractor shall be subject to all public laws governing such burning operations and shall be responsible for any damage to life or property as a result of burning. Fires shall not be started unless tractors are available in the immediate vicinity to check the spread of fire outside the cleared area. Fires shall be guarded at all times and shall be under constant attendance until they have burned out or have been extinguished.

- 2.3.6 Spoil material shall be disposed of only in areas to be designated by the Purchaser. The Contractor shall slope the spoil area for drainage, implement necessary erosion control measures, and provide a perennial stand of vegetation.

## **2.4 UNDERCUTTING AND SUBGRADE PREPARATION**

- 2.4.1 Prior to placement of the new embankment fills, undercutting of existing soils and/or ash will be required to improve the embankment foundation and subgrade. The horizontal, or lateral, extent of undercutting is shown on the cross-sections of the Project Drawings.
- 2.4.2 The vertical extent of undercutting will be dependent upon actual conditions encountered at the time of construction. Expected undercut materials include man-placed dredge soils (from the barge canal) that were previously placed with little to no compactive effort, as well as ash that has migrated to this area during ash pond operation. Estimated depth of undercutting is shown based on information obtained from the soil borings, but may be more or less at any given location.
- 2.4.3 Attempts will be made by the Purchaser to locate the natural gas line prior to the time of construction. Assistance from the Contractor may be required at the beginning of construction to confirm this location prior to mass undercutting. The horizontal and vertical extent of undercutting may be limited by the physical location of the gas line along the alignment of the new inboard embankment. The Contractor will be responsible for operation of his personnel and equipment around the natural gas line in accordance with any and all guidelines and restrictions that are established by the Purchaser and/or the natural gas line operator.
- 2.4.4 Once undercutting is complete, the exposed undercut subgrade shall be proof-compacted in an effort to improve the density and/or apparent consistency of the exposed soil. The proof-compaction shall be accomplished with a minimum of 3 passes with compaction equipment appropriate for the material type, as discussed in Section 2.6 of these Specifications. Any areas not responding favorably to

compaction in-place shall be undercut or otherwise stabilized to facilitate placement and compaction of structural fill soils.

- 2.4.5 No fill shall be placed on any part of the subgrade until such areas have been proof rolled and approved by the Purchaser.
- 2.4.6 Work flow shall be planned such that the first fill lift is placed soon after subgrade compaction to minimize subgrade exposure to inclement weather.
- 2.4.7 Soils removed from the undercut areas may be reused as structural fill as long as the soil meets the requirements of Section 2.5 and are approved by the Purchaser. Undercut soils may have a moisture content several percentage points above the optimum moisture content, thereby necessitating additional handling and/or stockpiling to allow the soil to dry to a more suitable moisture content. Material can be stockpiled near the construction area at a location designated by and/or approved by the Purchaser. Any ash that is exposed and undercut shall not be reused as structural fill and shall be disposed of within the limits of the existing ash pond at a location designated by the Purchaser. The Contractor shall take measures, as necessary and to the extent possible, to keep ash from blending with soils otherwise acceptable for reuse as fill.

## **2.5 STRUCTURAL EARTH FILL**

- 2.5.1 Compacted dike material shall consist of the clayey sands (SC, SC-SM), sandy and silty clays (CL, CL-ML), and silty sands (SM, SP-SM) from the excavation of the borrow area and shall be placed and compacted in accordance with these Specifications and Drawings.
- 2.5.2 Structural fill material shall have a plasticity index (PI) of greater than 4, a minimum of 35% by weight passing the #200 sieve (per ASTM D-422), and a Unified Soil Classification System (USCS) designation of SC, SC-SM, SP-SM, CL, or CL-ML. The fill shall be tested using appropriate ASTM methods and be approved by the Project Construction Manager.
- 2.5.3 No particle greater in size than 3 inches shall be used as dike fill.
- 2.5.4 Fill materials from sources other than the borrow area may be used, if required, and if they meet the requirements named in this section or if approved by the Project Construction Manager. The contractor must provide laboratory analysis for approval by the Project Construction Manager.
- 2.5.5 No earth fill shall be placed on any part of the dike foundation until such areas have been inspected and approved by the Project Construction Manager.

- 2.5.6 Earth fill shall be placed in uniform layers of 8 to 10 inches, nominal thickness, loose measurement. The fill material shall be placed a minimum of one foot beyond the toe of the dike slope on the west side. Where new fill adjoins the existing dike on the east side, each lift shall be appropriately tied into the existing dike by limited excavation and scarifying of existing dike soils. Upon completion of compaction, fill slopes shall be cut back to the final slope. Particular care must be used to obtain the required compaction along the edges of the dike.
- 2.5.7 Quality control testing shall be performed on all earth fill in accordance with Section 2.8 of this Specification. No earth fill layer may be placed until the Project Construction Manager has verified that the underlying layer has met the compaction and/or moisture requirements.
- 2.5.8 If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layers, it shall be loosened by harrowing, or as directed by the Project Construction Manger, before the succeeding layer is placed.
- 2.5.9 During the dumping and spreading processes, the Contractor shall maintain at all times a force of men adequate for removal of roots and debris from all earth fill materials and all stones greater than 3-inch maximum dimension.
- 2.5.10 Earth fill material for the dike shall be compacted to a minimum 98% maximum dry density, as determined by the Standard Proctor compaction test (ASTM D698). The moisture content of the earth fill at the time of placement shall be between -1% and +2% of the optimum moisture obtained by Standard Proctor compaction test. The Contractor shall strive to place the earth fill material on the wet side of optimum.
- 2.5.11 When moisture content is too low, the moisture content shall be adjusted to within the above specification prior to compaction. Moisture adjustment shall be by sprinkling and disking sufficiently to bring the moisture content within the specified range. Sprinkling and disking of the layer shall be done after deposition, but before compaction.
- 2.5.12 If the moisture content is too high, the Contractor will be permitted to stockpile and disk the earth fill material to promote drying to bring it back within the allowable moisture range. This drying must be done prior to placement.
- 2.5.13 Earth fill which cannot be compacted with roller equipment because of inadequate clearances shall be spread in 4-inch layers and compacted with power tampers to the extent required by the Specifications for embankment material.

- 2.5.14 The Contractor will be required to remove any compacted material that does not comply with the compaction and/or moisture requirements and replace the compacted earth fill to comply with these Specifications at his own expense.
- 2.5.15 Excavations required for density and moisture tests shall be repaired by scarifying the walls of the excavation, backfilling, and compacting the fill material to the criteria specified in this Section.
- 2.5.16 If the construction of the dike is interrupted, the Contractor shall be required to shape and smooth the last layer of earth fill material placed on the fill to provide a surface that will shed as much water as possible during the interruption. When the work is resumed, the Contractor shall be required to level, scarify and compact the last layer of earth fill material before placing additional layers.
- 2.5.17 Dike slopes shall be grassed upon reaching final grade in accordance with the Vegetation Schedule.

## **2.6 EARTHWORK EQUIPMENT**

### **2.6.1 General**

The Earthwork Contractor shall be responsible for providing all earthwork equipment necessary to perform the work set forth in these Specifications. The Contractor shall be responsible for maintaining the equipment during the contract period. Any delays in work activities due to equipment maintenance must be reported to the Project Construction Manager for determination of impacts on the schedule.

The Contractor shall be responsible for the cleaning of haul vehicles. The Contractor shall wash down the wheels, outside body, cab, undercarriage, etc. of all haul vehicles to prevent spreading material during transit of the equipment out of the boundary of the working area.

All of the Contractor's equipment shall be operated in a safe, careful manner in accordance with these Specifications.

### **2.6.2 Tamping Roller**

The use of self-propelled, non-vibratory tamping rollers, conforming to the following specification, shall be permitted to compact the backfill material. Their design and operation shall be subject to the approval of the Project Construction Manager. If use of self-propelled tamping rollers causes shearing planes in the fill, laminations in the fill, or results in inadequate compaction, the Project Construction Manager may direct that such rollers be removed from the fill.

Two-drum or four-drum equipment separated by cab and differential and arranged in tandem must have its static weight equally distributed to all compaction drums and must have the tandem drums positioned such that the prints of the tamping feet produced by the tandem drums are staggered. The surface on which the tamping feet are mounted shall have a minimum outside diameter of four feet and one (1) tamping foot for approximately each 100 square inches of drum surface. The distance between the centers of any two adjacent tamping feet shall be not less than nine inches. The length of each tamping foot from the outside mounting surface of the drum shall be not more than eight inches and shall be maintained at not less than six inches based on compaction of the clay fill placed in eight (8) inch loose lifts. During rolling operations, the spaces between the tamping feet shall be maintained clear of materials which would impair the effectiveness of the tamping roller.

The weight of all roller drums during compaction of fill material shall be maintained uniform with weight per foot of drum length of approximately 3,000 pounds. For self-propelled rollers in which steering is accomplished through the use of rubber-tired wheels, the tire pressure shall not exceed 40 psi. The use of a compactor shall be discontinued if the rubber tires leave ruts that prevent uniform compaction by the tamping roller and the substitution of appropriate towed tamping rollers shall be operated at a speed not to exceed 5.0 miles per hour.

#### 2.6.3 Pneumatic Rubber-Tired Roller

Pneumatic rubber-tired rollers shall be permitted to compact the backfill and shall have a minimum of four wheels equipped with pneumatic tires. The tires shall be of such size and ply as can be maintained at tire pressure between 65 and 85 pounds per square inch for 20,000 pound wheel load during roller operations. The roller wheels shall be located abreast and be so designed that each wheel will carry approximately equal load in traversing uneven ground. The spacing of the wheels will be such that the distance between the nearest edges of adjacent tires will not be greater than 50 percent of the tire width of a single tire at the operating pressure for a 25,000 pound wheel load. The roller shall be provided with a body suitable for ballast loading such that the load per wheel may be varied from 18,000 to 25,000 pounds.

#### 2.6.4 Tamping Compactors

Compaction of materials in areas where it is impractical to utilize conventional compaction equipment shall be performed by the use of hand tampers or manually-guided sled/plate-type vibratory or ramming tampers which have been approved for use by the Project Construction Manager.

#### 2.6.5 Vibratory Rollers

Vibratory rollers, utilized for compacting sand shall be equipped with a smooth steel compaction drum and shall be operated at a frequency of vibration during compaction operations between 1,100 and 1,500 vibrations per minute. Vibratory rollers may be either towed or self-propelled and shall have an unsprung drum weight that is a minimum of 60 percent of the rollers' static weight. Towed rollers shall have at least 90 percent of their weight transmitted to the ground through the compaction drum hitched to the towing vehicle. Rollers shall have a minimum static weight of 20,000 pounds and a minimum dynamic force no less than 27,000 pounds when operating at 1,400 vibrations per minute and a total applied force not less than 5,500 pounds per foot of compaction drum length.

The vibratory mode may not be required for compacting some fill material. The Contractor shall operate the compactor in the vibratory and non-vibratory modes to determine the mode which effectively compacts and densifies the material.

The level and amplitude and vibration frequency during compaction will be maintained uniform. Rollers shall be operated at speeds not to exceed 1.5 miles per hour. The Contractor shall furnish sufficient data, drawings, and computations for verification of the above specifications to the Project Construction Manager and the character and efficiency of this equipment shall be subject to the approval of the Project Construction Manager.

## **2.7 QUALITY CONTROL TESTING**

- 2.7.1 Field density and moisture content testing shall be performed by a third-party Quality Control Inspector retained by the Contractor to verify that compaction requirements have been achieved. In-place field density testing of the compacted soil shall be performed in accordance with the procedure ASTM D 1556, the sand cone method. Test results reports should include both the moisture content and dry density, along with other data such as location, elevation, Proctor curve used for comparison, etc.
- 2.7.2 The Purchaser reserves the right to transfer responsibility of quality control testing from the Contractor to the Purchaser prior to the start of construction.
- 2.7.3 Testing procedures of in-place density and moisture content by nuclear methods is described in ASTM D 6938. The procedure may be used provided: 1) acceptable correlation with sand cone density test results can be obtained according to the guidelines of Section 7, "Calibration", of ASTM D 6938, and 2) the initial correlation results are reviewed and use of the nuclear device is approved by the Project Construction Manager. In addition, it shall be required that the testing agency or representative have the necessary licenses to operate a nuclear energy source, and to take all safety precautions per Section 6 of ASTM D 6938.

- 2.7.4 In the event of repeated failures, or water content and density test values plotting far from the Proctor curves used for comparison in computing percent compaction, it shall be the option of the Project Construction Manager to require one or two point Proctor checks (on the dry side of optimum) to verify that the proper Proctor curve is being referenced. If not, a new Proctor curve determined by a five-point test shall be required. The Contractor shall sample and perform the five-point testing, all at the Contractor's expense.
- 2.7.5 If the compaction requirements for a lift have not been achieved, the Purchaser's Representative shall direct the Contractor to either rework the lift to obtain the compaction requirements or remove and replace with a new lift for compaction, all at the Contractor's expense.
- 2.7.6 The in-place density testing frequency for the soil shall be one test for each 10,000 square feet of lift area or portion thereof for each lift, with a minimum of one test performed for each 200 lineal feet of dike per lift as measured parallel to the dike axis.

## **3.0 EXCAVATION DEWATERING**

### **3.1 GENERAL**

- 3.1.1 The planned construction is located between the barge canal and the existing ash pond. Due to the presence of free water surfaces in both features, along with the presence of potentially saturated, uncompacted soils in the undercut zones, dewatering may be required to facilitate undercutting and backfill placement and compaction. The means and methods for accomplishing dewatering in order to complete the construction of this project are left to the Contractor, with approval by the Purchaser.
- 3.1.2 Any water pumped from undercut or other excavations may be discharged to the ash pond under the direction and approval of the Purchaser.
- 3.1.3 If interceptor or diversion ditches are desired by the Contractor to assist with seepage control and dewatering, such ditches will be allowed on the west side (ash pond side) of the construction area. No ditching will be allowed in the existing embankment between the construction area and the barge canal.

## 4.0 VEGETATION

### 4.1 GENERAL

- 4.1.1 With the exception of the proposed borrow area, all disturbed areas shall be grassed. Hydroseeding methods may be used.
- 4.1.2 The Contractor shall produce a satisfactory stand of perennial grass in accordance with the vegetation schedule below. If it is necessary to repeat any or all the work, including plowing, fertilizing, watering, mulching and seeding, the Contractor shall repeat these operations until a satisfactory stand is obtained at no additional cost to the Purchaser.
- 4.1.3 Final stabilization shall be defined as follows: all soil disturbing activities at the site have been completed, and that for unpaved areas and areas not covered by permanent structures, 100% of the soil surface is uniformly covered in permanent vegetation with a density of 70% or greater, or equivalent permanent stabilization measures (such as the use of rip rap, gabions, permanent mulches or geotextiles) have been employed.
- 4.1.4 The areas to be vegetated shall be fertilized and limed, then seeded with a perennial grass as indicated in the vegetation schedule shown in the Plant Greene County Best Management Practices Plan.

In the absence of soil test data, the following fertilization rates shall be used:

Vegetation	N-P-K	Fertilizer Rates Per Acre
Grass Alone	8-24-24	400 lbs
Grass-Legume Mixture	8-24-24	400 lbs
Legume Alone	0-20-20	500 lbs

- 4.1.5 Measures shall be taken to prevent erosion of the surficial soil layer and vegetation until a full vegetative growth has been obtained. The Contractor shall make daily inspections of the seeded areas and repair all eroded areas to the satisfaction of the Purchaser.
- 4.1.6 After seeding, an erosion control biodegradable straw blanket shall be installed on the exterior slopes of the dikes and any areas that have slopes of 3H:1V or steeper. This material shall be a BioNet S150BN Double Net Straw Blanket by North American Green, or approved equal. The blanket shall be installed per manufacturer's installation instructions. However, the blanket shall be tacked as necessary to the ground to withstand the upward growth of grass and to permit the establishment of grass through the blanket. Failure to accomplish this will require that the effected area be re-grassed and redone to the satisfaction of the Project Construction Manager.
- 4.1.7 Graded areas that are to be grassed which have slopes flatter than 3H:1V shall be mulched with straw or other suitable material.
- 4.1.8 Water required to promote a satisfactory growth shall be furnished by the Purchaser and applied by the Contractor.

## **5.0 RECORDS**

The quality control records of inspection and testing shall be compiled by the Contractor's Quality Control Inspector and provided to the Purchaser upon completion of the Project. Furthermore, copies of the daily inspection records and field quality control records shall be provided to the Purchaser on a weekly basis. All records shall be forwarded to the Plant's permanent file to be retained as a record of the project.

**Intracompany Correspondence**



Date: July 20, 2009  
To: George Downer  
From: Jim Pegues  
Subject: Review of Laboratory Test Results  
Proposed Borrow Materials  
Plant Greene County Ash Pond East Dike Improvements

The Earth Science & Environmental Engineering Department (ES&EE) has reviewed the results of laboratory testing performed by TTL, Inc. on samples of proposed borrow material for the above referenced project. A total of six samples were collected for laboratory testing that included percent passing the No. 200 sieve, Atterberg limits and moisture-density relationship (i.e. standard Proctor). Of the six samples tested, five are deemed acceptable for use on this project. Sample No. 6, is judged unacceptable due to its low percentage of silt and clay sized particles. A summary of lab results is as follows:

**Acceptable Samples**

Sample ID	Description	Percent Passing No. 200 Sieve	Atterberg Limits		Standard Proctor	
			LL	PI	Max Dry Density (pcf)	Optimum Moisture Content
1	Light Brown Sand w/Silt (SP-SM)	10.4	NP	NP	108.3	12.0
2	Tan Sandy Lean Clay (CL)	52.3	24	8	121.3	11.5
3	Tan Sandy Silty Clay (CL-ML)	50.2	21	5	116.4	13.4
4	Tan Sandy Clayey Sand (SC-SM)	45.3	18	4	121.7	11.1
5	Tan and Brown Sandy Silty Clay (CL-ML)	59.4	23	7	111.7	14.5

**Unacceptable Samples**

Sample ID	Description	Percent Passing No. 200 Sieve	Atterberg Limits		Standard Proctor	
			LL	PI	Max Dry Density (pcf)	Optimum Moisture Content
6	Dark Brown Poorly Graded Sand (SP)	1.7	NP	NP	102.9	13.9

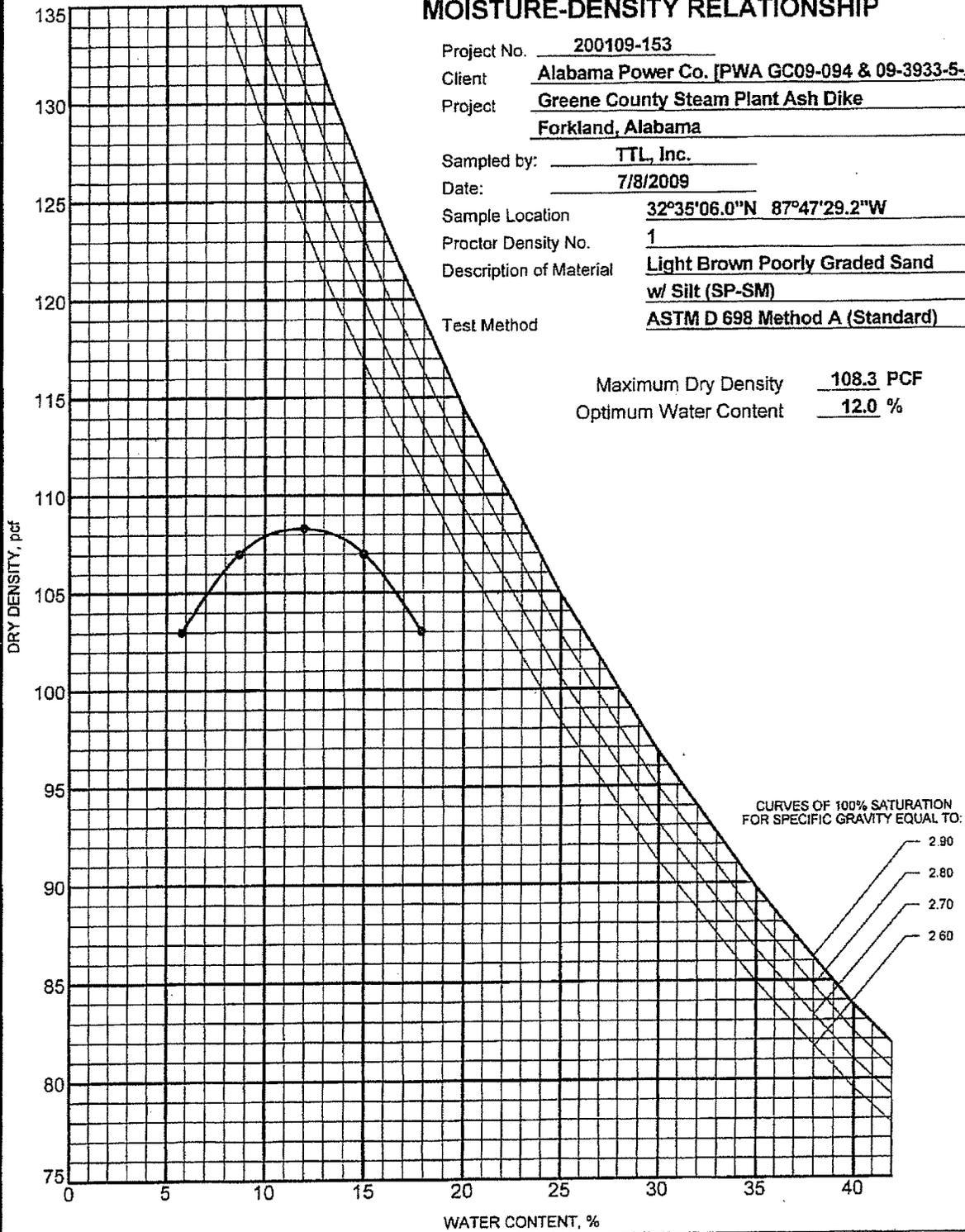
Please let us know if you have any questions.



# MOISTURE-DENSITY RELATIONSHIP

Project No. 200109-153  
Client Alabama Power Co. [PWA GC09-094 & 09-3933-5-APC]  
Project Greene County Steam Plant Ash Dike  
Forkland, Alabama  
Sampled by: TTL, Inc.  
Date: 7/8/2009  
Sample Location 32°35'06.0"N 87°47'29.2"W  
Proctor Density No. 1  
Description of Material Light Brown Poorly Graded Sand  
w/ Silt (SP-SM)  
Test Method ASTM D 698 Method A (Standard)

Maximum Dry Density 108.3 PCF  
Optimum Water Content 12.0 %



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Tuscaloosa, AL 35401  
205.345.0816  
Fax 205.345.0992

SUBMITTED BY:

John J. Harvey, P.E.

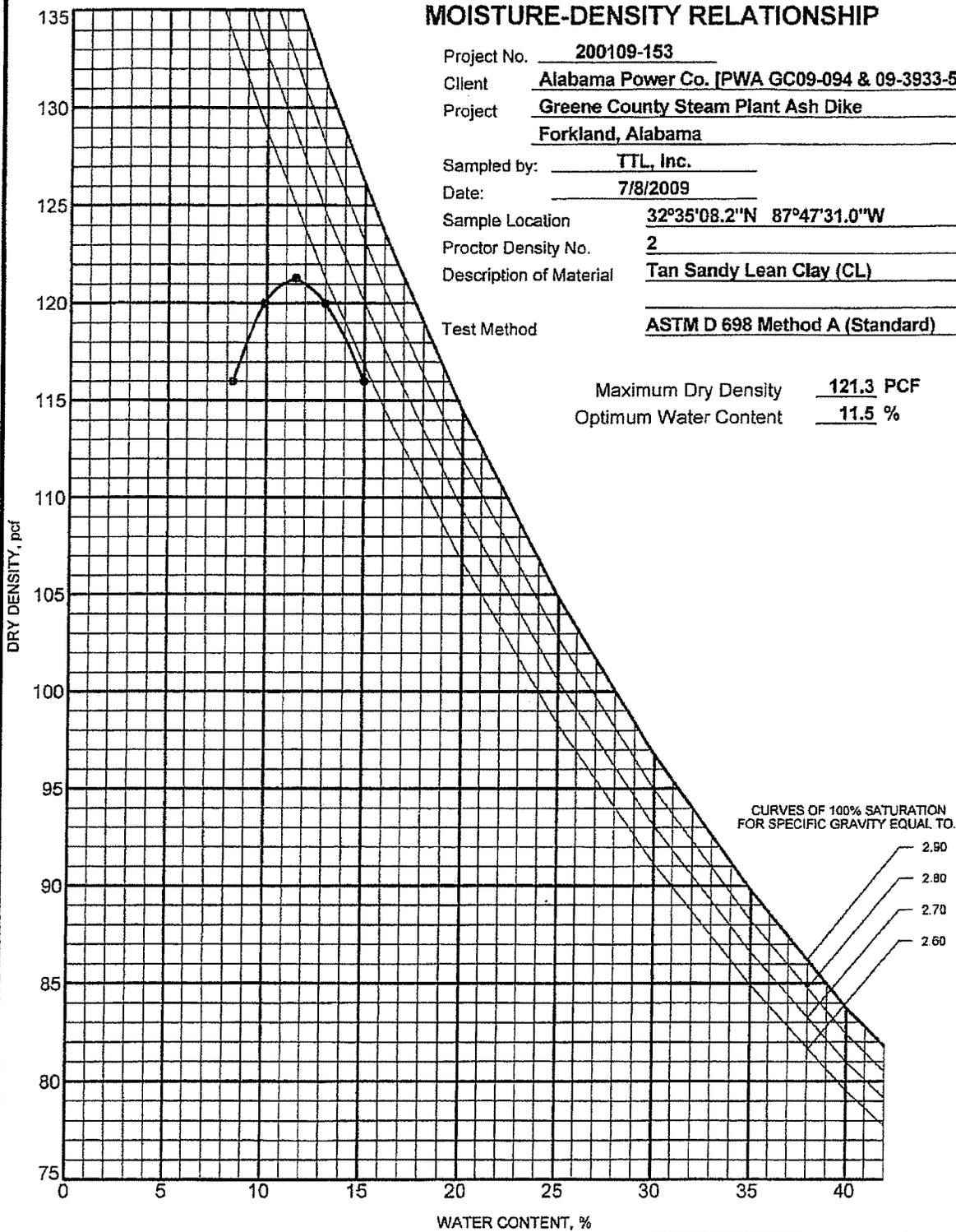


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### MOISTURE-DENSITY RELATIONSHIP

Project No. 200109-153  
 Client Alabama Power Co. [PWA GC09-094 & 09-3933-5-APC]  
 Project Greene County Steam Plant Ash Dike  
Forkland, Alabama  
 Sampled by: TTL, Inc.  
 Date: 7/8/2009  
 Sample Location 32°35'08.2"N 87°47'31.0"W  
 Proctor Density No. 2  
 Description of Material Tan Sandy Lean Clay (CL)  
 Test Method ASTM D 698 Method A (Standard)

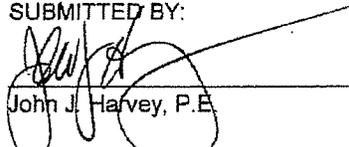
Maximum Dry Density 121.3 PCF  
 Optimum Water Content 11.5 %



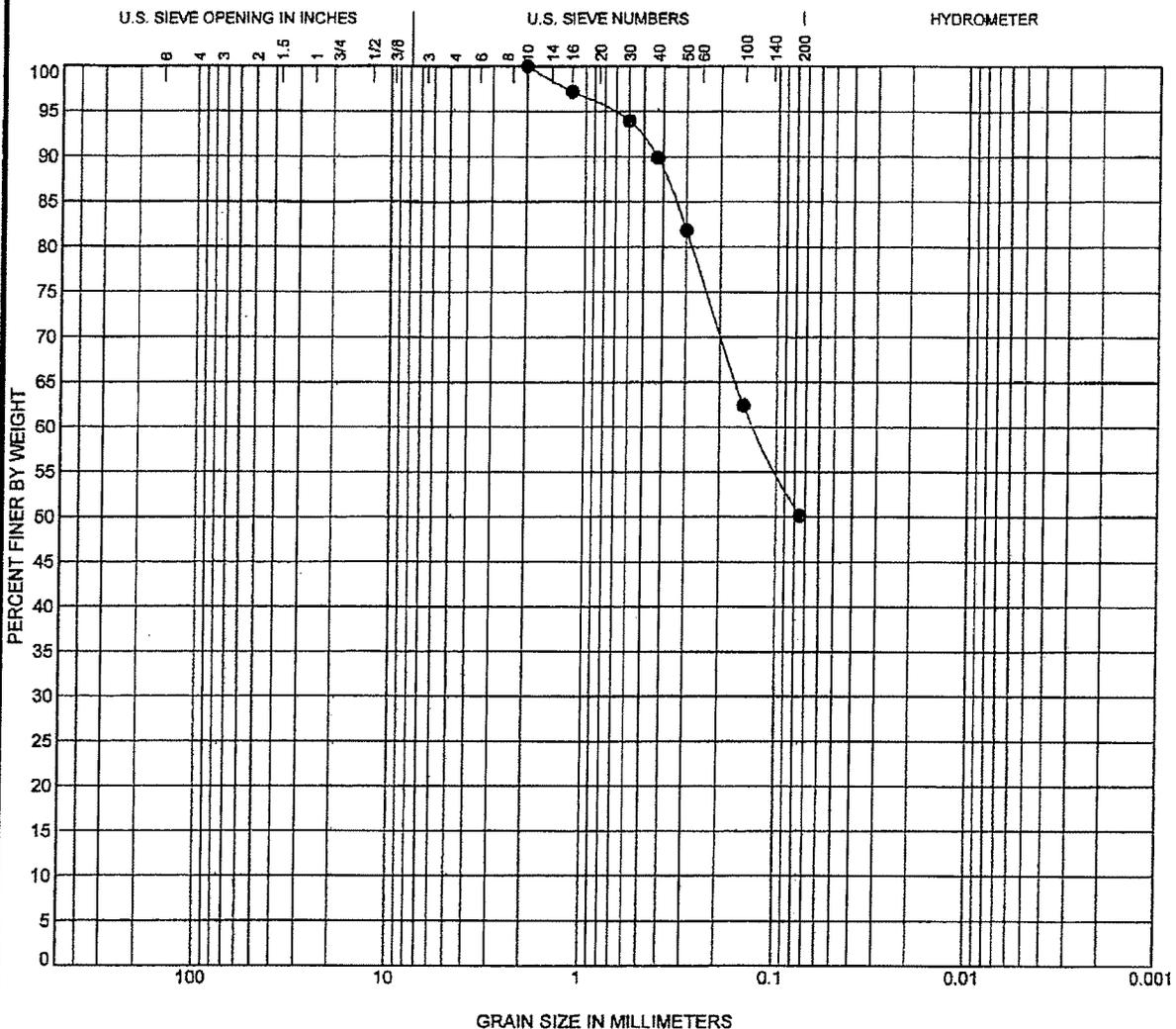
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 Fax 205.345.0992

SUBMITTED BY:

  
 John J. Harvey, P.E.

### GRAIN SIZE DISTRIBUTION



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample ID	3 (Corresponds to PD No. 3)												
Description	Tan Sandy Silty Clay (CL-ML)												
Sampled by:	TTL, Inc.												
Sample Location:	32°35'07.4"N 87°47'32.4"W												
Date Sampled:	7/8/2009												
wc (%)	LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
14	21	16	5			2	0.1			0.0	49.9		50.2



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#### SIEVE ANALYSIS RESULTS

Client: Alabama Power Co. [PWA GC09-094 & 09-3933-5-APC]  
 Project: Greene County Steam Plant Ash Dike  
 Location: Forkland, Alabama  
 Project Number: 200109-153

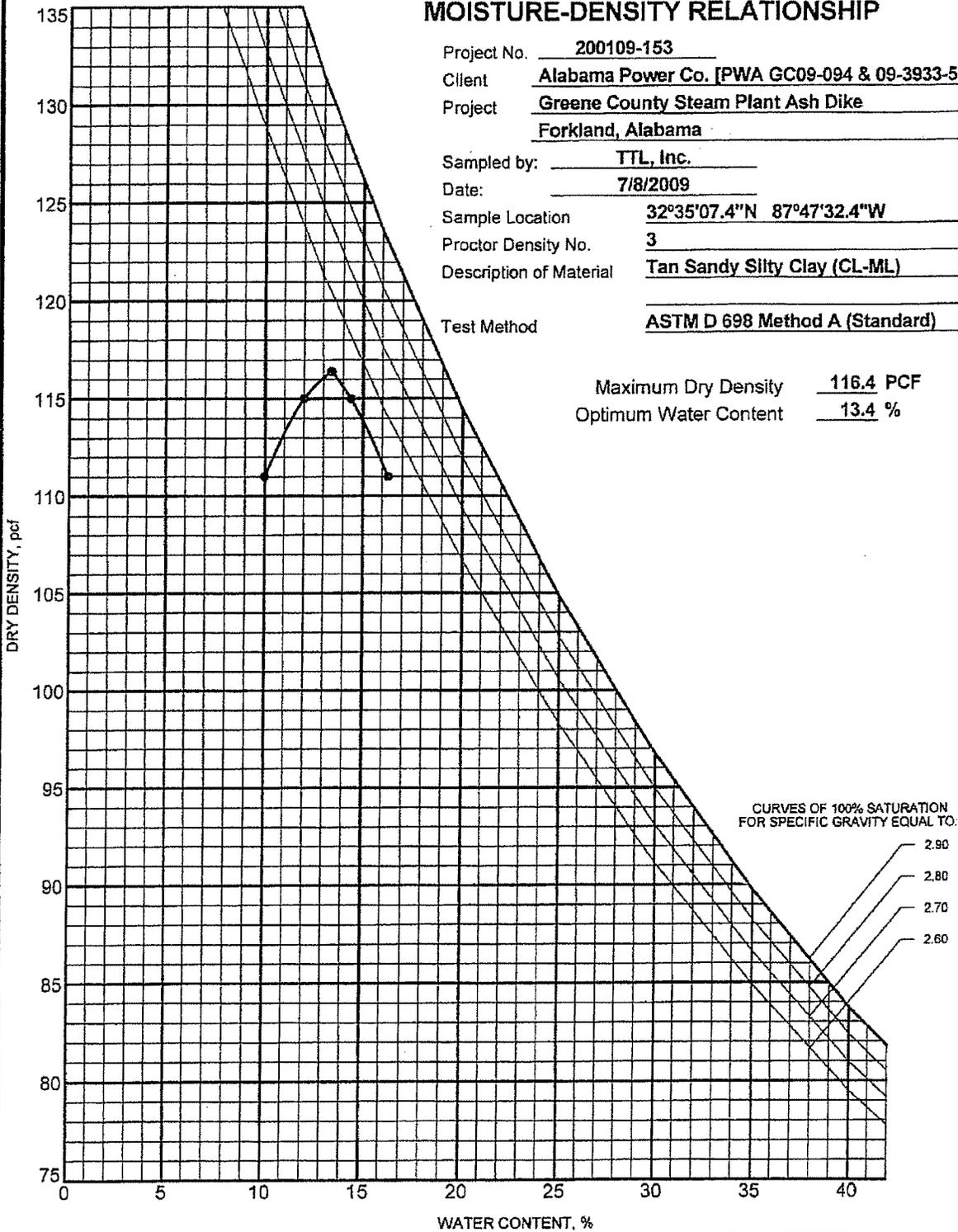
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### MOISTURE-DENSITY RELATIONSHIP

Project No. 200109-153  
 Client Alabama Power Co. [PWA GC09-094 & 09-3933-5-APC]  
 Project Greene County Steam Plant Ash Dike  
Forkland, Alabama  
 Sampled by: TTL, Inc.  
 Date: 7/8/2009  
 Sample Location 32°35'07.4"N 87°47'32.4"W  
 Proctor Density No. 3  
 Description of Material Tan Sandy Silty Clay (CL-ML)  
 Test Method ASTM D 698 Method A (Standard)

Maximum Dry Density 116.4 PCF  
 Optimum Water Content 13.4 %



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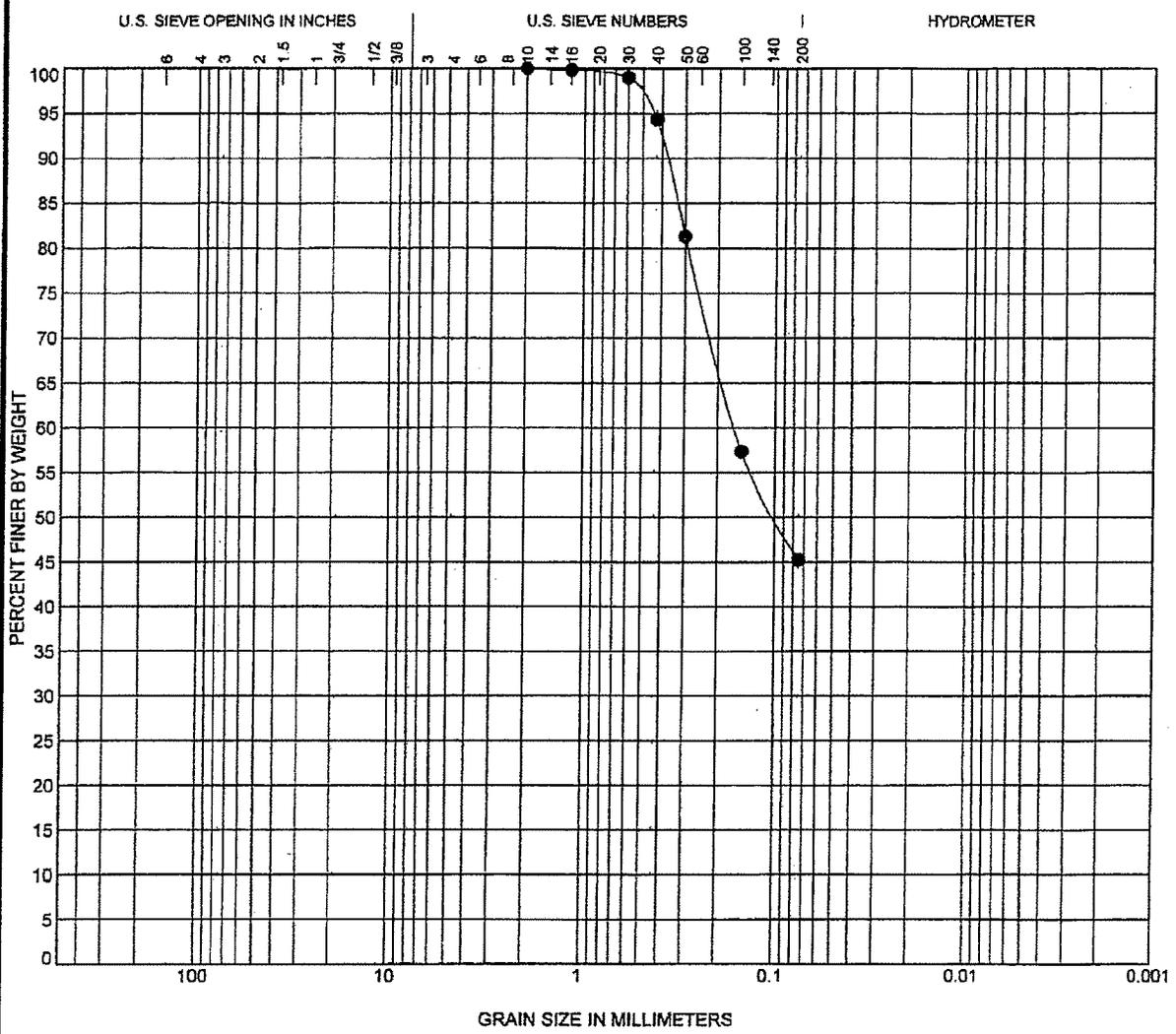
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 205.345.0816  
 Fax 205.345.0992

SUBMITTED BY:

John J. Harvey, P.E.

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### GRAIN SIZE DISTRIBUTION



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

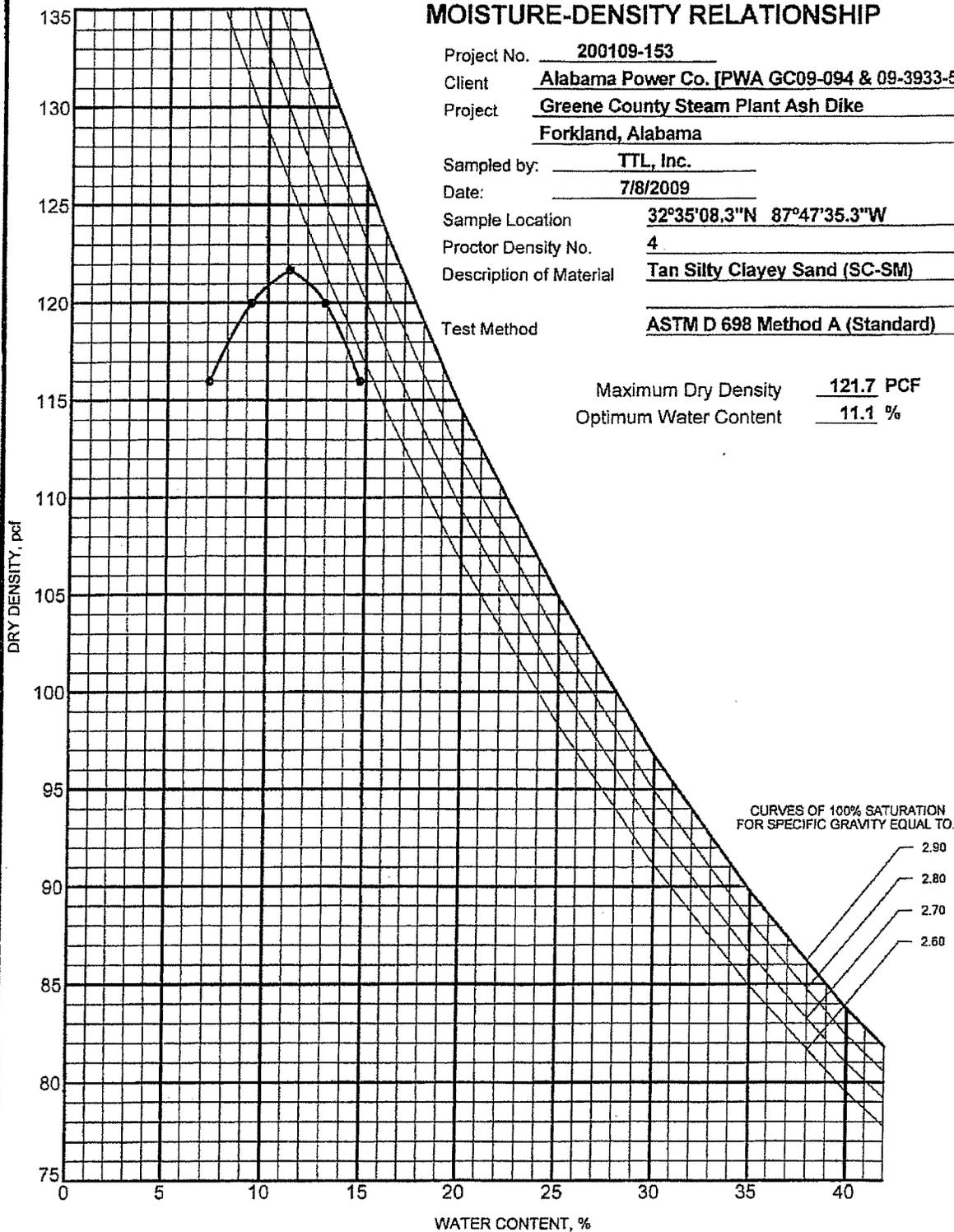
Sample ID	4 (Corresponds to PD No. 4)												
Description	Tan Silty Clayey Sand (SC-SM)												
Sampled by:	TTL, Inc.												
Sample Location:	32°35'08.3"N 87°47'35.3"W												
Date Sampled:	7/8/2009												
wc (%)	LL	PL	PI	Cc	Cu	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
7	18	14	4			2	0.2			0.0	54.8		45.3

<p style="font-size: small;">geotechnical • analytical • materials • environmental</p>	<h4>SIEVE ANALYSIS RESULTS</h4>
	<p>Client: Alabama Power Co. [PWA GC09-094 &amp; 09-3933-5-APC]</p> <p>Project: Greene County Steam Plant Ash Dike</p> <p>Location: Forkland, Alabama</p> <p>Project Number: 200109-153</p>

# MOISTURE-DENSITY RELATIONSHIP

Project No. 200109-153  
 Client Alabama Power Co. [PWA GC09-094 & 09-3933-5-APC]  
 Project Greene County Steam Plant Ash Dike  
Forkland, Alabama  
 Sampled by: TTL, Inc.  
 Date: 7/8/2009  
 Sample Location 32°35'08.3"N 87°47'35.3"W  
 Proctor Density No. 4  
 Description of Material Tan Silty Clayey Sand (SC-SM)  
 Test Method ASTM D 698 Method A (Standard)

Maximum Dry Density 121.7 PCF  
 Optimum Water Content 11.1 %



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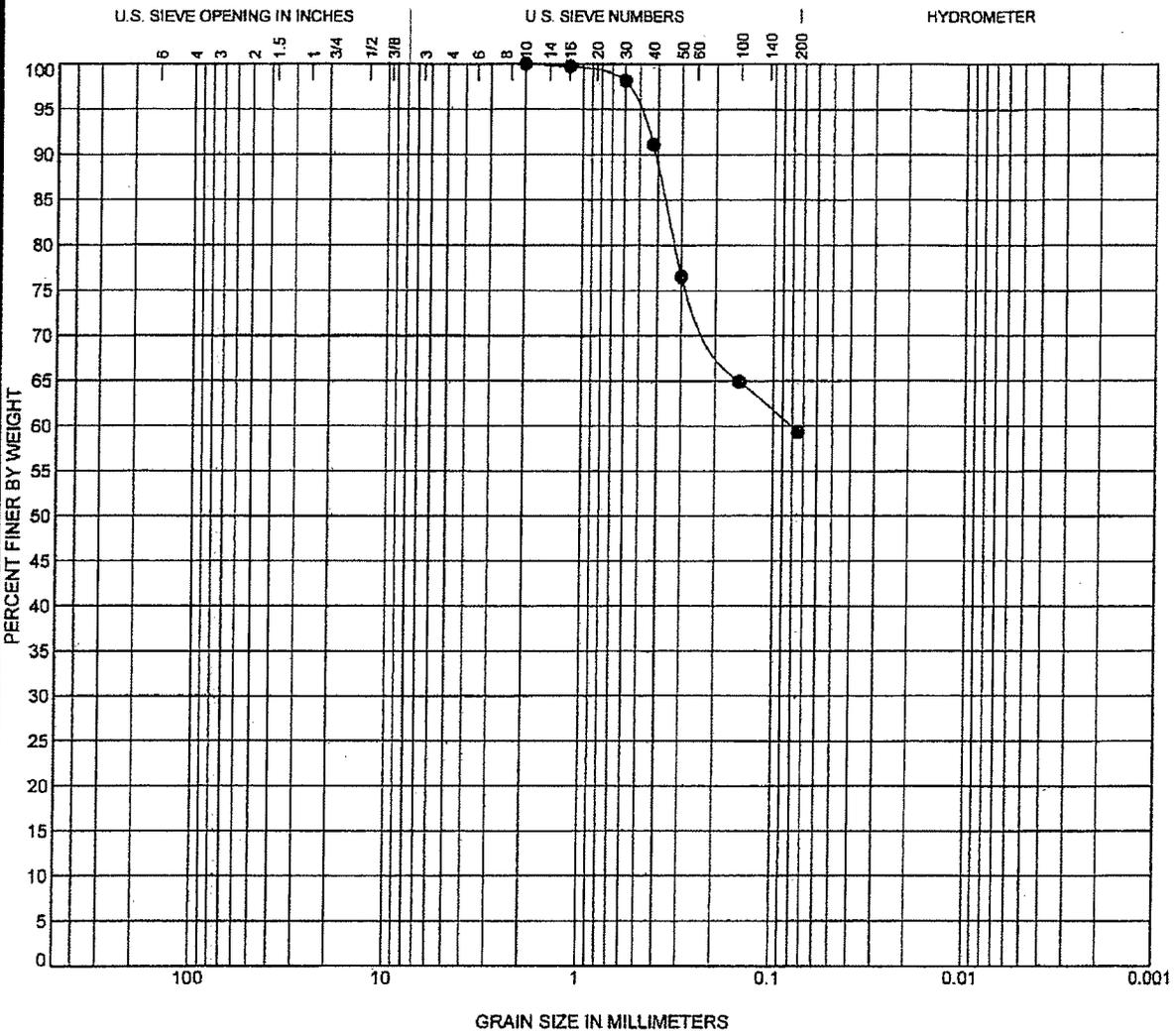


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### GRAIN SIZE DISTRIBUTION

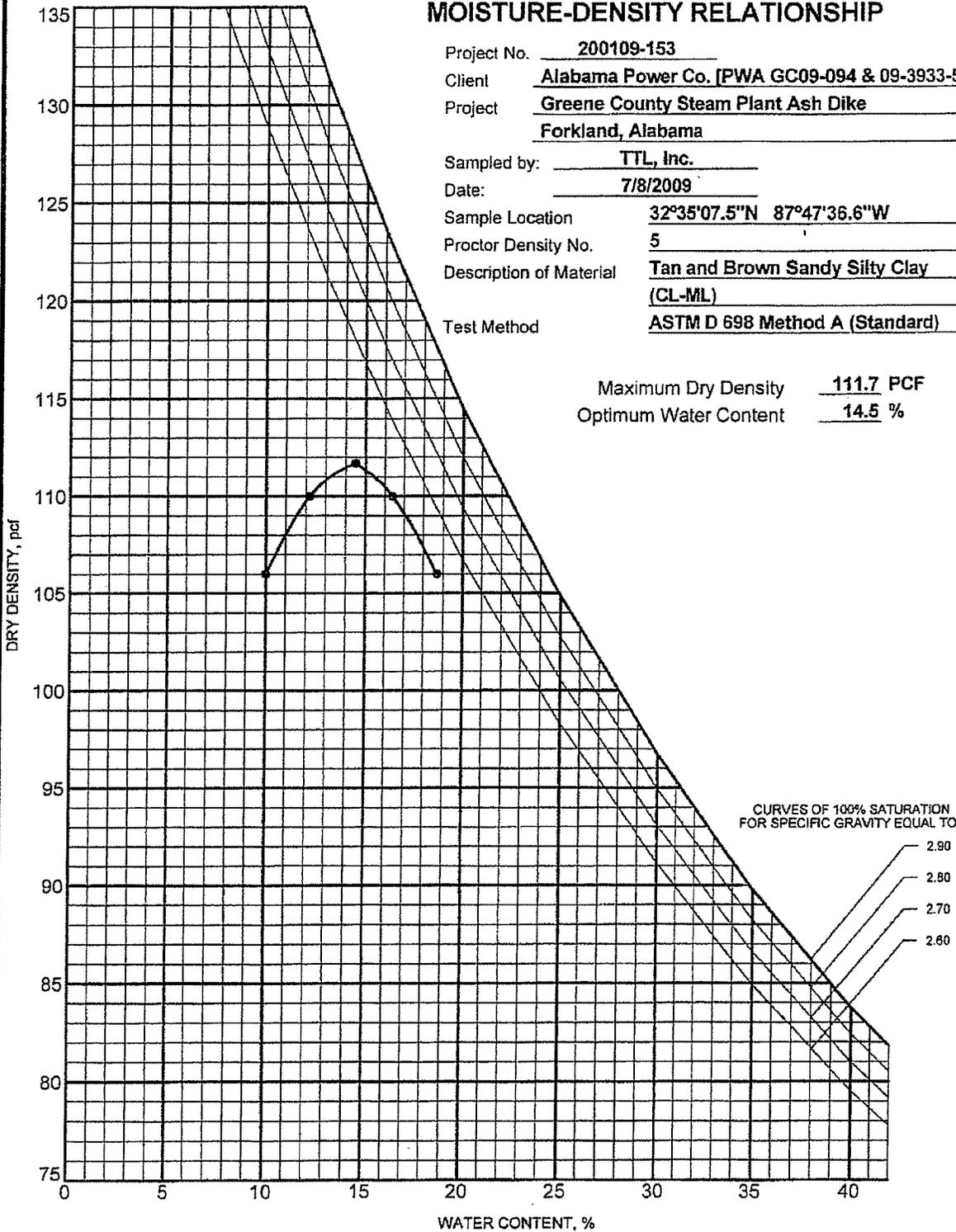


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### MOISTURE-DENSITY RELATIONSHIP

Project No. 200109-153  
 Client Alabama Power Co. [PWA GC09-094 & 09-3933-5-APC]  
 Project Greene County Steam Plant Ash Dike  
Forkland, Alabama  
 Sampled by: TTL, Inc.  
 Date: 7/8/2009  
 Sample Location 32°35'07.5"N 87°47'36.6"W  
 Proctor Density No. 5  
 Description of Material Tan and Brown Sandy Silty Clay  
(CL-ML)  
 Test Method ASTM D 698 Method A (Standard)

Maximum Dry Density 111.7 PCF  
 Optimum Water Content 14.5 %



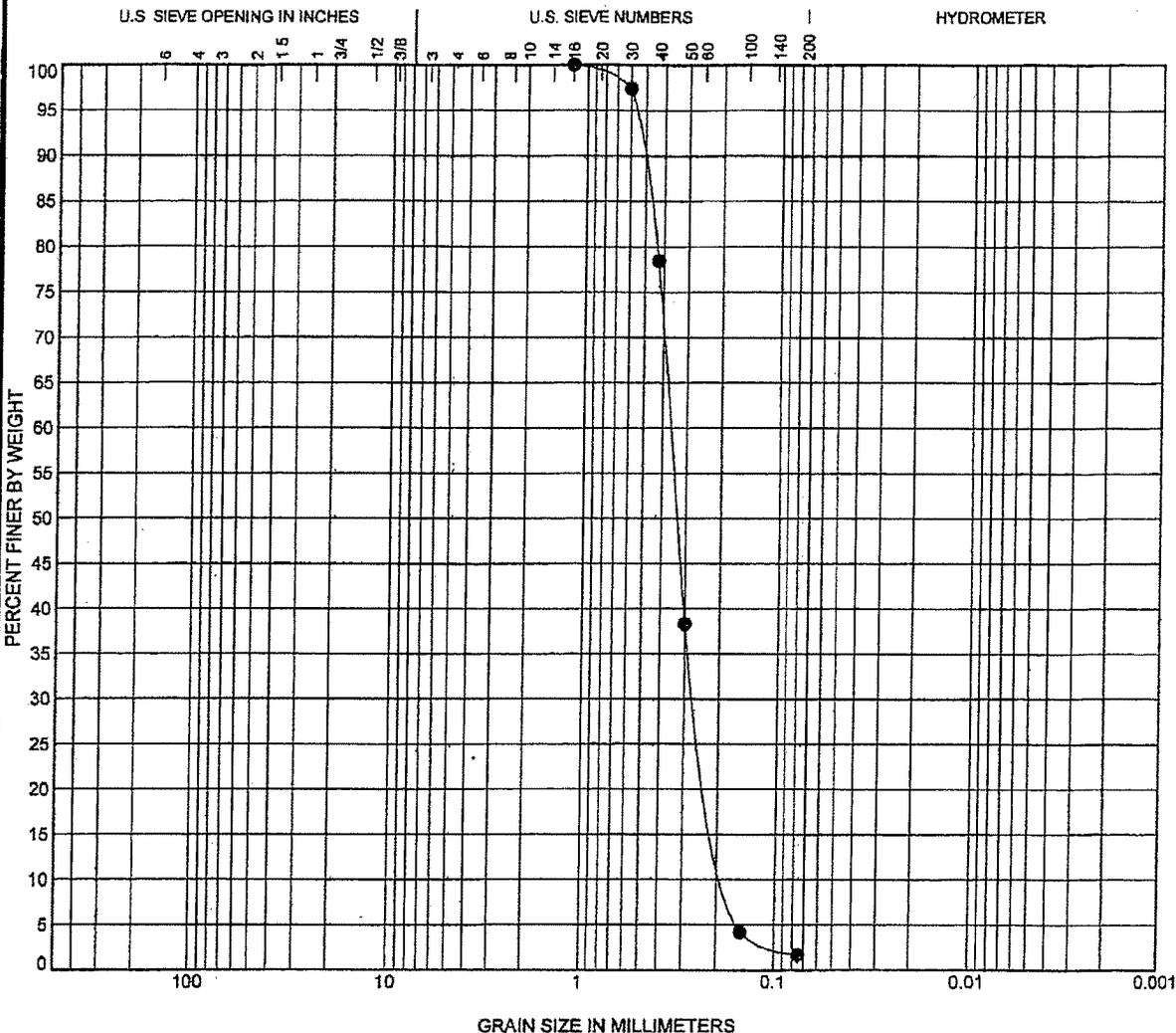
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SUBMITTED BY:

*[Signature]*  
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### GRAIN SIZE DISTRIBUTION

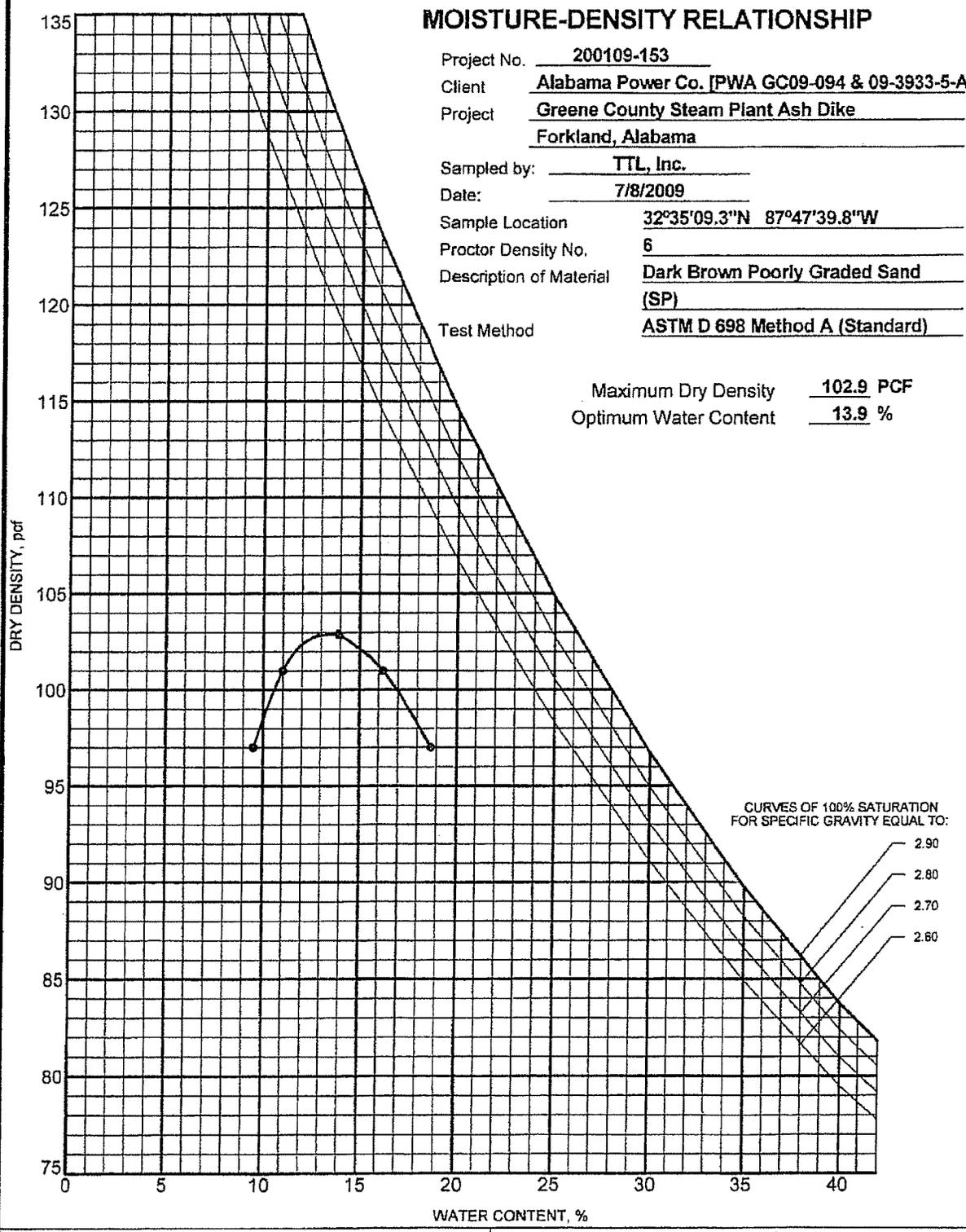


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### MOISTURE-DENSITY RELATIONSHIP

Project No. 200109-153  
 Client Alabama Power Co. [PWA GC09-094 & 09-3933-5-APC]  
 Project Greene County Steam Plant Ash Dike  
Forkland, Alabama  
 Sampled by: TTL, Inc.  
 Date: 7/8/2009  
 Sample Location 32°35'09.3"N 87°47'39.8"W  
 Proctor Density No. 6  
 Description of Material Dark Brown Poorly Graded Sand  
(SP)  
 Test Method ASTM D 698 Method A (Standard)

Maximum Dry Density 102.9 PCF  
 Optimum Water Content 13.9 %



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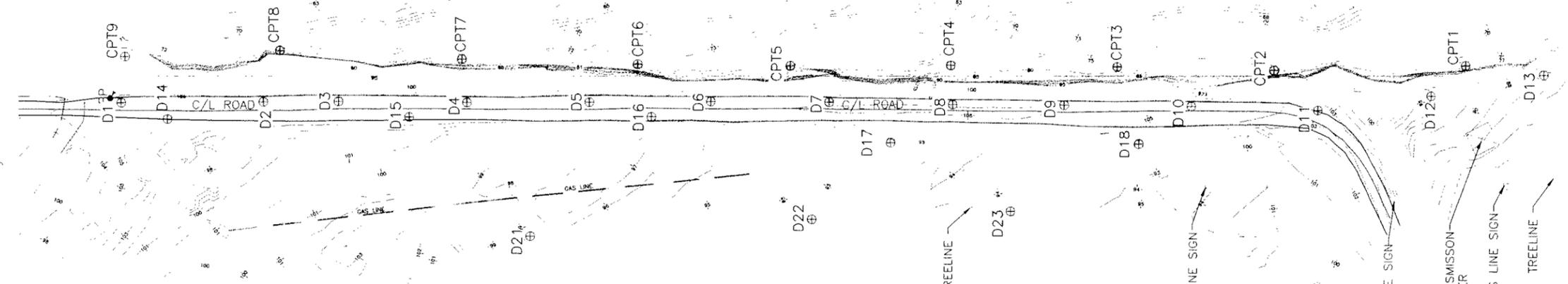
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 Fax 205.345.0992

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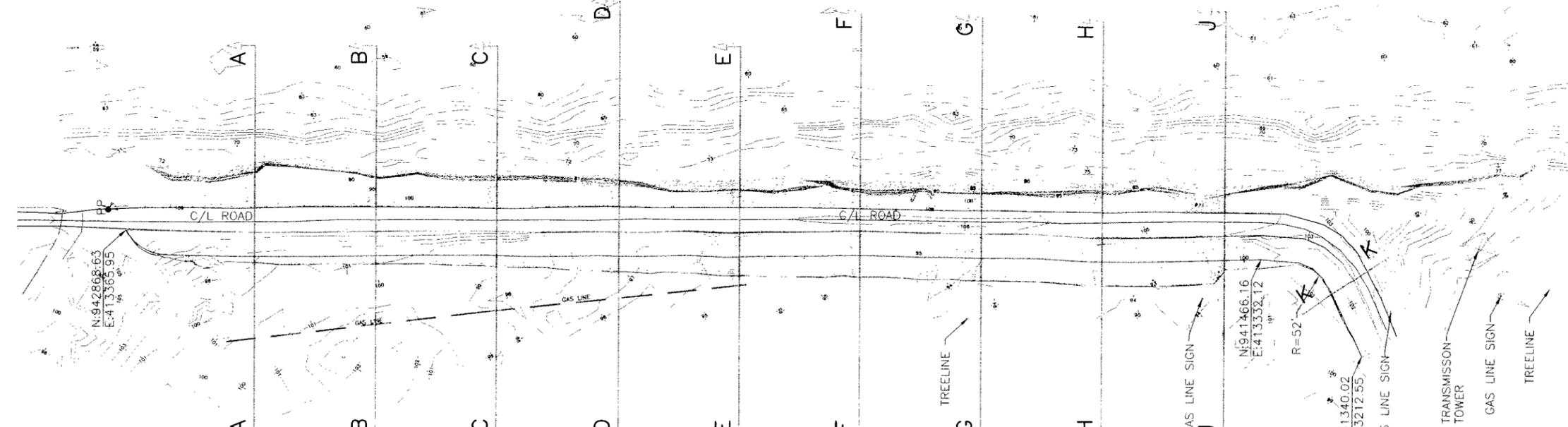
*[Signature]*  
 John J. Harvey, P.E.



PLANT GRID COORDINATES



PLAN-A  
EXISTING CONDITIONS  
SCALE: 1" = 50'



PLAN-B  
IMPROVEMENTS & GRADING  
SCALE: 1" = 50'

Legend:  
 D21 ⊕ LAND BASED BORING  
 CPT9 ⊕ WATER BASED CPT SOUNDING

NOTES:  
 1) SURVEY DATA COLLECTED 05/27/2009  
 2) CONTOUR INTERVAL 1 FOOT  
 3) CONTOURS WERE PRODUCED BY DIGITAL TERRAIN MODEL  
 4) DRAWING IS ACCURATE ONLY AT ORIGINAL SCALE

TOPGRAPHIC/SOUNDING SURVEY  
 DRAWING PRODUCED BY SCDGM  
 SURVEY AND MAPPING  
 600 NORTH 18TH STREET  
 BIRMINGHAM, ALABAMA 35291  
 (205)864-6109

REVISION	DATE																			

**Southern Company Generation Engineering and Construction Services FOR**

**Alabama Power Company**

GREENE COUNTY STEAM PLANT  
 ASH POND EAST DIKE IMPROVEMENTS  
 TOPOGRAPHIC SURVEY WITH BORING  
 LOCATION & GRADING PLAN

SCALE: AS SHOWN  
**E 546457**  
 SHEET 1 OF 1  
 DATE: 05/27/09  
 STATUS: FINAL

**CONFIDENTIAL**

GC-API-0014

GEN-10003, Rev. 0

**APPROVAL:**

TITLE,  
Southern Company  
Generation

  
SIGNATURE 6-29-09

# **Safety Procedure for Dams and Dikes**

**ATTORNEY CLIENT PRIVILEGE**

*This correspondence/communication was prepared at the direction of legal counsel, and is privileged, protected and confidential under attorney work product doctrine.*

GAS-API-0014

**CONFIDENTIAL**

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## 10003.000 Purpose

Safe operation of water retaining structures is required to ensure public safety, environmental safety and to protect Company assets. A comprehensive dam safety program sets forth guidelines for the safe operation of water retaining structures.

A coordinated, pre-planned, effective emergency response is crucial to lessen the danger to public and environmental safety and to minimize the risk to Company assets.

This procedure documents responsibility for dam safety actions including inspection, reporting, analysis, regulatory compliance, and emergency response.

This procedure also documents vegetation control standards for dams and dikes.

## 10003.100 General Information

### 10003.110 Definitions

Toe – the junction of the downstream slope or surface with the original ground surface

Water retaining structure – an artificial barrier that has the ability to impound water, wastewater, or any liquid-borne material for the purpose of storage: dam, dike

Water control structure – structure appurtenant to a water retaining structure that allows conveyance of water, controls the direction or rate of discharge or maintains a prescribed water elevation, such as a spillway gate or discharge structure

Crest – top of the dam

Dam Safety Engineer – Individual determined by the Hydro Services Principal Engineer responsible for condition assessment of dams and the General Manager - Hydro to be qualified to conduct dam safety inspections and evaluations based on education, experience or other qualifications.

### 10003.120 Dam Safety Criteria

#### 10003.120.1 FERC-Licensed Structures

FERC-licensed structures shall be governed by the FERC criteria as set forth in the FERC Engineering Guidelines or as approved by FERC on a case-by-case basis.

#### 10003.120.2 Other Structures

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Where structures are under the jurisdiction of a state dam safety program, the criteria set forth in that program shall apply. Where structures are not governed by a state dam safety program, generally accepted engineering criteria for slope stability, structural stability, and hydraulic adequacy shall apply.

#### 10003.130 Regulatory Interface

The environmental organizations of the individual operating companies will be responsible for the interface with State and Federal environmental regulatory agencies. In practice, SCG Hydro Services may provide technical interface with State and Federal regulatory agencies regarding dam safety.

#### 10003.140 Compliance

SCG dams and dikes will meet applicable dam safety requirements or have a plan for investigation and remediation to meet these requirements.

The plant manager will be responsible for ensuring on-site compliance with dam safety requirements. Appropriate reference to and/or provisions of this procedure should be included in the plant's general emergency plan documents.

### **10003.200 Inspections**

#### 10003.210 Inspection Applicability

This procedure is applicable to the following water retaining structures:

- hydroelectric project dams
- ash pond dams and dikes (active or water retaining)
- cooling water and make-up water pond dams and dikes
- gypsum pond dikes
- other similar structures as requested by generating plants

#### 10003.220 Inspection Scheduling

##### 10003.220.1 Inspections by Plant Personnel

Plant personnel will inspect the water retaining structures weekly at a minimum, unless more frequent inspection is warranted by previous maintenance history or by site specific conditions.

##### 10003.220.2 Inspections by Dam Safety Engineers

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Structures will be inspected by SCG Hydro Services dam safety engineers annually at a minimum, unless more frequent inspection is warranted by previous maintenance history or by unusual events. If deemed necessary, Hydro Services may obtain assistance in the inspections from qualified personnel working in other SCG engineering departments or the operating companies.

Plant management will be contacted (ideally 30 days or more prior to the inspection date) by SCG Hydro Services to schedule a mutually acceptable date. The following items shall be discussed at this time:

- a) Status of previous inspection recommendations
- b) Proper vegetation control to ensure the Dam Safety Engineer has adequate visibility to perform a comprehensive inspection.
- c) Identify plant personnel to take part in the inspection (should include personnel who conduct weekly plant inspections to the extent possible).
- d) Any necessary arrangements such as safety equipment or transportation needed to conduct the inspection.

#### 10003.220.3 Unusual Circumstances

The water retaining and control structures should be inspected by either plant personnel and/or a Dam Safety Engineer any time one of the following unusual circumstances occurs:

- a) Severe rain event
- b) Post storm (hurricane, tornado, etc.)
- c) High river or stream flow (if adjacent to a river or stream)
- d) Unusually high tide (if adjacent to a tidal area)
- e) Earthquake

Plant personnel will notify SCG Hydro Services if any of these events occurs at their site. SCG Hydro Services will notify plant management in the event of an earthquake.

This inspection will be conducted as soon as safety allows and/or there is sufficient visibility. SCG Hydro Services may request plant personnel to perform these inspections. Results of such inspections shall be reported to SCG Hydro Services immediately upon completion. Depending on the findings of the inspection by plant personnel, a follow-up inspection may be conducted by SCG Hydro Services.

#### 10003.230 Inspection Methodology

Inspections should be conducted using a checklist that is specific to the water retaining structure and/or water control structure being inspected.

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10003.230.1 Checklist for Inspection by Plant Personnel

The inspection checklist should be developed cooperatively by SCG Hydro Services dam safety engineers and plant personnel and may include some or all of the following items:

- a) Inspector(s)
- b) Date / time
- c) Checklist revision number
- d) Pond level
- e) Weather conditions
- f) Rainfall since last inspection
- g) Instrumentation readings (if applicable)
- h) Condition of slopes, crest, and toe (i.e. evidence of seepage, wet/saturated ground surface, water-boils etc)
- i) Drains – drainage ditches / weir flows
- j) Vegetation
- k) Erosion
- l) Animal damage
- m) Anthills
- n) Depressions
- o) Misalignment of retaining structures
- p) Condition of outlet structures (i.e. emergency spillway, gates)

10003.230.2 Checklist for Inspection by Dam Safety Engineers

The Dam Safety Engineer Inspection Checklist should contain the same information as the Plant Personnel Inspection Checklist, with the addition of the following information at minimum:

- a) Instrumentation readings review
- b) Instrumentation reading spot check
- c) Condition of instrumentation
- d) Maintenance / remediation performed since last inspection
- e) Status of prior inspection recommendations
- f) Check for posting of current emergency notification information

10003.240 Inspection Documentation

10003.240.1 Documentation of Inspections by Plant Personnel

Inspections performed by plant personnel shall be documented on the checklist described in section 10003.230.1.

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Any areas of concern identified during the inspection should be brought to the attention of the assigned SCG Hydro Services Dam Safety Engineer immediately by phone. If unable to contact the assigned Dam Safety Engineer, call the Dam Safety Referral Line number noted on the checklist for the Engineer on duty. Fax or email a copy of the checklist noting the unusual condition or concern to SCG Hydro Services.

Inspection reports with no areas of concern identified shall be retained for the current year plus one year. Inspection reports with areas of concern identified shall be retained for the life of the plant plus ten years.

#### 10003.240.2 Documentation of Inspections by Dam Safety Engineers

Inspections performed by the Dam Safety Engineer shall be documented on the checklist described in section 10003.230.2. Once the inspection is concluded, the Dam Safety Engineer will conduct an exit meeting with the plant personnel to discuss the observations made during the inspection and to point out any items that need immediate attention. The Dam Safety Engineer will prepare a standardized report for distribution in a timely manner that provides more detailed information regarding inspection observations.

This report shall contain (at a minimum):

- a) Instrumentation review (if applicable)
- b) Findings
- c) Recommendation items requiring immediate attention for the safety of the structure (if any are identified)
- d) Items requiring attention to assure the long-term safety of the structure (if any are identified).

These reports shall be retained by SCG Hydro Services for the life of the corporation.

#### 10003.240.2.1 Dam Safety Engineer Inspection Recommendation Tracking

Inspection reports will include the outstanding recommendations from previous inspections and the status of the recommendations. SCG Hydro Services will track the recommendations to completion.

#### 10003.240.2.2 Dam Safety Engineer Inspection Report Distribution

Inspection reports will be distributed to the following:

1. SPO
2. Plant Manager or Superintendent (as addressee)
3. OPCO Environmental Manager
4. Hydro General Manager
5. Plant Compliance Manager (if applicable)

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6. Any other personnel designated by the Plant Manager

### **10003.300 Instrumentation**

If dam safety instrumentation is installed at the site, instrument readings are to be reported to SCG Hydro Services as soon as possible, but within a maximum of five working days of being taken. Instrument readings will be reviewed by SCG Hydro Services as soon as possible, but within a maximum of five working days of receipt. (These maximums may be reduced as necessary if site specific conditions at a particular location dictate that a shorter review time is appropriate.) The schedule for instruments read by the plant shall be entered into the Plant's work order management system for compliance tracking.

Data from installed instrumentation can provide early warning for potential problems and is important to the success of the Dam Safety Program. Readings from installed instruments should be made on schedule and should be taken by a qualified individual who has undergone applicable training.

Abnormal instrument readings should be brought to the attention of SCG Hydro Services immediately by phone. If necessary, call the Dam Safety Referral Line for the contact information of the Engineer on Duty.

Dam movement surveys require a significant amount of post-processing and therefore cannot be accommodated in the five working day window cited above. These results should be forwarded to SCG Hydro Services as soon as possible. The movement survey results will be reviewed by SCG Hydro Services as soon as possible after receipt.

### **10003.400 Emergency Response**

#### 10003.410 Emergency Notification

SCG Hydro Services maintains two dam safety referral phone numbers, one each for the Atlanta and Birmingham offices. Each office will maintain an on-call roster so that an engineer is available for response at all times. The referral phone number will connect with a recorded message that provides the caller with the name and contact information for the Engineer on Duty at the time. The referral phone number and the contact information for the individual Dam Safety Engineers will be included on cards distributed to the SCG plants. These cards shall be posted in the Control Room and other conspicuous locations as designated by the plant manager.

#### 10003.420 Dam Safety Problem Reporting

Suspected dam safety problems should be brought to the attention of the assigned SCG Hydro Services Dam Safety Engineer immediately by phone. If unable to contact the

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assigned Dam Safety Engineer, call the Dam Safety Referral Line number for contact information for the Engineer on duty.

FERC requires that any condition affecting the safety of a FERC-licensed hydro project be reported to them immediately. FERC describes a condition affecting safety by saying: "Such conditions may include, but are not limited to, gate operation failure, piping, seepage, slides, unusual instrumentation readings, sinkholes, sabotage, natural disasters (floods, earthquakes) and other signs of instability of any project works. Additional conditions, include, but are not limited to, reservoir monitoring instrumentation and communication systems malfunction or failure, and remote control systems malfunction or failure."

For problems occurring at hydro plants, SCG Hydro Services will be responsible for notification of FERC and, if applicable, state dam safety agencies.

#### 10003.430 Emergency Equipment

In conjunction with the designated plant management team, equipment present at the plant location for loading or moving material (or other uses) may be utilized, as necessary, to respond to emergency conditions at the dams.

#### 10003.440 Emergency Supplies

In order to be able to deal with boils or large seeps in a timely manner, granular materials for constructing filters should be stockpiled at earth embankments. These stockpiles should be located as near to the toe of the embankment as practical so that the material can readily be moved to any location along the toe of the dam. The amounts and specifications for material to be stockpiled at each location will be determined by SCG Hydro Services. These stockpiles should be protected with a silt fence or safety fence enclosure and should be labeled "Emergency Filter Stockpile, Emergency Use Only".

#### **10003.500 Training**

SCG Hydro Services will be responsible for development and maintenance of a training program for plant personnel who conduct safety inspections of water retaining structures. The training may include instructor-led classroom training and on-the-job-training with Dam Safety Engineers and shall be required on an annual basis. Video-based training may be used as appropriate for refresher training or for new or temporary employees.

The classroom training may consist of technical presentations using training materials such as FEMA publications and Association of State Dam Safety Officials or United States Society on Dams training programs as well as materials developed by SCG Hydro Services.

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Dam Safety Engineers will provide on-the-job-training on the actual retaining structures and demonstrate appropriate inspection procedures and techniques. The Dam Safety Engineer will also conduct training on proper instrument reading procedures and data recording for the sites with installed instrumentation that is read by plant personnel.

#### **10003.600 Vegetation Control**

A uniform cover of a suitable species of grass shall be maintained on all earth dams or dikes. The grass should be mowed at least twice a year at a reasonable height to facilitate adequate inspection, unless drought or other circumstances make mowing unnecessary. Mowing should be done with appropriate equipment in such a way as to minimize damage to the dam or grass cover from mower tires or blades.

Dam crests should be protected by a suitable granular surface material if traffic prevents establishment of a good grass cover. The use of bottom ash or similar CCB materials for this purpose should be limited to material that is free of pyrites or other components that would be harmful to grass.

Generally, trees and woody brush should not be allowed on the slopes, crest or along the water line of any dam or dike. Exceptions to this provision (in the case of beneficial vegetation or other situations) may be made as deemed appropriate by SCG Hydro Services dam safety engineers. The areas adjacent to the toe of the dam and the contact of the dam and the abutment should also be clear of trees and woody brush to distances deemed appropriate by SCG Hydro Services dam safety engineers (ideally a minimum of 20 feet).

Outlet structures and associated inlet and outlet channels should be kept free of vegetation that would impede the flow of water.

#### **10003.700 Modification of Retaining Structures and Water Levels**

The FERC and state safe dams organizations require that any modifications to water retaining structures (that they regulate) be reviewed and approved by their organization prior to construction. In addition, FERC requires that any soil boring program on a FERC-regulated structure be reviewed and approved by FERC prior to implementation. For FERC regulated structures, SCG Hydro Services will serve as the contact with FERC and, if applicable, with the state dam safety regulatory agencies in these matters.

Proposed new water retaining structures and proposed modifications to existing dams and associated structures (including discharge structures, internal retaining structures, diversion dikes and dry ash storage within existing ponds) should be reviewed with SCG Hydro Services prior to and during design and construction. SCG Hydro Services shall be included in the review and approval process for new water retaining structures and for modifications to existing structures.

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Increases in maximum pond elevations should be reviewed with SCG Hydro Services prior to exceeding existing maximum elevations.

#### **10003.900   References**

The documents listed below contain both general and specific guidance on topics related to the safety of dams and dikes. Requirements and provisions of these documents may or may not apply to a specific dam or dike covered under this procedure.

FEMA-93 Federal Guidelines for Dam Safety Rev. April, 2004

FEMA-473 Technical Manual for Dam Owners - Impacts of Animals on Earthen Dams Rev. September, 2005

FEMA-534 Technical Manual for Dam Owners - Impacts of Plants on Earthen Dams Rev. September, 2005

FERC Engineering Guidelines, Ch. 14 Dam Safety Performance Monitoring Program Rev. July 2005

Georgia Environmental Protection Division Rules for Dam Safety Environmental Rule 391-3-8. Authorized by OCGA 12-5-370 GA Safe Dams Act of 1978.

Georgia Safe Dams Program Engineering Guidelines v.3.1, Georgia EPD Safe Dams Program, 2007.

Mississippi Commission on Environmental Quality Dam Safety Regulation LW-4 Revised August 2005

Northwest Florida Water Management District, Chapter 40A-4, Florida Administrative Code

Southern Company Records Management home page  
<http://compliance.southernco.com/records-mgmt/SoCoRecordsMgtHome.html>

The Southern Company Records and Information Management Retention Schedule, Revision 12, June 16, 2009.  
[http://compliance.southernco.com/records-mgmt/SOCORIMRetentionSchedule\\_06\\_16\\_2009.pdf](http://compliance.southernco.com/records-mgmt/SOCORIMRetentionSchedule_06_16_2009.pdf)

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Engineering and Construction Services Calculation

Calculation Number:  
TV-GC-ECS8699-001

<b>Project/Plant:</b> Plant Greene County Ash Pond Inspection	<b>Unit(s):</b>	<b>Discipline/Area:</b> ES&EE
<b>Title/Subject:</b> Plant Greene County Ash Pond Hydrology Study		
<b>Purpose/Objective:</b> Evaluate the ability of the ash pond to contain a 100-year/24-hour rainfall event		
<b>System or Equipment Tag Numbers:</b> NA	<b>Originator:</b> Veronica Weaver-Rivers	

**Contents**

Topic	Page	Attachments <small>(Computer Printouts, Tech. Papers, Sketches, Correspondence)</small>	# of Pages
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Methodology	2	Attachment B – Drawing No. ES 1862, Plant Greene County Ash Pond 2005 Topographic Survey	1
Criteria and Assumptions	2	Attachment C – Greene County Steam Plant Water Use Flow Diagram	1
Summary of Conclusions	2	Attachment D – AutoCAD Volume Computations	1
Design Inputs/References	3		
Body of Calculation	3		
Total # of pages including cover sheet & attachments:		8	

**Revision Record**

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0		VWR/6-17-10	RS/6-25-10	JP 6/25/10

**Notes:**

Rev. 0  
6/17/2010

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GC-API-0016

## Purpose of Calculation

Plant Greene County is a coal-fired steam plant located in Greene County, Alabama, that produces ash as a combustion residual. The facility sluices fly ash and bottom ash to an on-site 474 acre ash pond that is contained by a ring dike measuring 21,402 ft. in perimeter length. The purpose of this calculation is to confirm the ability of the ash pond to contain a 100-year/24-hour rainfall event without overtopping the dike.

## Methodology

The 100-year/24-hour design rainfall event was determined from the rainfall frequency map in Technical Paper No. 40, Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years, May 1961. The topography and layout of the ash pond was obtained from a survey completed in 2001. The rainfall runoff was calculated using the rational method.

## Criteria and Assumptions

The capacities were calculated based upon the following assumptions and design criteria:

1. All process waters from the plant enter and exit the ash pond normally.
2. The plant maintains the current operating water level during the event.
3. All rainfall within the dike perimeter is contained in areas of the pond below 92.0 ft. MSL.
4. The volume below EL 85.5 ft. MSL cannot be utilized for storage due to the existing operating water level.
5. No infiltration occurs.
6. The rainfall in the coal pile drain will overwhelm the surge pond and runoff directly to the ash pond.
7. No evaporative loss occurs during the event.

There is no regulatory requirement to store the entire rainfall volume from a 100-year/24-hour event. However, sufficient storage capacity will prevent overtopping the dike during design events and mitigate the need for an emergency spillway.

## Summary of Conclusions

The ash pond has a capacity of 622 acre-ft above the normal operating level, based on the 2005 survey data. The total volume of water that accumulates during a 100-year/24-hour design rainfall event is 386 acre-ft. Based on the 2005 survey, the storage capacity remaining after a 100-year/24-hour event is 236 acre-ft.

The normal pool elevation is approximately 85.5 ft MSL. The total rainfall accumulation of 386 acre-ft corresponds to an elevation of approximately 90.5 ft. MSL. After a 100-year/24-hour event, approximately 1.5 ft. of free board will remain in the pond based on present capacity. Therefore, the rainfall will not overtop the existing dike.

### Design Inputs/References

*Technical Paper No. 40, Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years, 100-year 24-hour Rainfall (Inches), p. 56, May 1961*

Southern Company Generation E&CS for Alabama Power Company ES 1862, *Plant Greene County Ash Pond 2005 Topographic Survey*

Greene County Steam Plant Water Use Flow Diagram

All volume calculations were computed in AutoCAD Civil 3D 2010

### Body of Calculation

The following calculation outlines the volume capacity and free board determination of the ash pond:

1. The design 100-year/24-hour rainfall event for Greene County, Alabama is approximately 9.5 inches over a pond area of 474 acres, equaling to:

$$(9.5 \text{ in})(474 \text{ acres}) / (12 \text{ in/ft}) = \underline{375.3 \text{ acre-ft}}$$

2. The water use flow diagram indicates the area of the coal pile drain is 15 acres. Given a runoff coefficient of 0.8, this volume equals:

$$(9.5 \text{ in})(15 \text{ acres}) / (12 \text{ in/ft}) = 11.9 \text{ acre-ft} (0.80) = \underline{9.5 \text{ acre-ft}}$$

3. Assuming no evaporative loss,  $2.65 \times 10^5$  GPD must be converted to acre-ft:

$$(2.65 \times 10^5 \text{ gal})(3.069 \times 10^{-6} \text{ acre-ft} / 1 \text{ gal}) = \underline{0.81 \text{ acre-ft}}$$

4. Add Steps 1 through 3 for the total water volume that accumulates during the rainfall event:

$$375.3 \text{ acre-ft} + 9.5 \text{ acre-ft} + 0.81 \text{ acre-ft} = \underline{385.6 \text{ acre-ft}}$$

5. The total storage capacity above the operating water level is 622 acre-ft. The remaining capacity is computed by subtracting the rainfall accumulation:

$$622 \text{ acre-ft} - 386 \text{ acre-ft} = \underline{236 \text{ acre-ft}}$$

6. The total water volume computed in Step 4 translates to an elevation of approximately 90.5 ft. MSL, determined by volume analysis in AutoCAD. The free board remaining below the dike elevation is computed by subtraction:

$$\text{EL } 92.0 \text{ ft MSL} - \text{EL } 90.5 \text{ ft. MSL} = \underline{1.5 \text{ ft. of free board}}$$

The computed free board confirms that the rainfall from a 100-year/24-hour design event will not overtop the existing dike.

### **Attachments**

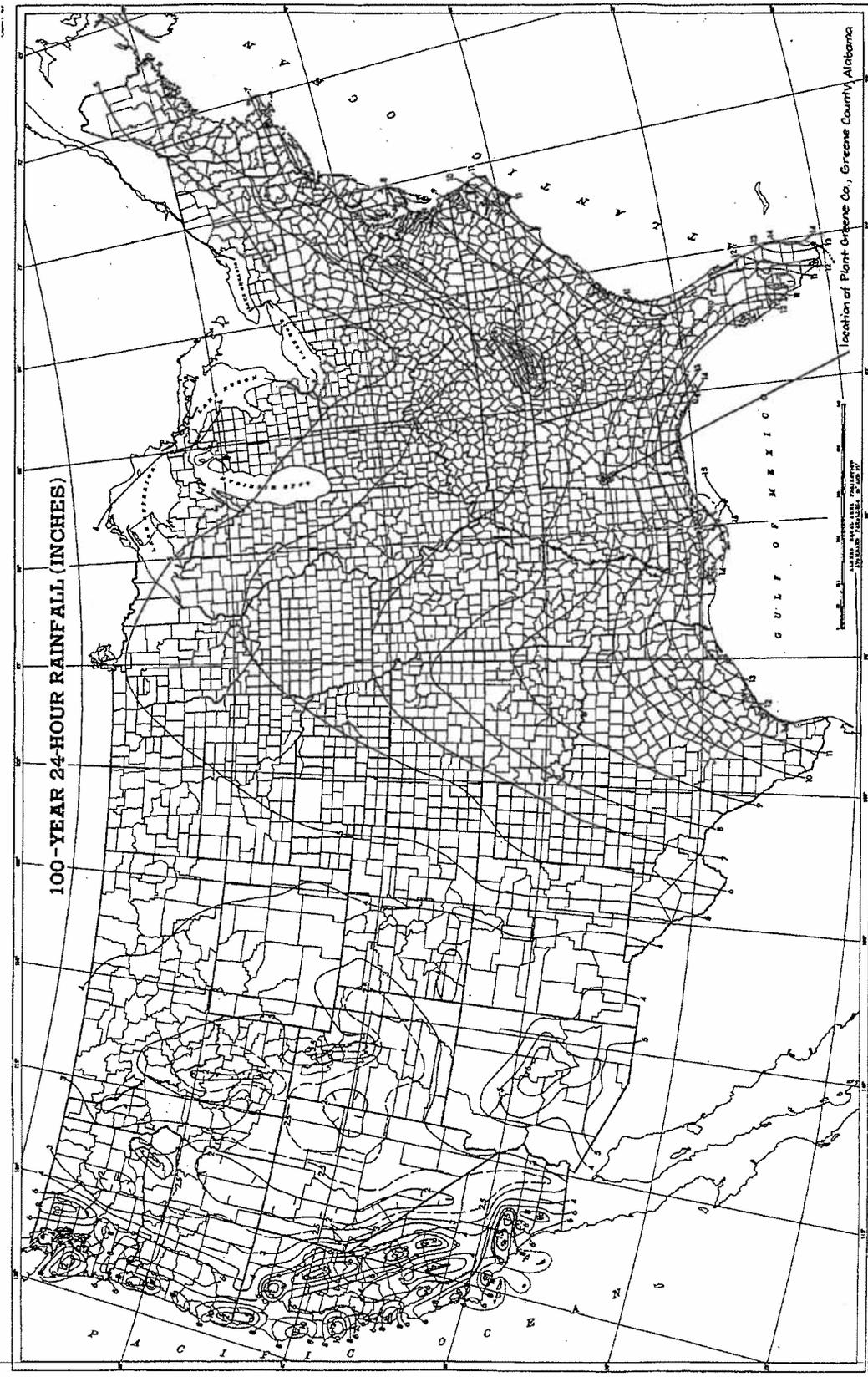
# Attachment A – Technical Paper No. 40

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100-YEAR 24-HOUR RAINFALL (INCHES)

Location of Plant-Oilpine Co., Greene County, Alabama

Technical Paper No. 40, Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years, May 1961

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# Attachment B – Drawing: Plant Greene County Ash Pond 2005 Topographic Survey

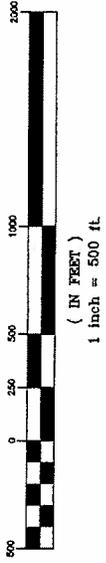
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6/17/2010

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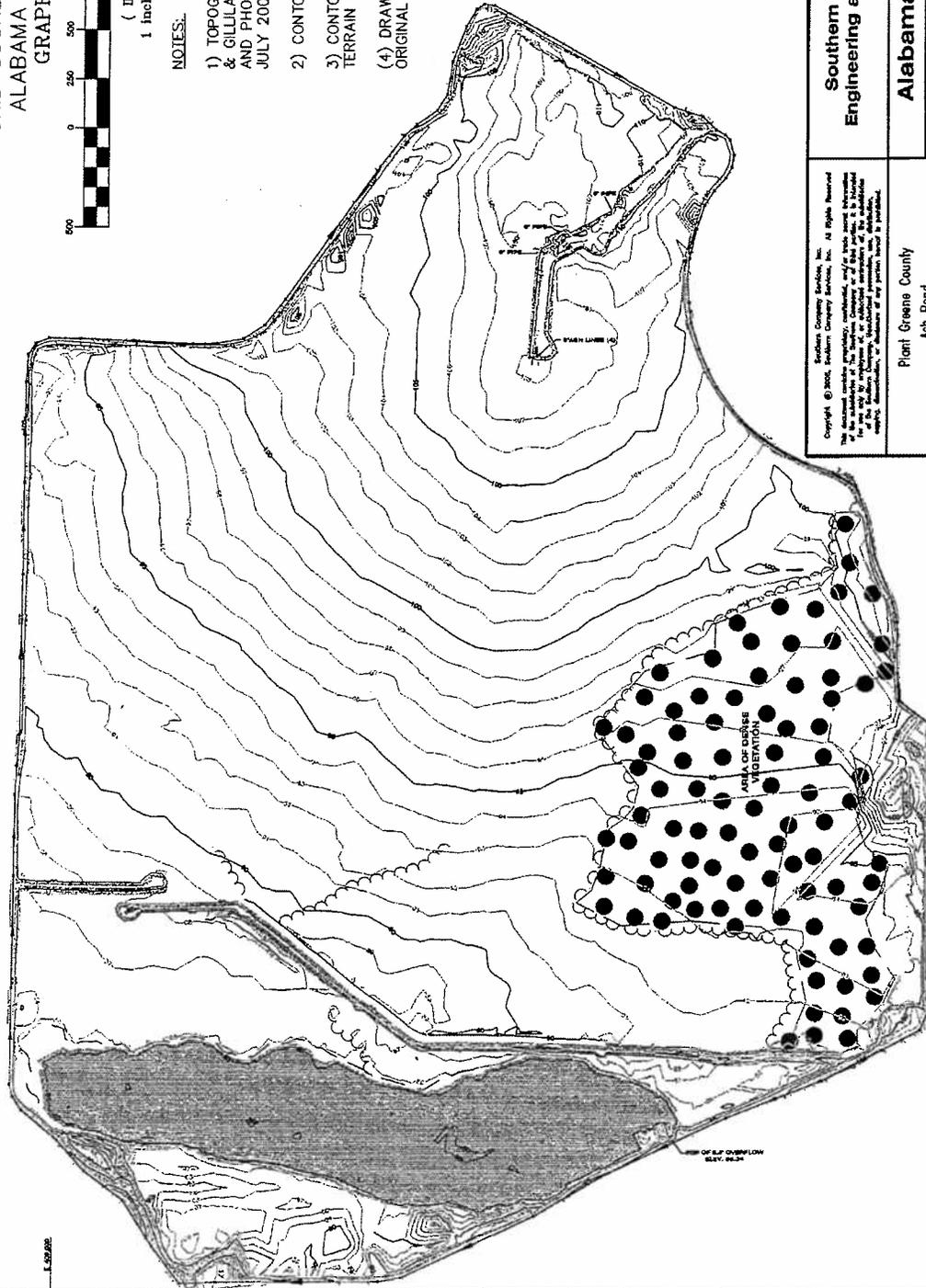
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TOPOGRAPHIC SURVEY  
 GRID COORDINATES NAD 27  
 ALABAMA STATE PLANE  
 GRAPHIC SCALE



NOTES:

- 1) TOPOGRAPHY DATA COLLECTED BY RAY & GILLILAND; SCS. SURVEY OCT. 2001 AND PHOTOGRAPHIC SURVEY JULY 2001.
- 2) CONTOUR INTERVAL 1 FOOT
- 3) CONTOURS WERE PRODUCED BY DIGITAL TERRAIN MODEL
- 4) DRAWING IS ACCURATE ONLY AT ORIGINAL SCALE.



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Southern Company Generation Engineering and Construction Services		FOR	
Alabama Power Company		PROJ. ID.	DRAWING NUMBER
SCALE	NONE	ES1862	
SHEET	1	FINAL	0
CONTO			
REV			

Drawing name: T:\ESEE MAJOR PROJECTS\PROJECTS\Greene County\2010\ES1862\_Ash Pond Hydrology Study\Drawings\ES1862 ASHPND-TOPO.dwg Jun 23, 2010 - 4:43pm(S) B: 17x11 Civil 3D 2010

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# Attachment C – Greene County Steam Plant Water Use Flow Diagram

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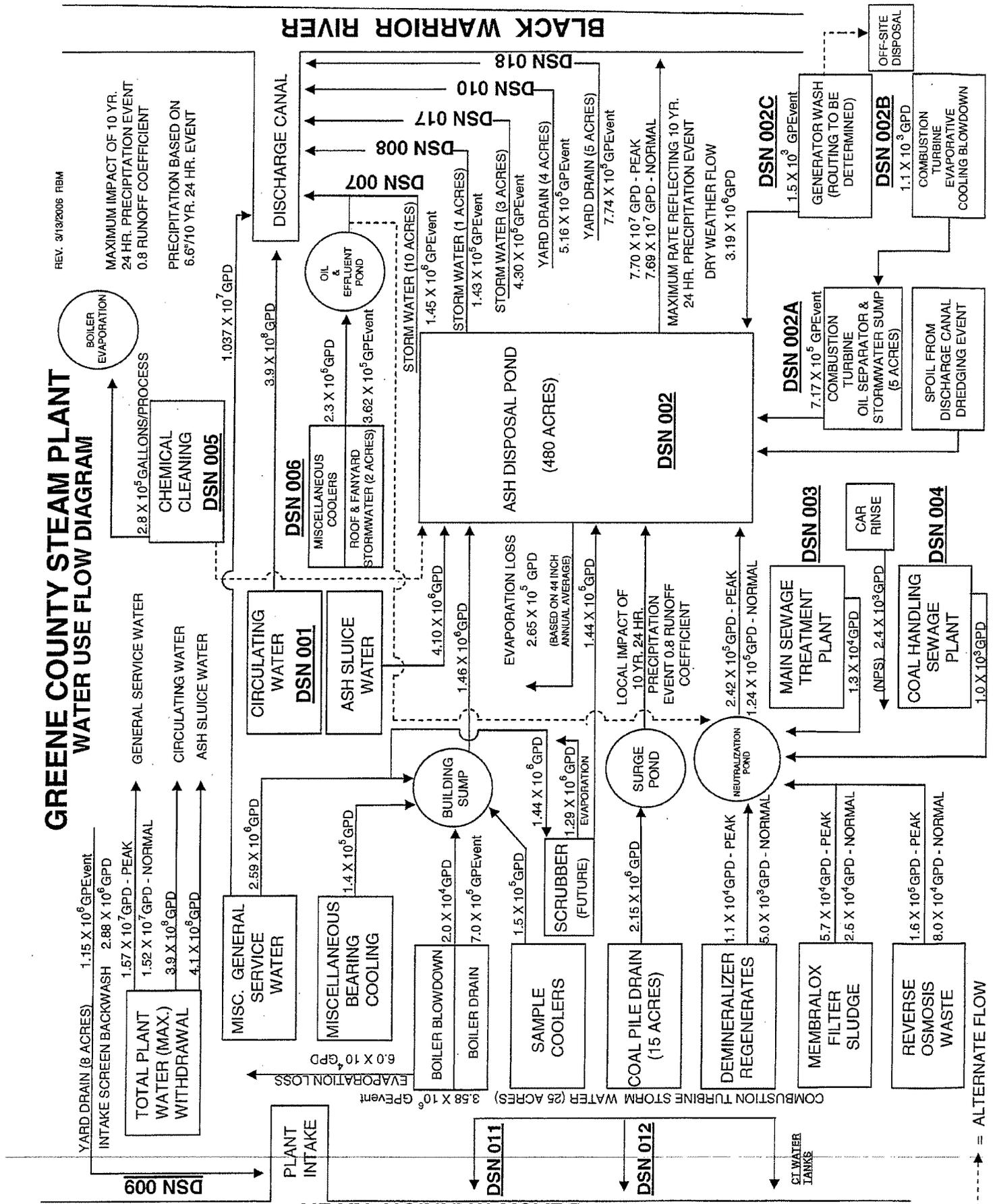
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# GREENE COUNTY STEAM PLANT WATER USE FLOW DIAGRAM

REV. 3/13/2006 RBM

MAXIMUM IMPACT OF 10 YR.  
24 HR. PRECIPITATION EVENT  
0.8 RUNOFF COEFFICIENT  
  
PRECIPITATION BASED ON  
6.6"/10 YR. 24 HR. EVENT

BLACK WARRIOR RIVER



BLACK WARRIOR RIVER

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= ALTERNATE FLOW

# Attachment D – AutoCAD Volume Computations

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**Weaver-Rivers, Veronica L.**

---

**From:** Flemming, Anna S.  
**Sent:** Wednesday, June 23, 2010 2:55 PM  
**To:** Weaver-Rivers, Veronica L.  
**Subject:** volumes

OK,  
Here goes.....

The discharge point of the pond is 385.34'

87.5' to discharge is 189,349.33 cuyd  
88' to discharge is 66,692.99 cuyd (This is the elevation the ash pond spills over into pond)  
91' -----769,236.00  
91.5-----882,222.89  
92-----1,003,908.32

Thank,

**Anna Flemming**  
**ESEE - SCS - Inverness**  
**205-992-6794**

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*"There is a theory which states that if ever anyone discovers exactly what the universe is for and why it's here, it will instantly disappear and be replaced by something even more bizzarly inexplicable." "There is another theory which states that this has already happened!"*  
*Douglas Adams' The Hitch Hiker's Guide to the Galaxy*

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6/23/2010

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Engineering and Construction Services Calculation

Calculation Number:  
TV-GC-ESC8699-001

<b>Project/Plant:</b> Plant Greene County Ash Pond	<b>Unit(s):</b> Units 1 & 2	<b>Discipline/Area:</b> ES&EE
<b>Title/Subject:</b> Slope Stability Analyses of Ash Pond		
<b>Purpose/Objective:</b> Analyze slope stability of Ash Pond		
<b>System or Equipment Tag Numbers:</b> NA	<b>Originator:</b> Jacob Jordan	

**Contents**

Topic	Page	Attachments <small>(Computer Printouts, Tech. Papers, Sketches, Correspondence)</small>	# of Pages
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Methodology	1	Slope Stability Analyses Printouts	17
Criteria & Assumptions	1		
Summary of Conclusions	4		
Design Inputs/References	4		
Section Location Drawing	6		
Body of Calculation (print outs)	7-23		
Total # of pages including cover sheet & attachments:			

**Revision Record**

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	JAJ/7-9-10	JCP/7-9-10	JCP/7-9-10

**Notes:**

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## Purpose of Calculation

The purpose of this calculation is to determine the stability of the Ash Pond dikes.

Design and construction began on the ash pond in the early 1960's. The first series of borings drilled for the ash pond were dated 1962. From the early construction to 1996, only minor modifications were made to the ash pond dikes, including raising dike elevations a few feet in select areas and improving the access road along the dike crest.

In 1996, the dike was modified to its current geometry and elevation, with the exception of the dike adjacent to the barge canal. Erosion of the barge canal led to a 2009 study that addressed potential modifications to that section of the dike, and the decision was made to widen the dike by adding to the inboard section. The work was conducted during 2009 and 2010. The material used to add to the dike was borrowed from an area near the pool at the south end of the pond. The resultant dike between the borrow area and the pool was breached in June 2010 to expand the pool.

## Methodology

The calculation was performed using the following methods and software:

GeoStudio 2007 (Version 7.16, Build 4840), Copyright 1991-2008, GEO-SLOPE International, Ltd. Bishop, Ordinary, Janbu, and Morgenstern-Price analytical methods were run. Morgenstern-Price was reported.

## Criteria and Assumptions

The slope stability models were run using the following assumptions and design criteria:

- According to the USGS earthquake acceleration probability maps for the vicinity of Plant Greene County, the ground motion having a 2% probability of exceedance in 50 years is 0.10g.
- The current required minimum criteria (factors of safety) were taken from US Corps of Engineers Manual EM 1110-2-1902, October 2003.
- The soil properties of unit weight, phi angle, and cohesion were obtained from historical laboratory test results, including triaxial shear testing performed on UD samples and standard Proctor tests of bulk samples from borrow areas.
- Soil stratigraphy and piezometric data was estimated from the historical boring logs.

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The following soil properties were used in the analyses:

Soil Description	Moist Unit Weight, pcf	c', psf*	$\Phi'$ , degrees*
Dike Fill	113	0 (200)	32 (28)
2009 Dike Fill	115	0	30
Soft Organics and Silty Clay	90	300(500)	0(0)
Silty Clay	105	0(500)	28(20)
Chalk	Impenetrable Bedrock		
Fine Sand and Silty Sand	115	0	35
Fly Ash	80	0	28

\*Total strength parameters in parentheses where applicable

### Summary of Conclusions

The following table lists the factors of safety for various slope stability failure conditions at four locations along the dike. Alabama does not currently have standards for dam safety, so the minimum factors of safety were taken from US Corps of Engineers Manual EM 1110-2-1902, October 2003. All conditions are steady state except where noted. Construction cases were not considered. Based on the results of these analyses all structures are stable.

Failure Condition	Computed Factor of Safety	Typical Minimum Factor of Safety
<b>Section A-A'</b>		
Downstream Steady State	1.7	1.5
Downstream Seismic	1.4	1.1
Upstream Steady State	1.8	1.5
Upstream Seismic	1.4	1.1
<b>Section B-B'</b>		
Downstream Steady State	1.4	1.5
Downstream Seismic	1.1	1.1
Upstream Steady State	1.7	1.5
Upstream Seismic	1.2	1.1
Upstream Rapid Drawdown	1.1	1.3
<b>Section C-C'</b>		
Downstream Steady State	1.5	1.5
Downstream Seismic	1.1	1.1
Upstream Steady State	2.8	1.5
Upstream Seismic	2.1	1.1
<b>Section D-D'</b>		

Downstream Steady State	1.6	1.5
Downstream Seismic	1.8	1.1
Upstream Steady State	3.7	1.5
Upstream Seismic	2.6	1.1

### Design Inputs/References

USGS Earthquake Hazards website, <http://www.usgs.gov/hazards/earthquakes/>.  
Greene County Steam Plant Historical Files, Southern Company and/or Alabama Power.  
US Corps of Engineers Manual EM 1110-2-1902, October 2003

### Body of Calculation

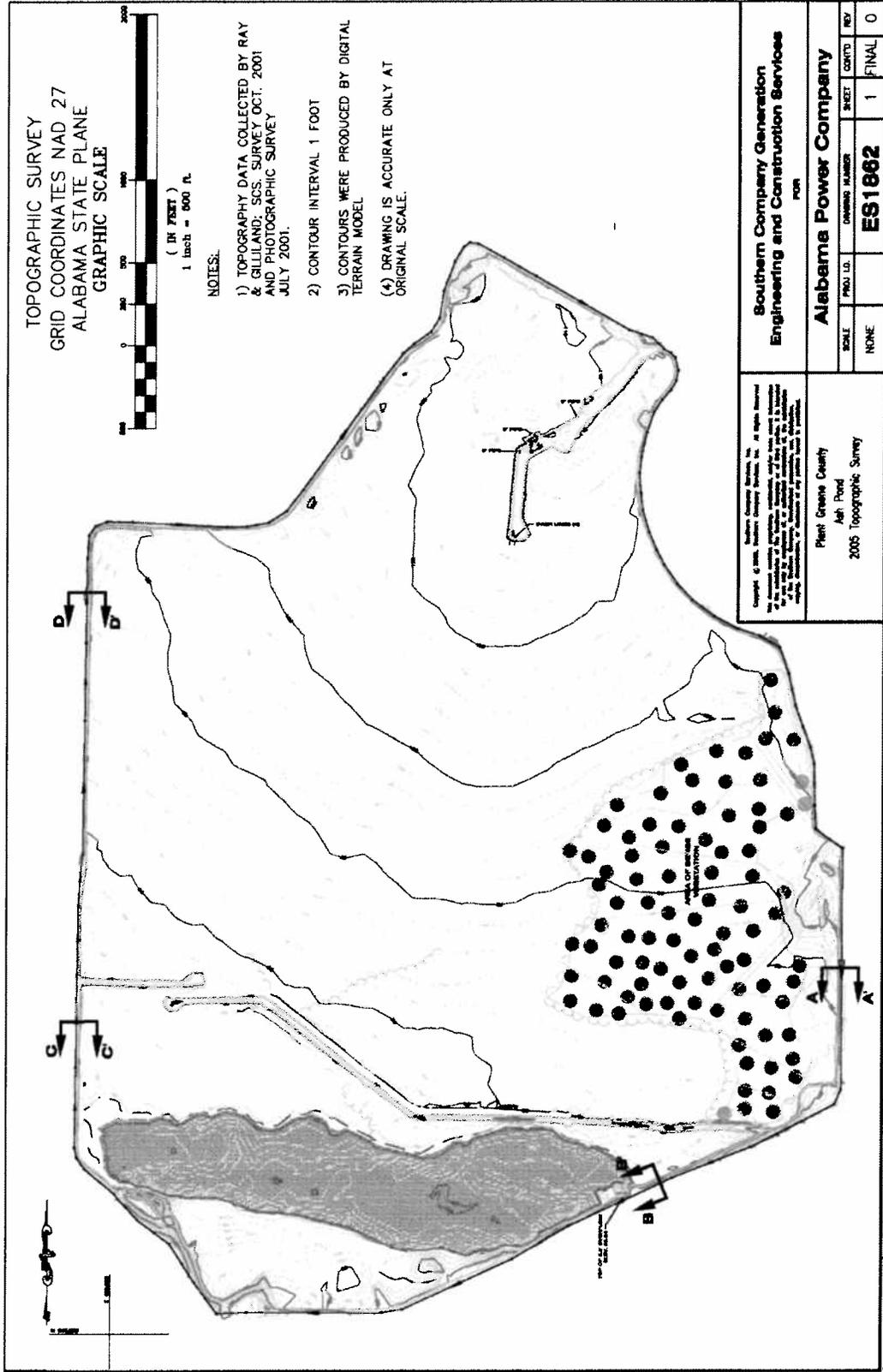
Calculation consists of Slope-W modeling attached.

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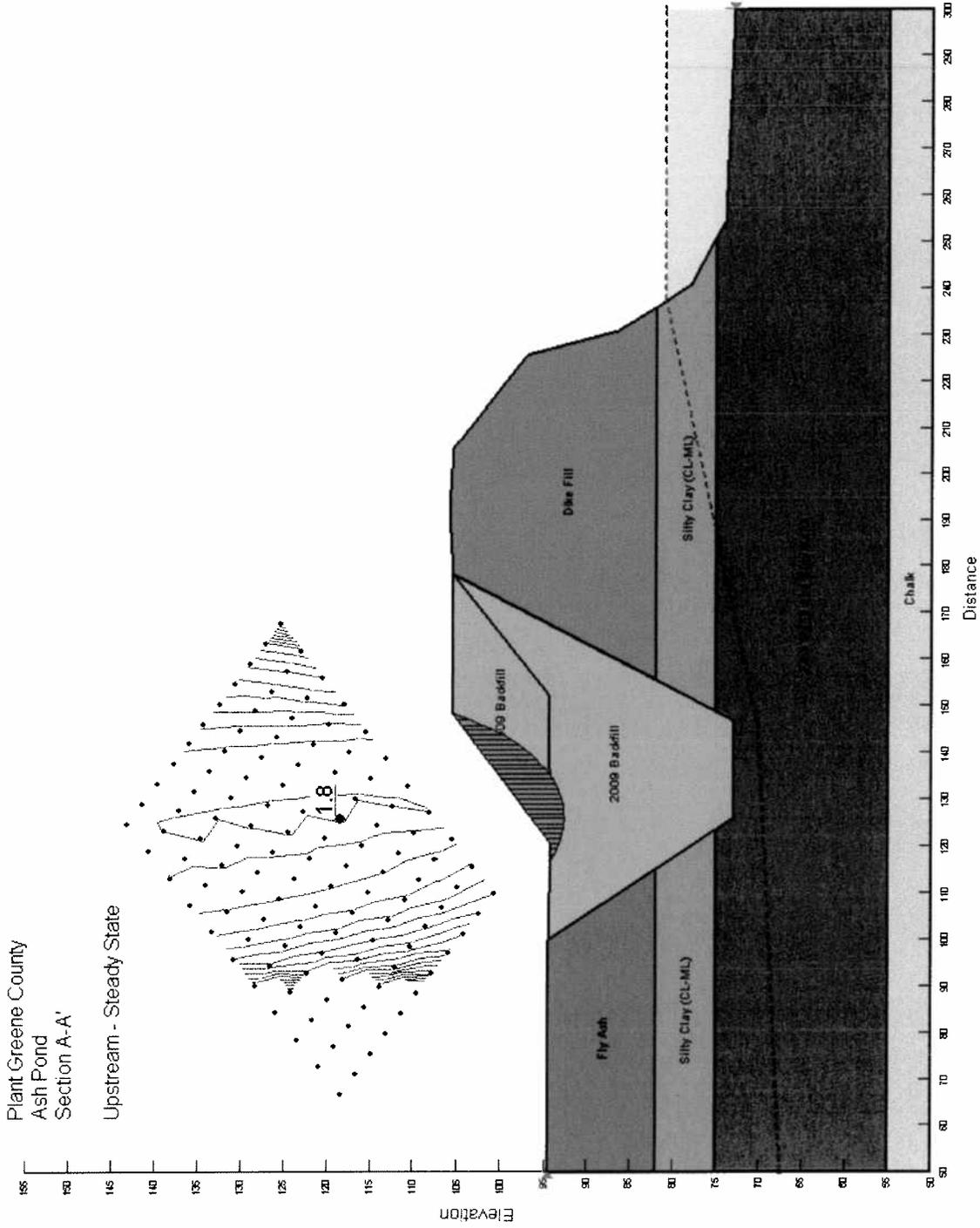
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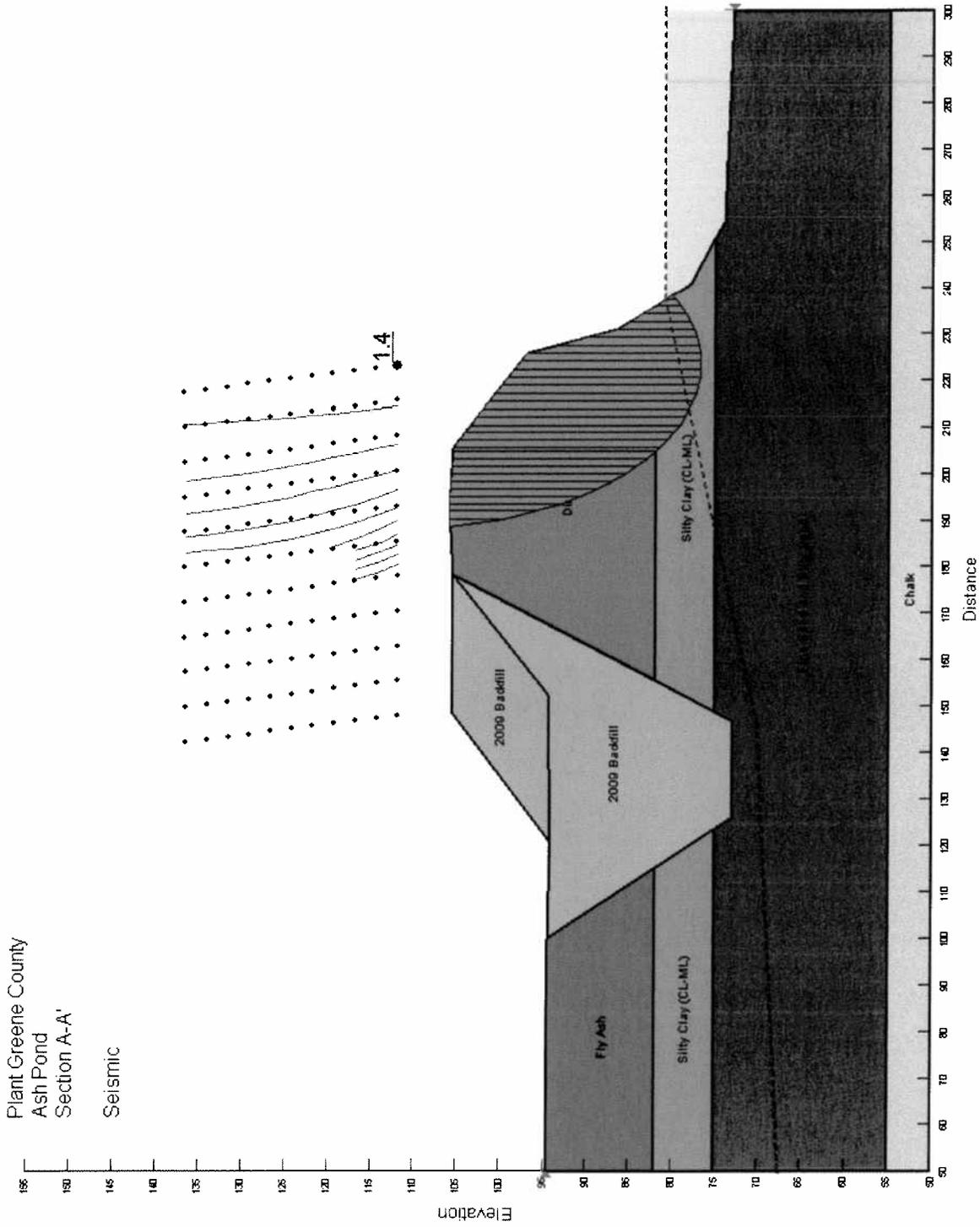
Section Location Drawing



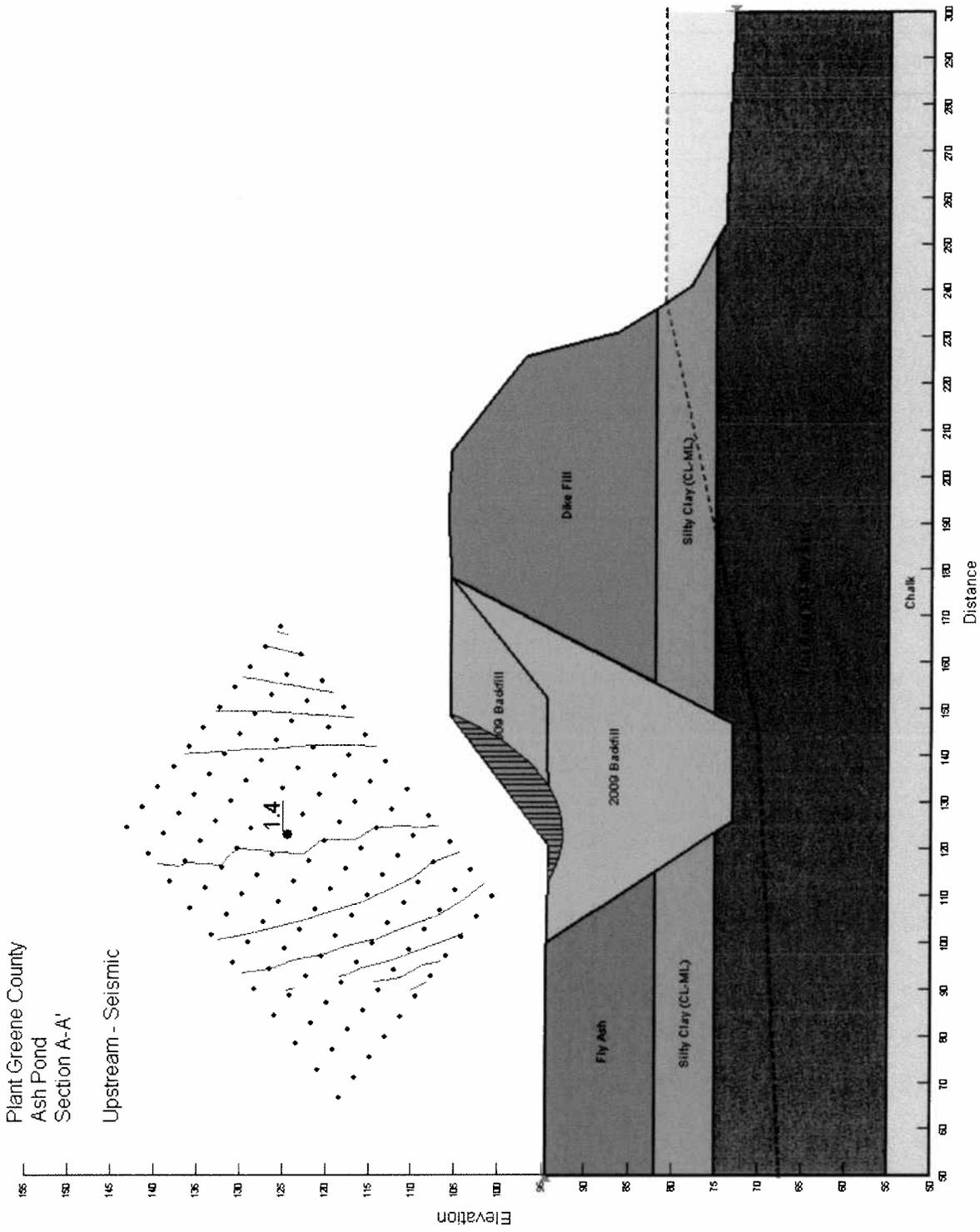
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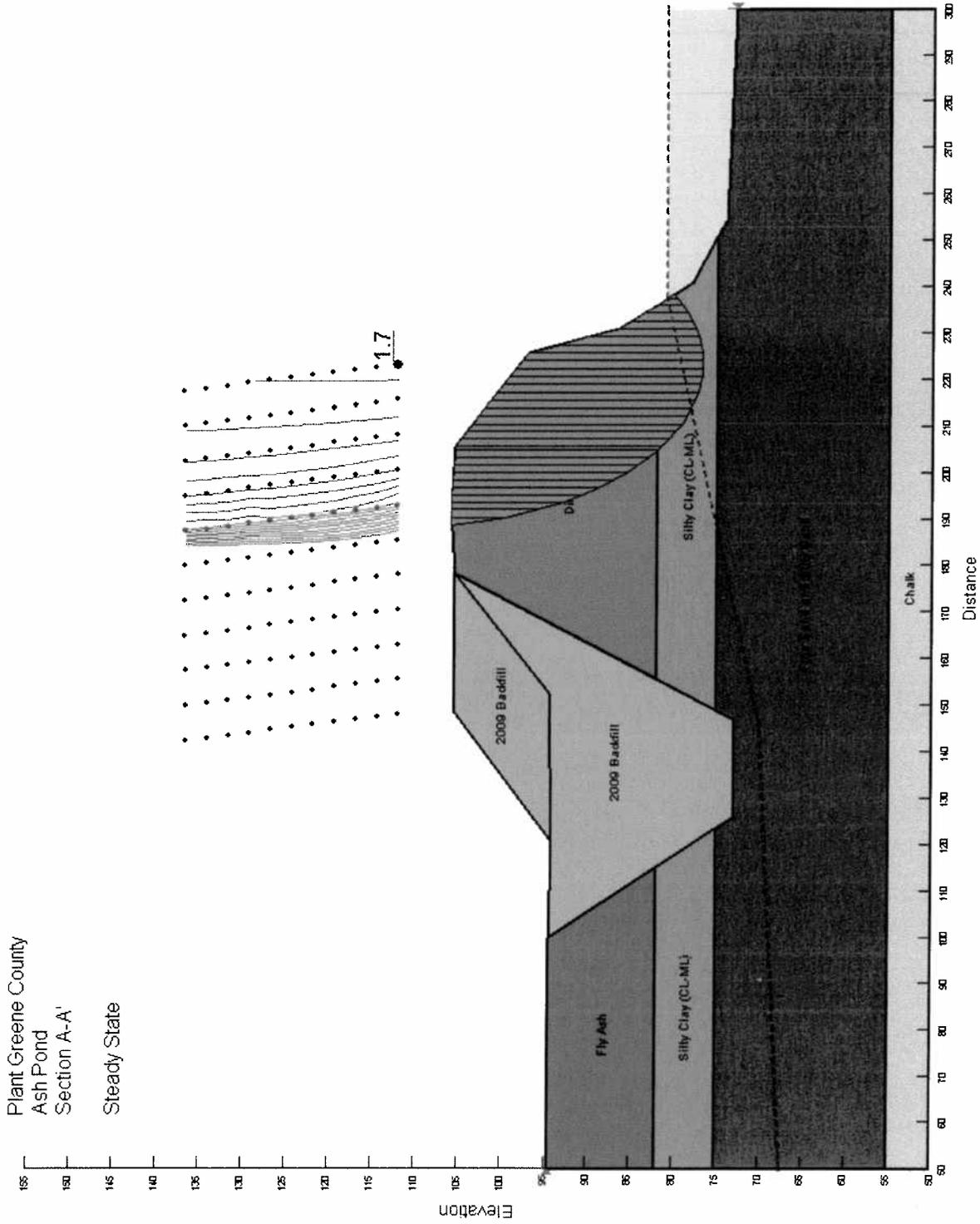


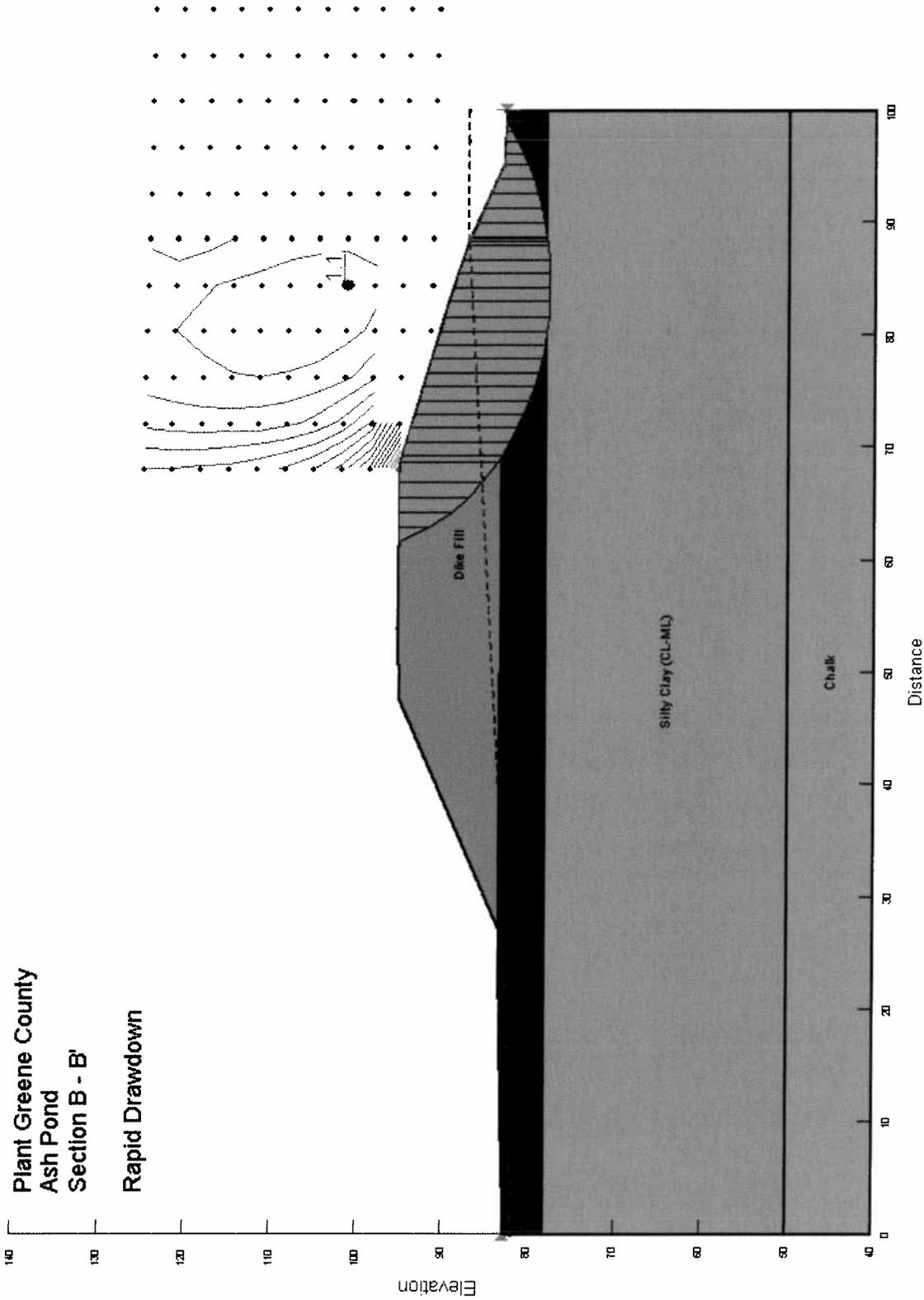
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Plant Greene County  
Ash Pond  
Section A-A'  
Upstream - Seismic

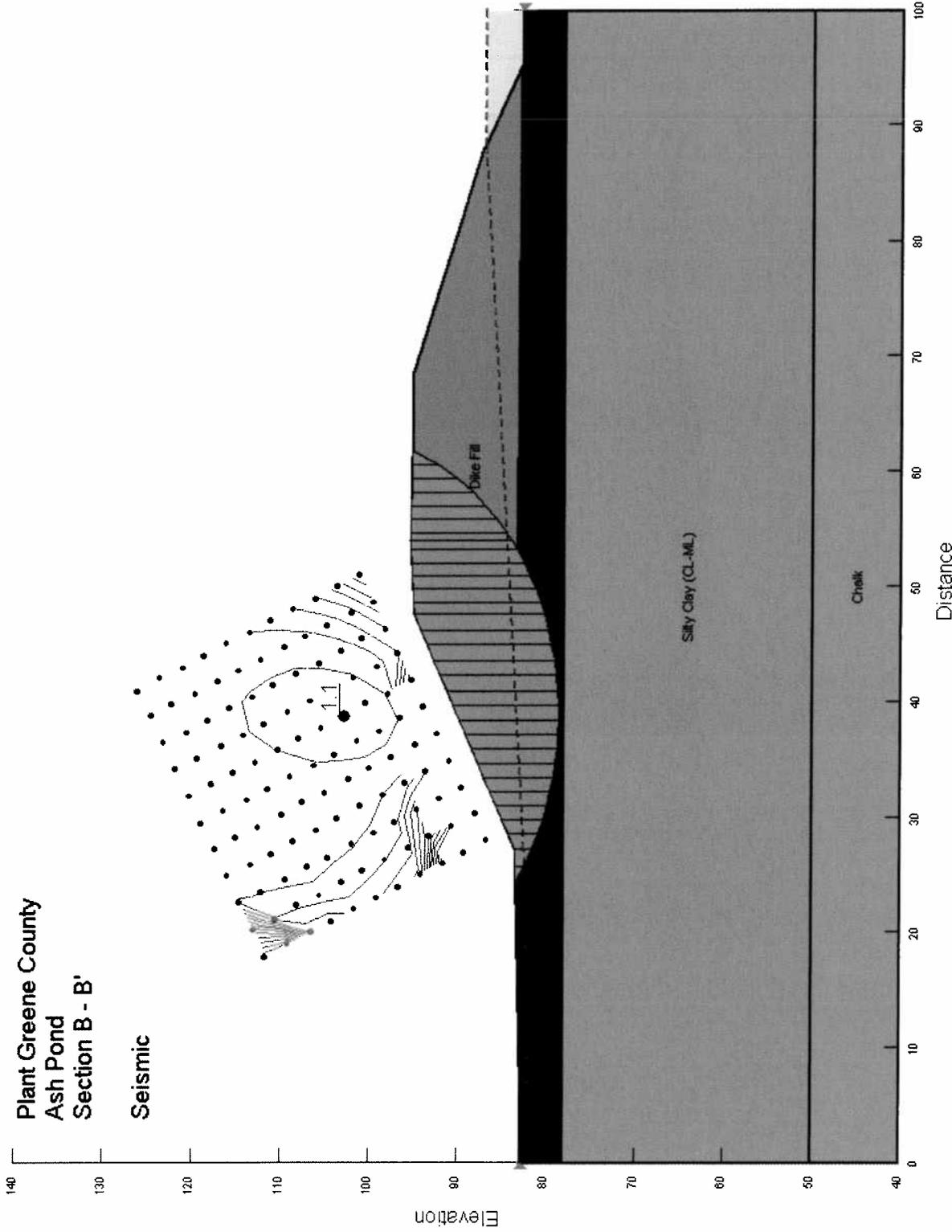
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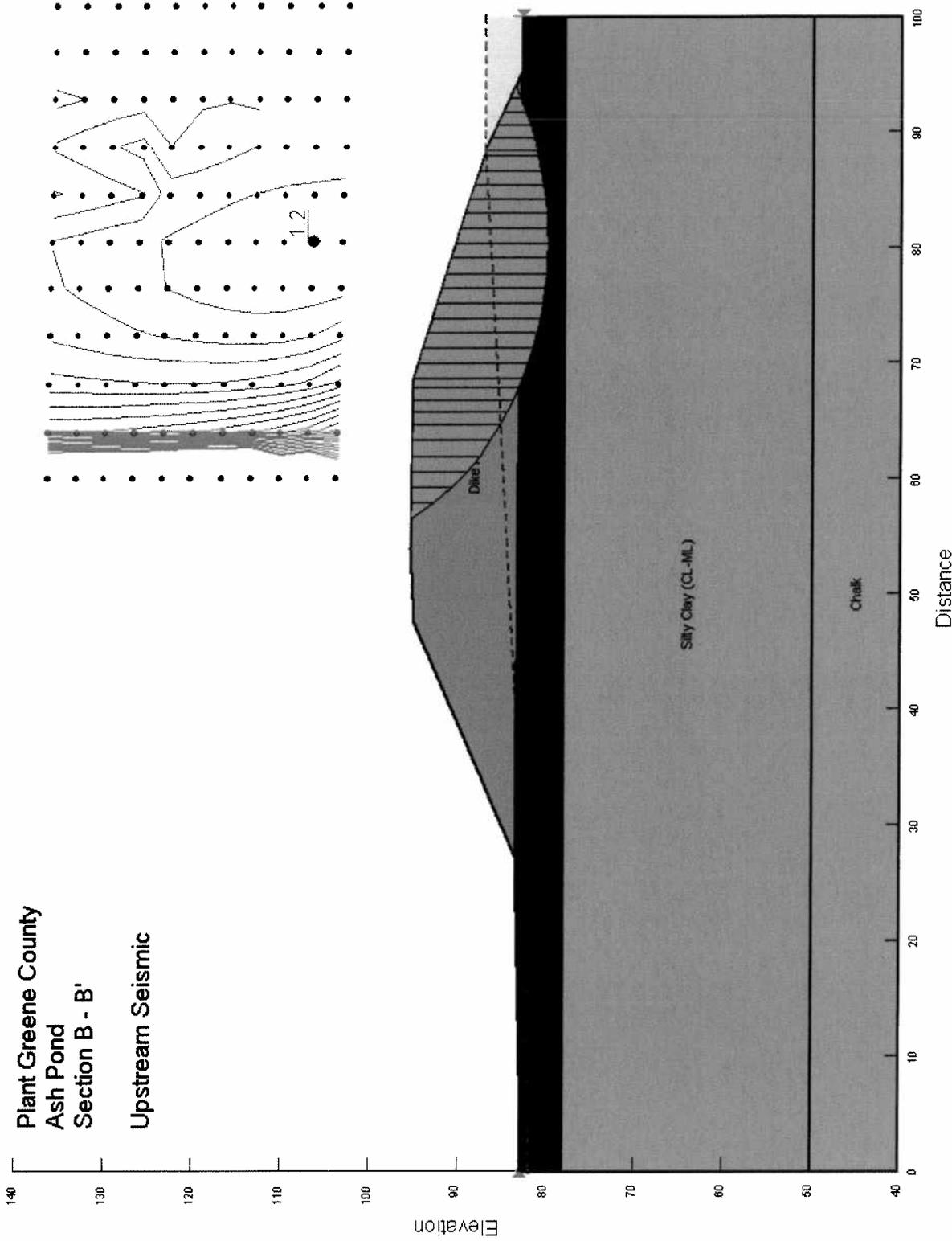
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Ash Pond  
Section B - B'  
Rapid Drawdown

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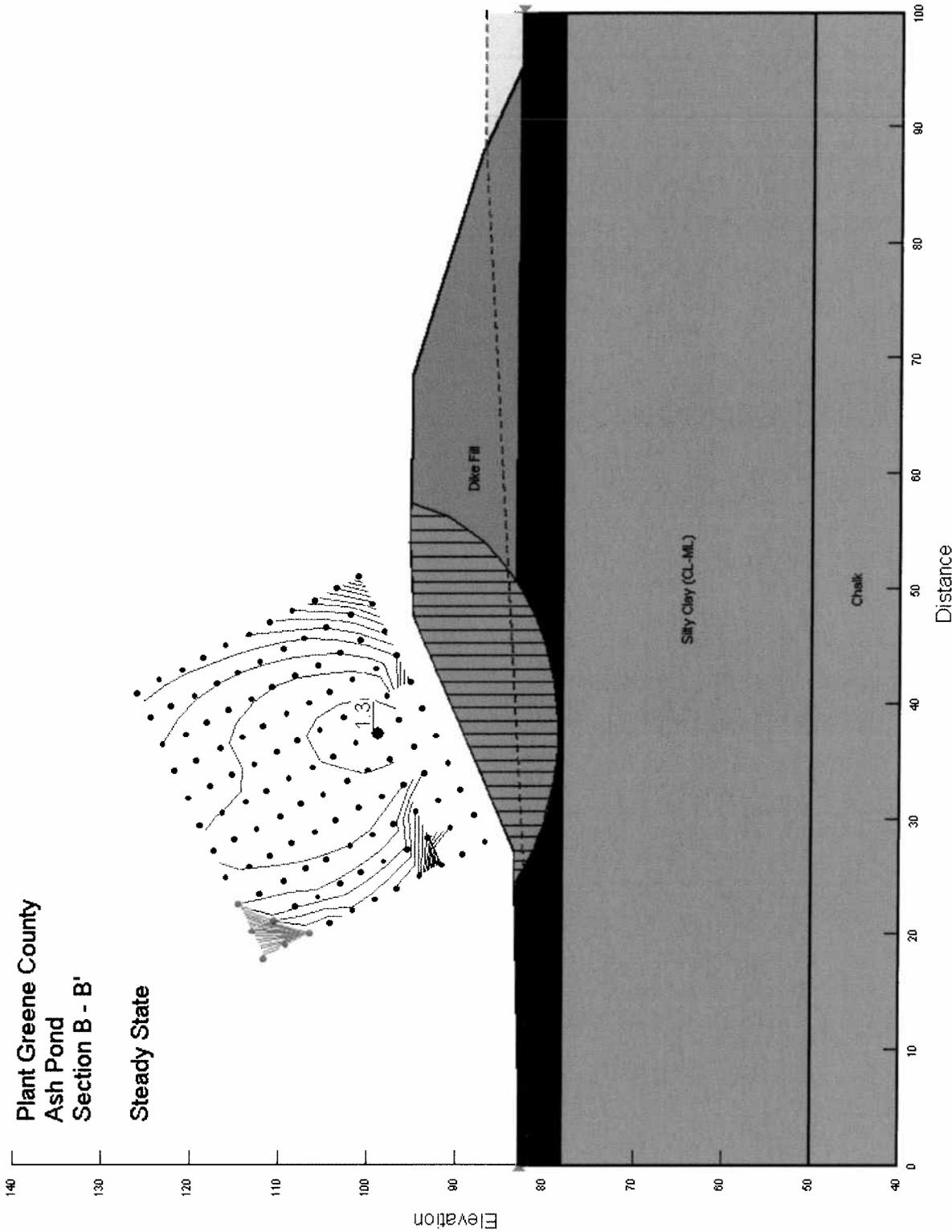


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CONFIDENTIAL BUSINESS

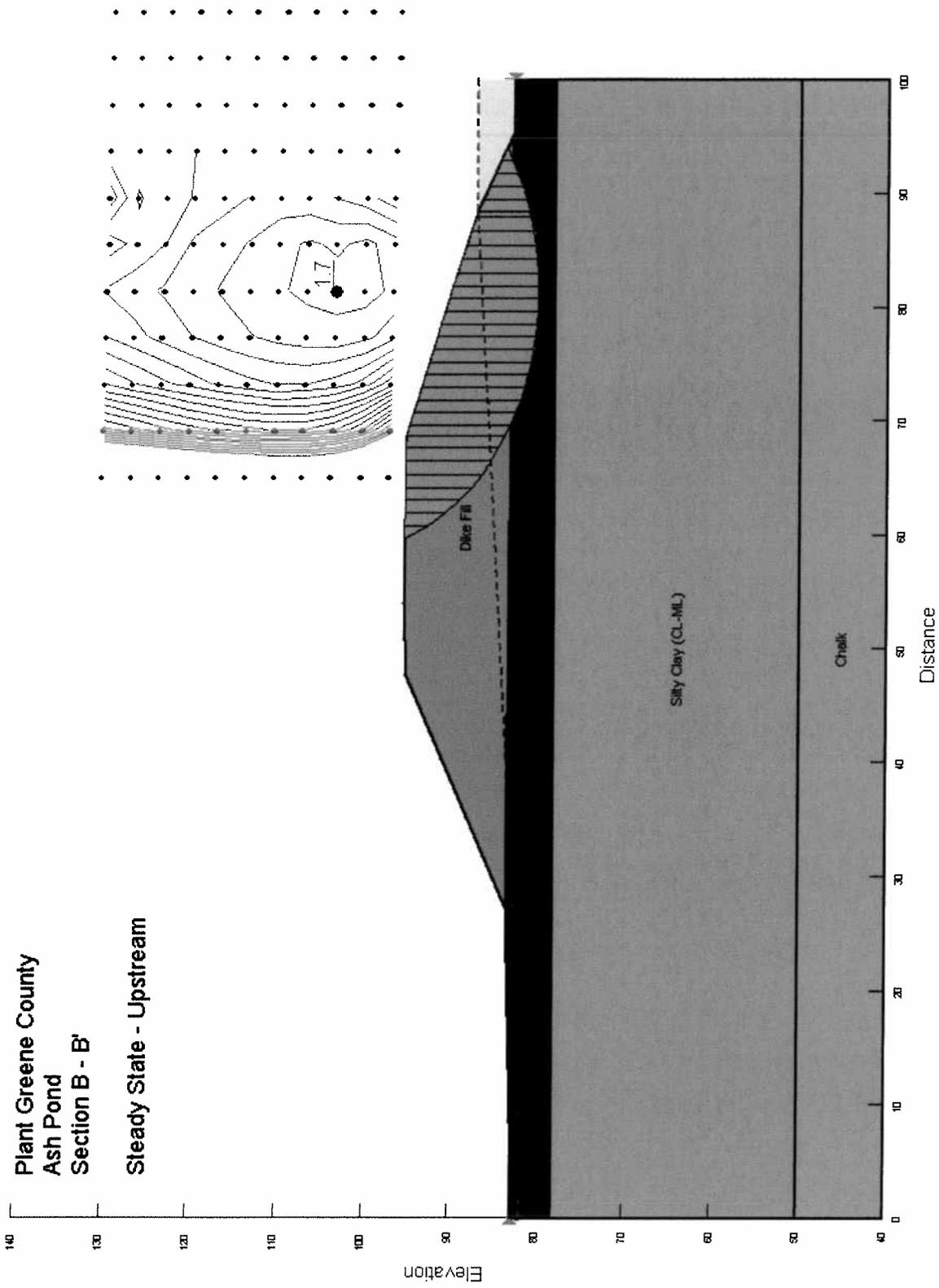


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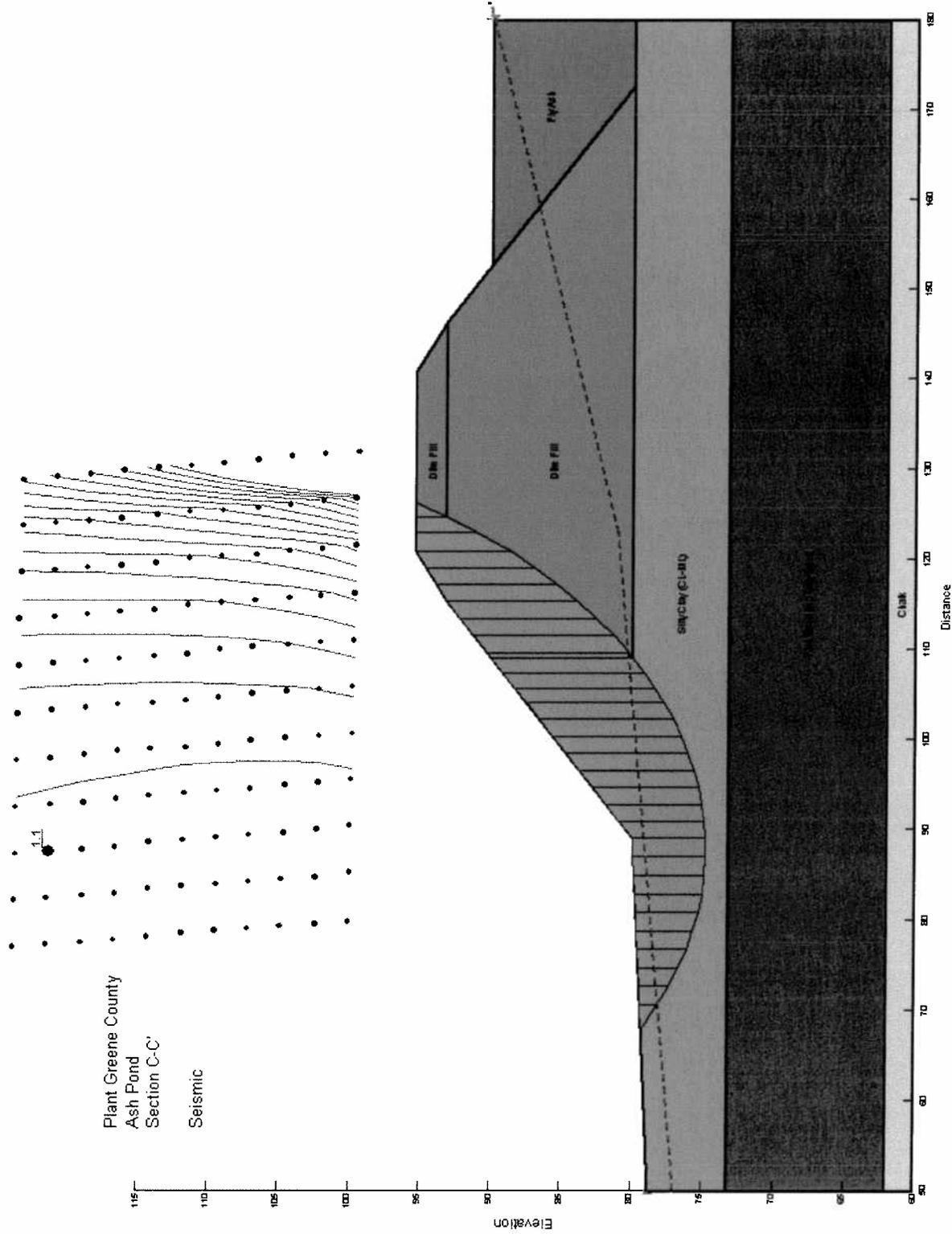


Plant Greene County  
Ash Pond  
Section B - B'  
Steady State

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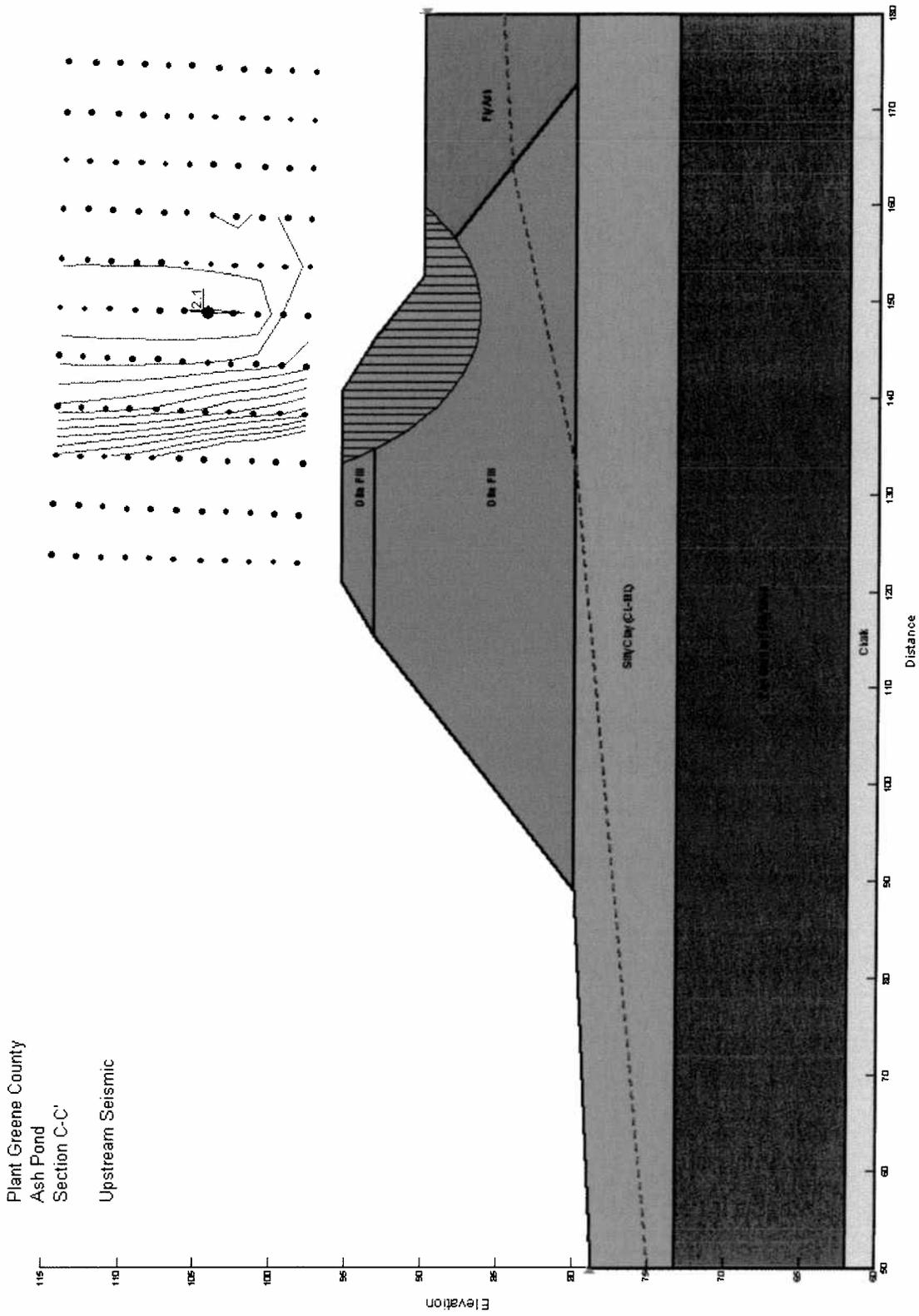


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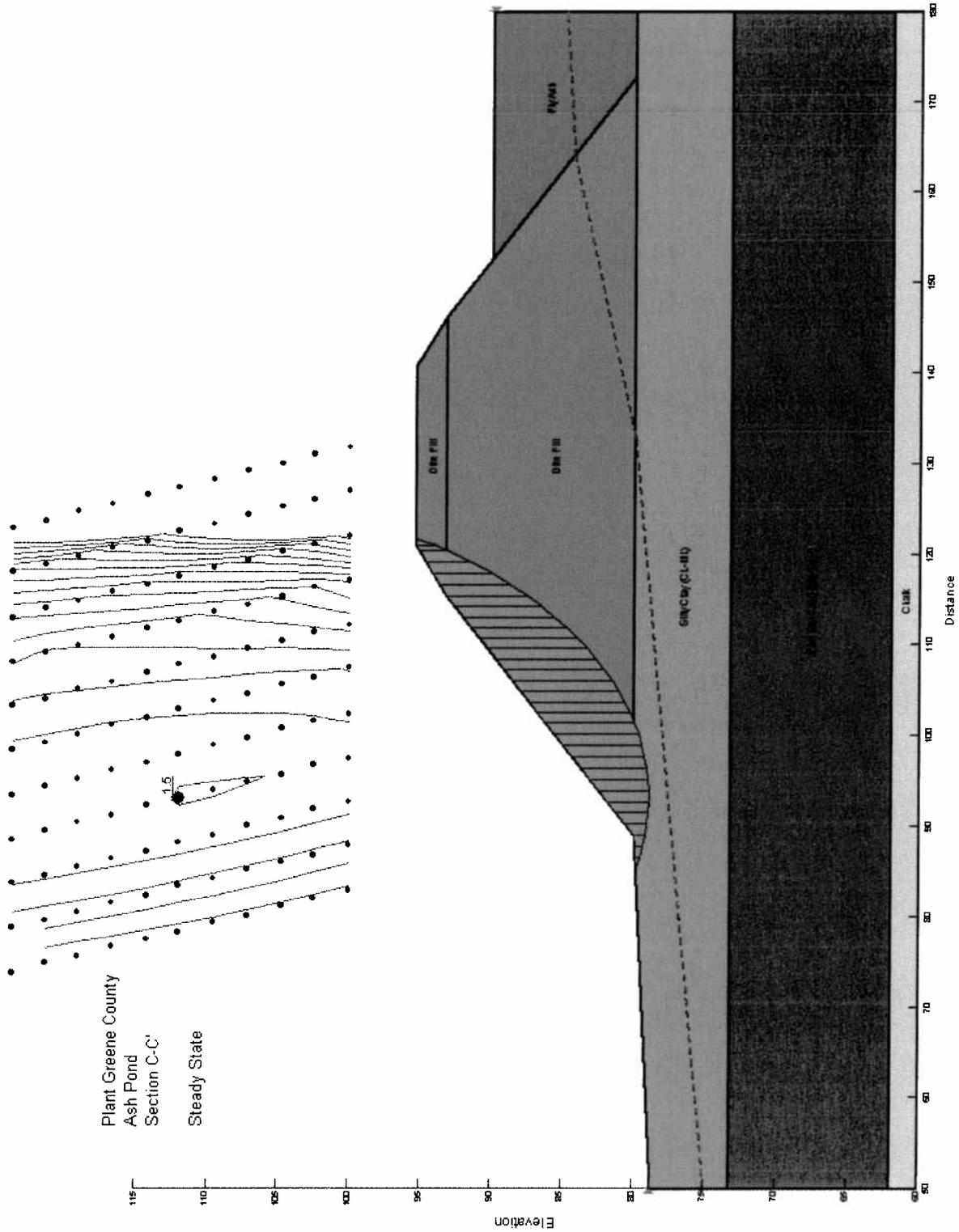


Plant Greene County  
Ash Pond  
Section C-C'  
Seismic

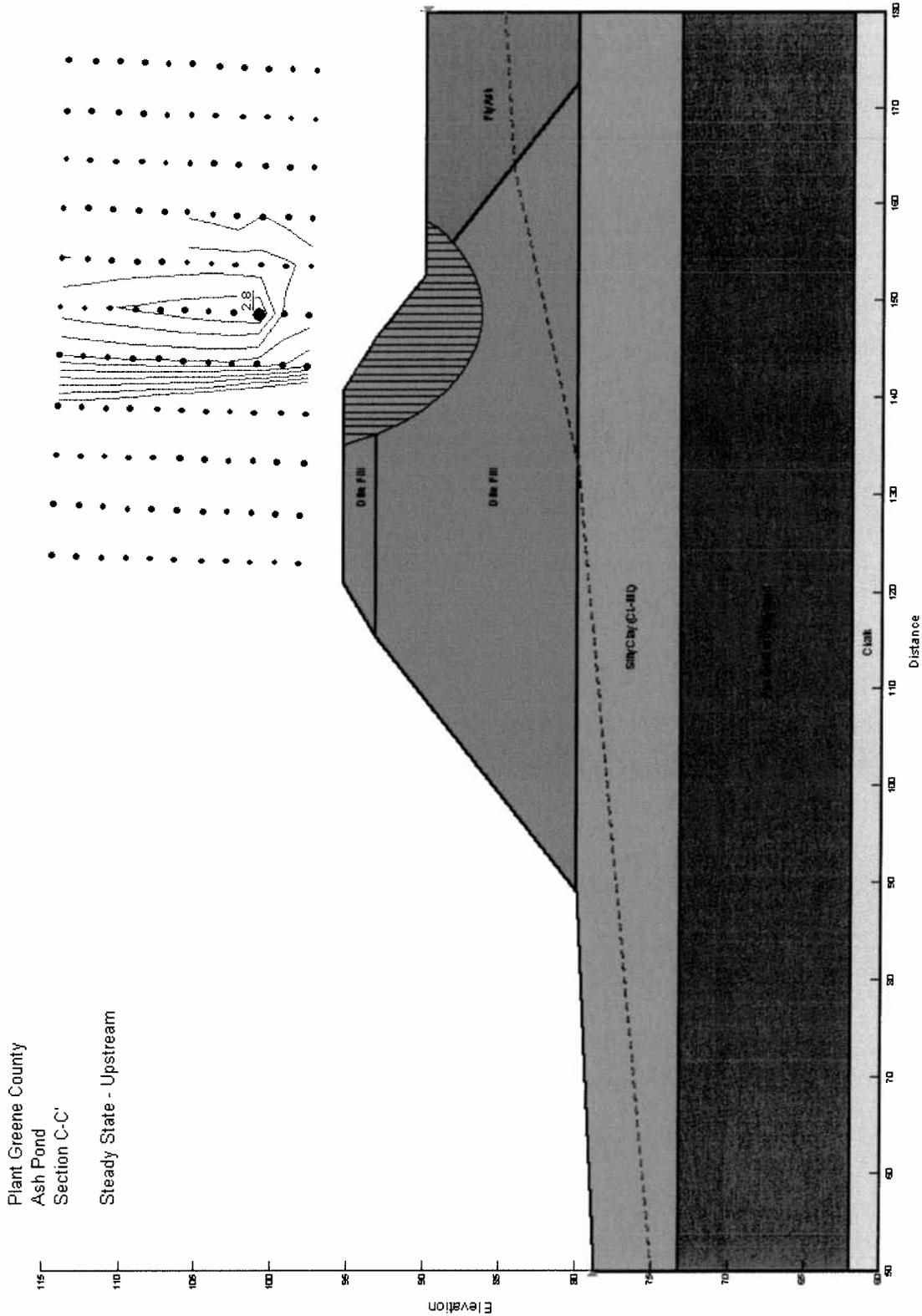
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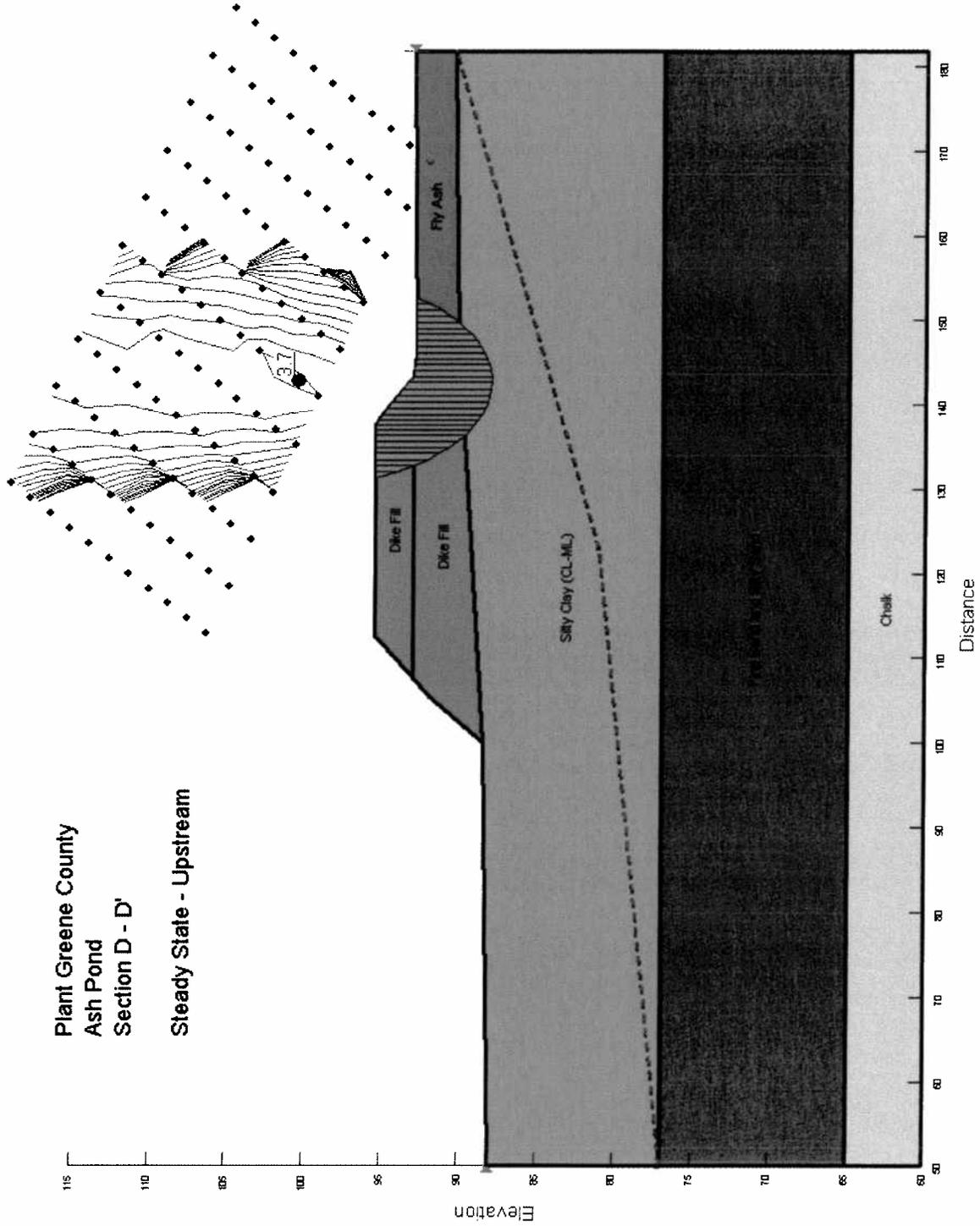
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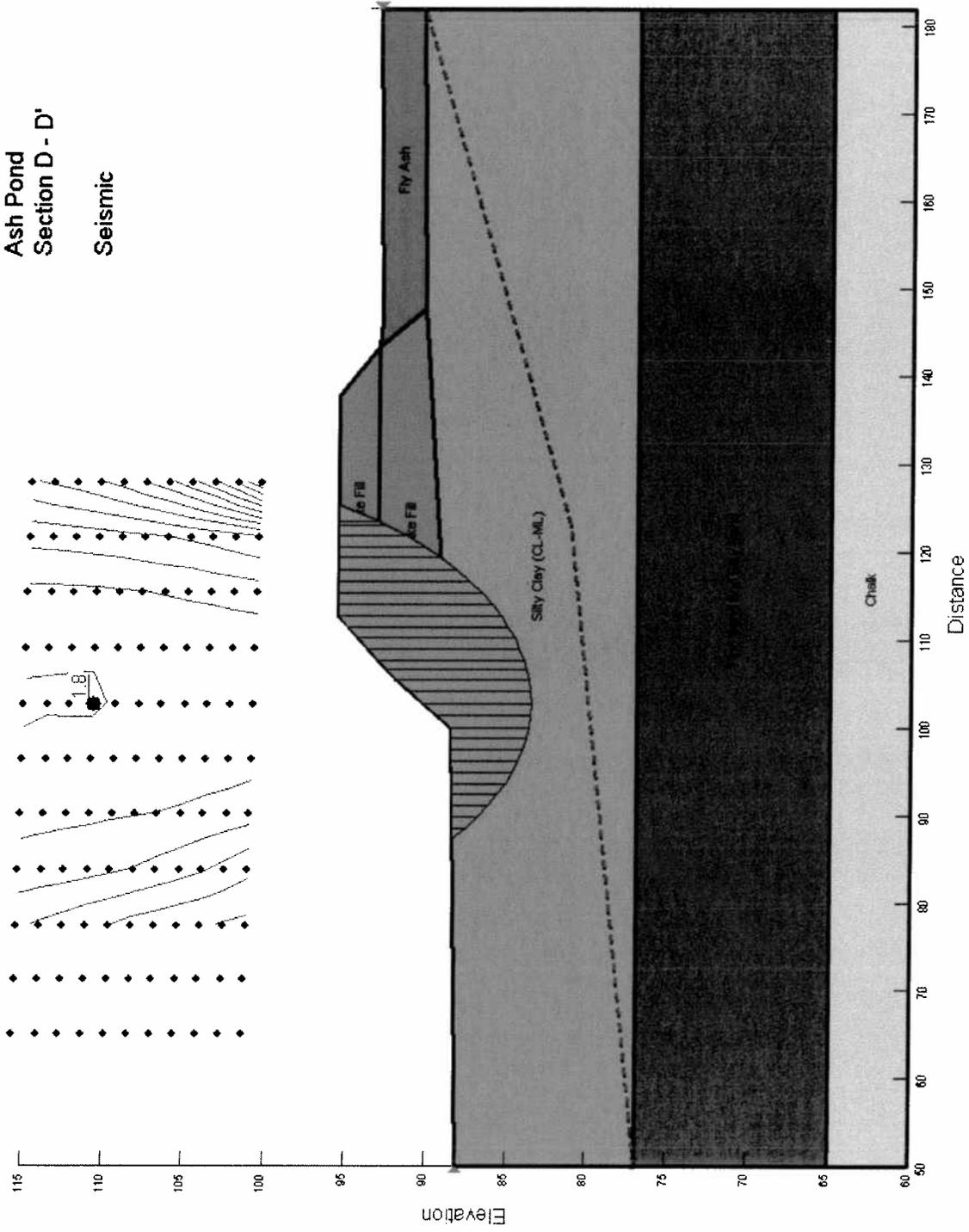
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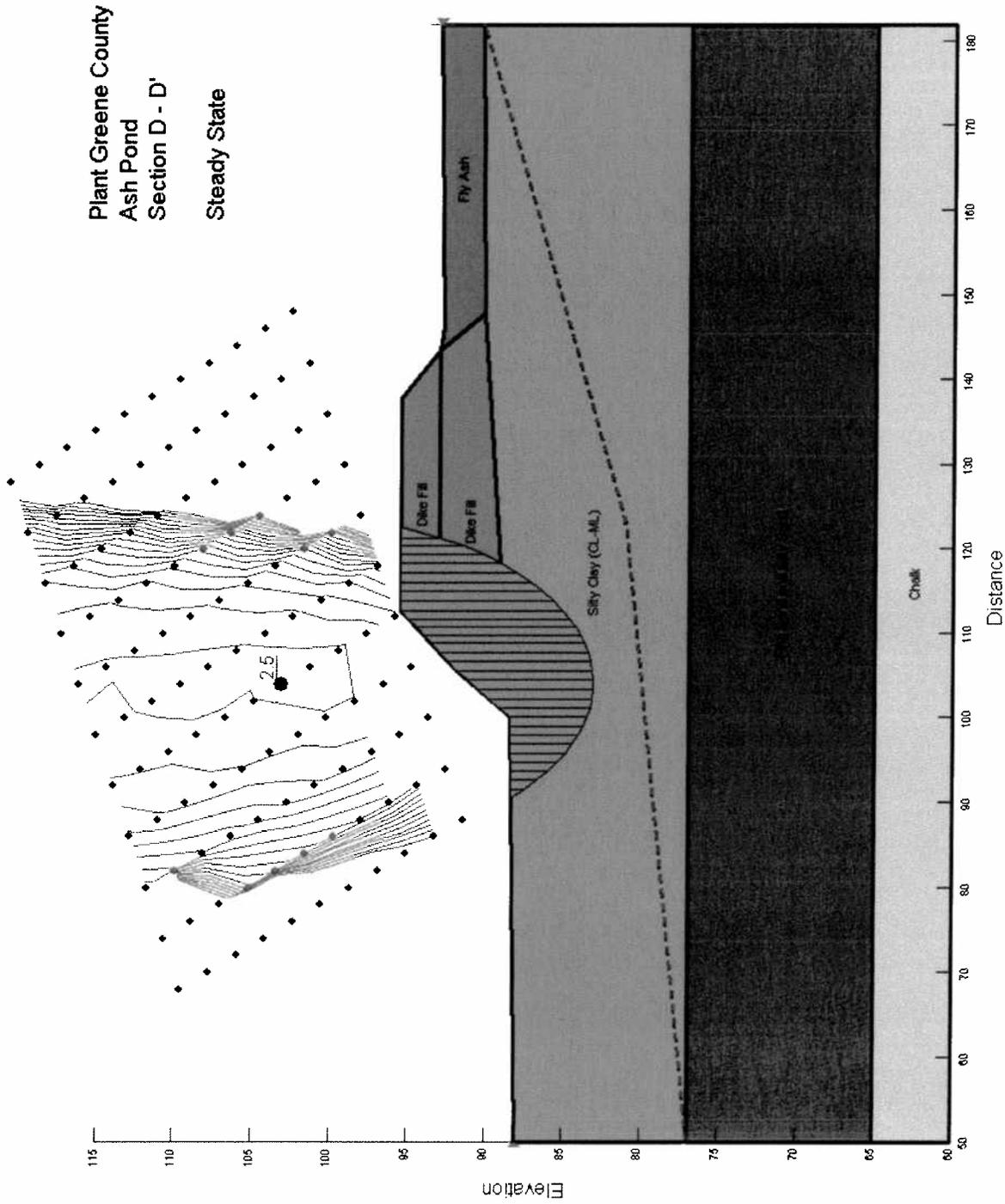
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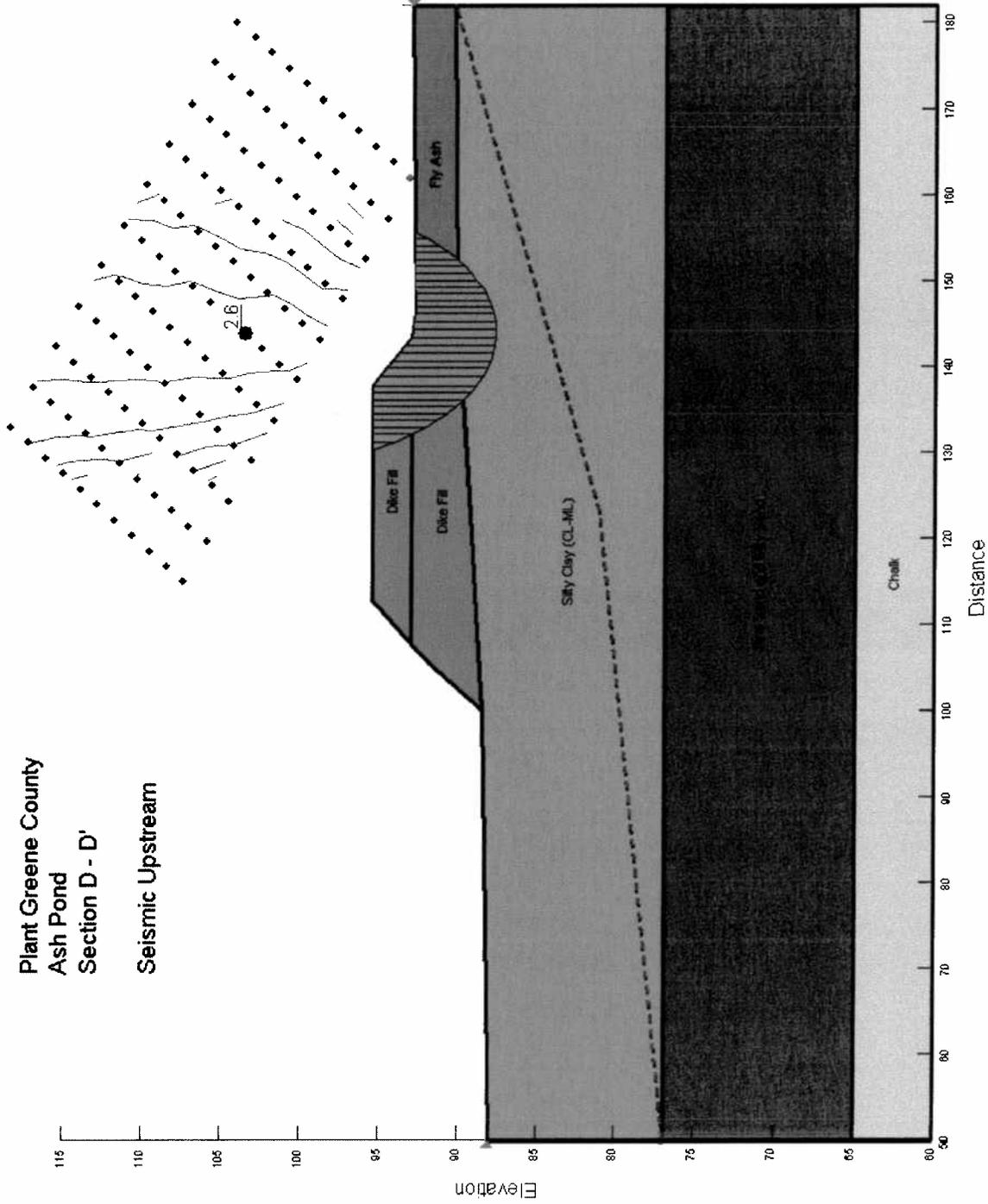
Plant Greene County  
Ash Pond  
Section D - D'  
Seismic



CONFIDENTIAL



Plant Greene County  
Ash Pond  
Section D - D'  
Seismic Upstream



CONFIDENTIAL



Engineering and Construction Services Calculation

Calculation Number:  
TV-GC-ESC8699-001

<b>Project/Plant:</b> Plant Greene County Ash Pond	<b>Unit(s):</b> Units 1 & 2	<b>Discipline/Area:</b> ES&EE
<b>Title/Subject:</b> Slope Stability Analyses of Ash Pond		
<b>Purpose/Objective:</b> Analyze slope stability of Ash Pond		
<b>System or Equipment Tag Numbers:</b> NA	<b>Originator:</b> Jacob Jordan	

Contents

Topic	Page	Attachments (Computer Printouts, Tech. Papers, Sketches, Correspondence)	# of Pages
Purpose of Calculation	1	Section Location Drawing	1
Methodology	1	Slope Stability Analyses Printouts	17
Criteria & Assumptions	1		
Summary of Conclusions	4		
Design Inputs/References	4		
Section Location Drawing	6		
Body of Calculation (print outs)	7-23		
Total # of pages including cover sheet & attachments:			

Revision Record

Rev. No.	Description	Originator Initial / Date	Reviewer Initial / Date	Approver Initial / Date
0	Issued for Information	JAJ/7-9-10	JCP/7-9-10	JCP/7-9-10
1	Summary of Conclusions Revisions	JAJ/7-15-10	JCP/7-15-10	JCP/7-15-10

Notes:

*This correspondence/communication was prepared at the direction of legal counsel, and is privileged, protected and confidential under attorney work product doctrine.*

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GC-API-0018

## Purpose of Calculation

The purpose of this calculation is to determine the stability of the Ash Pond dikes.

Design and construction began on the ash pond in the early 1960's. The first series of borings drilled for the ash pond were dated 1962. From the early construction to 1996, only minor modifications were made to the ash pond dikes, including raising dike elevations a few feet in select areas and improving the access road along the dike crest.

In 1996, the dike was modified to its current geometry and elevation, with the exception of the dike adjacent to the barge canal. Erosion of the barge canal led to a 2009 study that addressed potential modifications to that section of the dike, and the decision was made to widen the dike by adding to the inboard section. The work was conducted during 2009 and 2010. The material used to add to the dike was borrowed from an area near the pool at the south end of the pond. The resultant dike between the borrow area and the pool was breached in June 2010 to expand the pool.

## Methodology

The calculation was performed using the following methods and software:

GeoStudio 2007 (Version 7.16, Build 4840), Copyright 1991-2008, GEO-SLOPE International, Ltd. Bishop, Ordinary, Janbu, and Morgenstern-Price analytical methods were run. Morgenstern-Price was reported.

## Criteria and Assumptions

The slope stability models were run using the following assumptions and design criteria:

- According to the USGS earthquake acceleration probability maps for the vicinity of Plant Greene County, the ground motion having a 2% probability of exceedance in 50 years is 0.10g.
- The current required minimum criteria (factors of safety) were taken from US Corps of Engineers Manual EM 1110-2-1902, October 2003.
- The soil properties of unit weight, phi angle, and cohesion were obtained from historical laboratory test results, including triaxial shear testing performed on UD samples and standard Proctor tests of bulk samples from borrow areas.
- Soil stratigraphy and piezometric data was estimated from the historical boring logs.

The following soil properties were used in the analyses:

Soil Description	Moist Unit Weight, pcf	c', psf*	$\Phi'$ , degrees*
Dike Fill	113	0 (200)	32 (28)
2009 Dike Fill	115	0	30
Soft Organics and Silty Clay	90	300(500)	0(0)
Silty Clay	105	0(500)	28(20)
Chalk	Impenetrable Bedrock		
Fine Sand and Silty Sand	115	0	35
Fly Ash	80	0	28

\*Total strength parameters in parentheses where applicable

### Summary of Conclusions

The following table lists the factors of safety for various slope stability failure conditions at four locations along the dike. Alabama does not currently have standards for dam safety, so the minimum factors of safety were taken from US Corps of Engineers Manual EM 1110-2-1902, October 2003. All conditions are steady state except where noted. Construction cases were not considered. Based on the results of these analyses, typical minimum factors of safety were achieved in most instances.

The one exception is the Upstream Rapid Drawdown case for Section B-B'. As can be seen in the table that follows, the computed factor of safety of 1.1 is less than the typical minimum factor of safety of 1.3. However, given the operational characteristics of the Greene County Ash Pond, we offer the following comments:

1. The operational characteristics of the facility does not lend itself to a rapid drawdown condition. The referenced section is near the discharge structure, downstream of the diversion dike that currently retains most of the ash, and the loading of this embankment section is primarily water that is about to discharge the facility. The discharge structure is generally an overflow weir, and the water level in this part of the pond is generally not subject to lowering.
2. The analysis does not indicate a rapid drawdown failure surface would result in an immediate breach of the embankment. Furthermore, due to the location of this section of the embankment, the probability of ash excursion due to a breach is considered low.
3. While the computed factor of safety is below the referenced typical minimum factor of 1.3, it is sufficiently high to indicate failure would not be imminent, and given the considerations outlined in (1) and (2) above, the probability of catastrophic failure is low.

Failure Condition	Computed Factor of Safety	Typical Minimum Factor of Safety
<b>Section A-A'</b>		
Downstream Steady State	1.7	1.5
Downstream Seismic	1.4	1.1
Upstream Steady State	1.8	1.5
Upstream Seismic	1.4	1.1
<b>Section B-B'</b>		
Downstream Steady State	1.4	1.5
Downstream Seismic	1.1	1.1
Upstream Steady State	1.7	1.5
Upstream Seismic	1.2	1.1
Upstream Rapid Drawdown	1.1	1.3
<b>Section C-C'</b>		
Downstream Steady State	1.5	1.5
Downstream Seismic	1.1	1.1
Upstream Steady State	2.8	1.5
Upstream Seismic	2.1	1.1
<b>Section D-D'</b>		
Downstream Steady State	1.6	1.5
Downstream Seismic	1.8	1.1
Upstream Steady State	3.7	1.5
Upstream Seismic	2.6	1.1

### Design Inputs/References

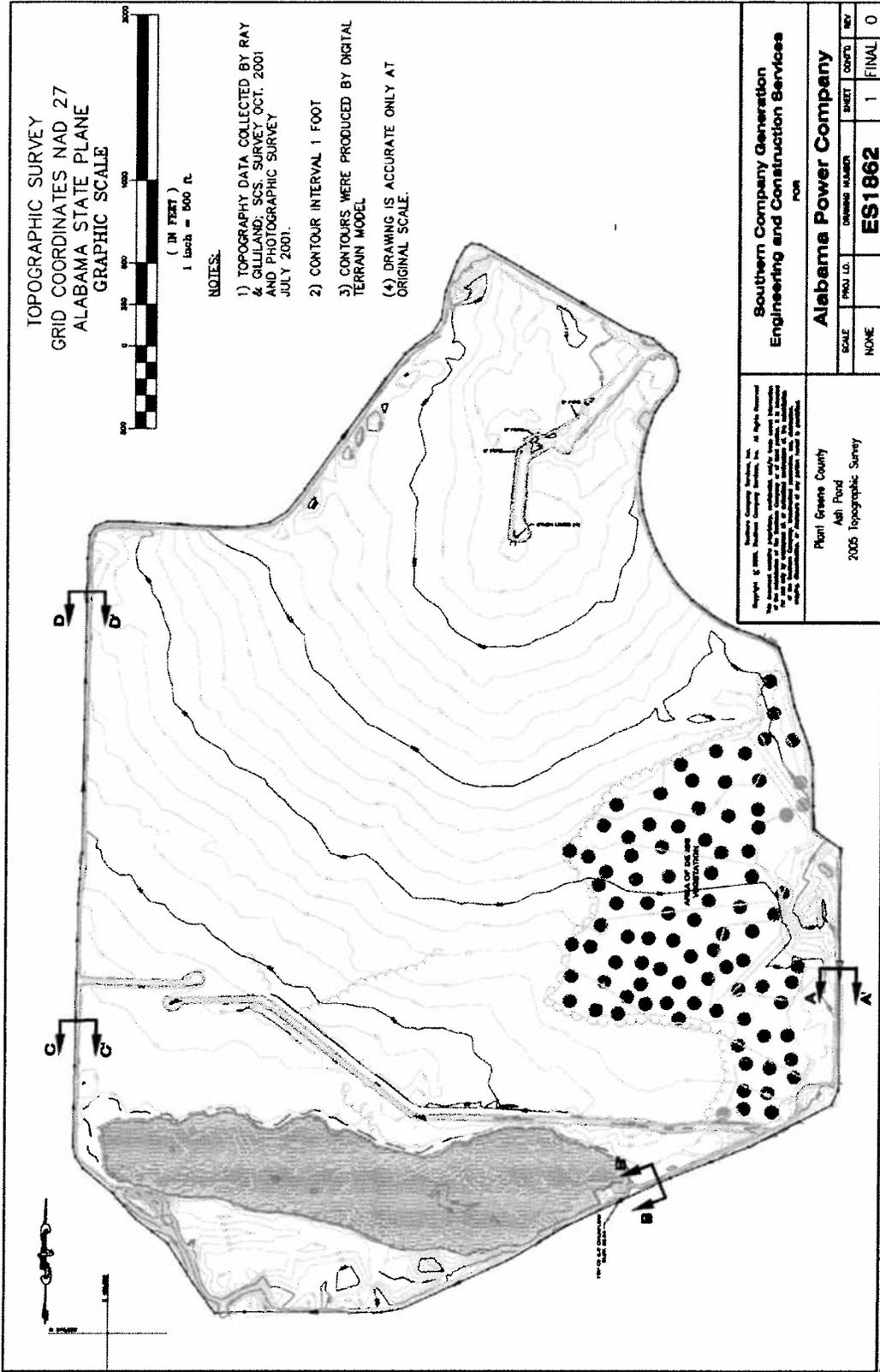
USGS Earthquake Hazards website, <http://www.usgs.gov/hazards/earthquakes/>.  
 Greene County Steam Plant Historical Files, Southern Company and/or Alabama Power.  
 US Corps of Engineers Manual EM 1110-2-1902, October 2003

### Body of Calculation

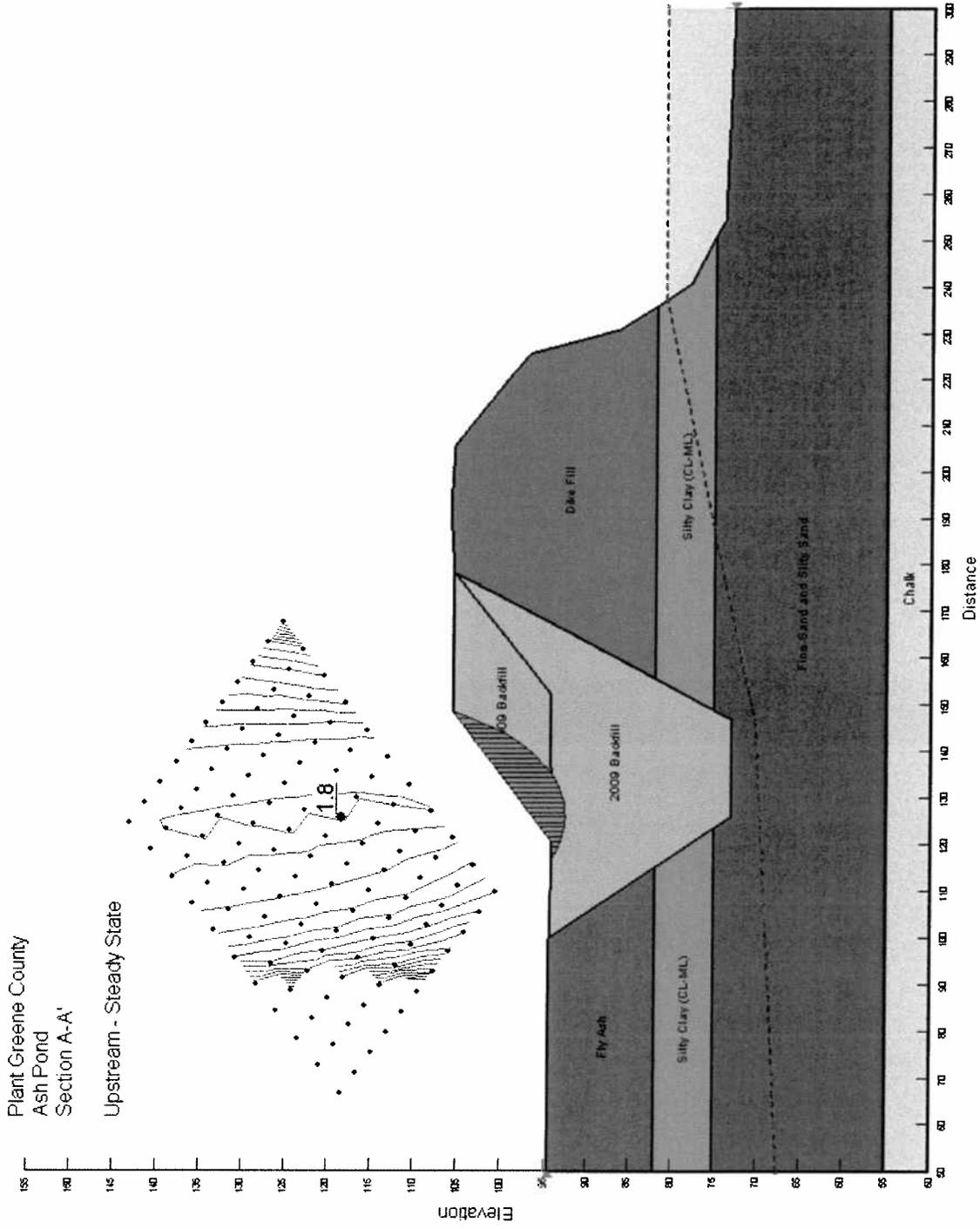
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**Attachments**

Section Location Drawing

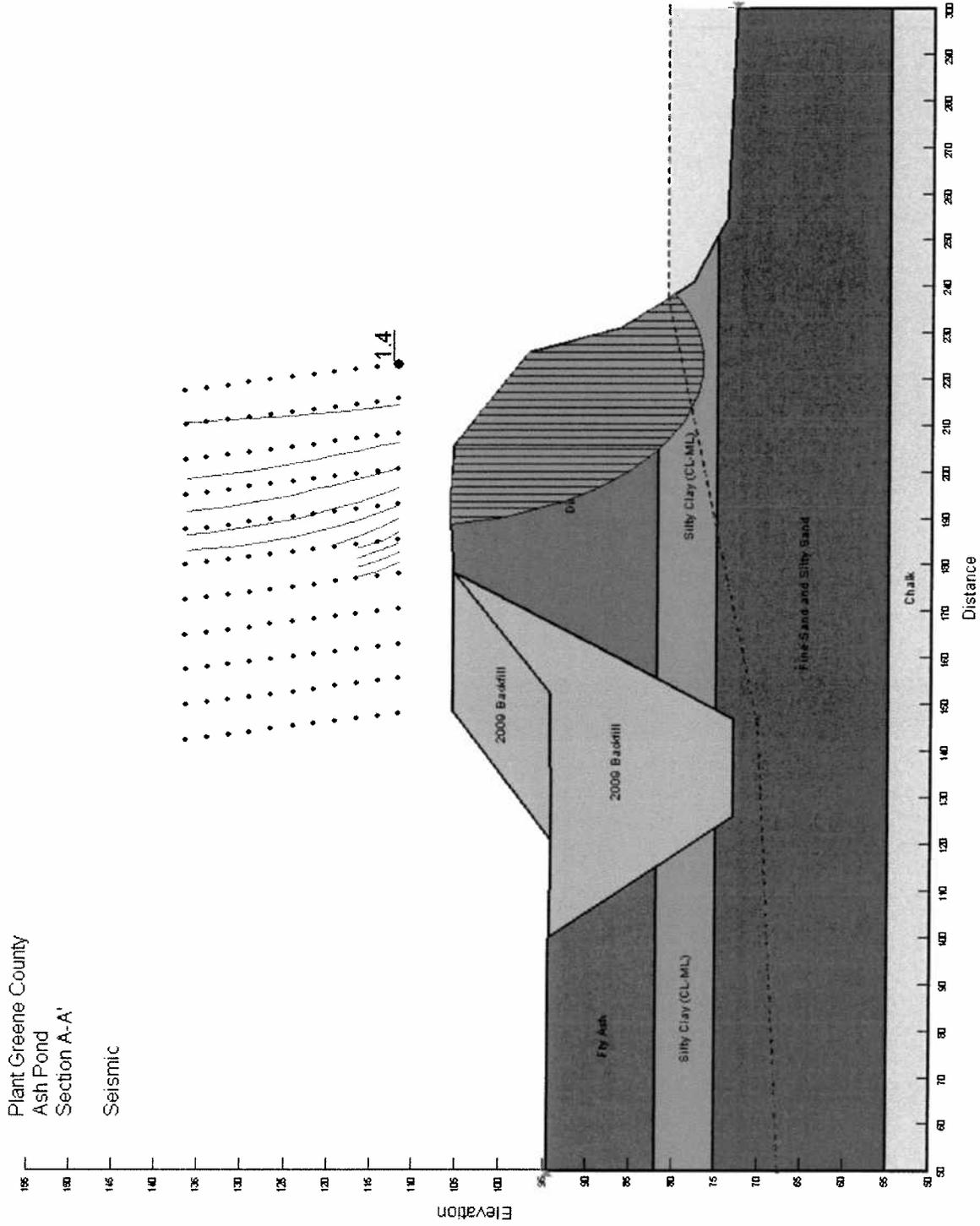


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Project of 2005, Southern Company Services, Inc. All Rights Reserved. This drawing is the property of Southern Company Services, Inc. and is not to be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Southern Company Services, Inc.		PROJECT NO. NONE	

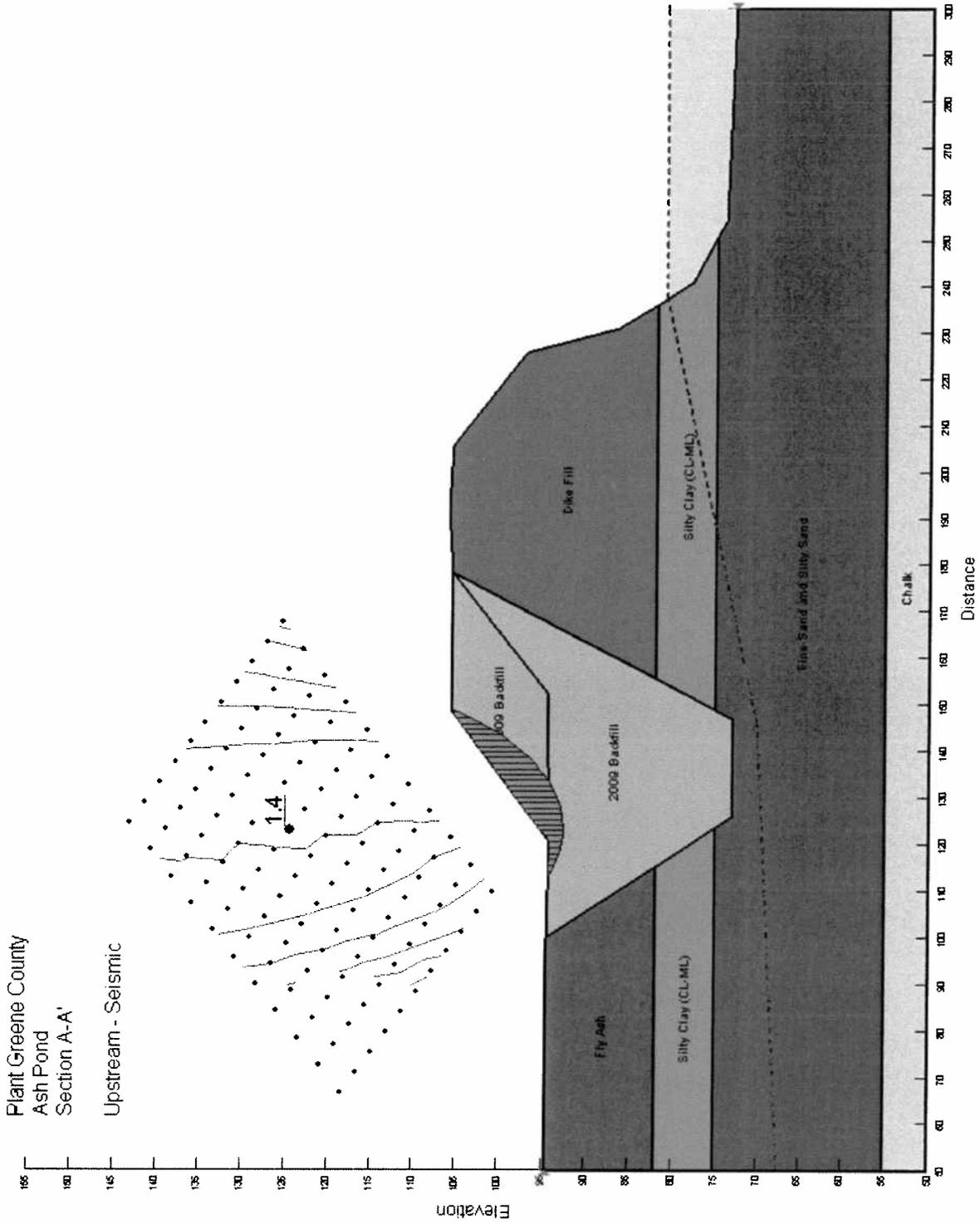


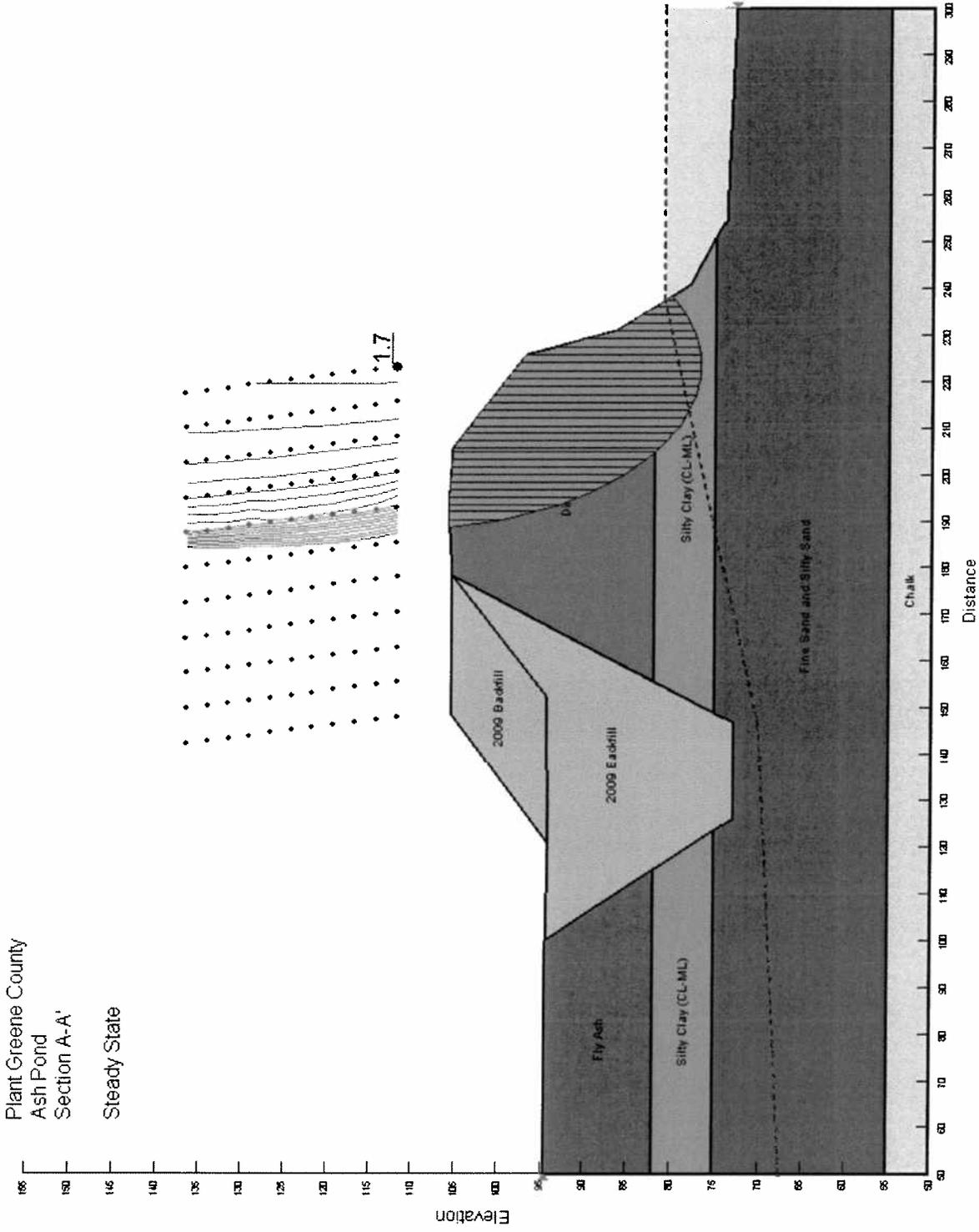
Plant Greene County Ash Pond Slope Stability

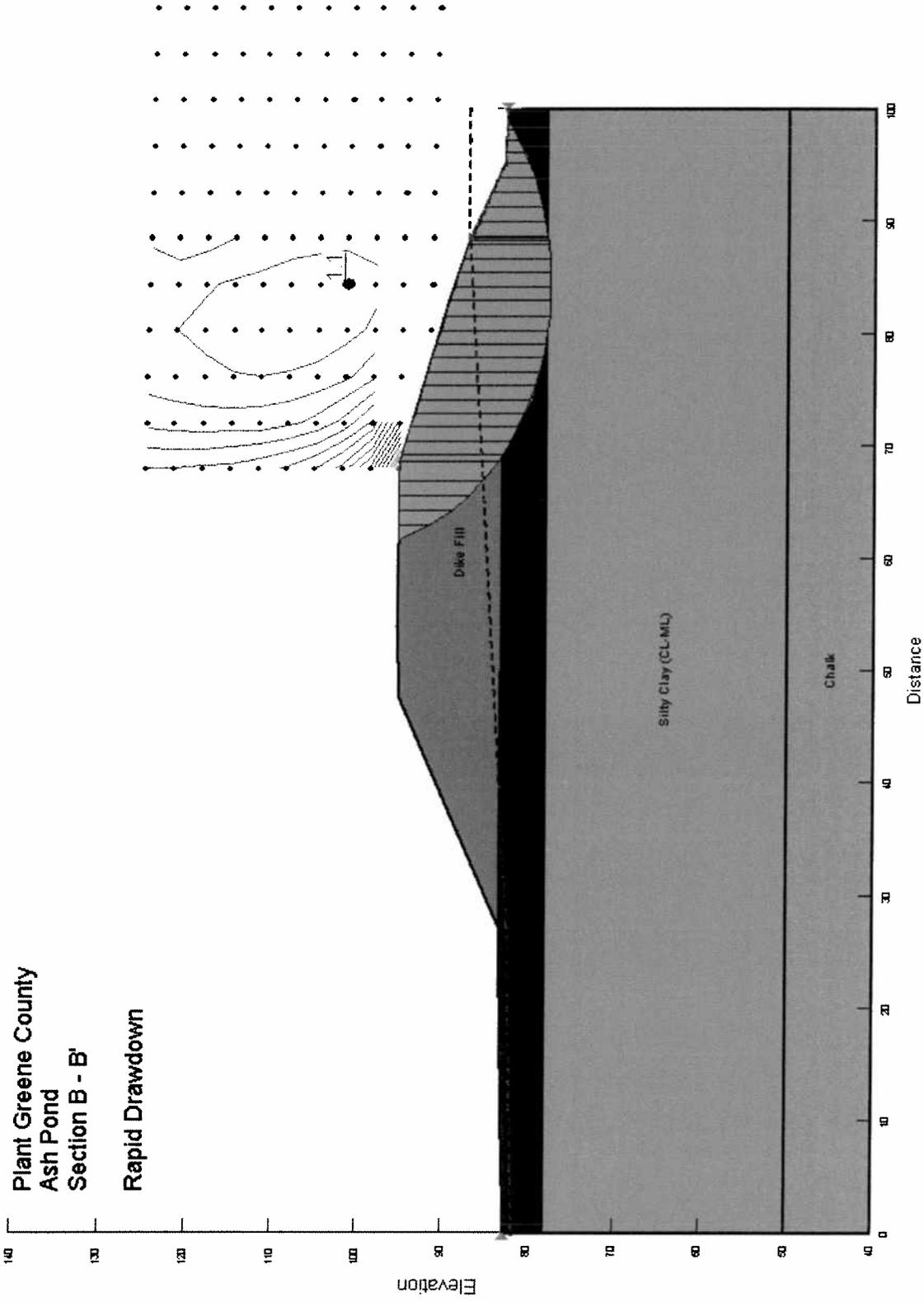
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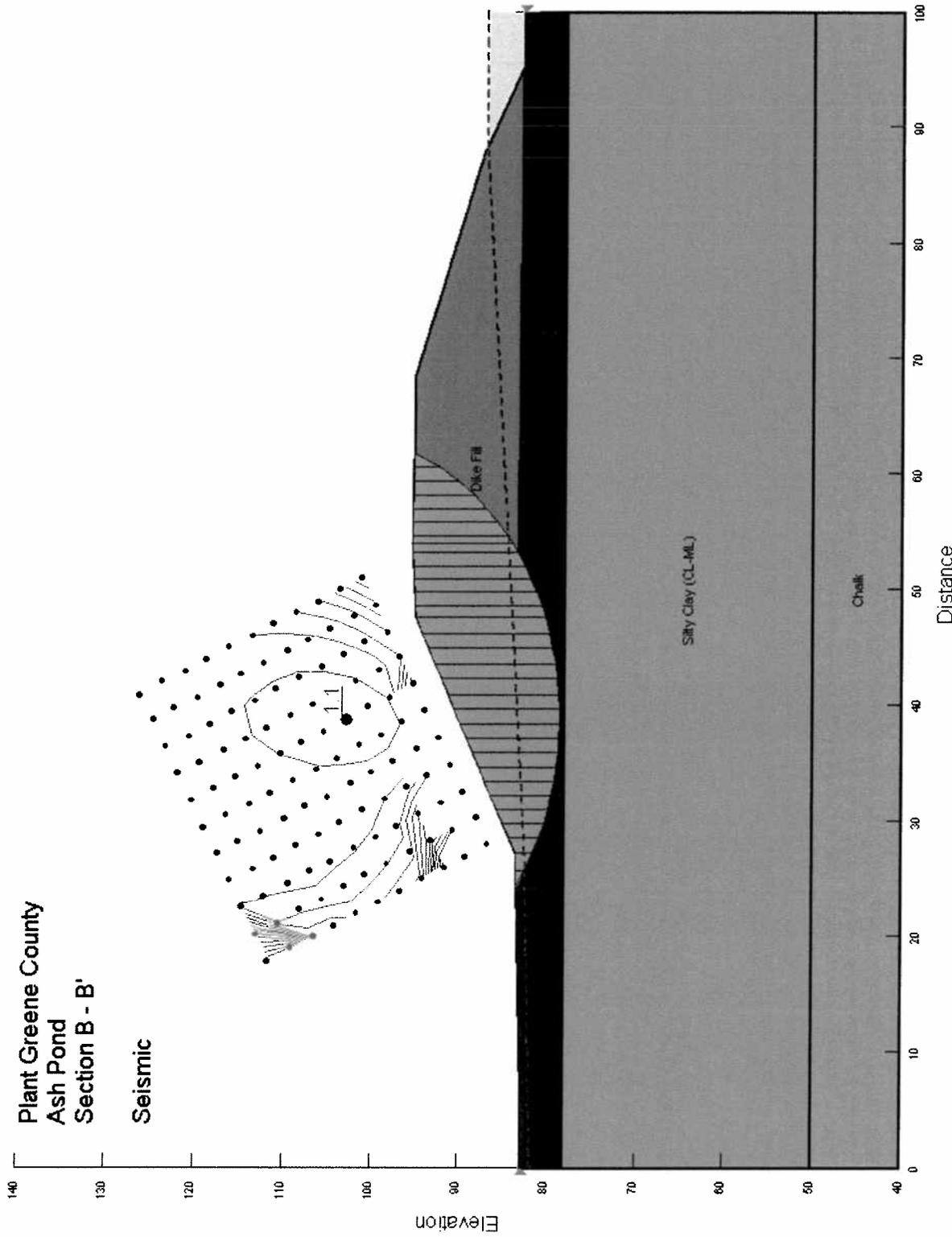
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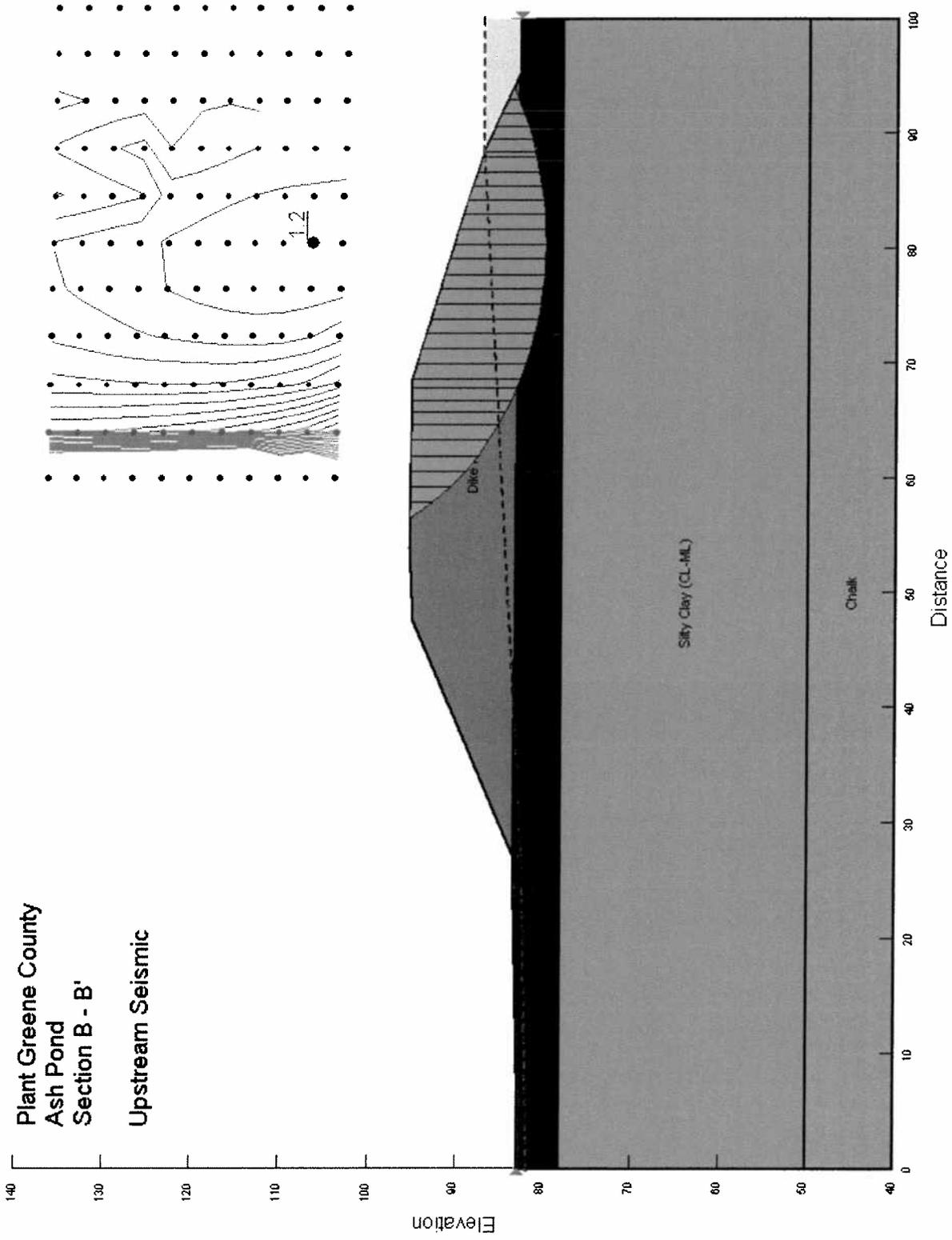


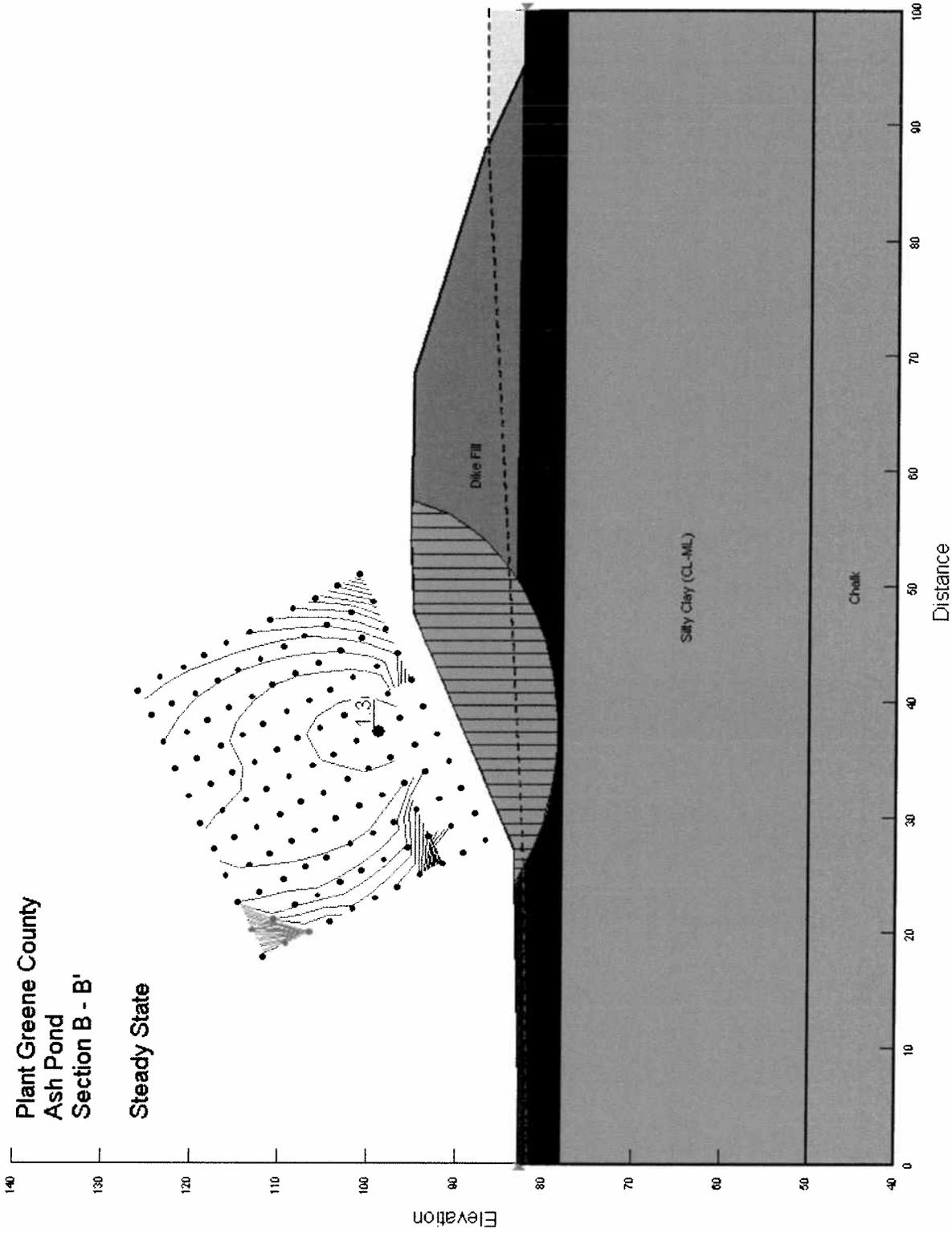




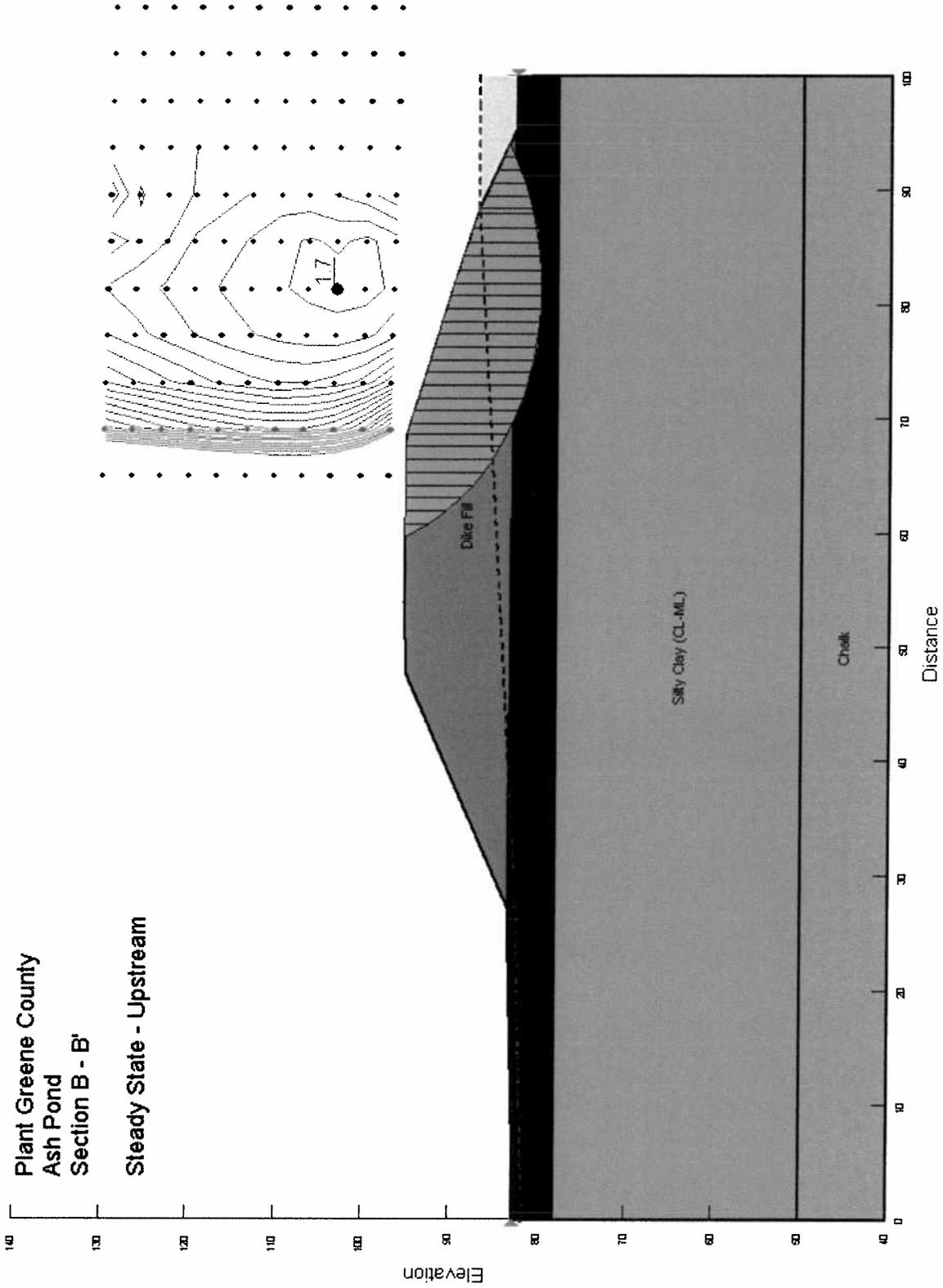
Plant Greene County  
 Ash Pond  
 Section B - B'  
 Rapid Drawdown





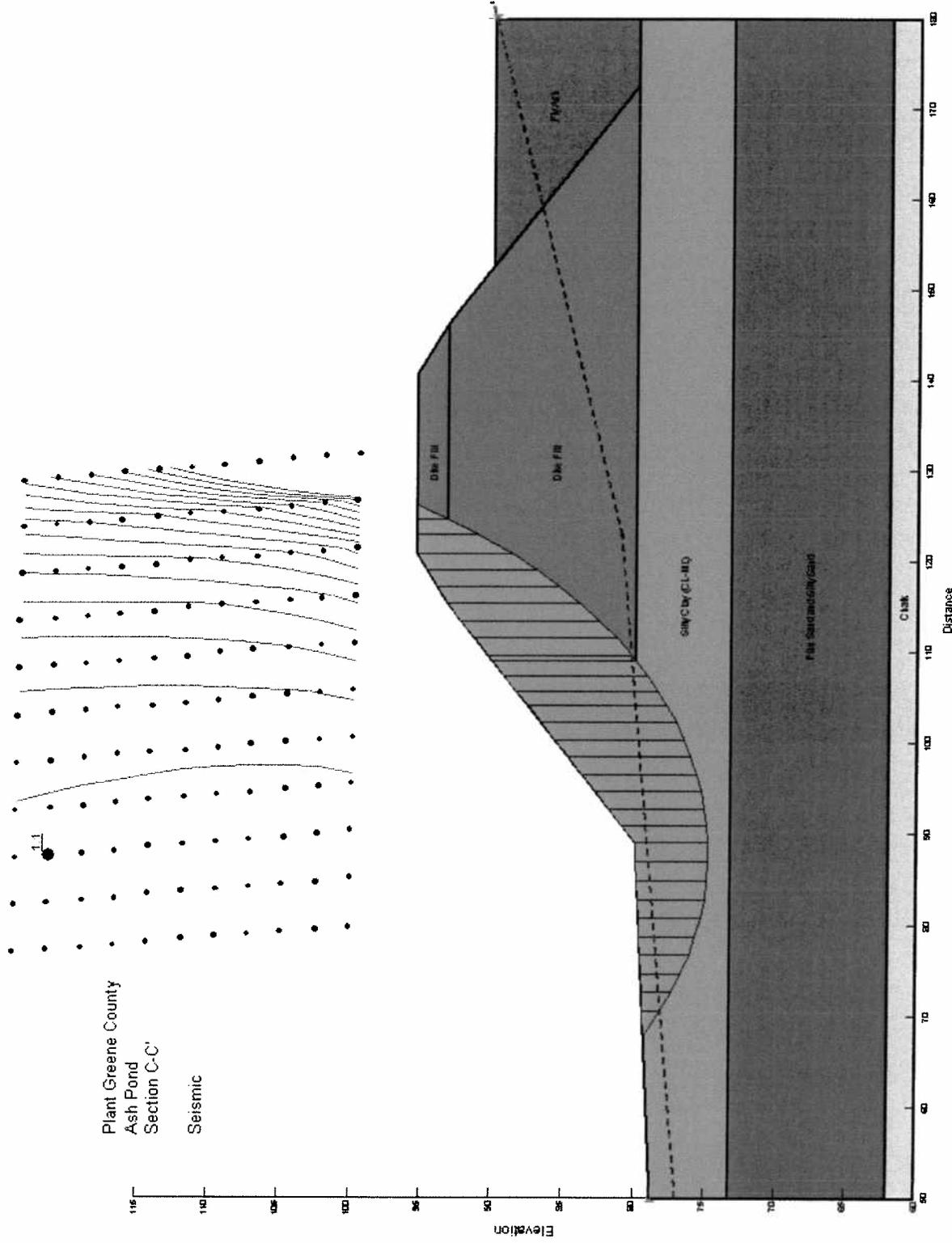


Plant Greene County  
Ash Pond  
Section B - B'  
Steady State



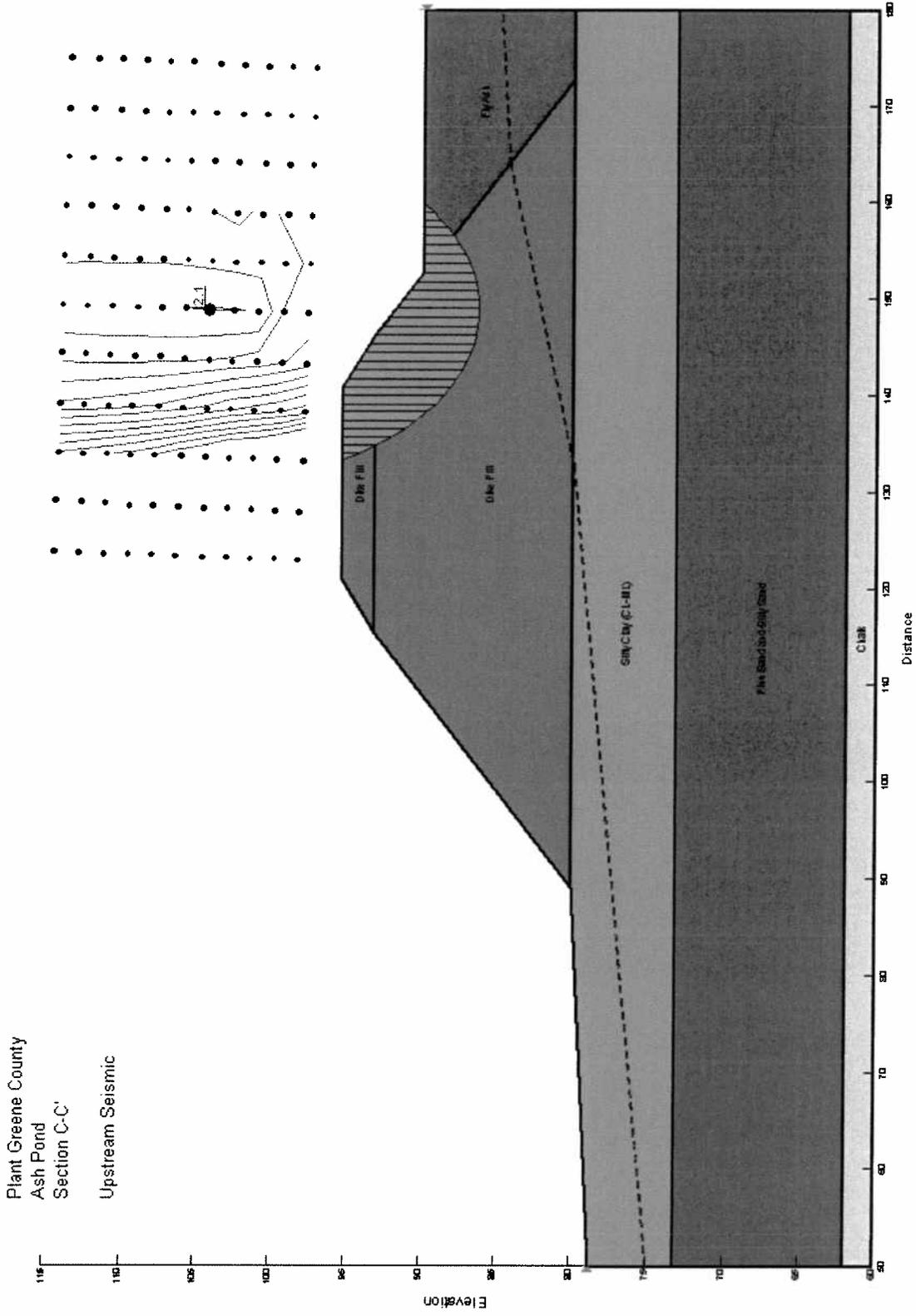
Plant Greene County Ash Pond Slope Stability

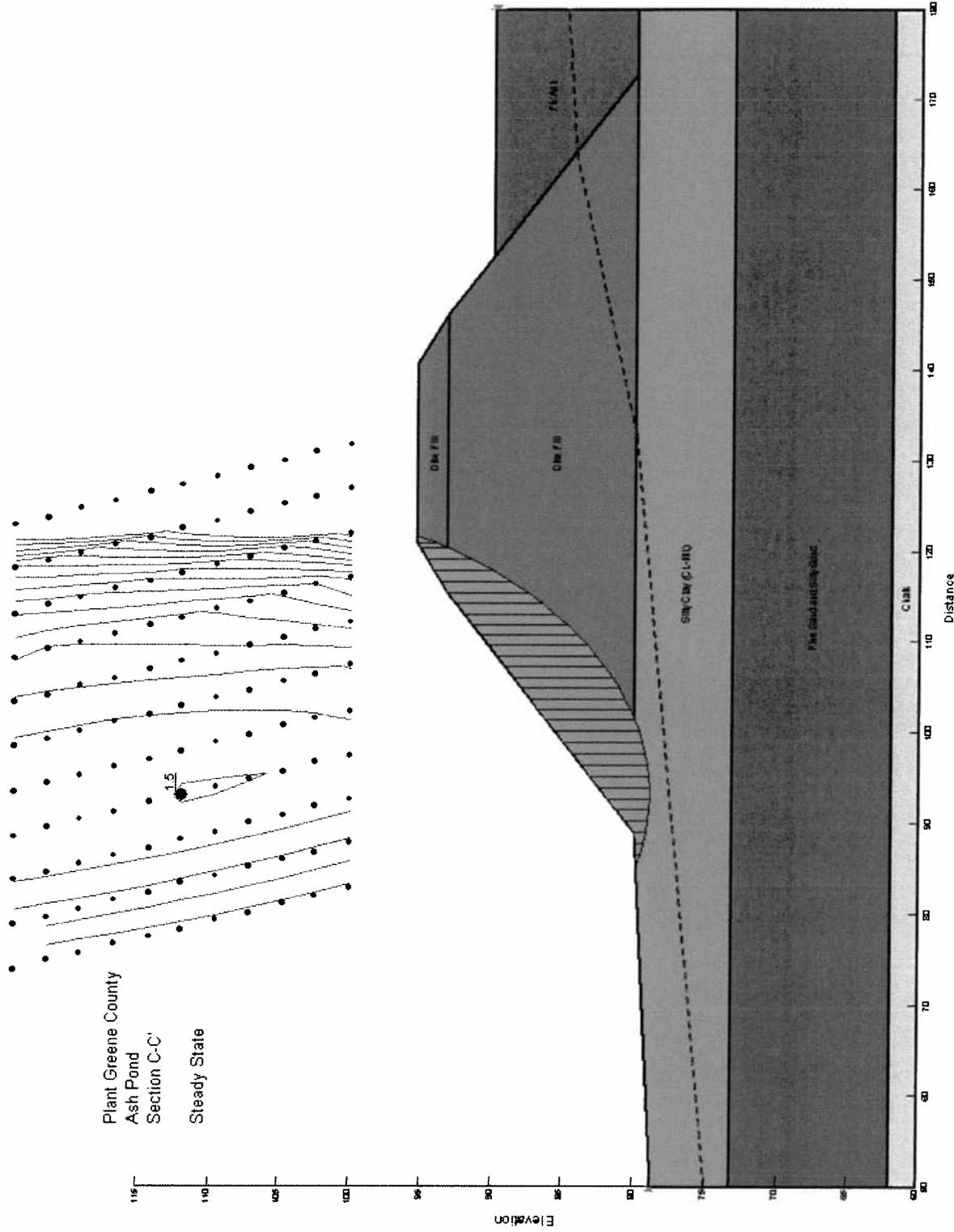
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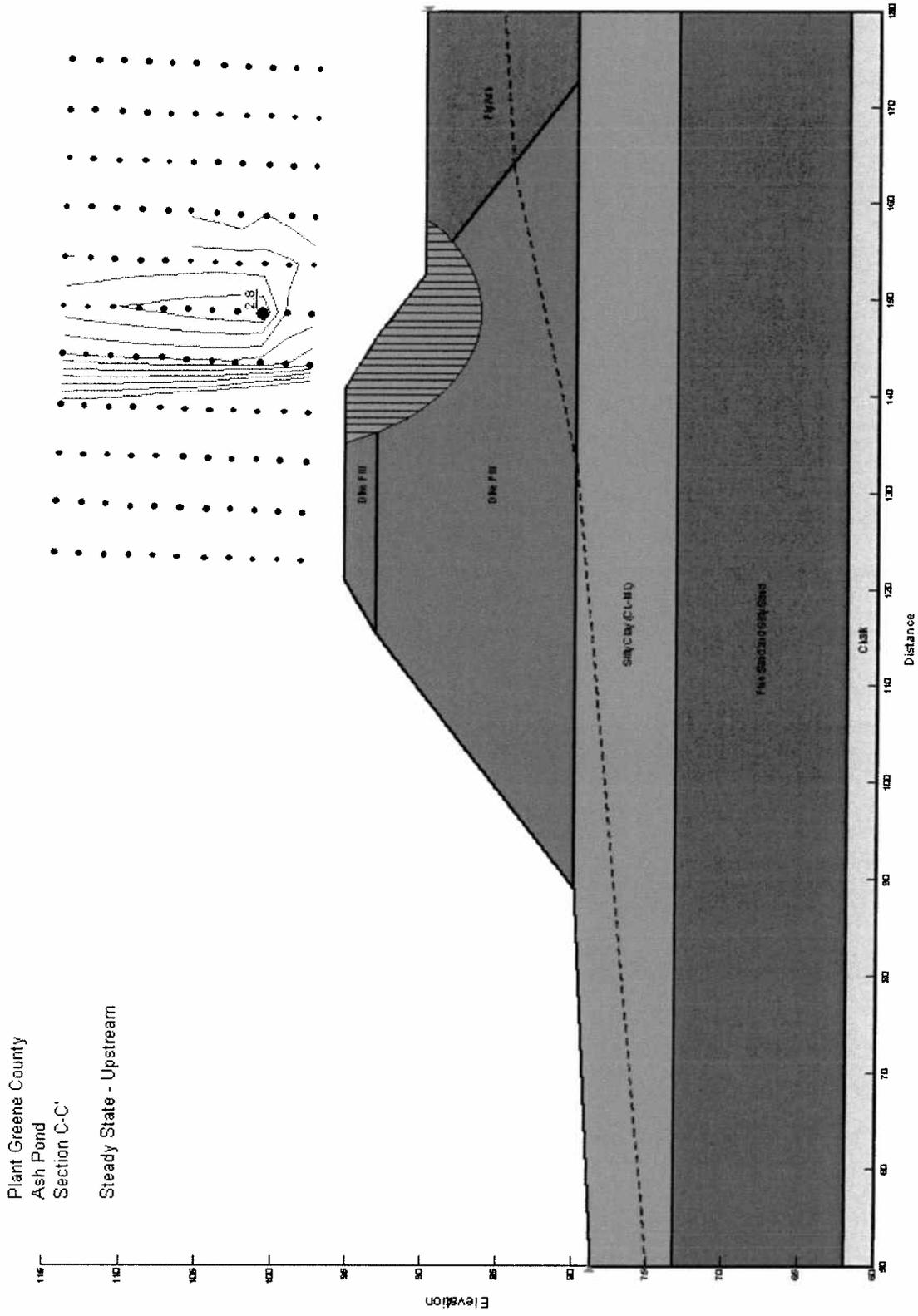


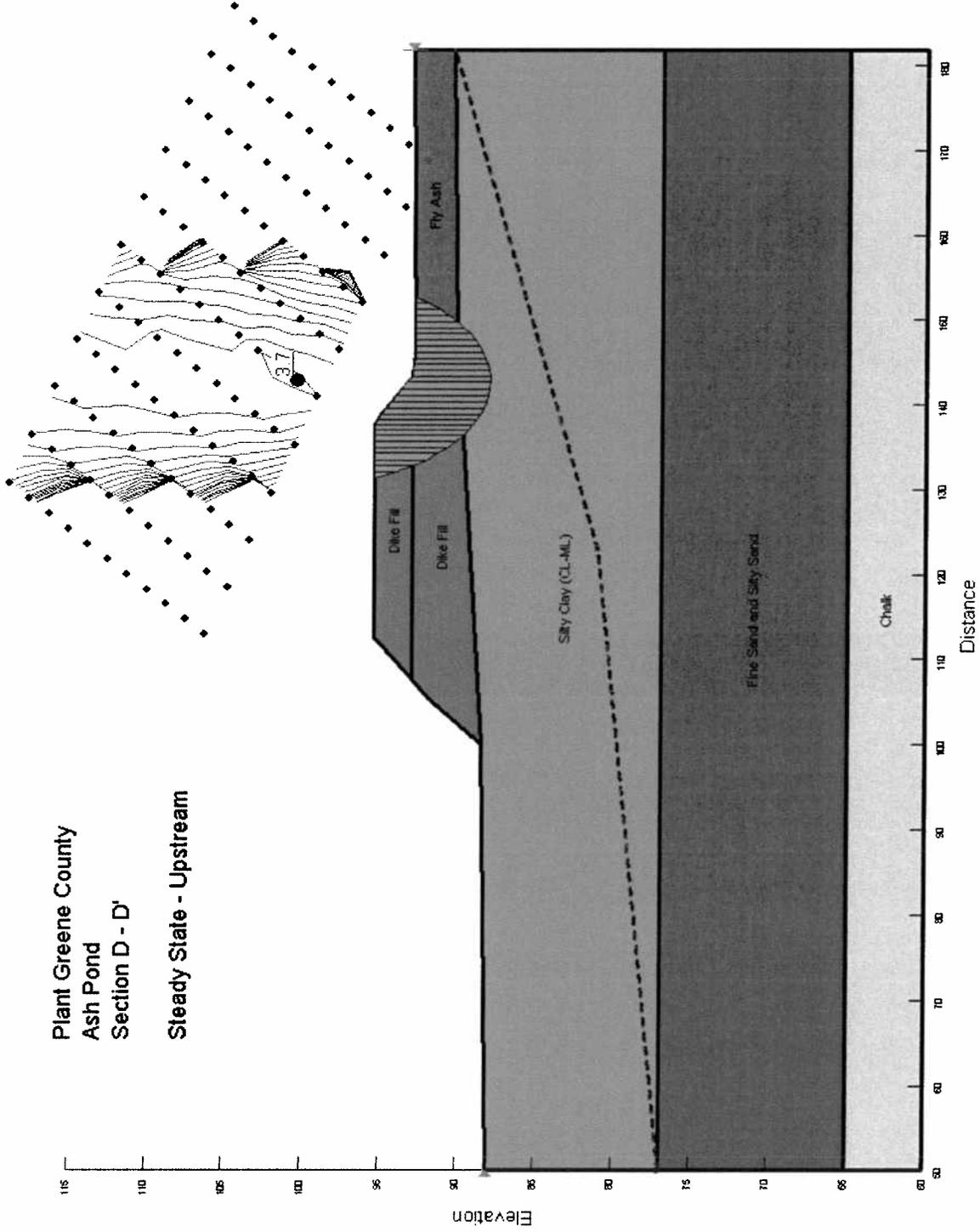
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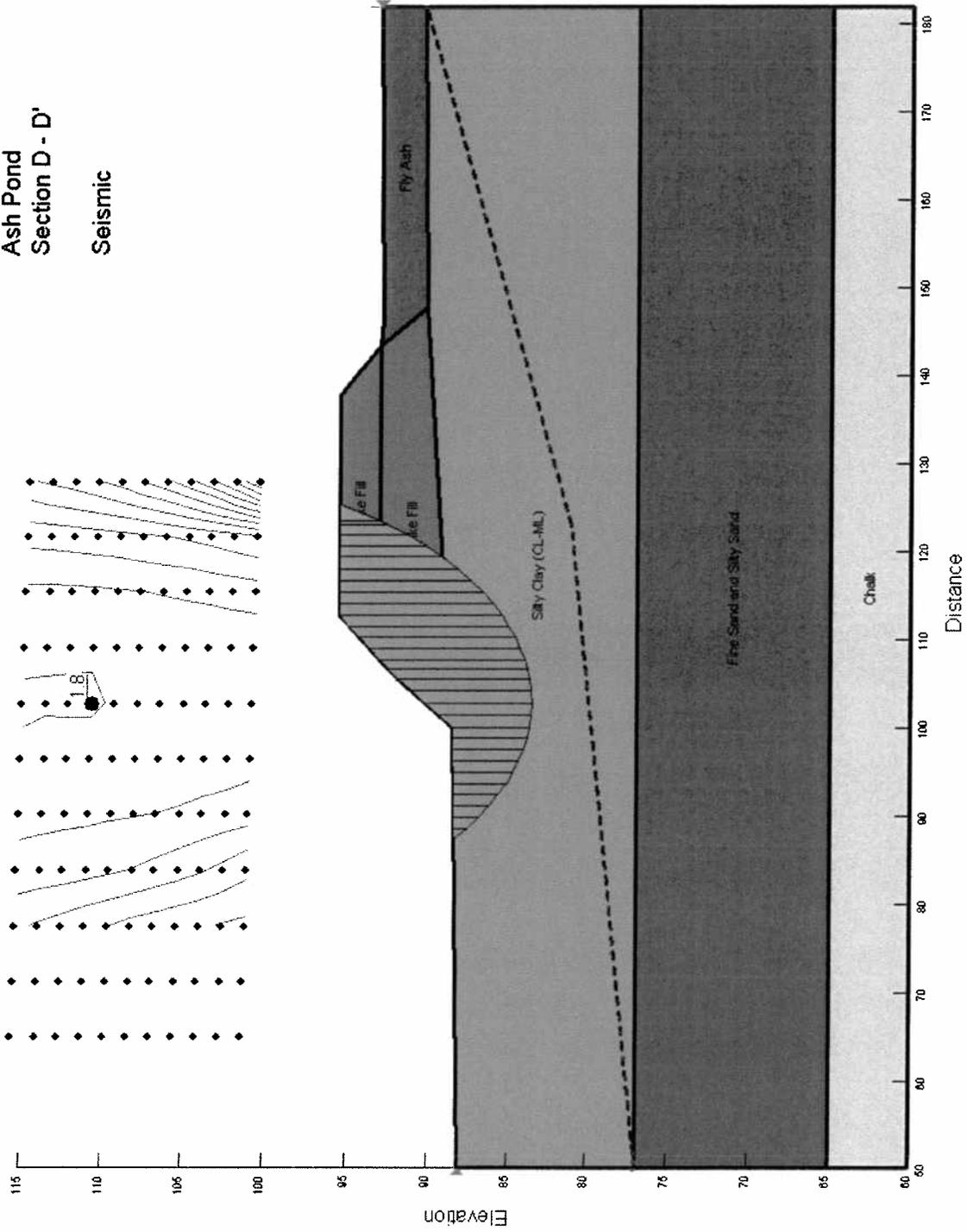




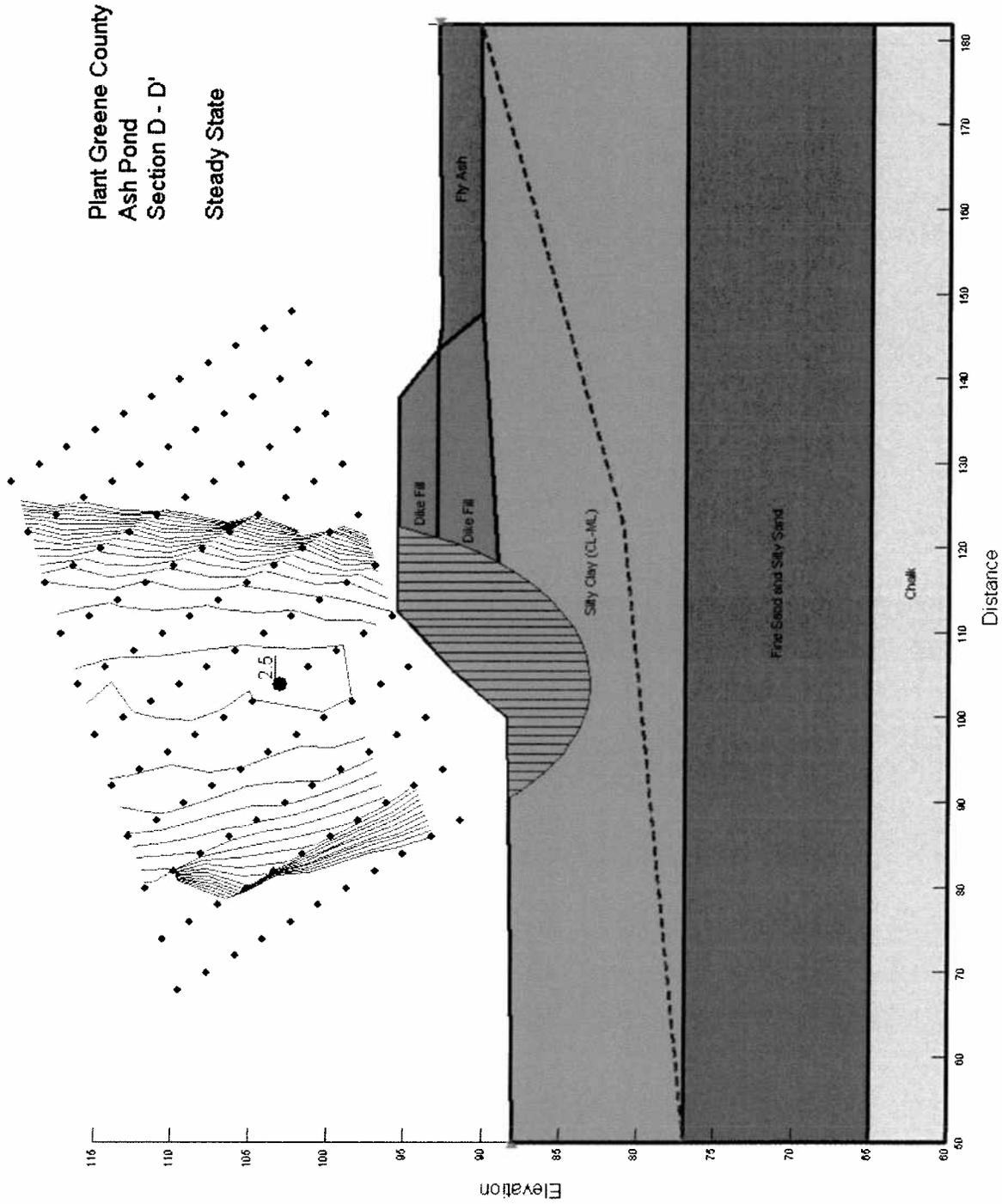


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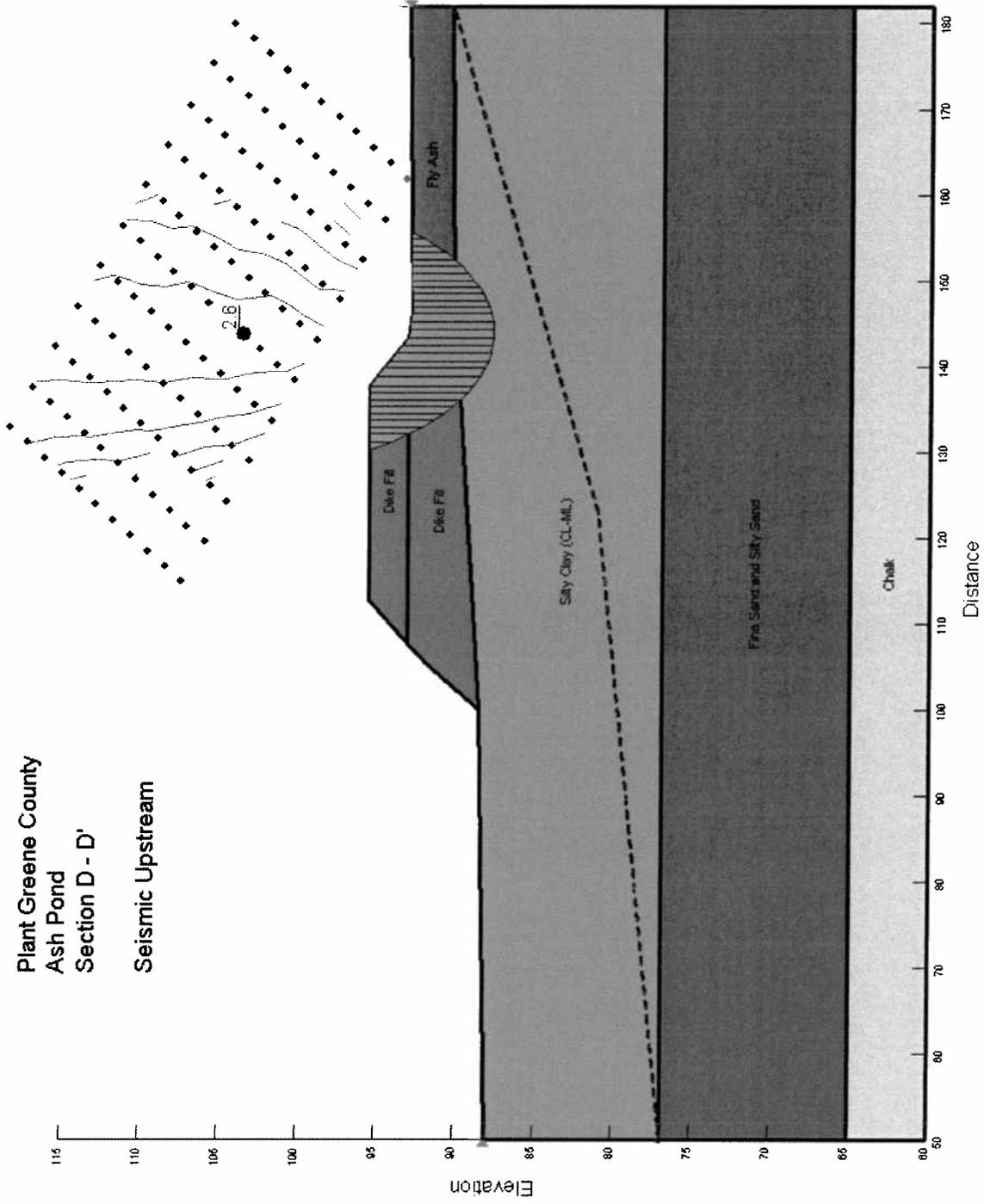
Plant Greene County  
Ash Pond  
Section D - D'  
Seismic



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Plant Greene County  
Ash Pond  
Section D - D'  
Seismic Upstream



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JOB NAME Demopolis Steam plant Site RECORDER Holbrook  
 HOLE IDENTIFICATION A.H. # 62 - Dike Hole - E-413417.70 DRILLER Dover  
 SURFACE ELEV. 94.2 WEATHER Fair & HOT DATE 7-10-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	94.2	Surface of Ground.
	2		Brown to gray silty clay.
4.0	4	90.2	
	6		Brown to gray fine grain sandy clay.
	8		
	10		material becoming moist at 9.0' (85.2).
12.0	12	82.2	
	14		water table at 14.0' (80.2).
	16		Brown clayey fine grain sand.
18.0	18	76.2	
	20		Brown fine to medium grain sand.
22.0	22	72.2	
	24		gray weathered chalk saturated with water.
	26		
	28		
28.5	30	65.7	
	32		Hard gray chalk becoming progressively harder.
32.5	34	61.7	Bottom of Hole.
	36		6.5 M.S.F.
	Penetration Tests		
	Depth - Elev To Depth - Elev		No. of Blows
	40	4.0 (90.2) 5.0 (89.2)	17
	42	8.0 (86.2) 9.0 (85.2)	23
	44	12.0 (82.2) 13.0 (81.2)	11
	46	16.0 (78.2) 17.0 (77.2)	9
	48	20.0 (74.2) 21.0 (73.2)	4

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GC-API-0010

JOB NAME Demopolis Steamplant Site RECORDER Holbrook  
 HOLE IDENTIFICATION A.H. #62 - 612 - Hole No. 2158072 DRILLER Cover  
 SURFACE ELEV. 71.7 WEATHER Partly Cloudy DATE 7-10-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
			Penetration Tests
	50		Depth - Elev. TO Depth - Elev. NO. OF BLOWS
	52		24.0 (70.2) 25.0 (69.2) 5
	54		28.0 (66.2) 29.0 (65.2) 107
	56		32.0 (62.2) 32.5 (61.7) 100
	58		
	60		Sack Samples
	62		0.0 (94.2) TO 4.0 (90.2)
	64		4.0 (90.2) TO 12.0 (82.2)
	66		12.0 (82.2) TO 18.0 (76.2)
	68		18.0 (76.2) TO 22.0 (72.2)
	70		22.0 (72.2) TO 28.5 (65.7)
	72		28.5 (65.7) TO 32.5 (61.7)
	74		
	76		NOTE - Sack Sample 22.0 (72.2) TO 28.5 (65.7)
	78		is mixed with sand.
	80		
	82		
	84		
	86		
	88		
	90		
	92		
	94		
	96		

JOB NAME Demopolis Steam Plant Site RECORDER W. J. Cook  
 HOLE IDENTIFICATION A. H. #62 - Dike Hole - E. 11-945-388.0' DRILLER Cover  
 SURFACE ELEV. 85.0 WEATHER Fair & Hot DATE 7-10-67

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	85.0	SURFACE OF Ground.
	2		Runy to Brown Fine grain Sandy clay.
	4		
	6		material becoming moist at 6.0' (79.0)
8.0	8	77.0	
10.0	10	75.0	Runy Fine grain Sand. WATER TABLE AT 10.0' (75.0).
	12		Brown Fine to medium grain Sand.
13.5	14	71.5	
15.0	16	69.0	Runy weathered c. and returned with water.
17.0	18	68.0	Hard Runy Sink becoming progressively harder. BOTTOM OF HOLE.
	20		
	22		
	24		PENETRATION TESTS
	26		Depth - Elev To Depth - Elev. No. of Blows
	28		4.0 (81.0) 5.0 (80.0) 6
	30		8.0 (77.0) 9.0 (76.0) 7
	32		12.0 (73.0) 13.0 (72.0) 5
	34		16.0 (69.0) 17.0 (68.0) 100
	36		
	38		2.5' Mud
	40		
	42		
	44		
	46		
	48		

CONFIDENTIAL

JOB NAME Demopolis Steam plant site

RECORDER Holloman

HOLE IDENTIFICATION A.H.#64-Dike Hole M-944883.01 E-413417.70

DRILLER W. L. ...

SURFACE ELEV. 83.3

WEATHER Fair & Hot

DATE 7-11-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	83.3	Sur face of Ground.
1.5	2	81.8	Gray to Brown Silty Clay.
	4		
	6		Gray to Brown Fine grain Sandy Clay.
	8		Material becoming moist at 8.0' (75.3).
	10		
11.0	12	72.3	Water Table at 11.0' (72.3).
13.0	14	70.3	Gray Fine grain Sand.
	16		Gray weathered Chalk saturated with water.
	18		
	20		
20.5	22	<del>67.8</del> 7.5	Hard gray chalk becoming progressively harder.
	24		
25.0	26	58.3	BOTTOM OF HOLE.
	28		
	30		Penetration Tests
	32		Depth - Elev. To Depth - Elev. No. of Blows.
	34		4.0 (79.3) 5.0 (78.3) 8
	36		8.0 (75.3) 9.0 (74.3) 17
	38		12.0 (71.3) 13.0 (70.3) 1
	40		16.0 (67.3) 17.0 (66.3) 4
	42		20.0 (63.3) 21.0 (62.3) 20
	44		24.0 (59.3) 25.0 (58.3) 100
	46		7.5 Mod
	48		

CONFIDENTIAL

JOB NAME Demopolis Steam Plant Site RECORDER Holbrook  
 HOLE IDENTIFICATION A.H. # 65-Dike Hole - E-413417.70 DRILLER McDonnell  
 SURFACE ELEV. 82.1 WEATHER Fair & Hot DATE 7-11-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	82.1	Surface of Ground.
1.5	2	80.6	Gray to Brown Silty Clay.
	4		
	6		Gray to Brown Fine grain Sandy clay.
	8		
10.0	10	72.1	Material becoming moist at 9.0' (73.1). Water Table at 10.0' (72.1).
	12		Brown Fine to medium grain sand.
	14		
16.0	16	66.1	
17.0	18	65.1	Hard Gray Chalk becoming progressively harder. Bottom of Hole.
	20		
	22		
	24		Penetration Tests
	26		Depth - Elev To Depth - Elev No. of Blows
	28		4.0 (78.1) 5.0 (77.1) 9
	30		8.0 (74.1) 9.0 (73.1) 24
	32		12.0 (70.1) 13.0 (69.1) 4
	34		16.0 (66.1) 17.0 (65.1) 50
	36		
	38		
	40		
	42		0 Mud
	44		
	46		
	48		

CONFIDENTIAL

JOB NAME Demo Polis Steam Plant RECORDER \_\_\_\_\_  
 HOLE IDENTIFICATION A.H. #66-Dice Hole - 10-94888 DRILLER McDonnell  
 SURFACE ELEV. 84.4 WEATHER Fair & Hot DATE 7-11-67

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	84.4	Surface of Ground.
	2		Brown silty clay.
4.0	4	80.4	
6.0	6	78.4	Curry to Brown Fine Grain Sandy Clay.
8.0	8	76.4	Moist Brown Clayey Fine Grain Sand. Water Table at 8.0' (76.4).
	10		
	12		
	14		
	16		
	18		Brown Fine to medium grain sand.
	20		
	22		
	24		
	26		1' Mud
26.0	26	58.4	
27.0	28	57.4	Clay weathered Chalk saturated with water.
28.2		56.2	Hard Curry Chalk. Bottom of hole.
	30		
			Penetration Tests
	32		
			Depth - Elev To Depth - Elev No. of Blows
	34		4.0 (80.4) 5.0 (79.4) 10
	36		8.0 (76.4) 9.0 (75.4) 9
	38		12.0 (72.4) 13.0 (71.4) 10
	40		16.0 (68.4) 17.0 (67.4) 4
	42		20.0 (64.4) 21.0 (63.4) 7
	44		24.0 (60.4) 25.0 (59.4) 9
	46		28.0 (56.4) 28.2 (56.2) 50
	48		

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JOB NAME Demopolis Steam plant site RECORDER Holtzworth  
 HOLE IDENTIFICATION A.H.#67-Dice Hole - E-413417.70 DRILLER Dover  
 SURFACE ELEV. 80.5 WEATHER Fair & Hot DATE 7-13-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	80.5	Surface of Ground.
	2		
	4		Gray to Brown Fine grain Sandy Clay.
	6		
8.0	8	72.5	Water Table at 8.0' (72.5).
	10		
	12		
	14		Clay to Brown Fine to medium grain Sand.
	16		
	18		
	20		
20.5	22	69.0	
23.0	24	57.5	Gray to Brown medium coarse grain sand with rounded gravel up to 3/8" in size. Hard gray clay becoming progressively harder.
24.5	26	56.0	Bottom of Hole.
	28		
	30		Penetration Tests
	32		Depth Elev. of S. Elev. No. of Blows
	34		4.0 (76.5) 5.0 (75.5) 8
	36		8.0 (72.5) 9.0 (71.5) 11
	38		12.0 (69.5) 13.0 (67.5) 4
	40		16.0 (64.5) 17.0 (63.5) 1
	42		20.0 (60.5) 21.0 (59.5) 8
	44		24.0 (56.5) 24.5 (56.0) 50
	46		0 Mud
	48		

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JOB NAME Demopolis Steam plant Site RECORDER Holt  
 HOLE IDENTIFICATION A.H. #68-Dike Hole <sup>N-942883.01</sup> <sub>E-41347.70</sub> DRILLER Over  
 SURFACE ELEV. 82.8 WEATHER Fair & Hot DATE 7-16-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	82.8	Surface of Ground.
	2		Brown Silty Clay.
4.0	4	78.8	
	6		Gray to Brown fine grain sandy clay.
	8		
8.5		74.3	Water Table at 8.5' (74.3).
	10		
	12		
	14		Gray fine to medium grain sand.
	16		
	18		
	20		
20.5		62.3	
	22		Brown medium to coarse grain sand with
	24		rounded gravel up to 3/8" in size.
	26		0 Mud
27.0	28	55.8	
28.5		54.3	Hard Gray Chalk becoming progressively harder.
	30		Bottom of hole.
	32		
			Penetration Tests
	34		Depth - Elev. To Depth - Elev. No. of Blows
	36		4.0 (78.8) 5.0 (77.8) 16
	38		8.0 (74.8) 9.0 (73.8) 17
	40		12.0 (70.8) 13.0 (69.8) 6
	42		16.0 (66.8) 17.0 (65.8) 5
	44		20.0 (62.8) 21.0 (61.8) 11
	46		24.0 (58.8) 25.0 (57.8) 11
	48		28.0 (54.8) 28.5 (54.3) 50

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JOB NAME Demopolis Steam plant Site RECORDER Hickman  
 HOLE IDENTIFICATION A.H. #69-Dike Hole-E-413A17.70 DRILLER Kie Downis  
 SURFACE ELEV. 83.4 WEATHER Fair & Hot DATE 7-16-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	83.4	Surface of Ground.
	2		Brown Silty Clay.
4.0	4	79.4	
	6		Clay to Brown clayey fine grain sand.
8.0	8	75.4	material becoming moist at 7.0' (76.4). Water Table at 8.0' (75.4).
	10		Brown fine to medium grain sand.
11.0	12	72.4	
	14		
	16		
	18		Brown medium to coarse grain sand with
	20		numerous rounded gravel up to 3/8" in size.
	22		
	24		
	26		
	28		
29.5	30	53.9	Clay weathered chalk saturated with water.
32.0	32	51.4	Hard clay chalk becoming progressively harder.
32.4	34	51.0	Bottom of hole.
			Penetration Tests
	36		DEPTH - Elev To DEPTH - Elev. NO. OF Blows
			4.0 (79.4) 5.0 (78.4) 8
	38		8.0 (75.4) 9.0 (74.4) 8 <i>2.5 Mod</i>
	40		12.0 (71.4) 13.0 (70.4) 20
	42		16.0 (67.4) 17.0 (66.4) 12
	44		20.0 (63.4) 21.0 (62.4) 9
	46		24.0 (59.4) 28.0 (58.4) 14
	48		28.0 (55.4) 29.0 (54.4) 9
			32.0 (51.4) 32.4 (51.0) 50

JOB NAME Demo Falls 2 Team Plant Site RECORDER Holbrook  
 HOLE IDENTIFICATION P.H. #70 - Dike Line 2 - 241882.01 DRILLER Cover  
 SURFACE ELEV. 86.6 WEATHER Fair & Hot DATE 7-17-02

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	86.6	Surface of Ground.
2.5	2		Reddish Brown Clayey Fine grain sand.
	4	84.1	
6.0	6	80.6	Brown Fine grain sand with numerous rounded gravel up to 3/8" in size.
	8		
8.5	8		Moist Brown Fine grain sand.
	10	78.1	
18.0	10		Water Table at 10.0' (76.6).
	12		
	14		Brown Fine to medium grain sand.
	16		
	18	68.6	
	20		
	22		Brown medium grain sand with scattered rounded gravel.
	24		
26			
28.0	28	58.6	Gravel Increased in size up to 3/4" at this depth. ←
	30		
	32		
	34		
36.5	36		
	38	50.1	Gray slightly clayey medium grain sand.
40	46.6		
40.0	40	46.6	Hard Gray Chalk becoming progressively harder.
40.4	42	46.2	
	44		
	46		(Continued on page 2) 0 Mud
	48		

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JOB NAME Damopolis Steamplant Site RECORDER Holbrook  
 HOLE IDENTIFICATION A.H. # 70-Dike Hole - E-413417.70 DRILLER Dover  
 SURFACE ELEV. 86.6 WEATHER Fair & Hot DATE 7-17-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
			Penetration Tests
	50		Depth - Elev To Depth Elev No. of Blows
	52		4.0 (82.6) 5.0 (81.6) 8
	54		8.0 (78.6) 9.0 (77.6) 8
	56		12.0 (74.6) 13.0 (73.6) 7
	58		16.0 (70.6) 17.0 (69.6) 4
	60		20.0 (66.6) 21.0 (65.6) 9
	62		24.0 (62.6) 25.0 (61.6) 12
	64		28.0 (58.6) 29.0 (57.6) 12
	66		32.0 (54.6) 33.0 (53.6) 13
	68		36.0 (50.6) 37.0 (49.6) 12
	70		40.0 (46.6) 40.4 (46.2) 50
	72		
	74		
	76		
	78		
	80		
	82		
	84		
	86		
	88		
	90		
	92		
	94		
	96		

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JOB NAME DemoPolis Steam Plant Site RECORDER Heibrock  
 HOLE IDENTIFICATION A.H. # 71-Dike Hole-E-413417.70 N-941388.01 DRILLER McDonald  
 SURFACE ELEV. 81.2 WEATHER Fair & Hot DATE 7-18-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	81.2	Surface of Ground.
	2		Brown Silty Clay.
	4		
4.5	6	76.7	Gray To Brown Fine Grain Sandy Clay.
	8		
8.5	10	72.7	
10.0	10	71.2	Gray to Brown Clayey Fine Grain Sand. WATER TABLE AT 10.0 (71.2).
	12		
	14		
	16		Brown medium grain sand with scattered rounded
	18		gravel.
	20		
	22		
23.5	24	57.7	
	26		
	28		Gray weathered chalk saturated with water.
	30		
	32		
	34		
	36		17.5 feet
36.0	36	45.2	
37.0	38	44.2	Hard Gray Chalk becoming progressively harder. Bottom of Hole.
	40		
	42		
	44		(CONT'd. on Page 2)
	46		
	48		

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JOB NAME Demopolis Steam Plant Site RECORDER Helbrook  
 HOLE IDENTIFICATION A.H. #71 - Dike Hole - E-418417.70 DRILLER McDonald  
 SURFACE ELEV. 81.2 WEATHER Fair & Hot DATE 7-18-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
			Penetration Tests
	50		Depth - Elev To Depth - Elev. No. of Blows
	52		4.0 (77.2)      5.0 (76.2)      6
	54		8.0 (73.2)      9.0 (72.2)      14
	56		12.0 (69.2)      13.0 (68.2)      27
	58		16.0 (65.2)      17.0 (64.2)      12
	60		20.0 (61.2)      21.0 (60.2)      21
	62		24.0 (57.2)      25.0 (56.2)      5
	64		28.0 (53.2)      29.0 (52.2)      5
	66		32.0 (49.2)      33.0 (48.2)      5
	68		36.0 (45.2)      37.0 (44.2)      50
	70		
	72		
	74		Water Table checked at 5.0' (76.2) 7-19-62.
	76		
	78		
	80		
	82		
	84		
	86		
	88		
	90		
	92		
	94		
	96		

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JOB NAME Demopolis Steam Plant Site RECORDER Holbrook  
 HOLE IDENTIFICATION A.A. # 72-Dive Hole <sup>12-941152.75</sup> <sub>S-413051.19</sub> DRILLER McDonald  
 SURFACE ELEV. 85.2 WEATHER Fair & Hot DATE 7-18-67

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	85.2	SURFACE OF GROUND.
	2		
	4		Reddish Brown sandy clay.
	6		
8.0	8	77.2	
	10		Water Table AT 10.0' (75.2).
	12		
	14		Brown fine to medium grain sand.
	16		
	18		
0	20	66.2	
	22		
	24		
	26		Brown medium to coarse grain sand with scattered
	28		rounded gravels.
	30		
	32		
	34		
	36		
	38		
	40		
42.0	42	43.2	Hard gray chalk becoming progressively harder.
42.4	44	42.6	BOTTOM OF HOLE.
	46		
	48		

(CONT'D. ON PAGE 2)

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JOB NAME Demopolis Steam Plant SiteRECORDER HolbrookHOLE IDENTIFICATION A.H. #72-Dice Hole - N-941102.74  
8-413051.19DRILLER McDonnellSURFACE ELEV. 85.2WEATHER Fair & HotDATE 7-19-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
			Penetration Tests
	50		Depth - Elev To Depth - Elev No. of Blows
	52		4.0 (81.2) 5.0 (80.2) 7
	54		8.0 (77.2) 9.0 (76.2) 8
	56		12.0 (73.2) 13.0 (72.2) 4
	58		16.0 (69.2) 17.0 (68.2) 7
	60		20.0 (65.2) 21.0 (64.2) 15
	62		24.0 (61.2) 25.0 (60.2) 9
	64		28.0 (57.2) 29.0 (56.2) 8
	66		32.0 (53.2) 33.0 (52.2) 8
	68		36.0 (49.2) 37.0 (48.2) 15
	70		40.0 (45.2) 41.0 (44.2) 6
	72		42.0 (43.2) 42.4 (42.8) 50
	74		
	76		
	78		SACK Sample 19.0 (66.2) TO 42.0 (43.2)
	80		
	82		Water Table checked AT 10.0' (75.2) 7-19-62.
	84		
	86		
	88		
	90		
	92		
	94		
	96		

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JOB NAME Damopolis Steam Plant Site RECORDER Holtbrook  
 HOLE IDENTIFICATION A-1 #73-Dike Hole <sup>NO. 940910.60</sup> DRILLER Cover  
 SURFACE ELEV. 84.9 WEATHER \_\_\_\_\_ DATE 7-20-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	84.9	Surface of Ground.
	2		Reddish Brown Fine grain sandy clay.
4.0	4	80.9	
	6		Brown clayey fine grain sand.
	8		MATERIAL BECOMING MOIST AT 8.0' (76.9).
	10		WATER TABLE AT 10.0' (74.9).
12.0	12	72.9	
	14		
	16		Brown fine to medium grain sand.
	18		
20.0	20	64.9	
	22		Brown medium to coarse grain sand.
24.0	24	60.9	
26.0	26	58.9	Brown coarse grain sand with scattered gravel from #4 to #18" in size.
27.0	28	57.9	Clay weathered chalk saturated with water.
28.5	30	56.4	Hard clay chalk becoming progressively harder. BOTTOM OF HOLE
	32		
	34		Penetration Tests
	36		Depth - Elev To Depth - Elev No. of Blows
	38		4.0 (80.9) 5.0 (79.9) 8
	40		8.0 (76.9) 9.0 (75.9) 9
	42		12.0 (72.9) 13.0 (71.9) 3
	44		16.0 (68.9) 17.0 (67.9) 14 1' Mud ✓
	46		20.0 (64.9) 21.0 (63.9) 6
	48		24.0 (60.9) 25.0 (59.9) 7
			28.0 (56.9) 28.5 (56.4) 50

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JOB NAME Demopolis Steam Plant Site. RECORDER Holbrook  
 HOLE IDENTIFICATION AH#74 Ash Pond Dike DRILLER Douer  
 SURFACE ELEV. 81.8 WEATHER Fair + Hot DATE 7-20-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS	N 940,688.45	E 412,176.29
	0	81.8	Surface of Ground		
	2				
	4		Grayish-brown mottled, silty clay		
	6				
	8				
8.5		73.3			
	10	71.8	Gray, very plastic clay (fine clay)		
10.0			Water table 10.0 (71.8)		
	12				
	14		Brown, fine to medium grain sand		
	16				
	18	63.8			
18.0			Brown, medium to coarse grain sand		
	20		Scattered, small gravel 20.0 (61.8) to 22.5 (59.3)		
	22				
22.5		59.3	Top of weathered chalk		
	24	57.8	Top of Hard Chalk		
24.0		57.2	Bottom of Hole (Refusal).		
24.6	26		Gray, hard chalk.		
	28				
	30				
			Penetration Tests		
	32		4.0 (77.8) - 5.0 (76.8)	No. Blows	9
	34		8.0 (73.8) - 9.0 (72.8)		11
	36		12.0 (69.8) - 13.0 (68.8)		14
	38		16.0 (65.8) - 17.0 (64.8)		6
	40		20.0 (61.8) - 21.0 (60.8)		9
	42		24.0 (57.8) - 24.6 (57.2)		50
	44				1.5 Mud
	46				
	48				

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JOB NAME Demopolis Steam Plant Site RECORDER Holbrook  
 HOLE IDENTIFICATION A.H. #75-Dike Hole <sup>N-940426.20</sup> <sub>E-411738.84</sub> DRILLER Dover  
 SURFACE ELEV. 88.7 WEATHER Fair & Hot DATE 7-23-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
Q.0	0	88.7	Surface of ground.
	2		Brown, slightly silty fine grain sand.
	4		
G.0	6	82.7	
	8		Brown silty, clayey fine grain sand.
	10		
	12		
14.0	14	74.7	Water Table AT 14.0' (74.7)
	16		
	18		Brown medium to coarse grain sand with small
	20		scattered gravel increasing in number toward
	22		bottom of hole.
	24		
	26		
	28		
30.0	30	58.7	Top of weathered Chalk.
	32	56.7	Grey weathered Chalk saturated with water.
32.0			Top of Hard Grey Chalk.
32.6	34	56.1	Hard Grey Chalk. Bottom of hole.
	36		
	38		(cont'd. on Page 2)
	40		
	42		
	44		2' mud
	46		
	48		

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JOB NAME Demopolis Steam Plant RECORDER                     

HOLE IDENTIFICATION A.H. #75-Dike Hole N-940426.20 DRILLER                       
B-411788.84

SURFACE ELEV. 38.7 WEATHER Fair & Hot DATE 7-28-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
			Penetration Tests
	50		Depth - Elev To Depth - Elev - No. of Blows
	52		4.0 (84.7) 5.0 (83.7) 10
	54		8.0 (80.7) 9.0 (79.7) 10
	56		12.0 (76.7) 13.0 (75.7) 11
	58		16.0 (72.7) 17.0 (71.7) 8
	60		20.0 (68.7) 21.0 (67.7) 19
	62		24.0 (64.7) 25.0 (63.7) 14
	64		28.0 (60.7) 29.0 (59.7) 27
	66		32.0 (56.7) 32.6 (56.1) 50
	68		
	70		
	72		
	74		
	76		
	78		
	80		
	82		
	84		
	86		
	88		
	90		
	92		
	94		
	96		

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JOB NAME Demopolis Steam Plant #1 RECORDER Holbrook  
 HOLE IDENTIFICATION A.H. #46 - Dike Hole N-940154.15 DRILLER M. E. Down  
E-411301.89  
 SURFACE ELEV. 92.9 WEATHER Fair & Hot DATE 7-27-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	92.9	Surface of Ground.
	2		
	4		Brown, slightly silty, fine grain sand.
	6		
	8		
	10		
11.0	12	81.9	
	14		Brown, fine to medium grain sand.
15.5	16	77.4	Water Table at 15.5' (77.4).
	18		Brown medium grain sand.
	20		
22.0	22	70.9	
	24		Brown medium to coarse grain sand with scattered
	26		small rounded gravel.
	28		
	30		
	32		
32.4	34	60.5	Hard Curly Chalk,
33.0		59.9	Bottom of Hole.
	36		
	38		(cont'd. on page 2)
	40		
	42		
	44		
	46		
	48		

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JOB NAME Damascus Steam Plant Site RECORDER Halbrook  
 HOLE IDENTIFICATION A.H. # 77-Dike hole 15-940184.15 410201.39 DRILLER Dover  
 SURFACE ELEV. 91.2 WEATHER Fair & hot DATE 7-25-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	91.2	Surface of ground.
	2		
	4		Brown Fine grain Sand.
	6		
	8		
	10		
	12		
13.0	14	78.2	water Table at 13.0' (78.2).
	16		
	18		
	20		Brown medium to coarse grain Sand with small rounded scattered gravel.
	22		
	24		
	26		
	28		Scattered gravel increasing in quantity toward bottom of hole. 26.0' (65.2) to 38.0' (53.2).
	30		
	32		
	34		
	36		
38.0	38	53.2	
40.0	40	51.2	Gray weathered Chalk saturated with water.
40.5	42	50.7	Hard gray Chalk Bottom of hole.
	44		
	46		(CONT'D. ON PAGE 2)
	48		2' Mud

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JOB NAME Demoport 2 Steam Plant 313 RECORDER Holo Hook

HOLE IDENTIFICATION A.H. #77 - pipe hole - E-412501.39 DRILLER Dover

SURFACE ELEV. 91.2 WEATHER Fair & hot DATE 7-25-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
			Penetration Tests
	50		Depth - Elev To Depth - Elev No. of Blows
	52		4.0 (87.2) 5.0 (86.2) 11
	54		8.0 (83.2) 9.0 (82.2) 6
	56		12.0 (79.2) 13.0 (78.2) 9
	58		16.0 (75.2) 17.0 (74.2) 3
	60		20.0 (71.2) 21.0 (70.2) 2
	62		24.0 (67.2) 25.0 (66.2) 10
	64		28.0 (63.2) 29.0 (62.2) 4
	66		32.0 (59.2) 33.0 (58.2) 12
	68		36.0 (55.2) 37.0 (54.2) 12
	70		40.0 (51.2) 40.5 (50.7) 50
	72		
	74		
	76		
	78		
	80		
	82		
	84		
	86		
	88		
	90		
	92		
	94		
	96		

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JOB NAME DemoPole Steam Plant Site RECORDER Holtwood  
 HOLE IDENTIFICATION A.H. # 79-Dike Hole - N-940184.15 DRILLER Over  
E-409271.39  
 SURFACE ELEV. 100.8 WEATHER Fair & HOT DATE 3-30-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	100.8	Surface of Ground.
	2		
	4		Brown Fine grain Sand.
	6		
	8		
	10		
	12		
	14		
	16		Sand becoming moist at 16.0' (84.8).
	18		
20.5	20		Scattered rounded gravel up to 3/4" in size beginning at 15.0' (82.8) and increasing in number toward bottom of hole.
	22	80.5	
23.0	22		Brown medium to coarse grain sand. WATER TABLE AT 22.0' (78.8).
	24	77.8	
	26		
	28		
	30		Brown coarse grain sand.
	32		
	34		
	36		
37.0	38	63.8	
38.0	38	62.8	Rounded gravel from 1/2" to 3/4" in size. TOP OF Crumpled bedded Chalk.
40.0	40	60.8	TOP OF Hard bedded Chalk.
41.0	42	59.8	BOTTOM OF HOLE.
	44		
	46		
	48		

2 1700

COPY

JOB NAME Demopolis Steam Plant Site RECORDER Holt, Ross  
 HOLE IDENTIFICATION A.H. # 79-Dice Hole N-940184.15 E-409601.29 DRILLER Casper  
 SURFACE ELEV. 100.8 WEATHER Fair & Hot DATE 8-30-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
	0		Penetration Tests
	2		Depth-Elev To Depth-Elev No. of Blows
	4		4.0 (96.8) 5.0 (95.8) 8
	6		8.0 (92.8) 9.0 (91.8) 7
	8		12.0 (88.8) 13.0 (87.8) Dry loose sand coming in, can't keep hole clear
	10		16.0 (84.8) 17.0 (83.8) same
	12		20.0 (80.8) 21.0 (79.8) 15
	14		24.0 (76.8) 25.0 (75.8) 10
	16		28.0 (72.8) 29.0 (71.8) 11
	18		32.0 (68.8) 33.0 (67.8) 13
	20		36.0 (64.8) 37.0 (63.8) 40
	22		40.0 (60.8) 41.0 (59.8) 50
	24		
	26		
	28		
	30		
	32		
	34		
	36		
	38		
	40		
	42		
	44		
	46		
	48		

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JOB NAME Demo Falls Steam Plant Site RECORDER H. Hook  
 HOLE IDENTIFICATION A.H. # 80-Dico Line E. 940184.15 DRILLER Dover  
E. 407301.27  
 SURFACE ELEV. 91.0 WEATHER Fair & Hot DATE 8-30-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	91.0	Surface of Ground.
	2		
	4		Brown Fine grain Sand.
	6		
	8		
	10		Scattered rounded gravel up to 3/4" in size beginning at 9.0' (82.0).
12.0	12	79.0	
14.0	14	77.0	MOIST Brown Medium to Coarse Grain Sand. Water Table at 14.0' (77.0).
	16		Brown Coarse Grain Sand.
	18		Gravel becoming very numerous at 16.5' (74.5)
	20		and continuing to bottom of hole.
	22		
	24		
	26		
28.0	28	63.0	Top of Hard Gray CLAY.
29.0	30	62.0	Bottom of Hole.
	32		Penetration Tests
			Depth - Elev To Depth - Elev No. of Blows
	34		4.0 (87.0) 5.0 (86.0) 8
	36		8.0 (83.0) 9.0 (82.0) 10
	38		12.0 (79.0) 13.0 (78.0) 19
	40		16.0 (75.0) 17.0 (74.0) 11
	42		20.0 (71.0) 21.0 (70.0) 13
	44		24.0 (67.0) 25.0 (66.0) 15
	46		28.0 (63.0) 29.0 (62.0) 50
	48		0 Mod

JOB NAME Demo Polite Steam Plant #1 RECORDER Hollis  
 HOLE IDENTIFICATION A.H. # 81 - DIKE Hole - E-408901.89 DRILLER McDonald  
 SURFACE ELEV. 90.0 WEATHER Fair & Hot DATE 8-31-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	90.0	Surface of Ground.
	2		
	4		
	6		Brown Fine grain Sand.
	8		
	10		
12.0	12	78.0	Water Table at 12.0' (78.0).
	14		
	16		Brown Medium grain Sand.
	18		
	20		
22.0	22	68.0	
	24		Brown Coarse grain Sand with small widely scattered rounded gravel.
	26		
26.5	28	65.5	TOP OF HARD WEATHERED CHALK.
28.0		62.0	TOP OF HARD CHALK.
29.0	30	61.0	BOTTOM OF HOLE.
	32		PENETRATION TESTS
			Depth - Elev to Depth - Elev NO. OF BLOWS
	34		4.0 (86.0) 5.0 (85.0) 8
	36		8.0 (82.0) 9.0 (81.0) Any loose sand caving in could not keep clean.
	38		12.0 (78.0) 13.0 (77.0) 6
	40		16.0 (74.0) 17.0 (73.0) 6
	42		20.0 (70.0) 21.0 (69.0) 7
	44		24.0 (66.0) 25.0 (65.0) 20
	46		28.0 (62.0) 29.0 (61.0) 50
	48		

CONFIDENTIAL

0.5 ft

JOB NAME Demoopolis Steam plant Site

RECORDER Holbrook

HOLE IDENTIFICATION A.H. # 82 - DIKE Hole - E-408201.39

DRILLER Dover

SURFACE ELEV. 92.2

WEATHER Fair & Hot

DATE 9-4-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
9.0	0	92.9	Surface of Ground.
	2		
	4		
	6		Brown Fine grain sand.
	8		
	10		
11.0	12	81.9	Moist Brown medium grain sand.
	14		water table at 13.5' (79.4).
	16		
	18		
	20		
22.0	22	70.9	
	24		Brown medium to coarse grain sand.
	26		
28.0	28	64.9	Top of gray weathered chalk.
	30		Gray weathered chalk with small scattered rounded gravel.
32.0	32	60.9	Top of hard gray chalk.
33.0	34	59.9	Bottom of hole.
	36		Penetration Tests
	38		Depth - Elev TO Depth - Elev No. of Blows
			4.0 (88.9) 5.0 (87.9) 8
			8.0 (84.9) 9.0 (83.9) 7
	40		12.0 (80.9) 13.0 (79.9) 18
			16.0 (76.9) 17.0 (75.9) 12
	42		20.0 (72.9) 21.0 (71.9) 8
			24.0 (68.9) 25.0 (67.9) 15
	44		28.0 (64.9) 29.0 (63.9) 18
			32.0 (60.9) 33.0 (59.9) 50
	46		
	48		A Mud

JOB NAME Demo Lake Steam Plant Site RECORDER Holtbrook  
 HOLE IDENTIFICATION A.H. # 83 - Dike Hole No. 941184.15 DRILLER McDonnell  
400801.39  
 SURFACE ELEV. 79.0 WEATHER Fair & Hot DATE 8-29-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	79.0	Surface of Ground.
2.0	2	77.0	Brown Silty Clay.
	4		Gray to Brown fine grain sandy clay.
	6		MATERIAL becoming moist at 6.0' (73.0).
7.0	8	72.0	Water Table at 7.0' (72.0).
	10		Brown medium to coarse grain sand with numerous rounded gravel up to 3/8" in size.
11.0	12	68.0	
	14		
	16		Brown coarse grain sand with numerous rounded gravel up to 3/8" in size.
18.0	18	61.0	Top of Gray weathered Chalk.
	20		
20.5		58.5	Top of Hard gray Chalk.
21.0	22	58.0	Bottom of Hole.
	24		
	26		Penetration Tests
	28		DEPTH. Elev to Depth - Elev. No. of Blows
	30		4.0 (75.0) 5.0 (74.0) 7
	32		8.0 (71.0) 9.0 (70.0) 8
	34		12.0 (67.0) 13.0 (66.0) 3
	36		16.0 (63.0) 17.0 (62.0) 8
	38		20.5 (58.5) 21.0 (58.0) 50
	40		
	42		2.5 M/L
	44		
	46		
	48		

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JOB NAME Demo Falls Steam Plant Site RECORDER Holbrook  
 HOLE IDENTIFICATION A.H. # 84-Dike Hole - E-408801.89 DRILLER Cover  
 SURFACE ELEV. 78.8 WEATHER Fair & Hot DATE 8-29-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
	0	78.8	Surface of Crowned.
	2	76.8	Brown Silty Clay.
	4		Gray to Brown Fine grain Sandy Clay.
	6	73.3	
	8		water table at 8.0' (70.8). Moist Gray Clayey medium grain sand.
	10	68.8	Brown Clayey medium grain sand.
	12		Brown medium grain sand.
	14	64.8	
	16		Brown coarse grain sand with numerous gravel from #4 to 3/8" in size.
	18	61.8	Top of Gray weathered chalk.
	20	58.8	Top of Hard Gray Chalk.
	22	57.8	Bottom of Hole.
	24		
	26		Penetration Tests
	28		Depth - Elev To Depth - Elev No. of Blows
	30		4.0 (74.8) 5.0 (73.8) 4
	32		8.0 (70.8) 9.0 (69.8) 5
	34		12.0 (66.8) 13.0 (65.8) 15
	36		16.0 (62.8) 17.0 (61.8) 14
	38		20.0 (58.8) 21.0 (57.8) 50
	40		
	42		3 Mud
	44		
	46		
	48		

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JOB NAME Damopolis Steam Plant Site RECORDER Halbrook  
 HOLE IDENTIFICATION A.U. # 85 - Dico Hole - E- 408801.39 DRILLER McCoy  
 SURFACE ELEV. 78.2 WEATHER Fair & Hot DATE 8-28-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	78.2	Surface of Ground.
1.5	2	76.8	Brown Silty Clay.
	4		Clay to Brown Fine grain Sandy Clay.
	6		
	8		Material becoming moist at 7.0' (71.2).
9.5	10	68.7	Water Table at 9.0' (69.2).
	12		
	14		Brown medium grain Sand.
	16		
18.0	18	60.2	Top of Hard Clay Chalk.
	20		Hard Clay Chalk.
21.0	22	57.2	Bottom of Hole.
	24		
	26		Penetration Tests
	28		Depth - Elev TO Depth - Elev NO. OF Blows
	30		4.0 (74.2) 5.0 (73.2) 6
	32		8.0 (70.2) 9.0 (69.2) 4
	34		12.0 (66.2) 13.0 (65.2) 13
	36		16.0 (62.2) 17.0 (61.2) 6
	38		20.0 (58.2) 21.0 (57.2) 50
	40		
	42		0 Mud
	44		
	46		
	48		

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JOB NAME Demographic Station #101 RECORDER Holtbrook  
 HOLE IDENTIFICATION A.H.#86-Dike Hole - E. 742284.15 DRILLER W. J. ...  
 SURFACE ELEV. 83.4 WEATHER Fair & Hot DATE ...

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
9.0	0	83.4	Surface of Ground.
	2		
	4		Clay To Brown Fine grain SANDY clay.
	6		
7.0	8	76.4	moist Brown To Gray Fine grain SANDY clay, Finest graining in Sand.
8.0		75.4	Water Table at 8.0' (75.4).
	10		Clay medium grain Sand.
11.0	12	72.4	
	14		Brown medium grain Sand with small scattered rounded gravel.
16.0	16	67.4	
	18		Brown Coarse grain Sand with increased number of small
	20		rounded gravel.
	22		
23.0	24	60.4	Top of weathered CLAY.
24.0		59.4	Top of Hard Clay CLAY.
24.5	26	58.9	Bottom of Hole.
	28		
	30		Penetration Tests
	32		Depth - Elev To Depth - Elev. No. of Blows
	34		4.0 (79.4) 5.0 (78.4) 20
	36		8.0 (75.4) 9.0 (74.4) 2
	38		12.0 (71.4) 13.0 (70.4) 11
	40		16.0 (67.4) 17.0 (66.4) 8
	42		20.0 (63.4) 21.0 (62.4) 8
	44		24.0 (59.4) 24.5 (58.9) 50
	46		
	48		

JOB NAME Demopolis Steam Plant Site RECORDER Holtwood  
 HOLE IDENTIFICATION A.H. #37-Oike Hole - N-943184.15 E-408801.39 DRILLER Cover  
 SURFACE ELEV. 90.0 WEATHER Fair & HOT DATE 8-27-67

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	90.0	Surface of Ground.
1.5	2	88.5	Blown silty clay.
	4		
	6		clay to brown fine grain sandy clay.
	8		material slightly organic stained from 8.0'(82.0) to 10.0'(80.0).
	10		material becoming moist and brown in coloring at 10.0'(80.0).
12.0	12	78.0	
	14		moist brown to gray fine grain sandy clay, increasing in sand. water table at 15.0'(75.0).
15.0	16	75.0	
16.0		74.0	brown medium grain sand.
	18		gray medium grain sand.
20.0	20	70.0	
	22		
	24		
	26		Brown medium to coarse grain sand with small scattered rounded gravel.
	28		
	30		Sand becoming coarser with numerous gravel up to 3/4" in size from 28.0'(62.0) toward bottom of hole.
32.0	32	58.0	
32.3		57.7	Top of Hard Clay Chalk. Bottom of Hole.
	34		
	36		Penetration Tests
			Depth - Elev. to Depth - Elev. No. of Blows
	38		4.0 (86.0) to 5.0 (85.0) 17
			8.0 (82.0) to 9.0 (81.0) 16
	40		12.0 (78.0) to 13.0 (77.0) 12
			16.0 (74.0) to 17.0 (73.0) 7
	42		20.0 (70.0) to 21.0 (69.0) 3
			24.0 (66.0) to 25.0 (65.0) 12
	44		28.0 (62.0) to 29.0 (61.0) 10
			32.0 (58.0) to 32.3 (57.7) 50
	46		
	48		

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JOB NAME Memphis Steam plant site RECORDER Holbrook  
 HOLE IDENTIFICATION A.H. # 88 Dike Hole - E-40890.57 DRILLER Cover  
 SURFACE ELEV. 91.1 WEATHER Cloudy & HOT DATE 8-23-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	91.1	SURFACE OF GROUND.
2.0	2	89.1	Brown silty clay.
	4		Reddish Brown fine grain sandy clay.
6.0	6	85.1	
	8		moist reddish brown slightly clayey fine grain sand.
10.0	10	81.1	
	12		Water Table at 12.0' (79.1).
	14		Brown medium grain sand.
	16		
18.0	18	75.1	
	20		
	22		
	24		Brown medium to coarse grain sand with small scattered rounded gravel.
	26		
	28		
30.0	30	61.1	TOP OF HARD CLAY CHALK.
30.5	32	60.6	BOTTOM OF HOLE.
	34		Penetration Tests
	36		Depth - Elev To Depth - Elev No. of Blows
		4.0 (87.1)	5.0 (86.1) 25
		8.0 (82.1)	9.0 (82.1) 19
	38	12.0 (79.1)	13.0 (78.1) 11
		16.0 (75.1)	17.0 (74.1) 3
	40	20.0 (71.1)	21.0 (70.1) 10
		24.0 (67.1)	25.0 (66.1) 15
	42	28.0 (63.1)	29.0 (62.1) 8
		30.0 (61.1)	30.0 (60.6) 50
	44		
	46		
	48		

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JOB NAME Camopolis Steam Plant Site RECORDER Holbrook  
 HOLE IDENTIFICATION A.H. # 89 ~~92.8~~ Dike Hole - 944184.15 DRILLER Dover  
 SURFACE ELEV. 92.8 WEATHER Cloudy & Hot DATE 8-22-67

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	92.8	Surface of Ground.
	2		Gray to Brown Silty Clay.
3.0	4	89.8	
	6		
	8		Gray to Brown Fine grain sandy clay.
	10		Material increased in sand and became moist
	12		at 11.0' (81.8).
13.0	14	79.8	
			Brown clayey fine grain sand.
15.0	16	77.8	Water Table at 15.0' (77.8).
16.0		76.8	Brown fine grain sand.
	18		
	20		
	22		Brown medium grain sand.
23.0	24	69.8	
	26		
	28		Brown medium to coarse grain sand with small scattered rounded gravel.
30.0	30	62.8	Top of hard Gray Chalk.
31.5	32	61.3	Bottom of Hole.
	34		Penetration Tests
	36		Depth - Elev To Depth - Elev No. of Blows
			4.0 (88.8) 5.0 (87.8) 11
			8.0 (84.8) 9.0 (83.8) 14
	38		12.0 (80.8) 13.0 (79.8) 12
			16.0 (76.8) 17.0 (75.8) 7
	40		20.0 (72.8) 21.0 (71.8) 10
			24.0 (68.8) 25.0 (67.8) 20
	42		28.0 (64.8) 29.0 (63.8) 16
			31.0 (61.8) 31.5 (61.3) 50
	44		
	46		
	48		

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JOB NAME Demopolis Steam Plant Site RECORDER Holbrook  
 HOLE IDENTIFICATION A.H. # 90-Dice Hole. N-944684.15 E-408801.39 DRILLER Dover  
 SURFACE ELEV. 91.2 WEATHER Cloudy & Hot DATE 8-21-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	91.2	Surface of Ground.
2.0	2	89.2	Brown Silty Clay.
	4		
	6		Gray To Brown Fine grain Sandy Clay.
	8		MATERIAL becoming moist AT 7.0' (84.2).
	10		
	12		MATERIAL Increasing in Sand AT 12.0' (79.2).
14.0	14	77.2	Water Table AT 14.0' (77.2).
	16		
	18		
	20		
	22		Brown medium grain Sand.
	24		
	26		
	28		
	30		
31.0	32	60.2	
	34		Brown medium To coarse grain Sand with small scattered
	36		Rounded gravel.
	38		
39.0	40	52.2	TOP OF HARD Gray Chalk.
40.5	42	50.7	BOTTOM OF Hole.
	44		0 14.1
	46		
	48		

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JOB NAME Demopolis Steam Plant Site RECORDER Holtbrook  
 HOLE IDENTIFICATION A.H.#90 - Pike Hole - E-408801.39 DRILLER Dover  
 SURFACE ELEV. 91.2 WEATHER Cloudy & Hot DATE 8-21-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS	
			Penetration Tests	
	50		Depth - Elev. to Depth - Elev. No. of Blows	
	52		4.0 (87.2) 5.0 (86.2)	11
	54		8.0 (83.2) 9.0 (82.2)	12
	56		12.0 (79.2) 13.0 (78.2)	9
	58		16.0 (75.2) 17.0 (74.2)	4
	60		20.0 (71.2) 21.0 (70.2)	7
	62		24.0 (67.2) 25.0 (66.2)	4
	64		28.0 (63.2) 29.0 (62.2)	5
	66		32.0 (59.2) 33.0 (58.2)	6
	68		36.0 (55.2) 37.0 (54.2)	8
	70		40.0 (51.2) 40.5 (50.7)	25
	72			
	74			
	76			
	78			
	80			
	82			
	84			
	86			
	88			
	90			
	92			
	94			
	96			

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JOB NAME Demopolis Steam plant Site RECORDER Holbrook  
 HOLE IDENTIFICATION A.H. # 91-Dike Hole - N-944969.13 E-409012.41 DRILLER Dover  
 SURFACE ELEV. 91.0 WEATHER Partly Cloudy & Hot DATE 8-20-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	91.1	Surface of Ground.
	2		Gray to brown slightly silty clay.
	4		
	6		material becoming moist and organic stained at
	8		6.0' (85.1).
10.0	10	81.1	
	12		Gray to brown fine grain sandy clay.
	14		
15.0	16	76.1	water table at 15.0' (76.1).
	18		Brown medium grain sand.
	20		
22.0	22	69.1	Top of Hard Gray Chalk.
	24		Hard Gray Chalk.
24.5	26	66.6	Bottom of Hole.
	28		
	30		Penetration Tests
			Depth - Elev. To Depth - Elev. No. of Blows
	32		4.0 (87.1) 5.0 (86.1) 11
	34		8.0 (83.1) 9.0 (82.1) 14
	36		12.0 (79.1) 13.0 (78.1) 10
	38		16.0 (75.1) 17.0 (74.1) 3
	40		20.0 (71.1) 21.0 (70.1) 5
	42		24.0 (67.1) 24.5 (66.6) 50
	44		
	46		
	48		

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JOB NAME Demopolis Steam Plant Site RECORDER Dover, E  
 HOLE IDENTIFICATION AH# 92 - Dike Line DRILLER Dover, D  
 SURFACE ELEV. 89.8 WEATHER \_\_\_\_\_ DATE 8-17-62

N- 944964.94  
 E- 409512.39

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	89.8	SURFACE.
1.5	2	88.3	BROWN silty clay.
	4		
	6		Brown to gray fine grain
8.0	8	81.8	SANDY clay.
	10		
11.0	12	78.8	gray to brown fine grain SANDY CLAY. MATERIAL becoming moist AT 9.0' (80.8) WATER TABLE AT 11.0 (78.8).
	14		
5.0	16	74.9	Brown to gray fine to medium grain CLAYEY SAND.
	18		
	20		Fine to medium grain SAND.
	22		
4.0	24	65.8	
5.0	26	64.8	Bottom of HARD GRAY CHALK OF HOLE
	28		
	30		PENETRATION TEST
	32		Depth Elev To Depth Elev NO. OF Blows
	34		4.0 (85.8) 5.0 (84.8) 15
	36		8.0 (81.8) 9.0 (80.8) 12
	38		12.0 (77.8) 13.0 (76.8) 4
	40		16.0 (73.8) 17.0 (72.8) 4
	42		20.0 (69.8) 21.0 (68.8) 8
	44		24.0 (65.8) 25.0 (64.8) 50
	46		
	48		

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JOB NAME Demopolis STEAM PLANT Site RECORDER DOVER, E

HOLE IDENTIFICATION A.H. #93 - DIKE LINE DRILLER DOVER, D

SURFACE ELEV. 93.3 WEATHER FAIR & HOT DATE 8-16-62

N-944960.75  
E-410012.37

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
2.0	0	93.3	SURFACE.
1.0	2		Silty fine grain clay.
	4		
	6		
	8		Brown to gray fine grain sandy clay.
	10		MATERIAL BECOMING MOIST AT 9.0 (84.3).
2.0	12	81.3	
	14		
16.0	16	77.3	Brown to gray fine grain clayey sand. WATER TABLE AT 15.0 (78.3)
	18		
	20		
	22		Fine to medium grain sand with small stringer of gray clay.
14.0	24	70.3	
14.5	24	68.8	HARD GRAY CHALK. BOTTOM OF HOLE.
	26		
	28		
	30		Penetration Test
	32		Depth Elev To Depth Elev No. of Blows
	34		4.0 - (89.3) 5.0 (88.3) 21
	36		8.0 (85.3) 9.0 (84.3) 6
	38		12.0 (81.3) 13.0 (80.3) 4
	40		16.0 (77.3) 17.0 (76.3) 4
	42		20.0 (73.3) 21.0 (72.3) 9
	44		24.0 (69.3) 24.5 (68.8) 50
	46		
	48		0 Mud

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JOB NAME Demopolis Steam Plant site RECORDER Dover, E  
 HOLE IDENTIFICATION A.H.#94 - DIKE LINE DRILLER McDONALD  
 SURFACE ELEV. 93.0 WEATHER FAIR & HOT DATE 8-16-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
	0	93.0	
	1.5	91.5	SURFACE. BROWN SILTY CLAY.
	2		
	4		
	6		
	8		BROWN TO GRAY FINE GRAIN SANDY CLAY.
	10		with small amount of organic material.
	12		
	14		MATERIAL BECOMING MOIST AT 9.0 (84.0).
	15.0	78.0	WATER TABLE AT 15.0 (78.0).
	16		
	18		
	20		BROWN TO GRAY CLAYEY SAND
	22	76.0	medium grain.
	24		
	26		GRAY WEATHERED CHALK.
	28	65.0	
	29.0	64.0	HARD GRAY CHALK. BOTTOM OF HOLE.
	30		6' Mud
	32		
	34		Penetration Test
	36		Depth Elev TO Depth Elev No. OF BLOWS
	38		4 (89.0) 5 (88.0) 9
	40		9 (85.0) 9 (84.0) 10
	42		12 (81.0) 13 (80.0) 6
	44		16 (77.0) 17 (76.0) 4
	46		20 (73.0) 21 (72.0) 4
	48		24 (69.0) 25 (68.0) 7
			28 (65.0) 29 (64.0) 50

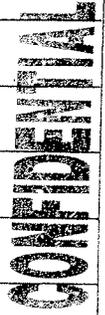
JOB NAME Dampelle Steam Plant Site RECORDER W. J. ...

HOLE IDENTIFICATION A.U. # 127 - Proposed Power Plant DRILLER D. ...

SURFACE ELEV. 95.0 WEATHER Fair & ... DATE 3-19-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
	0	95.0	Surface of Ground.
0.0	2	93.0	Brown Silty Clay.
	4		
	6		Gray to Brown Fine Grained Sandy Clay.
8.0	8	87.0	material becoming moist at 8.0' ( 87.0 ).
	10		
	12		Brown Slightly Sandy Clay.
	14		
15.0	16	80.0	Water Table at 15.0' ( 80.0 ).
	18		Brown Clayey Fine Grained Sand with lens increasing
	20		towards Bottom of Hole.
	22		
24.0	24	71.0	Top of Hard Gray Chalk
25.5	26	67.5	Bottom of Hole
	28		
	30		
	32		Sampled
	34		0.0 ( 95.0 ) TO 8.0 ( 87.0 )
	36		8.0 ( 87.0 ) TO 15.0 ( 80.0 )
	38		15.0 ( 80.0 ) TO 24.0 ( 71.0 )
	40		
	42		
	44		
	46		
	48		

O.M.I.



JOB NAME Danforth Steam Plant Site RECORDER W. J. ...

HOLE IDENTIFICATION A.S. #136-Prof. Borrow Pit DRILLER ...

SURFACE ELEV. 94.9 WEATHER Fair 90° DATE 9-19-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
0.0	0	94.9	Surface of ...
1.5	2	93.4	Brown clayey silty
	4		
	6		Gray to black fine grain silty clay
	8		medium to heavy moist silty (86.9)
	10		
	12		
	14		
15.0	16	79.9	water table at 15.0' (79.9)
	18	76.9	Brown fine to medium grain clayey silty
	20		
	22		Brown medium grain sand
	24		
	26		
27.0	28	67.9	Top of Hard br. chalk
29.0	30	65.9	Bottom of hole
	32		
	34		Sampled
	36		1.5 ( 93.4 ) TO 15.0 ( 79.9 )
	38		15.0 ( 79.9 ) TO 18.0 ( 76.9 )
	40		18.0 ( 76.9 ) TO 27.0 ( 67.9 )
	42		
	44		
	46		0 Mud
	48		



JOB NAME Damascus Steam Plant 2100 RECORDER Holmes

HOLE IDENTIFICATION A.H. # 137 - Proctor - Balance Hole DRILLER F. J. ...

SURFACE ELEV. 95.0 WEATHER Fine & Cool DATE 9-12-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS	N- 9448 E- 410438
	0	95.0	Surface of ...	
<u>1.5</u>	2	93.5	Brown Cherty Silt.	
	4			
	6		Brown Fine Grained Sandy Clay.	
	8		intermittent seeping water AT 8.0' ( 87.0 ).	
	10			
<u>11.0</u>	12	84.0		
	14		Brown Cherty Fine Grained Sand.	
<u>15.0</u>	16	80.0	water table at 16.0' ( 80.0 ).	
	18			
	20		Brown medium grain Sand.	
	22			
<u>24.0</u>	24	71.0	TOP of Hard Blue Chalk.	
<u>25.0</u>	26	69.5	BOTTOM OF hole.	
	28			
	30			
	32		Sampled	
	34		1.5 ( 93.5 ) TO 11.0 ( 84.0 )	
	36		11.0 ( 84.0 ) TO 15.0 ( 80.0 )	
	38		15.0 ( 80.0 ) TO 21.0 ( 71.0 )	
	40			
	42			
	44			0 Mud
	46			
	48			

COMPLETED

JOB NAME Dempsey Storage Site RECORDER W. J. ...

HOLE IDENTIFICATION A.H. #130 - ... DRILLER ...

SURFACE ELEV. 82.8 WEATHER ... DATE 1-10-62

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
	0	82.8	Surface of Ground.
	2		
	4		Brown Fine Grain Sand, Clay.
6.0	6	76.8	
	8		Brown Clayey Fine Grain Sand.
9.0	10	73.8	Water Table at 10' ( 73.8' ).
	12		
	14		Brown Medium Grain Sand.
	16		
17.5	18	65.8	Brown Coarse Grain Sand with widely scattered small rounded pebbles.
	20		
21.0	22	61.8	Top of thin ...
23.0	24	59.8	Bottom of thin ...
	26		
	28		Sample
	30		0.01 82.8 to 0.01 76.8 )
	32		0.01 76.8 to 0.01 73.8 )
	34		1.01 73.8 to 17.5 65.8 )
	36		17.5 ( 65.8 ) to 2.01 61.8 )
	38		
	40		
	42		
	44		0 Mud
	46		
	48		

COPIED  
 BY  
 DATE

JOB NAME Demo of ST... RECORDER H...

HOLE IDENTIFICATION A.H. 189-... DRILLER ...

SURFACE ELEV. 84.0 WEATHER Fair & 60° DATE ...

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
	0	84.0	Surface of ground
	2		...
	4		
<u>5.0</u>	6	79.0	
	8		...
	10		
<u>12.0</u>	12	72.0	water table at 12.0' ( 72.0 ).
	14		
	16		...
	18		...
	20		
<u>22.0</u>	22	62.0	Top of Hard Sand Barren
	24		
<u>25.0</u>	26	59.0	Bottom of ...
	28		
	30		
	32		9.0' 84.0' to 5.0' 79.0' )
	34		5.0' 79.0' to 12.0' 72.0' )
	36		12.0' 72.0' to 22.0' 62.0' )
	38		
	40		
	42		
	44		
	46		
	48		

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JOB NAME Demo 2011 Steam Plant Site RECORDER Holtz

HOLE IDENTIFICATION A.H. 142 - PROBEAD 10.000 ALB DRILLER S. J. ...

SURFACE ELEV. 82.5 WEATHER Fair + ... DATE 9-19-11

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS	N-241580 E-42170
0.0	0	82.5	Surface of ground.	
	2		Blackish ... Fine grain ... clay.	
	4			
6.0	6	76.5		
	8		Blackish Brown clay, fine grain ...	
9.0	10	73.5	under water ... 73.5	
	12			
	14		Brown medium grain ...	
	16			
	18	68.5		
	20			
	22		Brown coarse grain ... with small ...	
	24		... ..	
	26			
	28			
29.0	30	53.5	Top of ... ..	
	32	50.5	Top of hard ... ..	
32.0	34	48.5	Bottom of ... ..	
34.0	36		Sample	
	38		0.01 82.5 ) TO 6.01 76.5 )	
	40		6.01 76.5 ) TO 9.01 73.5 )	
	42		9.01 73.5 ) TO 12.01 68.5 )	
	44		12.01 68.5 ) TO 15.01 53.5 )	
	46			
	48			

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JOB NAME Low Falls Transmission SW RECORDER W. H. ...  
 HOLE IDENTIFICATION A.H.# 141 - ... Ave. DRILLER ...  
 SURFACE ELEV. 87.2 WEATHER Fair & Hot DATE 7-8-44

8.0  
1.0  
5.0  
7.0  
9.0  
25.0  
27.0

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
	0	87.2	Surface of ground.
	2	85.2	Reddish brown silty clay.
	4		Reddish brown silty clay.
	6	83.2	Brown clayey fine sand.
	8	81.2	Fine sand.
	10	79.2	Water Table at ( 79.2 ).
	12		
	14		Phos. Medium to coarse gran. sand.
	16		
	18		Scattered sand in general silty clay.
	20		Increasingly silty bottom of hole.
	22		
	24		
	26	62.2	Top of Hard in clay.
	28	60.2	Bottom of hole.
	30		Sample
	32		1.0' ( 86.2 ) to 5.0' ( 82.2 )
	34		5.0' ( 82.2 ) to 7.0' ( 80.2 )
	36		7.0' ( 80.2 ) to 9.0' ( 78.2 )
	38		9.0' ( 78.2 ) to 15.0' ( 62.2 )
	40		
	42		
	44		
	46		
	48		

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JOB NAME Demo/old Steam Plant Site RECORDER Heinrich  
 HOLE IDENTIFICATION A.H.# 142 - Progress Down Area DRILLER ...  
 SURFACE ELEV. 87.6 WEATHER Fair & HOT DATE 9-13-...

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
	0	87.6	Surface of Ground.
0.0	2		Brown Silt.
	4		
5.0	6	82.6	
	8		Brown Medium grain Sand.
	10		
12.0	12	75.6	Water Table at 12.0' ( 75.6 ).
	14		
	16		Brown coarse grain Sand with scattered pebbles up to 3/8" in size.
	18		
	20		
	22		
	24		
	26		
	28		
30.0	30	57.6	TOP OF Hard Sandstone.
32.0	32	55.6	BOTTOM of Hole.
	34		
	36		
	38		Sampled
	40		0.0' 87.6 ) to 5.0' 82.6 )
	42		5.0' 82.6 ) to 12.0' 75.6 )
	44		12.0' 75.6 ) to 30.0' 57.6 )
	46		
	48		

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JOB NAME Greene County Steam Plant RECORDER S.A. McDaniel  
 HOLE IDENTIFICATION Hole #1 Ash Pond Dike DRILLER W.P. Sheehan  
 SURFACE ELEV. 105.0 WEATHER Fair & Hot DATE 9-15-76

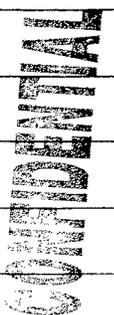
Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
			N-941-253.5 E-413-092.8
0.0	0	105.0	Surface of fill Standard Penetration Test
2.0	2	103.0	Brown fine grained clayey, silty sand. (sm)
	4		Brown, very fine grained, clayey sand. (sc)
	6		5.0-6.5
8.0	8	97.0	6-11-17=N 28
	10		Brown fine grained, gravelly sand (sp) mostly 1/2"
	12		10.0-11.5 gravel, becoming moist. 10-12-9=N 21
13.0	14	92.0	
	16		Dark grayish brown, slightly organic 15.0-16.5
18.0	18	87.0	silty clay, (OL-CL) 4-5-7=N 12 Bottom of fill
	20		Light gray to Grayish brown, slightly plastic, silty sandy clay (CL)
	22		with layers of organic, silty clay (OL) 20.0-21.5 3-2-2=N 4
	24		
	26		25 C - 26.5
28.0	28	77.0	3-2-2=N 4
	30		Light gray mottled yellowish brown, very silty clay (CL).
	32		30.0-31.5 4-5-7=N 12
34.0	34	71.0	
	36		35.0-36.5 9-12-18=N 30
	38		Dark yellowish brown fine grained
	40		clean sand(S)). slight increase in 40.0-41.5
	42		10-10-15=N 21 grain size with depth.
44.0	44	61.0	
	46		45.0-46.5 Strong brown fine to medium grained, 10-15-26=N 41
	48		" gravelly sand. (SP) rounded gravel up to 1/2"

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# Alabama Power Company DRILLING LOG

JOB NAME Greene County Steam Plant RECORDER S. A. McDaniel  
 HOLE IDENTIFICATION Hole #1 Ash Pond Dike DRILLER W. P. Sheehan  
 SURFACE ELEV. 105.0 WEATHER Fair & Hot DATE 9-15-75

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
			Standard Penetration Test
	50		50.0-51.5
	52		3-7-15=N 22
53.0		52.0	
	54		Strong brown, fine to medium grained,
	56		fine gravelly sand (SP-SW). 55.0-56.5 10-20-31=N 51
	58		
	60		60.0-61.5
62.0	62	43.0	Top of chalk 17-20-20=N 40
	64		Dark gray very hard chalk
	66		65.0-66.3 50-60-100= N refus
66.3		39.7	3
	68		Bottom of hole. Split spoon refusal
	70		
	72		Note water table @:27.0(76.0)
	74		U.D. Samples
	76		8.0(97.0) to 10.0(95.0) 18.0(87.0) to 20.0(85.0)
	78		28.0(77.0) to 30.0(75.0)
	80		
	82		
	84		
	86		
	88		
	90		
	92		
	94		
	96		



# Alabama Power Company DRILLING LOG

JOB NAME Greene County Steam Plant RECORDER S.A. McDaniel  
 HOLE IDENTIFICATION Hole #2 Ash Pond Dike DRILLER W.P. Sheehan  
 SURFACE ELEV. 95.8 WEATHER Cloudy & Rain DATE 9-17-75

Strata Symbol	Depth	Elev.	N-940,754.6 E-911.962.1	DESCRIPTION AND REMARKS
	0	95.8		Surface of ground
	2	93.8		Brown fine grained silty sand. (SM) Standard Penetration Test
	4			Strong brown fine grained silty sand.
	6			(sm) 5.0-6.5 9-16-20=N 36
	8			
	10	84.8		10.0-11.5
	12			12-16-18=N 34
	13.0	82.8		Strong brown to olive fine grained silty sand.
	14			Bottom of fill.
	16			15.0-16.5 Dark gray soft organic silty clay. (ol) 4-2-1=N 3
	18.0	77.8		
	20			Light gray mottled yellish-brown, plastic silty clay (CL) 20.0-21.5 4-5-8=N 13
	22			
	22.5	73.3		
	24			Gray to brown mottled, fine sandy, clayey silt (ML) 25.0-26.5 5-6-10=N 16
	26.0	69.8		
	28			Light gray fine grained silty sand. (sm)
	28.5	67.3		
	30			30.0-31.5 10-12-25=N 37
	32			Yellowish brown fine grained, small gravelly clean sand (SP).
	34			
	36			35.0-36.5
	38.0	57.8		12-8-13=N 21 Top of chalk
	40			Dark gray very hard chalk 40.0-41.5
	41.5	54.3		Bottom of hole
	44			
	46			Note water table @: 20.0 (75.8)
	48			U.D. Samples 8.0(87.8) to 10.0(85.8)

CORRECTION

# Alabama Power Company DRILLING LOG

JOB NAME Greene County Steam Plant RECORDER S. A. McDaniel

HOLE IDENTIFICATION #3 Ash Pond Dike DRILLER W. D. Sheehan

SURFACE ELEV. 93.8 WEATHER Cloudy & Hot DATE 9-18-75

Strata Symbol	Depth	Elev.	Location	DESCRIPTION AND REMARKS
			N-940,292.07 E-411.044.04	
0.0	0	93.8	Surface of ground	Standard Penetration Test
2.0	2	91.8	Brown very fine grained silty sand. (SW)	
	4		Strong brown very fine grained, very slightly clayey silty sand. (sm)	
	6			5.0-6.5 9-9-11=N 20
	8			
	10			10.0-11.5
	12			3-5-5=N 10
	14		Becoming very moist at 13.0 (80.8)	
	16			15.0-16.5 8-10-12=N 22
	18			
19.0	20	74.8	Yellowish brown fine to medium grained, fine gravelly, sl. silty sand (sp-sm) some organic stain	20.0-21.5 3-4-4=N 8
	22			
	24			
25.0	26	68.8	Strong brown dense fine gravelly, fine Grained sand (sp-sm)	25.0-26.5 6-10-25=N 35
	28			
	30			30.0-31.5
	32			7-11-28=N 39
33.0	34	60.8	Yellowish brown fine grained silty sand (sm)	
	36			35.0-36.5 10-15-20=N 35
	38			
38.5	40	55.3	Top of chalk Dark gray very hard chalk. (CL)	
41.4	42	52.4	Bottom of hole	40.0-41.2 17-30-100/.4=Refusa
	44			U.D. Samples
	46			8.0 (85.8) to 10.0 (83.8) 18.0 (75.8) to 20.0 (73.8)
	48			28.0 (65.8) to 30.0 (63.8)
				Note water table

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# Alabama Power Company DRILLING LOG

JOB NAME Greene County Steam Plant RECORDER S.A. McDaniel  
 HOLE IDENTIFICATION #4 Ash Pond Dike DRILLER Sheehan  
 SURFACE ELEV. 94.8 WEATHER Cloudy & Hot DATE 9-19-75

Strata Symbol	Depth	Elev.	Location N-940,125.4 E-409,981.3	DESCRIPTION AND REMARKS
	0	94.8		Surface of ground Standard Penetration Test
//	2			Dark brown fine silty sand (sm) with few small roots.
	4			
	6			5.0-6.0 6-10-12=N 22
	8	87.8		
. . .	10			Yellowish-brown, sl. gravelly, fine gr. sand (sm) 10.0-11.5 8-7-8=N 15
	12			
	14	80.8		
. . .	16			Brown fine grained slightly gravelly sand (sp-sm) 15.0-16.5 4-8-9=N 17
	18	76.8		
. . .	20			Dark brown, fine to med. gr. sl. fine gravelly sand (sp-sm) 20.0-21.5 4/5/6 = N11
	22			
	24			
	26			25.0-26.5 5-6-9=N 15
	28	66.8		
. . .	30			Strong brown fine grained sand (sp-sm) 30.0-31.5
	32	63.9		Top of weathered chalk. (CL) 9-9-15=N 24 Light gray, weathered chalk
	34			grading to dark gray, hard chalk 32.0
	36			35.0-36.1 25-40-60=N 100
	38	58.3		
	40			Bottom of hole
	42			U.D. Samples
	44			8.0(86.8) to 10.0 (84.8) 18.0(76.8) to 20.0 (74.8) no re
	46			28.0(66.18) to 30.0 (64.8) to wet & sandy
	48			

# Alabama Power Company DRILLING LOG

JOB NAME Greene County Steam Plant RECORDER W.R. Jenkins  
 HOLE IDENTIFICATION Hole #5 Ash Pond Dike DRILLER Sheehan  
 SURFACE ELEV. 93.1 WEATHER cloudy & showers DATE 9-24-75

Strata Symbol	Depth	Elev.	location N-940,861.0 E-408,990.70	DESCRIPTION AND REMARKS
0.0	0	93.1		Surface of ground Standard Penetration Test
	2			Brown, fine, silty, sandy, clay (CL)
4.0	4	89.1		
	6			4.5-6.0
	8			8-10-13=N 23
	10			
	12			10.0-11.5 Yellowish brown, fine grained, sand. (sm) 3-2-4=N 6
	14			
	16			14.5-16.0 5-5-2=N 7
	18			
	20			
23.0	22			20.0-21.5 2-4-12=N 16
	24	70.1		Brown, fine grained, sand & scattered 1/4"
	26			24.5-26.0 Rounded gravel. (sp-sm) 2-3-6=N 9
	28			
30.0	30	63.1		Top of weathered chalk
				Dark gray, hard chalk (CL)
31.5	32	61.6		Bottom of hole 30.0-31.5 14-20-25=N 45
	34			Note: Water Table @ 10.6(82.5)
	36			U.D. Samples
	38			8.0(85.1 ) 10.0(83.1 ) No recovery
	40			18.0(75.1 ) 20.0(73.1 ) " "
	42			28.0(65.1 ) 30.0(63.1 ) " "
	44			
	46			
	48			



# Alabama Power Company DRILLING LOG

JOB NAME Greene County S.P. RECORDER \_\_\_\_\_  
 HOLE IDENTIFICATION Hole # 6 Ash Pond Dike DRILLER \_\_\_\_\_  
 SURFACE ELEV. 93.2 WEATHER Cloudy & cool DATE 9-24-75

Strata Symbol	Depth	Elev.	Location	DESCRIPTION AND REMARKS
			N-941.841.20 E-408,801.60	
	0	93.2	Surface of ground	Standard Penetration Test
	2			
	4		Yellowish-brown mottled dark gray, fine sandy, silty clay (CL)	4.5-6.0 4-6-9=N 15
	6			
	8	85.2		
	10		Brownish-gray, sl. organic, clayey silt to fine sandy silt (ML)	10.0-11.5 7-7-3=N 10
	12	81.2		
	14		Light brown to strong brown, mottled gray, very fine grained, clayey	14.5-16.0 4-5-6=N 11
	16		sand. (SC)	
	18			
	20	73.2		
	22		Reddish-brown, fine grained, sand, (SM)	20.0-21.5 4-4-3=N 7
	24			
	26	67.2		
	28			24.5-26.0 6-8-16=N 24
	30		Brown, fine grained, sand & scattered 1/4" rounded gravel (sp-sm)	
	32	62.0	Top of weathered chalk	30.0-31.5
	31.5	61.7	Dark gray dense chalk. (CL)	8-10-15=N 25
	34		Bottom of hole Note: Water table @ 11.9(81.3)	
	36		U.D. Samples	
	38		8.0(85.2) 10.0(83.2)	
	40		18.0(75.2) 20.0(73.2)	
	42		28.0(65.2) 30.0(63.2) No recovery	
	44			
	46			
	48			



JOB NAME Greene County S.P.RECORDER Jenkins & DanielHOLE IDENTIFICATION Hole #7 Ash Pond Dike

DRILLER \_\_\_\_\_

SURFACE ELEV. 92.7WEATHER Cloudy & coolDATE 9-24-75

Strata Symbol	Depth	Elev.	DESCRIPTION AND REMARKS
	0	92.7	Surface of ground
	2		Standard Penetration Test
	3.0	89.7	Yellow sandy clay (CL)
	4		4.5-6.0
	6		6-6-6=N 12
	8		Yellowish-brown to olive, fine sandy silty clay (CL)
	10		10.0-11.5
	12		5-9-10=N 19
	14		
	16.0	76.7	
	18		14.5-16.0
	20.0	72.7	4-4-7=N 11
	20		Yellowish brown mottled gray, sl. plastic, silty caly (CL)
	22		20.0-21.5
	24		5-9-11=N 20
	25.0	67.7	Very pale brown fine grained sand(sm)
	26		Light yellowish brown fine grained
	28		gravelly sand. (sp-sm)
	29.0	63.7	24.5-26.0
	30		3-4-10=N 14
	32		Light yellowish brown, fine to coarse grained, clayey sand (SC) with deposits or organic material
	34		30.0-31.5
	35.6	57.1	3-4-6=N 10
	36		Top of weathered chalk
	36.5	56.2	Dark gray hard chalk (CL)
	38		Bottom of hole
	40		35.0-36.5
	42		15-20-30=N 50
	44		Note water table @: 10.0 (82.7 )
	46		U.D. Samples
	48		8.0(84.7 ) to 10.0(82.7 )
			18.0(74.7 ) to 20.0(72.7 )
			28.0(64.7 ) to 30.0(62.7 )

COMPLETED  
 9-24-75

JOB NAME Greene County S.P. RECORDER \_\_\_\_\_HOLE IDENTIFICATION Hole # 8 DRILLER \_\_\_\_\_SURFACE ELEV. 93.4 WEATHER \_\_\_\_\_ DATE \_\_\_\_\_

Strata Symbol	Depth	Elev.	location N-944,325.9 E-408,871.0	DESCRIPTION AND REMARKS
0.0	0	93.4		Surface of ground Standard Penetration Test
2.0	2	91.4		Yellowish sandy clay (CL)
	4			Strong brown mottled light brown and light gray silty clay (CL)
	6			5.0-6.5 7-8-14=N 2
	8			
	10			10.0-11.5
	12			4-4-9=N 13
14.0	14	79.4		
	16			15.0-16.5 3-3-6=N 9
	18			Light brown to tan, wet silty sand. (sm)
	20			
	22			20.0-21.5 7-8-13=N 21
24.0	24	69.4		Top of weathered chalk med gray, lightly weathered chalk harder at 26.0 (67.4)
	26			25.0 - 26.5 9/11/20 = N 31
26.5	26	66.9		
	28			Bottom of hole
	30			
	32			
	34			Note water table @: 12.3 (81.1 )
	36			U.D. Samples
	38			8.0 (85.4 ) to 10.0 (83.4 ) 18.0 (75.4 ) to 20.0 (73.4 )
	40			no recovery
	42			
	44			
	46			
	48			

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JOB NAME Greene County S.P.

RECORDER \_\_\_\_\_

HOLE IDENTIFICATION Hole #9

DRILLER \_\_\_\_\_

SURFACE ELEV. 93.7

WEATHER \_\_\_\_\_

DATE \_\_\_\_\_

Strata Symbol	Depth	Elev.	Location	DESCRIPTION AND REMARKS
			N-944,889.80 E-409,527.80	
0.0	0	93.7	Surface of ground	Standard Penetration Test
4.0	2		Dark yellowish-brown silty clay (CL)	
	4	89.7		
	6		Light gray to brown mottled silty clay. (CL)	5.0-6.5 5-7-8=N 15
	8			
	10			
	12			10.0-11.5 4-5-7=N 12
14.0	14	79.7		
19.0	16		Light gray to brown, very silty clay slightly moist (CL-mI)	15.0-16.5 4-5-6=N 11
	18	74.7		
	20			
24.0	22		very pale brown, fine grained, sand(sm)	20.0-21.5 5-6-9=N 15
	24	69.7		
27.0	26		Dark gray to very pale, brown, fine grained sand, very wet (sm)	25.0-26.5 7-9-13=N 22
	28	66.7	Top of weathered chalk	
31.5	30		Dark gray, hard chalk. (CL)	
	32	62.2	Bottom of hole	30.0-31.5 15-20-34=N 54
	34		Note: water Table @ 10.5 (83.2 )	
	36		U.D. Samples	
	38		8.0 (85.7 ) 10.0 (83.7 )	
	40		18.0 (75.7 ) 20.0 (73.7 )	
	42			
	44			
	46			
	48			

**CONFIDENTIAL**

JOB NAME Greene County S.P. RECORDER \_\_\_\_\_  
 HOLE IDENTIFICATION Hole #10 ASH ROAD DIKE DRILLER \_\_\_\_\_  
 SURFACE ELEV. 94.5 WEATHER \_\_\_\_\_ DATE 9-29-75

Strata Symbol	Depth	Elev.	Location	DESCRIPTION AND REMARKS
			N-945,374.90 E-410,333.60	
	0.0	94.5	Surface of Ground	Standard Penetration Test
	2			
	3.0	91.5		Dark Yellowish brown silty clay (CL)
	4			
	4.5	90.0		Dark gray to brown, organic, sandy clay (ol)
	6			5.0-6.5
	8		Yellowish brown, mottled olive gray silty clay (CL)	5-4-7=N 11
	10		Becoming moist at 13.0 (81.5)	
	12			10.0-11.5 5-7-10=N 17
	14			
	16			15.0-16.5
	18			4-4-8=N 12
	19.0	75.5		(sc)
	20		Gray, fine grained, clayey, sand with	
	22	72.5	layers of strong brown, fine grained, silty sand. (sm)	20.0-21.5 2-4-6=N 10
	24		Gray, fine grained, slightly organic, silty sand (sm)	
	26			25.0-26.5 2-2-2=N 4
	28			
	29.0	65.5	Top of weathered chalk	
	30		Dark gray, hard chalk. (CL)	
	31.3	63.2	Bottom of hole	30.0-31.3 20-23-100/.3=N Re
	32			
	34		Note: Water table @21.0 (73.5 )	
	36		U.D. Samples	
	38		8.0 (86.5 ) 10.0 (84.5 )	
	40		18.0 (76.5 ) 20.0 (74.5)	
	42		28.0 (66.5 ) 29.0 (65.5 )	
	44			
	46			
	48			

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JOB NAME Greene County S.P. RECORDER \_\_\_\_\_  
 HOLE IDENTIFICATION Hole #11 P.H. Control Facility DRILLER \_\_\_\_\_  
 SURFACE ELEV. 86.6 WEATHER Partly Cloudy&Warm DATE 9-29-75

Strata Symbol	Depth	Elev.	Location	DESCRIPTION AND REMARKS
			N-940,746.06 E-412,104.24	
	0	86.6	Surface of ground	Standard Penetration Test
	2			
	4		Brown, fine grained, clayey sand (SC)	
	6			5.0-6.5
8.0	8	78.6		6-2-2=N 4
	10		Brown, mottled gray, slightly plastic	
	12		clay. (CL)	10.0-11.5
13.0	14	73.6		3-4-6=N 10
	16		Gray, silty, sandy clay. (CL) grading to clayey sand (SC)	15.0-16.5
18.0	18	68.6		3-6-7=N 13
	20		VERY PALE BROWN, FINE GRAINED, SL. FINE GRAVELLY SAND, (SM)	
	22			20.0-21.5
				5-5-10=N 15
24.0	24	62.6		
	26		very pale brown, fine grained, gravelly sand (SP-SM) 1/4" rounded gravel	25.0-26.5
27.0	28	59.6	Top of weathered chalk.	5-8-8=N 16
	30		Dark gray, hard chalk. (CL)	
31.5	32	55.1	Bottom of hole.	30.0-31.5
				14-25-48=N 73
	34			
	36		Note: Water Table @ 5.2 (81.4)	
	38		No. U.D. taken	
	40			
	42			
	44			
	46			
	48			

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JOB NAME Greene County S.P. RECORDER \_\_\_\_\_HOLE IDENTIFICATION Hole #11-A PH Control Facility DRILLER \_\_\_\_\_SURFACE ELEV. 86.6 WEATHER Cloudy & Rain DATE 10-1-75

Strata Symbol	Depth	Elev.	Location: N-940,746.06 E-412,104.24	DESCRIPTION AND REMARKS
	0	86.6		Surface of ground
	2			
	4			Brown, fine grained, clayey sand (SC)
	6			
8.0	8	78.6		
	10			Brown, mottled gray, slightly plastic, sandy clay. (CL)
	12			
13.0	14	73.6		
	16			Gray, silty, sandy, clay (CL) grading to clayey sand (SC)
18.0	18	68.6		
	20			very pale brown, sl. fine gravelly, fine gr. sand (SC)
22.0	22	64.6		Bottom of hole
	24			
	26			Water table @ 5.2 (81.4)
	28			Note: hole drilled adjacent to hole #11 for taking
	30			U.D. Samples
	32			U.D. Samples
	34			6.0 (80.6) - 8.0 (78.6)
	36			10.0 (76.6) - 12.0 (74.6)
	38			15.0 (71.6) - 17.0 (69.6)
	40			20.0 (66.6) - 22.0 (64.6)
	42			
	44			
	46			
	48			

CONFIDENTIAL

JOB NAME Greene County S.P. RECORDER Jenkins  
 HOLE IDENTIFICATION Hole #12 PH Control Facility DRILLER \_\_\_\_\_  
 SURFACE ELEV. 83.8 WEATHER Cloudy DATE 9-30-75

Strata Symbol	Depth	Elev.	Location N-940.721.11 E-412,059.80	DESCRIPTION AND REMARKS
	0	83.3		Surface of ground Standard Penetration Test
	2	81.8		Brown, fine grained, silty sand. (SM)
	4	79.8		Gray, fine grained, clayey, silty, slightly organic, sand (SM)
	6			5.0-6.5
	8			2-3-5=N 8
	10			Brown, mottled gray, sl. plastic, fine sandy, silty clay (CL)
	12			10.0-11.5
13.0		70.8		2-2-4=N 6
	14			very pale brown, fine grained, sand. (SM)
	16			15.0-16.5
18.0	18	65.8		4-6-7=N 13
	20			very pale brown, fine gravelly, fine-med. gr. sand (SP-SM)
	22			20.0-21.5
23.0		60.8		6-7-15=N 22
	24			Light brown, clayey, very fine grained sand. (SC)
25.8	26	58.0		25.0-26.5
26.5		57.3		4-6-14=N 20
	28			Top of weathered chalk
				Dark gray, mod. soft, weathered chalk
				Bottom of hole
	30			
	32			Note: water table @ 5.2 (78.6)
	34			no U.D. taken
	36			
	38			
	40			
	42			
	44			
	46			
	48			

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# Alabama Power Company DRILLING LOG

JOB NAME Greene County S.P. RECORDER Jenkins

HOLE IDENTIFICATION Hole #13 PH Control Facility DRILLER \_\_\_\_\_

SURFACE ELEV. 83.4 WEATHER Cloudy DATE 9-30-75

Strata Symbol	Depth	Elev.	Location	DESCRIPTION AND REMARKS
			N-940.626.24 E-412.016.80	
	0	83.4	Surface of Ground	Standard Penetration Test
	1.0	82.4	Brown, fine grained, silty sand. (SM)	
	3.0	80.4	Gray, fine grained, clayey, silty, slightly organic sand. (SC)	
	4			
	6		Brown, mottled gray, sl. plastic, silty clay	5.0-6.5
	8		Grading to sandy clay (CL)	3-4-6=N 10
	10			
12.0	12	71.4		10.0-11.5 3-5-10=N 15
	14		very pale brown, fine gravelly, mostly	
	16		fine gr. sand. (SP-SM)	15.0-16.5 2-5-10=N 15
	18			
	20			
	22			20.0-21.5 5-13-19=N 32
	24			
25.6	26	57.8	Top of weathered chalk	
	26.5	56.9	Dark gray, mod. soft, weathered chalk (CH)	25.0-26.5
	28		Bottom of hole	3-7-13=N 20
	30			
	32		Note: water table @ 1.0 (82.4)	
	34		No U.D. Taken	
	36			
	38			
	40			
	42			
	44			
	46			
	48			

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# Alabama Power Company DRILLING LOG

JOB NAME Greene County S.P. RECORDER Jenkins

HOLE IDENTIFICATION Hole #14 PH Control Facility DRILLER \_\_\_\_\_

SURFACE ELEV. 82.8 WEATHER Cloudy DATE 9-30-75

Strata Symbol	Depth	Elev.	Location	DESCRIPTION AND REMARKS
			N-940,672.24 E-411,979.49	
	0	82.8	Surface of ground	Standard Penetration Test
	1.0	81.8		Brown, fine grained, silty sand. (SM)
	2			Gray, fine grained clayey, silty, slightly organic
	3.0	79.8		sand. (SC)
	4			
	6			Brown, mottled gray, silty clay. (CL) 5.0-6.5 2-3-5=N 8
	8			
	10.0	72.8		
	12	70.8		Light gray, silty fine sand (SM) 10.0-11.5 4-5-9=N 14
	14			
	16			Grayish brown, fine grained, fine gravelly sand (SP-SM) 15.0-16.5 5-8-11=N 19
	18			
	19.0	63.8		
	20			Reddish brown decomposed wood. (PT)
	21.5	61.3		20.0-21.5 2-2-2=N 4
	24			very pale brown, fine grained, sand & 1/4" rounded gravel (SP_SM)
	26	56.8		Top of weathered chalk
	28			Dark gray hard chalk (CL) 27.0-28.5
	28.5	54.3		Bottom of hole 10-28-60=N 88
	30			
	32			Note: Water table @ 1.0 (81.8)
	34			U.D. Samples
	36			8.0(74.8)10.0(72.8)
	38			23.0(59.8)25.0(57.8) no recovery
	40			
	42			
	44			
	46			
	48			

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# DRILLING LOG

Hole No. 1

Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 97.8 TOTAL DEPTH 21.5

LOCATION Ash Pond COORDINATES N 945418. E 410638.7

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861041

OVERBURDEN DEPTH NA NO. PENT. TESTS 8 NO. U.D. SAMPLES 2

CASING SIZE NX(3") LENGTH 19.4 CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 1.5 ELEV. \_\_\_\_\_ TIME AFTER COMP 24 hours DATE TAKEN 2/23/88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 2/18/88

DRILLER Harry Gaither RECORDER R.D.Hill APPROVED W.B. Pulemi DRILLING DATE COMP. 2/22/88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	97.8	Surface of fly-ash.	0.5-						
	1			2.5	U.D. Sample		1		85	
	2		Dark gray fly-ash.	2.5-						
	3			4.0	1/0/1 =1					
	4									
	5									
5.5	6	92.3		5.0-						
	7			6.0	2/2/5 =7		2			
	8		Brownish yellow to light gray sandy clay.	7.0-	5/8					
	9			8.5	12 =20		3			
	10			8.5-						
	11			10.5	U.D. Sample		2		55	
	12			10.5-						
	13	84.8		12.0	5/7/9 =16		4			
13.0	14		Brownish yellow, fine-grained, sandy, silty clay.	13.0-						
	15			14.5	5/8/8 =16		5			
	16			15.0-	9/10					
	17			16.5	/8 =18		6			
18.0	18	79.8		17.0-						
	19		Brownish yellow, fine-grained, clayey sand.	18.5	3/4/5 =9		7			
19.5	20	76.3		19.5-						
	21	76.8	Layered red, to gray, to yellow very slightly clayey, fine sand.	21.0	8/7/8 =15		8			
21.0	22		Bottom of hole.							
	23									
	24									

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# DRILLING LOG

Hole No. 2  
Page 1 of 1

SITE Greene County S.P. Ash Borrow Area SURF. ELEV. NA TOTAL DEPTH 24.0

LOCATION Ash Pond COORDINATES N NA E NA

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. Tri-Pod APC861041

OVERBURDEN DEPTH 23.8 NO. PENT. TESTS 10 NO. U.D. SAMPLES NA

CASING SIZE NX(3") LENGTH 20.0 CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 0.0 ELEV. NA TIME AFTER COMP 24 hrs. DATE TAKEN 2/25/88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 2/23/88

DRILLER Harry Gaither RECORDER R.D.Hill APPROVED W.B. Hill DRILLING DATE COMP. 2/24/88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0		Surface of Fly-ash.	0.0-						
	1			1.5	0/0/1 = 1		1			
	2									
	3			2.5-						
	4		Dark gray to grayish black, Fly-ash.	4.0	0/0/1 = 1		2			
	5									
	6			5.0-						
	7			6.5	1/2/2 = 4		3			
	8									
	9			7.5-						
	10			9.0	2/2/2 = 4		4			
	11			10.0-						
	11		Dark brown, organic, silty clay (Topsoil).	11.5	2/2/1 = 3		5			
	12									
	13		Beige to light yellowish brown, silty clay.	12.5-						
	14			14.0	3/3/4 = 7		6			
	15		Mottled, light gray, red, brownish yellowed, silty, sandy clay.							
	16			15.0-	8/8					
	17			16.5	/10 = 18		7			
	18		Note: Bag sample taken with U.D. Tubes from 15.0( ) 19.0( )	17.5-						
	19			19.0	3/5/7 = 12		8			
	20									
	21		Brownish yellow, clayey sand.	20.0-	11/10					
	22			21.5	/10 = 20		9			
	23		Gray, to red to beige fine-grained, slightly clayey sand.	22.5-	9/9					
	24		Possible top of weathered chalk.	24.0	/10 = 19		10			
	24.2		Red, highly weathered chalk.							
			Bottom of hole							

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# DRILLING LOG

Hole No. 3  
Page 1 of 1

SITE Greene County S.P.-Ash Borrow Area

LOCATION Ash Pond SURF. ELEV. 103.5 TOTAL DEPTH 21.5

ANGLE Vertical BEARING NA COORDINATES N 945691. E 411714.6

OVERBURDEN DEPTH NA NO. PENT. TESTS 9 CONTRACTOR APCO DRILL NO. Tri-Pod APC861041

CASING SIZE NX(3") LENGTH 20.0 NO. U.D. SAMPLES NA

WATER TABLE DEPTH 0.0 ELEV. \_\_\_\_\_ CORE SIZE NA TOTAL % REC. NA

TYPE GROUT Backfill QUANTITY NA MIX NA TIME AFTER COMP 24 hours DATE TAKEN 3/1/88

DRILLER Harry Gaither RECORDER R.D. Hill APPROVED W.B. Givens DRILLING DATE START 2/25/88

DRILLING DATE COMP. 2/29/88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	103.5	Surface of Fly-ash.	0.0-						
	1			1.5-	0/0/1 = 1	1				
	2									
	3		Dark gray to grayish black Fly-ash.	2.5-						
	4			4.0-	0/0/1 = 1	2				
	5									
	6			5.0-						
	7			6.5-	3/3/2 = 5	3				
	8									
	9			7.5-						
	10			9.0-	1/1/2 = 3	4				
	11									
	12			10.0-						
	13			11.5-	2/1/1 = 2	5				
	14									
	15			12.5-						
	16			14.0-	1/1/0 = 1	6				
	17	87.2		15.0-						
	18		Brownish yellow to light gray, fine grained, silty, sandy clay.	16.5-	1/2/3 = 5	7				
	19									
	20			17.5-						
	21	82.5		19.0-	3/5/8 = 13	8				
	22	82.0	Brownish yellow to light gray fine-grained sand.	20.0-	6/6					
	23		Bottom of hole.	21.5-	12 = 18	9				
	24				no recovery.					

0.0  
16.3  
21.0  
21.5

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# DRILLING LOG

Hole No. 4  
Page 1 of 1

SITE Greene County S.P. Ash Borrow Area SURF. ELEV. 103.4 TOTAL DEPTH 19.0  
LOCATION Ash Pond

COORDINATES N 945886. E 411536.3

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. Tri-pod APC861041

OVERBURDEN DEPTH NA NO. PENT. TESTS 8 NO. U.D. SAMPLES NA

CASING SIZE NX(3") LENGTH 18.0 CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 0.0 ELEV. \_\_\_\_\_ TIME AFTER COMP 72 hours DATE TAKEN 2/29/88

TYPE GROUT Back fill QUANTITY NA MIX NA DRILLING DATE START 2/25/88

DRILLER Harry Gaither RECORDER R.D. Hill APPROVED W.B. Gilliam DRILLING DATE COMP. 2/25/88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	103.4	Surface of ground - Fly Ash.	0.0-						
	1			1.5	0/1/1	=2	1			
	2									
	3		Dark gray to grayish black, Fly-Ash.	2.5-						
	4			4.0	1/0/1	=1	2			
	5			5.0-						
	6			6.5	3/3/2	=5	3			
	7									
	8			7.5-						
	9			9.0	1/1/1	=2	4			
	10									
	11			10.0-						
	12			11.5	1/2/2	=4	5			
	13									
	14			12.5-						
	15	88.4	14.0	1/0/1	=1	6				
	16		15.0-							
	17		Brownish yellow to light gray, fine-grained, sandy, silty clay.	16.5	5/4/4	=8	7			
	18	85.4								
	19	81.4	Brownish yellow to light gray, fine-grained sand.	17.5-						
	20		Bottom of hole.	19.0	4/6/7	=13	8			
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. #5

Site Greene County S.P. - Ash Borrow Area

Page 1 of 1

LOCATION Ash Pond

SURF. ELEV. 102.6 TOTAL DEPTH 19.5

ANGLE Vertical BEARING NA

COORDINATES N 946322. E 411806.6

OVERBURDEN DEPTH 17.8 ( )

NO. PENT. TESTS 8

CONTRACTOR APCO DRILL NO. APC861010

CASING SIZE NA LENGTH NA

CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 3.0

ELEV. \_\_\_\_\_ TIME AFTER COMP 72 hours

DATE TAKEN 2/15/88

TYPE GROUT Backfill

QUANTITY NA

MIX NA

DRILLING DATE START 2/10/88

DRILLER Harry Gaither

RECORDER R.D. Hill

APPROVED W.B. Gilliam

DRILLING DATE COMP. 2/11/88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	102.6	Surface of ground.	0.0-	9/13					
	1		Yellowish brown, sandy clay.	1.5	/9	=22	(1)			
	2									
	3	99.6		2.5-						
	4		Brownish yellow to gray, fine-grained sand with intermittent clay layers.	4.0	5/6/8	=14	(2)			
	5									
	6			5.0-	U.D.					
	7			7.0	Sample	#1		100		
	8			7.0-	7/13					
	9	93.6		9.5	/16	=29	(3)			
	10			Beige, fine-grained sand.	10.0-	U.D.				
	11				12.0	Sample	#2		100	
	12									
	13		12.0-		8/9					
	14		13.5		/12	=21	(4)			
	15		13.5-		8/12					
	16		15.0		/11	=23	(5)			
	16.8	85.8	15.0-		6/9/9	=18	(6)			
	17		Beige to reddish yellow coarse grained sand with gravel up to 3/4" diameter.	16.5-						
	18	84.8		18.0	6/6/2	=8	(7)			
	18.4	84.2	Red to brown, highly weathered chalk.	18.0-	6/18					
	19		Gray chalk.	19.5	/35	=53	(8)			
	19.5	83.1	Bottom of hole.							
	20									
	21		Bag Samples							
	22		0.0( ) to 3.0( )							
	23		3.0( ) to 7.0( )							
	24									

WATER

# DRILLING LOG

Hole No. 6  
Page 1 of 2

SITE Greene County S.P. Ash Borrow Area SURF. ELEV. 107.8 TOTAL DEPTH 24.7

LOCATION Ash Pond COORDINATES N 945959. E 412051.5

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861010

OVERBURDEN DEPTH 24.2 NO. PENT. TESTS 8 NO. U.D. SAMPLES 2

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 3.0 ELEV. \_\_\_\_\_ TIME AFTER COMP 24 hours DATE TAKEN 2/10/88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 2/9/88

DRILLER Harry Gaither RECORDER Roger D. Hill APPROVED W.B. Gilman DRILLING DATE COMP. 2/9/88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	107.8	Surface of dike.	0.5-						
	1		Reddish brown to yellowish brown sandy clay. (Fill).	1.5-	8/5/5 =10		1			
	2									
	3									
	4									
	5									
	6	102.3	Very dark gray to grayish black, fly-ash.	5.0-						
	7			7.0-	U.D. Smp1		1		85	
	8			8.5-	7/5/5 =10		3			
	9									
	10									
	11				10.0-	U.D. Sample	(2)		85	
	12				12.0-					
	13			12.0-						
	14	93.9		13.5-	3/1/1 =2		4			
	15	92.8	Slightly organic, brown sandy topsoil.	13.5-						
	16		Note: Soft material little to no sample recovered. Light brownish gray, fine-grained sand.	15.0-	5/5/4 =9		5			
	17	91.1								
	18		Light brownish gray, fine-grained sand.	16.7-						
	19				18.2	2/3/4 =7		6		
	20				18.2-					
	21			19.7	1/2/3 =5		7			
	22									
	23	84.8	Brownish yellow coarse sand.	23.2-						
	24	83.8			24.7	8/3/2 =5		8		
			Top of weathered chalk.							

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# DRILLING LOG

Hole No. #6

Page 2 of 2

SITE Greene County S.P. Ash Borrow Area

SURF. ELEV. 107.8

TOTAL DEPTH 24.7

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Pen. Test			Sample No.	Fluid Chg. %	Rec. %	RQD
				From To	Blows	N				
24.7	25	83.1	Dark gray, weathered chalk. Bottom of hole.							
	26									
	27									
	28									
	29									
	30									
	31									
	32									
	33									
	34									
	35									
	36									
	37									
	38									
	39									
	40									
	41									
	42									
	43									
	44									
	45									
	46									
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	51									
	52									
	53									
	54									
	55									
	56									

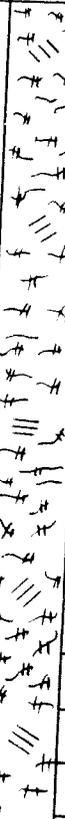
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# DRILLING LOG

Hole No. 7  
Page 1 of 1

SITE Greene County S.P. Ash Borrow Area SURF. ELEV. 99.5 TOTAL DEPTH 23.5  
 LOCATION Ash Pond COORDINATES N 944578. E 412223.3  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861041  
 OVERBURDEN DEPTH NA NO. PENT. TESTS 10 NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 0.0 ELEV. \_\_\_\_\_ TIME AFTER COMP 24 hrs. DATE TAKEN 2/18/88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 2/16/88  
 DRILLER Harry Gaither RECORDER R.D. Hill APPROVED H.B. Giddens DRILLING DATE COMP. 2/17/88

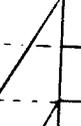
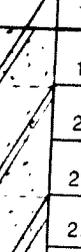
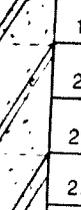
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD	
				From To	Blows	N					
	0	99.5	Surface of ash pond.	0.0-							
	1			1.5	1/1/1 = 2		1				
	2										
	3			2.5-							
	4			4.0	1/1/1 = 2		2				
	5										
	6			5.0-							
	7		Very dark gray fly-ash.	6.5	2/2/2 = 4		3				
	8										
	9				7.5-						
	10				9.0	2/2/3 = 5		4			
	11			10.0-							
	12			11.5	3/3/3 = 6		5				
	13										
	14			12.5-							
	15			14.0	2/1/2 = 3		6				
	15.5	84.0		15.0-							
	16		Light gray to brownish yellow, silty sandy clay.	16.5	1/1/1 = 2		7				
	17										
	17.5	82.0		17.5-							
	18		Mottled light gray to brownish yellow silty sandy clay.	19.0	3/3/4 = 7		8				
	19										
	20				20.0-						
	21			21.5	4/6/7 = 13		9				
	21.5	78.0									
	22		Light gray slightly organic, silty, sandy clay.	22.0-	10/10						
	23	76.2			23.5	/13 = 23		10			
	23.3										
	23.5	76.0	Bottom. Light gray fine-grained sand.								

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# DRILLING LOG

Hole No. 8  
Page 1 of 2

SITE Greene Co.S.P. Ash Borrow Area SURF. ELEV. 103.4 TOTAL DEPTH 26.0  
 LOCATION Ash Pond COORDINATES N 945772. E 410955.7  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 4.0 ELEV. 99.4 TIME AFTER COMP 24 Hours DATE TAKEN 3-17-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-16-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Gellman DRILLING DATE COMP. 3-16-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	103.4	Surface of ground.							
	1		Yellowish red, sandy clay. (Fill.)							
	2									
	3									
	4									
	5									
6.0	6	97.4	Brown, silty, sandy clay.	4.5 to 6.0, 4/4/4 =	8	1				
	7									
	8									
	9									
	10.0	10	93.4	Grayish black fly ash.	9.5 to 11.0, 3/2/2 =	4	2			
		11								
12										
	13									
	14									
	15.0	15	88.4	Mottled brownish yellow to light gray, silty clay.	14.5 to 16.0, 3/5/14 =	19	3			
	16									
	17									
	18.0	18	85.4	Brownish yellow to light gray, silty, clayey sand.	19.5 to 21.0, 5/7/6 =	13	4			
		19								
		20								
		21								
		22								
23.0	23	80.4	Gray fine-grained sand. Top of Chalk.							
24.0	24	79.4								

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# DRILLING LOG

Hole No. 8

Page 2 of 2

SITE Greene Co.S.P. Ash Borrow Area Ash Pond Holes SURF. ELEV. 103.4 TOTAL DEPTH 26.0

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Pen. Test			Sample No.	Fluid Chg. %	Rec. %	ROD
				From To	Blows	N				
	25		Gray chalk.							
26.0	26	77.4	Bottom of hole.							
	27									
	28									
	29									
	30		Bag Samples							
	31		S-1) 6.0 to 10.0							
	32		S-2) 15.0 to 18.0							
	33									
	34									
	35									
	36									
	37									
	38									
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	50									
	51									
	52									
	53									
	54									
	55									
	56									

24.5 to 26.0, 18/26/54= 80 5

**CONFIDENTIAL**

# DRILLING LOG

Hole No. 1  
Page 1 of 1

SITE Greene Co.S.P. Ash Borrow Area SURF. ELEV. 95.7 TOTAL DEPTH 19.5

LOCATION Borrow Pit-A COORDINATES N 940553. E 409417.8

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 4.5 ELEV. 92.9 TIME AFTER COMP 72 Hours DATE TAKEN 3-7-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-3-88

DRILLER Pete Storey RECORDER R. D. Hill APPROVED W. B. Gilmer DRILLING DATE COMP. 3-3-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	96.7	Surface of ground.							
	1		Yellowish brown, fine-to-medium-grained sand.							
	2									
	3									
	4									
	5	91.7	Moist							
	6		Yellowish brown, fine-to-medium-grained sand.							
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18	79.2	Yellowish brown, saturated, fine-to-medium-grained sand.							
	19									
	20	77.2	Bottom of hole.							
	21		No sample.							
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 2  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 89.0 TOTAL DEPTH 12.0  
 LOCATION Borrow Pit-A COORDINATES N 940178. E 410688.3  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 4.0 ELEV. 85.0 TIME AFTER COMP 72 Hours DATE TAKEN 3-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-3-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED H. B. Williams DRILLING DATE COMP. 3-3-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	ROD
				From To	Blows	N				
0.0	0	89.0	Surface of ground.							
	1		Yellowish brown, fine-to-medium-grained sand.							
	2									
	3									
4.0	4	85.0	Moist							
	5		Yellowish brown, fine-to-medium-grained sand.							
	6									
	7									
	8									
	9									
	10									
11.0	11	78.0	Saturated.							
12.0	12	77.0	Yellowish brown, fine-to-medium-grained sand. Bottom of hole.							
	13		No samples.							
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

CONFIDENTIAL

# DRILLING LOG

Hole No. 1  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 96.2 TOTAL DEPTH 17.0  
 LOCATION Borrow Pit-B COORDINATES N 944434. E 409041.8  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC8601017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 6.0 ELEV. 90.2 TIME AFTER COMP \_\_\_\_\_ DATE TAKEN 3-3-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-2-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Hillman DRILLING DATE COMP. 3-2-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From	To	Blows				
	0	96.2	Surface of ground.							
	1		Yellow to light gray, silty sandy clay.							
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15	81.2	Light olive, slightly clayey, silty sand.							
	16									
	17	79.2	Bottom of hole.							
	18		Bag Sample S-1) 0.0 to 15.0							
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 2  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 96.2 TOTAL DEPTH 14.5  
 LOCATION Borrow Pit-B COORDINATES N 943371. E 409083.1  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.5 ELEV. 90.7 TIME AFTER COMP 24 Hours DATE TAKEN 3-3-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-2-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W. B. Gillen DRILLING DATE COMP. 3-2-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From	To	Blows				
0.0	0	96.2	Surface of ground.							
1.0	1	95.2	Brownish yellow, slightly clayey sand.							
	2		Yellowish brown, sandy, silty clay.							
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
10.5	11	85.7	Yellowish brown, (wet) sand. (Fine-to-medium-grained)							
	12									
	13									
	14		Bottom of Hole.							
14.5	15	81.7								
	16									
	17									
	18			Bag Sample.						
	19			S-1) 1.0 to 10.5						
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 3  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 97.2 TOTAL DEPTH 17.0  
 LOCATION Borrow Pit-B COORDINATES N 043579. E 409006.1  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 6.0 ELEV. 91.2 TIME AFTER COMP 24 Hours DATE TAKEN 3-3-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-2-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W. B. Hillman DRILLING DATE COMP. 3-2-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	97.2	Surface of ground.							
	1		Yellowish brown, slightly clayey sand.							
	2									
	3	94.2								
	4		Brownish yellow, sandy, silty clay.							
	5									
	6									
	7									
	8									
	9									
	10	87.2	Yellowish brown to light gray, silty, fine-grained clayey sand.							
	11									
	12									
	13									
	14									
	15	82.2	Yellow, fine-to-medium-grained, wet sand.							
	16									
	17	80.2	Bottom of hole.							
	18		Bag samples							
	19									
	20			S-1) 3.0 to 10.0						
	21			S-2) 10.0 to 15.0						
	22									
	23									
	24									

CONFIDENTIAL

# DRILLING LOG

Hole No. 4  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 96.1 TOTAL DEPTH 18.0  
 LOCATION Borrow Pit-B COORDINATES N 943851. E 409163.0  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.5 ELEV. 90.6 TIME AFTER COMP 24 Hours DATE TAKEN 3-3-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-2-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Gilliam DRILLING DATE COMP. 3-2-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	ROD
				From To	Blows	N				
	0	96.1	Surface of ground.							
	1	95.1	Brown, clayey sand.							
	2		Brownish yellow to light gray, silty, sandy clay.							
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11	84.6	Brownish yellow, clayey, fine-grained, sandy silt.							
	12									
	13									
	14									
	15									
	16	80.1	Yellow, wet sand.							
	17									
	18	78.1	Bottom of hole.							
	19		Bag Samples							
	20									
	21			S-1) 1.0 to 10.5						
	22			S-2) 10.5 to 16.0						
	23									
	24									

CONFIDENTIAL

# DRILLING LOG

Hole No. 5  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 100.1 TOTAL DEPTH 17.0  
 LOCATION Borrow Pit-B COORDINATES N 944152. E 409161.7  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.5 ELEV. 94.6 TIME AFTER COMP 24 Hours DATE TAKEN 3-3-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-2-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Hill DRILLING DATE COMP. 3-2-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	100.1	Surface of ground.							
	1		Brown, clayey sand.							
	2									
	3	97.6								
	4		Brownish yellow, slightly clayey silt.							
	5									
	6									
	7									
	8									
	9									
	10	90.6	Brown, slightly clayey, fine-grained, sandy silt.							
	11									
	12									
	13									
	14									
	15									
	16									
	17	83.1	Yellow, wet sand.							
	18									
	19									
	20	80.1	Bottom of hole.							
	21		Bag Samples S-1) 2.5-17.0							
	22									
	23									
	24									

CONFIDENTIAL

# DRILLING LOG

Hole No. 1  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 101.2 TOTAL DEPTH 12.0  
 LOCATION Borrow Pit-C COORDINATES N 946837. E 410663.9  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 6.0 ELEV. 95.2 TIME AFTER COMP 5 Days DATE TAKEN 3-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-1-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Garrison DRILLING DATE COMP. 3-1-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	101.2	Surface of ground.							
	1		Yellowish red, sandy clay.							
	2									
	3									
	4									
	5	96.2	Yellowish red, fine-grain sand. Note: Hole wet at 8.5'.							
	6									
	7									
	8									
	9									
	10									
	11		Bottom of hole.							
	12	89.2								
	13									
	14									
	15			Bag Samples						
	16			S-1) 0.0 to 4.0						
	17			S-2) 5.0 to 8.5						
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 2  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 101.8 TOTAL DEPTH 10.0  
 LOCATION Borrow Pit-C COORDINATES N 946734. E 410844.7  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.5 ELEV. 96.3 TIME AFTER COMP 5 Days DATE TAKEN 3-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-1-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Bellini DRILLING DATE COMP. 3-1-88

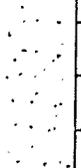
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	ROD
				From	To	Blows				
	0	101.8	Surface of ground.							
	1		Yellowish red, slightly clayey sand.							
	2									
	3									
	4	97.8								
	5		Yellowish red, fine-to-medium-grain sand. Note: Hole wet at 6.0'.							
	6									
	7									
	8									
	9									
	10	91.8	Bottom of hole.							
	11		Bag Samples S-1) 0.0 to 4.0							
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

3-1-88  
 R. D. Hill  
 Recorder

# DRILLING LOG

Hole No. 3  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 100.7 TOTAL DEPTH 12.0  
 LOCATION Borrow Pit-C COORDINATES N 946532. E 4108442.4  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 6.0 ELEV. 94.7 TIME AFTER COMP 5 Days DATE TAKEN 3-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-1-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W. B. Gillis DRILLING DATE COMP. 3-1-88

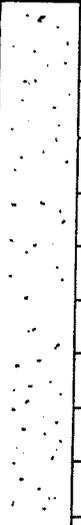
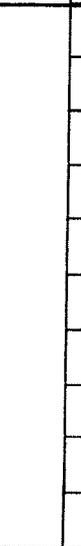
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	100.7	Surface of ground.							
	1		Yellowish red, sandy clay.							
	2									
	3									
	4									
	5									
	6	94.7	Note: Hole wet at 6.0.							
	7		Light gray to brownish yellow, clayey sand.							
	8									
	9	92.2	Biege, fine-grain sand.							
	10									
	11									
	12	88.7	Bottom of hole.							
	13		Bag Samples S-1) 0.0 to 6.0 S-2) 6.0 to 8.5							
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 4  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 101.8 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-C COORDINATES N 946345. E 410806.5  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.5 ELEV. 94.7 TIME AFTER COMP 5 Days DATE TAKEN 3-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-1-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Quinn DRILLING DATE COMP. 3-1-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	101.8	Surface of ground.							
	1		Yellowish red, slightly clayey sand.							
	2									
	3									
	3.5	98.3								
	4		Yellowish red, fine-grain sand.  Note: Hole wet at 7.0'.							
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14	87.8		Bottom of hole.						
	15		Bag Samples S-1) 0.0 to 3.5							
	16									
	17									
	18									
	19									
	20									
	21									
	22									
23										
24										

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# DRILLING LOG

Hole No. 5  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 102.0 TOTAL DEPTH 5.0  
 LOCATION Borrow Pit-C COORDINATES N 946147. E 410787.6  
 ANGLE Vertical BEARING NA CONTRACTOR APCO DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.0 ELEV. 97.0 TIME AFTER COMP 5 Days DATE TAKEN 3-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-1-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED *W. B. Quinn* DRILLING DATE COMP. 3-1-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From	To	Blows				
	0	102.0	Surface of ground							
	1		Yellowish red, fine-grain sand.							
	2									
	3									
	4									
	5	97.0	Bottom of Hole. Hole wet.							
	6		Bag Samples S-1) 0.0 to 5.0							
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 6  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 102.6 TOTAL DEPTH 10.0  
 LOCATION Borrow Pit-C COORDINATES N 945949. E 410764.1  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.5 ELEV. 97.1 TIME AFTER COMP 5 Days DATE TAKEN 3-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-1-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W. B. Hill DRILLING DATE COMP. 3-1-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	102.6	Surface of ground.							
	1		Yellowish red, clayey sand.							
	2									
	3									
	4									
	5.0	97.6	Hole wet.							
	6		Yellowish red, fine-grain sand.							
	7									
	8									
	9									
	10	92.6		Bottom of hole.						
	11			Bag Samples S-1) 0.0 to 5.0						
	12									
	13									
	14									
	15									
16										
17										
18										
19										
20										
21										
22										
23										
24										

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# DRILLING LOG

Hole No. 7  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 101.6 TOTAL DEPTH 7.0

LOCATION Borrow Pit-C COORDINATES N 945919. E 410562.4

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 3.5 ELEV. 98.1 TIME AFTER COMP 24 Hours DATE TAKEN 3-2-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-1-88

DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Hill DRILLING DATE COMP. 3-1-88

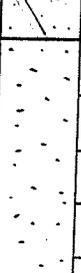
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	ROD
				From To	Blows	N				
	0	101.6	Surface of ground.							
	1		Yellowish red, clayey sand.							
	2									
	3	98.6								
	4	97.6	Yellowish red, sandy clay. Hole wet.							
	5		Biege to yellowish red, fine-grain sand.							
	6									
	7	74.6		Bottom of hole.						
	8		Bag Samples S-1) 0.0 to 3.0 S-2) 4.0 to 7.0							
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 8  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 104.7 TOTAL DEPTH 10.0  
 LOCATION Borrow Pit-C COORDINATES N 946022. E 410614.4  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.0 ELEV. 99.7 TIME AFTER COMP 24 Hours DATE TAKEN 3-2-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-1-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W. B. Gilliam DRILLING DATE COMP. 3-1-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	104.7	Surface of Ground							
	1	103.7	Dark brown sandy topsoil.							
	2		Yellowish red, clayey sand.							
	3									
	4									
	5	99.7								
	6		Biege to yellowish red, fine-grain sand.							
	7									
	8									
	9									
	10	94.7	Bottom of hole.							
	11		Bag Samples S-1) 1.0 to 5.0							
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 9

Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 103.0 TOTAL DEPTH 10.0

LOCATION Borrow Pit-C COORDINATES N 946241. E 410618.6

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 5.5 ELEV. 97.5 TIME AFTER COMP 24 Hours DATE TAKEN 3-2-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-1-88

DRILLER Pete Storey RECORDER R. D. Hill APPROVED W. B. Gillin DRILLING DATE COMP. 3-1-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	103.0	Surface of ground							
	1		Brown slightly clayey sand. (Possible Topsoil pile.)							
	2									
	3									
	4									
	5	98.0								
	6		Brownish yellow sand.							
	7									
	8									
	9									
	10	93.0								
	11		Bottom of hole.							
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 100.6 TOTAL DEPTH 5.0  
 LOCATION Borrow Pit-C COORDINATES N 946371. E 410620.8  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 3.5 ELEV. 97.1 TIME AFTER COMP 24 Hours DATE TAKEN 3-2-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-1-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W. B. Guinn DRILLING DATE COMP. 3-1-88

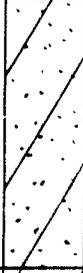
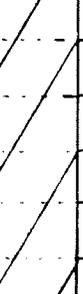
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
0.0	0	100.6	Surface of ground.							
	1		Brownish yellow sand.							
	2									
	3									
	4									
5.0	5	95.6	Bottom of hole.							
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 11  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 99.9 TOTAL DEPTH 32.0  
 LOCATION Borrow Pit-C COORDINATES N 945403. E 410332.3  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.5 ELEV. 94.4 TIME AFTER COMP 24 Hours DATE TAKEN 3-2-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-1-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Quinn DRILLING DATE COMP. 3-1-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	99.9	Surface of ground.							
	1		Yellowish red sandy clay. (Dike)							
	2									
	3									
	4									
	5	94.9								
	6		Mottled gray to light brown, slightly plastic, silty sandy clay.							
	7									
	8									
	9	91.4	Mottled gray to light brown, highly plastic silty clay.							
	10	90.4								
	11		Mottled brownish yellow to light gray, moderately plastic, silty, sandy clay.							
	12									
	13									
	14									
	15									
	16									
	17									
	18	81.9								
	19		Yellowish brown, silty clay (slightly plastic).							
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 11

Page 2 of 2

SITE Greene Co.S.P. Ash Borrow Area Pit-C SURF. ELEV. 99.9 TOTAL DEPTH 32.0

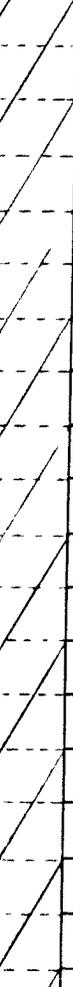
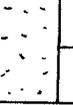
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Pen. Test			Sample No.	Fluid Chg. %	Rec. %	RQD
				From To	Blows	N				
	25		Yellowish brown, silty clay (slightly plastic).							
26.0	26	73.9								
	27		Biege, wet sand.							
	28									
	29									
	30									
	31									
32.0	32	67.9	Top of Chalk.							
			Bottom of hole.							
	33									
	34									
	35									
	36									
	37									
	38		Bag Samples							
	39									
	40		S-1) 5.0 to 8.5							
	41		S-2) 9.5 to 18.0							
	42		S-3) 18.0 to 26.0							
	43									
	44									
	45									
	46									
	47									
	48									
	49									
	50									
	51									
	52									
	53									
	54									
	55									
	56									

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# DRILLING LOG

Hole No. 12  
Page 1 of 2

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 100.6 TOTAL DEPTH 25.5  
 LOCATION Borrow Pit-C COORDINATES N 948247.3 E 416200.7  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 1.5 ELEV. 99.1 TIME AFTER COMP 24 Hours DATE TAKEN 3-14-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-10-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED *W.B. Hill* DRILLING DATE COMP. 3-14-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	100.6	Surface of ground.							
	1		Grayish black flyash.							
	2									
	3	97.7								
	4		Mottled yellowish brown, light gray, silty, fat clay.							
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22	78.6	Biege sand (Fine-to-medium-grained).							
	23									
	24									

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# DRILLING LOG

Borrow Pit-C

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 100.6 TOTAL DEPTH 25.5

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Pen. Test			Sample No.	Fluid Chg. %	Rec. %	ROD
				From To	Blows	N				
25.0	25	75.6	Beige sand (fine-to-medium grain). Top of chalk.							
25.5	26	75.1	Gray Chalk. Bottom of hole.							
	27									
	28									
	29		Bag Samples							
	30		S-1) 3.5 to 7.0							
	31		S-2) 7.0 to 12.0							
	32		S-3) 12.0 to 15.0							
	33									
	34									
	35		Moisture Samples							
	36		S-1) 3.5							
	37		S-2) 10.0							
	38									
	39									
	40									
	41		Note: Set 25.5' of 1½" PVC pipe with lower 5.0' slotted. Backfilled with 10.0' of gravel and 1½" of Bentonite Pellets.							
	42									
	43									
	44									
	45									
	46									
	47									
	48									
	49									
	50									
	51									
	52									
	53									
	54									
	55									
	56									

COPIED



# DRILLING LOG

Hole No. 2

Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 100.9 TOTAL DEPTH 15.0

LOCATION Borrow Pit-D COORDINATES N 947441i E 410945.5

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 5.0 ELEV. 95.9 TIME AFTER COMP 24 Hours DATE TAKEN 3-8-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-7-88

DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Gilliam DRILLING DATE COMP. 3-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From	To	Blows				
	0	100.9	Surface of ground.							
	1	99.9	Brown sand. (Topsoil)							
	2		Brownish yellow, sandy clay.							
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11	89.9								
	12		Light gray, slightly clayey sand.							
	13									
	14									
	15	85.9	Bottom of hole.							
	16		Bag Samples							
	17									
	18			S-1) 1.0 to 11.0						
	19			S-2) 11.0 to 15.0						
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 3  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 96.2 TOTAL DEPTH 11.0  
 LOCATION Borrow Pit-D COORDINATES N 947298.1 E 411521.7  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 4.5 ELEV. 91.7 TIME AFTER COMP 72 Hours DATE TAKEN 3-21-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-17-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gillen DRILLING DATE COMP. 3-17-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	ROD
				From To	Blows	N				
0.0	0	96.2	Surface of ground.							
0.5	0.5	95.7	Brown, clayey sand. (Topsoil.)							
2.0	2	94.2	Yellow fine-grain sand.							
	3		Mottled gray yellowish brown, fine-grain clayey sand.							
	4									
	5									
	6									
6.5	6.5	89.7	Biege, fine-grained sand.							
	7									
	8									
	9									
	10									
11.0	11	85.2	Bottom of hole.							
	12		Bag Samples S-1) 3.0 to 6.0							
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

COMPLETED  
 3-21-88

# DRILLING LOG

Hole No. 4  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 102.1 TOTAL DEPTH 10.5  
 LOCATION Borrow Pit-D COORDINATES N 947294.7 E 411425.9  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.0 ELEV. 97.1 TIME AFTER COMP 72 Hours DATE TAKEN 3-21-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-17-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Linton DRILLING DATE COMP. 3-17-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	102.1	Surface of ground.							
	0.5	101.6	Brown, clayey sand. (Topsoil.)							
	2		Mottled gray, reddish yellow, brown, fine-grain clayey sand.							
	3									
	4									
	5									
	5.5	96.6	Yellow, fine-grain sand.							
	6									
	7									
	8									
	9									
	10		Bottom of hole.							
	10.5	91.6								
	11		Bag Samples S-1) 0.5 to 3.0							
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

**CONFIDENTIAL**

# DRILLING LOG

Hole No. 5  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 105.6 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-D COORDINATES N 947293.3 E 411335.1  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.0 ELEV. 100.6 TIME AFTER COMP 72 Hours DATE TAKEN 3-21-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-17-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Green DRILLING DATE COMP. 3-17-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	105.6	Surface of ground.							
	0.5	105.1	Brown, clayey sand. (Topsoil.)							
	2		Yellowish brown, fine-grain, clayey sand.							
	3									
	4	101.6								
	5		Yellowish brown, slightly clayey sand.							
	6									
	7									
	8									
	9									
	10									
	11		Yellow, fine-grain sand.							
	12	94.1								
	13									
	14	91.6	Bottom of hole.							
	15		Bag Samples S-1) 1.0 to 3.5 S-2) 4.0 to 8.0							
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

**CONFIDENTIAL**

# DRILLING LOG

Hole No. 6  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 105.6 TOTAL DEPTH 18.5

LOCATION Borrow Pit-D COORDINATES N 947285.8 E 411240.2

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 5.0 ELEV. 100.6 TIME AFTER COMP 72 Hours DATE TAKEN 3-21-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-17-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Ginn DRILLING DATE COMP. 3-17-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	105.6	Surface of ground.							
	0.5	105.1	Brown, clayey sand.							
	1		Yellowish brown, fine-grain clayey sand.							
	2									
	3									
	3.5	102.1	Reddish brown, slightly clayey sand.							
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11		Yellow, fine-to-medium-grained sand.							
	12									
	12.5	93.1								
	13									
	14									
	15									
	16									
	17		Bottom of hole.							
	18									
	18.5	87.1								
	19									
	20		Bag Samples							
	21		S-1) 0.5 to 3.5							
	22		S-2) 3.5 to 8.5							
	23									
	24									

ALABAMA  
 POWER  
 COMPANY

# DRILLING LOG

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 105.6 TOTAL DEPTH 14.2  
 LOCATION Borrow Pit-D COORDINATES N 947280.5 E 411145.0  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.5 ELEV. 100.1 TIME AFTER COMP 72 Hours DATE TAKEN 3-21-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-17-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Miller DRILLING DATE COMP. 3-17-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	105.6	Surface of ground.							
	0.5	105.1	Brown clayey sand. (Topsoil.)							
	2		Reddish brown clayey sand.							
	3									
	4									
	4.5	101.1								
	5		Reddish brown, slightly clayey sand.							
	6									
	7									
	8									
	9									
	10									
	11									
	12.0	93.6	Yellow, fine-to-medium-grained sand.							
	13									
	14	91.4								
	14.2		Bottom of hole.							
	15		Bag Samples							
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

**CONFIDENTIAL**

# DRILLING LOG

Hole No. 8  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 104.8 TOTAL DEPTH 13.5  
 LOCATION Borrow Pit-D COORDINATES N 947276.6 E 411054.5  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.5 ELEV. 99.3 TIME AFTER COMP 72 Hours DATE TAKEN 3-21-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-17-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Givens DRILLING DATE COMP. 3-17-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	ROD
				From To	Blows	N				
	0	104.8	Surface of ground.							
	0.5	104.3	Brown, clayey sand. (Topsoil.)							
	2		Reddish brown, clayey sand.							
	3									
	4									
	5									
	6									
	7.0	97.8	Reddish brown, slightly clayey sand.							
	8									
	9									
	10									
	11.0	93.8	Yellow, fine-to-medium-grained sand.							
	12									
	13									
	13.5	92.3	Bottom of hole.							
	14		Bag Samples S-1) 1.0 to 3.5 S-2) 7.0 to 9.0							
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

W.B. GIVENS  
 3/17/88

# DRILLING LOG

Hole No. 9  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 103.3 TOTAL DEPTH 13.5

LOCATION Borrow Pit-D COORDINATES N 947279.0 E 410961.3

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 5.5 ELEV. 97.8 TIME AFTER COMP 72 Hours DATE TAKEN 3-21-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-17-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Hill DRILLING DATE COMP. 3-17-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	103.3	Surface of ground.							
	0.5	102.8	Brown, clayey sand. (Topsoil.)							
	2		Reddish brown, clayey sand.							
	3									
	4									
	5									
	6.0	97.3	Reddish brown, slightly clayey sand.							
	7									
	8									
	9									
	10									
	11.5	91.8	Yellow, fine-to-medium-grained sand.							
	12									
	13.5	89.8	Bottom of hole.							
	14		Bag Samples S-1) 1.0 to 5.0 S-2) 6.0 to 9.0							
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

CONFIDENTIAL

# DRILLING LOG

Hole No. 10  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 102.6 TOTAL DEPTH 18.5  
 LOCATION Borrow Pit-D COORDINATES N 947282.9 E 410860.4  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.5 ELEV. 97.1 TIME AFTER COMP 72 Hours DATE TAKEN 3-21-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-17-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Quinn DRILLING DATE COMP. 3-17-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	102.6	Surface of ground.							
	1		Brown, clayey sand. (Topsoil.)							
	2	100.6								
	3		Light brown, silty, clayey sand.							
	4									
	5									
	6									
	7									
	8									
	9									
	9.5	93.1	Mottled gray and brown slightly clayey sand.							
	10									
	11									
	12									
	13		Yellow, fine-to-medium-grained sand.							
	14	88.6								
	15									
	16									
	17		Bottom of hole.							
	18									
	18.5	84.1								
	19									
	20		Bag Samples							
	21		S-1) 2.0 to 6.5							
	22									
	23		S-2) 10.0 to 12.0							
	24									

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# DRILLING LOG

Hole No. 11  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 101.0 TOTAL DEPTH 13.5  
 LOCATION Borrow Pit-D COORDINATES N 947285.4 E 410737.7  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 4.5 ELEV. 96.5 TIME AFTER COMP 72 Hours DATE TAKEN 3-21-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-17-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED *W.B. Quinn* DRILLING DATE COMP. 3-17-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	101.0	Surface of ground.							
	1	100.0	Brown, clayey sand. (Topsoil.)							
	2		Brown to gray, fine-grained, silty, clayey sand.							
	3									
	4									
	5									
	6									
	7									
	8									
	8.5	92.5								
	9		Gray, fine-grain, sandy, clayey silt.							
	10									
	11									
	11.5	89.5								
	12		Yellow, fine-to-medium-grained sand.							
	13									
	13.5	87.5	Bottom of hole.							
	14		Bag Samples S-1) 1.0 to 7.0							
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

CONTINUED

# DRILLING LOG

Hole No. 12  
Page 1 of 1

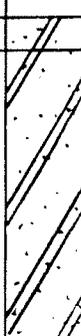
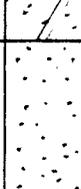
SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 96.9 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-D COORDINATES N 947206.7 E 411509.3  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 6.5 ELEV. 90.4 TIME AFTER COMP 24 Hours DATE TAKEN 3-23-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-22-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED *H.B. Gaiter* DRILLING DATE COMP. 3-22-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	96.9	Surface of ground.							
	1	95.9	Brown, clayey sand. (Topsoil.)							
	2		Yellowish brown, fine-grain clayey sand.							
	3									
	4									
	5									
	6									
	7		Beige, fine-to-medium-grained sand.							
	8	89.4								
	9									
	10									
	11									
	12									
	13									
	14	82.9	Bottom of hole.							
	15		Bag Samples S-1) 1.0 to 7.5							
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

ALABAMA POWER  
 GREENE COUNTY  
 STEAM PLANT  
 ASH BORROW AREA  
 BORROW PIT-D  
 HOLE NO. 12  
 DRILL NO. APC861017  
 DATE 3-23-88

# DRILLING LOG

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 101.5 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-D COORDINATES N 947207.1 E 411418.8  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.5 ELEV. 96.0 TIME AFTER COMP 24 Hours DATE TAKEN 3-23-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-22-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Gaither DRILLING DATE COMP. 3-22-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	101.5	Surface of ground.							
	0.5	101.0	Brown, clayey sand. (Topsoil.)							
	1		Yellowish brown, fine-grain, clayey sand.							
	2									
	3									
	4									
	5									
	6									
	6.5	95.0	Yellowish brown, slightly clayey sand.							
	7									
	8									
	9									
	10									
	10.5	91.0	Yellow to beige, fine-to-medium-grained sand.							
	11									
	12									
	13									
	14	87.5	Bottom of hole.							
	15		Bag Samples S-1) 1.0 to 6.5 S-2) 6.5 to 10.5							
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

CORONA

# DRILLING LOG

Hole No. 14  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 105.7 TOTAL DEPTH 13.5  
 LOCATION Borrow Pit-D COORDINATES N 947205.6 E 411334.4  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.0 ELEV. 101.7 TIME AFTER COMP 24 Hours DATE TAKEN 3-23-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-22-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Gillen DRILLING DATE COMP. 3-22-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	105.7	Surface of ground							
	1		Brown, clayey sand. (Topsoil.)							
	2.0	103.7								
	3		Yellowish brown, slightly clayey sand.							
	4									
	5									
	6									
	7.0	98.7	Yellowish brown, slightly clayey sand.							
	8									
	9									
	10									
	11.5	94.2	Yellowish to beige, fine-to-medium-grained sand.							
	12									
	13									
	13.5	92.2	Bottom of hole.							
	14		Bag Samples							
	15									
	16									
	17			S-1) 2.0 to 7.0						
	18			S-2) 7.0 to 11.5						
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 15  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 106.6 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-D COORDINATES N 947194.2 E 411238.3  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.0 ELEV. 101.6 TIME AFTER COMP 24 Hours DATE TAKEN 3-23-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-22-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Givens DRILLING DATE COMP. 3-22-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	106.6	Surface of ground.							
	0.5	106.1	Brown, clayey sand. (Topsoil.)							
	1		Reddish brown, fine-grained, clayey sand.							
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11	95.6	Yellowish red, fine-to-medium-grained sand.							
	12		Bottom of hole.							
	13									
	14	92.6								
	15		Bag Sample S-1) 0.5 to 11.0							
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

CONFIDENTIAL

# DRILLING LOG

Hole No. 16  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 106.4 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-D COORDINATES N 947186.3 E 411144.9  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.0 ELEV. 101.4 TIME AFTER COMP 24 Hours DATE TAKEN 3-23-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-22-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Guler DRILLING DATE COMP. 3-22-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	106.4	Surface of ground.							
	0.5	105.9	Brown, clayey sand (Topsoil).							
	1		Yellowish red, fine-grain sandy clay.							
	2									
	3.0	103.4	Reddish brown, fine-grain clayey sand.							
	4									
	5									
	6.0	100.4	Reddish brown, slightly clayey sand.							
	7									
	8									
	9									
	10.0	96.4	Yellow to beige, fine-to-medium grained sand.							
	11									
	12									
	13		Bottom of hole.							
	14	92.4								
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 17  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 106.1 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-D COORDINATES N 947180.9 E 411048.7  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.0 ELEV. 101.1 TIME AFTER COMP 24 Hours DATE TAKEN 3-23-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-22-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Hill DRILLING DATE COMP. 3-22-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	106.1	Surface of ground.							
	1	105.1	Brown, clayey sand. (Topsoil.)							
	2		Red to yellowish brown, fine-grained, clayey sand.							
	3									
	4									
	5									
	6	100.1								
	7		Red to yellowish brown, fine-grained, slightly clayey sand.							
	8									
	9	97.1								
	10		Yellow to beige, fine-grained sand.							
	11									
	12									
	13									
	14	92.1	Bottom of hole.							
	15		Bag Samples S-1) 1.0 to 6.5 S-2) 6.5 to 10.5							
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 18  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 104.9 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-D COORDINATES N 947178.9 E 410936.3  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.0 ELEV. 99.9 TIME AFTER COMP 24 Hours DATE TAKEN 3-23-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-22-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Gitter DRILLING DATE COMP. 3-22-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	104.9	Surface of ground.							
	0.5	104.4	Brown, clayey sand. (Topsoil.)							
	2		Reddish brown, fine-grained, clayey sand.							
	3									
	4									
	5									
	5.5	99.4	Reddish brown, fine-grained, slightly clayey sand.							
	6									
	7									
	8									
	9.0	95.9	Reddish brown to yellow, fine-to-medium-grained sand.							
	10									
	11									
	12									
	13									
	14.0	90.9	Bottom of hole.							
	15		Bag Samples S-1) 0.5 to 5.5 S-2) 5.5 to 9.0							
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 19

Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 103.6 TOTAL DEPTH 14.0

LOCATION Borrow Pit-D COORDINATES N 947175.0 E 410845.9

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 5.0 ELEV. 98.6 TIME AFTER COMP 24 Hours DATE TAKEN 3-23-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-22-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED *W.B. Linton* DRILLING DATE COMP. 3-22-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	103.6	Surface of ground.							
	0.5	103.1	Brown, clayey sand. (Topsoil.)							
	2		Reddish brown, fine-grained, clayey sand.							
	3									
	4	99.6								
	5		Reddish brown, slightly clayey sand.							
	6									
	7	96.6								
	8		Reddish brown to yellow, fine-grained sand.							
	9									
	10									
	11									
	12									
	13									
	14	89.6		Bottom of hole.						
	15		Bag Samples							
	16									
	17			S-1) 0.5 to 4.0						
	18			S-2) 4.0 to 7.0						
	19									
	20									
	21									
	22									
	23									
	24									

CONFIDENTIAL

# DRILLING LOG

Hole No. 20  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 102.2 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-D COORDINATES N 947174.1 E 410728.8  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 5.0 ELEV. 97.2 TIME AFTER COMP 24 Hours DATE TAKEN 3-23-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-22-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED *W.B. Gaither* DRILLING DATE COMP. 3-22-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	102.2	Surface of ground.							
	0.5	101.7	Brown, clayey sand. (Topsoil.)							
	2		Reddish brown, fine-grained, clayey sand.							
	3									
	3.5	98.7								
	5		Reddish brown, fine-grained, clayey sand.							
	6									
	7.0	95.2								
	8		Reddish brown to yellow, fine-to-medium-grained sand.							
	9									
	10									
	11									
	12									
	13									
	14	88.2	Bottom of hole.							
	15		Bag Samples							
	16									
	17									
	18			S-1) 0.5 to 3.5						
	19			S-2) 3.5 to 7.0						
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 1  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. NA TOTAL DEPTH 15.0  
 LOCATION Borrow Pit-E COORDINATES N NA E NA  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 7.0 ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 3-8-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-7-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Guler DRILLING DATE COMP. 3-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0		Surface of ground.							
	1		Brown sand. Topsoil.							
	2									
	3		Brownish yellow to red, clayey sand to sandy clay.							
	4									
	5		Yellow to brownish yellow, fine-to-medium grain sand.							
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15		Bottom of hole.							
	16		Bag Sample S-1) 2.0 to 3.5							
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

APPROVED  
 W.B. Guler  
 3-7-88

# DRILLING LOG

Hole No. 2

Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 102.8 TOTAL DEPTH 18.1

LOCATION Borrow Pit-E COORDINATES N 948253. E 414654.9

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH 8.0 ELEV. 94.0 TIME AFTER COMP 24 Hours DATE TAKEN 3-8-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-7-88

DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Dillman DRILLING DATE COMP. 3-7-88

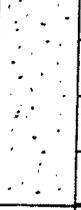
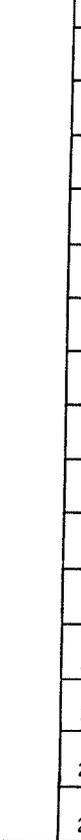
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	102.8	Surface of ground.							
	1		Dark brown sand. (Topsoil)							
	2									
	3	99.8	Mottled brown, yellow, red, silty, sandy clay.							
	4									
	5	97.8	Light gray to yellow, fine-grain, sandy, silty clay.							
	6									
	7									
	8									
	9									
	10									
	11		Yellow to light gray, fine-grained, slightly clayey silt.							
	12	91.3								
	13		Yellow, fine-grained, slightly clayey sand.							
	14	89.3								
	15									
	16	86.8	Yellow, fine-grained sand.							
	17									
	18	84.7	Bottom of Hole							
	19		Bag Samples							
	20									
	21			S-1) 3.0 to 5.0						
	22			S-2) 5.0 to 11.5						
	23			S-3) 11.5 to 13.5						
	24			S-4) 13.5 to 16.0						

APCO

# DRILLING LOG

Hole No. 3  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 100.3 TOTAL DEPTH 8.0  
 LOCATION Borrow Pit-E COORDINATES N NA E NA  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 7.5 ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 3-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-8-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W. B. Austin DRILLING DATE COMP. 3-8-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	ROD
				From To	Blows	N				
	0	100.3	Surface of ground							
	1		Red, clayey sand.							
	2									
	3									
	4	96.3								
	5		Red to yellow, fine-grain sand.							
	6									
	7									
	8	92.3		Bottom of hole.						
	9		Bag Sample S-1) 0.0 to 4.0							
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

3-8-88  
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# DRILLING LOG

Hole No. 4  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. NA TOTAL DEPTH 12.0  
 LOCATION Borrow Pit-E COORDINATES N NA E NA  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 7.0 ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 3-8-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-7-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W. B. Gilliam DRILLING DATE COMP. 3-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0		Surface of ground.							
	1		Brownish yellow to light gray, clayey sand.							
	2									
	3									
	4									
	5									
6.0	6		Yellowish brown, fine-grain, silty sand.							
	7									
	8									
9.0	9		Yellow, wet sand.							
	10									
	11									
12.0	12		Bottom of hole.							
	13		Bag Sample S-1) 0.0 to 6.0							
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

APPROVED  
 W. B. GILLIAM  
 3-7-88

# DRILLING LOG

Hole No. 5  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 107.7 TOTAL DEPTH 15.0  
 LOCATION Borrow Pit-E COORDINATES N 947536. E 414348.6  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 6.0 ELEV. 101.7 TIME AFTER COMP 24 Hours DATE TAKEN 3-9-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-8-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Gilliam DRILLING DATE COMP. 3-8-88

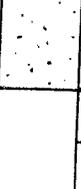
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	107.7	Surface of ground.							
	1		Yellowish red, sandy clay.							
	2									
	3									
	4	103.7								
	5		Yellowish red, clayey sand.							
	6									
	7									
	8									
	9									
	10									
	11	96.7	Yellowish red to reddish yellow, fine-to-medium-grained sand.							
	12									
	13									
	14									
	15	92.7	Bottom of hole.							
	16		Bag Samples S-1) 0.0 to 4.0 S-2) 4.0 to 11.0							
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 6  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 105.8 TOTAL DEPTH 13.0  
 LOCATION Borrow Pit-E COORDINATES N 947693. E 414425.1  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 6.0 ELEV. 99.8 TIME AFTER COMP 24 Hours DATE TAKEN 3-9-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-8-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Giddens DRILLING DATE COMP. 3-8-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	105.8	Surface of ground.							
	1		Yellowish red, sandy clay.							
	2									
	3									
	4	101.8								
	5		Yellowish red, clayey sand.							
	6									
	7									
	8									
	9	96.8	Yellowish red to reddish yellow, fine-to-medium-grained sand.							
	10									
	11									
	12									
	13	92.8	Bottom of hole.							
	14		Bag Samples S-1) 0.0 to 4.0 S-2) 4.0 to 9.0							
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

W.B. GIDDENS  
 APPROVED  
 3-8-88

# DRILLING LOG

Hole No. 7  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 103.8 TOTAL DEPTH 15.0  
 LOCATION Borrow Pit-E COORDINATES N 947862. E 414566.3  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 7.0 ELEV. 96.8 TIME AFTER COMP 24 Hours DATE TAKEN 3-9-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-10-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED *W.B. Gilliam* DRILLING DATE COMP. 3-10-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	103.8	Surface of ground.							
	1		Brown sand. (Topsoil)							
	1.5	102.3								
	2		Yellowish brown, fine-grain clayey sand.							
	3.0	100.8								
	4		Brownish yellow, silty, sandy clay.							
	5									
	6									
	7									
	8									
	8.5	95.3								
	9		Light gray to brownish yellow, silty, fine-grained clayey sand.							
	10									
	11									
	12.0	91.8								
	12		Brown to yellowish brown, fine-grained sand with scattered pea gravel.							
	13									
	14									
	15.0	88.8	Bottom of hole.							
	15		Bag Samples S-1) 3.0 to 8.5 S-2) 8.5 to 12.0							
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 8  
Page 1 of 1

SITE Greene Co. S.P. Ash Borrow Area SURF. ELEV. 102.3 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-E COORDINATES N 947649. E 414585.6  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH 7.0 ELEV. 95.3 TIME AFTER COMP 24 Hours DATE TAKEN 3-9-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 3-8-88  
 DRILLER Pete Storey RECORDER R. D. Hill APPROVED W.B. Gidman DRILLING DATE COMP. 3-8-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	102.3	Surface of ground.							
	1		Brown sand.							
	1.5	100.8								
	2		Yellowish brown, clayey sand.							
	3.0	99.3								
	4									
	5									
	6		Brownish yellow, sandy clay.							
	7									
	8									
	9									
	10.0	92.3								
	11		Brownish yellow, fine-grained sand.							
	12									
	13									
	14.0	88.3	Bottom of hole.							
	15									
	16									
	17		Bag Sample							
	18	S-1)	1.5 to 10.0							
	19									
	20									
	21									
	22									
	23									
	24									

W.B. GIDMAN  
 APPROVED  
 3-8-88

# DRILLING LOG

Hole No. 1  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 108.8 TOTAL DEPTH 12.0

LOCATION Borrow Pit-F COORDINATES N 945608.2 E 408262.4

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

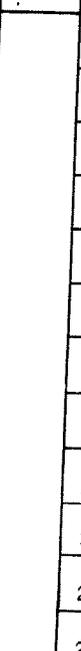
OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-5-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-4-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED *H.B. Hill* DRILLING DATE COMP. 4-4-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0		Surface of ground.							
	0.5		Brown, clayey sand. (Topsoil.)							
	2		Red, sandy clay.							
	3									
	4									
	5									
5.0	6		Red, clayey sand.							
	7									
	8									
	9		Red to yellow, fine-grain sand.							
	10									
	11									
	12									
12.0	12		Bottom of hole.							
	13		Bag Samples. S-1) 0.5 to 5.0							
	14									
	15									
	16									
	17									
	18									
	19									
	20									
21										
22										
23										
24										

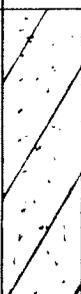
# DRILLING LOG

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 108.5 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-F COORDINATES N 945625.4 E 408536.2  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-5-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-4-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gilliam DRILLING DATE COMP. 4-4-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	108.5	Surface of ground.							
	0.5	108.0	Brown, clayey sand. (Topsoil)							
	1		Red, sandy clay.							
	2									
	3									
	4									
	5									
	6.0	102.5	Red, clayey sand.							
	7									
	8									
	9		Red to yellow, fine-grained sand.							
	9.5	99.0								
	11									
	12									
	13		Bottom of hole.							
	14	94.5								
	15									
	16									
	17			Bag Samples						
	18			S-1) 0.5 to 6.0						
	19			S-2) 6.0 to 9.5						
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 107.9 TOTAL DEPTH 12.0  
 LOCATION Borrow Pit-F COORDINATES N 945739.3 E 407829.5  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gullett DRILLING DATE COMP. 4-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
0.0	0	107.9	Surface of ground.							
	1		Reddish brown, sandy clay.							
	2									
	3									
	4									
	5									
5.5	5.5	102.4	Reddish brown, clayey sand.							
6										
7										
9.0	8		Yellow fine-to-medium sand.							
	9	98.9								
12.0	10		Bottom of hole.							
	11									
	12	95.9	Bag Sample S-1) 1.0 to 7.0							
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 4

Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 101.3 TOTAL DEPTH 11.5

LOCATION Borrow Pit-F COORDINATES N 946000.7 E 407323.3

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

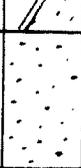
OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. [Signature] DRILLING DATE COMP. 4-7-88

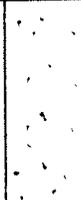
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	101.3	Surface of ground.							
	1		Mottled light gray, to yellowish brown, sandy clay.							
	2									
	3									
	4									
	5									
	6									
	7									
7.5	93.8	Yellowish brown, clayey sand.								
9.0	92.3	Yellow to biege fine-to-medium sand.								
	10		Bottom of hole.							
	11									
	11.5	89.8								
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
21										
22										
23										
24										

Bag Sample.  
S-1) 1.0 to 8.0

# DRILLING LOG

Hole No. 5  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 103.3 TOTAL DEPTH 13.0  
 LOCATION Borrow Pit-F COORDINATES N 946034.2 E 407911.5  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Sullivan DRILLING DATE COMP. 4-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	103.3	Surface of ground.							
	1		Yellowish brown fine sand.							
	2									
	3									
	3.5	99.8								
	4		Yellowish brown, sandy clay.							
	5									
	6									
	7									
8.0	8	95.3	Yellowish brown, clayey sand.							
	9									
10.5	10	92.8	Yellow to biege fine-to-medium sand.							
	11									
13.0	12		Bottom of hole.							
	13	90.3								
	14									
	15									
	16				Bag Sample					
	17				S-1) 1.0 to 8.0					
	18									
	19									
	20									
	21									
	22									
	23									
24										

# DRILLING LOG

Hole No. 6  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 104.9 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-F COORDINATES N 946053.6 E 408595.1  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gullett DRILLING DATE COMP. 4-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	104.9	Surface of ground.							
	1		Brown slightly clayey sand.							
	2	102.9								
	3		Yellowish brown, slightly clayey sand.							
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14	90.9	Bottom of hole.							
	15		No Sample.							
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

CORRECTION

# DRILLING LOG

Hole No. 7

Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 103.2 TOTAL DEPTH 11.0

LOCATION Borrow Pit-F COORDINATES N 946336.4 E 408595.7

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

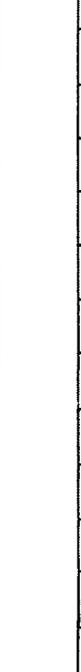
OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Quinn DRILLING DATE COMP. 4-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	103.2	Surface of ground.							
	1		Mottled yellowish brown, light gray, sandy clay.							
	2									
	3									
	4									
	5									
	6									
7.0	7	96.2	Yellowish brown, clayey sand.							
	8									
	9									
9.5		93.7	Yellow fine-to-medium sand.							
	10									
	11.0	11	92.2	Bottom of hole.						
	12		Bag Sample. S-1) 1.0 to 7.5							
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 8  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 102.4 TOTAL DEPTH 13.0

LOCATION Borrow Pit-F COORDINATES N 946336.5 E 407958.3

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED *W.B. Seelin* DRILLING DATE COMP. 4-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	102.4	Surface of ground.							
	1		Mottled yellowish brown, silty, sandy clay.							
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	8.5	93.9	Mottled light gray, yellowish brown, clayey sand.							
	9									
	10									
	11.5	90.9	Yellow fine-to-medium sand.							
	11									
	12		Bottom of hole.							
	13	89.4								
	14		Bag Sample. S-1) 1.0 to 8.5							
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 9  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 103.8 TOTAL DEPTH 13.5  
 LOCATION Borrow Pit-F COORDINATES N 946350.3 E 407092.2  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED *H.B. Hill* DRILLING DATE COMP. 4-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	103.8	Surface of ground.							
	1		Yellowish brown, sandy clay.							
	2									
	3									
	4									
	5									
	6									
	7									
	8	95.8	Yellowish brown, clayey sand.							
	9									
	10									
	11	92.3	Yellow fine-to-medium sand.							
	12									
	13		Bottom of hole.							
	14	90.3								
	15									
	16									
	17									
	18									
	19									
	20									
	21		Bag Sample S-1) 1.0 to 8.0							
	22									
	23									
	24									

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 ORIGINAL

# DRILLING LOG

Hole No. 1  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 106.0 TOTAL DEPTH 15.0  
 LOCATION Borrow Pit-G COORDINATES N 947560.5 E 409448.3  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-5-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-4-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Hill DRILLING DATE COMP. 4-4-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	106.0	Surface of ground.							
	1		Gray to brown, clayey silt.							
	1.5	104.5								
	2									
	3			Gray to brown, silty clay.						
4										
5.0	101.0									
6		Mottled yellow, light gray, yellowish brown, silty, sandy clay.								
7										
8										
9										
10										
11										
12.5	93.5	Yellow, fine to medium grained sand.								
13										
14										
15.0	15	91.0	Bottom of hole.							
	16		Bag Samples S-1) 0.0 to 5.0 S-2) 5.0 to 12.5							
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 2  
Page 1 of 1

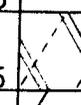
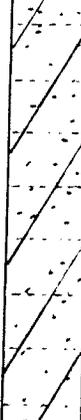
SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 107.1 TOTAL DEPTH 15.0  
 LOCATION Borrow Pit-G COORDINATES N 947457.3 E 409620.1  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-6-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-5-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Hill DRILLING DATE COMP. 4-5-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	ROD
				From To	Blows	N				
	0	107.1	Surface of ground							
	1		Gray to brown, clayey silt.							
	2	105.1								
	3			Gray to brown, silty clay.						
	4									
	5									
	5.5	101.6	Mottled yellow, gray yellowish brown, silty, sandy clay.							
	6									
	7									
	8									
	9									
	10									
	11									
	12.0	95.1	Yellow fine to medium grained sand.							
	13									
	14									
	15	92.1	Bottom of hole							
	16		Bag Samples							
	17									
	18									
	19			S-1) 0.0 to 5.5						
	20			S-2) 5.5 to 12.0						
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 3  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 109.1 TOTAL DEPTH 15.0  
 LOCATION Borrow Pit-G COORDINATES N 947359.5 E 409797.6  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-6-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-5-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gilman DRILLING DATE COMP. 4-5-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	109.1	Surface of ground.							
	1		Brown, clayey silt.  Brown, silty clay. Note: Wet zone from 3.0' to 5.5'.							
	1.5	107.6								
	2									
	3									
	4									
	5									
	5.5	103.6	Mottled yellow, light gray, yellowish brown, silty, sandy clay.							
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	13.5	95.6								
	14		Yellow fine to medium grained sand.							
	15	94.1	Bottom of hole.							
	16		Bag Samples S-1) 5.5 to 13.5							
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 4

Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 110.7 TOTAL DEPTH 16.0

LOCATION Borrow Pit-G COORDINATES N 947260.2 E 409066.4

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-6-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-5-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Hillman DRILLING DATE COMP. 4-5-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD	
				From	To	Blows					
	0	110.7	Surface of ground.								
	1	109.7	Brown, clayey silt.								
	2		Brown to reddish brown, silty clay.								
	3										
	4	106.7									
	5		Mottled yellow, gray, yellowish brown, silty, sandy clay.								
	6										
	7										
	8										
	9										
	10										
	11										
	12										
	13										
	14	96.7									
	15		Yellow, fine to medium grained sand.								
	16	94.7	Bottom of hole.								
	17		Bag Samples								
	18										
	19										
	20			S-1) 1.0 to 4.0							
	21			S-2) 4.0 to 14.0							
	22										
	23										
	24										

# DRILLING LOG

Hole No. 5

Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 109.3 TOTAL DEPTH 15.0

LOCATION Borrow Pit-G COORDINATES N 947065.5 E 409905.1

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

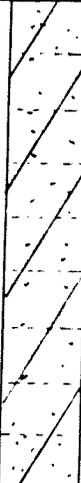
OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-6-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-5-88

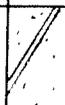
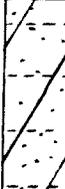
DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Gietman DRILLING DATE COMP. 4-5-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	109.3	Surface of ground.							
	1		Mottled red, light gray, yellowish brown, silty, sandy clay.							
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	9.5	99.8	Yellowish brown, clayey sand.							
	10									
	11									
	12	97.3	Yellow, fine to medium grained sand.							
	13									
	14									
	15	94.3	Bottom of hole							
	16		Bag Samples S-1) 0.0 to 12.0							
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 6  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 112.3 TOTAL DEPTH 13.0  
 LOCATION Borrow Pit-G COORDINATES N 946867.9 E 409852.2  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-6-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-5-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gilliam DRILLING DATE COMP. 4-5-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From	To	Blows				
	0	112.3	Surface of ground							
	1		Brown, clayey sand. (Topsoil.)							
	2									
	2.5	109.8								
	3		Mottled red, light gray, yellowish brown, silty, sandy clay.							
	4									
	5									
	6									
	7.0	105.3	Red, clayey sand.							
	8									
	9.0	103.3	Brownish yellow, fine to medium grained sand.							
	10									
	11									
	12									
	13.0	99.3	Bottom of hole							
	14		Bag Samples S-1) 2.5 to 7.0							
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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 4/5/88



# DRILLING LOG

Hole No. 8  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 109.3 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-G COORDINATES N 946949.7 E 409468.4  
 ANGLE Vertical BEARING NA CONTRACTOR NA DRILL NO. NA  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-6-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-5-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Hill DRILLING DATE COMP. 4-5-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	109.3	Surface of ground.							
	0.5	108.8	Brown, clayey sand. (Topsoil.)							
	2		Red to reddish brown, sandy clay.							
	3									
	4									
	5									
	6									
	7									
	8									
	8.5	100.8	Red to reddish brown, clayey sand.							
	9									
	10.0	99.3	Yellow, fine to medium grain sand.							
	11									
	12									
	13		Bottom of hole.							
	14	95.3								
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 9  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 107.0 TOTAL DEPTH 15.0

LOCATION Borrow Pit-G COORDINATES N 946992.4 E 409264.4

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-6-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-5-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gullett DRILLING DATE COMP. 4-5-88

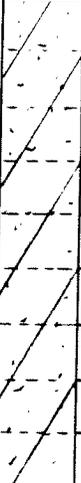
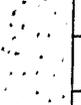
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	107.0	Surface of ground.							
	0.5	106.5	Brown, clayey sand (Topsoil).							
	2		Mottled yellow, light gray, brownish yellow silty, sandy clay.							
	3									
	4									
	5									
	6									
	7		Yellow to light gray, clayey sand.							
	7.5	99.5								
	8		Yellow, fine to medium grain sand.							
	9	98.0								
	10									
	11									
	12									
	13		Bottom of hole.							
	14									
	15	92.0								
	16									
	17		Bag Sample S-1) 0.5 to 9.0							
	18									
	19									
	20									
	21									
	22									
	23									
	24									



# DRILLING LOG

Hole No. 10  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 106.3 TOTAL DEPTH 12.0  
 LOCATION Borrow Pit-G COORDINATES N 947188.1 E 409311.1  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-6-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-5-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gellman DRILLING DATE COMP. 4-5-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	106.3	Surface of ground.							
	1		Mottled yellow, light gray, brownish yellow, silty, sandy clay.							
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9	97.3								
	10		Yellow, fine to medium grain sand.							
	11									
	12	94.3	Bottom of hole.							
	13		Bag Sample S-1) 0.0 to 9.0							
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 11  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 107.4 TOTAL DEPTH 12.0  
 LOCATION Borrow Pit-G COORDINATES N 947188.5 E 409503.5  
 ANGLE Vertical BEARING NA CONTRACTOR APCO DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-6-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-5-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gilson DRILLING DATE COMP. 4-5-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	107.4	Surface of ground.							
	1	106.4	Brown, clayey sand.							
	2		Mottled yellow, light gray, brownish yellow, silty, sandy clay.							
	3									
	4									
	5									
	6									
	7									
	8	99.4								
	9		Yellow, to light gray to brownish yellow, silty, clayey sand.							
	9.5	97.9								
	10		Yellow, fine to medium grained sand.							
	11									
	12	95.4	Bottom of hole.							
	13		Bag Sample S-1) 1.0 to 9.5							
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 12  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 109.4 TOTAL DEPTH 15.0

LOCATION Borrow Pit-G COORDINATES N 947175.1 E 409698.1

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-6-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-5-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gietman DRILLING DATE COMP. 4-5-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	109.4	Surface of ground.							
	1	108.4	Brown, clayey sand.							
	2		Mottled light gray to brown to yellowish brown, slightly gravelly, sandy clay.							
	3									
	4									
	5									
	6	103.4								
	7		Yellow to yellowish brown, silty, sandy clay.							
	8									
	9									
	10									
	11									
	12	97.4								
	13		Yellow, fine to medium grained sand.							
	14									
	15	94.4	Bottom of hole.							
	16		Bag Sample S-1) 1.0 to 12.0							
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									



# DRILLING LOG

Hole No. 13  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 105.1 TOTAL DEPTH 15.0  
 LOCATION Borrow Pit-G COORDINATES N 946502.5 E 408716.3  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-6-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Givens DRILLING DATE COMP. 4-6-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	105.1	Surface of ground.							
	1		Brown sandy silt (Topsoil).							
	2									
	3	102.1								
	4		Yellow to yellowish brown, silty, sandy clay.							
	5									
	6									
	7									
	8									
	9									
	10	95.1	Light gray, clayey sand.							
	11									
	12									
	13		Yellow fine-to-medium-sand.							
	14	91.6								
	15	90.1	Bottom of hole.							
	16		Bag Samples. S-1) 3.0 to 13.5							
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

ORIGINAL  
 W. B. GIVENS  
 4-6-88

# DRILLING LOG

Hole No. 14  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 106.5 TOTAL DEPTH 10.0  
 LOCATION Borrow Pit-G COORDINATES N 946880.3 E 408716.3  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-6-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Gilliam DRILLING DATE COMP. 4-6-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	106.5	Surface of ground.							
	1		Red to reddish brown, silty, sandy clay.							
	2									
	3									
	4									
	5									
	6	100.5	Red to reddish brown clayey sand.							
	7									
	8	98.5	Red to yellow fine-to-medium-sand.							
	9									
	10	96.5	Bottom of hole.							
	11		Bag Sample. S-1) 0.0 to 8.0							
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 15  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 104.2 TOTAL DEPTH 15.0  
 LOCATION Borrow Pit-G COORDINATES N 947176.5 E 408730.9  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-6-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Gorman DRILLING DATE COMP. 4-6-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	104.2	Surface of ground.							
	1		Brown to gray, sandy silt. (Topsoil.)							
	2									
	3	101.2								
	4		Mottled yellow, light gray, yellowish brown, silty, sandy clay.							
	5									
	6									
	7									
	8									
	9									
	10									
	11	93.2	Light gray, clayey sand.							
	12									
	13	91.7	Yellow fine-to-medium-grained sand.							
	14									
	15	89.2	Bottom of hole.							
	16		Bag Sample. S-1) 3.0 to 11.0 Moisture Sample. S-1) 3.0 to 11.0							
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 16  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 107.0 TOTAL DEPTH 14.0  
 LOCATION Borrow Pit-G COORDINATES N 946497.6 E 409039.8  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-6-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Hillman DRILLING DATE COMP. 4-6-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	107.0	Surface of ground.							
	0.5	106.5	Brown clayey sand. (Topsoil.)							
	1		Mottled red to reddish brown, yellow to yellowish brown sandy clay.							
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	8.5	98.5	Red to reddish yellow, clayey sand.							
	9									
	10.0	97.0	Yellow fine-to-medium-sand.							
	11									
	12									
	13									
	14.0	93.0	Bottom of hole.							
	15		Bag Sample S-1) 0.5 to 10.0							
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

# DRILLING LOG

Hole No. 17  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 110.4 TOTAL DEPTH 16.0  
 LOCATION Borrow Pit-G COORDINATES N 946513.4 E 409468.5  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-6-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gellum DRILLING DATE COMP. 4-6-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	ROD
				From To	Blows	N				
	0	110.4	Surface of ground.							
	1		Reddish brown to yellow brown to light gray sandy clay.							
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11	99.4								
	12		Reddish brown, to yellowish brown, to light gray, clayey sand.							
	13									
	14									
	15	95.9								
	16	94.4	Bottom of hole.							
	17		Bag Sample. S-1) 0.0 to 14.5							
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 18  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 116.0 TOTAL DEPTH 16.0  
 LOCATION Borrow Pit-G COORDINATES N 946283.7 E 409808.9  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 24 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-6-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W.B. Gilem DRILLING DATE COMP. 4-6-88

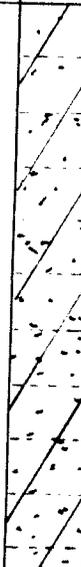
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	110.0	Surface of ground.							
	1		Mottled reddish brown, yellow, light gray, silty sandy clay.							
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11	100.0	Reddish brown, yellow, light gray, silty, clayey sand.							
	12									
	13		Yellow fine-to-medium-sand.							
	14									
	15	96.5	Bottom of hole.							
	16									
	17		Bag Sample S-1) 0.0 to 13.5							
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 19  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 109.0 TOTAL DEPTH 16.0  
 LOCATION Borrow Pit-G COORDINATES N 946274.8 E 409419.5  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED *W. B. Hillman* DRILLING DATE COMP. 4-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	ROD
				From To	Blows	N				
	0	109.0	Surface of ground.							
	1		Reddish brown, to yellow to light gray, silty sandy clay.							
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11	98.0	Reddish brown, to yellow, to light gray, silty clayey sand.							
	12									
	13		Yellow fine-to-medium-sand.							
	14	95.5								
	15		Bottom of hole.  Bag Sample. S-1) 0.0 to 14.0							
	16	93.0								
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									



# DRILLING LOG

Hole No. 20  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 103.7 TOTAL DEPTH 12.0  
 LOCATION Borrow Pit-G COORDINATES N 946240.6 E 408664.3  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gellum DRILLING DATE COMP. 4-7-88

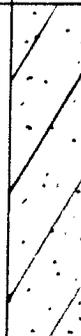
Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	103.7	Surface of ground.							
	1	102.7	Brown clayey silt. (Topsoil)							
	2		Yellow to brown to light gray, silty, sandy clay.							
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10	93.7								
	11		Beige to yellow fine-to-medium-sand.							
	12	91.7	Bottom of hole.							
	13		Bag Sample. S-1) 1.0 to 10.0							
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 21  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 108.6 TOTAL DEPTH 12.5  
 LOCATION Borrow Pit-G COORDINATES N 945775.9 E 408696.7  
 ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017  
 OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA  
 CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA  
 WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88  
 TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88  
 DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. S. Gilman DRILLING DATE COMP. 4-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	108.6	Surface of ground.							
	1		Reddish brown, sandy clay.							
	2									
	3									
	4									
	5									
	6									
6.5	7	102.1	Reddish brown, clayey sand.							
	8									
	9									
	10									
	11									
11.5	12	97.1	Yellow fine-to-medium sand.							
12.5	13	96.1	Bottom of hole.							
	14		Bag Sample S-1) 1.0 to 6.5							
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 22  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 109.0 TOTAL DEPTH 12.0

LOCATION Borrow Pit-G COORDINATES N 945785.1 E 409063.4

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

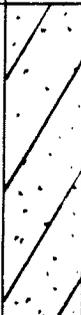
OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Givins DRILLING DATE COMP. 4-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	109.0	Surface of ground.							
	1		Red to reddish brown sandy clay.							
	2									
	3									
	4									
	5									
	6									
	6.5	102.5								
	7		Red to reddish brown clayey sand.							
	8									
	9									
	10									
	10.5	98.5								
	11		Yellow fine-to-medium sand. Bottom of hole.							
	12	97.0								
	13		Bag Sample. S-1) 1.0 to 6.5							
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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# DRILLING LOG

Hole No. 23  
Page 1 of 1

SITE Greene County Steam Plant Ash Borrow Area SURF. ELEV. 108.9 TOTAL DEPTH 12.5

LOCATION Ash Borrow Pit-G COORDINATES N \_\_\_\_\_ E \_\_\_\_\_

ANGLE Vertical BEARING NA CONTRACTOR APCo DRILL NO. APC861017

OVERBURDEN DEPTH NA NO. PENT. TESTS NA NO. U.D. SAMPLES NA

CASING SIZE NA LENGTH NA CORE SIZE NA TOTAL % REC. NA

WATER TABLE DEPTH Dry ELEV. NA TIME AFTER COMP 4 Hours DATE TAKEN 4-7-88

TYPE GROUT Backfill QUANTITY NA MIX NA DRILLING DATE START 4-7-88

DRILLER Harry Gaither RECORDER R. D. Hill APPROVED W. B. Gilliam DRILLING DATE COMP. 4-7-88

Graphic Log	Depth	Elev.	Material Description, Classification and Remarks	Standard Penetration Test			Sample No.	Fluid Chg. %	Rec %	RQD
				From To	Blows	N				
	0	108.9	Surface of ground.							
	1		Yellowish brown, sandy clay.							
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9	99.9	Yellowish brown, clayey sand.							
	10									
	11	92.9	Yellow fine-to-medium sand.							
	12									
	13	96.4	Bottom of hole.  Bag Sample. S-1) 1.0 to 9.0							
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D1

Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 81 SURF.ELEV. 105.46  
 LOCATION Sta. 41+75 COORDINATES N 942877.84 E 413385.83  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 16 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/5/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/5/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/5/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist , loose to med dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	2-3-4	7		
7									
8									
9									
10									
11				2	9.5-11.0	5-7-9	16		
12									
13									
14									
15									
16				3	14.5-16.0	5-6-8	14		
17									
18									
19									
20									
21				4	19.5-21.0	5-7-8	15		
22									
23									
24									

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**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. D1

Sheet 2 of 3

SITE Plant Greene County Dike TOTAL DEPTH 81 SURF.ELEV. 105.46

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Sandy CLAY (CL), brown, moist, med stiff to stiff.	5	24.5-26.0	3-4-6	10			
26									
27									
28									
29									
30									
31									
32									
33									
34									
35	WET	Clayey SAND (SC), Brown, moist, very loose to med dense.	7	34.5-36.0	2-3-2	5			
36									
37									
38									
39									
40									
41									
42									
43									
44									
45		Weathered CHALK (CL), gray, dry, hard.	9	44.5-46	7-10-10	20			
46									
47									
48									
49									
50									
51									
52									
53									
54									
55			10	49.5-51	5-7-6	13			
56									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D1  
Sheet 3 of 3

SITE Plant Greene County Dike TOTAL DEPTH 81 SURF.ELEV. 105.46

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
57		Weathered CHALK (CL), gray, dry, hard.							
58									
59									
60									
61				12	59.5-61	25-42-46	+50		
62									
63									
64									
65									
66				13	64.5-66	16-18-50/3	+50		
67									
68									
69									
70									
71				14	69.5-71	23-44-50/3	+50		
72									
73									
74									
75									
76			15	74.5-76	17-18-50/2	+50			
77									
78									
79									
80									
81		Boring terminated @ 81'	16	79.5-81	36-50/4	+50			
82									
83									
84									
85									
86									
87									
88									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D2

Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 66 SURF.ELEV. 105.3  
 LOCATION Sta. 43+00 COORDINATES N 942703.31 E 413387.05  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 14 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/3/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/3/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/3/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist , very loose to very dense							
1									
2									
3									
4									
5									
6			1	4.5-6.0	3-3-5	8			
7									
8									
9									
10									
11			2	9.5-11.0	4-8-9	17			
12									
13									
14									
15									
16			3	14.5-16.0	4-9-10	19			
17									
18									
19									
20									
21			4	19.5-21.0	4-5-6	11			
22									
23									
24									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D2

Sheet 2 of 3

SITE Plant Greene County Dike TOTAL DEPTH 66 SURF.ELEV. 105.3

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist , very loose to very dense							
26			5	24.5-26.0	3-3-6	9			
27									
28									
29									
30	WET								
31				6	29.5-31.0	4-5-7	12		
32									
33									
34									
35									
36			7	34.5-36.0	2-1-3	4			
37									
38									
39									
40									
41			8	39.5-41	3-6-8	14			
42									
43									
44									
45									
46			9	44.5-46	5-6-6	12			
47									
48									
49									
50									
51			10	49.5-51	4-7-8	15			
52									
53									
54									
55		Weathered CHALK (CL), gray, dry, hard.							
56			11	54.5-56	22-45-50/4	+50			

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D2  
Sheet 3 of 3

SITE Plant Greene County Dike TOTAL DEPTH 66 SURF.ELEV. 105.3

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
57		Weathered CHALK (CL), gray, dry, hard.							
58									
59									
60									
61				12	59.5-61	16-35-50/4	+50		
62									
63									
64									
65									
66			Boring terminated @ 66'	13	64.5-66	18-35-50/4	+50		
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D3

Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 66 SURF. ELEV. 105.19  
 LOCATION Sta. 44+50 COORDINATES N 942610.19 E 413387.75  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 14 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/13/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/13/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/13/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RCD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist , loose to dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	3-4-5	9		
7									
8									
9									
10									
11				2	9.5-11.0	3-5-5	10		
12									
13									
14									
15									
16				3	14.5-16.0	4-5-7	12		
17									
18									
19									
20									
21				4	19.5-21.0	4-14-19	33		
22									
23									
24									

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**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. D3

Sheet 2 of 3

SITE Plant Greene County Dike TOTAL DEPTH 66 SURF.ELEV. 105.19

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD						
				From To	Blows	N									
25		Sandy CLAY (CL), gray, moist, med stiff	5	24.5-26.0	2-2-7	9									
26															
27															
28															
29															
30		Clayey SAND (SC), Brown, moist , loose to med dense	6	29.5-31.0	5-8-7	15									
31															
32															
33															
34															
35															
36															
37															
38															
39															
40			8	39.5-41	5-7-9	16									
41															
42															
43															
44															
45															
46															
47															
48															
49															
50			9	44.5-46	5-9-11	20									
51															
52															
53															
54															
55															
56															
55									Weathered CHALK (CL), gray, dry, hard.	11	54.5-56	4-12-19	31		
56															

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**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. D3

Sheet 3 of 3

SITE Plant Greene County Dike TOTAL DEPTH 66 SURF.ELEV. 105.19

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
57		Weathered CHALK (CL), gray, dry, hard.							
58									
59									
60									
61				12	59.5-61	21-24-29	53		
62									
63									
64									
65									
66			Boring terminated @ 66'	13	64.5-66	25-50/4	+50		
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D4  
Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 71 SURF. ELEV. 105.56  
 LOCATION Sta. 46+00 COORDINATES N 942451.18 E 413386.69  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 14 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/5/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/5/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/5/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist , loose.							
1									
2									
3									
4									
5			1	4.5-6.0	3-4-5	9			
6									
7									
8									
9									
10		Sandy CLAY (CL), brown, moist, soft.	2	9.5-11.0	2-2-3	5			
11									
12									
13									
14									
15		Clayey SAND (SC), Brown, moist , loose to dense.	3	14.5-16.0	11-18-20	38			
16									
17									
18									
19									
20									
21				4	19.5-21.0	6-5-6	11		
22									
23									
24									





**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. D4

Sheet 2 of 3

SITE Plant Greene County Dike TOTAL DEPTH 71 SURF.ELEV. 105.56

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist , loose to dense.							
26			5	24.5-26.0	2-4-5	9			
27									
28									
29									
30									
31			6	29.5-31.0	4-6-7	13			
32									
33									
34									
35									
36			7	34.5-36.0	11-10-10	20			
37									
38									
39									
40		SAND (SW), brown, moist, med dense.							
41			8	39.5-41	35-12-6	18			
42									
43									
44									
45			9	44.5-46	21-8-8	16			
46									
47									
48									
49									
50		Weathered CHALK (CL), gray, dry, v stiff to hard.							
51			10	49.5-51	4-16-18	34			
52									
53									
54									
55			11	54.5-56	15-20-50	30			
56									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D4

Sheet 3 of 3

SITE Plant Greene County Dike TOTAL DEPTH 71 SURF.ELEV. 105.56

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
57		Weathered CHALK (CL), gray, dry, v stiff to hard.							
58									
59									
60									
61				12	59.5-61	13-32-50/3	+50		
62									
63									
64									
65									
66				13	64.5-66	20-18-31	49		
67									
68									
69									
70									
71		Boring terminated @ 71'	14	69.5-71	23-29-50/4	+50			
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D5

Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 71 SURF. ELEV. 105.13  
 LOCATION Sta. 47+50 COORDINATES N 942300.4 E 413387.52  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 14 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/6/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/6/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/6/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist, med dense to dense.							
1									
2									
3									
4									
5									
6			1	4.5-6.0	9-8-9	17			
7									
8									
9									
10									
11			2	9.5-11.0	5-6-7	13			
12									
13									
14									
15		Sandy CLAY (CL), brown, moist, med stiff.							
16			3	14.5-16.0	3-3-4	7			
17									
18									
19		Clayey SAND (SC), Brown, moist, loose to med dense.							
20			4	19.5-21.0	4-7-9	16			
21									
22									
23									
24									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D5  
Sheet 2 of 3

SITE Plant Greene County Dike TOTAL DEPTH 71 SURF.ELEV. 105.13

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD			
				From To	Blows	N						
25		Clayey SAND (SC), Brown, moist , loose to med dense.	5	24.5-26.0	3-4-4	7						
26												
27												
28												
29												
30	WET											
31			6	29.5-31.0	6-7-7	14						
32		GRAVEL (GC), tan, wet, med dense.										
33												
34												
35												
36												
37												
38												
39		Clayey SAND (SC), Brown, moist , med dense.										
40												
41												
42												
43												
44												
45									9	44.5-46	5-5-8	13
46		Weathered CHALK (CL), gray, dry, very stiff to hard.										
47												
48												
49												
50									10	49.5-51	10-12-11	23
51												
52												
53												
54												
55												
56									11	54.5-56	18-36-50/3	+50





**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D5  
Sheet 3 of 3

SITE Plant Greene County Dike TOTAL DEPTH 71 SURF.ELEV. 105.13

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
57		Weathered CHALK (CL), gray, dry, very stiff to hard.							
58									
59									
60									
61				12	59.5-61	22-35-40	+50		
62									
63									
64									
65									
66				13	64.5-66	20-38-50/3	+50		
67									
68									
69									
70									
71		Boring terminated @ 71'	14	69.5-71	13-41-50/3	+50			
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									





**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D6  
Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 71 SURF.ELEV. 105.62  
 LOCATION Sta. 49+00 COORDINATES N 942150.85 E 413389.03  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 14 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/6/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/6/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/6/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist , loose to m dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	5-8-10	18		
7									
8									
9									
10									
11				2	9.5-11.0	6-7-6-	13		
12									
13									
14									
15									
16				3	14.5-16.0	4-6-8	14		
17									
18									
19									
20									
21				4	19.5-21.0	4-6-7	13		
22									
23									
24									





**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. **D6**  
Sheet 2 of 3

SITE **Plant Greene County Dike** TOTAL DEPTH **71** SURF.ELEV. **105.62**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test		Comments	% Rec	ROD	
				From To	Blows				
25		Clayey SAND (SC), Brown, moist , loose to m dense							
26			5	24.5-26.0	3-3-3	6			
27									
28									
29									
30	WET			6	29.5-31.0	4-4-6	10		
31									
32									
33									
34									
35			7	34.5-36.0	3-3-4	7			
36									
37									
38									
39									
40			8	39.5-41	4-6-9	15			
41									
42									
43									
44									
45			9	44.5-46	8-9-11	20			
46									
47									
48									
49									
50		Weathered CHALK (CL), gray, dry, stiff to hard.	10	49.5-51	woh-4-8	12			
51									
52									
53									
54									
55				11	54.5-56	woh-18-50/3	+50		
56									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D6  
Sheet 3 of 3

SITE Plant Greene County Dike TOTAL DEPTH 71 SURF.ELEV. 105.62

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
57		Weathered CHALK (CL), gray, dry, stiff to hard.							
58									
59									
60									
61				12	59.5-61	12-20-45	65		
62									
63									
64									
65									
66				13	64.5-66	10-18-37	54		
67									
68									
69									
70									
71		Boring terminated @ 71'	14	69.5-71	13-19-29	58			
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
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88									

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## DRILLING LOG GEOLOGICAL SERVICES

Hole No. D7  
Sheet 1 of 3

**SITE** Plant Greene County Dike **HOLE DEPTH** 76 **SURF.ELEV.** 106.14

**LOCATION** Sta. 50+50 **COORDINATES N** 942004.21 **E** 413388.56

**ANGLE** \_\_\_\_\_ **BEARING** \_\_\_\_\_ **CONTRACTOR** SCS **DRILL NO.** CME 550

**DRILLING METHOD** H.S.A. **NO. SAMPLES** 15 **NO. U.D. SAMPLES** 0

**CASING SIZE** \_\_\_\_\_ **LENGTH** \_\_\_\_\_ **CORE SIZE** \_\_\_\_\_ **TOTAL % REC.** \_\_\_\_\_

**WATER TABLE DEPTH** \_\_\_\_\_ **ELEV.** \_\_\_\_\_ **TIME AFTER COMP.** \_\_\_\_\_ **DATE TAKEN** 5/11/2009

**TYPE GROUT** \_\_\_\_\_ **QUANTITY** \_\_\_\_\_ **MIX** \_\_\_\_\_ **DRILLING START DATE** 5/11/2009

**DRILLER** S. Milam **RECORDER** G. Wilson **APPROVED** \_\_\_\_\_ **DRILLING COMP. DATE** 5/11/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	ROD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist , loose to med dense							
1									
2									
3									
4									
5				1	4.5-6.0	5-8-10	18		
6									
7									
8									
9									
10				2	9.5-11.0	4-9-10	19		
11									
12									
13									
14									
15				3	14.5-16.0	3-5-10	15		
16									
17									
18									
19									
20				4	19.5-21.0	2-4-8	12		
21									
22									
23									
24									

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**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. D7  
Sheet 2 of 3

SITE Plant Greene County Dike TOTAL DEPTH 76 SURF.ELEV. 106.14

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist , loose to med dense							
26			5	24.5-26.0	3-4-5	9			
27									
28									
29									
30									
31				6	29.5-31.0	woh-3-5	8		
32									
33									
34									
35									
36			7	34.5-36.0	6-12-10	22			
37									
38									
39									
40									
41			8	39.5-41	woh-8-9	17			
42									
43									
44									
45									
46			9	44.5-46	4-8-10	18			
47									
48									
49									
50									
51			10	49.5-51	3-6-7	13			
52									
53									
54									
55									
56			11	54.5-56	9-11-10	21			

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D7  
Sheet 3 of 3

SITE Plant Greene County Dike TOTAL DEPTH 76 SURF.ELEV. 106.14

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
57		Clayey SAND (SC), Brown, moist , loose to med dense							
58									
59									
60			Weathered CHALK (CL), gray, dry, v stiff to hard.	12	59.5-61	5-8-12	20		
61									
62									
63									
64									
65				13	64.5-66	16-24-50/3	+50		
66									
67									
68									
69									
70			14	69.5-71	15-31-50/3	+50			
71									
72									
73									
74									
75									
76		Boring terminated @ 76'	15	74.5-76	16-50/4	+50			
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									





**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D8  
Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 71 SURF. ELEV. 106.17  
 LOCATION Sta. 52+00 COORDINATES N 941850.54 E 413385.7  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 14 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/12/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/12/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/12/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC); Brown, moist , very loose to dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	7-7-4	12		
7									
8									
9									
10									
11				2	9.5-11.0	3-3-4	7		
12									
13									
14									
15									
16				3	14.5-16.0	8-15-14	29		
17									
18									
19									
20									
21				4	19.5-21.0	4-8-7	15		
22									
23									
24									

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**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. D8  
Sheet 2 of 3

SITE Plant Greene County Dike TOTAL DEPTH 71 SURF.ELEV. 106.17

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25	WET	Clayey SAND (SC), Brown, moist , very loose to dense							
26			5	24.5-26.0	2-2-3	5			
27									
28									
29									
30									
31				6	29.5-31.0	3-4-5	9		
32									
33									
34									
35									
36				7	34.5-36.0	2-4-5	9		
37									
38									
39									
40									
41				8	39.5-41	4-8-7	15		
42									
43									
44									
45									
46				9	44.5-46	7-9-12	21		
47									
48									
49									
50									
51				10	49.5-51	30-26-6	32		
52									
53									
54									
55									
56				11	54.5-56	9-15-17	32		

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**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. **D8**  
Sheet 3 of 3

SITE **Plant Greene County Dike** TOTAL DEPTH **71** SURF.ELEV. **106.17**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RCD
				From To	Blows	N			
57		Clayey SAND (SC), Brown, moist , very loose to dense							
58									
59									
60			Weathered CHALK (CL), gray, dry, hard.	12	59.5-61	4-22-24	46		
61									
62									
63									
64									
65				13	64.5-66	21-36-5	41		
66									
67									
68									
69									
70									
71		Boring terminated @ 71'	14	69.5-71	17-32-50/3	+50			
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D9  
Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 81 SURF.ELEV. 105.75  
 LOCATION Sta. 53+50 COORDINATES N 941712.23 E 413385.52  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 16 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/12/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/12/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/12/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist , loose to dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	3-5-6	11		
7									
8									
9									
10									
11				2	9.5-11.0	3-3-4	7		
12									
13									
14									
15									
16				3	14.5-16.0	4-7-4	11		
17									
18									
19									
20									
21				4	19.5-21.0	3-3-3	6		
22									
23									
24									

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## DRILLING LOG GEOLOGICAL SERVICES

Hole No. **D9**  
Sheet 2 of 3

SITE **Plant Greene County Dike** TOTAL DEPTH **81** SURF.ELEV. **105.75**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD	
				From	To	Blows				N
25		Clayey SAND (SC), Brown, moist , loose to dense	5	24.5	26.0	3-3-4	7			
26										
27										
28										
29										
30	WET			6	29.5	31.0	3-4-5	9		
31										
32										
33										
34										
35				7	34.5	36.0	10-10-12	22		
36										
37										
38										
39										
40			8	39.5	41	4-5-3	8			
41										
42										
43										
44										
45			9	44.5	46	5-7-10	17			
46										
47										
48										
49										
50			10	49.5	51	7-11-9	20			
51										
52										
53										
54										
55			11	54.5	56	10-11-14	25			
56										

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## DRILLING LOG GEOLOGICAL SERVICES

Hole No. D9

Sheet 3 of 3

SITE Plant Greene County Dike TOTAL DEPTH 81 SURF. ELEV. 105.75

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
57		Clayey SAND (SC), Brown, moist , loose to dense							
58									
59									
60									
61				12	59.5-61	11-14-19	33		
62									
63		Weathered CHALK (CL), gray, dry, hard.							
64									
65				13	64.5-66	13-21-23	44		
66									
67									
68									
69									
70									
71				14	69.5-71	16-23-50/4	+50		
72									
73									
74			Boring terminated @ 81'						
75									
76				15	74.5-76	28-50/3	+50		
77									
78									
79									
80									
81				16	79.5-81	32-50/3	+50		
82									
83									
84									
85									
86									
87									
88									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D10

Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 76 SURF. ELEV. 104.99  
 LOCATION Sta. 55+00 COORDINATES N 941554.5 E 413384.35  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 15 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/14/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/14/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/14/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From	To	Blows			
0		Clayey SAND (SC), Brown, moist , loose to med dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	35-7	12		
7									
8									
9									
10									
11				2	9.5-11.0	3-4-3	7		
12									
13									
14									
15									
16				3	14.5-16.0	3-5-5	10		
17									
18									
19									
20									
21				4	19.5-21.0	2-4-5	9		
22									
23									
24									





**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. D10  
Sheet 2 of 3

SITE Plant Greene County Dike TOTAL DEPTH 76 SURF.ELEV. 104.99

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist , loose to med dense							
26			5	24.5-26.0	2-4-4	8			
27									
28									
29									
30									
31			6	29.5-31.0	2-3-5	8			
32									
33									
34									
35									
36		7	34.5-36.0	11-8-9	17				
37									
38									
39									
40									
41		8	39.5-41	7-8-10	18				
42									
43									
44									
45									
46		9	44.5-46	6-9-10	19				
47									
48									
49									
50									
51		10	49.5-51	6-7-11	18				
52									
53									
54									
55									
56		11	54.5-56	5-7-9	16				

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D10

Sheet 3 of 3

SITE Plant Greene County Dike TOTAL DEPTH 76 SURF.ELEV. 104.99

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
57		Clayey SAND (SC), Brown, moist , loose to med dense							
58									
59									
60									
61				12	59.5-61	4-6-7	13		
62									
63		Weathered CHALK (CL), gray, dry, hard.							
64									
65				13	64.5-66	22-23-16	39		
66									
67									
68									
69									
70									
71				14	69.5-71	22-32-50/4	+50		
72									
73		Boring terminated @ 76'							
74									
75									
76				15	74.5-76	36-50/3	+50		
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									





**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D11

Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 71 SURF.ELEV. 104.07  
 LOCATION Sta. 56+50 COORDINATES N 941401.17 E 413380.65  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 14 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/14/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/14/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/14/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist, v loose to med dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	6-3-5	8		
7									
8									
9									
10									
11				2	9.5-11.0	4-7-9	16		
12									
13									
14									
15				3	14.5-16.0	4-4-6	10		
16									
17									
18									
19									
20									
21				4	19.5-21.0	5-6-5	11		
22									
23									
24									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D11

Sheet 2 of 3

SITE Plant Greene County Dike TOTAL DEPTH 71 SURF.ELEV. 104.07

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist , v loose to med dense							
26			5	24.5-26.0	3-5-5	10			
27									
28									
29									
30									
31				6	29.5-31.0	3-5-9	14		
32									
33									
34									
35									
36			7	34.5-36.0	7-7-7	14			
37									
38									
39									
40									
41			8	39.5-41	1-5-9	14			
42									
43									
44									
45									
46			9	44.5-46	2-1-3	4			
47									
48									
49									
50		Clayey SAND (SC), gray, moist , med dense							
51			10	49.5-51	5-8-6	14			
52									
53									
54									
55									
56				11	54.5-56	5-6-7	13		





**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D11  
Sheet 3 of 3

SITE Plant Greene County Dike TOTAL DEPTH 71 SURF.ELEV. 104.07

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD	
				From	To	Blows				N
57		Clayey SAND (SC), gray, moist , med dense								
58										
59										
60			Weathered CHALK (CL), gray, dry, v stiff to hard.	12	59.5-61	3-18-32	50			
61										
62										
63										
64										
65										
66				13	64.5-66	16-33-50/4	+50			
67										
68										
69										
70										
71		Boring terminated @ 71'	14	69.5-71	18-42-50/2	+50				
72										
73										
74										
75										
76										
77										
78										
79										
80										
81										
82										
83										
84										
85										
86										
87										
88										





## DRILLING LOG GEOLOGICAL SERVICES

Hole No. D12

Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 61 SURF. ELEV. 94.46  
 LOCATION Sta. 58+00 COORDINATES N 941257.61 E 413398.4  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 12 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/18/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/18/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/18/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist , loose to m dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	6-10-15	25		
7									
8									
9									
10									
11				2	9.5-11.0	8-8-7	15		
12									
13									
14									
15									
16				3	14.5-16.0	4-3-5	8		
17									
18									
19									
20									
21				4	19.5-21.0	3-3-5	8		
22									
23									
24									

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**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. D12

Sheet 2 of 3

SITE Plant Greene County Dike TOTAL DEPTH 61 SURF.ELEV. 94.46

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist , loose to m dense							
26			5	24.5-26.0	5-4-4	8			
27									
28									
29									
30	WET			6	29.5-31.0	4-5-9	14		
31									
32									
33									
34									
35			7	34.5-36.0	6-7-9	16			
36									
37									
38									
39									
40		Weathered CHALK (CL), gray, dry, m stiff to hard.	8	39.5-41	4-5-4	9			
41									
42									
43									
44									
45				9	44.5-46	5-9-11	20		
46									
47									
48									
49									
50				10	49.5-51	17-32-50/4	+50		
51									
52									
53									
54									
55									
56			11	54.5-56	23-30-50/4	+50			





**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D12

Sheet 3 of 3

SITE Plant Greene County Dike

TOTAL DEPTH 61

SURF.ELEV. 94.46

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From	To	Blows			
57		Weathered CHALK (CL), gray, dry, m stiff to hard.							
58									
59									
60									
61			Boring terminated @ 61'	12	59.5-61	14-28-50/3	+50		
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
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88									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D13

Sheet 1 of 3

SITE Plant Greene County Dike HOLE DEPTH 61 SURF. ELEV. 86.46  
 LOCATION Sta. 59+50 COORDINATES N 941116.69 E 413424.89  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 12 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/15/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/15/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/15/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist, v. loose to m dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	4-3-3	6		
7									
8									
9									
10									
11				2	9.5-11.0	2-2-2	4		
12									
13									
14									
15									
16				3	14.5-16.0	4-2-3	5		
17									
18									
19									
20									
21				4	19.5-21.0	2-4-7	7		
22									
23									
24									





**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. D13

Sheet 2 of 3

SITE Plant Greene County Dike

TOTAL DEPTH 61

SURF.ELEV. 86.46

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	ROD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist , v. loose to m dense							
26			5	24.5-26.0	3-8-8	16			
27									
28									
29									
30	WET								
31				6	29.5-31.0	2-4-4	8		
32									
33									
34									
35									
36			7	34.5-36.0	7-8-9	17			
37									
38									
39									
40		Weathered CHALK (CL), gray, dry, stiff to hard.							
41			8	39.5-41	17-32-50/4	+50			
42									
43									
44									
45									
46				9	44.5-46	14-31-45	76		
47									
48									
49									
50									
51				10	49.5-51	19-29-48	77		
52									
53									
54									
55									
56			11	54.5-56	19-32-50/4	+50			

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D13

Sheet 3 of 3

SITE Plant Greene County Dike TOTAL DEPTH 61 SURF.ELEV. 86.46

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From	To	Blows			
57									
58									
59									
60									
61		Boring terminated @ 61'	12	59.5-61	17-50-50/2	+50			
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									

**CONFIDENTIAL**



**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D14

Sheet 1 of 2

SITE Plant Greene County Dike HOLE DEPTH 56 SURF. ELEV. 105.35  
 LOCATION Sta. 42+25 COORDINATES N 942820.95 E 413365.68  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 11 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/19/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/19/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/19/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From	To	Blows			
0		Clayey SAND (SC), Brown, moist, loose to m dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	4-4-3	7		
7									
8									
9									
10									
11				2	9.5-11.0	6-8-8	16		
12									
13									
14									
15									
16				3	14.5-16.0	6-3-3	6		
17									
18									
19									
20									
21				4	19.5-21.0	2-6-7	13		
22									
23									
24									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D15

Sheet 1 of 2

SITE Plant Greene County Dike HOLE DEPTH 51 SURF. ELEV. 105.45  
 LOCATION Sta. 45+25 COORDINATES N 942522.77 E 413368.89  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 10 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/19/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/19/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/19/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist, v soft to v stiff							
1									
2									
3									
4									
5									
6				1	4.5-6.0	5-3-4	7		
7									
8									
9									
10									
11				2	9.5-11.0	3-4-6	10		
12									
13									
14									
15									
16				3	14.5-16.0	4-10-19	29		
17									
18									
19									
20									
21				4	19.5-21.0	4-7-20	27		
22									
23									
24									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D15  
Sheet 2 of 2

SITE Plant Greene County Dike TOTAL DEPTH 51 SURF.ELEV. 105.45

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist , v soft to v stiff							
26			5	24.5-26.0	0-1-2	3			
27									
28									
29									
30									
31				6	29.5-31.0	4-5-10	15		
32									
33									
34									
35									
36			7	34.5-36.0	4-6-8	14			
37									
38									
39									
40									
41			8	39.5-41	6-10-10	20			
42									
43									
44									
45									
46			9	44.5-46	4-6-12	18			
47									
48									
49									
50		Weathered CHALK (CL), gray, dry, hard.							
51		Boring terminated @ 51'	10	49.5-51	16-28-50/4	+50			
52									
53									
54									
55									
56									





**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D16

Sheet 1 of 2

SITE Plant Greene County Dike HOLE DEPTH 56 SURF. ELEV. 105.05  
 LOCATION Sta. 48+25 COORDINATES N 942225.08 E 413370  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 11 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/19/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/19/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/19/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist, loose to m dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	8-8-8	16		
7									
8									
9									
10									
11				2	9.5-11.0	9-9-11	20		
12									
13									
14									
15									
16				3	14.5-16.0	10-4-11	15		
17									
18									
19									
20									
21				4	19.5-21.0	12-8-9	17		
22									
23									
24									





**DRILLING LOG**  
GEOLOGICAL SERVICES

Hole No. D16

Sheet 2 of 2

SITE Plant Greene County Dike TOTAL DEPTH 56 SURF.ELEV. 105.05

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist , loose to m dense							
26			5	24.5-26.0	4-5-3	8			
27									
28									
29									
30									
31				6	29.5-31.0	3-4-6	10		
32									
33									
34									
35									
36			7	34.5-36.0	5-6-7	13			
37									
38									
39									
40									
41			8	39.5-41	6-4-8	12			
42									
43									
44									
45									
46			9	44.5-46	15-12-17	29			
47									
48									
49									
50									
51			10	49.5-51	4-3-5	8			
52									
53									
54									
55		Weathered CHALK (CL), gray, dry, hard.							
56		Boring terminated @ 56'	11	54.5-56	26-33-50/4	+50			

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D17

Sheet 1 of 2

SITE Plant Greene County Dike HOLE DEPTH 46 SURF.ELEV. 94.16  
 LOCATION Sta. 51+25 COORDINATES N 941926.69 E 413338.35  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 9 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/20/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/20/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/20/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist, loose to m dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	3-4-7	11		
7									
8									
9									
10									
11				2	9.5-11.0	3-4-4	8		
12									
13									
14									
15									
16				3	14.5-16.0	6-8-5	13		
17									
18									
19									
20									
21				4	19.5-21.0	2-3-5	8		
22									
23									
24									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D17  
Sheet 2 of 2

SITE Plant Greene County Dike TOTAL DEPTH 46 SURF.ELEV. 94.16

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist, loose to m dense	5	24.5-26.0	2-5-5	10			
26									
27									
28									
29									
30									
31									
32		Weathered CHALK (CL), gray, dry, m stiff to hard.	6	29.5-31.0	5-6-8	14			
33									
34									
35									
36									
37									
38									
39		Boring terminated @ 56'	7	34.5-36.0	4-7-8	15			
40									
41									
42			8	39.5-41	4-3-3	6			
43									
44									
45									
46									
47									
48									
49			9	44.5-46	17-34-50/4	+50			
50									
51									
52									
53									
54									
55									
56									





**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D18  
Sheet 1 of 2

SITE Plant Greene County Dike HOLE DEPTH 56 SURF.ELEV. 94  
 LOCATION Sta. 54+25 COORDINATES N 941619.02 E 413337.62  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 11 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/20/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/20/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/20/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist , loose to dense							
1									
2									
3									
4									
5				1	4.5-6.0	3-4-6	10		
6									
7									
8									
9									
10				2	9.5-11.0	2-3-5	8		
11									
12									
13									
14									
15				3	14.5-16.0	3-3-4	7		
16									
17									
18									
19									
20				4	19.5-21.0	2-2-5	7		
21									
22									
23									
24									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D21  
Sheet 1 of 2

SITE Plant Greene County Dike HOLE DEPTH 46 SURF.ELEV. 98.26  
 LOCATION Sta. 46+75 COORDINATES N 942372.03 E 413221.32  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 9 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/21/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/21/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/21/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist, v loose to m dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	2-3-3	6		
7									
8									
9									
10									
11				2	9.5-11.0	2-1-2	3		
12									
13									
14									
15									
16				3	14.5-16.0	2-1-1	2		
17									
18									
19									
20									
21				4	19.5-21.0	1-2-2	4		
22									
23									
24									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D21  
Sheet 2 of 2

SITE Plant Greene County Dike TOTAL DEPTH 46 SURF.ELEV. 98.26

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test		Comments	% Rec.	RCD	
				From To	Blows				N
25		Clayey SAND (SC), Brown, moist , v loose to m dense							
26			5	24.5-26.0	5-4-5	9			
27									
28									
29									
30									
31				6	29.5-31.0	6-11-8	19		
32									
33									
34									
35									
36			7	34.5-36.0	3-7-9	16			
37									
38									
39									
40									
41			8	39.5-41	3-6-9	15			
42									
43									
44									
45		Weathered CHALK (CL), gray, dry, hard.							
46		Boring terminated @46'	9	44.5-46	22-33-50/4	+50			
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

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## DRILLING LOG GEOLOGICAL SERVICES

Hole No. D22

Sheet 1 of 2

SITE Plant Greene County Dike HOLE DEPTH 41 SURF. ELEV. 94.55  
 LOCATION Sta. 50+00 COORDINATES N 942024.94 E 413243.23  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 8 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/20/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/20/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/20/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		ASH, moist, black							
1									
2									
3									
4									
5									
6				1	4.5-6.0	2-1-1	2		
7									
8									
9									
10									
11				2	9.5-11.0	1-woh-1	1		
12									
13									
14									
15		Clayey SAND (SC), Brown, moist , loose to m dense							
16				3	14.5-16.0	0-3-3	6		
17									
18									
19									
20									
21				4	19.5-21.0	3-4-4	8		
22									
23									
24									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D22

Sheet 2 of 2

SITE Plant Greene County Dike TOTAL DEPTH 41 SURF.ELEV. 94.55

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist , loose to m dense							
26			5	24.5-26.0	5-8-6	14			
27									
28									
29									
30									
31				6	29.5-31.0	6-8-9	17		
32									
33									
34									
35									
36			7	34.5-36.0	4-7-11	18			
37									
38									
39									
40		Weathered CHALK (CL), gray, dry, hard.							
41		Boring terminated @ 41'	8	39.5-41	28-50/4	+50			
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

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**DRILLING LOG**  
**GEOLOGICAL SERVICES**

Hole No. D23

Sheet 1 of 2

SITE Plant Greene County Dike HOLE DEPTH 46 SURF. ELEV. 93.46  
 LOCATION Sta. 52+75 COORDINATES N 941777.95 E 413253.88  
 ANGLE \_\_\_\_\_ BEARING \_\_\_\_\_ CONTRACTOR SCS DRILL NO. CME 550  
 DRILLING METHOD H.S.A. NO. SAMPLES 9 NO. U.D. SAMPLES 0  
 CASING SIZE \_\_\_\_\_ LENGTH \_\_\_\_\_ CORE SIZE \_\_\_\_\_ TOTAL % REC. \_\_\_\_\_  
 WATER TABLE DEPTH \_\_\_\_\_ ELEV. \_\_\_\_\_ TIME AFTER COMP. \_\_\_\_\_ DATE TAKEN 5/20/2009  
 TYPE GROUT \_\_\_\_\_ QUANTITY \_\_\_\_\_ MIX \_\_\_\_\_ DRILLING START DATE 5/20/2009  
 DRILLER S. Milam RECORDER G. Wilson APPROVED \_\_\_\_\_ DRILLING COMP. DATE 5/20/2009

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
0		Clayey SAND (SC), Brown, moist , loose to m dense							
1									
2									
3									
4									
5									
6				1	4.5-6.0	2-1-1	2		
7									
8									
9									
10									
11				2	9.5-11.0	2-4-3	7		
12									
13									
14									
15									
16				3	14.5-16.0	4-6-8	14		
17									
18									
19									
20									
21				4	19.5-21.0	4-5-4	9		
22									
23									
24									

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**DRILLING LOG  
GEOLOGICAL SERVICES**

Hole No. **D23**

Sheet 2 of 2

SITE **Plant Greene County Dike**

TOTAL DEPTH **46**

SURF.ELEV. **93.46**

Depth	Elev.	Material Description, Classification and Remarks	Sample No.	Standard Penetration Test			Comments	% Rec	RQD
				From To	Blows	N			
25		Clayey SAND (SC), Brown, moist , loose to m dense					no sample		
26			5	24.5-26.0	4-11-8	19			
27									
28									
29									
30									
31			6	29.5-31.0	4-5-6	11			
32									
33									
34									
35									
36			7	34.5-36.0					
37									
38									
39									
40									
41		8	39.5-41	5-6-7	13				
42									
43									
44									
45		Weathered CHALK (CL), gray, dry, m stiff to hard.							
46		Boring terminated @ 56'	9	44.5-46	11-23-50/3	+50			
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									

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**APPENDIX B—FLY ASH POND PHOTOGRAPHS**

Photograph 1: East Dike Crest & Inside Slope - South Area, 6/24/2010



Photograph 2: East Dike Crest and Inside Slope – Central Area 6/24/2010



Photograph 3: East Dike Crest & Outside Slope Along Barge Canal View North, 6/24/2010



Photograph 4: East Dike Outside Slope North End 5, 6/24/2010



Photograph 5: East Dike Outside Slope - Animal Burrow, 6/24/2010



Photograph 6: East Dike Outside Slope - Erosion Feature, 6/24/2010



Photograph 7: East Dike Outside Slope Along Barge Canal 5 including erosion at toe, 6/24/2010



Photograph 8: East Dike Outside Slope Central Section Maintenance, 6/24/2010



Photograph 9: Crest of South Dike – East End 6/24/2010



Photograph 10: Crest of South Dike – West End 6/24/2010



Photograph 11: South Dike Outside Slope East End 9, 6/24/2010



Photograph 12: South Dike Widened Outside Slope West End, 6/24/2010



Photograph 13: South Dike Soft Area at Toe Central Section, 6/24/2010



Photograph 14: West Dike Crest – South Section, 6/24/2010



Photograph 15: West Dike Inside Slope Central Section, 6/24/2010



Photograph 16: West Dike Crest – Central Section, 6/24/2010



Photograph 17: West Dike Inside Slope South End View South, 6/24/2010



Photograph 18: West Dike Inside Slope North End View South, 6/24/2010



Photograph 19: West Dike Outside Slope South End, 6/24/2010



Photograph 20: West Dike Downstream Slope – Central Section, 6/24/2010



Photograph 21: West Dike Downstream Slope North Section, 6/24/2010



Photograph 22 North Dike Crest – West End, 6/24/2010



Photograph 23 North Dike Outside Slope – East Section, 6/24/2010



Photograph 24: North Dike Outside Slope – Central Section, 6/24/2010



Photograph 25: Primary Spillway Riser, 6/24/2010



Photograph 26: Primary Spillway Depth Gauge, 6/24/2010



Photograph 27: Spillway Outfall Structure, 2/24/2010



Photograph 28: Primary Riser Spillway Discharge to River, 6/24/2010





Site Name: Greene County Steam Plant Date: 6/24/2010  
 Unit Name: Steam Plant Ash Pond Operator's Name: Alabama Power Company  
 Unit I.D.: \_\_\_\_\_ Hazard Potential Classification: High Significant Low

Inspector's Name: Joseph P. Klein III, P.E. Julia Meline, E.S.T., CFM

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?	<u>Weekly</u>			18. Sloughing or bulging on slopes?		<input checked="" type="checkbox"/>	
2. Pool elevation (operator records)?	<u>87.5</u>			19. Major erosion or slope deterioration?			<input checked="" type="checkbox"/>
3. Decant inlet elevation (operator records)?	<u>87.5</u>			20. Decant Pipes:			
4. Open channel spillway elevation (operator records)?	<u>NA</u>			Is water entering inlet, but not exiting outlet?			<input checked="" type="checkbox"/>
5. Lowest dam crest elevation (operator records)?	<u>91.9</u>			Is water exiting outlet, but not entering inlet?			<input checked="" type="checkbox"/>
6. If instrumentation is present, are readings recorded (operator records)?		<input checked="" type="checkbox"/>		Is water exiting outlet flowing clear?		<input checked="" type="checkbox"/>	
7. Is the embankment currently under construction?			<input checked="" type="checkbox"/>	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)?	<u>N/A</u>			From underdrain?			<input checked="" type="checkbox"/>
9. Trees growing on embankment? (If so, indicate largest diameter below)			<input checked="" type="checkbox"/>	At isolated points on embankment slopes?		<input checked="" type="checkbox"/>	
10. Cracks or scarps on crest?			<input checked="" type="checkbox"/>	At natural hillside in the embankment area?			<input checked="" type="checkbox"/>
11. Is there significant settlement along the crest?			<input checked="" type="checkbox"/>	Over widespread areas?			<input checked="" type="checkbox"/>
12. Are decant trashracks clear and in place?	<input checked="" type="checkbox"/>			From downstream foundation area?			<input checked="" type="checkbox"/>
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?			<input checked="" type="checkbox"/>	"Boils" beneath stream or ponded water?			<input checked="" type="checkbox"/>
14. Clogged spillways, groin or diversion ditches?			<input checked="" type="checkbox"/>	Around the outside of the decant pipe?			<input checked="" type="checkbox"/>
15. Are spillway or ditch linings deteriorated?			<input checked="" type="checkbox"/>	22. Surface movements in valley bottom or on hillside?			<input checked="" type="checkbox"/>
16. Are outlets of decant or underdrains blocked?			<input checked="" type="checkbox"/>	23. Water against downstream toe?		<input checked="" type="checkbox"/>	
17. Cracks or scarps on slopes?			<input checked="" type="checkbox"/>	24. Were Photos taken during the dam inspection?		<input checked="" type="checkbox"/>	

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

Inspection Issue #	Comments
<u>1.</u>	<u>Weekly inspections by Plant personnel. Annual inspections by SCG Hydro Systems dam safety engineers.</u>
<u>8.</u>	<u>Data on foundation preparation not available for early 1960s original construction. Specifications for 2009 Ash Pond East Dike Improvements require removal of all vegetative material within construction footprint and undercutting existing soils and ash to improve embankment foundation.</u>





Coal Combustion Waste (CCW) Impoundment Inspection

Impoundment NPDES Permit # AL 0002917  
Date 6/24/2010

INSPECTOR Joseph P. Klein

Impoundment Name Green Co. Steam Plant Ash Pond  
Impoundment Company Alabama Power Co.  
EPA Region 4  
State Agency (Field Office) Address \_\_\_\_\_

Name of Impoundment Greene County Steam Plant Ash Pond  
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New \_\_\_\_\_ Update

	Yes	No
Is impoundment currently under construction?	_____	<input checked="" type="checkbox"/>
Is water or ccw currently being pumped into the impoundment?	<input checked="" type="checkbox"/>	_____

IMPOUNDMENT FUNCTION: Coal Combustion Waste Storage

Nearest Downstream Town : Name Demopolis, AL  
Distance from the impoundment 7 miles

Impoundment Location: Longitude -87 Degrees 47 Minutes 18.41 Seconds  
Latitude 32 Degrees 35 Minutes 39.16 Seconds  
State AL County Greene

Does a state agency regulate this impoundment? YES  NO \_\_\_\_\_ [Discharge Only]

If So Which State Agency? Alabama Department of Environmental

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

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

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

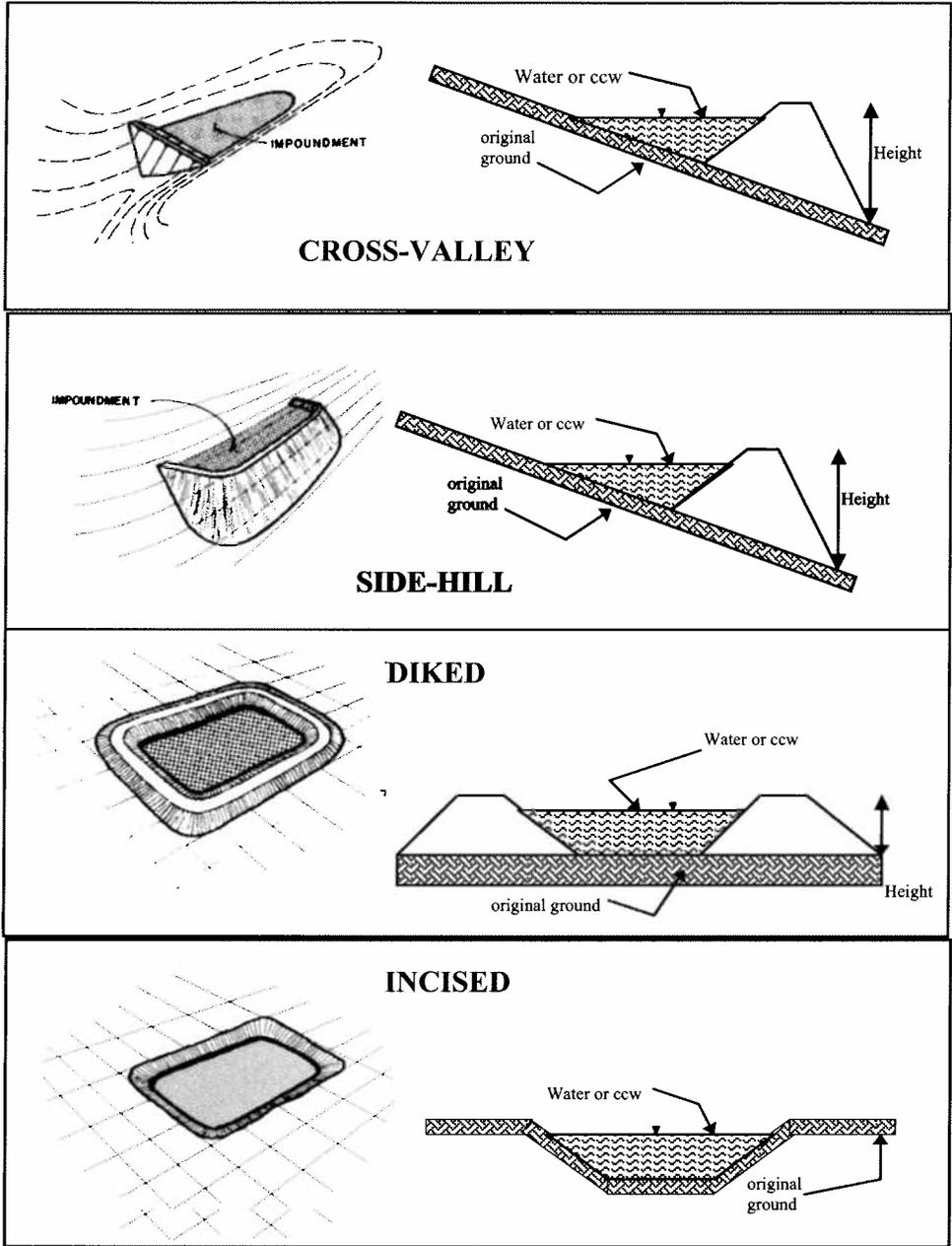
✓ \_\_\_\_\_ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other 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:**

*Based on height of dam and distance to occupied housing failure or misoperation probably would not result in loss of life. However, failure or misoperation probably would result in economic loss and/or environmental damage due to release of ash into the barge canal / Black Warrior River on the east side of the impoundment or the swamp/wetland area along the west side of the impoundment.*

**CONFIGURATION:**



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

Embankment Height 25 feet      Embankment Material Clayey SAND  
 Pool Area 474 acres      Liner None  
 Current Freeboard 4.4 feet      Liner Permeability N/A

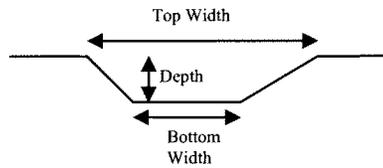
**TYPE OF OUTLET** (Mark all that apply)

       **Open Channel Spillway**

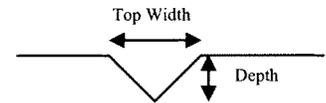
- Trapezoidal
- Triangular
- Rectangular
- Irregular

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

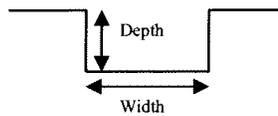
TRAPEZOIDAL



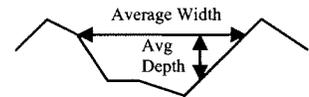
TRIANGULAR



RECTANGULAR



IRREGULAR

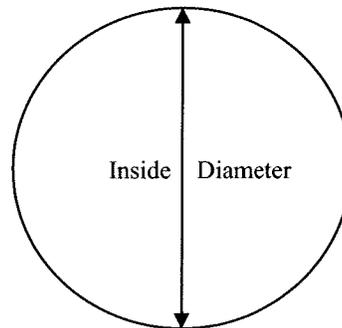


**Outlet**

30 " inside diameter

**Material**

- corrugated metal
- welded steel
- concrete
- plastic (hdpe, pvc, etc.)
- other (specify) \_\_\_\_\_



Is water flowing through the outlet? YES \_\_\_\_\_ NO

       **No Outlet**

       **Other Type of Outlet (specify)** \_\_\_\_\_

The Impoundment was Designed By Alabama Power Company





